

SIPLUS S7-300 SM 331-20-pole -25...+70°C with conformal coating based on 6ES7331-7KB02-0AB0 . Analog input isolated 2 AI, Resolution 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                                                           |
| • 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 loss                                                            |                                                                |
| Power loss, typ.                                                      | 1.3 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                                                          |

| 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 E                                   | Yes            |
| • Input resistance (Type E)                | 10 M $\Omega$  |
| • 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                                                    |
| • Pt 100                                                      | Yes                                                                |
| • Input resistance (Pt 100)                                   | 10 kΩ; Standard                                                    |
| 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                        |                                                                    |
| Measurement principle                                         | integrating                                                        |
| Integration and conversion time/resolution per channel        |                                                                    |

- Resolution with overrange (bit including sign), max.
- Integration time, parameterizable
- 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  
 400 / 60 / 50 / 10 Hz

## Encoder

### Connection of signal encoders

- 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

## Errors/accuracies

### Operational error limit in overall temperature range

- Voltage, 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 ... +60 °C;  $\pm 1.3\%$  (80 mV);  $\pm 0.8\%$  (250 mV to 1 000 mV);  $\pm 1\%$  (2.5 V to 10 V) @ -25 ... +70 °C
- Current, relative to input range, (+/-) 0.7 %; @ 0 ... +60 °C;  $\pm 0.9\%$  @ -25 ... +70 °C; from 3.2 mA to 20 mA
- Resistance, relative to input range, (+/-) 0.7 %; @ 0 ... +60 °C;  $\pm 0.9\%$  @ -25 ... +70 °C; 150, 300, 600 ohm
- Resistance thermometer, relative to input range, (+/-) 0.7 %;  $\pm 0.7\%$  (Pt100 / Ni100);  $\pm 0.8\%$  (Pt100 climate) @ 0 ... +60 °C;  $\pm 0.9\%$  (Pt100 / Ni100);  $\pm 1\%$  (Pt100 climate) @ -25 ... +70 °C

### Basic error limit (operational limit at 25 °C)

- Voltage, 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)
- 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)

## Interrupts/diagnostics/status information

Diagnostics function Yes; Parameterizable

### Alarms

- Diagnostic alarm Yes
- Limit value alarm Yes; Parameterizable, channel 0

### Diagnostic messages

- Diagnostic information readable Yes

### Diagnostics indication LED

- Group error SF (red) Yes

## Potential separation

|                                                                     |                                                                                                                                                                                                                 |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Potential separation analog inputs                                  |                                                                                                                                                                                                                 |
| • between the channels and backplane bus                            | Yes                                                                                                                                                                                                             |
| Isolation                                                           |                                                                                                                                                                                                                 |
| Isolation tested with                                               | 500 V DC                                                                                                                                                                                                        |
| 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 50121-4                                                        | No                                                                                                                                                                                                              |
| • EN 50155                                                          | No                                                                                                                                                                                                              |
| Ambient conditions                                                  |                                                                                                                                                                                                                 |
| Ambient temperature during operation                                |                                                                                                                                                                                                                 |
| • min.                                                              | -25 °C; = Tmin                                                                                                                                                                                                  |
| • max.                                                              | 70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use                                                                                                                                                                  |
| 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 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                                                                                          |
| — Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04                | Yes                                                                                          |
| 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                                                                                        |
| <b>last modified:</b>                                                                                       | 08/15/2019                                                                                   |