

# Modular Spinning Strain Gage Amplifier

## Model AMP-SG Series

- 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
- Pilots on SR series slip ring rotors
- Amplifiers are stackable for multi-channel use

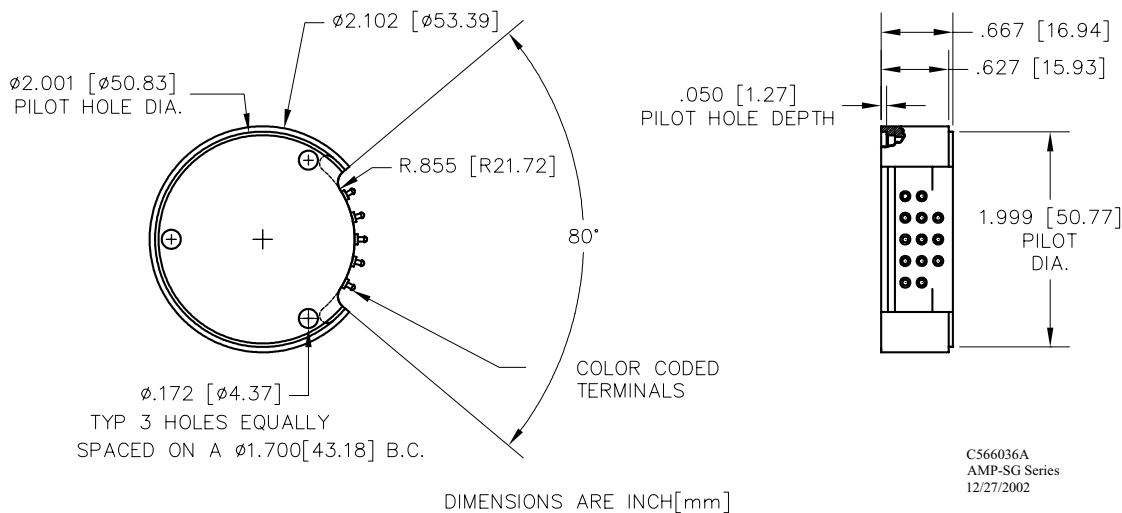


## Description

The *Modular Spinning Strain Gage Amplifier* is designed to mount on the rotor (spinning side) of all Michigan Scientific SR series slip rings. 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 *Modular Spinning 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 module provides strain gage bridge excitation and amplification for one channel. For multiple channels, the amplifiers may be stacked or arrayed around an adapter plate.

Refer to the literature in the Technical Notes section for a wiring schematic of an individual amplifier and recommended wiring techniques when using multiple amplifiers.



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# Modular Spinning Strain Gage Amplifier

## Specifications

<b>PARAMETER</b>	<b>SPECIFICATION</b>
<b>BRIDGE EXCITATION</b>	
Type	DC Constant Voltage (Bipolar excitation)
Magnitude	AMP-SG-U2 ±2.5V Standard (5 volts total) AMP-SG-U2-10 ±5.0V Available (10 volts total) AMP-SG-U2-17 ±8.5V Available (17 volts total) AMP-SG-U2-20 ±10.0V Available (20 volts total)
Accuracy	0.20%
Temperature Coefficient	0.0005%/°C Max (0.00028 %/°F)
Current Limit	AMP-SG-U2 42 mA AMP-SG-U2-10 84 mA AMP-SG-U2-17 142 mA AMP-SG-U2-20 167 mA
<b>REMOTE CALIBRATION</b>	
Shunt Resistance internal value external value	100kΩ & 1 MΩ 100kΩ through 1 MΩ
Shunt accuracy @ 100kΩ @ 1MΩ	0.02% 0.10%
<b>GAIN</b>	
Range w/ jumper	Externally adjustable 100 & 2000 V/V
w/ external resistor	100 through 2000 V/V
Accuracy @ 25°C, Gain =100 @ 25°C, Gain =1000	±0.05 %typ (±0.50 % max) ±0.50 %typ (±1.0 %max)
Temperature Coefficient	0.0025 %/°C (0.0014 %/°F)
<b>OUTPUT</b>	
Range	±10V Max
Capacitive Load	1000 pF Max
<b>VOLTAGE OFFSET</b>	
Referred to input of amplifier	
Initial @ 25°C	±10 μV
Temperature Stability	±0.1 μV /°C
Time Stability	±1.0 μV / Month
DC CMRR	160 dB
Noise rti 0.01 to 10 Hz	0.7 μV p-p
<b>DYNAMIC RESPONSE</b>	
<i>Higher Bandwidths Available</i>	
Frequency Response @ Gain=1000 -3dB @ Gain=100	1 kHz 10 kHz
Slew rate	0.5 V/ μs
Settling Time to 0.01% @ Gain=100	145 μs
<b>POWER REQUIREMENTS</b>	
Voltage @ 25°C	±13 to ±17 VDC
Current	±15 mA plus Bridge Load (+15 mA additional during shunt calibration)
<b>ENVIRONMENT</b>	
Specification	-25 to +85°C (-13 to +185°F)
Operation	-55 to +125°C (-67 to +257°F)
<b>MECHANICAL</b>	
Weight	AMP-SG-U2, AMP-SG-U2-10 64 g (2.25 oz) AMP-SG-U2-17, AMP-SG-U2-20 82 g (2.89 oz)
<b>OPTIONS:</b> Four models are available from stock: APM-SG-U2, AMP-SG-U2-10, AMP-SG-U2-17, AMP-SG-U2-20 These units provide 5V, 10V, 17V, or 20V excitation respectively. Other custom bridge excitations are available.	

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# Modular Spinning Thermocouple Amplifier

## Model AMP-TC

- Available with 2 or 3 thermocouple amplifier channels
- Cold junction compensation
- High level voltage signal output
- Signal is equal to 10 mV per degree C
- Units available in all thermocouple types
- Input signal can be grounded or isolated
- Pilots on SR series slip ring rotors
- Amplifiers are stackable for multi-channel use



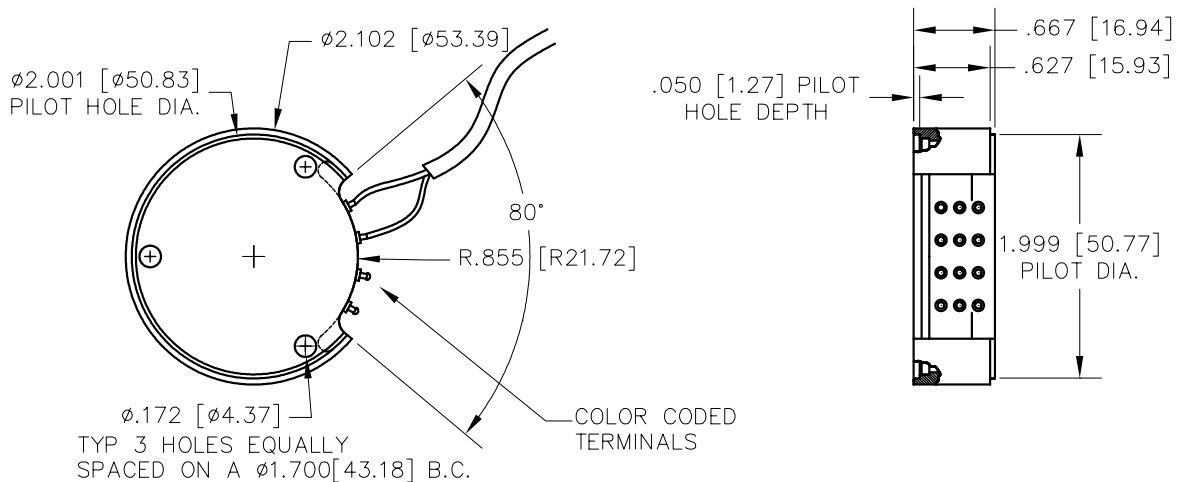
## Description

The *Modular Spinning Thermocouple Amplifiers* are designed to mount on the rotor (spinning side) of all Michigan Scientific SR series slip rings. Superior data accuracy is achieved by locating precision amplifiers 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, electro-magnetic interference, and temperature gradients across slip ring contacts.

These *Modular Spinning Thermocouple Amplifiers* provide amplification for two or three thermocouple channels. For applications that require more than three channels, the amplifiers may be stacked or arrayed around an adapter plate.

Refer to the literature in the Technical Notes section for wiring schematics of these amplifiers.

## Configuration



DIMENSIONS ARE INCH[mm]

C566037A  
AMP-TC  
12/27/2002

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# Modular Spinning Thermocouple Amplifier

## Specifications

PARAMETER	SPECIFICATION
<b>OUTPUT</b>	Output is not linearized over temperature, if necessary, the output may be linearized externally
Range	±10V Max
Sensitivity @ 25°C TC Temperature	10mV/°C
Capacitive Load	1000 pF Max
<b>TEMPERATURE ERROR</b>	Includes errors due to nonlinearity over temperature in cold junction compensation
Initial @ 25°C Case Temperature	± 1°C Max
-25°C to +85°C Case Temperature	± 2°C Max
-55°C to +125°C Case Temperature	± 5°C Max
<b>NOISE</b>	Referred to input of amplifier
0.01 - 10Hz	0.8 µV p-p
<b>DYNAMIC RESPONSE</b>	1.56 kHz ( <i>Higher bandwidths available</i> )
Frequency Response -3dB	3.35 kHz
Slew Rate	0.4 V/ µs
Settling time 0.1% / 0.01%	40 µs/ 50 µs
<b>POWER REQUIREMENTS</b>	
Voltage	±15 VDC
Current	±10 mA Max Total (2 channels) ±15 mA Max Total (3 channels)
<b>ENVIRONMENT</b>	
Specification	-25°C to +85°C (-13°F to +185°F)
Operation	-55°C to +125°C (-67°F to +257°F)

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