

# SR Scales®

by **SR**® Instruments, Inc.

**SR463 SERIES**



**In-Floor Platform Scale**

## **Operating and Service Manual**

*Serial Numbers: 1084+*

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## PACKING CHECKLIST- SR463-H In-Floor Platform Scale

√	DESCRIPTION	QUANTITY
	<b>Box 1</b>	
	WALL BOX ASSEMBLY	1 ea
	PIT FRAME ASSEMBLY	1 ea
	PLATFORM ASSEMBLY 32 IN x 36 IN	1 ea
	CABLE ASSEMBLY	1 ea
	HANDRAIL	1 ea
	¼" LONG FLAT HEAD SCREW	4 ea
	¾" LONG FLAT HEAD SCREW	8 ea
	½" LONG BUTTON HEAD SCREW	4 ea
	CONDUIT	1 ea
	CALIBRATION CERTIFICATE	1 ea
	WARRANTY CARD	1 ea
	MANUAL	1 ea

## PACKING CHECKLIST- SR463-3H In-Floor Platform Scale

√	DESCRIPTION	QUANTITY
	<b>Box 1</b>	
	WALL BOX ASSEMBLY	1 ea
	PIT FRAME ASSEMBLY	1 ea
	PLATFORM ASSEMBLY 32 IN x 50 IN	1 ea
	CABLE ASSEMBLY	1 ea
	HANDRAIL	1 ea
	¼" LONG FLAT HEAD SCREW	4 ea
	¾" LONG FLAT HEAD SCREW	8 ea
	½" LONG BUTTON HEAD SCREW	4 ea
	CONDUIT	1 ea
	CALIBRATION CERTIFICATE	1 ea
	WARRANTY CARD	1 ea
	MANUAL	1 ea

## ASSEMBLY

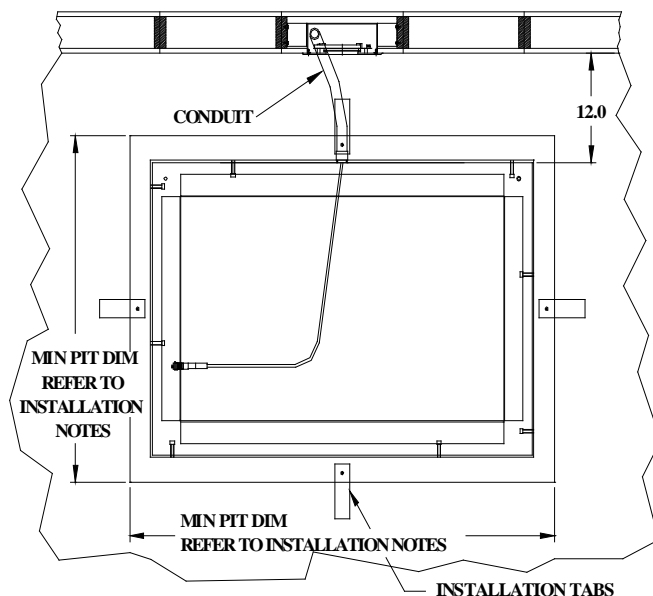
**STEP 1:** Unpack the scale system and check parts against the **PACKING CHECKLIST**. If there are any missing or damaged parts, please call the Service Hotline at: 1-800-654-6360.

**STEP 2:** Verify that the serial number on the label of Wall Box Display matches that on Platform Base.

**STEP 3:** (Figure 1) Mount Wall Box Display into wall and run the conduit, with connector cable inside, down through wall and into pit as shown.

**STEP 4:** Prepare pit area to accept the Scale Frame. It is recommended that a properly plumbed drain be installed in the center of pit to avoid any water buildup that might damage scale.

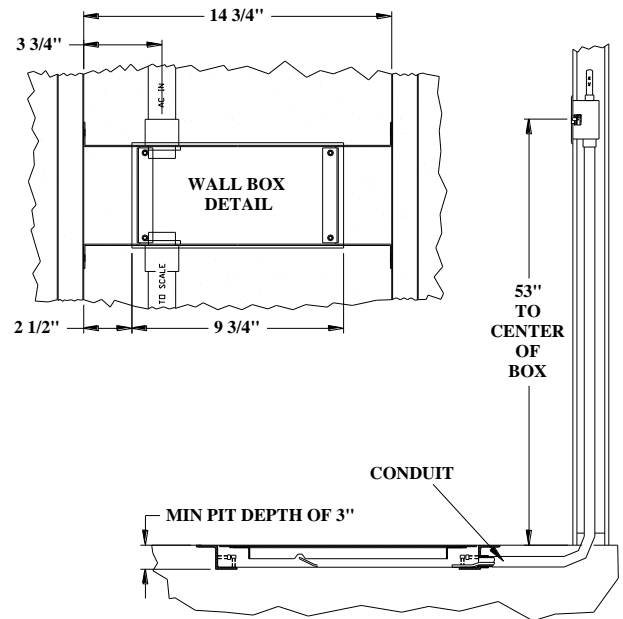
**STEP 5:** (Figure 2) Center the Scale Frame in the pit using the supplied installation tabs to suspend the frame in place (see “**Pit Area Installation Notes**”).



**Figure 2: Conduit Placement and Installation Tabs**



**Figure 3: Conduit Hole in Scale Frame**



**Figure 1: Wall Box/Conduit Placement**

### Pit Area Installation Notes

- This is a rectangular frame so it is important to check the placement specifications to make sure the conduit connection is properly placed facing the wall where the conduit/cable connection is located. There are holes cut for conduit entry in the center of two sides of the frame so the scale can be placed with either the long or short side against wall (Figure 3). Run conduit/cable through hole and into pit area.
- **For 32" x 36" Platforms:** If using supplied installation tabs to suspend frame while pouring concrete, pit perimeter dimensions cannot exceed 44"x 48".
- **For 32" x 36" Platforms:** If using supplied installation tabs to suspend frame while pouring concrete, perimeter dimensions of pit cannot exceed 44"x 62".
- Wood floor installation must be site engineered by qualified personnel.

## ASSEMBLY cont'd

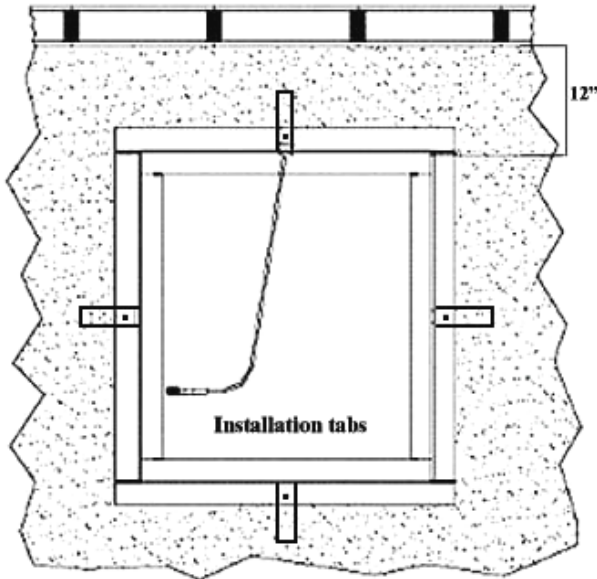
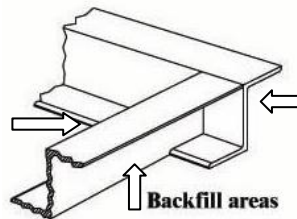


Figure 4: Concrete Fill and Installation Tabs

**STEP 6:** Back fill around the perimeter of the frame with 3000PSI concrete. Trowel the concrete level with the scale frame and existing floor. Trowel the base of the pit level with the base of the frame with a gradient toward the centered drain, if used. Conduit and cable should be left free so cable can be easily connected to the platform base.



**STEP 7:** (Figure 4) When the concrete has set, remove and discard the installation tabs and screws. Install the four 1/4" long flat head screws into holes left by plate removal.

**STEP 8:** (Figure 5) Remove the platform deck from the base using a 5/32" hex wrench to remove the four (4) mounting screws and set aside.

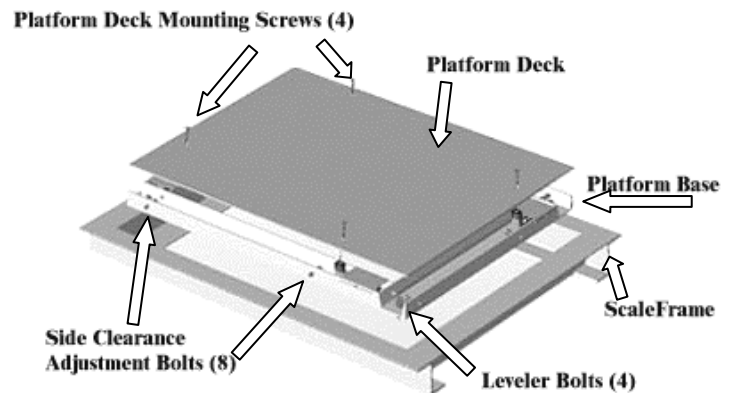


Figure 5: Hardware Placement



Figure 6: Cable Connection Inside Frame

**STEP 9:** (Figure 6) Place the Platform Base into the frame. The cable connection will plug into the connector on the platform base. Ensure extra cable does not interfere with platform top.

## ASSEMBLY cont'd

**Note:** This scale is designed so that the platform is level with the pit frame. When tiling or carpeting the platform deck, be sure to compensate for the thickness of the material. **Tiling Tip:** If tiling the floor, the use of an extra tile (or something with the same surface height) is placed under each of the four leveling feet of the pit frame. This will bring the scale surface flush with the tiled floor.

**STEP 10:** (Figure 7) Adjust the eight (8) Side Clearance Adjustment Bolts, so that the platform base is at an equal distant from all sides of the frame. Tighten bolts to secure Platform Assembly in place.

**STEP 11:** (Figure 5) Set the deck onto the platform base and secure in place with the four (4) top mounting screws. Allow 1/8" gap between platform deck and floor.

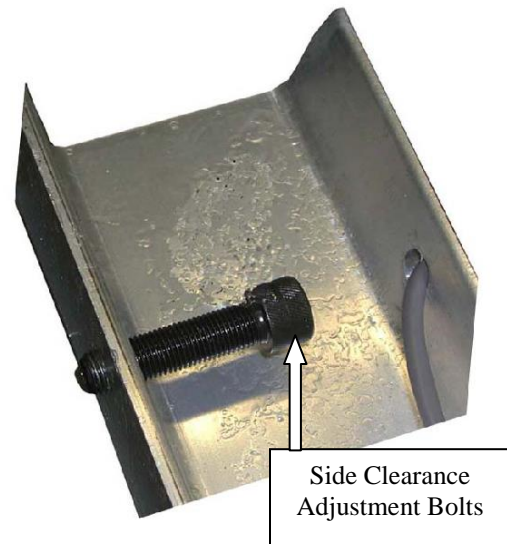


Figure 7: Side Clearance Adjustment Bolts

<b>⚠ ELECTRIC SHOCK HAZARD ⚠</b>	
<b>TURN OFF POWER AT CIRCUIT BREAKER FOR DISPLAY PRIOR TO INSTALLING FRONT PANEL. DISPLAY IS POWERED BY 120V A/C 60HZ.</b>	
<b>⚠ WARNING ⚠</b>	
<b>QUALIFIED ELECTRICIAN MUST INSTALL DISPLAY ACCORDING TO LOCAL, STATE, AND NATIONAL STANDARDS. 20A OR LESS BREAKER IS RECOMMENDED. GROUND FAULT INTERRUPTER IS RECOMMENDED.</b>	

**STEP 12:** Install building ground wire and green ground wire from Display Front Plate into the terminal lug in the wall box.

**STEP 13:** Connect Transducer Cable to the mating cable on the back of the Display Front Plate

**STEP 14:** Connect A/C power wires to the power supply wire leads.

## ASSEMBLY cont'd

**STEP 15:** Install Front Panel Assembly to the previously mounted Wall Box Assembly. Use supplied star washers and screws. Ensure that the screws are securely tightened.

**STEP 16:** Restore power to the display.

**STEP 17:** Secure the handrail to the platform deck using the eight (8) included flat head screws.



**Figure 8: Handrail Attached to Scale**





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## REPLACEMENT PARTS AND ACCESSORIES

Part #	Description
ELFUSE.25	FUSE – 1/4 amp SLO-BLO #313.250
ES7624	MEMBRANE SWITCH LABEL
SE4961-1	CABLE ASSEMBLY

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## SYSTEM DESCRIPTION

The SR463 Series weight systems are precision digital scales specifically designed for installation in the floor so the weighing surface is flush.

This scale system employs the latest in microprocessor and load cell technology to provide accurate and repeatable weight data. Four (4) identically matched load cell transducers are strategically placed to ensure an accurate representation of the patient's weight regardless of weight distribution.

The SR463 Series display units use 120v AC line power that is mounted in a recessed wall box so the display is flush with the wall (Figure 9).

The patient's weight is displayed on a 16-character dot matrix liquid crystal display. With the push of a button, patient weight may be viewed in either pounds or kilograms, with a displayed resolution of 0.1 for each.



**Figure 9: Wall Display**

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## INTENDED USE

The SR463 Series is designed to be used as a stand-on scale for weighing ambulatory patients as well as a Wheelchair / Chair / Walker scale for semi or non-ambulatory applications.





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## MAINTENANCE and CLEANING

Exercise caution when cleaning the display window as it is made of clear polyester and can be scratched by abrasive cleaners. Mild soap and water is recommended for general cleaning and disinfecting. Periodically remove the top and vacuum or sweep in the pit. Also, make sure pit is dry.

**Note:** Do not allow the pit to fill with water.

 <b>WARNING</b> 
<b>DO NOT use pressurized water or steam. The scale system contains microprocessor circuitry and strain gauge sensors that may be adversely affected by exposure to such an environment.</b>

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## STORAGE and TRANSPORTATION

This is a built-in scale system. To maintain proper operation of this instrumentation, storage and transport conditions should not vary outside the following conditions: Relative Humidity 0% to 85%, Ambient Temperature 14°F to 122° (-10°C to +50°C).

## SPECIFICATIONS

<b>MAXIMUM WEIGHT CAPACITY</b>	1000 lb or 454 kg
<b>PLATFORM SIZE</b>	SR463: 32 in x 36 in (81 cm x 91cm) SR463-3: 32 in x 50 in (81 cm x 127 cm)
<b>DISPLAY TYPE</b>	16-Character dot-matrix LCD
<b>DISPLAY RESOLUTION</b>	0.1 lb/0.1 kg
<b>ACCURACY</b>	0.1% +/- 1 digit of displayed resolution for calibrated range
<b>ZERO</b>	One button Auto-Tare
<b>AUTO POWER DOWN</b>	After 60 seconds
<b>AVERAGING</b>	Automatic digital filter
<b>POWER SUPPLY</b>	120v AC, 50 – 60 Hz
<b>CALIBRATION</b>	Calibration is traceable to NIST standards.
<b>OPERATING CONDITIONS</b>	Normal operating conditions for this product: Ambient Temperature Range: 68°F to 85°F (20°C to 30°C), Relative Humidity Range: 0%-85%. Avoid exposure to high-pressure water or steam.
<b>TRANSPORT and STORAGE</b>	Storage and transport conditions should not vary outside the following conditions: Relative Humidity 0% to 85%, Ambient Temperature 14°F to 122°F (-10°C to +50°C). Remove batteries if storing longer than three (3) months.

## BUTTON FUNCTIONS



Figure 10: Button Display

### ZERO



The “**ZERO**” button is used to zero the system before placing a patient onto the scale system. When pressed, the display message will indicate “**PLEASE WAIT**” “**HANDS OFF**”. Ensure that nothing is in contact with the weighing surface during this procedure. The display will read “**WEIGHT 0.0 lb**” (or **kg**).

### WEIGH



The “**WEIGH**” button wakes up the display and shows the patient’s weight if it should Auto Power Down before patient’s weight is read.

### HOLD / RECALL



The “**HOLD / RECALL**” button freezes the displayed weight and temporarily stores it away in memory. Press “**HOLD / RECALL**” to store the weight in memory. To recall the last stored weight, press the “**HOLD / RECALL**” button.

### DISPLAY MODE



Weight data may be viewed in either pounds or kilograms. Pressing the “**DISPLAY MODE**” button allows the operator to toggle between the two readings. Both pounds and kilograms are displayed in a resolution of 0.1.

## BASIC SYSTEM OPERATION

### SETTING SYSTEM ZERO

#### ZERO



Ensure that the scale is free and clear of any obstructions while zeroing the system. Press the “**ZERO**” button. The display will read “**HANDS OFF – PLEASE WAIT**”. Seconds later the display will read “**WEIGHT = 0.0 lb**” (or kg). **Note:** If weighing a non-ambulatory patient with a walker or in a wheelchair, place the walker or wheelchair and any other items that will accompany the patient on the platform while zeroing the system. This will ensure that the patient’s weight will be displayed. It is recommended that the system be zeroed prior to weighing each new patient.

Center the patient on the scale platform, press the “**WEIGH**” button to wake up the display and view the patient’s weight. Display will be visible for 60 seconds before unit returns to “sleep” mode.

### CONTINUOUS WEIGH

In this default mode, the weighing surface remains active. Press the “**HOLD / RECALL**” button once to lock the displayed reading and store it in memory as the “last weight” for recall later if needed.

### AUTO-HOLD

This mode is for patients unable to remain still for the weighing procedure. It locks, stores, and displays the patient’s weight as soon as the “**WEIGH**” button is pressed once. **Note:** No weight will be displayed until the button is pressed.

To enable this mode, BEFORE zeroing the system, press and hold the “**HOLD / RECALL**” button for approximately five (5) seconds until the display reads “**AUTO-HOLD ENABLED**”.

To return to CONTINUOUS WEIGH mode when finished, press and hold the “**HOLD / RECALL**” button for approximately five (5) seconds until the display reads “**CONTINUOUS WEIGH**”.

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## THEORY OF OPERATION

SR Instruments patient weighing systems are digital scales. Strain-gauge force cells convert the force of an applied weight into an analog signal. This signal is amplified by an operational amplifier and converted to a digital signal by an analog to digital converter. The digital signal is transferred to a micro-controller where it is filtered, converted to appropriate units and displayed on a liquid crystal display.

Strain-gauge force cells each contain four strain gauges mounted in a full Wheatstone-bridge configuration. These bridges convert the physical movement of the force cell, due to the applied mass on the system, into minute changes in electrical resistance. These changes in resistance produce a voltage difference across the Wheatstone-bridge, which is amplified by the operational amplifier. The amplifier is configured to current sum the output of each cell, with potentiometers serving to adjust the sensitivity (voltage out per unit of weight applied) of each bridge. The offset potentiometer produces a small current, which nulls the output of the amplifier for an unloaded system.

The output of the operational amplifier is digitized by the analog to digital converter. The converter integrates the analog signal onto the integrating capacitor over a short interval. The integrating capacitor is then discharged at a rate proportional to the reference voltage applied to the converter. The residual voltage on the integrating capacitor is then multiplied by a factor and again discharged at a rate proportional to the reference voltage. The residual voltage from this discharge is again multiplied by a factor and again discharged. The time taken to discharge the capacitor is proportional to the voltage from the operational amplifier, which is proportional to the applied load on the force cells. The time is stored as a binary number in the analog to digital converter and is transferred to the micro-controller when the conversion is complete.

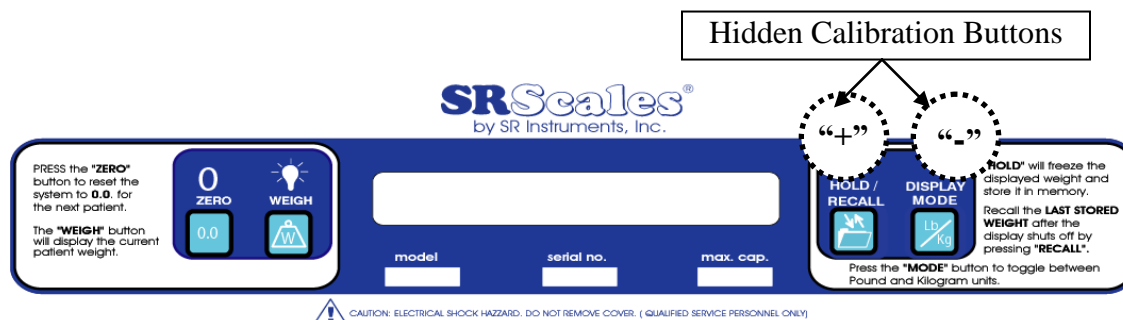
The micro-controller averages and filters the digital output of the analog to digital converter, subtracts the value saved during the system zero operation and scales the filtered output, then displays the result on the liquid crystal display. The micro-controller performs a rolling average of data for continuous weigh and, for AutoHold, the micro-controller averages the data before locking in on the reading. If the data variance is greater than 0.1% in the AutoHold mode, the micro-controller will reset the filter and start a new averaging period.

The micro-controller can be placed in a calibration mode, where the system can be re-calibrated. In the calibration mode, the result of the weigh operation is scaled to match the value by adjusting the “up” and “down” calibration buttons. This new calibration factor is then stored in the non-volatile memory.

## CALIBRATION

**⚠ IMPORTANT ⚠**

**CALIBRATION CHECK** Qualified service personnel only should perform this procedure. Load cells have no user serviceable components and should not be tampered with for any reason. Re-calibration is generally not required, but should be verified periodically to ensure accuracy. The recommendation for calibration check is at least once every 12 months, or as individual maintenance policy requires.



**Figure 11: Calibration Hidden Buttons**

**NOTE:** Ensure that nothing is in contact with the scale system during this procedure. Remove hands from the system when noting the displayed calibration results.

**STEP 1:** (Figure 11) Simultaneously press and hold the “+” and “-” hidden buttons on the label. The display will read “**HOLD TO CAL**” as the digit displayed on the far right counts down from 9 to 0 to enter the CAL mode.

**STEP 2:** The number displayed on the right hand side is the system offset. This should be between 70-100 lbs positive. To adjust the offset, turn R13 (10k Potentiometer) on the display PC board to the desired value. This can be done with a standard flat head screwdriver. Refer to **PC BOARD LAYOUT** (Figure 12) for potentiometer’s location.

**STEP 3:** With no weight on the platform, press the zero button.

**STEP 4:** Place a known calibrated weight, traceable to NIST, onto the weighing surface and compare it to the displayed reading. **Note:** DO NOT USE barbell weights or calibrate to a mechanical scale.

**STEP 5:** Use the hidden buttons to make “+” (Up) or “-” (Down) corrections to the displayed weight. The displayed value should be within 0.1% of the calibrated weight. (See the Calibration Tolerance Table - right).

CALIBRATION TOLERANCE TABLE		
LOW LIMIT	APPLIED LOAD	HIGH LIMIT
99.9	100.0	100.1
199.8	200.0	200.2
299.7	300.0	300.3
399.6	400.0	400.4
499.5	500.0	500.5
599.4	600.0	600.6
699.3	700.0	700.7
799.2	800.0	800.8
899.1	900.0	900.9
999.0	1000.0	1001.0





## INITIALIZATION

**INITIALIZATION PROCEDURE**  
To be used ONLY IF REPLACING IC5 or if DISPLAY READS DOUBLE



**Figure 13: Location of Hidden Initialization Buttons**

- STEP 1:** (Figure 13) The Initialization Buttons are hidden buttons located on the label.
- STEP 2:** Simultaneously press buttons indicated to initialize the system. The display will read, “**HOLD TO INIT**” and count down from 9 to 0. When the initializing is complete, the display will read, “**INITIALIZING**” and then return to the WEIGH mode.
- STEP 3:** Follow the **CALIBRATION** procedure.

**CAUTION**

**The integrated circuits and semiconductors on the printed circuit boards may be damaged by electrostatic discharge (ESD). Be sure to use proper handling precautions at all times.**

## TROUBLESHOOTING

SYMPTOM	REASON/CORRECTIVE ACTION
Characters only appear on half of the display	Press the “ <b>WEIGH</b> ” button.
Display shows no reading at all	Check to ensure that circuit breaker to the scale is on and the 1/4 amp fuse in the display is good.
Display reads “ <b>WEIGHT OVERLOAD</b> ”	Disconnect the transducer cable from the platform. If the “ <b>WEIGHT OVERLOAD</b> ” message goes away, the problem is in the platform. Check to make sure the platform transducer wires are intact and pit is clean and dry.
Display shows a <b>DOUBLE WEIGHT READING</b>	IC5 has failed. Refer to <b>INITIALIZATION</b> section. For repair information, please call the factory.
<b>For additional information or assistance, phone our Service Hotline: 1-800-654-6360 or e-mail: <a href="mailto:sri@srinstruments.com">sri@srinstruments.com</a></b>	



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## WARRANTY

### FOUR (4) YEAR LIMITED WARRANTY

Each **SR Scales**<sup>®</sup> system is manufactured with high quality components. SR Instruments, Inc. warrants that all new equipment will be free from defects in material or workmanship, under normal use and service, for a period of four (4) years from the date of purchase by the original purchaser. Normal wear and tear, injury by natural forces, user neglect, and purposeful destruction are not covered by this warranty. Warranty service must be performed by the factory or an authorized repair station. Service provided on equipment returned to the factory or authorized repair station includes labor to replace defective parts. Goods returned must be shipped with transportation and/or broker charges prepaid. SR Instruments, Inc.'s obligation is limited to replacement of parts that have been so returned and are disclosed to SR Instruments, Inc.'s satisfaction to be defective. The provisions of this warranty clause are in lieu of all other warranties, expressed or implied, and of all other obligations or liabilities on SR Instruments, Inc.'s part, and it neither assumes nor authorizes any other person to assume for SR Instruments, Inc. any other liabilities in connection with the sale of said articles. In no event shall SR Instruments, Inc. be liable for any subsequent or special damages. Any misuse, improper installation, or tampering, shall void this warranty.

### DAMAGED SHIPMENTS

Title passes to purchaser upon delivery to Transportation Company. Any claims for shortage or damage should be filed with the delivery carrier by purchaser.

### RETURN POLICY

All products being returned to SR Instruments, Inc. require a Return Goods Authorization number (RGA). To receive an RGA, call our Technical Service Team at 716-693-5977 or toll-free in the USA and Canada at 800-654-6360.

When inquiry is made, please supply model and serial numbers, purchase order, if the scale was bought on contract, and reason for return.

Generally, deleted, damaged, and outdated merchandise will not be accepted for credit. A minimum restocking charge of 15% will be assessed on return of current merchandise.

All returns are to be shipped **FREIGHT PREPAID** to: SR Instruments, Inc., 600 Young Street, Tonawanda, NY 14150.

### RESTOCKING FEE

- **15% fee** for any scale that has been opened and used
- **10% fee** for any scale returned that has been ordered incorrectly or refused delivery with no model change
- **5% fee** if an error in ordering has been made and a different model exchanged
- **No fees** will be charged if the scale is returned because of an error on the part of SR Instruments, Inc.
- **No returns** accepted after 60 days.

## NOTES

# **SR**Scales®

**SR**® Instruments, Inc.

**Precision & Technology in  
Perfect Balance®**