



SI OnBoard

ROAD RUNNER I

Aircraft Scale with
Portable Wheel Weighers



ROAD RUNNER

6190103 Rev A

5920 South 194th Street | Kent, WA 98032 | USA
Sales Support: 800-638-5111 | Technical Support: 626-202-5047
E-mail: sionboard@vpgsensors.com

www.sionboard.com

CONTENTS

	<u>Page</u>
Introduction	1
Purpose of this Manual	2
Accuracy	2
Recalibration	2
System Parts List	3
Description of Components	4
Weighing Pads	4
Figure 1	4
Indicator	5
Figure 2	6
Battery Charger Cable	8
Wheel Weigher Cables	8
Setup for Weighing	9
Figure 3	9
Weighing the Aircraft	10
Troubleshooting	11
Optional Metal Connectors Technical Reference Information	15
Warranty	16
Calibration Data	

INTRODUCTION

ROAD RUNNER WHEEL WEIGHERS are placed under the tires to weigh an aircraft. The aircraft may be rolled up the ramps onto the wheel weigher pads or the aircraft may be jacked up and the pads slid under the tires. Tire stops may be inserted into slots on the pads to prevent the plane from rolling off:

Although specifically designed for weighing aircraft, the wheel weighers may also be used to weigh race cars, ambulances, farm wagons or other vehicles. They may also be used for taking inventory by weight or for determining weights of packages being shipped.

The system consists of WEIGHING PADS, a digital summing INDICATOR, COLORED CABLES and a BATTERY CHARGER CABLE for recharging the internal battery or operating the system from AC power. RAMPS and TIRE STOPS are also included. TENSION LOAD CELLS are also available (optional) for weighing aircraft where one end must be hoisted to level the craft.

Individual pad capacities of 2,500 pounds (1136 kgs.), 6,000 pounds (2722 kgs.), 10,000 pounds (4536 kgs.), and 15,000 pounds (6804 kgs.) are available. Different capacity pads may be mixed within the system.

The INDICATOR displays weight on any individual pad or the total aircraft weight or the total of any combination of wheel weights.

Weights are displayed in 1 pound (or 1 kg.) increments. The totalizer is limited to 20,000 counts (20,000 pounds or 20,000 kgs.). Weights must be summed manually above 20,000.

Each channel is color coded. The weighing pad, indicator input connector, zero knob and cable for each channel are all marked with the same color.

An internal RECHARGEABLE BATTERY operates the scale for at least 18 hours without recharging. The recharger cable can be connected to 115 Volt AC power to operate the scale or recharge the battery. A charger for 220 Volt 50 Hz power is available (optional). Power is automatically turned OFF when all wheel weigher cables are disconnected from the indicator. This is a battery saving feature.

AC POWER PLUGS for most nations are available on the battery charger cable. Battery charger cables are not grounded.

PURPOSE OF THIS MANUAL

This manual provides instructions for using the ROAD RUNNER I WHEEL WEIGHERS. It is not intended as a procedure for aircraft weight and balance measurement and calculation. The user is referred to the aircraft manufacturer's weighing instructions or to a comprehensive Weight and Balance Manual.

ACCURACY

Weighing accuracy is within 0.2% in typical operation. Accuracy can be improved to 0.1% by centering the tires carefully on the weighing pads.

RECALIBRATION

The scale should be calibrated once a year. Periodic recalibration by EVERGREEN WEIGH, INC. is recommended since most local agencies do not have the proper equipment to apply many thousands of pounds to the load cells with the required accuracy.

Calibration adjustments are located under date-marked calibration stickers on the front panel. These stickers should not be broken except during recalibration.

ROAD RUNNER I
WHEEL WEIGHER SYSTEM
PARTS LIST

<u>ITEM</u>	<u>PART NUMBER</u>		<u>QUANTITY</u>
Weighing Pads (any combination) or	1-0235-2.5K	(2,500 Lbs.)	(as requested)
or	1-0235-06K	(6,000 Lbs.)	
or	1-0235-10K	(10,000 Lbs.)	
or	1-0235-15K	(15,000 Lbs.)	
Indicator	3-0057-BA-3C	(3 Channel)	1
or	3-0057-BA-4C	(4 Channel)	
or	3-0057-BA-5C	(5 Channel)	
or	3-0057-BA-6C	(6 Channel)	
Load Cell Cables	5-0017-25C	(25 Ft.-Colored)	1 per Weighing Pad
Battery Chgr. Cable	5-0018-01	(115 Volts AC) USA	1
Manuals	6-0003		2
Calibration Certificates	6-0008		2
Aircraft Hat	2-0269-01		1
Ramps	2-0202	(2,500 Lb. Pads)	1 per Weighing Pad
or	2-0243	(6,000, 10,000 and 15,000 Lb. Pads)	
Tire Stops (Chocks)	2-0209		2 per Weighing Pad
<u>LIST OF OPTIONAL PARTS</u>			
Battery Chgr. Cable	5-0021-01	(230 Volts AC)	Germany Austria Netherlands Belgium France Norway Sweden Finland
or	5-0021-02	(230 Volts AC)	Australia New Zealand
or	5-0021-03	(230 Volts AC)	Great Britain
or	5-0021-04	(230 Volts AC)	Denmark
or	5-0021-05	(230 Volts AC)	Israel
or	5-0021-06	(230 Volts AC)	Italy
or	5-0021-07	(230 Volts AC)	South Africa India
or	5-0021-08	(230 Volts AC)	Switzerland
Tension Load Calls	1-0234-3K-I+	(3,000 Lbs.)	Use Polarity Reversing Cable for positive tension reading.
or	1-0130-5K-C+	(5,000 Lbs.)	
or	1-0234-10K-I+	(10,000 Lbs.)	
Polarity Reversing Cable	5-0025		
Eyebolts with Nuts	2-0268-01	(3,000 Lb. Cells)	
	2-0268-02	(5,000 and 10,000 Lb. Cells)	
Storage Box	2-0301	(2,500 Lb. Pads)	
	2-0266	(6,000, 10,000 and 15,000 Lb. Pads)	

DESCRIPTION OF SYSTEM COMPONENTS

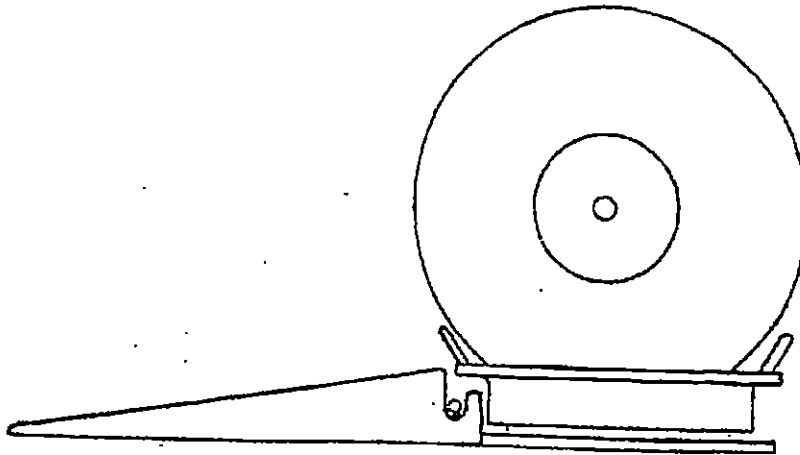
WEIGHING PADS (Figure 1)

Each weighing pad consists of a heavy duty aluminum casting with the ROAD RUNNER logo on the top surface. A precision load cell is mounted in each pad. Pad capacities are 2,500 pounds, 6,000 pounds, 10,000 pounds and 15,000 pounds. Other capacities are available on special orders.

A single strain gage load cell is mounted inside each weighing pad. The load cell is temperature compensated. Weight readings are not sensitive to location of the tire on the pad (to within $\pm 0.2\%$). Accuracy within $\pm 0.1\%$ can be achieved by carefully centering the tire on the pad.

All load cells of a particular capacity are calibrated alike within $\pm 1/4\%$. Load cells are easily replaced by unbolting from the scale pad and bolting a new load cell in place.

Load cells are temperature compensated to prevent zero or sensitivity variations due to temperature changes.



TIRE ON WEIGHING PAD
FIGURE 1

INDICATOR (Figure 2)

The DIGITAL INDICATOR is housed in its own portable carrying case. It is powered by an internal sealed lead acid rechargeable battery or by external AC power through the battery charger cable. Weight is shown on a liquid crystal display for easy viewing, even in direct sunlight.

A CONNECTOR for each wheel weigher cable is mounted on the side of the indicator housing. Each connector is color coded to match a particular weighing pad and cable.

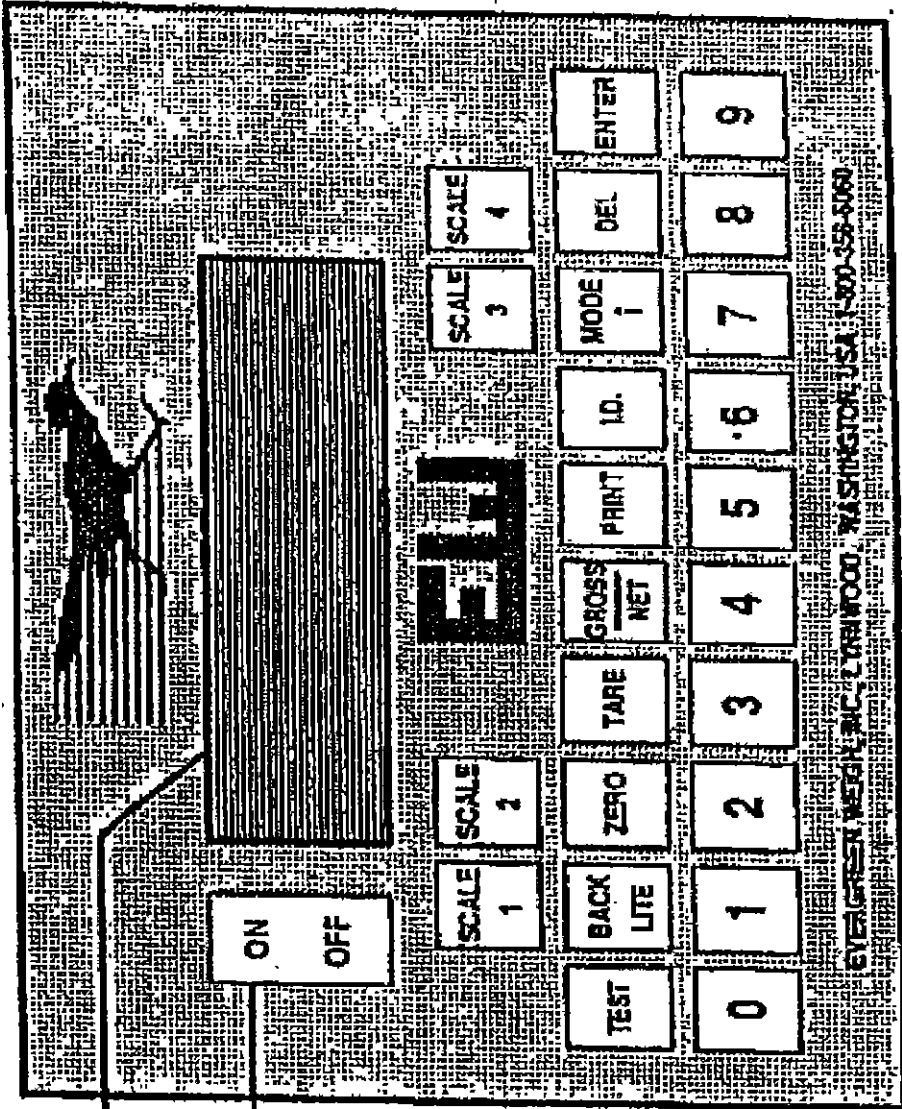
POWER is turned on with the POWER ON-OFF toggle switch. The battery charger cable may be connected to AC power and to the POWER connector on the side of the indicator. This will operate the indicator from the AC power source and recharge the battery at the same time. The indicator can be operated for prolonged periods using the battery charger cable. Without the external power connected the indicator operates from its own battery power. Battery life is at least 18 hours when fully charged.

POWER is automatically turned off when all wheel weigher cables are disconnected from the indicator. This is a battery saving feature.

A GROUP OF CONTROLS on the front panel corresponds to each weighing channel. By turning the toggle switch for one channel ON (and the others OFF) the weight on that particular pad will be displayed. Turning several channels ON simultaneously will display the sum of the weights on any combination of pads. The sum is limited to 20,000 digits in one pound (or 1 kg.) increments.

There is a ZERO adjustment knob on the front panel for each weighing pad. This is used to set each indicator channel to zero with no load on the pad.

The CALIBRATION adjustment for each channel is recessed behind the front panel under the calibration sticker. Calibration is set and sealed at the factory. The user should not break this seal or adjust the calibration screw since this would make the calibration certification invalid.



LCD DISPLAY

ON/OFF SWITCH

SCALE BUTTONS:

FUNCTION KEYS:

NUMERIC KEYS:

EVERGREEN WEIGH, INC., LATHAMWOOD, WASHINGTON, USA 1-800-358-5060

A POUNDS/KILOGRAMS switch in the lower right corner of the indicator panel selects the units in which weights will be displayed. Pull up the switch handle to release it.

The TEST button produces a reading which assures that the entire system is electrically intact and that the calibration has not been adjusted. After calibration with no load, a TEST reading is taken for each channel by turning one channel ON and all others OFF, zeroing the reading, and then pressing the TEST button. This produces a number which checks the calibration setting and the continuity of the electrical circuit through the load cell for that channel. This number should be written down after calibration. If the scale system is recalibrated, a new TEST number should be read and recorded for each channel.

If a different weighing pad of the same capacity is connected to an indicator channel (example: red pad to green indicator input) the weight reading will still be correct to within 1/4% but the TEST reading will be different.

This TEST function should not be used to readjust the calibration. Typically, variations in the TEST reading are less than 1%, but are not as accurate as the known weight calibration performed at the factory.

LOW BATTERY VOLTAGE is indicated by an arrow in the upper left corner of the display window near the LOW BATT. legend on the panel.

RADIO INTERFERENCE PROTECTION is built into the indicator. This prevents jittering of the weight display due to nearby radio transmissions.

BATTERY CHARGER CABLE

The internal sealed lead acid battery built into the indicator will operate the system for at least 18 hours without recharging. To recharge the battery, the BATTERY CHARGER CABLE is connected to the POWER connector on the side of the indicator and plugged into the AC power source. The scale system can continue weighing while the battery is being charged.

The battery charges rapidly when it is low. During this phase two red lights on the charger are ON, a POWER light and a FAST CHARGE light. When the battery is charged the FAST CHARGE light goes OFF and the current from the charger is greatly reduced. This prevents overcharging if the charger is left on for a long period.

Battery charging is usually completed overnight. The battery should not be allowed to discharge completely. This may reduce the life of the battery.

The battery can be recharged without connecting load cell cables to the indicator, but the indicator will not operate without these cables connected.

Standard power plugs are available for most nations.

Battery charger cables are not grounded.

WHEEL WEIGHER CABLES

A twenty-five foot CABLE is provided to connect each wheel weigher pad with the corresponding indicator channel. These cables have tough polyurethane jackets and will withstand substantial abuse without damage. Each cable is color coded to match a wheel weigher and indicator channel. Any cable can be used with any wheel weigher and indicator channel but observing the color codes makes it easier to identify which wheel weigher is connected to which indicator channel.

1. Weighing must be done in a hangar to prevent errors due to wind lift. Temperature of the scale components should be stabilized before weighing to prevent errors due to temperature changes after zero adjustment. It is recommended that hot air heaters or air conditioners be turned off to avoid errors due to air pressure on the aircraft.

2. Connect each WEIGHING PAD cable to the corresponding connector on the side of the indicator. Match the color codes on pads, cables, and indicator inputs.

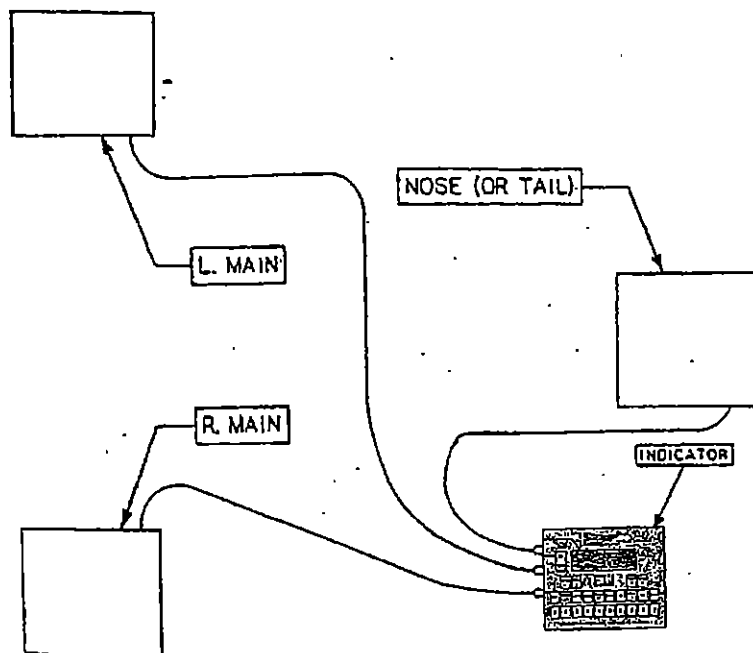
3. Turn the indicator POWER ON. Five minute warm up is suggested before adjusting zero readings.

4. Adjust the ZERO for each channel with no load on the scale. Switch one channel ON and all other channels OFF. Use the ZERO KNOB for that channel to set the display to 00000 WITH NO WEIGHT ON THE WEIGHING PAD.

5. Press the TEST button and compare the reading with the TEST number for that channel. The TEST numbers are recorded inside the cover of the indicator. The TEST number should be within 1% of the recorded number. This verifies that the scale is electrically intact and that the calibration has not been tampered with.

Repeat the ZERO adjustment and TEST for each of the other channels.

The scale is now ready to weigh the aircraft.



SCALE CONNECTIONS - THREE CHANNEL SYSTEM
FIGURE 3

WEIGHING THE AIRCRAFT

Adjust the ZERO KNOB for each channel to read 00000 with no weight on the weighing pads.

NOTE!

If TIRE STOPS will be used to keep the airplane from rolling off the weighing pads, place the TIRE STOPS on the weighing pads before adjusting zeros. Each TIRE STOP weighs 1 1/2 pounds.

Place the airplane on the weighing pads either by rolling the aircraft up the ramps or by jacking the aircraft and sliding the pads under the tires. The weight is now displayed on the indicator. The weight on any one pad is displayed when the switch for that channel is ON and all others OFF.

Switching ON more than one channel at a time will display the sum of the weights on all channels which are ON. The indicator is limited to 20,000 digits. If the total is larger than 20,000 the weights must be summed manually. (Over 20,000 digits, the display shows 00000. This indicates that the weight is over the indicator capacity.)

AIRCRAFT CONFIGURATION FOR WEIGHT AND BALANCE

The aircraft must be leveled and fluids emptied (or corrections made) for correct weight and balance analysis. Specific directions for setting up the aircraft configuration and for calculating center of gravity are contained in the aircraft manufacturer's manual.

TROUBLESHOOTING

Troubleshooting is made simple by having several interchangeable components.

FAILED COMPONENT IDENTIFICATION:

1. If one channel demonstrates an apparent malfunction, replace the weighing pad with another pad of the same capacity. If the problem disappears, the fault is in the load cell which is inside the weighing pad. Double check by connecting the bad pad to one of the good indicator channels. If the fault reoccurs, this verifies that the pad is defective.

2. If replacing the pad does not correct the problem, replace the cable with a good cable. If the problem disappears, the fault is in the cable.

3. If neither replacement corrects the problem, the fault is probably in the indicator.

CALL THE FACTORY FOR FURTHER INFORMATION AND CUSTOMER SUPPORT.

WEIGHING PAD (LOAD CELL) CHECKS:

(The LOAD CELL is the sensing element inside each WEIGHING PAD.)

1. ELECTRICAL INTEGRITY can be checked with an ohmmeter. Readings should be:

Input (Excitation)	Pins 7 & 9	1050 to 1250 ohms
Output (Signal)	Pins 1 & 3	990 to 1010 ohms
Isolation resistance	Any pin to pad surface	100 megohms (minimum)

If electrical measurements are correct, the load cell in the weighing pad is electrically intact.

If isolation resistance is too low, there is probably moisture in the connector. Dry it out and try again. Moisture will make the readings unstable and zero may be shifted badly. Be sure to avoid touching probes with fingers during the isolation measurement. Body resistance is less than the required isolation resistance and may confuse the readings.

2. A FUNCTIONAL WEIGHING PAD CHECK can be performed by connecting the pad to a good indicator channel and observing the change when a man stands on the pad. The reading should change by an amount indicating the man's weight (including clothing).

3. WEIGHING PAD ZERO can be checked by connecting the load cell to a good indicator channel and attempting to adjust the ZERO reading. If the zero reading is stable but cannot be adjusted to 0000 the load cell may have been overstressed. Check the electrical integrity and the functional operation of the load cell (above). If it passes these tests, it can still be used by adjusting the WIDE RANGE ZERO in the indicator.

A WIDE RANGE ZERO adjustment is provided inside the indicator for each channel. This is a small potentiometer on the circuit board about one inch behind the panel. This potentiometer faces to the side of the circuit board and is located directly behind the calibration potentiometer (which is behind the front panel calibration sticker). ZERO can be readjusted and the scale will become functional.

CAUTION!

DO NOT ADJUST THE CALIBRATION
SCREW. THIS WOULD CAUSE
SENSITIVITY ERRORS.

4. PIN CONNECTIONS are:

Pin 1	Signal, Negative
Pin 3	Signal, Positive
Pin 7	Excitation, Positive
Pin 9	Excitation, Negative

5. The load cells can be removed by unbolting four bolts and removing the connector from the deck. Replacement load cells are available from the factory. All load cells have the same calibration within $\pm 1/4\%$. After load cell replacement, the pad should be seated by applying the full rated load and retightening bolts after weight is removed. This will prevent future zero shift.

LOAD CELL REPAIRS MUST BE DONE AT THE FACTORY!

CABLE CHECKS:

1. Replace the suspected defective cable with one from another channel which is functioning properly. If the problem disappears, the cable is defective.

2. An ohmmeter can be used to check a cable. With the cable disconnected from the indicator and from the load cell, measure the resistance from Socket 1 at one end of the cable to Socket 1 at the other end. Resistance should be less than 1 ohm. Repeat for other conductors, 1,3,5,7, and 9.

Check for low insulation between conductors before setting the ohmmeter on the highest resistance range and measuring between sockets 1,3,5,7, and 9 in the connectors. Resistance between any two sockets should be greater than 100 megohms.

NOTE!

Resistance between sockets 4 and 6 will be zero. This is part of the battery saving feature.

3. CABLE SOCKET CONNECTIONS

<u>Pin</u>	<u>Wire Color</u>	<u>Function</u>
1	White	Negative Signal
3	Green	Positive Signal
5	Silver	Shield
7	Red	Positive excitation
9	Black	Negative excitation
4 and 6		Connected together

INDICATOR CHECKS:

1. If the display does not turn on, check to be sure that at least one load cell cable is connected to the indicator. Power is automatically turned off when all load cell cables are disconnected.

2. Check for low battery. A low battery will display an arrow in the display corner near the LOW BATT. legend. Recharge if necessary.

If low battery is the problem, it can be verified by connecting the battery charger cable to AC power and to the POWER connector on the indicator. The system should now function properly.

NOTE!

If the battery has been allowed to discharge completely, the LOW BATTERY ARROW will not be displayed until the battery charger is connected. Then the LOW BATTERY ARROW will be displayed for a few minutes. Do not attempt to use the scale until the LOW BATT. arrow disappears. Weighing errors could occur.

3. The indicator should function properly with any weighing pad of the same capacity and any cable connected to any input channel (except that TEST numbers will be different from those marked inside the indicator cover). If the problem continues after pads and cables have been interchanged, the problem is in the indicator..

FOR BEST RESULTS THE INDICATOR SHOULD BE RETURNED TO THE FACTORY FOR REPAIR, ALONG WITH THE WEIGHING PADS FOR REPAIR OR RECALIBRATION. THE WARRANTY WILL BE VOIDED WHEN REPAIRS ARE DONE BY OTHER AGENCIES. HOWEVER, IT MAY SOMETIMES BE ESSENTIAL FOR OTHER AGENCIES TO MAKE REPAIRS DUE TO OVERSEAS SHIPPING PROBLEMS OR SIMILAR CIRCUMSTANCES. IN THIS CASE, EVERGREEN WEIGH WILL SUPPLY ELECTRONIC SCHEMATICS TO THE REPAIR AGENCY UPON REQUEST.

4. The liquid crystal display will become sluggish or fail to show the digits at temperatures below 0° F (-18°C).

OPTIONAL METAL CONNECTORS

TECHNICAL REFERENCE INFORMATION

Scale pad Connector Polarity (7 pin metal connector):

PIN D	EXCITATION	+	RED WIRE
PIN C	EXCITATION	-	BLACK WIRE
PIN A	SIGNAL	+	GREEN WIRE
PIN F	SIGNAL	-	WHITE WIRE

Power Connector Polarity (4 pin metal connector):

PIN A	12 OR 24 VOLTS DC	+	RED WIRE
PIN C	12 OR 24 VOLTS DC	-	BLACK WIRE
PIN B	BATTERY CHARGER CABLE	+	When indicator is equipped with
PIN D	BATTERY CHARGER CABLE	-	a rechargeable battery option.
PIN B	110 V AC HOT WIRE		When indicator is
PIN D	110 V AC RETURN WIRE		equipped with AC power option.

Load Cell Resistance:

OUTPUT (SIGNAL)	PIN A to PIN F	990-1010 ohms
INPUT (EXCITATION)	PIN C to PIN D	1050-1250 ohms
ISOLATION RESISTANCE ANY PIN TO PAD SURFACE		More than 100 megohms

WARRANTY

ROAD RUNNER SCALES are warranted against defects in materials or workmanship for one year after delivery. Repairs are warranted for six months. The scale must be shipped both ways at customer expense.

This warranty may be considered as unconditional, provided that, in the opinion of EVERGREEN WEIGH, INC., the equipment has not been mechanically, electrically or environmentally abused.

Warranty repairs are performed at the factory, without charge except for freight which will be paid by the customer. After repair, the scale is recalibrated. Repairs performed by other agencies will void the warranty.

This warranty is limited, at the option of EVERGREEN WEIGH, INC., to repair, replacement or an appropriate credit adjustment not to exceed the original sale price paid to EVERGREEN WEIGH, INC.

Warranty does not include travel expense if a factory engineer or dealer technician is requested to perform repairs at a location other than the factory.

EVERGREEN WEIGH, INC., assumes no liability in connection with the sale or use of the scales beyond that stated above.

Congratulations on your purchase of a new EVERGREEN WEIGH, INC. scale system! The care and quality that goes into each system we manufacture ensures years of trouble-free service for you.