

# Strain Gage Amplifiers

## Series AMP-SG-M1

- Single channel miniature amplifier
- Highly accurate bridge excitation
- Provides high level voltage signal output
- Externally adjustable shunt resistance
- Externally adjustable gain
- Precision low noise differential amplifier
- Remote bridge excitation On/Off capability
- Remote shunt calibration capability

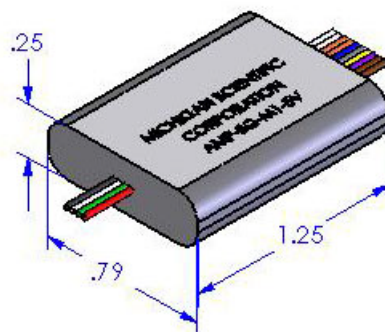


## Description

Michigan Scientific's *AMP-SG-M1 Strain Gage Amplifiers* are ideal for applications where signal conditioning is needed and space is limited. They are designed to provide signal amplification prior to passing the signal through a slip ring. Superior data accuracy is achieved by locating the signal amplifier on the rotating side of the slip ring. This configuration greatly improves signal quality because the amplifier is located closer to the sensor which reduces errors due to long lead wires, connector resistance variations, and electro-magnetic interference.

These strain gage amplifiers incorporate a precision low drift bridge excitation supply, a stable differential amplifier, and a remotely activated shunt calibration resistor for system span verification. Each amplifier provides strain gage bridge excitation and amplification for one channel. Multiple channel configurations are available.

## Drawings



C586004S\_M1.PSD

8500 Ance Road  
Charlevoix, MI 49720  
Tel: 231-547-5511  
Fax: 231-547-7070

**MICHIGAN SCIENTIFIC**  
corporation  
<http://www.michsci.com>  
Email: [mscinfo@michsci.com](mailto:mscinfo@michsci.com)

321 East Huron Street  
Milford, MI 48381  
Tel: 248-685-3939  
Fax: 248-685-5406

Rev: 4/28/12

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## Specifications

| PARAMETER                             | SPECIFICATION   |
|---------------------------------------|---|
| <b>BRIDGE EXCITATION</b>              |   |
| Type                                  | DC Constant Voltage (Bipolar excitation)  |
| Magnitude                             | AMP-SG-M1-5 $\pm 2.5$ V (5 volts total)<br>AMP-SG-M1-10 $\pm 5.0$ V (10 volts total)  |
| Accuracy                              | 0.40%   |
| Temperature Coefficient               | 0.0005 %/ $^{\circ}$ C Max (0.00028 %/ $^{\circ}$ F)  |
| Current Limit                         | AMP-SG-M1-5 42 mA<br>AMP-SG-M1-10 84 mA   |
| <b>REMOTE CALIBRATION</b>             |   |
| Positive & negative shunt Calibration |   |
| Shunt Resistance                      | internal values 100K $\Omega$ and 1M $\Omega$<br>external values 100k $\Omega$ Through 1M $\Omega$                                  |
| Shunt accuracy                        | @ 100k $\Omega$ 0.01%<br>@ 1M $\Omega$ 0.01%  |
| <b>GAIN</b>                           |   |
| Range                                 | with external jumper 100 & 2000 V/V<br>w/ external resistor 100 through 2000 V/V  |
| Accuracy                              | @ 25 $^{\circ}$ C, Gain =100 $\pm 0.05$ % typ ( $\pm 0.50$ %max)<br>@ 25 $^{\circ}$ C, Gain =1000 $\pm 0.50$ %typ ( $\pm 1.0$ %max) |
| Temperature Coefficient               | 0.0025 %/ $^{\circ}$ C (0.0014 %/ $^{\circ}$ F)   |
| <b>OUTPUT</b>                         |   |
| Range                                 | $\pm 10$ V Max  |
| Capacitive Load                       | 1000 pF Max   |
| <b>VOLTAGE OFFSET</b>                 |   |
| Referred to input of amplifier        |   |
| Initial @ 25 $^{\circ}$ C             | $\pm 10$ $\mu$ V typ ( $\pm 50$ $\mu$ V max)  |
| Temperature Stability                 | $\pm 0.1$ $\mu$ V / $^{\circ}$ C typ ( $\pm 0.25$ $\mu$ V / $^{\circ}$ C max)   |
| Time Stability                        | $\pm 0.1$ $\mu$ V / month   |
| DC CMRR                               | 160 dB  |
| Noise rti 0.01 - 10 Hz                | 0.7 $\mu$ V p-p   |
| <b>DYNAMIC RESPONSE</b>               |   |
| Frequency Response -3dB               |   |
|                                       | @ Gain=1000 20 kHz  |
|                                       | @ Gain=100 20 kHz   |
| Slew rate                             | 4 V/ $\mu$ s  |
| Settling Time to 0.01% @ Gain=100     | 9 $\mu$ s   |
| <b>POWER REQUIREMENTS</b>             |   |
| Voltage @ 25 $^{\circ}$ C             | $\pm 15$ VDC  |
| Current                               | $\pm 15$ mA plus Bridge Load<br>(+15 mA additional during shunt calibration)  |
| <b>ENVIRONMENT</b>                    |   |
| Specification                         | -40 to +85 $^{\circ}$ C (-40 to +185 $^{\circ}$ F)  |
| Operation                             | -40 to +125 $^{\circ}$ C (-40 to +257 $^{\circ}$ F)   |
| <b>MECHANICAL</b>                     |   |
| <b>AMP-SG-M1</b>                      |   |
| Weight                                | 14.17 G (0.50 Oz)   |
| Overall Length                        | 31.75 mm (1.250 in)   |
| Overall Height                        | 6.35 mm (0.250 in)  |
| Overall Width                         | 20.32 mm (0.800 in)   |

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