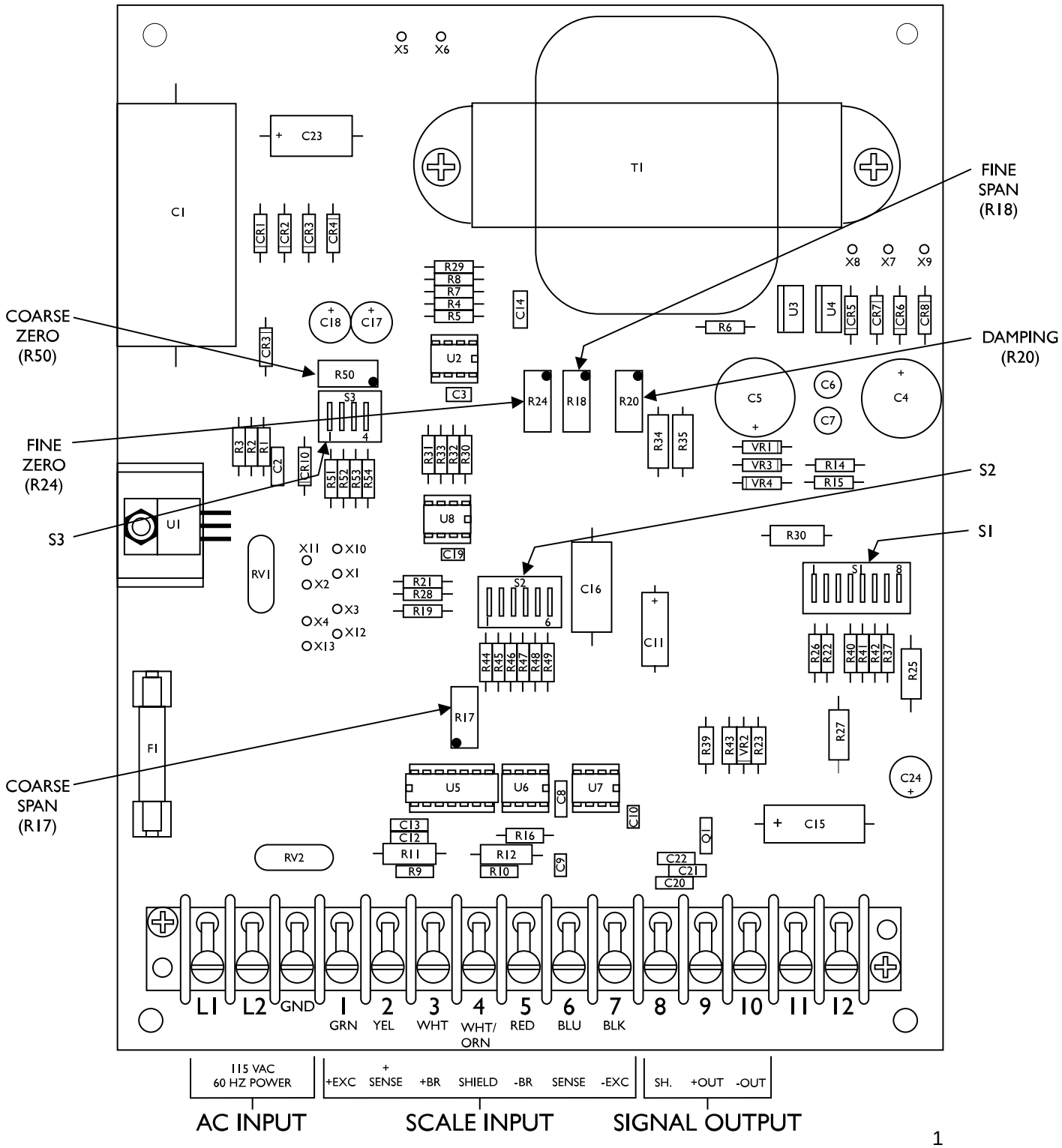
WEIGH-TRONIX

SP-100 Analog Signal Processor
Installation and Calibration Guide



Introduction

The SP-100 interfaces with Weigh-Tronix scales, batching weigh bars or other manufacturer's weight sensors and provides an analog output proportional to applied weight.

Installation

If used with a scale with no sense lines (four conductor cable plus shield), terminals 1 and 2 must be connected together and terminals 6 and 7 must be connected together.

The SP-100 has excellent temperature stability and is normally supplied with a NEMA IV enclosure. Whenever possible however, it is prudent to avoid installing the instrument in areas with wide temperature fluctuations, where it will be subject to washdown, or in areas with severe vibrations.

The pc board illustration on the cover shows the location of the potentiometers and switches, provides field wiring information, and the color of the wires used in Weigh-Tronix supplied cables.

Selectable Outputs

Standard SP-100 outputs are:

ZERO BASED	WITH ZERO OFFSET
0-1 Volt	.2-1 Volt
0-5 Volt	1-5 Volt
0-10 Volt	2-10 Volt
0-5mA	1-5mA
0-20mA	4-20mA
0-50mA	10-50mA

DESCRIPTION	S1 1	2	3	4	5	6	7	8
0-1 Volt	X	0	0	X	0	0	0	0
.2-1 Volt	X	0	0	X	0	0	X	X
0-5 Volt	X	0	0	0	X	0	0	0
1-5 Volt	X	0	0	0	X	0	X	X
0-10 Volt	X	0	0	0	0	X	0	0
2-10 Volt	X	0	0	0	0	X	X	X
0-5mA	X	0	0	0	0	0	0	0
1-5mA	X	0	0	0	0	0	X	X
0-20mA	0	X	0	0	0	0	0	0
4-20mA	0	X	0	0	0	0	X	X
0-50mA	0	0	X	0	0	0	0	0
10-50mA	0	0	X	0	0	0	X	X

Table 1
Output programming (X=Closed)

For voltage outputs, the load to which the output is applied should be 5000 ohms per volt or greater.

For current outputs the loads should be: 5mA output for 2400 ohms or less, 20mA output for 600 ohms or less, 50mA for 240 ohms or less.

Coarse Zero and Deadload Compensation

The coarse zero adjustment or deadload compensation is normally made in the junction box. If your scale does not have a junction box, deadload compensation is provided on this indicator.

The required amount of deadload compensation is determined by this calculation:

Applied Load/Scale Capacity X Scale mv/v = Required Compensation

Example:

This example calculates the required deadload compensation with three 75,000 lb (2mv/v) weigh bars with a deadload of 100,000 lb.

100,000/225,000 X 2mv/v = .89mv/v

Coarse Zero (R50) Range-mv/v	Switch 3 1	2	3	4
-.20 to +.2	X	0	0	0
-.05 to +.35	X	X	0	0
+.10 to +.5	X	X	X	0
+.25 to +.65	X	X	X	0
+.40 to +.8	X	0	0	X
+.55 to +.95	X	X	0	X
+.70 to +1.1	X	0	X	X
+.85 to +1.25	X	X	X	X

Table 2

Deadload compensation programming (X=closed)

Switches S2-1 through S2-6 provide coarse settings for the gain (or mv/v) of the SP-100. The appropriate gain is determined by the mv/v, capacity, and live load (net weight) of the scale. The SP-100 or system mv/v can be calculated as follows:

Live Load / Scale Capacity X Scale mv/v = System mv/v

Example 1

This example calculates the mv/v programming required for a 2000 lb (lmv/v) capacity scale which will be used to 1600 lb.

1600/2000 X 1mv/v = .8mv/v

Example 2:

This example calculates the mv/v programming required for a scale with three 20,000 lb (2mv/v) capacity batching weigh bars used to weigh 40,000 lb.

40,000/60,000 X 2mv/v = 1.33mv/v

	Switch S2					
MV/V	1	2	3	4	5	6
0.05	X	X	X	X	X	X
0.09	0	X	X	X	X	X
0.12	X	0	X	X	X	X
0.15	0	0	X	X	X	X
0.19	X	X	0	X	X	X
0.22	0	X	0	X	X	X
0.26	X	0	0	X	X	X
0.29	0	0	0	X	X	X
0.33	X	X	X	0	X	X
0.36	0	X	X	0	X	X
0.39	X	0	X	0	X	X
0.43	0	0	X	0	X	X
0.46	X	X	0	0	X	X
0.50	0	X	0	0	X	X
0.53	X	0	0	0	X	X
0.56	0	0	0	0	X	X
0.59	X	X	X	X	0	X
0.62	0	X	X	X	0	X
0.66	X	0	X	X	0	X
0.69	0	0	X	X	0	X
0.73	X	X	0	X	0	X
0.76	0	X	0	X	0	X
0.79	X	0	0	X	0	X
0.81	0	0	0	X	0	X
0.86	X	X	X	0	0	X
0.90	0	X	X	0	0	X
0.93	X	0	X	0	0	X
0.97	0	0	X	0	0	X
1.00	X	X	0	0	0	X
1.03	0	X	0	0	0	X
1.07	X	0	0	0	0	X

	Switch S2					
MV/V	1	2	3	4	5	6
1.10	0	0	0	0	0	X
1.13	0	X	X	X	X	0
1.17	X	0	X	X	X	0
1.20	0	0	X	X	X	0
1.24	X	X	0	X	X	0
1.27	0	X	0	X	X	0
1.30	X	0	0	X	X	0
1.34	0	0	0	X	X	0
1.37	X	X	X	0	X	0
1.41	0	X	X	0	X	0
1.44	X	0	X	0	X	0
1.48	0	0	X	0	X	0
1.51	X	X	0	0	X	0
1.54	0	X	0	0	X	0
1.58	X	0	0	0	X	0
1.61	0	0	0	0	X	0
1.64	X	X	X	X	0	0
1.67	0	X	X	X	0	0
1.70	X	0	X	X	0	0
1.74	0	0	X	X	0	0
1.77	X	X	0	X	0	0
1.81	0	X	0	X	0	X
1.84	X	0	0	X	0	0
1.87	0	0	0	X	0	0
1.91	X	X	X	0	0	0
1.94	0	X	X	0	0	0
1.98	X	0	X	0	0	0
2.01	0	0	X	0	0	0
2.05	X	X	0	0	0	0
2.08	0	X	0	0	0	0
2.11	X	0	0	0	0	0
2.15	0	0	0	0	0	0

Table 3
MV/V Programming (X=Closed)

Occasionally, due to scale or component tolerances there may be insufficient span range (R17 and R18) to calibrate at the calculated mv/v. Should this happen, use switches S2-1 through S2-6 to select a higher or lower gain. This will not degrade performance nor affect system accuracy.

Calibration Procedure

Zero Based Output

1. Turn R20 (damping) fully counterclockwise.
2. With the scale empty, adjust the coarse zero pot and/or R24, the fine zero pot, for zero output.

   Care must be taken not to obtain a negative output. Adjust for a slightly positive output, then slowly turn R24 counterclockwise until just on zero.
3. Select the appropriate gain with S1-1 through S1-6, apply a known weight, and adjust R17 (coarse span) and R18 (fine span) for the proper output.

EXAMPLE: This example calculates the gain for 200 lb scale programmed for 0-20mA output with 150 lb on the scale.

150/200 X 20mA = 15mA

Zero Offset Output

1. Turn R20 (damping) fully counterclockwise.
2. Open S1-7.
3. With the scale empty, adjust the coarse zero pot and/or R24, the fine zero pot, for zero output.

   Care must be taken not to obtain a negative output. Adjust for a slightly positive output, then slowly turn R24 counterclockwise until just on zero.
4. Select the appropriate gain with S2-1 through S2-6, apply a known weight, and adjust R17 (coarse span) and R18 (fine span) for the proper span range output.

   The span range is equal to full scale output minus zero offset. Span range for 4-20mA output is 20 minus 4 or 16mA. Span range for 1 to 5mA is 5 minus 1 or 4mA.

EXAMPLE: This example calculates the mA output for a 200 lb scale programmed for 4 to 20mA output with 150 lb on the scale.

150/200 X 16mA = 12mA

5. Close S1-7 and adjust R50 (coarse zero) and/or R24 (fine zero), until the output increases by the zero offset quantity.

   Using the previous example, adjust zero until the output increases from 12mA to 16mA.
6. Remove the weight and insure the output equals the zero offset (4mA for the 4-20mA range). If not, adjust R24 and/or R50 coarse zero pot.

7. Apply the weight and insure the output is the same as in step 5 above. If not, adjust R17 and/or R18.
8. Repeat steps 6 and 7 as required.

   R20 is a damping adjustment which slows the SP-100 response and averages the output. To reduce the effect of vibrations and other interferences, adjust R20 clockwise until the output is suitable for the application.

UNITED STATES

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CANADA

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la Class A prescrites dans le Reglement sur le brouillage radioelectrique que edicte par le ministere des Communications du Canada.

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04/20/00 SP100.P65 PN 29519-0011e1 Printed in USA