



## 2. Strain gage amplifier DMS



Strain gage amplifiers DMS01 and DMS 03

### DMS01

Single channel amplifier  
W x D x H (mm) 120 x 120 x 60  
weight 350 g

(power supply included)

### DMS03

Triple channel amplifier  
W x D x H (mm) 240 x 120 x 60  
weight 550 g

(power supply included)

### Accessories

- LEMO connectors 0S304 fitting to DMS signal input sockets
- 4-wire cables, shielded with one side LEMO 0S304 connector, 1 side blunt length 1.5 m (other lengths on request)
- 4-wire extension cables, shielded with LEMO 0S304 connector/coupler length 2 m, 3 m, 4 m



## Strain and Position Detection

- **Analog Signal Output:**

0V/+5V equivalent piezo actuator's max. strain  
 Impedance: 1 kOhms  
 Connector BNC

- **Readout**

3 1/2 digit LC-display

### Amplifier adjusts via mini-potentiometers

- **Zero setting**

The absolute length of a piezo stack varies with the preload conditions during mounting, thermal status etc.

Therefore a zero point setting procedure can be carried out for piezo actuator's operation to compensates for all mechanical offsettings during the installation of the actuator.

- **Variable gain**

The original signal height of a strain gage arrangement depends mainly on the strain gage characteristics (k-factor) and the number of active bridge elements (full bridge, half bridge, 2-quarter bridge etc).

The DMS-amplifiers shows a variable gain adjust for adapting the DMS output exactly to 0V / +5V range for a defined piezo stroke/strain.

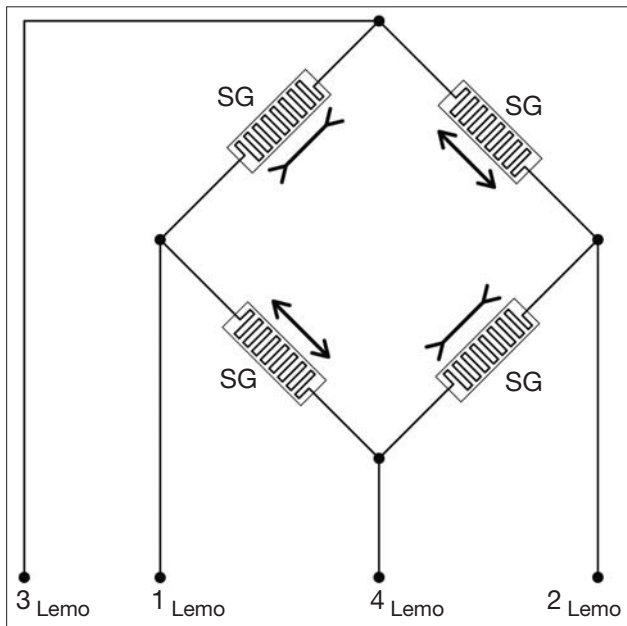
- **Calibration of display for position readout in  $\mu\text{m}$**

A steady or slow varying position with sub-micrometer resolution is shown in terms of fractions of  $\mu\text{m}$  on a large LC-display.

A simple calibration procedure allows the user to adapt the readout to a distinct piezo actuator / sensor configuration.

- **Power supply:**

12V



**Schematic arrangement** of a 4 active elements  
 Wheatstone bridge

- **Contacts:**

Connector LEMO 0S 304 pin-numbers or  
 stranded wires/insulation color (for blunt ends)

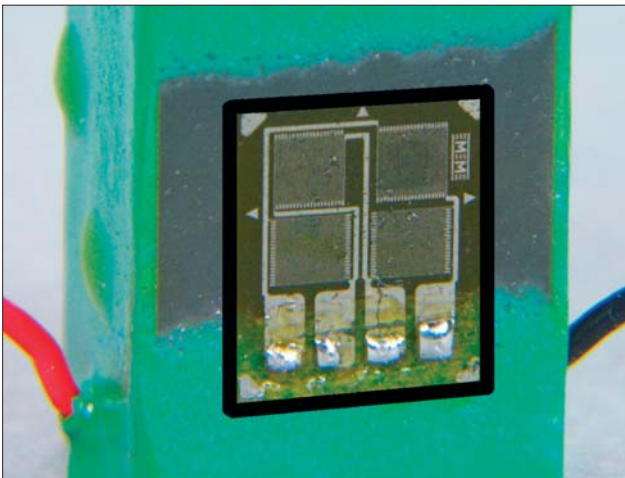
Supply voltage **in** bridge diagonal 1-2 / red-black  
 Signal **out** bridge diagonal 3-4 / white-green



## Position Sensing by strain gages

Strain gage circuits produce very small signals in the mV and  $\mu\text{V}$ -range. A high quality amplifier like the DMS device is needed to convert this original signal into a reasonable standard analog output voltage level (e.g. 5 V) or other kind of usable information.

- All kinds of strain gages with a resistance of 350 Ohms up to 5 kOhms can be operated by the DMS amplifiers.
- The DMS amplifiers are a complete detection units comprising the strain gage electrical supply and the signal detection unit. No other attributes are necessary to run a strain gage measurement.
- The DMS 01 and 03 amplifiers show high resolution capability down to a strain variation  $< 10^{-6}$ .
- High dynamics with a 30 kHz bandwidth.
- The DMS amplifiers are stand-alone devices. This allows to locate the amplifiers rather near to the strain gage arrangement independently of other piezo-electronics. Hereby, any electrical noise pick up due to long distances from gage to amplifier is strongly reduced.
- ▶ Therefore, the strain gage amplifiers DMS are excellently suitable to be combined with piezo actuator borne strain gages for high resolution, high dynamic position monitoring.



4 active-elements strain gage-bridge configuration on a piezo stack Typical gage resistance: 1.2 kiloOhms.



Basic position control equipment. Piezo-actuator with strain gage position sensor. Position read out by DMS 01 unit. Piezo-actuator supply electronics SVR 150 (left).