

# SIEMENS

## Product data sheet

**6ES7331-1KF02-0AB0**


SIMATIC S7-300, ANALOG INPUT SM 331,  
OPTICALLY ISOLATED, 8 AI,  
13 BIT RESOLUTION,  
U//RESISTANCE/PT100, NI100, NI1000,  
LG-NI1000, PTC / KTY,  
66 MS MODULE UPDATE, 1 X 40 PIN

| Input current   |   |
|---|---|
| from backplane bus 5 V DC, max.                                       | 90 mA                                     |
| Power losses  |   |
| Power loss, typ.  | 0.4 W                                     |
| Analog inputs   |   |
| Number of analog inputs   | 8   |
| Number of analog inputs for resistance measurement                    | 8   |
| permissible input voltage for voltage input (destruction limit), max. | 30 V ; 12 V continuous, 30 V for max. 1 s |
| permissible input current for current input (destruction limit), max. | 40 mA                                     |
| Input ranges  |   |
| Voltage   | Yes                                       |
| Current   | Yes                                       |
| Thermocouple  | No  |

|  |                |
|--|----------------|
| Resistance thermometer                             | Yes            |
| Resistance   | Yes            |
| <b>Input ranges (rated values), voltages</b>       |                |
| 0 to +10 V   | Yes            |
| Input resistance (0 to 10 V)                       | 100 k $\Omega$ |
| 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)                    | 100 k $\Omega$ |
| -10 V to +10 V                                     | Yes            |
| Input resistance (-10 V to +10 V)                  | 100 k $\Omega$ |
| -2.5 V to +2.5 V                                   | No             |
| -250 mV to +250 mV                                 | No             |
| -5 V to +5 V                                       | Yes            |
| Input resistance (-5 V to +5 V)                    | 100 k $\Omega$ |
| -50 mV to +50 mV                                   | Yes            |
| Input resistance (-50 mV to +50 mV)                | 100 k $\Omega$ |
| -500 mV to +500 mV                                 | Yes            |
| Input resistance (-500 mV to +500 mV)              | 100 k $\Omega$ |
| -80 mV to +80 mV                                   | No             |
| <b>Input ranges (rated values), currents</b>       |                |
| 0 to 20 mA   | Yes            |
| Input resistance (0 to 20 mA)                      | 100 $\Omega$   |
| -10 to +10 mA                                      | No             |
| -20 to +20 mA                                      | Yes            |
| Input resistance (-20 to +20 mA)                   | 100 $\Omega$   |
| -3.2 to +3.2 mA                                    | No             |
| 4 to 20 mA   | Yes            |
| Input resistance (4 to 20 mA)                      | 100 $\Omega$   |
| <b>Input ranges (rated values), thermoelements</b> |                |
| Type B   | No             |
| Type E   | No             |

|   |                        |
|---|------------------------|
| Type J  | No                     |
| Type K  | No                     |
| Type L  | No                     |
| Type N  | No                     |
| 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 ; Standard/climate |
| Input resistance (Ni 100)                                   | 100 MΩ                 |
| Ni 1000   | Yes                    |
| Input resistance (Ni 1000)                                  | 100 MΩ                 |
| LG-Ni 1000  | Yes ; Standard/climate |
| Input resistance (LG-Ni 1000)                               | 100 MΩ                 |
| Ni 120  | No                     |
| Ni 200  | No                     |
| Ni 500  | No                     |
| Pt 100  | Yes ; Standard/climate |
| Input resistance (Pt 100)                                   | 100 MΩ                 |
| Pt 1000   | No                     |
| Pt 200  | No                     |
| Pt 500  | No                     |
| <b>Input ranges (rated values), resistors</b>               |                        |
| 0 to 150 ohms   | No                     |
| 0 to 300 ohms   | No                     |
| 0 to 600 ohms   | Yes                    |
| Input resistance (0 to 600 ohms)                            | 100 MΩ                 |
| 0 to 6000 ohms  | Yes                    |
| Input resistance (0 to 6000 ohms)                           | 100 MΩ                 |
| <b>Thermocouple (TC)</b>                                    |                        |

|  |  |
|--|--|
| for thermocouples  | No   |
| <b>Temperature compensation</b>                                      |  |
| Parameterizable  | No   |
| internal temperature compensation                                    | No   |
| external temperature compensation with compensations socket          | No   |
| <b>Resistance thermometer (RTD)</b>                                  |  |
| <b>Characteristic linearization</b>                                  |  |
| for resistance thermometer   | yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con. |
| <b>Characteristic linearization</b>                                  |  |
| Parameterizable  | Yes  |
| <b>Cable length</b>  |  |
| Cable length, shielded, max.   | 200 m ; max. 50 m at 50 mV   |
| <b>Analog value creation</b>   |  |
| Measurement principle  | integrating  |
| <b>Integrations and conversion time/ resolution per channel</b>      |  |
| Resolution with overrange (bit including sign), max.                 | 13 bit   |
| Integration time, parameterizable                                    | Yes ; 60 / 50 ms   |
| Basic conversion time, ms  | 66 / 55 ms   |
| Interference voltage suppression for interference frequency f1 in Hz | 50 / 60 Hz   |
| <b>Encoder</b>   |  |
| <b>Connection of signal encoders</b>                                 |  |
| for current measurement as 2-wire transducer                         | Yes ; with external supply   |
| 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  |
| <b>Errors/accuracies</b>   |  |
| Operational limit in overall temperature range                       |  |

|   |  |
|---|--|
| Voltage, relative to input area                                 | +/- 0,6 % ; +/-0.6% (+/-5 V, 10 V, 1 to 5 V, 0 to 10 V);<br>+/-0.5% (+/-50 mV, 500 mV, 1 V)                                      |
| Current, relative to input area                                 | +/- 0,5 % ; +/-20 mA, 0 to 20 mA, 4 to 20 mA   |
| Impedance, relative to input area                               | +/- 0,5 % ; 0 to 6 kohms, 0 to 600 kohms   |
| Resistance-type thermometer, relative to input area             | 1 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic); 1.2 Kelvin (Pt100, Ni100, standard) |
| <b>Basic error limit (operational limit at 25 °C)</b>           |  |
| Voltage, relative to input area                                 | +/- 0,4 % ; 0.4% (+/-5 V, 10 V, 1 to 5 V, 0 to 10 V);<br>0.3% (+/-50 mV, 500 mV, 1 V)  |
| Current, relative to input area                                 | +/- 0,3 % ; +/-20 mA, 0 to 20 mA, 4 to 20 mA   |
| Impedance, relative to input area                               | +/- 0,3 % ; 0 to 6 kohms, 0 to 600 kohms   |
| Resistance-type thermometer, relative to input area             | 1 Kelvin (Pt100, Ni100, standard); 0.8 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic) |
| <b>Isochronous mode</b>   |  |
| Isochronous operation (application synchronized up to terminal) | No   |
| <b>Interrupts/diagnostics/status information</b>                |  |
| <b>Alarms</b>   |  |
| Diagnostic alarm  | No   |
| Limit value alarm   | No   |
| <b>Diagnostic messages</b>                                      |  |
| Diagnostic functions  | No   |
| Diagnostic information readable                                 | No   |
| Diagnostics   | No   |
| Group error   | No   |
| <b>Diagnostics indication LED</b>                               |  |
| Group error SF (red)  | No   |
| <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   |

| Connection method        |              |
|--------------------------|--------------|
| required front connector | 40-pin       |
| Dimensions               |              |
| Width                    | 40 mm        |
| Height                   | 125 mm       |
| Depth                    | 117 mm       |
| Weight                   |              |
| Weight, approx.          | 250 g        |
| Status                   | Jul 17, 2012 |