SRScales®
by SR®Instruments, Inc.

Model SR615

Infant Scale

Operating and Service Manual

Serial Numbers: 3000+

SR®Instruments, Inc., 600 Young Street, Tonawanda, NY 14150
Tel: 716-693-5977 Fax: 716-693-5854 URL: www.srscales.com
email: sri@srinstruments.com

TABLE OF CONTENTS

TABLE OF FIGURES

PACKING CHECKLIST - Model SR615
Infant Scale

√	DESCRIPTION	QUANTITY
	SCALE BASE	1 ea
	SCALE BASE COVER	1 ea
	CLEAR ACRYLIC CRADLE – One cradle size included with scale base	1 ea
	CRADLE OPTIONS (One of the following choices included.)	1 ea
	CRADLE - CLEAR ACRYLIC OPEN END 22” (Standard comes with scale)	
	CRADLE - CLEAR ACRYLIC CLOSED END 22” (Optional)	
	CRADLE - CLEAR ACRYLIC OPEN END 30” (Optional)	
	CRADLE - CLEAR ACRYLIC CLOSED END 30” (Optional)	
	PACKAGE OF SIX (6) D-CELL BATTERIES	6 ea
	NYLON SCREWS	4 ea
	CALIBRATION CERTIFICATE	1 ea
	QC INSPECTION SHEET	1 ea
	WARRANTY CARD	1 ea
	MANUAL	1 ea

ASSEMBLY

#	PART NAME
1	Scale Base Cover
2	Clear Acrylic Cradle
3	Nylon Screws (4)
4	Battery Compartment Cover
5	Battery Cover Screws

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 1-800-654-6360.

STEP 2: (Figure 1) Turn the scale base over to access the Battery Compartment Cover (4) and remove the two (2) Battery Cover Screws (5). Install the six (6) "D" cell batteries as described on battery compartment cover label and replace the Battery Compartment Cover. Turn scale base right side up and place on a stable flat surface so that all four feet are supported.

STEP 3: (Figure 2) Place the Scale Base Cover (1) on top of the scale base, then place the Clear Acrylic Cradle (2) on top of both pieces. Align the pre-drilled holes of all three parts. Using the four (4) Nylon Screws (3), attach the Clear Acrylic Cradle to the scale base. **Note**: Slightly tighten all four (4) Nylon Screws before securely tightening any one.

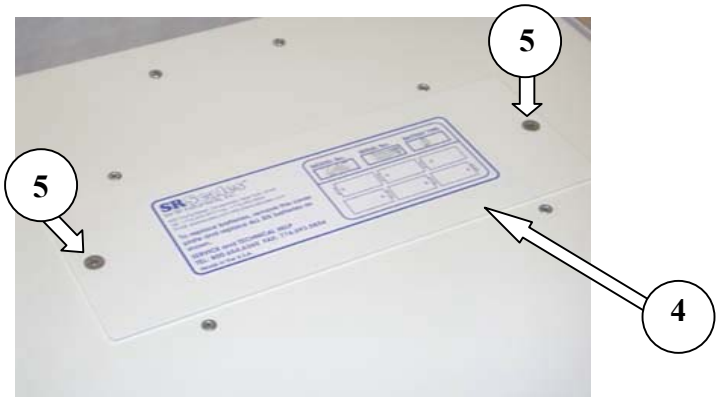

Figure 1: Battery Compartment Cover & Screw Locations

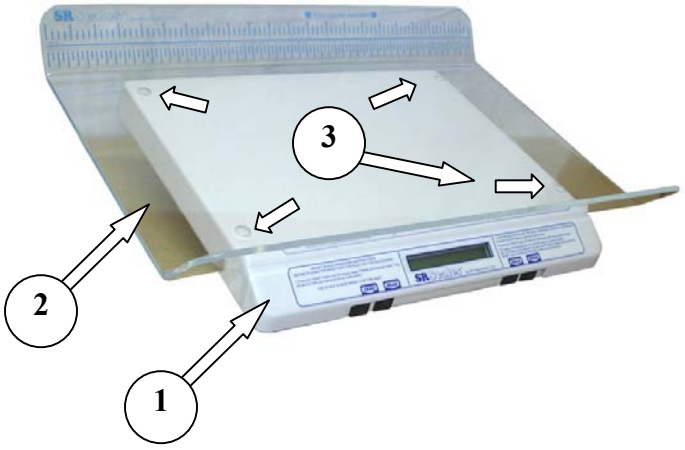

Figure 2: Attachment Screw Locations

REPLACEMENT PARTS and ACCESSORIES

Part #	Description
PF1051-1	22” Open End Cradle
PF1051-2	30” Open End Cradle
PF1374-1	22” Closed End Cradle
PF1374-3	30” Closed End Cradle
SRC-100	Stainless Steel Mobile Cart with two (2) Locking Wheel Casters
FB142058FN	1/4-20 x 5/8 Flat Nylon White Screw

SYSTEM DESCRIPTION and INTENDED USE

SYSTEM DESCRIPTION

The SR615 Infant Scale employs the latest in microprocessor and load cell technology to provide accurate and repeatable weight data. Four (4) identically matched transducers are strategically placed to ensure an accurate representation of the infant’s weight regardless of weight distribution.

The infant’s weight is displayed on a 16-character dot matrix LCD. With a push of a button, weight data may be viewed in either pounds/decimal, pounds/ounces, kilograms, or grams. These have a displayed resolution of 0.01 lb., 1/4 oz., 0.005 kg, and 5 g.

INTENDED USE

The SR615 Infant Scale is designed for use in pediatric applications. Maximum weight capacity must not exceed 45 pounds or 20 kilograms gross weight.

WARNING

DO NOT EXCEED MAXIMUM WEIGHT LIMIT OF 45 LB / 20 KG

MAINTENANCE and CLEANING

Exercise caution when cleaning the display window and infant cradle tray as both are made of clear polyester and can be scratched by abrasive cleaners. Mild soap and water is recommended for general cleaning and disinfecting.

WARNING

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.

STORAGE and TRANSPORTATION

If storing this equipment for periods longer than three (3) months, remove the batteries. 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°F (-10°C to +50°C).

SPECIFICATIONS

MAXIMUM WEIGHT CAPACITY	45 lb or 20 kg
CRADLE SIZE	Clear Acrylic 22 in x 15 1/2 in (56 cm x 39 cm)
DISPLAY TYPE	16-Character Dot-Matrix LCD
DISPLAY RESOLUTION	0.01 lb, 1/4 oz., 0.005 kg, 5 g
ACCURACY	0.1% +/- 1 digit of displayed resolution for calibration range
AUTO ZERO	One button operation
AUTO POWER DOWN	Approximately 35 seconds
HOLD	While active, freezes display data and stores it temporarily in memory
LAST WEIGHT RECALL	Press "HOLD" button to recall last stored displayed reading
AVERAGING	Automatic digital filter
POWER SUPPLY	Six (6) "D" cell batteries
CALIBRATION	Calibration is traceable to NIST standards
OPERATING CONDITIONS	Normal operating conditions for this product: Ambient Temperature Range: 68°F to 85°F (20°C to 30°C) Relative Humidity Range: 0% to 85% Avoid exposure to high-pressure water or steam.
TRANSPORTATION and STORAGE	Storage and transportation 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 3: Button Display

The "**ZERO**" button is used to turn the scale on and to zero the system before placing a patient onto the scale system. When pressed, the display message will indicate "**CONTINUOUS WEIGH**" "**WEIGHING**" "**0.0 LB**".

The "**READ**" button wakes up the display after de-activation and displays weight data. (Auto power down activates after approximately 35 seconds.)

The "**HOLD**" freezes the displayed weight and stores it temporarily away in memory. To recall the last weight reading after the system has shut down, press the "**HOLD**" button before pressing any other button. The "**ZERO**" button will clear the held memory.

The "**MODE**" button allows weight data to be displayed in pounds/decimal, pounds/ounces, kilograms, or grams. The display mode automatically defaults to the last mode used unless manually changed.

Note: Buttons are located below button names on Scale Base.

BASIC SYSTEM OPERATION

SETTING SYSTEM ZERO

Ensure that the scale is free and clear of any obstructions and press the "**ZERO**" button. The display message will indicate "**HANDS OFF**" "**PLEASE WAIT**" "**WEIGHING 0.00 LB**". The infant may now be placed on the scale for the weighing process. It is recommended that the system be zeroed before each weight.

Note: If there are any accessories (blanket, diaper, etc.), place them on the scale while zeroing the system. This will ensure that the patient's NET weight will be displayed. It is recommended that the system be zeroed prior to each new patient.

Continued next page

BASIC SYSTEM OPERATION CONT'D

CONTINUOUS WEIGH

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

AUTO-HOLD (ACTIVE PATIENTS)

For active patients, this mode locks, stores and displays the patient's weight as soon as the "**READ**" button is pressed once. **Note:** No weight will be displayed until the button is pressed.

To enable AUTO-HOLD mode, before zeroing the system, press and hold the "**HOLD**" button for approximately five seconds until the display reads "**AUTO-HOLD ENABLED**". Repeat the procedure to return to "**CONTINUOUS WEIGH**" mode.

BATTERY REPLACEMENT

STEP 1: Display will read "**REPLACE BATTERIES**".

STEP 2: (Figure 4) Turn the scale over and unscrew the two (2) screws from the Battery Compartment Cover.

STEP 3: Remove and replace ALL six (6) "D" cell batteries. Refer to battery compartment cover label for placement.

STEP 4: Replace the Battery Compartment Cover and securely tighten screws.

STEP 5: Press the "**READ**" button to confirm display is working.

STEP 6: Zero the system.

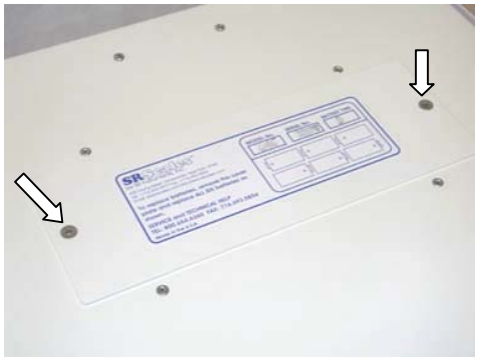

Figure 4: Battery Compartment Cover & Screw Locations

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. Recommendation for calibration check is at least once every 12 months, or as individual maintenance policy requires.

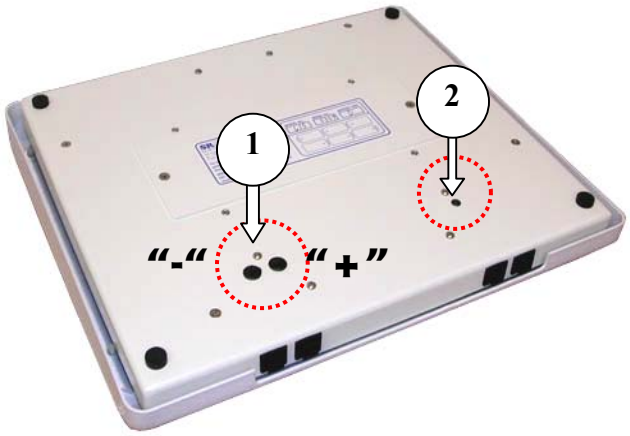

Figure 5: Calibration Buttons (1) and Offset Potentiometer Screw (2)

CALIBRATION PROCEDURE

(Figure 5) Place Scale Base upside down on countertop. Remove the black hole plugs on the underside of the scale from the two (2) calibration buttons (1) and one (1) potentiometer offset screw (2).

STEP 1: Turn the Scale Base upright. Carefully slide the Scale Base off the edge of the table's surface until the Calibration Buttons are accessible underneath.

STEP 2: Press and hold both "**CAL**" buttons (1) simultaneously for 10 seconds. The display will read **"HOLD TO CAL**" as the right hand digit counts down to enter the CAL mode.

STEP 3: Attach cradle. Offset figure should read between +2.00 lbs and +2.50 lbs. Adjust figure by using the Offset Potentiometer Screw (2). (Fine blade screwdriver required.)

STEP 4: When in CAL mode, press the "**ZERO**" button to zero the display.

Continued next page

CALIBRATION CONT'D

STEP 5: Place a known calibrated weight, traceable to NIST standards, onto the weighing surface and compare it to the displayed reading. **Note:** For best results use a minimum of 10 pounds to calibrate. (DO NOT USE barbell weights or calibrate to a mechanical scale.)

STEP 6: Use the right hand CAL button to make "+" corrections and the left hand calibration button to make "-" corrections to the displayed weight. The displayed value should be within 0.1% of the calibrated weight per the tolerance table.

CALIBRATION TOLERANCE TABLE		
LOW LIMIT	APPLIED LOAD	HIGH LIMIT
.99	1.0	1.01
4.99	5.0	5.01
9.99	10.0	10.01
14.98	15.0	15.02
19.98	20.0	20.02

STEP 7: When settings are completed: Press the **"HOLD"** button to SAVE your settings or press the "**READ**" button to CANCEL. Both choices will EXIT CAL mode**.**

STEP 8: Re-attach plugs on the bottom of the scale.

⚠ 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
Low readings	Check offset and verify calibration
Only half of display activates	Press the "WEIGH" button
No power	Check that batteries are making contact with each other and the terminals of the battery holder.
For additional information or assistance, telephone the Service Hotline: 1-800-654-6360 or e-mail: sri@srinstruments.com	

WARRANTY

FOUR YEAR LIMITED WARRANTY

Each **SR**Scales® system is manufactured with high quality components. SR Instruments, Inc. warrants that all new equipment purchased 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. The factory or an authorized repair station must perform warranty service. 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 part, which has been so returned and is disclosed to SR Instruments, Inc.'s satisfaction to be defective. The provision of this warranty clause is in lieu of all other warranties, expressed or implied, and of all other obligations or 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

SRScales®
By SR® Instruments, Inc.

Precision & Technology in Perfect Balance™

SR® Instruments, Inc., 600 Young Street, Tonawanda, NY 14150
Tel: 716-693-5977 Fax: 716-693-5854 URL: www.srscales.com
email: sri@srinstruments.com