SIEMENS

Data sheet 6ES7331-7KB02-0AB0

Figure similar

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

● parameterizable	Yes
— for thermocouples	Type E, J, K, L, N
— for resistance thermometer	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.	15 bit; Unipolar: 9/12/12/14 bit; bipolar: 9 bit + sign/12 bit + sign/12 bit + sign/14 bit + 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 voltage measurement	Yes
● for current measurement as 2-wire transducer	Yes
● 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, (+/-)	1 %; ±1% (80 mV); ±0.6% (250 mV to 1 000 mV); ±0.8% (2.5 V to 10 V)
● Current, relative to input range, (+/-)	0.7 %; From 3.2 to 20 mA
● Resistance, relative to input range, (+/-)	0.7 %; 150, 300, 600 Ohm
● Resistance thermometer, relative to input range, (+/-)	0.7 %; ±0.7 % (Pt100/ Ni100); ±0.8 % (Pt100 climate)
● Thermocouple, relative to input range, (+/-)	1.1 %; Type E, J, K, L, N
Basic error limit (operational limit at 25 °C)	
● Voltage, relative to input range, (+/-)	0.6 %; ±0.6% (80 mV, 2.5 V to 10 V); ±0.4% (250 mV to 1 000 mV)
● Current, relative to input range, (+/-)	0.5 %; 3.2 to 20 mA
● Resistance, relative to input range, (+/-)	0.5 %; 150, 300, 600 Ohm
● Resistance thermometer, relative to input range, (+/-)	0.6 %; ±0.5% (Pt100/ Ni100), ±0.6% (Pt100 climate)
● Thermocouple, relative to input range, (+/-)	0.7 %; Type E, N, J, K, L
Interrupts/diagnostics/status information	
Diagnostics function	Yes; Parameterizable
Alarms	
● Diagnostic alarm	Yes
● Limit value alarm	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	No
● between the channels and backplane bus	Yes
● between the channels and the power supply of the electronics	Yes; Not for 2-wire transmitters
Isolation	
Isolation tested with	500 V DC
connection method	
required front connector	20-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	250 g
Classifications	

		Version	Classification

eClass	14	27-24-22-01
eClass	12	27-24-22-01
eClass	9.1	27-24-22-01
eClass	9	27-24-22-01
eClass	8	27-24-22-01
eClass	7.1	27-24-22-01
eClass	6	27-24-22-01
ETIM	9	EC001420
ETIM	8	EC001420
ETIM	7	EC001420
IDEA	4	3562
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval

Miscellaneous

Manufacturer Declaration

Metrological Approval

General Product Approval	EMV	For use in hazardous locations

FM

For use in hazardous locations					Maritime application

Miscellaneous

CCC-Ex

Maritime application

NK / Nippon Kaiji Kyokai

CCS (China Classification Society)

last modified: 4/7/2025