

# SIEMENS

## Product data sheet

**6ES7331-7KB02-0AB0**


SIMATIC S7-300, ANALOG INPUT SM 331,  
OPTICALLY ISOLATED, 2 AI,  
9/12/14 BITS RESOLUTION,  
U/I/THERMOCOUPLE/RESISTANCE, INTERRUPT,  
DIAGNOSTICS, 1 X 20 PIN,  
REMOVE/INSERT W. 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.	80 mA
from backplane bus 5 V DC, max.	50 mA
Power losses	
Power loss, typ.	1.3 W
Analog inputs	
Number of analog inputs	2
Number of analog inputs 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
<b>Input ranges</b>	
Voltage	Yes
Current	Yes
Thermocouple	Yes
Resistance thermometer	Yes
Resistance	Yes
<b>Input ranges (rated values), voltages</b>	
0 to +10 V	No
1 to 5 V	Yes
Input resistance (1 to 5 V)	100 k $\Omega$
1 to 10 V	No
-1 V to +1 V	Yes
Input resistance (-1 V to +1 V)	10 M $\Omega$
-10 V to +10 V	Yes
Input resistance (-10 V to +10 V)	100 k $\Omega$
-2.5 V to +2.5 V	Yes
Input resistance (-2.5 V to +2.5 V)	100 k $\Omega$
-250 mV to +250 mV	Yes
Input resistance (-250 mV to +250 mV)	10 M $\Omega$
-5 V to +5 V	Yes
Input resistance (-5 V to +5 V)	100 k $\Omega$
-50 mV to +50 mV	No
-500 mV to +500 mV	Yes
Input resistance (-500 mV to +500 mV)	10 M $\Omega$
-80 mV to +80 mV	Yes
Input resistance (-80 mV to +80 mV)	10 M $\Omega$
<b>Input ranges (rated values), currents</b>	
0 to 20 mA	Yes
Input resistance (0 to 20 mA)	25 $\Omega$
-10 to +10 mA	Yes
Input resistance (-10 to +10 mA)	25 $\Omega$
-20 to +20 mA	Yes

Input resistance (-20 to +20 mA)	25 $\Omega$
-3.2 to +3.2 mA	Yes
Input resistance (-3.2 to +3.2 mA)	25 $\Omega$
4 to 20 mA	Yes
Input resistance (4 to 20 mA)	25 $\Omega$
<b>Input ranges (rated values), thermoelements</b>	
Type B	No
Type E	Yes
Input resistance (Type E)	10 M $\Omega$
Type J	Yes
Input resistance (type J)	10 M $\Omega$
Type K	Yes
Input resistance (Type K)	10 M $\Omega$
Type L	No
Type N	Yes
Input resistance (Type N)	10 M $\Omega$
Type R	No
Type S	No
Type T	No
Type U	No
Type TXK/TXK(L) to GOST	No
<b>Input ranges (rated values), resistance thermometers</b>	
Cu 10	No
Ni 100	Yes
Input resistance (Ni 100)	10 M $\Omega$ ; Standard
Ni 1000	No
LG-Ni 1000	No
Ni 120	No
Ni 200	No
Ni 500	No
Pt 100	Yes
Input resistance (Pt 100)	10 k $\Omega$ ; Standard
Pt 1000	No

Pt 200	No
Pt 500	No
<b>Input ranges (rated values), resistors</b>	
0 to 150 ohms	Yes
Input resistance (0 to 150 ohms)	10 MΩ
0 to 300 ohms	Yes
Input resistance (0 to 300 ohms)	10 MΩ
0 to 600 ohms	Yes
Input resistance (0 to 600 ohms)	10 MΩ
0 to 6000 ohms	No
<b>Thermocouple (TC)</b>	
for thermocouples	Type E, J, K, L, N
<b>Temperature compensation</b>	
Parameterizable	Yes
internal temperature compensation	Yes
external temperature compensation with compensations socket	Yes
<b>Resistance thermometer (RTD)</b>	
<b>Characteristic linearization</b>	
for resistance thermometer	Pt100 (standard, climatic range), Ni100 (standard, climatic range)
<b>Characteristic linearization</b>	
Parameterizable	Yes
<b>Cable length</b>	
Cable length, shielded, max.	200 m ; 50 m at 80 mV and thermocouples
<b>Analog value creation</b>	
Measurement principle	integrating
<b>Integrations and conversion time/ resolution per channel</b>	
Resolution with overrange (bit including sign), max.	15 bit ; Unipolar: 9/12/12/14 bits; bipolar: 9 bits + sign/12 bits + sign/12 bits + sign/14 bits + sign
Integration time, parameterizable	Yes ; 2.5/ 16.67/ 20/ 100 ms
Basic conversion time, ms	3 / 17 / 22 /102 ms
Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10 Hz

Encoder	
Connection of signal encoders	
for current measurement as 2-wire transducer	Yes
for current measurement as 4-wire transducer	Yes
for resistance measurement with 2-conductor connection	Yes
for resistance measurement with 3-conductor connection	Yes
for resistance measurement with 4-conductor connection	Yes
Errors/accuracies	
Operational limit in overall temperature range	
Voltage, relative to input area	+/- 1 % ; +/-1% (80 mV); +/-0.6% (250 to 1000 mV); +/-0.8% (2.5 to 10 V)
Current, relative to input area	+/- 0,7 % ; From 3.2 to 20 mA
Impedance, relative to input area	+/- 0,7 % ; 150, 300, 600 Ohm
Resistance-type thermometer, relative to input area	+/- 0,7 % ; +/-0.7% (Pt100/ Ni100); +/-0.8% (Pt100 climate)
Basic error limit (operational limit at 25 °C)	
Voltage, relative to input area	+/- 0,6 % ; +/-0.6% (80 mV, 2.5 to 10 V); +/-0.4% (250 to 1000 mV)
Current, relative to input area	+/- 0,5 % ; 3.2 to 20 mA
Impedance, relative to input area	+/- 0,5 % ; 150, 300, 600 Ohm
Resistance-type thermometer, relative to input area	+/- 0,6 % ; +/-0.5% (Pt100/ Ni100); +/-0.6% (Pt100 climate)
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Interrupts/diagnostics/status information	
Alarms	
Diagnostic alarm	Yes
Limit value alarm	Yes ; Parameterizable, channel 0
Diagnostic messages	
Diagnostic functions	Yes ; Parameterizable
Diagnostic information readable	Yes

Diagnostics	Yes
Group error	Yes
<b>Diagnostics indication LED</b>	
Group error SF (red)	Yes
<b>Galvanic isolation</b>	
<b>Galvanic isolation analog inputs</b>	
between the channels	No
between the channels and the backplane bus	Yes
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Connection method</b>	
required front connector	20-pin
<b>Dimensions</b>	
Width	40 mm
Height	125 mm
Depth	120 mm
<b>Weight</b>	
Weight, approx.	250 g
Status	Jul 17, 2012