

## 331-1KF01 - AI 8x13Bit - Technical Data

Module name	VIPA 331-1KF01
Dimensions and Weight	
Dimensions (WxHxD in mm)	40x125x120
Weight	ca. 205g
Data for specific module	
Number of inputs	8
- for 4wire resistance-type sensor	8
Length of cable	
- shielded	200m / 50m at measuring range $\pm 50\text{mV}$
Programming specifications	
Input data	8Words
Parameter data	14Byte
Diagnostic data	-
Voltages, Currents, Potentials	
Constant current for resistance-type sensor	
- resistance thermometer and resistance measurement 0 ... 600 $\Omega$	0.83mA
- resistance measurement 0 ... 6k $\Omega$	0.25mA
Isolation	
- between channels and backplane bus	yes
- between the channels	no
Permitted potential difference	
- between the inputs ( $U_{CM}$ )	DC 2V
- between the inputs and $M_{INTERN}$ ( $U_{ISO}$ )	DC 75V / AC 60V
Isolation tested with	DC 500V
Current consumption	
- from the backplane bus	200mA
Power dissipation of the module	1.0W
Analog value generation	
Measuring principle	Sigma delta
Integration time / conversion time / resolution (per channel)	
- programmable	yes
- Integration time in ms	60ms   50ms
- Basic conversion time in ms	61ms   51ms
additional conversion time for measuring resistance in ms	61ms   51ms
- Resolution incl. overrange	13Bit

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**331-7Kx01 - AI 8(2)x12Bit - Technical Data**

Module name	VIPA 331-7KF01	VIPA 331-7KB01
Dimensions and Weight		
Dimensions (WxHxD in mm)	40x125x117	
Weight	ca. 200g	
Data for specific module		
Number of inputs - for 4wire resistance-type sensor	8 4	2 1
Length of cable - shielded	200m / 50m at measuring range $\pm 80\text{mV}$	
Programming specifications	331-7KF01	331-7KB01
Input data	8Worte	2Worte
Parameter data	16Byte	16Byte
Diagnostic data	16Byte	16Byte
Voltages, Currents, Potentials		
Rated supply voltage of electronics L+ - Reverse polarity protection	DC 24V yes	
Power supply of the transmitters - Supply current - Short-circuit-proof	max. 30mA (per channel) yes	
Constant current for resistance-type sensor	2.25mA	
Isolation - between channels and backplane bus - between channels and power supply of the electronics	yes yes (not with 2wire measuring transducer)	
Permitted potential difference - between the inputs ( $U_{CM}$ ) - between $M_{ANA}$ and $M_{INTERN}$ ( $U_{ISO}$ ) - between the inputs and $M_{ANA}$ ( $U_{CM}$ )	DC 3V DC 75V / AC 60V DC 3V (at Signal = 0V)	
Insulation tested with	DC 500V	
Current consumption - from the backplane bus - from the power supply L+	max. 95mA max. 100mA (without 2wire measuring transducer)	
Power dissipation of the module	3.0W	

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Analog value generation	VIPA 331-7KF01	VIPA 331-7KB01
Measuring principle	Sigma delta	
Integration time/conversion time/resolution (per channel)		
- programmable	yes	
- Conversion rate in Hz	400 60 50 10	400 60 50 10
- Integration time in ms	2.5 16 <sup>2</sup> / <sub>3</sub> 20 100	2.5 16 <sup>2</sup> / <sub>3</sub> 20 100
- Basic conversion time in ms	4 18 22 68	4 18 22 68
Additional conversion time for open circuit monitoring in ms	4ms	
- Resolution (incl. overrange) in Bit	9 12 12 14	9 12 12 14
- Noise suppression for frequency f1 in Hz	- - - 50/60	- - - 50/60
- Basic execution time of the module in ms (all channels enabled)	42 154 186 554	18 46 54 146
Smoothing of the measured values	none	
Suppression of interference, limits error		
Noises suppression for f=n x (f1 ±1%) (f1=interference frequency, n=1,2,...)		
- Common-mode interference (U <sub>CM</sub> < 3V)	> 70dB	
- Series-mode noise (peak value of noise < nominal value of input range)	> 40dB	
Crosstalk between the inputs	> 50dB	
Operational limit (in the entire temperature range, with reference to the input range)		
- Voltage input	Measuring range ±80mV ±250mV, ±500mV, ±1V ±2.5V, ±5V, ±10V, 1 ... 5V	Tolerance ±1.0% ±0.6% ±0.8%
- Current input	±3.2mA, ±10mA, ±20mA 0 ... 20mA, 4 ... 20mA	±0.7% ±0.7%
- Resistors	0 ... 150Ω, 300Ω, 600Ω	±0.7%
- Resistance thermometer	Pt100 Standard, Ni100 Pt100 Climate	±0.7% ±0.8%
- Thermocouple	Type J, K, N, E, L Type T Type S, B, C, R (see note at the end of the table)	±1.3% ±2.0%
Basic error (operational limit at 25°C referred to the input range)		
- Voltage input	Measuring range ±80mV ±250mV, ±500mV, ±1V ±2.5V, ±5V, ±10V, 1 ... 5V	Tolerance ±0.7% ±0.4% ±0.6%
- Current input	±3.2mA, ±10mA, ±20mA 0 ... 20mA, 4 ... 20mA	±0.5% ±0.5%
- Resistors	0 ... 150Ω, 300Ω, 600Ω	±0.5%

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... Suppression of interference, limits error	VIPA 331-7KF01	VIPA 331-7KB01
- Resistance thermometer	Pt100 Standard, Ni100	±0.5%
	Pt100 Climate	±0.6%
- Thermocouple	Type J, K, N, L, E	±0.7%
	Type T	±1.1%
	Type S, B, C, R (see note at the end of the table)	
Temperature error (with reference to the input range)	±0.005%/K	
Linearity error (with reference to the input range)	±0.02%	
Repeatability (in steady state at 25°C, with reference to the input range)	±0.05%	
Temperature error of internal compensation	±1.5%	
Status, Interrupts, Diagnostics		
Interrupts	parameterizable (Channel 0 and 2)	parameterizable (Channel 0)
- Process interrupt when limit has been exceeded	parameterizable (Channel 0 and 2)	parameterizable (Channel 0)
- Diagnostic interrupt	parameterizable	
Diagnostic functions	red LED (SF)	
- Group error display	red LED (F0...F7)	red LED (F0...F1)
- Diagnostics information read-out	possible	
Data for selecting a sensor		
	Input range	Input resistance
- Voltage	± 80mV, ± 250mV	10MΩ
	± 500mV, ± 1V	10MΩ
	± 2.5V, ± 5V	100kΩ
	1 ... 5V, ± 10V	100kΩ
- Current	± 3.2mA, ± 10mA, ± 20mA	85Ω
	0 ... 20mA, 4 ... 20mA	85Ω
- Resistors	0 ... 150Ω, 300Ω, 600Ω	10MΩ
- Resistance thermometer	Pt100, NI100	10MΩ
- Thermocouples	Type J, K, N, L, E, T, S, B, C, R	10MΩ
Maximum input voltage for voltage input (destruction limit)	max. 20V	
Maximum input current for current input L+ (destruction limit)	max. 40mA	

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... Data for selecting a sensor	VIPA 331-7KF01	VIPA 331-7KB01
Connection of the sensors - for measuring voltage - for measuring current as 2wire transmitter as 4wire transmitter - for measuring resistance with 2conductor connection with 3conductor connection with 4conductor connection		possible  possible possible  possible possible possible
Characteristic linearization - for RTD - for thermocouples		Pt100, NI 100 Standard / Climate Type E, N, J, K, L, T, S, B, C, R Ni100 Standard / Climate
Temperature compensation - internal temperature compensation - external temperature compensation with compensating box - Compensation for 0°C comparison point temperature		parameterizable possible possible  possible
Technical unit for temperature measurement		°C

**Thermocouple for high temperature measurement**

The thermocouples for high temperature measurement (Type S, B, C, R) produce physically caused smaller thermoelectromotive forces than the "normal" thermocouples (Type E, N, J, K, L).

In the following table there is a comparison between the thermo electromotive forces of the thermocouple of the type N to type S, B, C, R.

Thermo electromotive forces of Thermocouples	0°C	500°C	1000°C	1700°C
Type N in $\mu\text{V} / ^\circ\text{C}$	26	38	39	not possible
Type S in $\mu\text{V} / ^\circ\text{C}$	5	10	12	12
Type B in $\mu\text{V} / ^\circ\text{C}$	0	5	9	11
Type C in $\mu\text{V} / ^\circ\text{C}$	13	19	18	14
Type R in $\mu\text{V} / ^\circ\text{C}$	5	11	13	13