Model SR241 Portable Infant/Adult Scale
Service Manual
Part No. MAN241_201006

SR Scales®
by SR® Instruments, Inc.

Model
SR241/SR241SO
Portable Infant / Adult Scale

Operating and Service Manual
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## PACKING CHECKLIST – Model SR241
Portable Infant / Adult Scale

<table>
<thead>
<tr>
<th>√</th>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SCALE BASE</td>
<td>1 ea</td>
</tr>
<tr>
<td></td>
<td>INFANT CRADLE</td>
<td>1 ea</td>
</tr>
<tr>
<td></td>
<td>9 VOLT BATTERY</td>
<td>1 ea</td>
</tr>
<tr>
<td></td>
<td>CERTIFICATE OF CALIBRATION</td>
<td>1 ea</td>
</tr>
<tr>
<td></td>
<td>MANUAL</td>
<td>1 ea</td>
</tr>
<tr>
<td></td>
<td><strong>OPTIONAL ITEMS IF ORDERED</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOFT-SIDED CARRY CASE</td>
<td>1 ea</td>
</tr>
</tbody>
</table>

## PACKING CHECKLIST – Model SR241SO
Portable Scale

<table>
<thead>
<tr>
<th>√</th>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
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<tbody>
<tr>
<td></td>
<td>SCALE BASE</td>
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<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td><strong>OPTIONAL ITEMS IF ORDERED</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOFT-SIDED CARRY CASE</td>
<td>1 ea</td>
</tr>
</tbody>
</table>
ASSEMBLY

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

STEP 2:  Insert the 9-volt battery.  See BATTERY REPLACEMENT instructions.

STEP 3:  SR241 scale system Infant Cradle slides onto the Scale Base and snaps securely into position.

REPLACEMENT PARTS and ACCESSORIES

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM4028</td>
<td>REPLACEMENT INFANT CRADLE</td>
</tr>
<tr>
<td>SR241SO</td>
<td>SCALE ONLY</td>
</tr>
<tr>
<td>MAN241</td>
<td>MANUAL</td>
</tr>
<tr>
<td>PP-4022</td>
<td>SOFT-SIDED CARRY CASE</td>
</tr>
</tbody>
</table>

SYSTEM DESCRIPTION and INTENDED USE

SYSTEM DESCRIPTION

The SR241/SR241SO Portable Infant/Adult 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 patient’s weight.

The patient’s weight is displayed on an LCD screen. With a push of a button, weight data may be viewed in either pounds or kilograms with a displayed resolution of 0.1 lb. or 0.1 kg.
SYSTEM DESCRIPTION and INTENDED USE (Cont’d)

INTENDED USE

The SR241 Portable Infant/Adult Scale is a unique portable scale system that offers the versatility of being able to weigh infants, toddlers, and adults on one lightweight and weather resistant system. Weighing in itself at a mere seven pounds, this scale is specialized for use in pediatrician or physicians’ offices and is also perfect for traveling nurse applications. The optional Soft-Sided Carry Case (Figure 1) protects the scale and facilitates its portability.

The SR241 Portable Infant/Adult Scale is a preferred means of gathering patient weight data of adults weighing up to 400 pounds (181 kilograms), and infants to 44 pounds (20 kilograms). Load cell technology ensures accurate and repeatable weight readings.

The SR241SO Portable Adult Scale is a unique portable scale system that is lightweight and weather resistant. It weighs a mere four pounds. This scale is specialized for use in physicians’ offices and is also perfect for traveling nurse applications. The optional Soft-Sided Carry Case (Figure 1) protects the scale and facilitates its portability.

The SR241SO Portable Adult Scale is a preferred means of gathering patient weight data of patients weighing up to 400 pounds (181 kilograms). Load cell technology ensures accurate and repeatable weight readings.

Please heed the following warning to avoid injury to the patient or attendant.

WARNING

DO NOT EXCEED MAXIMUM WEIGHT LIMIT OF 400 LB / 181 KG

STORAGE

If storing this equipment for periods longer than three (3) months, remove the battery. 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).

WARNING

Prolonged exposure to extremes of heat or cold can damage equipment and effect accuracy.
CLEANING and DISINFECTING

CLEANING
To clean the display / user interface and other scale contact areas:
- Use a soft cloth dampened with water and mild detergent to clean scale surfaces.
- Wipe surface with clean soft cloth dampened with water and then dry with clean soft cloth.
- Do not use abrasive materials to clean scale surface to prevent damage to the surface finish.
- Do not spray liquid directly onto scale surfaces. Use only a damp cloth.

DISINFECTION
To disinfect the display / user interface and other scale contact areas:
- Use a soft cloth dampened with disinfectant or a damp disposable disinfectant cloth. Cloth cannot be dripping wet. Follow manufacturer’s instruction on the proper use of commercially available disinfectants.
- Disinfectant solutions with 1% sodium hypochlorite or 70% isopropyl alcohol are suitable for display / user interface and other scale contact surfaces.
- After disinfecting, use a soft cloth dampened with clean water and dry with a soft clean cloth to prevent buildup of material on scale finish.
- Do not use abrasive material to disinfect / clean scale surfaces to prevent damage to the surface finish.
- Do not spray liquid directly onto scale surfaces. Use only a damp cloth.

WARNING: DO NOT SPRAY CLEANING SOLUTION OR LIQUIDS DIRECTLY ON SURFACES TO BE CLEANED.

WARNING: EXPOSURE TO EXCESSIVE LIQUID WILL DAMAGE USER INTERFACE KEYPAD.

WARNING: DO NOT USE PRESSURIZED WATER OR STEAM. THE SCALE SYSTEM CONTAINS ELECTRONIC COMPONENTS THAT MAY BE ADVERSELY AFFECTED BY EXPOSURE TO SUCH AN ENVIRONMENT.
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>MAXIMUM WEIGHT CAPACITY</th>
<th>Infant: 44 lb (20 kg)</th>
<th>Adult: 400 lb (181 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIMENSIONS</td>
<td>Infant Cradle: 22 in x 12.5 in (55 cm x 32 cm)</td>
<td>Adult Platform: 12 in x 14 in (31 cm x 36 cm)</td>
</tr>
<tr>
<td>DISPLAY TYPE</td>
<td>LCD</td>
<td></td>
</tr>
<tr>
<td>DISPLAY RESOLUTION</td>
<td>Infant: ¼ oz (0.01 kg)</td>
<td>Adult: 0.1 lb (0.1 kg)</td>
</tr>
<tr>
<td>ACCURACY</td>
<td>0.2% +/- 1 digit of displayed resolution (over 0.2 kg)</td>
<td></td>
</tr>
<tr>
<td>AUTO ZERO</td>
<td>One button operation</td>
<td></td>
</tr>
<tr>
<td>SR241 SCALE WEIGHT</td>
<td>7 lb (3 kg)</td>
<td></td>
</tr>
<tr>
<td>SR241SO SCALE WEIGHT</td>
<td>4 lb (2 kg)</td>
<td></td>
</tr>
<tr>
<td>AUTO POWER DOWN</td>
<td>After 1 minute</td>
<td></td>
</tr>
<tr>
<td>AVERAGING</td>
<td>Automatic digital filter</td>
<td></td>
</tr>
<tr>
<td>POWER SUPPLY</td>
<td>9-volt battery</td>
<td></td>
</tr>
<tr>
<td>CALIBRATION</td>
<td>Calibration is traceable to NIST standards</td>
<td></td>
</tr>
<tr>
<td>OPERATING CONDITIONS</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>TRANSPORATION AND STORAGE</td>
<td>Storage 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.</td>
<td></td>
</tr>
</tbody>
</table>
**BUTTON FUNCTIONS**

**SYSTEM ZERO**

**ZERO – ADULT MODE**

To zero for adult weigh: Press the large blue “ZERO” button. Display will read “0.0”. When patient is placed onto the scale, net weight will be displayed.

**ZERO – BABY MODE**

To zero for infant weigh: Slide and snap the cradle into place on the scale. Place any blankets, pads, or disposable liners being used for infant’s comfort on the cradle before zeroing. Press the yellow “BABY MODE” button to zero the scale system. When baby is placed on the scale, the infant’s net weight data will be displayed.

*Note:* When system is zeroed, memory is emptied.

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**LB / KG MODE BUTTONS**

Press either button to switch weight display between pounds/ounces or kilograms during the baby weighing process and press either button to switch the weight display between pounds or kilograms during the adult weighing process.

Pressing either button after weigh process is finished and display has shut down re-activates display and recalls last weight reading. This must be done before system is zeroed.
BASIC SYSTEM OPERATION

ADULT WEIGH

STEP 1:  Remove infant cradle from base. Place scale on hard smooth floor surface to ensure accurate data.

STEP 2:  Press the large blue “ZERO” button and wait for the display to indicate “0.0”.

STEP 3:  Position patient on the platform. Weight will be displayed in a few seconds.

STEP 4:  To recall last weight data, press the “LB” or “KG” buttons. Note: Must be done before “ZERO” button is pressed.

STEP 5:  If more weight needs to be added at any time during the weighing process, add weight and press the blue “ADULT WEIGH” button. This will update the net weight on the display.

BABY WEIGH – OPTION 1

STEP 1:  If necessary, attach the baby cradle by sliding and snapping it into place.

STEP 2:  Place the platform on a stable counter or table-top.

STEP 3:  Follow the directions for ZERO-BABY MODE in the previous section.

STEP 4:  When the display indicates “0.0”, you may place the baby on the scale. If the display shuts down before weight data can be noted, press the “LB” or “KG” button to recall the last stored weight data.

BABY WEIGH – OPTION 2

STEP 1:  Remove infant cradle from base. Place scale on hard smooth floor surface to ensure accurate data.

STEP 2:  Have an adult stand on the scale holding any accessories that will be necessary for the baby’s comfort (blanket, diaper, etc.). Press the yellow “BABY ZERO” button. This will zero the scale system and TARE the adult’s and additional accessories weight.

STEP 3:  Place the baby in the adult’s arms. The weight displayed will be the infant’s net weight.

STEP 4:  To recall last weight data, press the “LB” or “KG” buttons. Note: Must be done before “ZERO” button is pressed.

STEP 5:  If more weight needs to be added at any time during the weighing process, add weight and press the yellow “BABY WEIGH” button. This will update the net weight on the display.
BATTERY REPLACEMENT

REPLACING BATTERIES

The display will read “LoBat” when battery is low and needs to be changed.

STEP 1: (Figure 3) Turn the scale over and locate the battery cover. Unscrew the two (2) screws.

STEP 2: Remove and replace with a 9-volt battery.

STEP 3: Press the “ZERO” button to confirm display is working.

STEP 4: Replace cover and securely tighten screws.

STEP 5: Zero the system.

Figure 3: SR241/SR241SO Battery Compartment
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 Whetstone-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 Whetstone-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 averages the data before locking in on the reading.
## 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.

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## TROUBLESHOOTING

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>REASON/CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>System fails to perform correctly</td>
<td>Check battery  Make sure patient is standing on two feet, is clear of any obstacles and that nothing, including the caregiver, is touching the patient or scale.  Set scale on smooth, hard floor surface.</td>
</tr>
<tr>
<td>Scale reads 999.9</td>
<td>Return to factory for repair.</td>
</tr>
</tbody>
</table>

For additional information or assistance, phone our 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. Purchaser should file any claims for shortage or damage with the delivery carrier and should refuse any shipment that has obvious external damage.

RETURN POLICY

All products being returned to SR Instruments, Inc. require a Return Goods Authorization number (RGA). To receive an RGA, call our Customer Service at 716-693-5977 ext 103 or toll-free in the USA and Canada at 800-654-6360 ext 103.

When inquiry is made, please supply model and serial numbers, purchase order 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 unless scale is returned because of SR error.

No returns will be accepted after 30 days.

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

RESTOCKING FEE

- 15% fee will be assessed on return of current merchandise

- 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 30 days.