Product Manual

IAA100

Strain Gauge Analog Amplifier with Voltage Output (FSH04939)

Sensor Solutions Source
Load · Torque · Pressure · Multi-Axis · Calibration · Instruments · Software

www.futek.com

Getting Help

PRODUCT DOCUMENTATION AND TECHNICAL SUPPORT

For more IAA100 support and specification documents, please visit:
https://www.futek.com/store/instruments/analog-amplifier/strain-gauge-analog-amplifier-voltage-output-iaa100

EM1092-A
FUTEK reserves the right to modify its design and specifications without notice.
Please visit https://www.futek.com/terms-of-sale for complete terms and conditions.

Table of Contents

Default Settings 4
Connections 4
Set Up Steps 5
Shunt Feature 6
Digitally Controlled Remote Shunt 6
Switch Configurations 7
- Excitation 7
- Polarity 8
- Gain 8
- Bandwidth 9
- Shunt 9
- Offset 10

Offset and Span Calibration 11
- Adjusting the Offset 11
- Adjusting the Span 11

Default Settings

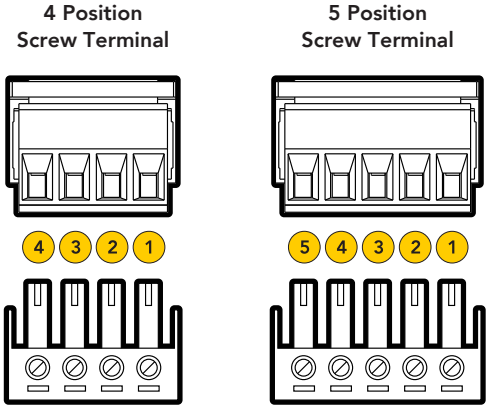
- Input Range: ±2 mV/V
- Excitation Voltage: 10 VDC
- Output Range: ±10 VDC
- Shunt: 60.4 kΩ

Connections:

SENSOR SIDE	
PIN	WIRING CODE
1	+ Excitation[1]
2	+ Signal
3	– Signal
4	– Excitation[1]/Gnd

POWER/OUTPUT	
PIN	WIRING CODE
1	+ Vin
2	Ground
3	Shunt
4	Ground
5	Vout

[1] For 6 wire sensors connect +Sense to +Excitation and –Sense to –Excitation



Note: Grounding and Shield Connection
GND and sensor -E/GND are internally connected circuit common nodes. Chassis is connected to the enclosure and is intended for cable shield, enclosure, DIN rail, system chassis, or earth bonding as required by the final installation. Terminate cable shields to the IAA Chassis connection point, not to GND or -E/GND. Do not use Chassis as a power, signal, or excitation return. The system integrator is responsible for selecting and verifying the final grounding and shielding scheme, including shield, chassis, earth, DIN rail, machine frame, and sensor-body connections, to avoid ground loops and comply with the final system's safety and EMC requirements. Refer to the FUTEK Effective Chassis Grounding Techniques guide for additional guidance.

Setup Steps

1. Set Excitation Voltage:
   Locate the Excitation Switch on the unit.
   - Right position = 10 VDC excitation (default setting from FUTEK)
   - Left position = 5 VDC excitation
2. Set the Gain:
   Configure the Gain DIP Switch according to your sensor's output (in mV/V).
   - By default, Switch 4 is set to "on" for a 2 mV/V sensor.
   - To determine the correct gain setting for your specific sensor, refer to the gain and shunt settings tool available on the FUTEK IAA100 Page.
3. Connect the Sensor and Power Supply:
   - Confirm wiring polarity matches the unit's input requirements.
   - Apply a DC power supply within the voltage range specified in the product's specifications document.
4. Zero Pot Adjustment (No Load):
   - With no load applied to the sensor, adjust the Zero potentiometer (on the front panel) until the output reads as close as possible to 0 VDC.
5. Span Pot Adjustment (With Known Load):
   - Apply a known reference load to the sensor.
   - Adjust the Span potentiometer until the output reads the expected full-scale value, for example, 10 VDC.
6. Re-verify Output:
   - Remove the load and verify the zero-load output.
   - Reapply the known load and recheck the span output.
   - Repeat zero and span adjustments as needed for accuracy.



Notes:

- Adjusting the Span potentiometer will affect system calibration. If your system has already been calibrated downstream (e.g., in software), re-calibration may be necessary.
- Adjusting the Zero potentiometer does not affect system calibration and can be safely used for fine tuning.

Shunt Feature

The shunt feature can be used to simulate a load. Follow these steps to use the shunt feature:

1. Determine the shunt resistor value using the gain and shunt settings tool.
2. Flip the correct DIP switches to achieve the corresponding value.
3. Press the Shunt pushbutton.
4. While the shunt is enabled, adjust the span to the correct output.

For example, with a 2 mV/V sensor, a 350 Ω bridge, and the default 60.4 kΩ shunt, the simulated load is approximately 72% of FSR. Adjust the span to 7.2 VDC to match this simulated load.

Digitally Controlled Remote Shunt

There are two methods to enable the shunt:

1. Use the pushbutton on the front of the instrument (see page 5).
2. Apply a voltage of 5-26 VDC to the shunt pin for remote digital control (see page 4). Removing this voltage will disable the shunt.

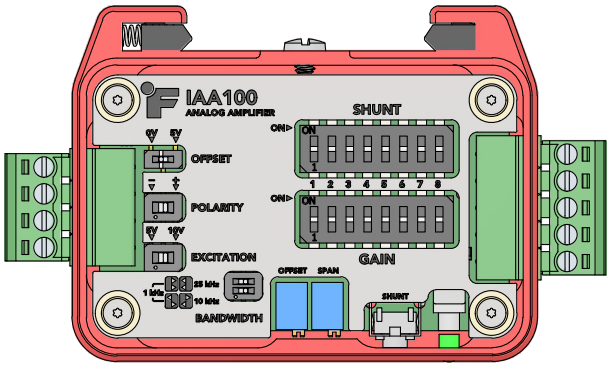
Switch Configurations

Excitation

Two excitation options are available: 10 VDC (default) and 5 VDC. Position the DIP switch to the desired setting.

Note: Depending on the maximum excitation your sensor can tolerate, adjust your excitation settings and gain accordingly to achieve your desired output.

SW1: Excitation (VDC)	
Left	5
Right	10

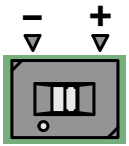


Switch Configurations

Polarity

There are two polarity options available: reverse and straight (default). To select the polarity, simply position the DIP switch to the appropriate configuration.

For example, if you want to change the positive direction from tension to compression, flip the DIP switch from the default (straight) to the reverse polarity position.



POLARITY

SW2: Polarity	
Left	Reverse
Right	Straight

Gain

There are eight gain DIP switches available, ranging from 0.5 mV/V to 10 mV/V, with a default setting of 2 mV/V. Select the value closest to your input range by configuring the DIP switches accordingly. Use the gain and shunt settings tool to determine the correct switches to flip.

For example, with a 2 mV/V sensor and 5 VDC excitation, use dipswitch 2 for 1 mV/V. With a 2 mV/V sensor and 10 VDC excitation, use dipswitch 4 for 2 mV/V.

SW3: Sensitivity (mV/V)					
1	On	0.5	5	On	2.5
	Off	N/A		Off	N/A
2	On	1	6	On	3
	Off	N/A		Off	N/A
3	On	1.5	7	On	4
	Off	N/A		Off	N/A
4	On	2	8	On	10
	Off	N/A		Off	N/A

Switch Configurations

Bandwidth

There are three bandwidth settings: 1 kHz (default), 10 kHz, and 25 kHz. To select the bandwidth, flip the DIP switches to the desired configuration.

Shunt

There are eight shunt DIP switches available, ranging from 30 kΩ to 432 kΩ. The default setting is configured to 60.4 kΩ. Use the online gain and shunt settings tool to help you determine how to position the dipswitches in order to obtain a desired output.

SW4: Bandwidth (kHz)

1[2]	2[2]	Cutoff Frequency (-3 dB)
Left	Left	25
Right	Left	10
Left	Right	1
Right	Right	1

SW5: Shunt (kΩ)

1	On	30	5	On	100
	Off	N/A		Off	N/A
2	On	43.7	6	On	150
	Off	N/A		Off	N/A
3	On	60.4	7	On	300
	Off	N/A		Off	N/A
4	On	87.6	8	On	432
	Off	N/A		Off	N/A

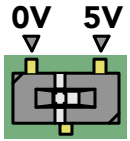
[2] Refer to page 7 for the switch location

Switch Configurations

Offset

A switch is available to offset the zero. When enabled, the zero shifts from 0 VDC to 5 VDC. To set the offset, flip the DIP switch to the appropriate configuration. Note that once the offset is enabled, the gain settings need to be adjusted accordingly.

For example, if using a sensor in the 0-10 VDC range for one direction, enabling the offset allows use in both directions with a positive output. The new zero would be 5 VDC, with one direction from 5-10 VDC and the other from 5-0 VDC. The system will need recalibration if this is done.



OFFSET

SW7: Offset (VDC)	
Right	5
Left	0 (Default)

Note: The offset adjustment is only applicable for a 0 to 10V setting and cannot be used in a 0 to 5V setting. For example, setting an offset of 2.5V is not possible in a 0 to 5V configuration.

Offset and Span Calibration

Adjusting the Offset

When using a signal conditioner, it may be necessary to offset the zero. Zero adjustment of approximately ±10% of FSR can be made using the onboard potentiometer.

Adjusting the Span

Similar to the offset, it maybe necessary to adjust the span. Span adjustment of approximately ±10% of FSR can be made using the onboard potentiometer.