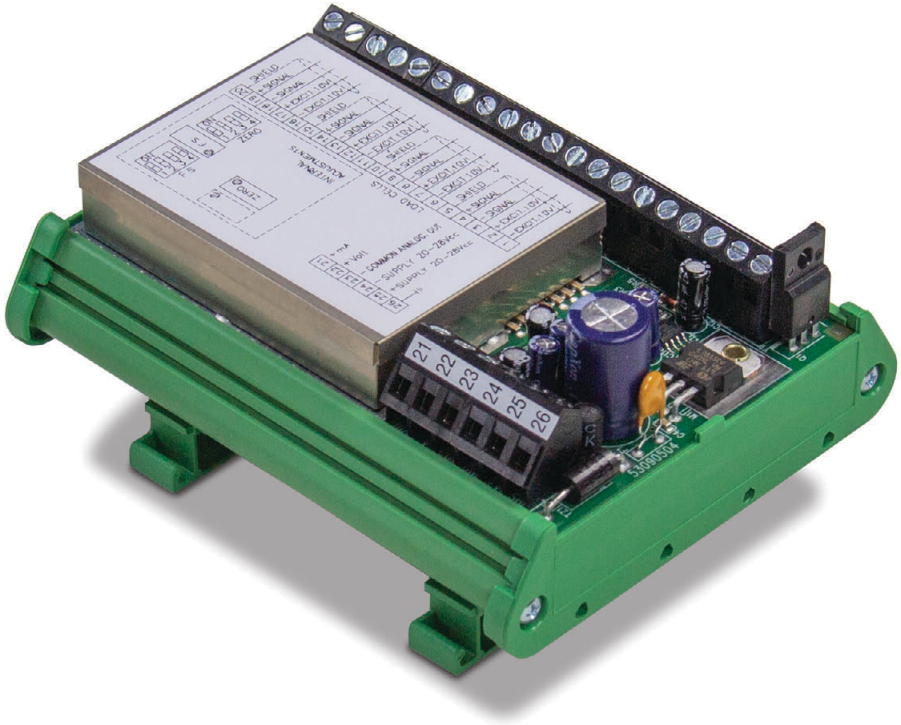
SCT-3300

Signal Conditioning Transmitter

Installation Manual



RICE LAKE WEIGHING SYSTEMS

January 19, 2022

PN 190937 Rev B

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www.ricelake.com

Contents

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1.0 Introduction

This manual is intended for use by service technicians responsible for installing and servicing SCT-3300 Signal Conditioning Transmitters/Indicators.

IMPORTANT ***This instrument must not be opened by the user. Any attempt to repair or alter the unit can expose the user to the danger of electric shock and will void the warranty. If a problem with the unit or system is experienced, please notify the manufacturer or the dealer.***

1.1 Safety

Safety Signal Definitions:

DANGER ***Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. Includes hazards that are exposed when guards are removed.***

WARNING ***Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death. Includes hazards that are exposed when guards are removed.***

CAUTION ***Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.***

IMPORTANT ***Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.***

General Safety

Do not operate or work on this equipment unless this manual has been read and all instructions are understood. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Rice Lake Weighing Systems dealer for replacement manuals.

WARNING

Failure to heed could result in serious injury or death.

Electric shock hazard!

Do not install in areas subject to explosion hazard.

There are no user serviceable parts. Refer to qualified service personnel for service.

Always disconnect from main power before performing any work on the device.

Do not allow minors (children) or inexperienced persons to operate this unit.

Do not operate without all shields and guards in place.

Do not use for purposes other then weighing applications.

Do not place fingers into slots or possible pinch points.

Do not use this product if any of the components are cracked.

Do not make alterations or modifications to the unit.

Do not remove or obscure warning labels.

Do not use near water.

IMPORTANT

Failure to follow could result in damage to equipment or corruption to and loss of data.

Keep away from heat sources and direct sunlight.

Protect the instrument from environmental factors: rain, snow, dust, etc.

Clean the instrument with a damp cloth, do not use anything but water

Always mount the instrument and platform in a vibration free setting.

All instrument connections must be made with respect to local zone and environment standards.

2.0 Installation

2.1 Load Cell Connections

Connect up to four load cells. The load cells are summed and provide an analog output signal. Adjustments for zero and span can be made. There is an adjustment to increase stability to reduce the effect of environmental vibration.

The connections are for four-wire load cells, if using six-wire load cells connect the sense lines to the excitation. Power the unit with 20–28 VDC. Analog outputs for 0–10 VDC, 0–20 mA or 4–20 mA are provided.

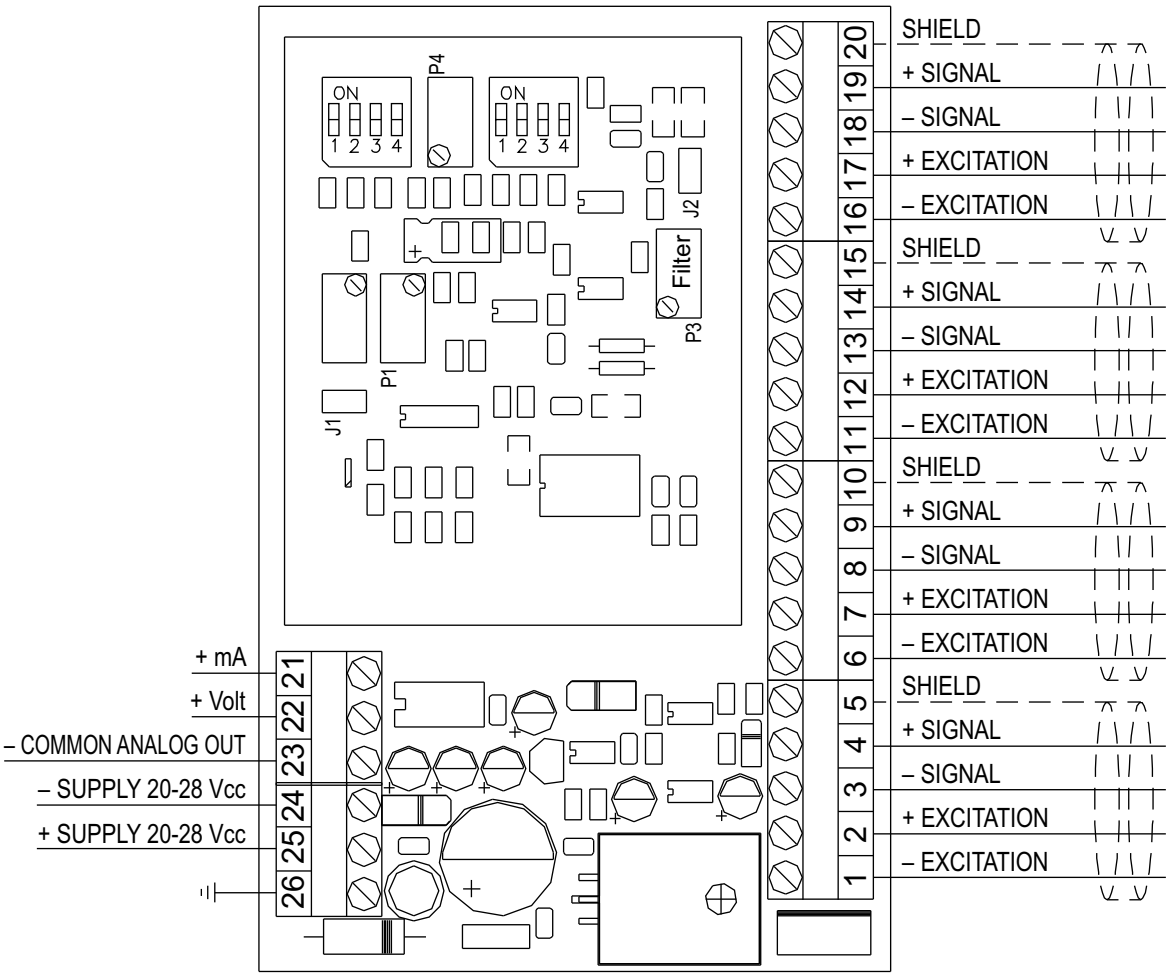

Figure 2-1. Connections

2.2 Start Up

Power on the indicator and wait 10 minutes for all components to reach a steady temperature. Ensure the scale is empty and free from mechanical constraints.

Using a voltmeter make sure the output is positive and increases when weight is applied to the scale. If the output is negative check the load cell connection and installation (the + and - signal may need to be reversed, whether the load cell is used in tension or compression).

2.3 Weight Oscillations (Vibration)

If the displayed weight is not steady it is possible to increase stability by using the analog filter. Turn the potentiometer (P3) clockwise to reduce the oscillations. To deactivate the filter remove the J2 jumper.

2.4 Installation Considerations

- Use proper grounding by connecting the upper supporting plate to the lower supporting plate with copper wire, then connect all the upper plates to the grounding system.
- For optimal functioning of the system, it is necessary to connect the transmitter, load cells, junction box and weighing structure to a single point ground. Ground the transmitter terminal 26 (SHD) to the earth ground of the system.
- Use conduit to protect the load cell cables.
- Use a waterproof junction box to extend load cell cables or to sum the load cells.
- Load cell cables must have their own conduit and be run as far as possible from any power cables.
- Load cell cables must be shielded separately from high voltage lines to reduce electrical interference when passing through troughs containing other cables.
- Use RC filters (Quench Arcs) on relays and control switches.
- The board installer is responsible for securing the electrical safety of the instruments (fuses, door-locking switch, etc.).

IMPORTANT ***Avoid welding near load cells.***

2.5 Mechanical Installation Check

1. With a voltmeter, measure the load cells excitation supply on the terminals 1 and 2 to read the actual 10 VDC excitation value.
2. When the scale is empty measure the signal in mV on the terminals 3 and 4.
3. Put a calibration weight on the scale and measure the signal in mV again.

Make sure the signal increase corresponds to the result of the following equation:

mV Total/ FS Capacity = mV Change/ Cal Weight

- **mV Total** is excitation voltage x mV/V rating of load cells
- **FS Capacity** is load cell capacity x number of load cells
- **mV Change** is the millivolt change when the weight is applied
- **Cal Weight** is the amount of test weight

Example *– Assume there are four 2,500 lb load cells for an FS Capacity of 10,000 lb*

With a calibration weight of 1,000 lb, the signal increases to 2.0 mV

$$\frac{\text{mV Total}}{\text{FS Capacity}} = \frac{\text{mV Change}}{\text{Cal Weight}}$$

$$\frac{20\text{ mV}}{10{,}000\text{ lb}} = \frac{X}{1{,}000\text{ lb}} \rightarrow X = \frac{20{,}000}{10{,}000} \rightarrow X = 2.0\text{ mV}$$

4. If the value in mV is correct and the output signal is wrong move on to **Calibration** (Section 3.0 on page 5).
5. If the value in mV is lower than the calculated value move on to the **Load Cell Verification**.
6. If the value in mV is greater than the calculated value move on to the **Load Cell Verification**.

Note ***If problems exist after completing the installation check, please call Rice Lake Weighing Systems for support.***

2.6 Analog Output Modification

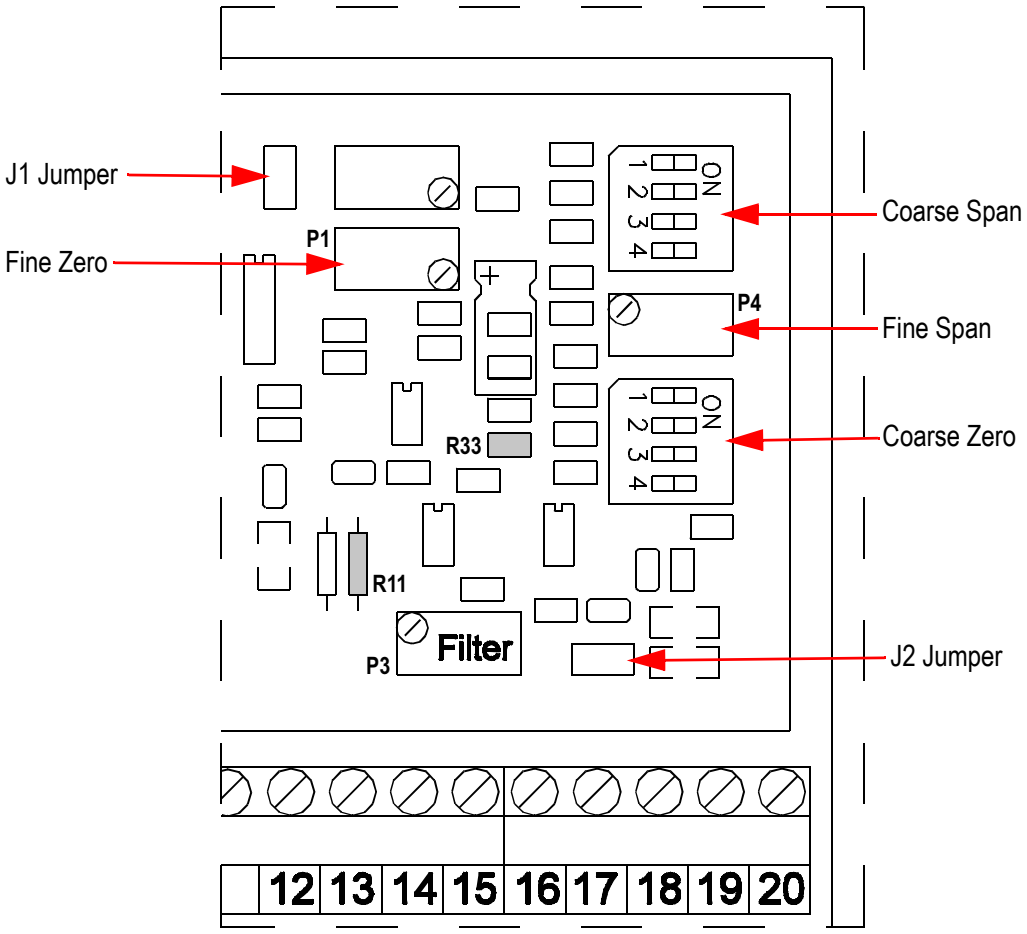

Figure 2-2. Analog Output Modification

- Remove the J1 jumper to obtain an analog output of 0–10 VDC (output on terminals 22–23)
- Remove the J1 jumper to obtain an analog output of 0–20 mA (output on terminals 21–23)
- Close the J1 jumper to obtain an analog output of 4–20 mA (output on terminals 21–23)
- If dead load exceeds 17 mV put a resistance of 10K (1/8 of Watt) instead of R33 (normally is 22 k)
- If signal exceeds 35 mV, add a 49.9K resistance (1% precision and temperature precision of 15 ppm) in parallel to R11

3.0 Calibration

3.1 Calibration Check

The instrument supplied has already been calibrated. This section provides information to check and adjust the zero and span calibrations. Always adjust the zero calibration first and then use a test weight equal to at least 50% of the max load capacity on the scale to check and adjust the span calibration. If the span output is less than expected, verify the error is not caused by a mechanical influence such as binding, side load, or angular load (see the Mechanical Installation Check, Section 2.5 on page 3).

Adjust the zero calibration (Section 3.1.1) before adjusting the span calibration (Section 3.1.2 on page 6).

3.1.1 Zero Calibration

Make sure the scale is empty, verify the output is 0 VDC, 0 mA or 4 mA and adjust as needed. See Table 3-1.

- Make sure the scale is empty
- Use the Fine Zero potentiometer for small variations or the Coarse Zero DIP switches to approach zero

Set DIP Switches of Coarse Zero (Figure 2-2 on page 4):

0 = OFF 1 = ON

Position of DIP Switches (1234)	Input mV to Set to Zero	
	mV range with potentiometer set to counterclockwise	mV range with potentiometer set to clockwise
0000	-2.4	-0.4
1000	-0.2	2.6
0100	1.7	4.5
1100	3.4	6.2
0010	4.9	7.7
1010	6.2	9.1
0110	7.3	10.2
1110	8.4	11.3
0001	9.4	12.3
1001	10.3	13.2
0101	11.1	14.0
1101	11.8	14.7
0011	12.5	15.4
1011	13.1	16.0
0111	13.7	16.6
1111	14.3	17.2

Table 3-1. Registered Values with Span Dip Switches Set to 1001 (Trim Span Clockwise)

3.1.2 Span Calibration

To check the span, put a test weight equal to at least 50% of the full scale and use the Fine Span potentiometer (Figure 2-2 on page 4) to adjust the corresponding output to the exact value. If the fine adjustment isn't sufficient use the DIP switches of Coarse Span, then verify the zero output is 0 VDC or 0 mA or 4 mA again. If necessary adjust the Zero and then reapply the test weight and recheck the span output. Repeat this operation until the output is correct.

Set DIP Switches 1-4 corresponding to the input mV to obtain 20 mA or 10 VDC.

Set DIP Switches of Coarse Span (Figure 2-2 on page 4):

0 = OFF 1 = ON

Position of DIP Switches (1234)	Input mV to Obtain 10 VDC or 20 mA Output	
	mV range with potentiometer set to counterclockwise	mV range with potentiometer set to clockwise
1111	31.2	19.5
0111	20.8	14.8
1011	15.5	12.0
0011	12.5	10.0
1101	10.3	8.6
0101	8.8	7.5
1001	7.7	6.7
0001	6.9	6.1
1110	6.3	5.6
0110	5.8	5.2
1010	5.3	4.8
0010	4.9	4.5
1100	4.5	4.2
0100	4.2	3.9
1000	3.9	3.7
0000	3.7	3.5

Table 3-2. Registered Values with Zero DIP Switches Set to 0000 (Trim Zero Counterclockwise)

3.2 Calibration Through Simulator

Use a cell simulator and a voltmeter to display in 0.1 of a millivolt.

1. Connect the simulator to the SCT-3300.
2. Measure the mV input on the terminals 4 (+) and 3 (-) and verify 0 mV; verify the mA or VDC output is 0-4 mA or 0 VDC (in accordance with the model used) otherwise use the DIP switches of coarse zero and the fine zero to set the output to those values (usually the DIP switch 1 is in position ON).
3. Measure the supply (about 10V +/- 3%) on the terminals 1 (-) and 2 (+).
4. Multiply this value by the rated output of the cells (mV/V) to obtain the mV value in input, set the simulator to obtain this value on the terminals 4 (+) and 3 (-).
5. Use the DIP switches and the potentiometer for span full scale to obtain in output 20 mA or 10 VDC.
6. Bring the mV input to zero and check the 4 - 0 mA or 0 VDC output, otherwise adjust the new value.
7. Move the mV input to full scale (load cells supply x rated output) and make sure the output signal is 20 mA or 10 VDC.
8. Adjust the full scale (Fine Span) if necessary.

4.0 Compliance

EU DECLARATION OF CONFORMITY

EU-KONFORMITÄTSERKLÄRUNG
DÉCLARATION UE DE CONFORMITÉ

Rice Lake Weighing Systems
230 West Coleman Street
Rice Lake, Wisconsin 54868
United States of America

Type/Typ/Type: SCT indicator series

English We declare under our sole responsibility that the products to which this declaration refers to, is in conformity with the following standard(s) or other regulations document(s).

Deutsch Wir erklären unter unserer alleinigen Verantwortung, dass die Produkte auf die sich diese Erklärung bezieht, den folgenden Normen und Regulierungsbestimmungen entsprechen.

Francais Nous déclarons sous notre responsabilité que les produits auxquels se rapporte la présente déclartion, sont conformes à la/aux norme/s suivante ou au/aux document/s normatif/s suivant/s.

EU Directive	Certificates	Standards Used / Notified Body Involvement
2014/30/EU EMC	-	EN 61000-6-2:2015, EN 61000-6-4:2007+A1:2011, EN61326-1:2013, EN55011:2009 +A1:2010
2014/35/EU LVD	-	EN 61010-1:2010
2011/65/EU RoHS	-	EN 50581:2012

Signature: Richard Shipman

Type Name: Richard Shipman

Title: Quality Manager

Place: Rice Lake, WI USA

Date: May 3, 2019

UK DECLARATION OF CONFORMITY

Rice Lake Weighing Systems
230 West Coleman Street
Rice Lake, Wisconsin 54868
United States of America

Type: SCT indicator series

English We declare under our sole responsibility that the products to which this declaration refers to, is in conformity with the following standard(s) or other regulations document(s).

UK Regulations	Certificates	Standards Used / Approved Body Involvement
2016/1101 Low Voltage	-	EN 61010-1:2010
2016/1091 EMC	-	EN 61000-6-2:2015, EN 61000-6-4:2007+A1:2011, EN61326-1:2013, EN55011:2009 +A1:2010
2012/3032 RoHS	-	EN 50581:2012

Signature: Brandi Harder

Name: Brandi Harder

Title: Quality Manager

Place: Rice Lake, WI USA

Date: December 30, 2021

5.0 Specifications

Dimensions	4.49 in x 3.66 in x 2.36 in (114 mm x 93 mm x 60 mm)
Mounting	Suitable for assembly on back panel or in junction box mounted to 35 mm DIN or Omega rail
Enclosure	Plastic resin, with DIN or Omega clips
Power	20-28 VDC LPS or with Class 2 Power Supply
Precision	0.25%
Repeatability	0.01%
Power Consumption	6 VA
Protection Degree	IP 50
Capacity	6 parallel load cells, 350 ohm
Load Cell Connection	4 wire
Load Cell Supply	10 VDC +/- 3%
Measuring Range	3.5-24 mV
Coarse Zero	4 DIP switches, 70% range
Fine Zero	Potentiometer 10% range
Coarse Full Scale Span	4 DIP switches
Fine Full Scale Span	Potentiometer, 10% range
Operating Temperature Range	14-122^{o} F (-10-50^{o} C)
Storage Temperature Range	-4-158^{o} F (-20-70^{o} C)
Thermal Stability	0.01% of range for 50^{o} F
Time of Thermal Stabilization	10 minutes
Analog Output	0-10 VDC (terminal 22-23) 0-20mA, 4-20 mA (terminals 21-23)

Table 5-1. Technical Specifications

5.1 FCC Compliance

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 présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescites dans le Règlement sur le brouillage radioélectrique edicté par le ministère des Communications du Canada.

RICE LAKE®
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