

SIPLUS S7-300 SM 331 20-pole -25...+70 °C With conformal coating
Based on 6ES7331-7KF02-0AB0 . Analog input isolated 8 AI, resol.
9/12/14 bits, U/I/thermocouple/resistor, alarm, diagnostics, 1x 20-
pole Removing/inserting with active backplane bus



Figure similar

Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V; A power supply according to EN 50155 shall be used for railway applications
• Reverse polarity protection	Yes
Input current	
from load voltage L+ (without load), max.	200 mA
from backplane bus 5 V DC, max.	50 mA
Power loss	
Power loss, typ.	1 W
Analog inputs	
Number of analog inputs	8
• For resistance measurement	4
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 k Ω
• 1 V to 10 V	No
• -1 V to +1 V	Yes
— Input resistance (-1 V to +1 V)	10 M Ω
• -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	100 k Ω
• -2.5 V to +2.5 V	Yes
— Input resistance (-2.5 V to +2.5 V)	100 k Ω
• -250 mV to +250 mV	Yes
— Input resistance (-250 mV to +250 mV)	10 M Ω
• -5 V to +5 V	Yes
— Input resistance (-5 V to +5 V)	100 k Ω
• -50 mV to +50 mV	No
• -500 mV to +500 mV	Yes
— Input resistance (-500 mV to +500 mV)	10 M Ω
• -80 mV to +80 mV	Yes
— Input resistance (-80 mV to +80 mV)	10 M Ω
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 C	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; Standard
— Input resistance (Ni 100)	10 MΩ
• Ni 1000	No
• LG-Ni 1000	No
• Ni 120	No
• Ni 200	No
• Ni 500	No
• Pt 100	Yes; Standard
— Input resistance (Pt 100)	10 MΩ
• 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
• 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) @ 0 ... +60 °C; ±1.3% (80 mV); ±0.8% (250 mV to 1 000 mV); ±1% (2.5 V to 10 V) @ -25 ... +70 °C
• Current, relative to input range, (+/-)	0.7 %; @ 0 ... +60 °C; ±0.9% @ -25 ... +70 °C; from 3.2 mA to 20 mA
• Resistance, relative to input range, (+/-)	0.7 %; @ 0 ... +60 °C; ±0.9% @ -25 ... +70 °C; 150, 300, 600 ohm
• Resistance thermometer, relative to input range, (+/-)	0.7 %; ±0.7 % (Pt100 / Ni100); ±0.8 % (Pt100 climate) @ 0 ... +60 °C; ±0.9 % (Pt100 / Ni100); ±1 % (Pt100 climate) @ -25 ... +70 °C
• Thermocouple, relative to input range, (+/-)	1.1 %; @ 0 ... +60 °C; ±1.3% @ -25 ... +70 °C; type E, J, K, L, N
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.6 %; ±0.4 % (250 mV to 1 000 mV); ±0.6 % (2.5 mV to 10 mV); ±0.7 % (80 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 %; $\pm 0.5\%$ (Pt100/ Ni100), $\pm 0.6\%$ (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; Parameterizable, channels 0 and 2
• Limit value alarm	Yes; Parameterizable
Diagnostic messages	
• 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

Isolation

Isolation tested with	500 V DC
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Standards, approvals, certificates

CE mark	Yes
UL approval	Yes; File E239877
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
Railway application	
• EN 50155	Yes; Sections 4, 5 and 12; no further agreements apply; T1, Category 1, Class A/B, EN 50155:2007 (see SIOS entry 109755985)

Ambient conditions

Ambient temperature during operation	
• min.	-25 °C; = Tmin
• max.	70 °C; = Tmax; for use on railway vehicles according to EN50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/ULhaz/ATEX/FM use applies
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	5 000 m

• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
Use in stationary industrial systems	
— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust; *
Use on land craft, rail vehicles and special-purpose vehicles	
— to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
— to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 50155 (ST2); *
— to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
Use on ships/at sea	
— to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
— to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *
Usage in industrial process technology	
— Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
— Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
— Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Connection method	
required front connector	20-pin
Dimensions	
Width	40 mm
Height	125 mm

Depth	120 mm
Weights	
Weight, approx.	250 g
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