

# V001 Octal Voltage Output Device

## ±10V, 16-Bit, fast settling, low noise, high stability

### Product Description

The V001 device is a versatile and easy-to-use voltage output device. With eight outputs, it can be used with any analog industrial interface with voltage input ranging from -10V to +10V. The ultra-low noise, the high resolution and the outstanding accuracy make it ideal for industrial applications as well as for scientific experiments.

Analog functions as well as experimental stimuli can be generated without much effort. All channels offer low impedance, low noise, minimal crosstalk, fast settling, excellent thermal stability and continuous over-voltage protection.

### Features

- ▶ Connected to 10/100BASE-TX Ethernet over RJ45 jack
- ▶ Eight independent voltage outputs
- ▶ Low output impedance and low noise
- ▶ Fast settling and low overshooting
- ▶ Stable output at large capacitive loads
- ▶ Minimal crosstalk between the channels
- ▶ Continuous short-circuit and over-voltage protection of up to ±30V
- ▶ 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
- ▶ Powered via PoE (Power over Ethernet)
- ▶ Idle power consumption of less than 1.4W
- ▶ Compatible with all modern Ethernet standards
- ▶ Drivers for Microsoft® Visual C++™, MathWorks® MATLAB™, Python and National Instruments® LabVIEW™ programming environment

### Accuracy

The V001 device is equipped with a low-drift voltage reference and eight 16-Bit D/A converters which are guaranteed monotonic over temperature. Moreover they feature ultra-low crosstalk between the outputs and low integral non-linearity. Advanced mathematical non-

linear compensation techniques even improve their performance. For highest accuracy and lowest thermal drift only components with low tolerance and ultra-low temperature coefficient are utilized.

A warm-up time of at least 30 minutes is recommended. Thermal stress like transients, cycles or under- and over-temperature may degrade accuracy. Though the output impedance of each channel is designed to be as low as possible, the load current should be preferably low to prevent voltage drops at the terminals or in the cable.

2σ Accuracy	Resolution	RMS Noise	Therm. Drift	Hysteresis <sup>1</sup>
±1.6mV	0.32mV	0.7mV	<0.16mV/K	<0.2mV

<sup>1</sup> Sweep of PCB temperature from 290 K to 330 K at 10 K/h

The following table shows typical settling times for programmed output voltage changes. The error band around the final value is the percentage of the voltage step.

Error Band	1.0%	0.1%	0.01%	0.001%
Settling Time	0.27ms	0.36ms	0.44ms	0.56ms

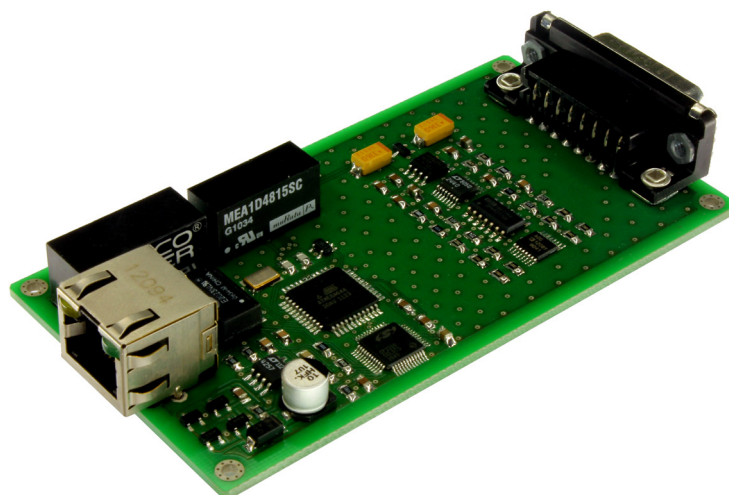
### Voltage Outputs

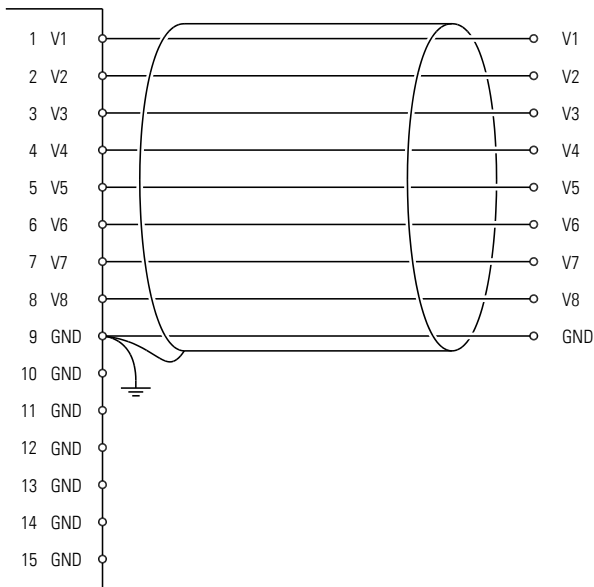
Gold-plated connectors ensure superior transducer connectivity and lowest output impedance of less than 0.1Ω. Every channel is continuously short-circuit and over-voltage protected up to ±40V but only one channel should be in over-voltage condition at a time.

The maximum output current per channel is ±10mA. The output is stable at any capacitive loads but longer settling times and increased overshooting occur if large capacitances loads are connected.

### Transducer Connection

The following figure shows the recommended pin configuration of the V001 device. The channels (V1 to V8) referenced to GND are continuously short-circuit and over-voltage protected up to ±40V but only one channel should be in failure 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 VIO1 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, 10, 11, 12, 13, 14 and 15 are internally connected and all input voltages are referenced to their potential. They do not need to be connected to earth for proper operation but for lowest noise it is recommended though.

## 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  $\varnothing$  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)

This product is not authorized for use as a critical component in life support devices or systems without the express written approval.