

SIPLUS S7-300 SM331 20-POLE -25 ... +70 DGR C WITH CONFORMAL COATING CONFORMITY WITH EN50155 T1 KAT 1 KL A/B BASED ON 6ES7331-7KF02-0AB0 . ANALOG INPUT GALVANICALLY ISOLATED 8 AI, AUFL. 9/12/14 BIT, U/I/THERMOEL./RESISTOR, ALARM, DIAGNOSTICS, 1 X 20-POLE, REMOVE/INSERT W.ACT. BACKPLANE BUS



Figure similar

| Supply voltage  |  |
|---|--|
| Load voltage L+   |  |
| • Rated value (DC)  | 24 V   |
| • 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  |

| 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 $\Omega$ |
| • 1 V 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 $\Omega$  |
| Input ranges (rated values), currents      |                |
| • 0 to 20 mA                               | Yes            |
| • Input resistance (0 to 20 mA)            | 25 $\Omega$    |
| • -10 mA to +10 mA                         | Yes            |
| • Input resistance (-10 mA to +10 mA)      | 25 $\Omega$    |
| • -20 mA to +20 mA                         | Yes            |
| • Input resistance (-20 mA to +20 mA)      | 25 $\Omega$    |
| • -3.2 mA to +3.2 mA                       | Yes            |
| • Input resistance (-3.2 mA to +3.2 mA)    | 25 $\Omega$    |
| • 4 mA to 20 mA                            | Yes            |
| • Input resistance (4 mA to 20 mA)         | 25 $\Omega$    |
| 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            |
| <b>Input ranges (rated values), resistance thermometer</b>    |               |
| • 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            |
| <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>                                      |               |
| <b>Temperature compensation</b>                               |               |
| — parameterizable   | Yes           |
| — internal temperature compensation                           | Yes           |
| — external temperature compensation with compensations socket | Yes           |

| Characteristic linearization   |  |
|--|--|
| <ul style="list-style-type: none"> <li>parameterizable <ul style="list-style-type: none"> <li>— for thermocouples</li> <li>— for resistance thermometer</li> </ul> </li> </ul>   | <p>Yes</p> <p>Type E, J, K, L, N</p> <p>Pt100 (standard, climatic range), Ni100 (standard, climatic range)</p>   |
| Cable length   |  |
| <ul style="list-style-type: none"> <li>shielded, max.</li> </ul>   | 200 m; 50 m at 80 mV and thermocouples   |
| Analog value generation for the inputs   |  |
| Measurement principle  | integrating  |
| Integration and conversion time/resolution per channel   |  |
| <ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> <li>Integration time, parameterizable</li> <li>Interference voltage suppression for interference frequency f1 in Hz</li> </ul>  | <p>15 bit; Unipolar: 9/12/12/14 bit; bipolar: 9 bit + sign/12 bit + sign/12 bit + sign/14 bit + sign</p> <p>Yes; 2,5 / 16,67 / 20 / 100 ms</p> <p>400 / 60 / 50 / 10 Hz</p>  |
| Encoder  |  |
| Connection of signal encoders  |  |
| <ul style="list-style-type: none"> <li>for current measurement as 2-wire transducer</li> <li>for current measurement as 4-wire transducer</li> <li>for resistance measurement with two-wire connection</li> <li>for resistance measurement with three-wire connection</li> <li>for resistance measurement with four-wire connection</li> </ul> | <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>   |
| Errors/accuracies  |  |
| Operational error limit in overall temperature range   |  |
| <ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> <li>Current, relative to input range, (+/-)</li> <li>Resistance, relative to input range, (+/-)</li> <li>Resistance thermometer, relative to input range, (+/-)</li> </ul>   | <p>1 %; <math>\pm 1\%</math> (80 mV); <math>\pm 0.6\%</math> (250 mV to 1 000 mV); <math>\pm 0.8\%</math> (2.5 V to 10 V) @ 0 ... +60 °C; <math>\pm 1.3\%</math> (80 mV); <math>\pm 0.8\%</math> (250 mV to 1 000 mV); <math>\pm 1\%</math> (2.5 V to 10 V) @ -25 ... +70 °C</p> <p>0.7 %; @ 0 ... +60 °C; <math>\pm 0.9\%</math> @ -25 ... +70 °C; from 3.2 mA to 20 mA</p> <p>0.7 %; @ 0 ... +60 °C; <math>\pm 0.9\%</math> @ -25 ... +70 °C; 150, 300, 600 ohm</p> <p>0.7 %; <math>\pm 0.7\%</math> (Pt100 / Ni100); <math>\pm 0.8\%</math> (Pt100 climate) @ 0 ... +60 °C; <math>\pm 0.9\%</math> (Pt100 / Ni100); <math>\pm 1\%</math> (Pt100 climate) @ -25 ... +70 °C</p> |
| Basic error limit (operational limit at 25 °C)   |  |
| <ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> <li>Current, relative to input range, (+/-)</li> <li>Resistance, relative to input range, (+/-)</li> <li>Resistance thermometer, relative to input range, (+/-)</li> </ul>   | <p>0.6 %; <math>\pm 0.4\%</math> (250 mV to 1 000 mV); <math>\pm 0.6\%</math> (2.5 mV to 10 mV); <math>\pm 0.7\%</math> (80 mV)</p> <p>0.5 %; 3.2 to 20 mA</p> <p>0.5 %; 150, 300, 600 Ohm</p> <p>0.6 %; <math>\pm 0.5\%</math> (Pt100/ Ni100), <math>\pm 0.6\%</math> (Pt100 climate)</p>   |
| Interrupts/diagnostics/status information  |  |

|   |  |
|---|--|
| Diagnostic functions  | Yes; Parameterizable   |
| <b>Alarms</b>   |  |
| • Diagnostic alarm  | Yes; Parameterizable, channels 0 and 2   |
| • Limit value alarm   | Yes; Parameterizable   |
| <b>Diagnostic messages</b>  |  |
| • Diagnostic information readable                                       | Yes  |
| <b>Diagnostics indication LED</b>                                       |  |
| • Group error SF (red)  | Yes  |
| <b>Potential separation</b>   |  |
| <b>Potential separation analog inputs</b>                               |  |
| • between the channels and backplane bus                                | Yes  |
| <b>Isolation</b>  |  |
| Isolation tested with   | 500 V DC   |
| <b>Standards, approvals, certificates</b>                               |  |
| CE mark   | Yes  |
| UL approval   | Yes; File E239877  |
| FM approval   | Yes; CofC 3028431  |
| RCM (formerly C-TICK)   | Yes  |
| KC approval   | Yes  |
| EAC (formerly Gost-R)   | Yes  |
| <b>Railway application</b>  |  |
| • EN 50121-4  | No   |
| • EN 50155  | Yes; T1 Category 1 Class A/B horizontal mounting position  |
| <b>Ambient conditions</b>   |  |
| <b>Ambient temperature during operation</b>                             |  |
| • 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                           |
| <b>Ambient temperature during storage/transportation</b>                |  |
| • min.  | -40 °C   |
| • max.  | 70 °C  |
| <b>Extended ambient conditions</b>                                      |  |
| <b>Relative humidity</b>  |  |
| — With condensation, tested in accordance with IEC 60068-2-38, max.     | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions)  |
| <b>Resistance</b>   |  |
| — against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request   |
| — against chemically active substances / conformity with EN 60721-3-3   | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |

— against mechanically active substances /  
conformity with EN 60721-3-3

Yes; Class 3S4 incl. sand, dust. The supplied connector covers  
must remain on 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

**last modified:** 05/31/2017