FUTEK
ADVANCED SENSOR TECHNOLOGY, INC.

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CSG110 Product Manual

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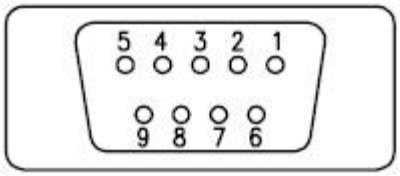
Default Settings

- Input Range: 0 to +/-2 mV/V
- Excitation Voltage: 10 VDC
- Output Range: +/-10 VDC, 4-20 mA

Connections

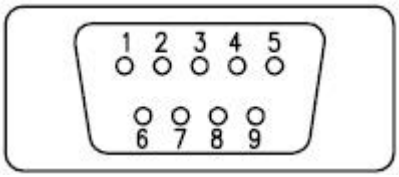
Pin	Wiring Code
1	+Excitation (1)
2	+Signal
3	-Signal
4	-Excitation (1)
5	Ground
6	Ground
7	Ground
8	Ground
9	Ground

Female- Sensor Side



Pin	Wiring Code	Cable Color Code
9	Power Supply	Red
8	Signal Out (Voltage)	Green
7	Ground	Orange
6	Ground	Black
5	Ground	N/A
4	Ground	N/A
3	Ground	N/A
2	Ground	Blue
1	Signal Out (Current)(2)	White

Male- Power Side



Note: Do not connect the device to the power supply when the power supply is already on!

(1) For 6 wire sensors connect +Sense to +Excitation and –Sense to –Excitation or Ground
(2) Only available with current output option

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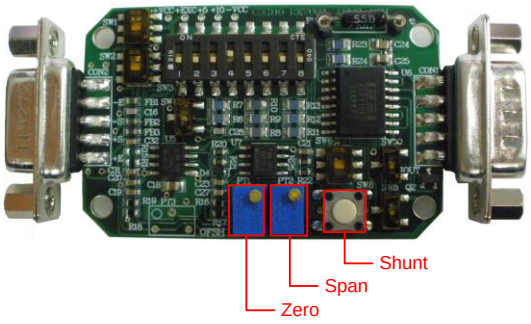
Standard Span & Zero Adjustment

Once all of the connections are complete, you can begin to set up the sensor/amplifier system. You will need to have the output from the CSG110 connected to a device so you can read the voltage or current.



To set up the system, follow the steps below:

1. Apply a known load to the sensor.
2. Allow the sensor to settle.
3. Use a screwdriver to adjust the span that correlates with that load.
4. Remove the load.
5. Allow the sensor to settle.
6. Adjust the zero.

Ex. If you are applying a full load to the sensor with an excitation voltage of 10 VDC, then you would want to adjust the output (span) to 10VDC or 20mA. If you are applying half of the full load then you would want to adjust the span to exactly half of the maximum. Once your span is set, check the zero. With no load applied to the sensor, adjust the zero.

Note: Adjusting the zero and span is done by using a screw driver to adjust the potentiometers (pots).

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Shunt Readings

Shunt resistors simulate a load on the load cell; thus, allowing for calibration. Follow the steps below in order to utilize the shunt feature.

1. Determine the value of the shunt resistor needed (http://www.futek.com/shuntcalc.aspx)
2. Connect the shunt resistor in the spot labeled 'RSH'.
3. Press the pushbutton that corresponds to the shunt.
4. While the shunt is enabled and the CSG110 is reading the simulated load, adjust the span (described above) to the correct output.

Ex. If you are using a 2 mV/V sensor with a 350 Ohm bridge and the default 60.4 kOhm resistor on the CSG110, then the simulated load would be approximately 72% of R.O. You can then adjust the span to 7.2 VDC to correlate with this simulated load.

Switch Configurations

To change any of the switch configurations from the default settings, follow the tables below to set your desired configuration. The figure below shows the default configuration.

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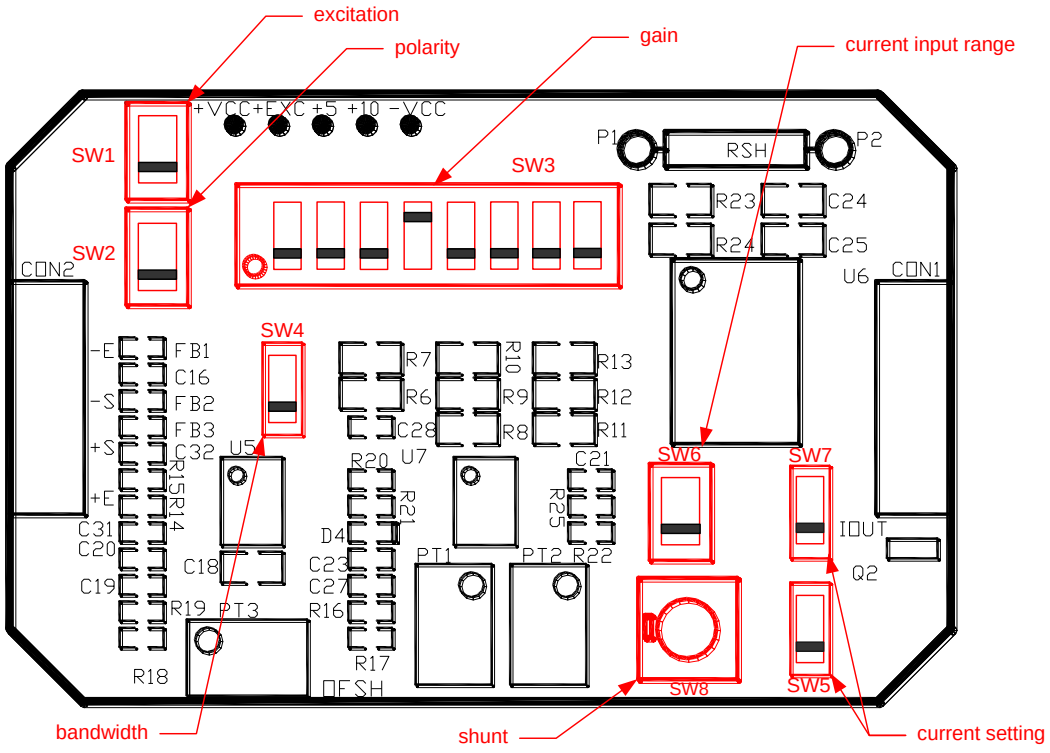

Excitation

There are two excitation values available on the CSG110: 10 VDC (default), and 5 VDC. To select the excitation, simply flip the DIP switch to the appropriate configuration. The excitation voltage controls the maximum output of the amplifier.

Ex. If your application requires a lower output voltage than 10 VDC, then the 5 VDC option is available to use. All you have to do is flip the DIP switch from the down position to the up position.

SW1: Excitation (VDC)	
UP	5
DOWN	10

Polarity

There are two polarities available on the CSG110: reverse, and straight (default). To select the polarity, simply flip the DIP switch to the appropriate configuration.

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Ex. If you are using your CSG110 with a tension and compression load cell and you have tension setup as the positive direction, but now you would like to have compression as the positive direction, all you have to do is flip the DIP switch from the default polarity position to the reverse polarity position.

SW2: Polarity	
UP	reverse
DOWN	straight

Gain

There are eight gain settings available on the CSG110: from 0.5 mV/V to 10 mV/V. The default setting is configured to 2 mV/V. Select the value closest to your input range by flipping the DIP switches to the appropriate configuration.

Ex. If you are using a 2 mV/V sensor with the 5 VDC excitation, then you would want to use configuration 2 for 1 mV/V. If you are using a 2mV/V sensor with 10 VDC excitation then you would want to use configuration 4 for 2 mV/V.

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

Bandwidth

There are two bandwidth settings available on the CSG110: 1 kHz (default), and 10 kHz. To select the bandwidth, simply flip the DIP switch to the appropriate configuration.

Ex. If your application requires a higher bandwidth in order to account for the higher frequency signals, such as those from dynamic applications, then you would want to use the higher setting bandwidth.

SW4: Bandwidth	
UP	10 (3)
DOWN	1

Current Setting (4)

There are four current output settings available on the CSG110: 0-16 mA, 0-20 mA, 4-20 mA (default), and 5-25 mA. To select the current, simply flip the DIP switches to the appropriate configuration.

SW5	SW6	SW7	Input Range (V)	Output Range (mA)
DOWN	DOWN	DOWN	0-10	4-20
DOWN	DOWN	UP	0-10	5-25
UP	DOWN	DOWN	0-10	0-16
UP	DOWN	UP	0-10	0-20
DOWN	UP	DOWN	0-5	4-20
DOWN	UP	UP	0-5	5-25
UP	UP	DOWN	0-5	0-16
UP	UP	UP	0-5	0-20

Note: Only available with current output option.

(3) 25 kHz for QSH01498
(4) Only available with current output option

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Advanced Span and Zero Adjustment

Adjusting the Zero

At times, when using a signal conditioner, it is necessary to offset the zero. The CSG110 makes this simple. The zero can be adjusted approximately ± 10% of R.O. by using the potentiometer on board.

Adjusting the Span

The input jumpers vary from 0.5 mV/V to 10.0 mV/V. This allows for a large variety of input ranges. However, it sometimes happens that the rated output from the sensor is not exactly 2.0 mV/V or 3.0 mV/V. The CSG110 has a ± 10% of R.O. adjustment range so a sensor with an output close to one of the input ranges will work fine.

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Appendix A (Noise levels)

		Current Output		Voltage Output
Bandwidth	**Sensitivity (mV/V)**	**Current noise (µA)**	**Voltage noise (mV)**	**Voltage noise (mV)**
1 kHz	0.5	151	50	30
	1	151	50	25
	1.5	151	50	20
	2	151	50	15
	2.5	151	50	15
	3	151	50	15
	4	151	50	15
	10	151	50	15

		Current Output		Voltage Output
Bandwidth	**Sensitivity (mV/V)**	**Current noise (µA)**	**Voltage noise (mV)**	**Voltage noise (mV)**
10 kHz	0.5	151	75	40
	1	151	75	35
	1.5	151	75	30
	2	151	75	25
	2.5	151	75	20
	3	151	75	20
	4	151	100	20
	10	151	100	15

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Appendix B (Specifications)

Electrical Specifications				
Parameter	**Min**	**Typical**	**Max**	**Unit**
Power Supply[6]	14		26	VDC
Current Draw[7]		30		mA
Output Impedance (Voltage)		< 1 Ohms		Ohms
Output Impedance (Current)			700	Ohms
Sensor Impedance	100			Ohms
Bandwidth	1000		25000	Hz
Common Mode Rejection Ration	120			dB
Noise		15		mVp-p
Output Span Range	-10		10	% of Rated Output
Output Zero Range	-10		10	% of Rated Output
Gain Drift with Temperature	-25	X	25	PPM of FSR per degree Celsius
Gain Non-Linearity	-0.001	X	0.001	% of FSR
Zero Drift with Temperature	-25	X	25	PPM of FSR per degree Celsius

[6] Minimum Power Supply Varies for OEM Models
[7] No Load Applied (Input or Output)