



PLEASE READ THE ENTIRE CONTENTS OF THIS MANUAL PRIOR TO INSTALLATION AND OPERATION. BY PROCEEDING YOU AGREE THAT YOU FULLY UNDERSTAND AND COMPREHEND THE FULL CONTENTS OF THIS MANUAL. FORWARD THIS MANUAL TO ALL OPERATORS. FAILURE TO OPERATE THIS EQUIPMENT AS DIRECTED MAY CAUSE INJURY OR DEATH.

REV A 06-21-10

p/n# 5900233

# INSTALLATION AND OPERATION MANUAL

## MODEL DST-2420 WHEEL BALANCER

FOR BALANCING  
AUTOMOBILE,  
MOTORCYCLE  
& LIGHT TRUCK  
TIRES / WHEELS



Keep this operation manual near the machine at all times. Make sure that ALL USERS read this manual.



### SHIPPING DAMAGE CLAIMS

When this equipment is shipped, title passes to the purchaser upon receipt from the carrier. Consequently, claims for the material damaged in shipment must be made by the purchaser against the transportation company at the time shipment is received.

### BE SAFE

Your new Ranger balancer was designed and built with safety in mind. However, your overall safety can be increased by proper training and thoughtful operation on the part of the operator. DO NOT operate or repair this equipment without reading this manual and the important safety instructions shown inside.



1645 Lemonwood Dr.  
Santa Paula, CA. 93060, USA  
Toll Free 1-800-253-2363  
Tel: 1-805-933-9970  
Fax: 1-805-933-9160  
www.rangerproducts.com

## Table of Contents

|   |       |
|---|-------|
| <b>Operator Protective Equipment</b> . . . . .            | 2     |
| <b>Definition of Hazard Levels</b> . . . . .              | 3     |
| <b>Owner's Responsibility</b> . . . . .                   | 3     |
| <b>Safety Instructions/Cautions</b> . . . . .             | 4     |
| <br>  |       |
| <b>Before You Begin</b>                                   |       |
| Receiving /Unpacking and Set Up . . . . .                 | 5     |
| Electrical Requirements . . . . .                         | 5     |
| Floor and Space Requirements . . . . .                    | 5     |
| Anchoring the Balancer . . . . .                          | 6     |
| Standard Accessories . . . . .                            | 6     |
| Specifications / Features . . . . .                       | 6     |
| <br>  |       |
| <b>Installation and Setup</b>                             |       |
| Mounting the Hood . . . . .                               | 6     |
| Installing the Threaded Shaft. . . . .                    | 7     |
| Initial Start-Up . . . . .                                | 7     |
| AUTO HOOD START: Enable / Disable . . . . .               | 7     |
| <br>  |       |
| <b>Balancer Overview</b>                                  |       |
| Determining the Planes . . . . .                          | 8     |
| Control Panel and Display . . . . .                       | 8     |
| <br>  |       |
| <b>Selecting Weight Positions</b>                         |       |
| FUNCTION Button Operation . . . . .                       | 9     |
| GRAM / OUNCE Selection . . . . .                          | 9     |
| MM / INCH Selection . . . . .                             | 9     |
| <br>  |       |
| <b>Mounting Wheels</b>                                    |       |
| Rear Cone Mounting . . . . .                              | 10    |
| Front Cone Mounting . . . . .                             | 10    |
| Dual Cone Mounting . . . . .                              | 11    |
| <br>  |       |
| <b>Balancing Instructions</b>                             |       |
| Inputting Wheel Data . . . . .                            | 12    |
| Inputting Wheel Offset . . . . .                          | 12    |
| Inputting Wheel Width . . . . .                           | 13    |
| Inputting Wheel Diameter . . . . .                        | 13    |
| Spin Mode / DYNAMIC, AL1, AL2, AL3, AL4 . . . . .         | 13    |
| Spin Mode / STATIC . . . . .                              | 15    |
| Rechecking The Balance . . . . .                          | 15    |
| CUT/ STOP BUTTON / Identifying Remaining Weight . . . . . | 15    |
| After Balance Vibration Problems . . . . .                | 15    |
| <br>  |       |
| <b>Maintenance and Calibration</b>                        |       |
| Trouble Shooting. . . . .                                 | 16    |
| SELF CALIBRATION Procedure . . . . .                      | 17    |
| Resetting PARAMETER SETTINGS . . . . .                    | 18    |
| Error Codes . . . . .                                     | 22    |
| Parts Breakdown . . . . .                                 | 23-26 |
| Tire & Wheel Data. . . . .                                | 27    |



Failure to follow danger, warning, and caution instructions may lead to serious personal injury or death to operator or bystander or damage to property.

Do not operate this machine until you read and understand all the dangers, warnings and cautions in this manual.

For additional copies  
or further information, contact:  
BendPak Inc. / Ranger Products  
1645 Lemonwood Dr.,  
Santa Paula, CA. 93060  
1-805-933-9970  
www.rangerproducts.com  
www.bendpak.com



## OPERATOR PROTECTIVE EQUIPMENT

Personal protective equipment helps make tire and wheel service safer. However, equipment does not take the place of safe operating practices. Always wear durable work clothing during tire service activity. Shop aprons or shop coats may also be worn, however loose fitting clothing should be avoided. Tight fitting leather gloves are recommended to protect operator's hands when handling worn tires and wheels. Sturdy leather work shoes with steel toes and oil resistant soles should be used by tire service personnel to help prevent injury in typical shop activities. Eye protection is essential during tire service activity. Safety glasses with side shields, goggles, or face shields are acceptable. Back belts provide support during lifting activities and are also helpful in providing operator protection. Consideration should also be given to the use of hearing protection if tire and wheel service activity is performed in an enclosed area, or if noise levels are high.



**THIS SYMBOL POINTS OUT IMPORTANT SAFETY INSTRUCTIONS WHICH IF NOT FOLLOWED COULD ENDANGER THE PERSONAL SAFETY AND/OR PROPERTY OF YOURSELF AND OTHERS AND CAN CAUSE PERSONAL INJURY OR DEATH. READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL BEFORE ATTEMPTING TO OPERATE THIS MACHINE.**

## DEFINITIONS OF HAZARD LEVELS

Identify the hazard levels used in this manual with the following definitions and signal words:



### DANGER!

Watch for this symbol. It means: Immediate hazards which will result in severe personal injury or death.



### WARNING!

Watch for this symbol. It means: Hazards or unsafe practices which could result in severe personal injury or death.



### CAUTION!

Watch for this symbol. It means: Hazards or unsafe practices which may result in minor personal injury or product or property damage.

Failure to follow danger, warning, and caution instructions may lead to serious personal injury or death to operator or bystander or damage to property. Do not operate this machine until you read and understand all the dangers, warnings and cautions in this manual.

### WARRANTY!

Ranger® Wheel Service Equipment is warranted for one year on all operating components to be free of defects in material and workmanship. Ranger Products® shall repair or replace at their option for the warranty period those parts returned to the factory freight prepaid which prove upon inspection to be defective. Ranger Products® will pay labor costs for the first 12 months only on parts returned as previously described. These warranties do not extend to defects caused by ordinary wear, abuse, misuse, shipping damage, improper installation or lack of required maintenance. This warranty is exclusive and in lieu of all other warranties expressed or implied. In no event shall BendPak Inc. / Ranger Products be liable for special, consequential or incidental damages for the breach or delay in performance of the warranty. BendPak Inc. / Ranger Products reserves the right to make design changes or add improvements to its product line without incurring any obligation to make such changes on product sold previously. Warranty adjustments within the above stated policies are based on the model and serial number of the equipment. This data must be furnished with all warranty claims.

## OWNER'S RESPONSIBILITY

To maintain machine and user safety, the responsibility of the owner is to read and follow these instructions:

- Follow all installation instructions.
- Make sure installation conforms to all applicable Local, State, and Federal Codes, Rules, and Regulations; such as State and Federal OSHA Regulations and Electrical Codes.
- Carefully check the unit for correct initial function.
- Read and follow the safety instructions. Keep them readily available for machine operators.
- Make certain all operators are properly trained, know how to safely and correctly operate the unit, and are properly supervised.
- Allow unit operation only with all parts in place and operating safely.
- Carefully inspect the unit on a regular basis and perform all maintenance as required.
- Service and maintain the unit only with authorized or approved replacement parts.
- Keep all instructions permanently with the unit and all decals on the unit clean and visible.



# IMPORTANT SAFETY INSTRUCTIONS! READ BEFORE OPERATING UNIT!

- Protective goggles, safety glasses, or a face shield must be worn by the operator. Care should be taken to see that all eye and face safety precautions are followed by the operator. **ALWAYS WEAR SAFETY GLASSES.**
- Keep guards and safety features in place and in working order.
- Wear proper protective clothing. Safety toe, non-slip footwear and protective hair covering to contain hair is recommended. Do not wear loose clothing, or jewelry when operating the balancer.
- If an extension cord is necessary, a cord with a current rating equal to or more than that of the equipment should be used. Cords rated for less current than the equipment may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
- Do not disable hood cover operation, or in any way shortcut safety controls and operations.
- Be sure that all wheels are mounted properly, the hub nut engages the arbor for not less than four turns, and the hub nut is firmly tightened before spinning the wheel.
- Read and understand this manual before operating.
- Be sure the balancer is properly connected to the power supply and electrically grounded.
- Do not operate damaged equipment or if the power cord is cut or worn.
- Keep work area clean and well lighted. Cluttered and/or dark areas invite accidents.
- Avoid dangerous environments. Do not use power tools or electrical equipment in damp or wet locations, or expose them to rain and moisture.
- Avoid unintentional starting. Be sure the balancer is turned off before servicing.
- Disconnect the balancer before servicing.
- Use only manufacturer's recommended accessories. Improper accessories may result in personal injury or property damage.
- Repair or replace any part that is damaged or worn and that may cause unsafe balancer operation. Do not operate damaged equipment until it has been examined by a qualified service technician.
- Never overload or stand on the balancer.
- Do not allow untrained persons to operate machinery.
- To reduce the risk of fire, do not operate equipment in the vicinity of open containers or flammable liquids.
- Adequate ventilation should be provided when working on operating internal combustion engines.
- Keep hair, loose clothing, fingers, and all parts of body away from moving parts.
- Use equipment only as described in this manual.
- Use only manufacturer's recommended attachments.



**CAUTION!**  
**DAMAGE CAUSED BY STRIKING OR HITTING THE QUICK-NUT WITH HAMMER, TIRE IRON OR HEAVY OBJECT IS NOT COVERED UNDER WARRANTY!**

**KEEP ALL INSTRUCTIONS PERMANENTLY WITH UNIT  
AND ALL SAFETY DECALS CLEAN AND VISIBLE !**

## **IMPORTANT !**

**THE SELECTOR SWITCH ON THIS EQUIPMENT IS SET FOR 220 VAC.**

For use with 220 current, attach appropriate plug head for your outlet.

For use with 110 VAC, change Selector Switch to 110 VAC,  
then attach appropriate plug head for your outlet.

**It is recommended to operate the Balancer on 220Volts for optimum performance.**

## BEFORE YOU BEGIN

### Receiving

The shipment should be thoroughly inspected as soon as it is received. The signed bill of lading is acknowledgement, by the carrier, of receipt in good condition of the shipment. If any of the goods called for on the bill of lading are shorted or damaged, **do not accept them** until the carrier makes a notation of the shorted or damaged goods on the freight bill. Do this for your own protection.

NOTIFY THE CARRIER AT ONCE if any hidden loss or damage is discovered after receipt. **IT IS DIFFICULT TO COLLECT FOR LOSS OR DAMAGE AFTER YOU HAVE GIVEN THE CARRIER A CLEAR RECEIPT.** File your claim with the carrier promptly. Support your claim with copies of the bill of lading, freight bill, invoice, and photographs if possible.

### Unpacking and Setup

Handling of the machine must be performed only with an appropriate lifting device such as a forklift or pallet jack.

Only personnel who are experienced and qualified on material handling procedures should handle any transportation or moving of machine.

1. Remove the carton from the pallet.
2. Remove the shipping bolts making sure to keep hands clear of all pinch points.
3. Remove straps and plastic wrap holding the hood other components in shipping position.

#### NOTE:

**The Accessory Box is packaged inside the Balancer. When lifting the Balancer off the pallet, remove the Accessory Box from the inside of the Balancer.**



- Do not use the, face-plate, hood or threaded shaft to lift the balancer.
- Use help to remove the balancer from the pallet. The unit is heavy and the weight is not evenly distributed.
- Dropping the unit from the pallet may cause personal injury or equipment damage.

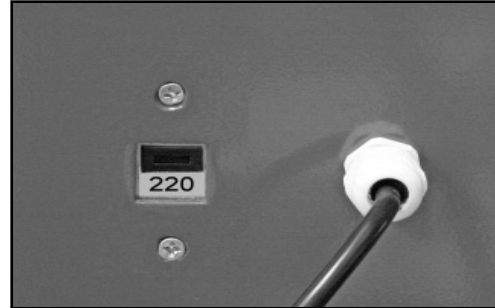
### Electrical Requirements

#### NOTE:

**It is recommended to operate the Balancer on 220Volts for optimum performance.**

**STANDARD WIRING IS 220 VOLTS.** YOUR MACHINE HAS A DUAL VOLTAGE MOTOR and can be run on either 110 or 220 volts. Your balancer features a dual voltage, (110/220volt) dual (50 or 60 HZ.) power system. Simply

position the switch located at the back of the machine to the desired voltage setting before installing the required plug if necessary.

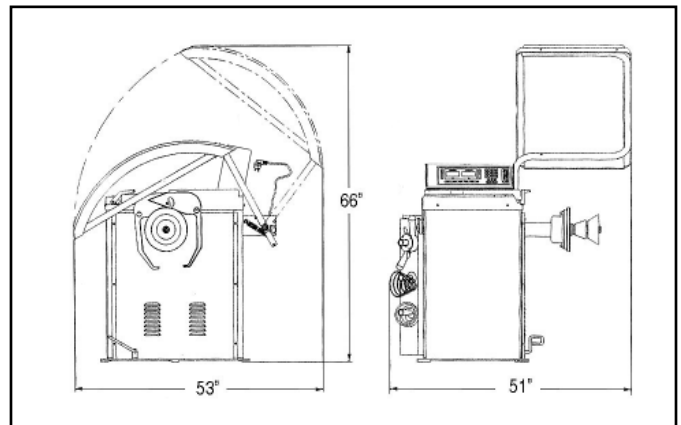


Consult a licensed electrician for electrical hook-up according to local electrical codes. Operation with no ground can damage electronics and will create a shock hazard for the operator or bystanders. Damage caused by improper electrical installation may void warranty. Most electrical codes require "hard-wiring" when machine is bolted to the floor. Consult a licensed electrician regarding specific codes.

### Floor and Space Requirements

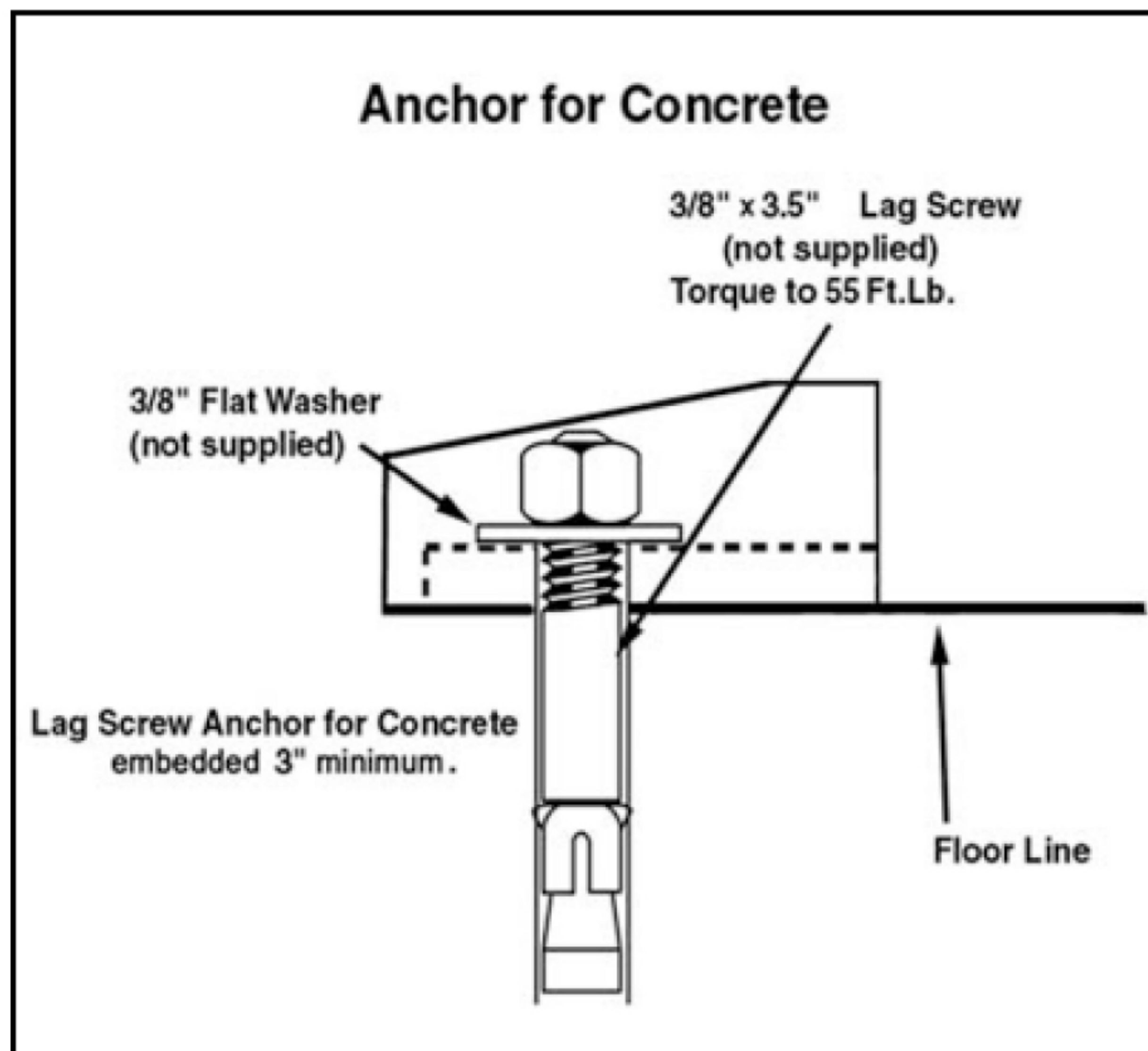
The balancer **MUST** be located on a flat floor of solid construction, preferably concrete. The balancer **MUST** sit solidly on the floor. If the balancer is not level, or is placed on an unstable floor, the balancer will not function properly and will produce inaccurate balance readings. The balancer **MUST** be bolted down. It will NOT function properly if operated on the pallet.

- Select a location for the balancer that provides a level, solid floor, and adequate clearance around and above the balancer.
- Make sure the location selected has enough room above and behind the unit so the hood can be raised completely.
- The location must also provide working room for mounting and removing wheels.



## Anchoring the Balancer

The balancer must be bolted to the floor using concrete anchors through the holes in the base.



## Standard Accessories

- Graduated Cone Assortment (hardened, 4-piece)
- Wheel Weight Pliers
- Rim Width / Diameter Caliper
- Quick-Release Hub-Nut
- Spacer Cup With No-Mar Ring
- Mounting Spring
- Calibration Weights
- Hex Head wrenches
- Spacer Ring

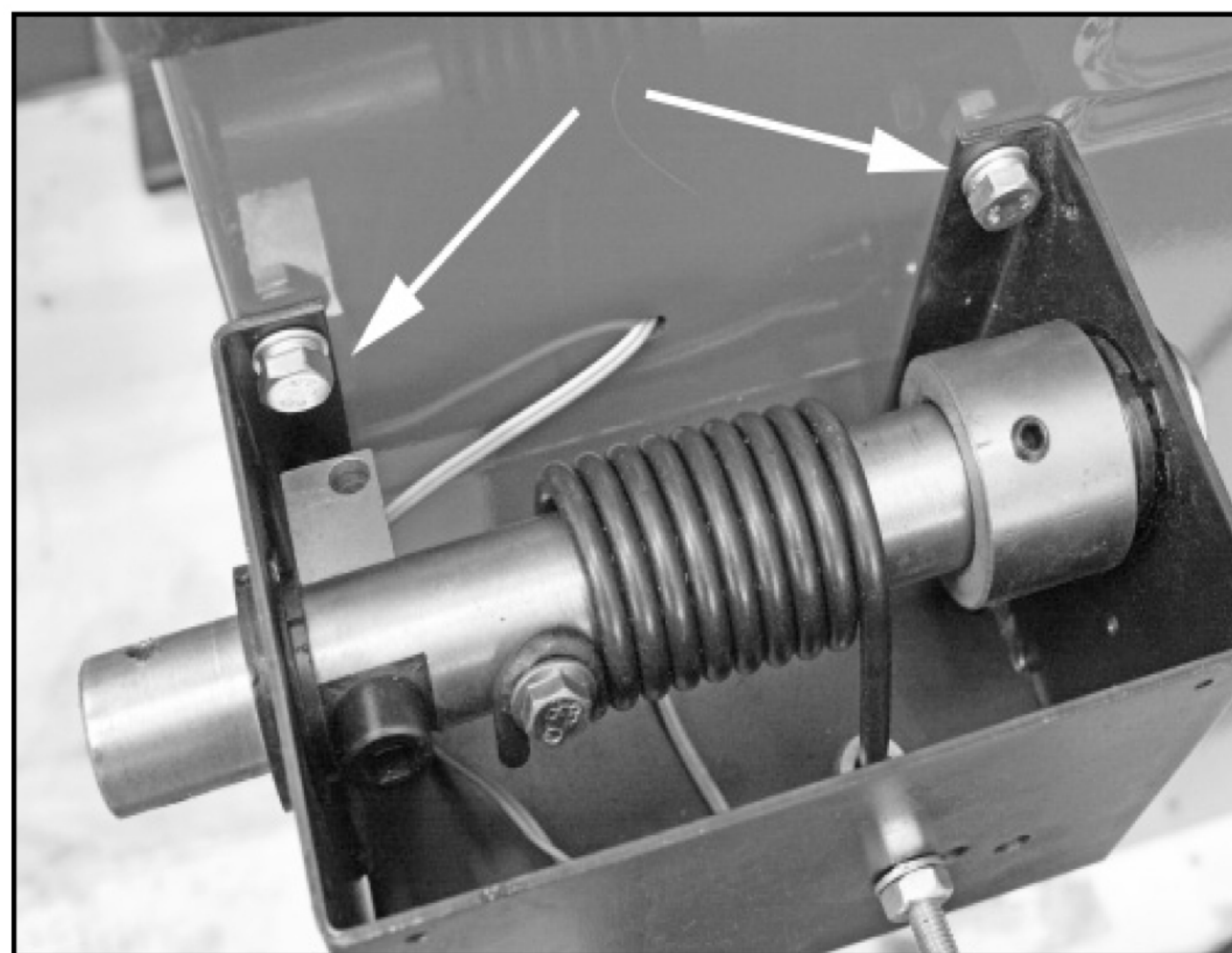


## Technical Data / Features / Specifications

- Voltage . . . . . 110/220V 50/60HZ
- Noise . . . . . 70 decibels
- Working Temperature . . . . 0°C / 32°F to 50°C / 82°F
- Power Consumption .1875kw @110V /.75kw @ 220V
- Drive System . . . . . Belt Drive
- Cycle time . . . . . 6-9 seconds (avg.)
- Balancing Modes . . . . . Dynamic / Static / Four Alloy
- Top Positioning Weight Locator . . . . . Standard
- Inside & Outside Measuring . . . . . Standard
- Millimeter / Inches Selection . . . . . Standard
- Self Calibration Function . . . . . Standard
- Wheel Distance Setting. . . . . Manual
- Ounce / Gram Selection. . . . . Standard
- Auto Start When Hood is Lowered . . . . . Standard
- Brake Type Automatic. . . . . Electronic
- Manual Brake Capability. . . . . Standard
- Max. Tire Diameter. . . . . 47" / 1194 mm
- Max. Tire Weight . . . . . 145 pounds (65 Kg)
- Max. Rim Diameter. . . . 10" - 24" / 254 mm - 610 mm
- Wheel Width Capacity. . . 1.5" - 18" / 38 mm - 457 mm
- Balancing Increments . . . . . 0.25 oz or 0.01 ounce
- Average Balancing Speed. . . . . 180 RPM
- Accuracy. . . . . +/- .04oz / 1 gram
- Shipping Weight . . . . . 398 pounds (181 Kg)

## INSTALLATION AND SET UP MOUNTING THE HOOD ASSEMBLY

1. Locate the Hood Assembly and open the accessory box and remove the Hood Mounting Bracket and hardware.
2. Use help and carefully assemble the Hood as described below.
3. Remove the Hood Bracket Mounting Cover and attach the Hood Mounting Bracket to the rear of the balancer cabinet using the 4 bolts and washers.

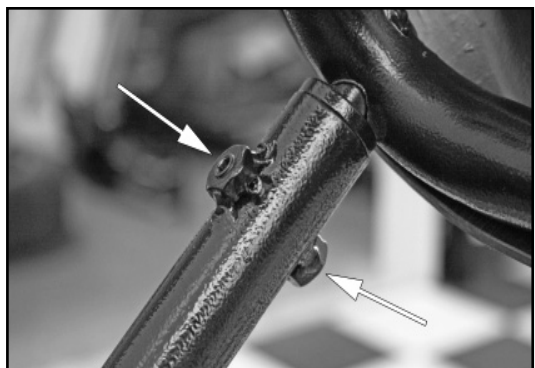


4. Slide the Hood Arm over the Hood Axle, align the holes in the Axle with the Allen bolts then secure in place using the two allen set screws.

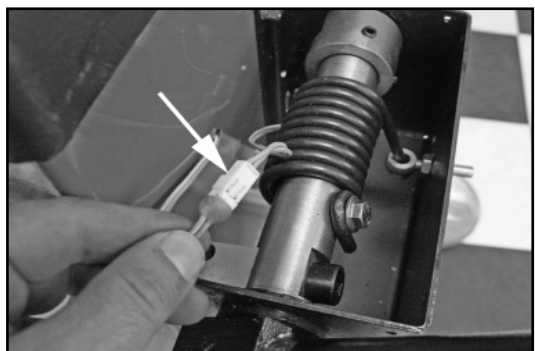


5. Raise the hood and hold it up. Use help to hold the hood while attaching the hood to the Hood Arm.

6. Slide the Hood Pin into the hole on the end of the hood arm and align the holes with the allen bolts and secure in place using the two allen set screws.



7. Connect the hood switch wires as shown.



8. Tuck the wire into the Hood Switch Box and install Hood Switch Box Cover and tighten allen bolts

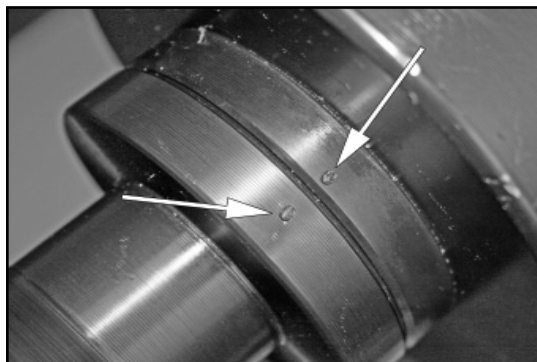


## INSTALLING THE THREADED MAIN SHAFT

1. Locate the Face Plate / Threaded Main Shaft and mounting bolt in the accessory box and install as shown.



2. Locate and align the witness marks on the Face Plate and Shaft Assembly.



3. Be sure to tighten the bolt firmly. Step on the manual brake to hold the shaft while tightening the bolt.

## INITIAL START-UP

1. Turn the balancer ON/OFF switch to ON.

2. The LED Display will show USA 511.

3. Press **START** button. The threaded main shaft should spin **CLOCKWISE** when viewed straight on. If the faceplate spins counterclockwise, turn the balancer off and consult the factory.

4. Now lower the Hood to check the activation of the **AUTO-HOOD START**. The Main shaft should spin when the hood is lowered.

5. To enable/ disable **AUTO HOOD START** feature press

and hold the **STOP** Button



and the **R** button.



## BALANCER OVERVIEW

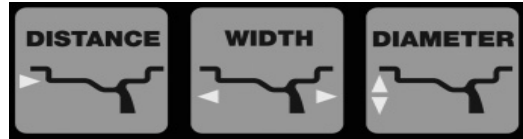
This machine is a two-plane, microprocessor-based computer balancer. Any imbalance in a wheel, either static or dynamic, is detected into two correction planes (the inner and outer) where corrective weights can be applied. Pressing the **F** button selects either **DYNAMIC**, **STATIC**, or **ALLOY** modes which changes the location of these planes.

### Determining the Planes

When the distance gauge is pulled out and held against the wheel flange, the distance measurement shown on the pull out slide refers to the **DISTANCE OFFSET MEASUREMENT**. This measurement tells the computer the location of the **INNER** plane of the wheel for Dynamic and/or Alloy balancing.

By using the **WHEEL CALIPERS**, the wheel width or the **WIDTH MEASUREMENT** tells the computer the location of the **OUTER** plane of the wheel for Dynamic and/or Alloy balancing.

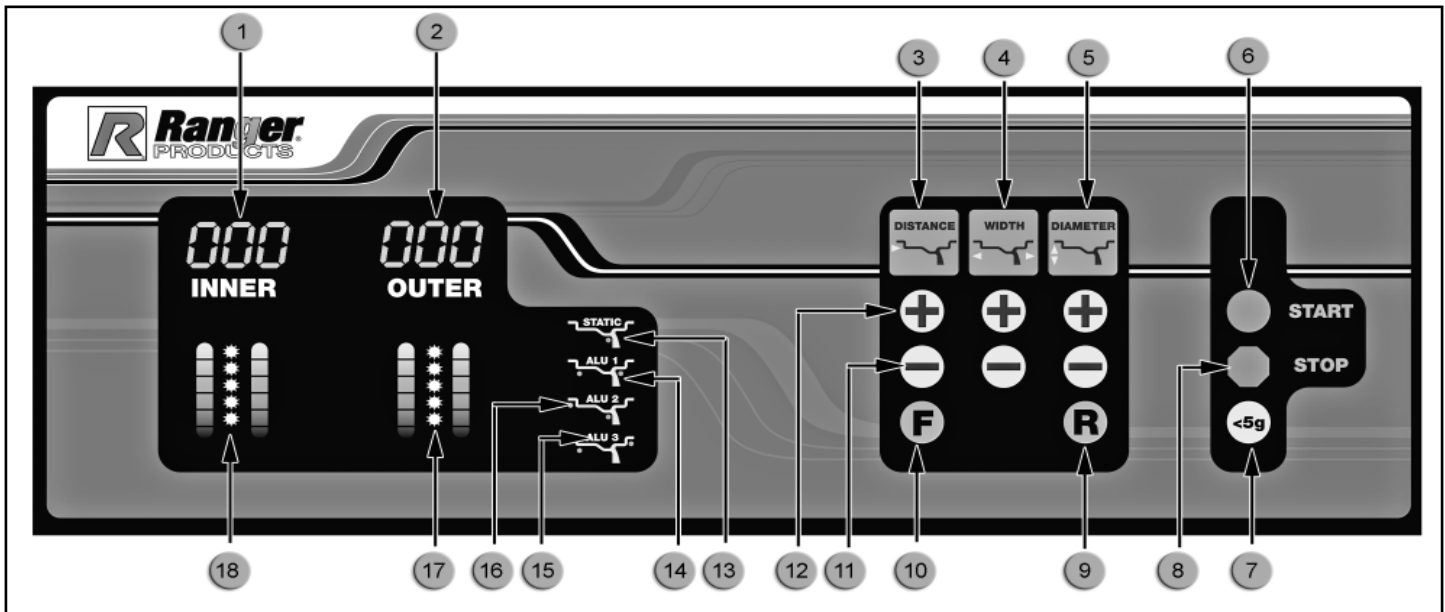
The wheel diameter will be referred as the **DIAMETER MEASUREMENT**. This is the diameter of the wheel at the weight location. You can determine the diameter of the wheel / tire on the tire sidewall to determine the wheel diameter. Or you can use the calipers. This tells the computer how far from the center of the hub the weights will be applied.



### Balancing a Wheel

When a wheel is spun, the balancer detects any imbalance present. The computer calculates the weight needed to correct the imbalance and the location for weight application. The weight required to correct the imbalance is displayed on the control panel, and the weight positioning lights assist the operator in positioning the weight application location at top-dead-center. Weight displays and positioning lights are provided for both inner and outer planes of the wheel.

## CONTROL PANEL AND DISPLAY



### Control Panel Legend

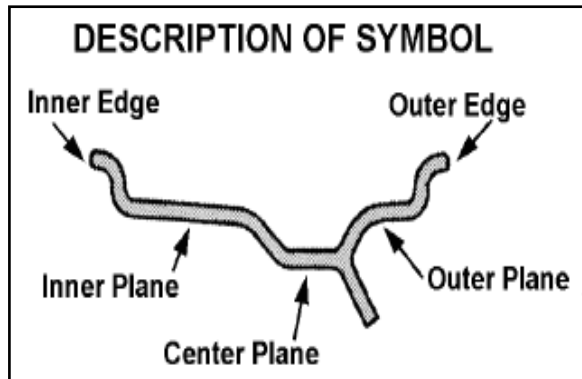
- 1 - Weight reading or information display window. INNER
- 2 - Weight reading or information display window. OUTER
- 3 - Wheel OFFSET setting keys.
- 4 - Rim WIDTH setting keys.
- 5 - Rim DIAMETER setting keys.
- 6 - START button for activating spin cycle.
- 7 - CUT button (<5g.) for identifying remaining weight.
- 8 - STOP Button for stopping spin cycle.
- 9 - Toggle display. Required Weights / Wheel Data

- 10 - Selector key for DYNAMIC, STATIC and ALLOY settings.
- 11 - Adjustment key for Offset, Width, Diameter. Decrease.
- 12 - Adjustment key for Offset, Width, Diameter. Increase.
- 13 - STATIC mode indicator
- 14 - ALU 1 mode indicator.
- 15 - ALU 3 mode indicator.
- 16 - ALU 2 mode indicator.
- 17 - OUTER weight position indicator LEDs.
- 18 - INNER weight position indicator LEDs.



## SELECTING WEIGHT POSITIONS FOR DIFFERENT WHEEL TYPES

Prior to balancing, a specific **FUNCTION** must be chosen for each particular wheel. The function settings automatically compensate weight location requirements for a particular wheel type. These settings can be selected by depressing the **F** button.



### **DYNAMIC** (No Symbol Illuminated)

For balancing standard steel or alloy wheels using clip-on weights attached to inner and outer wheel edges.

### **Static**

This function is used if weights can only be mounted on a single plane of the wheel.



### **ALU1**

This function is used if stick-on weights are to be mounted to both inner plane and outer planes of the wheel.



### **ALU2**

This function is used if stick-on /clip on weights are to be mounted to the inner edges and stick on weights are to be mounted on the center planes of the wheel.



### **ALU3**

This function is used if stick-on weights are to be mounted to the inner plane of the wheel and clip-on or stick weights are to be mounted to the outer edge of the wheel.



## GRAM / OUNCE SELECTION

This machine is capable of registering **GRAM** or **OUNCE** readings. To select either **GRAM** or **OUNCE** settings, follow the procedures below.

1. First press the "**STOP**" button.



Then press the Distance  "+" and "-" Button at the same time.

The weight readings will change in the **INNER** and **OUTER** windows to register the applicable setting.

### **NOTE:**


When set to Ounces or Inches the displayed values contains a decimal point.

## MM / INCH SELECTION "L" SETTING / WHEEL WIDTH

To select either **MM** or **INCH** measurement reading for the "**L**" **WHEEL WIDTH** setting, follow the procedures below.

1. First press the "**STOP**" button.



Then press the **WIDTH**  "+" and "-" Button at the same time. The weight readings will change in the **INNER** and **OUTER** windows to register the applicable setting.

### **NOTE:**


When set to Ounces or Inches the displayed values contains a decimal point.

## MM / INCH SELECTION "dia" SETTING / WHEEL DIAMETER

To select either **MM** or **INCH** measurement reading for the "**dia**" **WHEEL DIAMETER** setting, follow the procedures below.

1. First press the "**STOP**" button.



Then press the **DIAMETER**  "+" and "-" Button at the same time. The weight readings will change in the **INNER** and **OUTER** windows to register the applicable setting.

### **NOTE:**

When set to Ounces or Inches the displayed values contains a decimal point.

## MOUNTING WHEELS

Select the most appropriate mounting method for the wheel you are balancing. Using the proper method ensures secure mounting, accurate displays and safe balancer operation. It also prevents damage to the wheel. On most wheels, the inner side of the wheel hub usually has the most uniform surface for wheel balancing. Always center the wheel by the most uniformly shaped side of the hub to achieve the most accurate balance.

Regardless of mounting type, always make sure that the wheel is forced firmly against the arbor faceplate and that the Quick-Nut engages the threaded arbor for at least four complete turns. To assist in centering the wheel properly, rotate the wheel on the arbor while tightening the Quick-Nut.



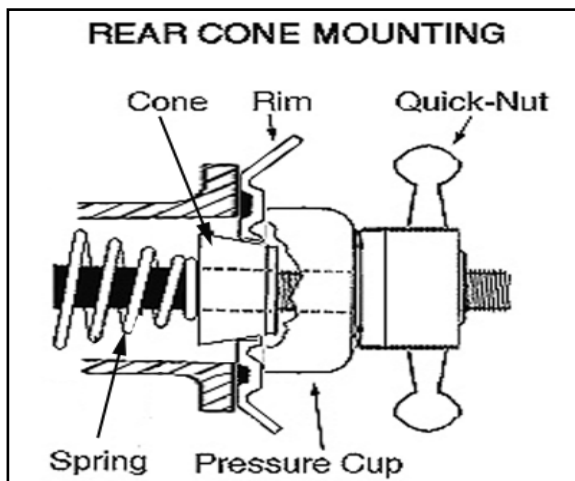
### CAUTION!

**DAMAGE CAUSED BY STRIKING OR HITTING THE QUICK-NUT WITH HAMMER, TIRE IRON OR HEAVY OBJECT IS NOT COVERED UNDER WARRANTY!**

### *Rear Cone Mounting*

Most original equipment and steel wheels can be mounted properly using this method. The wheel is centered on a cone from the inner side of the hub.

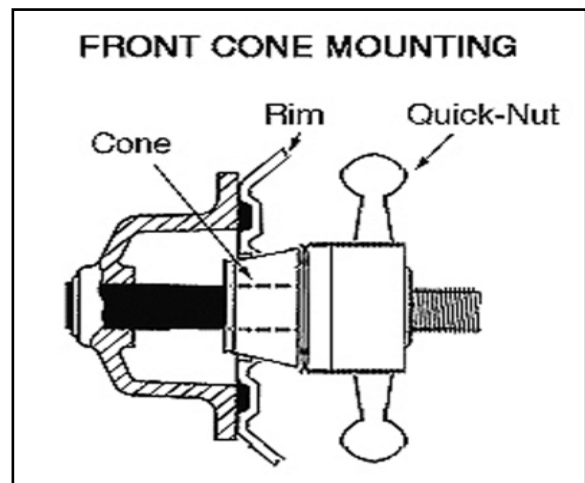
1. Place the cone spring on the arbor with the large end towards the balancer.
2. Select the cone that best fits the center hole in the wheel. Slide the cone onto the arbor with the large end towards the spring.
3. Lift the wheel onto the arbor and center it on the cone.
4. Attach the pressure cup to the Quick-Nut and spin the assembly onto the arbor. Tighten securely.



### *Front Cone Mounting*

A wheel should be centered by the outer side of the hub only when the inner surface will not provide an accurate surface to center on.

1. Select the cone that best fits the center hole in the wheel.
2. Lift the wheel onto the arbor and slide it back against the arbor faceplate.
3. Slide the cone onto the arbor and into the center of the wheel. Then lift the tire to seat the cone in the center hole.
4. Spin the Quick-Nut (without the pressure cup) onto the arbor. Tighten it securely against the cone.

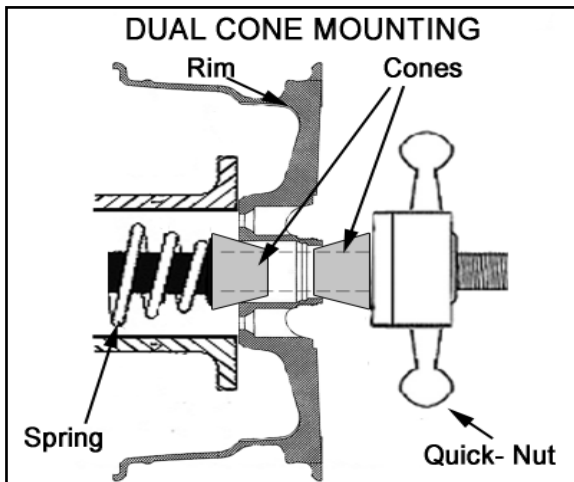


## Dual Cone Mounting

Some aftermarket or OEM performance wheels have a center hole that is deep enough to allow the use of two cones to mount it to the threaded shaft. The factory recommends that dual cone mounting is used in this situation. The cones must not contact each other and a correct cone combination is critical to correctly mount a tire using this method.

(Extra centering cones are available through Ranger Products)

1. Slide the Spring onto the Arbor.
2. Select the cone combination that best fits both sides of the center hole in the wheel. (Note: You may need two cones that are identical in size)
3. Place the rear cone on the arbor and against the Spring.
4. Lift the wheel onto the arbor and slide it back against the rear cone.
5. Place the front cone on the arbor and slide it into the center hole of the wheel.
6. Spin the quick nut (without the pressure cup) onto the arbor. Tighten securely.



## BALANCING INSTRUCTIONS

1. First determine which mounting method you will use for the wheel.
2. Select a centering / mounting cone that best fits the center hole of the wheel.
3. After installing the necessary mounting hardware, lift the wheel onto the threaded shaft and slide it back against the arbor hub. It will be necessary to lift the wheel slightly when positioning the cone in the center of the wheel hole.



### CAUTION!

**DAMAGE CAUSED BY STRIKING OR HITTING THE QUICK-NUT WITH HAMMER, TIRE IRON OR HEAVY OBJECT IS NOT COVERED UNDER WARRANTY!**

4. While holding the wheel and hardware in position, thread the Quick-Nut over the arbor and secure tightly. Never hammer or hit the Quick-Nut to tighten.



### WARNING!

Always make sure that the Quick-Nut engages the arbor threads by at least four (4) full turns. It helps to spin the wheel while at the same time tightening the Quick-Nut.

Never exceed weight capacity of balancer!  
Never hammer or strike the Quick-Nut to tighten.



### CAUTION!

**DAMAGE CAUSED BY STRIKING OR HITTING THE QUICK-NUT WITH HAMMER, TIRE IRON OR HEAVY OBJECT IS NOT COVERED UNDER WARRANTY!**



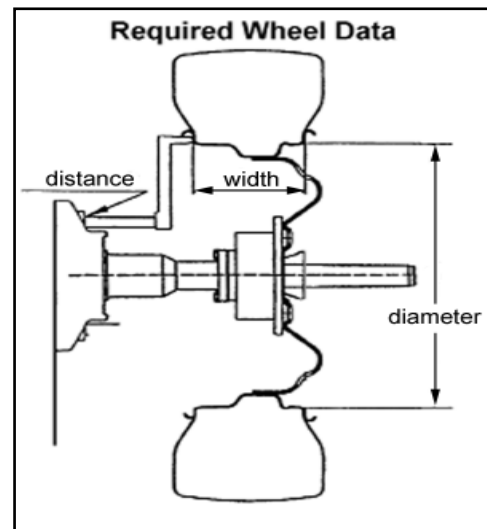
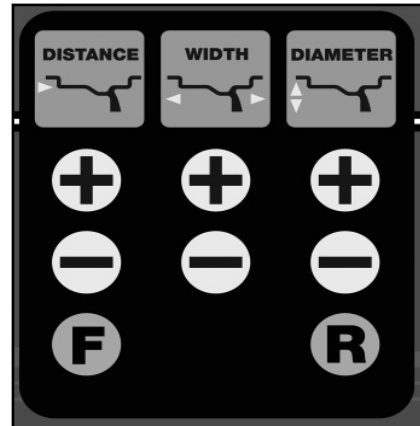
### WARNING!

Do not attempt to balance wheels that are larger than the machine was designed for.

## Inputting Wheel Data

Prior to balancing any wheel, specific data relating to that particular wheel must be entered into the computer. If the data displayed on the screen does not match that of the wheel you are attempting to balance then the wheel will not be accurately balanced. The three data requirements are; **"-A-" Offset**, **"-L-" Width** and **"-d-" Diameter**.


### WHEEL DATA KEY BOARD



### *dis - Wheel Offset*

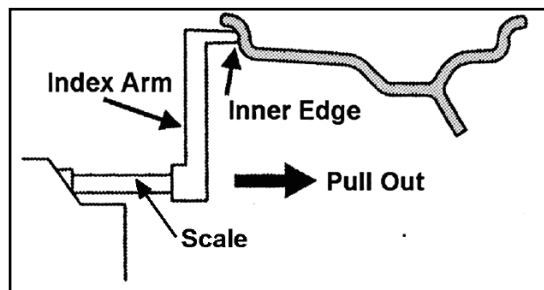
This is the distance between the side of the balancer and the inner edge of the wheel. To enter Wheel Offset data refer to the instructions below.


1. Turn the machine on.

2. Press the + or - button below Distance  .

3. **-A-** will be displayed in the **INNER** window.

- Pull the index arm out from the side of the machine until the tip touches the inner edge of the wheel.

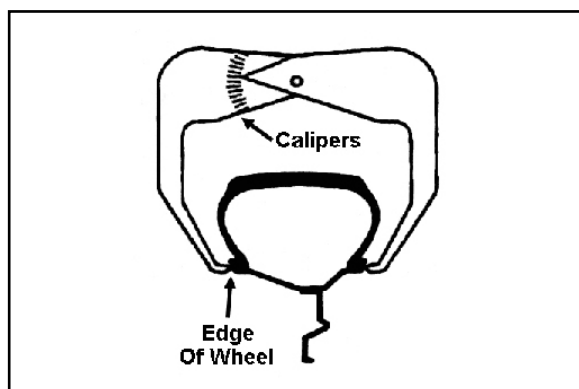


- Read the offset measurement as displayed on the scale directly on top of the index arm. Press the corresponding + - buttons below  to enter the correct data.


### L - Wheel Width

This is the width of the wheel at the inner edges. This distance is measured with the calipers. To enter Wheel Width data refer to the instructions below.

- Position the calipers over the wheel and touch the tips against the wheel edges.



- Read the measurement for Wheel Width shown on the calipers. (Use the proper scale for Width)

- Press the + or - button below .

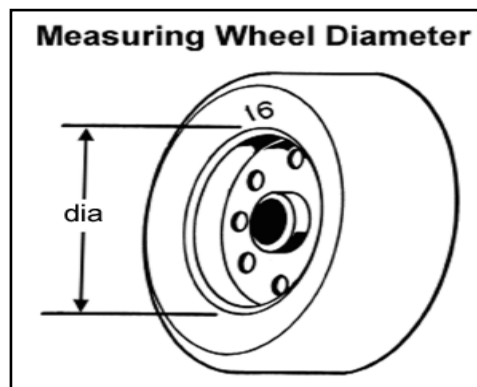
- L- will be displayed in the **INNER** window.

- Press the corresponding + - buttons to enter the correct data. **IMPORTANT NOTE:** The standard setting for this operation is shown in **INCHES**. If metric is desired, new calipers with metric readings will have to replace the calipers that accompanied the unit. (See page 10 for changing "L" reading to **MM** or **INCH** setting.)

### "dia" - Wheel Diameter

This is the diameter of the wheel at the rim flanges. This measurement can be read on the tire sidewall. Or measured. To enter Wheel Diameter data, refer to the instructions below.

- Read the diameter of the wheel as shown on the tire sidewall. Or use the Calipers to measure the wheel diameter. (Use the proper scale for Wheel Diameter)



- Press the + or - button adjacent to .

- d- will be displayed in the **INNER** window.

- Press the corresponding + - buttons to enter the correct data. (See page 10 for changing "d" reading to **MM** or **INCH** setting.)

### Spin Mode / DYNAMIC, AL1, AL2, AL3, AL4

- Once the correct wheel data and **FUNCTION** have been programmed, lower the hood to begin the spin mode.



**WARNING!**

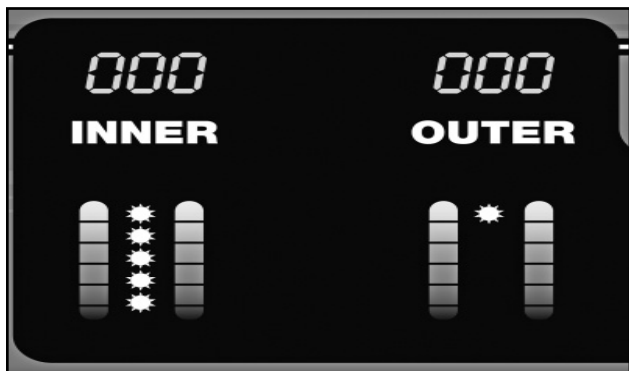
Before initiating the spin sequence, make sure that the Quick-Nut is secure and engaged on the arbor threads by at least four (4) full turns. Never hammer or hit the Quick-Nut to tighten.



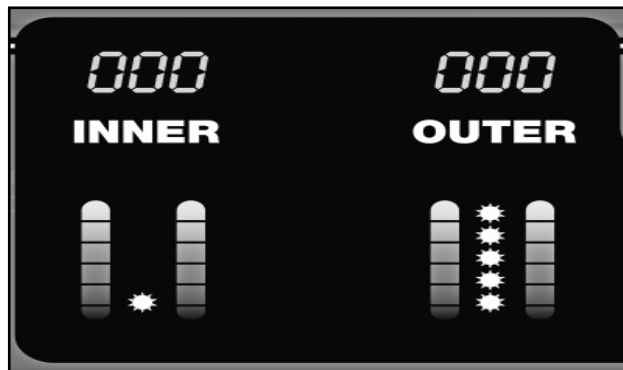
**CAUTION!**

**DAMAGE CAUSED BY STRIKING OR HITTING THE QUICK-NUT WITH HAMMER, TIRE IRON OR HEAVY OBJECT IS NOT COVERED UNDER WARRANTY!**

2. After the hood is lowered, or the **START** button is depressed, the wheel will spin for approximately six seconds then stop automatically.
3. After the wheel stops, weight readings for each side of the wheel (**INNER** and **OUTER**) will appear in the center display screen.
4. Turn the wheel by hand until the weight position indicator lights on the side marked **INNER** are **FULLY ILLUMINATED**. This indicates the position specified by the balancer for the inner weight position.



6. After the **INNER** weight is properly installed, turn the wheel by hand until the weight position indicator lights on the side marked **OUTER** are fully illuminated. This indicates the position specified by the balancer for the **OUTER** weight position.



7. Attach the specified weight for the appropriate **PLANE** position at top-dead-center.

5. Attach the specified weight for the appropriate **PLANE** position at top-dead-center.

**NOTE:**

To hold the wheel in position when installing weights, press down on the **TIRE STOP PEDAL** located on the right side of the machine.

**NOTE:**

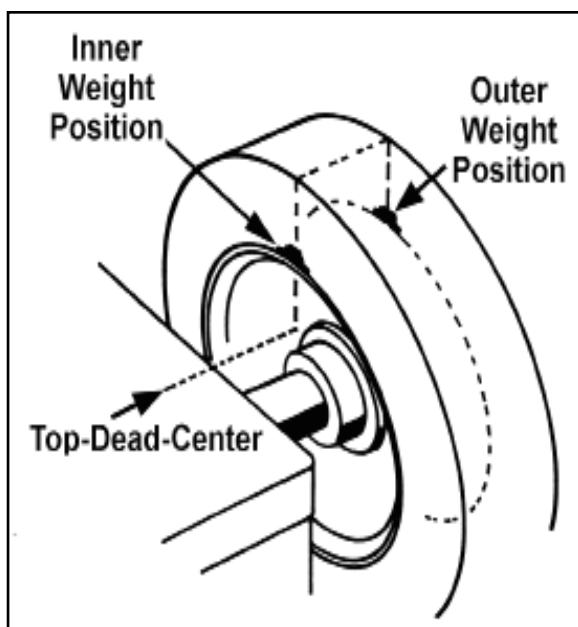
All weight positions are located at **TOP-DEAD-CENTER**. The more accurate you are in selecting the exact weight and position, the more accurate the wheel will be balanced.

**NOTE:**

Perform the Trouble Shooting and Calibration Procedures on page 16 and 17 if you are experiencing balancing problems.

**NOTE:**

It is recommended to perform the Weight Location Verification on a monthly basis following procedure that can be found on page 17 in the manual.



## Spin Mode / STATIC

This function is used if weights can only be mounted on a single plane of the wheel.

1. Once the correct wheel data has been programmed, lower the hood to begin the spin mode.
2. After the hood is lowered, or the **START** button is depressed, the wheel will spin for approximately six seconds then stop automatically.
3. After the wheel stops, a weight reading will appear in both center display screens. **The weight reading will appear the same in both screens.**
4. Turn the wheel by hand until the weight position indicator lights on the side marked **INNER** are fully illuminated. The **OUTER** indicator lights will not illuminate.
5. This indicates the position specified by the balancer for the desired weight location on the chosen **PLANE**.
6. Attach the specified weight on the **PLANE** of the wheel at top-dead-center.

## Rechecking the Balance

After installing the weights in the proper positions, lower the hood or press **START** to begin the spin mode. The weight display windows should display **0 -- 0** to indicate a perfect balance.

If the balancer indicates that an additional weight is required in the same position as the first weight, then the first weight installed was not heavy enough. Install a new weight or add additional weight to the same area. Re-spin the wheel and check again.

If the balancer indicates that an additional weight is required opposite the position as the first weight, then the first weight installed was too heavy. Correct the first weight and re-spin the wheel.

If the balancer indicates that an additional weight is required in a different position as the first weight, then the first weight was installed in the wrong position. Correct the first weight and re-spin the wheel and check again.

## IDENTIFYING REMAINING WEIGHT

Your balancer is set to read **0 -- 0** if the wheel is balanced within 5 grams on either side. If you wish to see what remainder is left on each side (less than 5 grams) press the **CUT** button.



After pressing the **CUT** button, residual weight readings will appear in the display windows.

## STOP BUTTON

The **STOP** button **IS** an emergency stop button. It will immediately shut down the shaft and wheel rotation. For emergency situations that require immediate shutdown of rotation, it is recommended that you use the **STOP** button and the **TIRE STOP PEDAL** located on the right-front side of the unit.



### After Balance Vibration Problems

If vibration is still present after balancing the wheels and driving the vehicle on smooth pavement remove the wheels and recheck the balance. If a wheel is out of balance the cause may be:

1. A weight has come off the wheel. Remove the other weights from the wheel and rebalance.
2. Tire slippage on the wheel. Remove and remount the tire using proper tire lubricant and inflate to 40 PSI. Do not over-inflate. Rebalance the wheel and reduce air pressure to recommended PSI.
3. Stones or other foreign objects caught in the tire tread.

Remove the objects and repair tire as necessary. Check and rebalance if needed. If the balancer still indicates the wheels are balanced to within 5 grams on both inner and outer displays, the problem is not in the balance of the wheels. Check the following possible sources of vibration:

1. Tire pressure. Bring all tires up to the recommended PSI.
2. Radial or lateral runout in the tire or wheel. Replace the damaged part.
3. Foreign material inside the tire. Remove the tire from the wheel, remove the material, and remount. Remove wheel weights and rebalance the wheel.
4. Imbalanced wheel covers or trim rings. Remove the wheel covers or trim rings and test drive, balance the wheel with the wheel cover or trim ring attached to the wheel.
5. Incorrectly mounted wheel. Remount correctly.
6. Damaged wheel bolt holes. Replace wheel.
7. Worn universal joints. Replace as required.
8. Drive shaft imbalanced or damaged. Balance, repair, or replace.
9. Imbalanced brake rotor(s) or drum(s).
10. Suspension out of alignment. Align the vehicle and replace any damaged or worn parts.

## TROUBLE SHOOTING GUIDE.

Perform the following checks if you are experiencing balancing problems.

### PROPER INSTALLATION / ASSEMBLY

Confirm that the balancer is bolted down. Confirm the location and alignment of the witness marks on the Face Plate and Shaft Assembly. (See Page 7.)

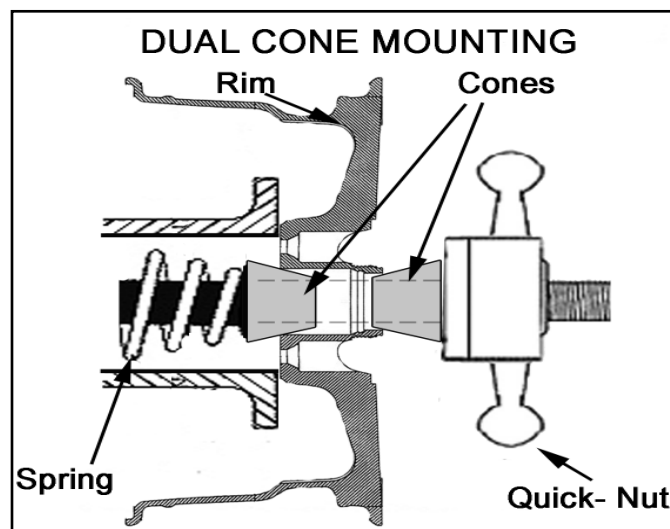
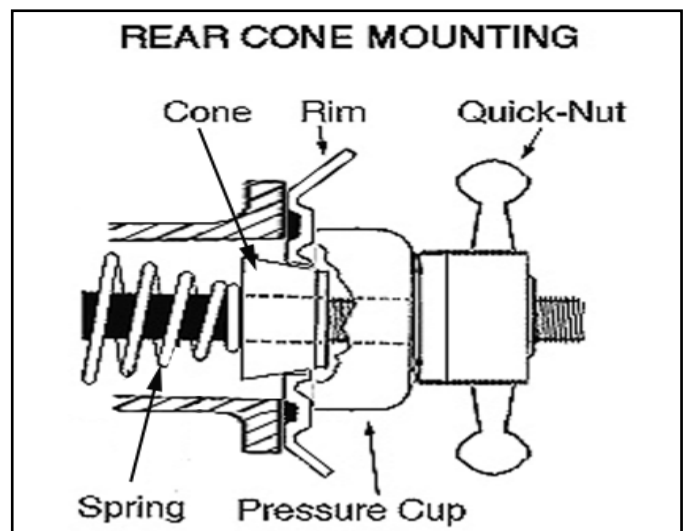
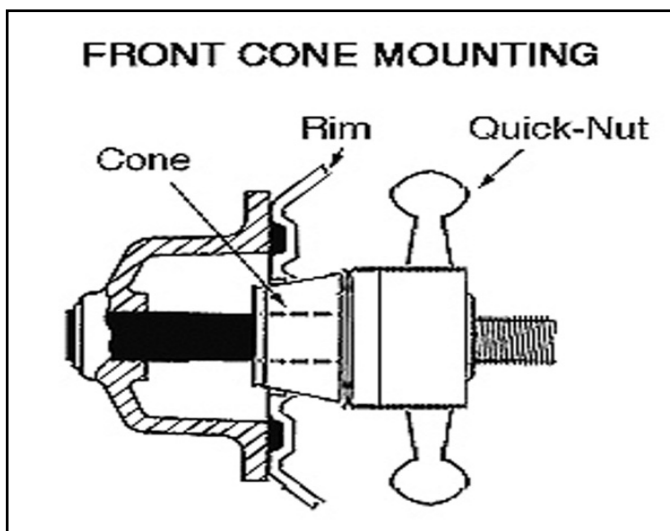
### CALIBRATION

It is recommended to perform the Weight Location Verification on a monthly basis following procedure that can be found on page 17 in the manual.

The calibration **MUST** be performed with a **14" or 15" steel wheel with a tire.**

**NOTE: It is good practice to keep a known good tire and 14" or 15" rim combination to use as a calibration /reference tire to assist in any trouble shooting.**

Ensure that the calibration weight used is a 100 gram or 3.5 oz weight and that is mounted correctly during the calibration procedure.



### PROPER MOUNTING

The recommended method for mounting of a tire and wheel for calibration and balancing is the Front Cone Mounting. (Using the cone to secure against the flange) for the most security and stability. (Rear Cone Mounting uses the Pressure Cup assembly.) (Extra centering cones are available though Ranger Products.)

If any the above conditions were found, the condition must be remedied and the balancer must be re-calibrated.



## WEIGHT LOCATION VERIFICATION PROCEDURE

### NOTE:

Before performing the Weight Location Verification Procedure, make sure the balancer is bolted down and/or rigid to the floor and that the shaft and centering cones are clean and undamaged. Even the slightest dirt or damage can cause inaccurate readings. **PAY CLOSE ATTENTION** to the following procedure. If not followed correctly, the balancer will not perform accurately. **This balancer should be checked every 30 days.**

### NOTE:

A standard 14" steel wheel and tire balanced to within 5 grams on either inner or outer with minimal wear or damage to the tire or wheel is required for this procedure.

1. Balance an average size tire and wheel to "00"—"00"
2. Add a 100 gram wheel weight to the outer edge of the wheel.
3. Press the Start button (close Hood). Wheel will spin and stop.
4. The balancer should call for 100 grams on the outer indicator and "00" on the inner indicator.
5. Rotate the wheel until all the LEDs on the outer indicator are lit.
6. The 100 gram wheel weight should be at 6(o clock) Bottom Dead Center.
7. Remove the 100 gram wheel weight from the outer edge of the wheel.
8. Install the 100 gram wheel weight on the inner edge of the wheel.
9. Press the Start button. Wheel will spin and stop.
10. The balancer should call for 100 grams on the inner indicator and "00" on the outer indicator.
11. Rotate the wheel until all the LEDs are lit on the inner indicator are lit.

The 100 gram wheel weight should be at (6 o'clock) Bottom Dead Center.

If the location is not as Bottom Dead Center (6 o'clock), please contact the Ranger Products Customer Service Department.

BendPak Inc. / Ranger Products  
1645 Lemonwood Dr.,  
Santa Paula, CA. 93060  
1-805-933-9970  
1-800-253-2363  
www.rangerproducts.com  
www.bendpak.com

## SELF-CALIBRATION PROCEDURE

### NOTE:

Before performing the self-calibration procedure, make sure the balancer is bolted down and/or rigid to the floor and that the shaft and centering cones are clean and undamaged. Even the slightest dirt or damage can cause inaccurate readings. **PAY CLOSE ATTENTION** to the following procedure. If not followed correctly, the balancer will not perform accurately. **This balancer should be checked every 30 days.**

1. Turn on the power. The display will show **USA 511**.
2. Select a centering / mounting cone that best fits the center hole of the wheel.

### NOTE:

A standard 14" steel wheel and tire with minimal wear or damage to either is recommended for this procedure.

3. Lift the wheel onto the arbor and slide it back against the arbor hub.
4. Slide the cone over the arbor and into the center hole of the wheel. It will be necessary to lift the wheel slightly.
5. While holding the wheel and cone in position, thread the Quick-Nut over the arbor and secure tightly.
5. Enter the correct wheel data. (Refer to page 12.)
7. Press and hold the "**R**" and "**START**" button until the Weight Indicator lights stop flashing. The screen will then display "**CAL CAL**"
8. Close the hood and/or press **START** to begin the calibration.
9. The wheel will spin for approximately 6 seconds then stop. "**Add 100**" will be displayed if Grams is selected or "**ADD 3.50**" if OZ is selected.
10. Place one 100 gram weight (included with balancer) on the outer edge of the rim.
11. Close the hood and press the **START** button. The wheel will spin for approximately 6 seconds and "**END Cal**" will be displayed.

### NOTE:

It is a good idea to keep the known good "calibration tire" set up for the monthly calibration procedure.

## PROCEDURES FOR CHANGING PARAMETER SETTINGS



### NOTE:

It is only necessary to modify the Parameter Settings if the computer/display board was replaced or if the calibration procedure does not resolve balancer problems.

### NOTE:

These settings must match the Parameter Setting Sticker located inside of the balancer. **DO NOT** modify these settings unless instructed to by a qualified/authorized Ranger Products technician.



### DANGER!

**DO NOT PERFORM ANY MAINTENANCE OR INSTALLATION OF ANY COMPONENTS WITH OUT FIRST ENSURING THAT ELECTRICAL POWER HAS BEEN DISCONNECTED AT THE SOURCE OR PANEL AND CANNOT BE RE-ENERGIZED UNTIL ALL MAINTENANCE AND/OR INSTALLATION PROCEDURES ARE COMPLETED.**

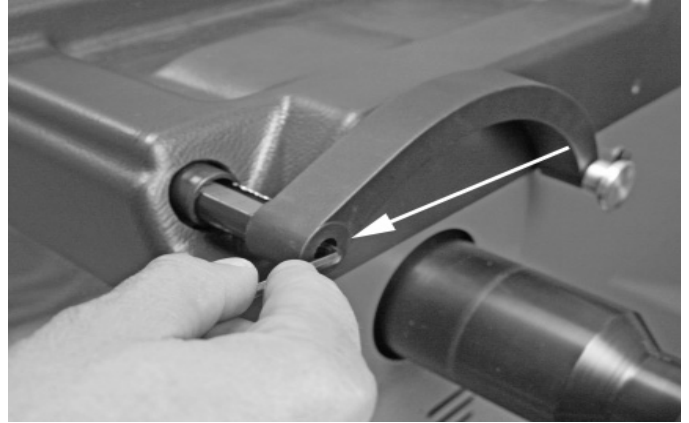
1. The Weight tray must be removed to replace the Computer Display Board and or read the Parameter Settings Sticker.

### NOTE:

Complete instructions for replacing the Computer/Power Board are included with the Power Board Service Kit available from Ranger Products.

2. Remove all weights and tools from the top of the weight tray.

3. Using an Allen Wrench, remove the Distance Arm from the Distance Arm Assembly. The Distance Arm Shaft will retract into the Balancer Cabinet.



4. Remove the Allen Head Screws (x 6) holding the Weight Tray to the Machine Base.



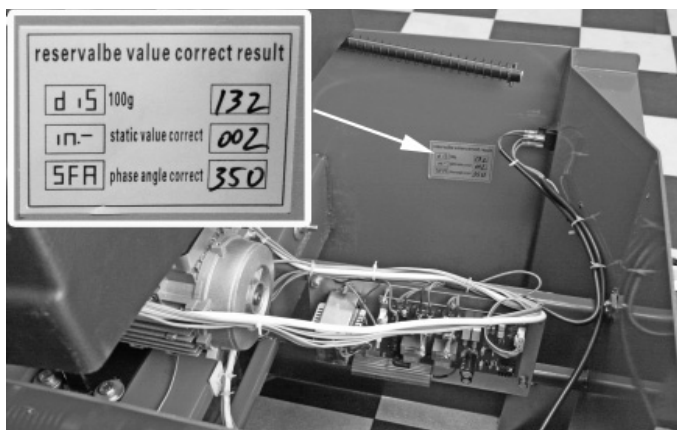
### NOTE:

The Weight Tray has a wiring harness connecting the connections to the Computer/ Display boards so the tray cannot be completely removed from the balancer.

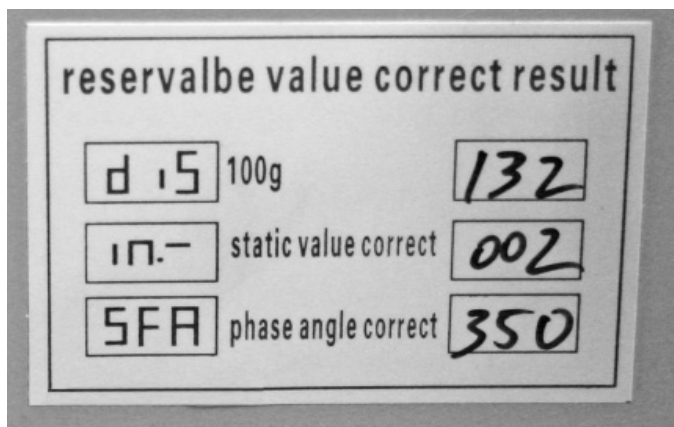
5. Carefully lift the weight tray off the Machine Base sliding the tray in the direction of the hood/ Shaft. Carefully support the Weight Tray.



6. Carefully support the Weight Tray while noting the Parameter Setting Values located on the Parameter Settings Sticker located on the inside wall of the front panel of the machine.




7. Note the Parameter Setting Values before reassembly, they will be needed after cover is closed.



8. Reassemble the Weight Tray and Distance Arm and proceed to resetting the Parameter Settings.

# RESETTING PARAMETER SETTINGS

1. Press and hold the **R** button  and the

Start button  at the same time until the

weight position indicators stop flashing.

2. The Screen should now display “CAL CAL”.



3. Press -, below , then + below 

and then **F** .


**NOTE:**


These buttons must be pressed in sequence otherwise you will bypass the first parameter setting.

4. The Screen should now display “dIS” on the Inner and a 3 digit number on the Outer.



5. Verify that the “dIS” setting matches the values shown on the Parameter Settings Sticker located on the inside of the balancer.

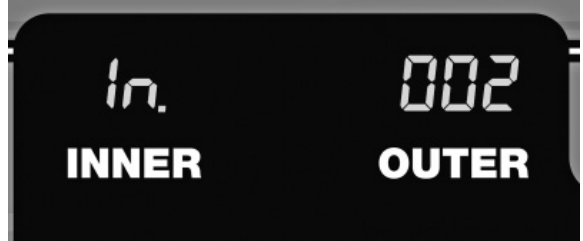
6. Press the + or - button below  to modify the values to match the values shown on the Parameter Settings Sticker.

7. When checking/modifying the “dIS” setting is complete, press Distance + button below  to move on to the next parameter setting.


**NOTE:**


Once you move on to the next parameter setting, you must restart this procedure if you would like to edit the dIS value again.

8. The Screen should now display “In.” on the Inner and a 3 digit number on the Outer.



9. Verify that the In.- setting matches the Parameter Settings Sticker located on the inside of the balancer.

10. Press the + or - button below  to modify the values to match the values shown on the Parameter Settings Sticker.

11. When checking/modifying the dIS setting is complete, press + button below  to move on to the next parameter setting.


**NOTE:**


Once you move on to the next parameter setting, you must restart this procedure if you would like to edit the In.- value again.

12. The Screen should now display “SFA” on the Inner and a 3 digit number on the Outer.



13. Verify that the SFA setting matches the Parameter Settings Sticker located on the inside of the balancer.

14. Press the + or - button below  to modify the values to match the values shown on the Parameter Settings Sticker.

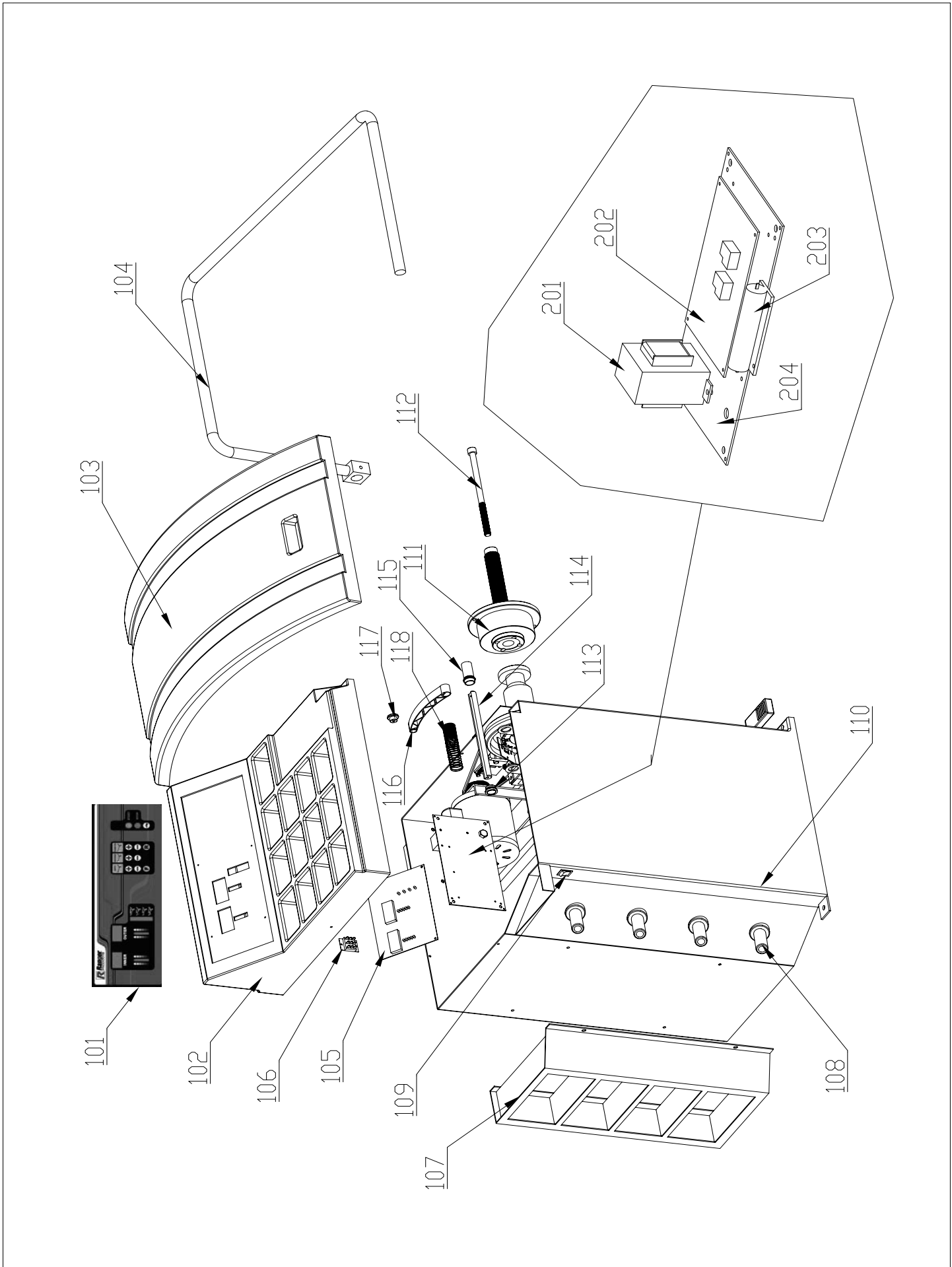
15. When checking/modifying the **SFA** setting is complete, press Distance + button below  to move on to the next parameter setting.

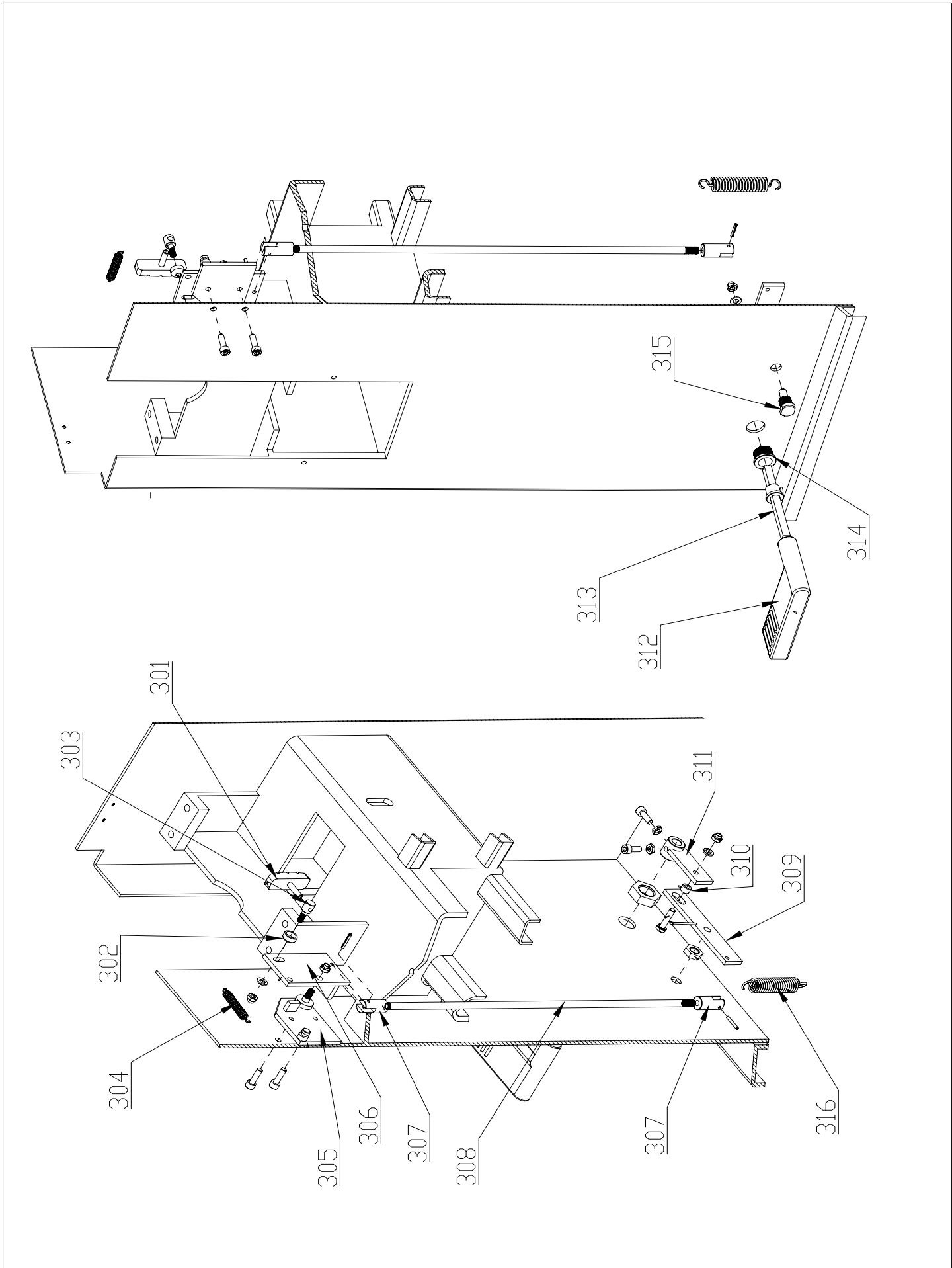
16. Once you are done checking/modifying the **SFA** setting, press Distance + to move save the changes.

**NOTE:**

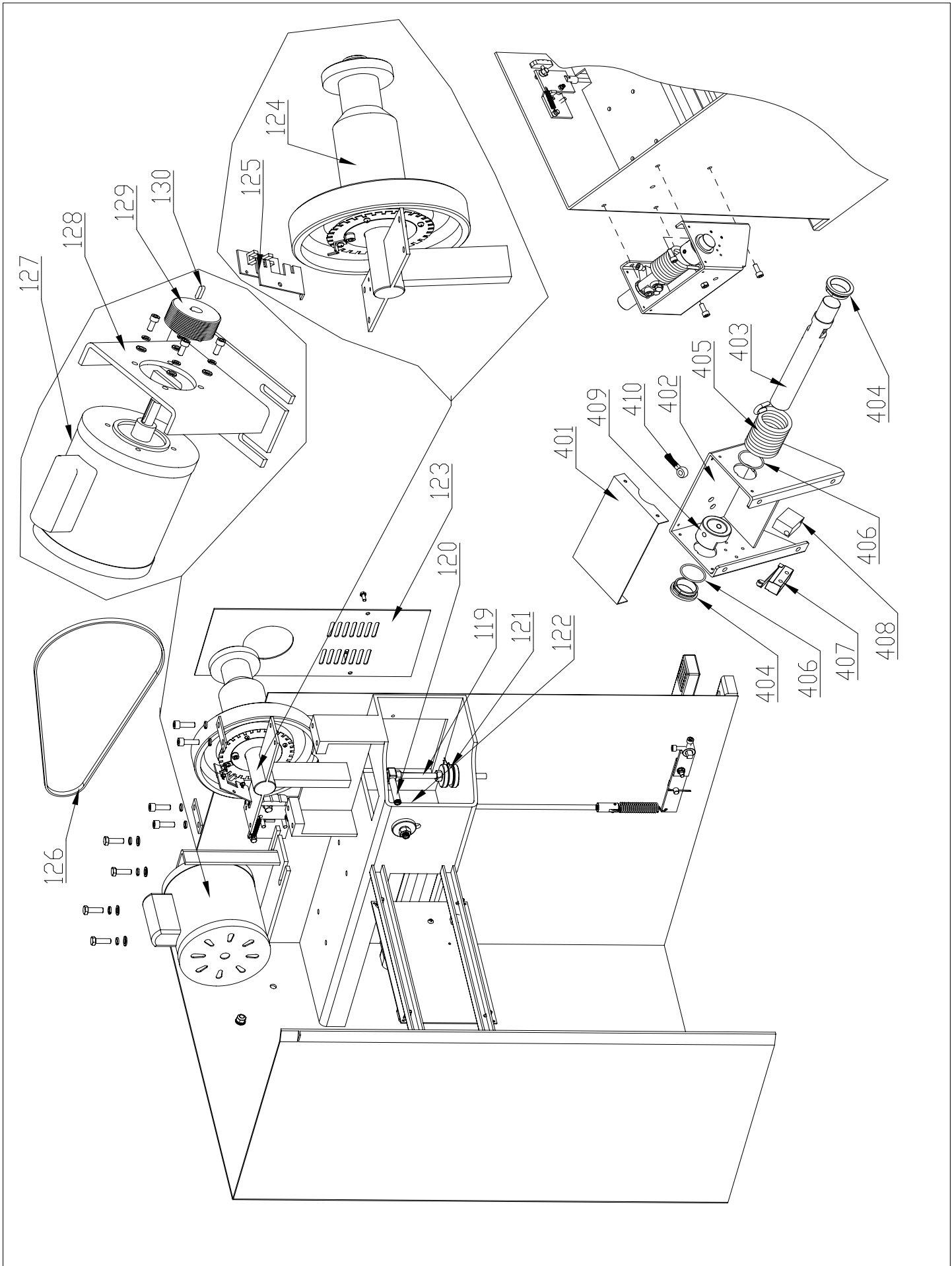
Once you move on to the next parameter setting, you must restart this procedure if you would like to edit the **SFA** value again.

|                                 |   |   |
|---------------------------------|---|---|
| Err. -1-                        | 1. Balancer Shaft Does Not Rotate.  | <ol style="list-style-type: none"> <li>1. Check the electrical connection.</li> <li>2. Replace the Power board.</li> <li>3. Replace the Electrical Motor.</li> </ol>  |
| Err. -2-                        | <ol style="list-style-type: none"> <li>1. A wheel is not installed on the balancer.</li> <li>2. A wheel is installed on the balancer but there is no tire.</li> <li>3. The quick nut is not tight and/or the wheel is not correctly installed on the balancer.</li> <li>4. The Electrical Motor belt tension is not correct.</li> </ol> | <ol style="list-style-type: none"> <li>1. Install a wheel on the balancer.</li> <li>2. Install a tire on the wheel.</li> <li>3. Remove the tire from the balancer and re-mount it correctly.</li> <li>4. Adjust the belt tension for the Electrical Motor.</li> </ol>   |
| Err. -3-                        | 1. The wheel/tire combination has to large of an unbalance.   | <ol style="list-style-type: none"> <li>1. Reposition the Tire on the Wheel to reduce the unbalance.</li> <li>2. Use a different Tire and/or Wheel.</li> <li>3. Redo the calibration procedure.</li> </ol>   |
| Err. -4-                        | <ol style="list-style-type: none"> <li>1. The wheel is rotating counter clockwise.</li> <li>2. The wheel is rotating clockwise and the Encoder Board is malfunctioning.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Check the electrical connections for the Electrical Motor.</li> <li>2. Adjust and/or Replace the Encoder Board.</li> </ol>  |
| Err. -5-                        | 1. The protective Hood is Open.   | 1. Close the protective Hood.   |
| Err. -6-                        | NA  | NA  |
| Err. -7-                        | 1. The Computer/Display board memory was cleared.   | <ol style="list-style-type: none"> <li>1. Check that the parameter setting match the sticker located inside the balancer and redo the factory calibration.</li> </ol>   |
| Err. -8-                        | <ol style="list-style-type: none"> <li>1. 100g weight was not attached during the calibration procedure.</li> <li>2. The piezo sensor(s) wires are disconnected or it is malfunctioning.</li> <li>3. Computer/Display board malfunction.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Do the calibration procedure and attach the 100g weight during the correct step.</li> <li>2. Check the electrical connections for the piezo sensor(s).</li> <li>3. Replace the Computer/Display board.</li> <li>4. Contact Ranger Products.</li> </ol>                              |
| Failed Calibration Check        | <ol style="list-style-type: none"> <li>1. The wheel used for calibration was too large.</li> <li>2. The wheel used for calibration had too large of an unbalance.</li> <li>3. The wheel data was not entered correctly.</li> <li>4. The SFA (Location) parameter setting is not correct.</li> </ol>                                     | <ol style="list-style-type: none"> <li>1. Use a balanced 14-15 inch wheel and redo the calibration procedure.</li> <li>2. Check the wheel information is entered correctly for the tire you are using for calibration.</li> <li>3. Contact Ranger Products for instruction to modify the SFA (Location) parameter.</li> </ol> |
| No Display                      | <ol style="list-style-type: none"> <li>1. The balancer is turned off.</li> <li>2. The balancer has no power going to it.</li> <li>3. The Computer/Display board is defective</li> </ol>   | <ol style="list-style-type: none"> <li>1. Check that the balancer is turned on.</li> <li>2. Check that the your balancer is connected to a live electrical source.</li> <li>3. Replace the Computer/Display board.</li> </ol>   |
| No Weight Information Displayed | <ol style="list-style-type: none"> <li>1. The piezo sensor(s) wires are disconnected or it is malfunctioning.</li> <li>2. The Computer/Display board has lost the parameter settings.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Check the electrical connections for the piezo sensor(s).</li> <li>2. Check that the parameter setting match the sticker located inside the balancer edit them if necessary.</li> </ol>   |









| DRAWING NO. | DESCRIPTION                     |
|-------------|---------------------------------|
|             |                                 |
| 101         | Membrane Switch                 |
| 102         | Plastic Tray Cover              |
| 103         | Wheel Guard                     |
| 104         | Wheel Guard Support             |
| 105         | Computer / Display Board        |
| 106         | Voltage Selector Switch         |
| 107         | Shelves                         |
| 108         | Hanger                          |
| 109         | Power Switch                    |
| 110         | Chassis Body                    |
| 111         | Hub                             |
| 112         | Hub Retaining Screw             |
| 113         | Gauge Sleeve - short            |
| 114         | Gauge Rod                       |
| 115         | Gauge sleeve - long             |
| 116         | Measurement Arm                 |
| 117         | Measurement Head                |
| 118         | Gauge Spring                    |
| 119         | Sensor Vertical Rod             |
| 120         | Sensor Horizontal Rod           |
| 121         | Vertical Sensor                 |
| 122         | Horizontal Sensor               |
| 123         | Side Panel                      |
| 124         | Spindle Cover                   |
| 125         | Encoder/Photo Electricity Board |
| 126         | Belt                            |
| 127         | Motor                           |
| 128         | Motor Bracket                   |
| 129         | Motor Pulley                    |
| 130         | Motor Pulley Key                |
|             |                                 |

| DRAWING NO. | DESCRIPTION           |
|-------------|-----------------------|
| 201         | Transformer           |
| 202         | Power Board           |
| 203         | Resistor              |
| 204         | Power Mounting Plate  |
|             |                       |
| 301         | Brake Pad             |
| 302         | Brake pad Spacer      |
| 303         | Brake Bracket         |
| 304         | Spring                |
| 305         | Brake Fixed Plate     |
| 306         | Brake Square Plate    |
| 307         | Tie-rod Head          |
| 308         | Tie-rod               |
| 309         | Brake Connector       |
| 310         | Bushing               |
| 311         | Brake Pedal Connector |
| 312         | Brake Pedal           |
| 313         | Square Rod            |
| 314         | Screw Sleeve          |
| 315         | Bolt                  |
| 316         | Spring                |
|             |                       |
| 401         | Hood Switch Box Cover |
| 402         | Hood Switch Box       |
| 403         | Head Pivot Shaft      |
| 404         | Bushing               |
| 405         | Hood Spring           |
| 406         | Snap Ring             |
| 407         | Hood Switch           |
| 408         | Block                 |
| 409         | Cam                   |
| 410         | Hood Adjustment Screw |





*The best automotive service equipment on the planet.*

**For Parts Or Service  
Contact:**

**BendPak Inc. / Ranger Products  
1645 Lemonwood Dr.  
Santa Paula, CA 93060  
Toll Free 1-800-253-2363  
Tel: 1-805-933-9970  
Fax: 1-805-933-9160**

**[www.bendpak.com](http://www.bendpak.com)  
[www.rangerproducts.com](http://www.rangerproducts.com)**

p/n# 5900233