



# ESA Messtechnik GmbH

Schlossstr. 119 - D-82140 Olching / Munich  
 Telefon: +49 (0)8142 444 130 - Fax: +49 (0)8142 444 131  
 Internet: [www.esa-messtechnik.de](http://www.esa-messtechnik.de)  
 E-Mail: [info@esa-messtechnik.de](mailto:info@esa-messtechnik.de)

## STRAIN GAGE CONDITIONER / AMPLIFIER SGA-0B

### Description:

The SGA0B Strain Gage Input Signal Conditioning Amplifier is a precise, fully programmable analog channel for strain gages, strain gage based transducers, potentiometers and voltage sources.

The SGA0B is a single-channel unit for a EUROCARD 19" with built-in power supply (24 VDC) and USB interface which allows the user to configure conditioner from any computer using special settings program.

### FEATURES:

- Constant-voltage software programmable bridge excitation.
- Bridge completion module for quarter or half-bridge 1000/350/120  $\Omega$  strain gage and transducer circuits.
- Built-in shunt calibration circuit with internal switches for user-software-selectable calibration configurations.
- Built-in four-pole software programmable Butterworth low-pass filter.
- Precise, software programmable electronic bridge-balance circuit.
- Fully programmable features: bridge excitation, gain, low-pass filter, calibration and bridge balance.
- All functions of particular analog channel are controlled and serviced by high speed low power CMOS microprocessor unit and stored in non-volatile EEPROM memory.

### Specification:

<b>Analog Inputs</b>	<b>Input Impedance:</b>	20M $\Omega$ shunted by 100 pF
	<b>Configuration:</b>	Quarter, half, or full-bridge strain gage, or transducer, or source voltage. Internal half bridge, 1000 $\Omega$ , 350 $\Omega$ and 120 $\Omega$ dummy, internal and external connections of calibration shunts
	<b>Common Mode Voltage:</b>	+/- 10 V
	<b>Differential Voltage:</b>	+/- 10 V
	<b>Input Protection Voltage:</b>	protected from damage up to +/- 40 V VDC
<b>Bridge Constant Voltage Excitation</b>	<b>Range:</b>	0 V to 10,23 V, increments of 2,5 mV (software programmable), max. current 40 mA
	<b>Accuracy:</b>	0,1 % +/- 5 mV in range 1,0 V to 10,23 V
	<b>Temperature Stability:</b>	Better than 0,01 %/°C
<b>Balance</b>	<b>Type:</b>	Internal Microcontroller electronic balance circuitry
	<b>Range:</b>	+/-10 024 $\mu\text{m/m}$ (5,12mV/V) RTI for gain: 50, 100, 200, 400, 500, 1000, 2000, 4000, 5000, 10000 V/V +/- 102 400 $\mu\text{m/m}$ (51.2mV/V) RTI for gain: 1-40, 80 V/V
<b>Calibration</b>	<b>Tree internal shunt calibration:</b>	RC1 = 499,0 k $\Omega$ 0,1%, 1000 $\mu\text{m/m}$ (0,50 mV/V) for 1000 $\Omega$ and gage factor K=2,00 RC2 = 174,8 k $\Omega$ 0,1%, 1000 $\mu\text{m/m}$ (0,50 mV/V) for 350 $\Omega$ and gage factor K=2,00 RC3 = 59,94 k $\Omega$ 0,1%, 1000 $\mu\text{m/m}$ (0,50 mV/V) for 120 $\Omega$ and gage factor K=2,00
	<b>Calibration procedure:</b>	Calibration switches of RC1 and RC2 resistors are software selectable
	<b>Calibration level:</b>	Bipolar $\pm$ 1000 $\mu\text{m/m}$ for half and quarter bridges

<b>Amplifier</b>	<b>Gains:</b>	1, 2, 4, 8, 10, 20, 40, 50, 80, 100, 200, 400, 500, 1000, 2000, 4000, 5000 and 10000
	<b>Accuracy:</b>	+/- 0,2 %
	<b>Linearity:</b>	0,02 % of Full Scale Range
	<b>Frequency Response:</b>	DC to 50 kHz, -0.5 dB maximum for all gain settings and full output; DC to 100 kHz, -3 dB maximum
	<b>Slew Rate:</b>	4 V/ $\mu$ s
	<b>Noise:</b>	(with 350 $\Omega$ source impedance) 0.5 Hz - 100 kHz: 5 $\mu$ Vrms max., referred to Input (RTI)
	<b>Temperature Co. of Zero:</b>	+/-1 $\mu$ V/ $^{\circ}$ C maximum for gain: 50, 100, 200, 400, 500, 1000, 2000, 4000, 5000 and 10000; +/-5 $\mu$ V/ $^{\circ}$ C typical for gain: 1-40, 80 V/V
	<b>Common-Mode Rejection:</b>	G=1 CMR=80dB, G=10 CMR=90dB, G=100 CMR=100dB, G=1000 CMR=100dB
	<b>Output Swing:</b>	+/- 10 V (fully protected against continuous short)
	<b>Filter:</b>	Four-pole Butterworth low-pass filter with software selectable 3dB bandwidths of 10Hz, 100Hz, 300Hz, 1kHz, 10kHz, 30kHz, 50 kHz and wide-band (100kHz, -3dB)
	<b>AC Coupling:</b>	Low Frequency Cutoff (- 3 dB) 1,0 Hz
<b>Mechanical</b>	<b>Size:</b>	100 H x 160 D mm; front plate width 7TE
	<b>Weight:</b>	ca. 0,4 kg
	<b>Power Supply:</b>	24 VDC
<b>Indicator and Connectors</b>	<b>LED Diode (green):</b>	lighted on if device is fully powered and functional
	<b>Connector (Input):</b>	KPT 06 B14-15P ITT/Cannon
	<b>Connector (Output):</b>	BNC connector placed on the front and additionally through rear connector of eurocard (DIN 41612 Typ C, 32 Pins)
<b>Programming Interface</b>	<b>Type:</b>	USB 2.0 or USB1.1 compatible interface, in Master-Slave-mode when use more than 2 channels (max. 8 Channels)
<b>Software</b>	<b>Drivers:</b>	USB drivers for any type of WINDOWS <sup>®</sup> operating system
	<b>Amplifier Settings:</b>	open setup software ( integration with user software possible, .dll type)
	<b>Calibration adjusting:</b>	Software for automatied setup adjusting according to user datasheet



Front view of amplifier