VI01 Octal Voltage Monitor
±10 V, 24-Bit, 3 kHz, Low Noise, Multiplexed Channels

Product Description

The VI01 device is a versatile and easy-to-use voltage monitor. With eight inputs, it can be used with any industrial transducer with the voltage output ranging from -10 to +10 V. The ultra-low noise, the high resolution and the outstanding accuracy make it ideal for industrial applications as well as for scientific experiments. The channels are multiplexed, amplified, conditioned and sampled by the high-performance 24-Bit delta-sigma A/D converter. This ensures maximum data acquisition rates of up to 3 kHz at lowest noise levels.

Since the channels are sampled alternately, the acquisition rate per channel depend on the number of selected channels.

Features

- Connected to 10/100BASE-TX Ethernet over RJ45 jack
- Eight independent transducer inputs
- Alternating data acquisition of selected channels
- Low crosstalk and low capacitive coupling between the channels
- High input resistance and small sampling capacitor
- High sampling rates of up to 3 kHz
- Highest accuracy is guaranteed when the device is operated within ±5 °C (±9 °F) of the last calibration
- Surveillance of supply voltage and board temperature
- Continuous over-voltage protected pins up to ±30 V
- Powered via PoE (Power over Ethernet)
- Idle power consumption of less than 1.3 W
- Compatible with all modern Ethernet standards
- Drivers for Microsoft® Visual C++™, MathWorks® MATLAB™, Python and National Instruments® LabVIEW™ programming environment

Accuracy

The VI01 device offers ten predefined internal A/D converter sampling rate settings which are 6 Hz, 12 Hz, 25 Hz, 50 Hz, 100 Hz, 200 Hz, 400 Hz, 800 Hz, 1,500 Hz and 3,000 Hz. Depending on the application the lowest possible frequency should be chosen in order to keep the measurement noise at a minimum. The acquisition frequency should be slightly lower than the configured internal A/D converter sampling rate. The default setting is 6 Hz which is sufficient for most monitoring applications.

Though only components with low tolerance and excellent thermal stability are utilized, advanced mathematical methods help to correct non-linearities and other measurement errors.

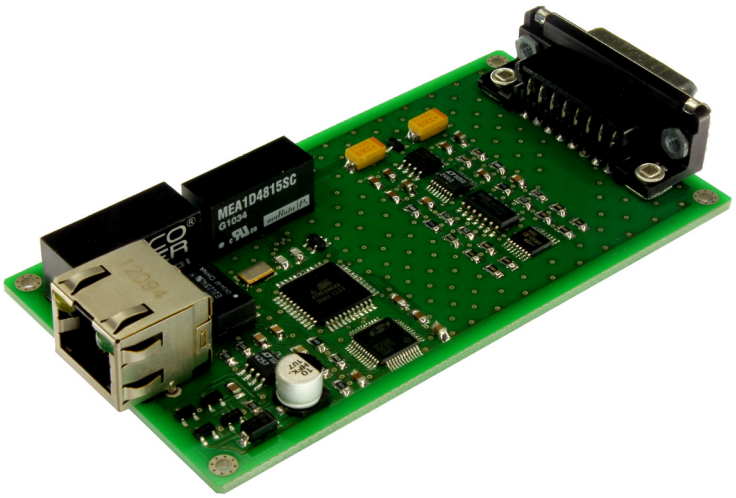
A warm-up time of at least 30 minutes is recommended. Exceptional thermal stress like fast transients, cycles or under- and over-temperature may derate accuracy or reduce the recommended calibration interval of one year.

Sampling Rate	2σ Accuracy	Resolution	RMS Noise	Therm. Drift	Hysteresis[1]
6 Hz	±1.0 mV	1.2 µV	5 µV	< 0.17 mV/K	< 50 µV
12 Hz	±1.0 mV	1.2 µV	5 µV	< 0.17 mV/K	< 50 µV
25 Hz	±1.0 mV	1.2 µV	6 µV	< 0.17 mV/K	< 50 µV
50 Hz	±1.0 mV	1.2 µV	6 µV	< 0.17 mV/K	< 50 µV
100 Hz	±1.0 mV	1.2 µV	7 µV	< 0.17 mV/K	< 50 µV
200 Hz	±1.0 mV	1.2 µV	9 µV	< 0.17 mV/K	< 50 µV
400 Hz	±1.0 mV	1.2 µV	12 µV	< 0.17 mV/K	< 50 µV
800 Hz	±1.0 mV	1.2 µV	17 µV	< 0.17 mV/K	< 50 µV
1,500 Hz	±1.0 mV	1.2 µV	24 µV	< 0.17 mV/K	< 50 µV
3,000 Hz	±1.0 mV	1.2 µV	130 µV	< 0.17 mV/K	< 50 µV

[1] Sweep of board temperature from 290 K to 330 K at 10 K/h

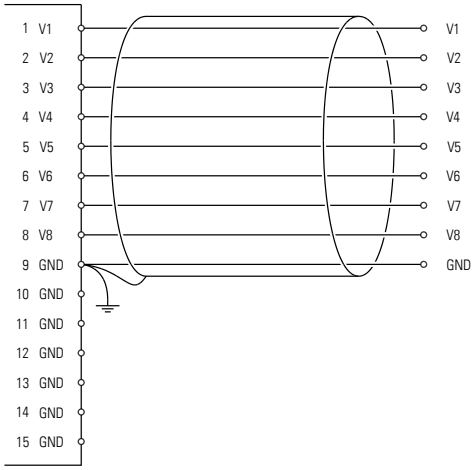
Transducer Inputs

Every channel (V1 to V8) referenced to GND is alternately sampled and the high-resolution 24-Bit differential delta-sigma A/D converter is utilized to convert the voltage. The more channels are sampled the lower the update rate per channel will become. Consequently, only the significant channels should be sampled in order to increase the acquisition rate if high throughput and low update times are desired. The typical input current is less than ±1 nA. Gold-plated connectors ensure superior transducer connectivity and low contact resistance.



Transducer Connection

The following figure shows the recommended pin configuration of the VI01 device. The channels are continuously over-voltage protected up to ±40 V but only one channel should be in over-voltage condition at a time. Do not connect or disconnect wires unless power has been switched off in order not to endanger the sensitive electronics.



Shielding and Grounding

For lowest noise and best accuracy the transducers should be connected to the VI01 device by the use of shielded twisted pair or coaxial cables. All shieldings must be grounded. Long cables should be avoided in any case when highest accuracy is a major concern. The ground pins 9 to 15 are internally connected and all input signals are referenced to their common potential.

Physical Specifications

Dimensions: 100 mm x 54 mm x 18 mm (3.94 in x 2.13 in x 0.71 in)
Mounting: 4 holes Ø 2.2 mm (0.087 in) at a distance of 94 mm x 48 mm (3.70 in x 1.89 in), intended for the use with metric M2 screws
PCB operating temperature: 0 °C to 70 °C (32 °F to 158 °F), ambient operating temperature depends on the case and its thermal isolation
Weight: 42 g (1.48 oz)