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JBA Strain Gauge Active Junction Box

Instruction Sheet

Features

- The Strain Gauge Junction Box is used to sum the outputs from up to four Strain Gauges to allow them to be connected to the LCA15, LCA20, ADW, LCD20 etc. Strain Gauge Indicators/Controllers
- The individual channel gains are set up via DIL switches and multi-turn potentiometers to allow for 1, 2, 3, or 4 Strain Gauges and facilitate corner correction
- Gain is non-interactive between channels to speed up matching of the Strain Gauges



Introduction

The JBA is an active summing junction box providing connectivity for up to four strain gauge-based sensors such as load cells, force sensors, pressure sensors, torque sensors etc. Power is derived from the host instrument, for example the ADW, LCA20, LCD20 etc.

Individual channel gains are setup via an 8-way DIP switch and multi-turn potentiometers to produce an overall 1:1 input/output gain e.g. if three gauges are connected they are each given a gain of 0.33 so that when summed, the overall gain is unity. The whole installation then appears as a single gauge to the host.

Any resulting offset (Zero) is not adjustable but can be compensated for in the host instrument.

The switch setting diagram on the JBA PCB assumes that the load cell channels are filled starting from Channel 1 through to Channel 4 as required. Unused channels should be linked out (+IN to -IN).

DIL Switch settings

Number of strain gauges connected	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	SW1-7	SW1-8	Gain range (channel trimmer)
1	On	On	Off	Off	Off	Off	Off	Off	x0.5 – x1.0
2	Off	On	Off	On	Off	Off	Off	Off	x0.33 – x0.5
3	On	Off	On	Off	On	Off	Off	Off	x0.25 – x0.33
4	Off	Off	Off	Off	Off	Off	Off	Off	x0.20 – x0.25

Calibration

The unit is designed for 4-wire Strain Gauges. If 6-wire Strain Gauges are used connect their excitation and sense wires to the appropriate '+E' and '-E' terminals. The four channels can be matched by adjusting the 'CHANNEL GAIN' potentiometers having first set the DIL switches for the number of Strain Gauges used. Final calibration and Zero adjustment will be carried out on the host instrument.

If access to the individual Strain Gauges is possible e.g. before the platform or hopper is in position, then calibration can be carried out by placing a weight on one of the cells, and noting the change in display reading on the host instrument. Repeat this for each remaining Strain Gauge channel adjusting the appropriate 'CHANNEL GAIN' potentiometer to give the same change in display reading for each cell used.

The 'OUTPUT GAIN' potentiometer can be used to adjust the overall gain as required.

If the strain gauges are already loaded i.e. the platform or hopper is already in place, it will be necessary to use a millivolt source to carry out the calibration.

Disconnect the gauges and set the DIL switch according to the number of channels being used (see above table).

Starting with channel 1, measure the excitation voltage between '+E' and '-E', multiply this voltage by the millivolt/volt figure given for the particular strain gauge e.g. $9.98 \times 2.503 = 24.98\text{mV}$. This will be the output voltage of the strain gauge when fully loaded. Apply the corresponding mV to the '+IN' and '-IN' terminals.

Divide the calculated mV value by the number of gauges to be used and adjust the appropriate 'CHANNEL GAIN' potentiometer to give this value between the '-OUT' and '+OUT' JBA terminals.

Disconnect the mV source and repeat with the other channels in the system.

Specifications

Electrical specifications	Typical	Units/notes
Power supply	5-10	V (note 1)
Current requirement	12	mA (note 2)
Input range	2	mV/V
Bridge resistance	350	Ohms (note 3)
Zero	±0.03	mV
Zero temperature coefficient	0.0014	%FR/°C (note 4)
Gain temperature coefficient	0.005	%/°C
Channel gain adjustment	0.2 – 1.1	(note 5)
Output gain adjustment	±12	%

Note 1: sourced from the host's excitation supply.

Note 2: excluding strain gauge excitation current.

Note 3: The sum of the load cell excitation currents must not exceed the capability of the host.

Note 4: 2.5mV/V @ 4V excitation.

Note 5: dependant on the number of gauges used – set by DIP switch and channel potentiometer.

Environmental	Typical
Storage temperature	-55 to + 125°C
Operating temperature	-40 to +80°C
Maximum humidity	95% non-condensing

Approvals	
European EMC Directive	2004/108/EC
Low Voltage Directive	2006/95/EC

Strain gauge connections
Two-part rising clamp screw connectors
6-wire from host to JBA, 4-wire from JBA to each strain gauge
Maximum cable size 2.5mm ²

