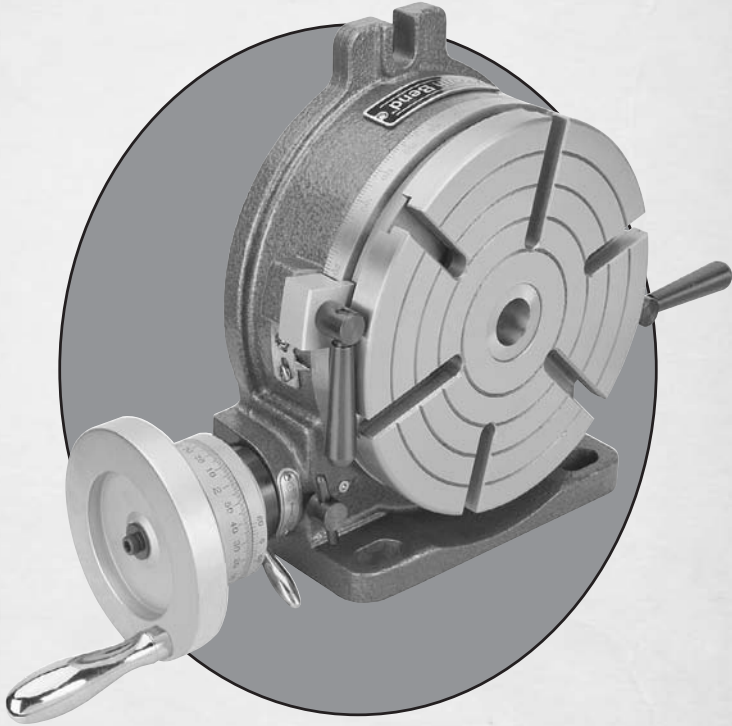




## ROTARY TABLE

MODEL SB1363 4"  
MODEL SB1364 6"  
MODEL SB1367 8"  
MODEL SB1368 10"



OWNER'S MANUAL

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# South Bend Lathe Co.™

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For Equipment Mfg. Since 10/09

## Scope Of Manual

This manual helps the reader understand the equipment, how to prepare it for operation, how to control it during operation, and how to keep it in good working condition. We assume the reader has a basic understanding of how to operate this type of equipment, but that the reader is not familiar with the controls and adjustments of this specific model. As with all equipment of this nature, learning the nuances of operation is a process that happens through training and experience. If you are not an experienced operator of this type of equipment, read through this entire manual, then learn more from an experienced operator, schooling, or research before attempting operations. Following this advice will help you avoid serious personal injury and get the best results from your work.

## Manual Feedback

We've made every effort to be accurate when documenting this item. However, errors sometimes happen or the design changes after the documentation process—so the manual may not exactly match the item you received. If a difference between the manual and what you received leaves you in doubt, contact our customer service for clarification.

We highly value customer feedback on our manuals. If you have a moment, please share your experience using this manual. What did you like about it? Is there anything you would change to make it better? Did it meet your expectations for clarity, professionalism, and ease-of-use?

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## Updates

For your convenience, any updates to this manual will be available to download free of charge through our website at:  
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## Customer Service

We stand behind our equipment. If you have any service questions, parts requests or general questions about your purchase, feel free to contact us.

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## Identification

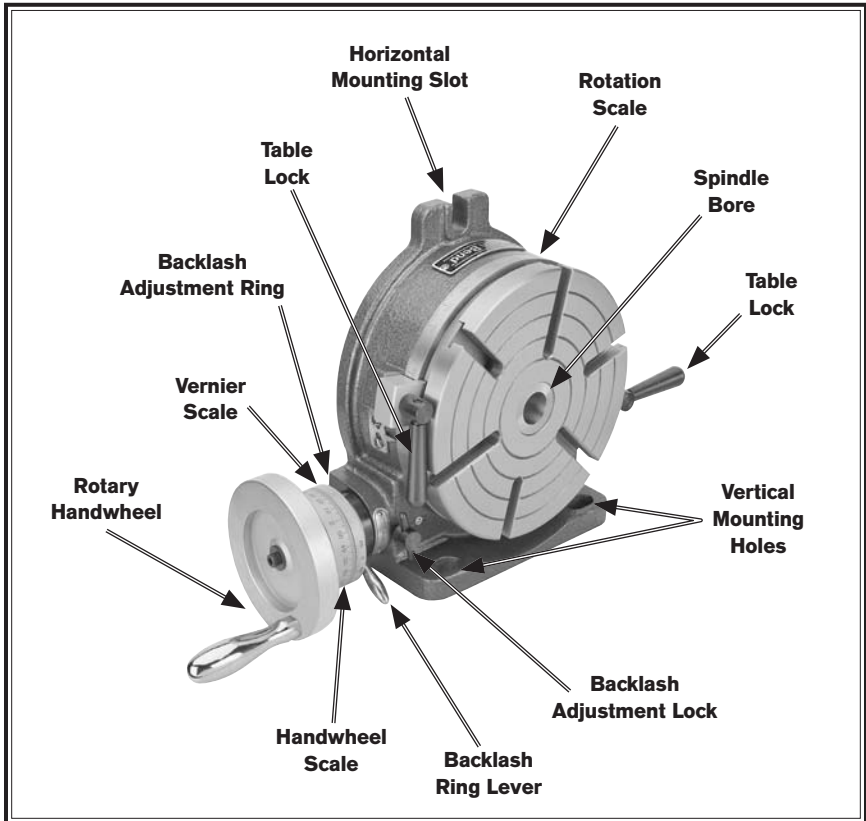


Figure 1. Identification (Model SB1367 shown).

## Specifications

Description	SB1363	SB1364	SB1367	SB1368
Clamping Surface Flatness (Concave)	0.0008"	0.0008"	0.0008"	0.0008"
Spindle Bore Concentricity	0.0008"	0.0008"	0.0010"	0.0010"
Surface to Base Parallelism	0.0008"	0.0008"	0.0008"	0.0008"
Surface to Angle Face Squareness	0.0008"	0.0008"	0.0008"	0.0008"
Overall Height (Horizontal)	3.05"	3.30"	4.17"	4.50"
Height to Center of Spindle Bore	3.20"	3.94"	5.12"	6.38"
Morse Taper	MT#1	MT#2	MT#3	MT#3
T-Slot Width (6 Each)	0.393"	0.433"	0.433"	0.512"
Table Diameter	3.94"	5.90"	8.03"	10.00"
Shipping Weight	16 lbs.	28 lbs.	62 lbs.	98 lbs.

## Understanding Risks of Machinery

Operating all machinery and machining equipment can be dangerous or relatively safe depending on how it is installed and maintained, and the operator's experience, common sense, risk awareness, working conditions, and use of personal protective equipment (safety glasses, respirators, etc.).

The owner of this machinery or equipment is ultimately responsible for its safe use. This responsibility includes proper installation in a safe environment, personnel training and usage authorization, regular inspection and maintenance, manual availability and comprehension, application of safety devices, integrity of cutting tools or accessories, and the usage of approved personal protective equipment by all operators and bystanders.

The manufacturer of this machinery or equipment will not be held liable for injury or property damage from negligence, improper training, machinemodifications, or misuse. Failure to read, understand, and follow the manual and safety labels may result in serious personal injury, including amputation, broken bones, electrocution, or death.

The signals used in this manual to identify hazard levels are defined as follows:

**⚠ DANGER**

*Death or catastrophic harm WILL occur.*

**⚠ WARNING**

*Death or catastrophic harm COULD occur.*

**⚠ CAUTION**

*Moderate injury or fire MAY occur.*

**NOTICE**

*Machinery or property damage may occur.*

## Basic Machine Safety

**Owner's Manual:** All machinery and machining equipment presents serious injury hazards to untrained users. To reduce the risk of injury, anyone who uses THIS item MUST read and understand this entire manual before starting.

**Properly Functioning Equipment:** Poorly maintained, damaged, or malfunctioning equipment has higher risks of causing serious personal injury compared to those that are properly maintained. To reduce this risk, always maintain this item to the highest standards and promptly repair/service a damaged or malfunctioning component. Always follow the maintenance instructions included in this documentation.

**Entanglement:** Loose clothing, gloves, neckties, jewelry or long hair may get caught in moving parts, causing entanglement, amputation, crushing, or strangulation. Reduce this risk by removing/securing these items so they cannot contact moving parts.

**Trained/Supervised Operators Only:** Untrained users can seriously injure themselves or bystanders. Only allow trained and properly supervised personnel to operate this item. Make sure safe operation instructions are clearly understood. If machine is electrically powered, use padlocks and master switches, or remove start switch keys to prevent unauthorized use or accidental starting. If machine cannot be locked out, restrict access to the shop.

**Personal Protective Equipment:**

Operating or servicing this item may expose the user to flying debris, dust, smoke, dangerous chemicals, or loud noises. These hazards can result in eye injury, blindness, long-term respiratory damage, poisoning, cancer, reproductive harm or hearing loss. Reduce your risks from these hazards by wearing approved eye protection, respirator, gloves, or hearing protection.

**Safe Environment:** Operating electrically powered equipment in a wet environment may result in electrocution; operating near highly flammable materials may result in a fire or explosion. Only operate this item in a dry location that is free from flammable materials.

**Unattended Operation:** Electrically powered equipment that is left unattended while running cannot be controlled and is dangerous to bystanders. Always turn the power OFF before walking away.

**Guards/Covers:** Accidental contact with moving parts during operation may cause severe entanglement, impact, cutting, or crushing injuries. Reduce this risk by keeping any included guards/covers/doors installed, fully functional, and positioned for maximum protection.

**Difficult Operations:** Attempting difficult operations with which you are unfamiliar increases the risk of injury. If you experience difficulties performing the intended operation, STOP! Seek an alternative method to accomplish the same task, ask a qualified expert how the operation should be performed, or contact our Technical Support for assistance.

**Chuck Keys or Adjusting Tools:** Tools used to adjust spindles, chucks, or any moving/rotating parts will become dangerous projectiles if left in place when the machine is started. Reduce this risk by developing the habit of always removing these tools immediately after using them.

**Secure Workpiece/Tooling:** Loose workpieces, cutting tools, or rotating spindles can become dangerous projectiles if not secured or if they hit another object during operation. Reduce the risk of this hazard by verifying that all fastening devices are properly secured and items attached to spindles have enough clearance to safely rotate.

**Disconnect Power:** Adjusting or servicing electrically powered equipment while it is connected to the power source greatly increases the risk of injury from accidental startup. Always disconnect power BEFORE any service or adjustments, including changing blades or other tooling.

**Electrical Connection:** With electrically powered equipment, improper connections to the power source may result in electrocution or fire. Always adhere to all electrical requirements and applicable codes when connecting to the power source. Have all work inspected by a qualified electrician to minimize risk of electrocution or fire.

**Mental Alertness:** Operating this item with reduced mental alertness increases the risk of accidental injury. Do not let a temporary influence or distraction lead to a permanent disability! Never operate when under the influence of drugs/ alcohol, when tired, or otherwise distracted.

**Health Hazards:** Certain cutting fluids and lubricants, or dust/ smoke created when cutting, may contain chemicals known to the State of California to cause cancer, respiratory problems, birth defects, or other reproductive harm. Minimize exposure to these chemicals by wearing approved personal protective equipment and operating in a well ventilated area.

**Work Area:** Clutter and dark shadows increase the risk of accidental injury. Only operate this item in a clean, non-glaring, and well-lighted work area.

## Preparation Overview

The purpose of the preparation section is to help you prepare your rotary table for operation. The list below outlines the basic process. Specific steps for each of these points will be covered in detail later in this section.

**The typical preparation process is as follows:**

1. Unpack the tool and inventory the contents.
2. Clean the tool and its components.
3. Install the rotary table on the mill table horizontally or vertically.
4. Align the rotary table with the mill spindle centerline.

## Required for Setup

The items listed below are required to successfully set up and prepare this tool for operation.

- Safety glasses
- Cleaner/degreaser (see **Page 6**)
- Clamping hardware and tools
- Custom keys for horizontal installation (see **Page 7**) (Optional)
- Machinist's square
- Test indicator
- Edge finder (Optional)

## Inventory

This item was carefully packaged to prevent damage during transport. If you discover any damage, please immediately call Customer Service at (360) 734-1540 for advice. You may need to file a freight claim, so save the containers and all packing materials for possible inspection by the carrier or its agent.

Description (Figure 2)	Qty
A. Rotary Table . . . . .	1
B. Handwheel Handle . . . . .	1

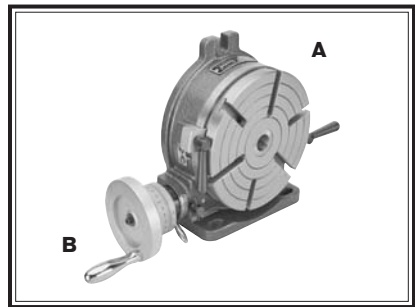


Figure 2. Shipping inventory.

## Cleaning & Protecting

The unpainted surfaces are coated at the factory with a heavy-duty rust preventative that prevents corrosion during shipment and storage. The benefit of this rust preventative is that it works very well. The downside is that it can be time-consuming to thoroughly remove.

Be patient and do a careful job when cleaning and removing the rust preventative. The time you spend doing this will reward you with smooth-sliding parts and a better appreciation for the proper care of the unpainted surfaces.

Although there are many ways to successfully remove the rust preventative, we have cleaned thousands of machines and found the following process to be the best balance between efficiency and minimized exposure to toxic fumes or chemicals.

### Before cleaning, gather the following:

- Disposable rags
- Cleaner/degreaser (certain citrus-based degreasers work extremely well and they have non-toxic fumes)
- Safety glasses & disposable gloves

**Note:** Automotive degreasers, mineral spirits, or WD•40 can be used to remove rust preventative. Before using these products, though, test them on an inconspicuous area of a painted area to make sure they will not damage it.

### Basic steps for removing rust preventative:

1. Put on safety glasses and disposable gloves.
2. Coat all surfaces that have rust preventative with a liberal amount of your cleaner or degreaser and let them soak for a few minutes.
3. Wipe off the surfaces. If your cleaner or degreaser is effective, the rust preventative will wipe off easily.

**Note:** To clean off thick coats of rust preventative on flat surfaces, such as beds or tables, use a PLASTIC paint scraper to scrape off the majority of the coating before wiping it off with your rag. (Do not use a metal scraper or it may scratch the surface.)

4. Repeat **Steps 2–3** as necessary until clean, then coat all unpainted surfaces with a quality metal protectant or light oil to prevent rust.

## WARNING

**Gasoline and petroleum products have low flash points and can explode or cause fire if used for cleaning. Avoid using these products to remove rust preventative.**

## CAUTION

**Many cleaning solvents are toxic if inhaled. Minimize your risk by only using these products in a well ventilated area.**

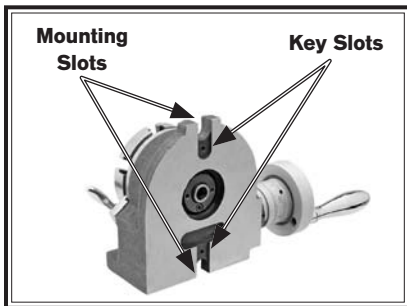


## Installation

Before installing the rotary table, make sure that the spindle centerline is properly aligned or "trammed" with the mill table. Also, remove any burrs or scratches from the mating surfaces of the rotary and mill table by "stoning" them, then thoroughly wipe them clean and dry (refer to the **Surface Care** section on **Page 16** for detailed instructions).

### Horizontal Installation

The horizontal base has slots (see **Figure 3**) that accept keys for quick alignment with the mill table. Because of the many variations in mill table T-slots, these keys are not provided with the rotary table. If you choose to use keys for alignment when installing the rotary table horizontally, you will have to machine them to fit the rotary table and your mill table.



**Figure 3. Locations of the horizontal base key slots and mounting slots (Model SB1363 shown).**

**To mount the rotary table horizontally:**

1. **DISCONNECT MILL FROM POWER!**
2. Position the rotary table horizontally on the mill table so that the mounting slots shown in **Figure 3** are aligned with the mill table center T-slot.

## NOTICE

**Make sure the rotary table handwheel is free of obstructions. Depending on your setup, the rotary table may need to be blocked up or mounted so the handle is hanging over the edge of the mill table.**

3. Attach the rotary table to the mill table with the clamping hardware, but leave the fasteners loose for now.
4. Place the machinist's square along the front edge of the mill table and the machined foot of the rotary table, square the rotary table to the mill table, then fully tighten the clamping fasteners.

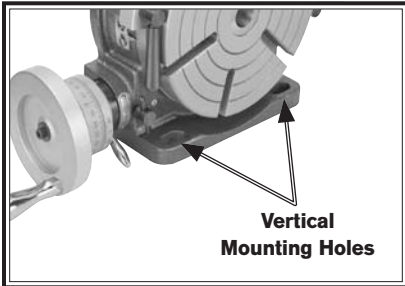
## CAUTION

**You MUST properly secure the rotary table to the mill table to prevent unexpected movement of the rotary table and workpiece during operation, which could result in personal injury or workpiece damage.**

5. Perform the **Horizontal Installation Alignment** procedure as instructed on **Page 9**.

## Vertical Installation

Compare the center to center distance between the mill table T-slots to the vertical mounting holes on the rotary table foot (see **Figure 4**). If the mounting holes do not intersect the mill table T-slots with sufficient space for T-bolts, use step blocks and clamps in place of one of the T-bolts.



**Figure 4. Locations of the vertical mounting holes.**

### To mount the rotary table vertically:

1. DISCONNECT MILL FROM POWER!
2. Insert the clamping hardware into the outer mill table T-slots.

## NOTICE

**Make sure the rotary table handwheel is free of obstructions. Depending on your setup, the rotary table may need to be blocked up or mounted so the handle is hanging over the edge of the mill table.**

3. Place the rotary table on the mill table so that you can use the clamping hardware to secure it in the next step.
4. Place the machinist's square along the front of the mill table and the machined side of the rotary table foot, square the rotary table to the mill table, then fully tighten the clamping hardware.
5. Perform the **Vertical Installation Alignment** procedure as instructed on **Page 10**.

## Aligning to Spindle Centerline

Whether the rotary table is mounted horizontally or vertically, you must align the rotary table centerline to the mill spindle centerline to achieve quality results. Also, the spindle centerline must first be properly aligned to mill table in both the X- and Y- axis (this procedure is generally called "trammig the spindle").

There are many methods for aligning the centerlines, and it is up to the machinist and their capabilities to decide which approach is best.

## Horizontal Installation Alignment

Two methods are described below for aligning the mill spindle and rotary table centerlines when the rotary table is mounted horizontally.

### To use a test indicator to align the rotary table:

1. DISCONNECT MILL FROM POWER!
2. Mount the test indicator to the mill spindle offset from the spindle centerline by the radius of the rotary table spindle bore, then position the tip on the inside vertical surface of the rotary table spindle bore (see **Figure 5** for an example).



**Figure 5. Example of using a test indicator to align a rotary table.**

3. Turn the mill spindle by hand so that the test indicator is aligned to the X-axis of the mill table.

**Note:** For best results, turn the mill spindle in only one direction.

4. Slowly move the mill table until the test indicator reads zero deviation.
5. Rotate the mill spindle and test indicator 90°, then repeat **Step 4**.

6. Repeat **Step 5** until the test indicator reads zero deviation in all four directions.

**Tip:** Use a mirror to read the indicator when it is facing away from you.

### To use an edge finder to align the rotary table:

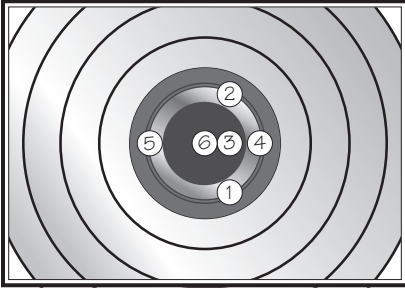
1. Mount an edge finder into the mill spindle, then position it roughly in the center of the rotary table spindle bore and below the rotary table surface.
2. Set the mill spindle speed to 800–1000 RPM, then turn the mill **ON**.
3. Slowly move the mill table along the X-axis in one direction until the edge finder meets the edge of the rotary table spindle bore, then note the position of the table on the handwheel dial.

**Note:** When recording the mill table position, take into account the backlash that is usually present in the leadscrew.

4. Slowly move the mill table in the opposite direction until you again find the edge of the spindle bore, then note the table position on the handwheel dial.
5. Calculate the difference of the mill table positions from **Steps 3–4**.
6. Move the mill table  $\frac{1}{2}$  the amount calculated in **Step 5** along the X-axis. Be sure to take into account any backlash.

- Repeat the above steps for the mill table Y-axis.

**Note:** Use the pattern illustrated in **Figure 6** to aid in positioning the edge finder for the above procedure.



**Figure 6. Pattern of positioning the edge finder to the rotary table spindle bore.**

## Vertical Installation Alignment

In these procedures, you will verify the rotary table alignment with the mill spindle from front to back and to its centerline.

### To verify the front-to-back alignment of the rotary table to the mill spindle:

- DISCONNECT MILL FROM POWER!
- Mount a test indicator to the mill spindle and position the indicator tip on one end of the rotary table face.
- Move the mill table along the Y-axis and note any deviations in the test indicator.
  - If a deviation is found, loosen the rotary table mounting fasteners, tap the rotary table into the proper position, then re-tighten the mounting fasteners.

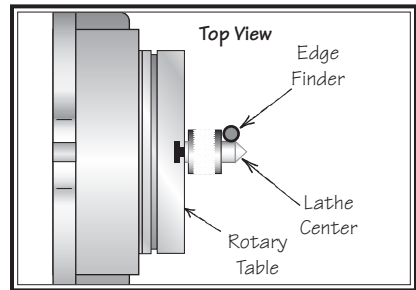
- Repeat **Step 3** until the entire rotary table surface is correctly aligned with the mill spindle.

### To center the rotary table with the mill spindle centerline:

- DISCONNECT MILL FROM POWER!
- Fully seat a lathe center into the rotary table spindle.

**Note:** Any center runout will have to be determined and accounted for in the following steps.

- Use an edge finder mounted in the mill spindle to find the edge of the center, as illustrated in **Figure 7**.



**Figure 7. Using an edge finder and center to align the rotary table (top view).**

- Measure the diameter of the center where the edge finder makes contact, divide this number in half, then add half of the edge finder diameter. The result is the amount you need to move the mill table along the Y-axis to center the rotary table with the mill spindle centerline.

**Note:** Be sure to take into account any backlash and any runout of the center when moving the table.

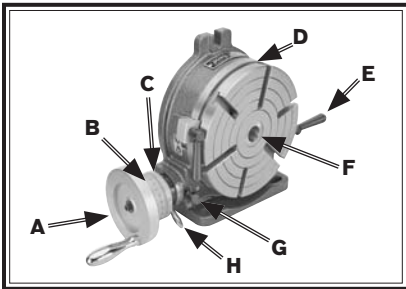
## ! WARNING



To reduce the risk of serious injury when using this equipment, read and understand this entire manual before beginning any operations.

## Controls & Components

Refer to **Figure 8** and the following descriptions to become familiar with the controls and components used to operate the rotary table.



**Figure 8. Rotary table controls and components (Model SB1367 shown).**

- A. Handwheel:** Rotates the table when the gears are engaged.
- B. Handwheel Scale:** Displays the amount of the table rotation with a resolution of 1' (one arc minute) and also in 1° marks. One complete revolution of the handwheel rotates the table 4°.

- C. Vernier Scale:** Displays the amount of table rotation with a resolution of 10" (ten arc seconds).
- D. Rotation Scale:** Displays the table position in whole degrees.
- E. Table Locks:** When fully tightened, keep the table from rotating to reduce the strain on the gears during operation. When cutting circular slots, a slight drag can be applied with the table locks to help reduce chatter caused by gear backlash.
- F. Spindle Bore:** Holds a center to support a workpiece for dividing work. Also, used in rotary table alignment with the mill spindle centerline.

### G. Backlash Adjustment

**Lock:** Secures the backlash adjustment ring in place.

### H. Backlash Adjustment Ring

**Lever:** Conveniently controls the backlash adjustment ring for adjusting the backlash between the gears.

When rotated completely clockwise, the backlash adjustment ring disengages the gears so that the table can be rotated by hand.

**Note:** The Model SB1368 uses a knurled ring instead of a lever.

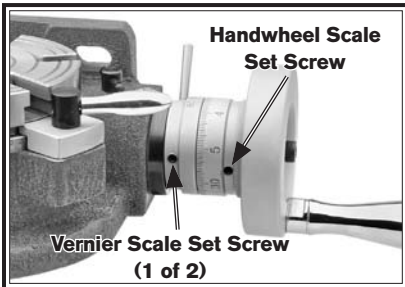
## Aligning Handwheel & Vernier Scales

The handwheel scales can be easily aligned with each other and adjusted for easy viewing.

Tools Needed	Qty
Hex Wrench 5mm. . . . .	1

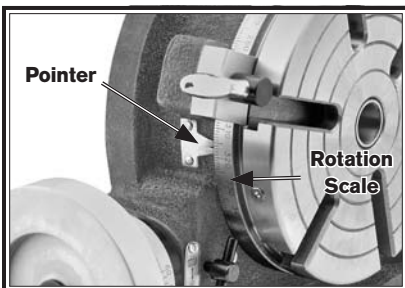
### To align and adjust the handwheel and vernier scales:

1. Loosen the two set screws on the vernier scale (see **Figure 9**), rotate the vernier scale so that it is in a convenient viewing position, then re-tighten the set screws.



**Figure 9. Locations of the handwheel and vernier scale set screws**

2. Use the handwheel to rotate the table until the 0° on the table rotation scale aligns with the center mark on the pointer (see **Figure 10**).



**Figure 10. Location of the rotation scale pointer.**

3. Loosen the set screw on the handwheel (see **Figure 9**), rotate the handwheel scale until the 0° mark aligns with the 0° mark on the vernier scale, then re-tighten the set screw.

## Using Vernier Scale

The vernier scale is used to measure table rotation by 10" (ten arc seconds) at a time.

Use your rotary table to follow along with the example below to better understand how to use the vernier scale.

**Note:** This example assumes the table rotation position is at 0°, and the handwheel and vernier scales are aligned at 0°.

### To set the table at 16° 32' 20":

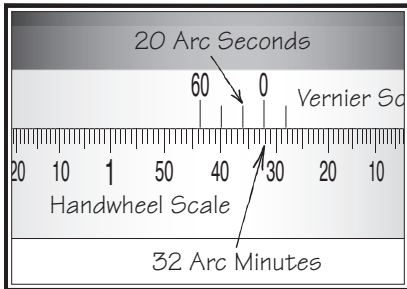
1. With the table at 0°, rotate the handwheel clockwise four full turns, which will rotate the table 16°.

— If you go past the handwheel scale 0° mark on the fourth turn, rotate the table counterclockwise ½ turn, then start again.

**Note:** When changing direction with the handwheel, take into account any backlash.

- Slowly continue to turn the handwheel until the 32' mark on the handwheel scale aligns with the 0° mark on the vernier scale (see the illustrated example in **Figure 11**).

**Note:** **Figure 11** may not agree with the layout of the scales on your model. However, the use of these scales as instructed here is the same.



**Figure 11. Handwheel and vernier scales aligned so that the table is at 16° 32' 20".**

- Identify the mark on the vernier scale that is two marks (20") to the left of the vernier scale 0° mark.

**Important:** When the handwheel is turned clockwise, the marks to the left of the vernier scale 0° mark are used, and when the handwheel is turned counterclockwise, the marks on the right are used.

- Identify the mark on the handwheel scale that is immediately to the left of the vernier scale 20" mark, then slowly rotate the handwheel clockwise until this mark and the vernier scale 20" mark are aligned. The table is now set at 16° 32' 20".

## Operational Examples

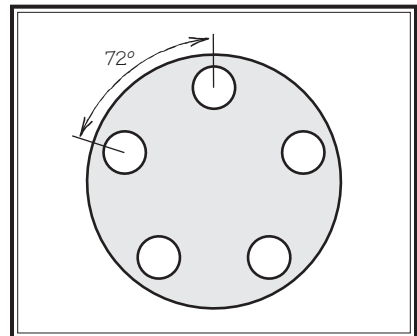
Use your rotary table and mill to follow along with the operational examples below to better understand how to use the rotary table.

**Note:** For both examples, the following statements are assumed to be true:

- The rotary table is properly secured to the mill in the horizontal position.
- The rotary table is properly centered with the mill spindle centerline.
- The workpiece is centered and properly clamped on the rotary table, and elevated for proper machining clearances.
- The 0° marks of the handwheel and vernier scales are aligned.

## Five Evenly Space Holes

In this example, you will make five holes spaced 72° apart in a circular workpiece, as illustrated in **Figure 12**.



**Figure 12. Five hole layout spaced 72° apart.**

**Tip:** When using the rotary table to machine several locations or with a complicated pattern, make a drawing with measurement details to help visualize the operation. This will reduce the risk of making errors during the operation.

**To make five evenly spaced holes:**

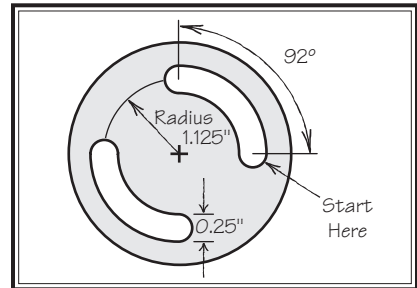
1. Use the handwheel to rotate the rotary table to the 0° mark on the rotation scale, then tighten both table locks.
2. Drill the first hole.
3. Unlock the table, then turn the handwheel 18 full turns. This will rotate the rotary table to 72°, as displayed on the rotational scale.

**Important:** Be careful not to pass the handwheel scale 0° mark on the last turn. If you go past the 0° mark, reverse the handwheel one full turn, then try again. This will eliminate any backlash error that occurs when reversing the handwheel direction.

4. Lock the table in place and drill the hole.
5. Repeat **Steps 3–4** to produce the third hole at 144°, the fourth hole at 216°, and the fifth hole at 288°.

## Two Circular Slots

In this example, you will cut two 92° circular slots in a round workpiece, as illustrated in **Figure 13**.



**Figure 13. Layout for creating two circular slots.**

**To make two circular slots:**

1. Use the handwheel to rotate the rotary table to the 0° mark on the rotational scale, then tighten the table locks.
2. Move the mill table to the left 1.125" along the X-axis so that the spindle is at the starting point above the lower end of the upper slot.
3. Install a ¼" end mill in the mill spindle, then make a 0.083" deep hole (approximately ⅓ the cutter diameter).



4. With the end mill continuing to cut, turn the rotary table handwheel clockwise 23 full turns ( $92^\circ$ ), using care not to pass the handwheel scale  $0^\circ$  mark on the last turn.
  5. Raise the end mill from the workpiece, then rotate the handwheel clockwise 45 full turns ( $180^\circ$ ), making sure not to pass the  $0^\circ$  mark. This will bring the cutter to the starting point of the second slot.
  6. Make a 0.083" deep hole, then with the end mill continuing to cut, turn the rotary table handwheel clockwise 23 full turns to begin the second  $92^\circ$  slot.
  7. Raise the end mill, rotate the rotary table clockwise back to the  $0^\circ$  mark on the rotational scale, then take an additional 0.083" deep cut.
  8. Repeat **Steps 4–7**, increasing the depth of cut by 0.083" each time, until the final depth of cut is reached for each slot.
- Note:** Rotating the rotary table in only one direction throughout the operation will remove any error from backlash.

## Maintenance Schedule

For optimum performance from your rotary table, follow this maintenance schedule and refer to any specific instructions given in this section.

### Daily Before Use

- Lubricate the ball oilers (**Page 17**).
- Check/resolve any unsafe condition.

### Daily After Use

- Clean the rotary table.
- Dress the machined surfaces.
- Lubricate the machined surfaces to prevent rust.

### Semi-Annually

- Disassemble and clean the internal cavity of the rotary table, then lubricate the worm gear and shaft (**Page 17**).

## Cleaning & Protecting

It is essential that the rotary table be cleaned after every use. DO NOT use compressed air to clean your rotary table. Chips or debris may become lodged between the moving parts, reducing the life and accuracy of the tool. Instead, use a stiff-bristled brush to remove the chips and swarf, then wipe down the machined surfaces with a clean shop rag before applying a thin coat of light machine oil to prevent corrosion.

## Surface Care

Nicks, dings, and scratches on the machined surfaces of the rotary table can have an adverse effect on accuracy and may damage the workpiece or mill table.

Prior to use, dress or "stone" these machined surfaces with a fine sharpening stone. A few strokes of the stone on the rotary table surface, the machined base and back, and the mill table will help to ensure longevity and accuracy. Make sure to thoroughly wipe these surfaces clean to remove any dust generated from the process, then apply a thin coat of light machine oil to prevent corrosion.

**Tip:** After stoning and wiping down the surfaces, run your fingers lightly across the surfaces to detect any irregularities.

## Lubrication

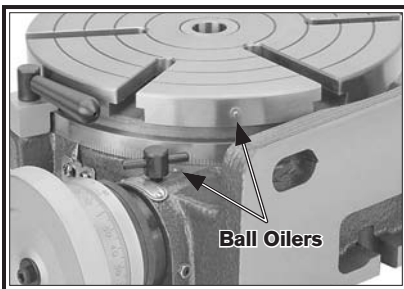
### NOTICE

The recommended schedule on the previous page for the lubrication tasks is based on light-to-medium usage. Keeping in mind that lubrication helps to protect the value and operation of the rotary table, these lubrication tasks may need to be performed more frequently than recommended, depending on usage.

Failure to follow reasonable lubrication practices as instructed in this manual could lead to premature failure of the rotary table components and will void the warranty.

### Ball Oilers

There are two ball oilers (see **Figure 14**) that must be lubricated before daily use, or more often with heavy use.



**Figure 14.** Locations of the two ball oilers.

**Important:** Use an oil can or gun that has a plastic or rubber tip. Metal tips can damage the ball and spring inside the oilers.

Clean away debris and grime from around the ball oilers, then depress the ball with the oil can tip to add oil until it is seen exiting between the parts. Clean away any excess lubricant, then rotate the table at least one full revolution to evenly disperse the lubricant.

### Worm Gear & Shaft

To gain access to the worm gear and shaft for cleaning and lubrication, you need to remove the table from the cast iron housing.

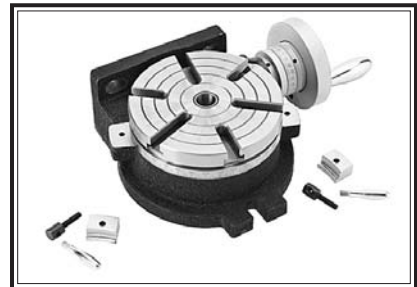
#### Items Needed

#### Qty

Hex Wrench 3mm. . . . .	1
Dead Blow Hammer. . . . .	1
Stiff-Bristled Brush . . . . .	1
Shop Rags. . . . .	As Needed
Mineral Spirits. . . . .	As Needed
MP Gear Grease. . . . .	As Needed

#### To remove the table and clean/lubricate the worm gear and shaft:

1. Remove the table lock assemblies, as shown in **Figure 15**.



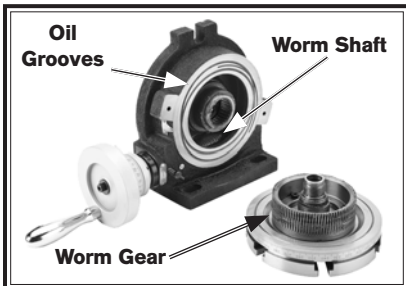
**Figure 15.** Table lock assemblies removed (Model SB1364 shown).

2. Use the backlash adjustment ring to disengage the gears from the handwheel so that the table rotates freely by hand.
3. Turn the rotary table upside down on a protective surface.
4. Loosen the cap screw that secures the spindle lock collar, then unthread and remove the collar (see **Figure 16**).



**Figure 16. Loosening the spindle lock collar cap screw.**

5. Lift the edge of the cast iron housing with one hand, and tap the back end of the spindle with the dead blow hammer until the table assembly breaks free from the housing.
6. Remove the table from the housing, as shown in **Figure 17**.



**Figure 17. Locations of worm gear and shaft with the table removed.**

7. Use the stiff-bristled brush, shop rags, and mineral spirits to clean grime and debris from inside the housing cavity, the worm shaft, and the worm gear.
8. When these parts are dry, apply a medium coat of multi-purpose gear grease to the teeth of the worm shaft and gear.
9. Use a clean shop rag and mineral spirits to wipe clean the mating surfaces of the housing and table, then apply a thin coat of light machine oil to the housing oil grooves and surrounding surface (see **Figure 17**).
10. Re-install the table, the spindle lock collar, and the table lock assemblies, then perform the **Spindle Preload** procedure as instructed on the next page.

## Spindle Preload

Setting the spindle preload on the rotary table affects the accuracy and ease of use during operation.

Keep in mind, that too much preload will make table rotation difficult and will cause pre-mature wear of the gears and mating surfaces of the table. Conversely, not enough preload may result in reduced accuracy. Use your best judgment when setting the spindle preload on the rotary table.

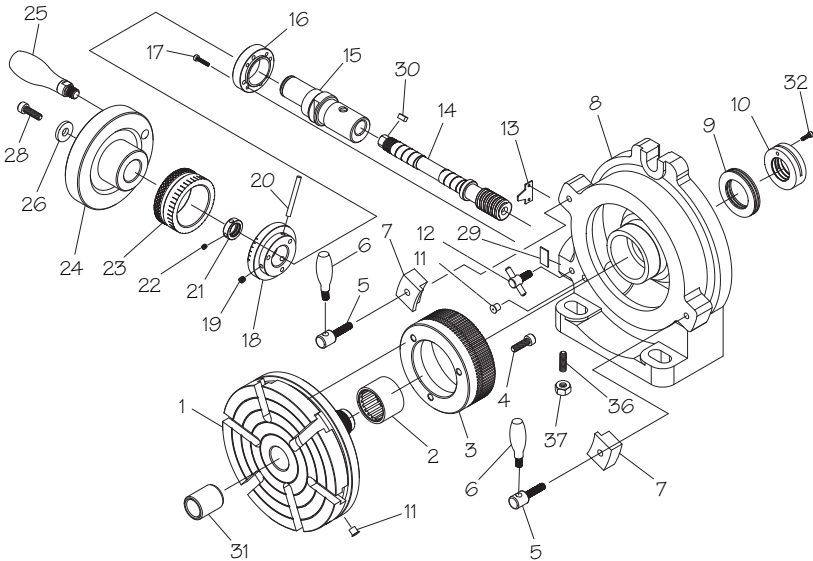
<b>Tool Needed</b>	<b>Qty</b>
Hex Wrench 3mm. . . . .	1

### To set the rotary table spindle preload:

1. Make sure the table locks are loose.
2. Use the backlash adjustment ring to disengage the worm shaft from the worm gear so that the table can be freely rotated by hand and not the handwheel.
3. Position the table in a vertical position so that both the front and the back are accessible.

4. From the back of the rotary table, loosen the spindle lock collar cap screw (see **Figure 16** on the previous page).
5. Loosen the lock collar at least two full turns to remove any preload.
6. Rotate the table by hand as you re-tighten the lock collar. When it becomes difficult to turn the table, back off the lock collar slightly until the table rotates freely again, then, while keeping the lock collar from rotating, re-tighten the lock collar cap screw.
7. Use the backlash adjustment ring to re-engage the worm shaft and gear, then test the table rotation by using the handwheel.
  - If you are not satisfied with the table rotation, repeat this procedure to re-adjust the preload until you are satisfied with the results.

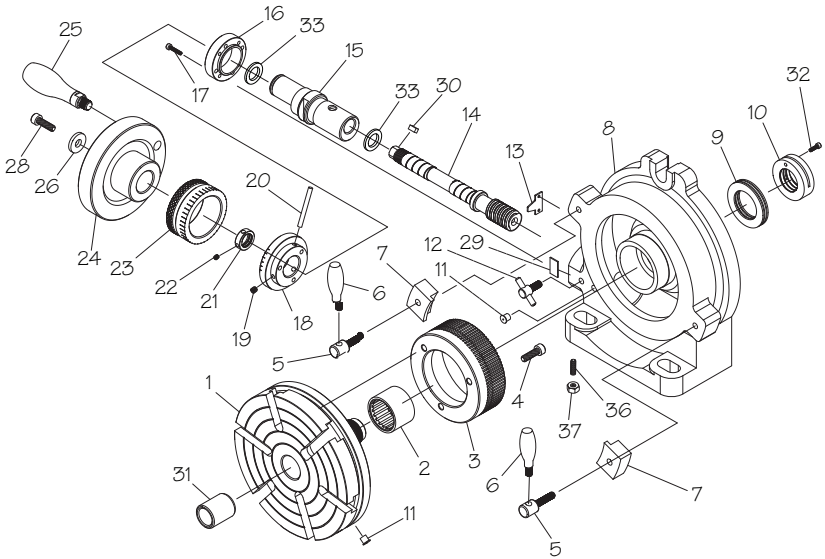
## SB1363



REF PART #	DESCRIPTION
1	PSB1363001 TABLE
2	PSB1363002 NEEDLE ROLLER BEARING NA4904
3	PSB1363003 WORM GEAR
4	PCAP15M CAP SCREW M5-.8 X 20
5	PSB1363005 CLAMP BOLT M6-1 X 25
6	PSB1363006 CLAMP BOLT HANDLE M6-1 X 10
7	PSB1363007 CLAMP
8	PSB1363008 MAIN CASTING
9	PSB1363009 THRUST NEEDLE BEARING 20 X 35 X 4
10	PSB1363010 LOCK COLLAR M20-1
11	PLUBE001 TAP-IN BALL OILER 1/4
12	PSB1363012 BACKLASH ADJUST LOCK M6-1 X 14
13	PSB1363013 POINTER
14	PSB1363014 WORM SHAFT
15	PSB1363015 ECCENTRIC WORM HOUSING
16	PSB1363016 BACKLASH ADJUSTMENT RING
17	PCAP164M CAP SCREW M3-.5 X 12

REF PART #	DESCRIPTION
18	PSB1363018 VERNIER RING
19	PS905M SET SCREW M5-.8 X 10
20	PSB1363020 BACKLASH RING LEVER
21	PSB1363021 LOCK COLLAR M14-1.25
22	PS9111M SET SCREW M4-.7 X 4
23	PSB1363023 HANDWHEEL SCALE
24	PSB1363024 HANDWHEEL
25	PSB1363025 HANDWHEEL HANDLE 3/8-16 X 1/2
26	PWF06M FENDER WASHER 6MM
28	PCAP26M CAP SCREW M6-1 X 12
29	PSB1363029 BACKLASH DIRECTION LABEL
30	PK05M KEY 4 X 4 X 7
31	PSB1363031 TAPER SLEEVE MT#1
32	PCAP18M CAP SCREW M4-.7 X 8
36	PS950M SET SCREW M4-.7 X 20
37	PNO4M HEX NUT M4-.7

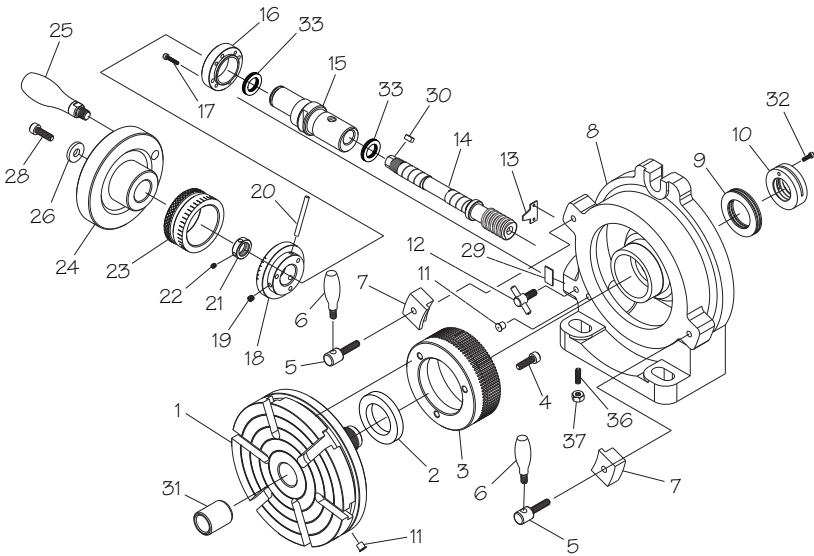
# SB1364



REF PART #	DESCRIPTION
1	PSB1364001 TABLE
2	PSB1364002 NEEDLE ROLLER BEARING NK3520
3	PSB1364003 WORM GEAR
4	PCAP15M CAP SCREW M5-.8 X 20
5	PSB1363005 CLAMP BOLT M6-1 X 25
6	PSB1363006 CLAMP BOLT HANDLE M6-1 X 10
7	PSB1363007 CLAMP
8	PSB1364008 MAIN CASTING
9	PSB1364009 THRUST NEEDLE BEARING 25 X 42 X 4
10	PSB1364010 LOCK COLLAR M24-1.5
11	PLUBE001 TAP-IN BALL OILER 1/4
12	PSB1363012 BACKLASH ADJUST LOCK M6-1 X 14
13	PSB1363013 POINTER
14	PSB1364014 WORM SHAFT
15	PSB1364015 ECCENTRIC WORM HOUSING
16	PSB1363016 BACKLASH ADJUSTMENT RING
17	PCAP164M CAP SCREW M3-.5 X 12

REF PART #	DESCRIPTION
18	PSB1364018 VERNIER RING
19	PS905M SET SCREW M5-.8 X 10
20	PSB1363020 BACKLASH RING LEVER
21	PSB1363021 LOCK COLLAR M14-1.25
22	PS9111M SET SCREW M4-.7 X 4
23	PSB1364023 HANDWHEEL SCALE
24	PSB1364024 HANDWHEEL
25	PSB1363025 HANDWHEEL HANDLE 3/8-16 X 1/2
26	PWF06M FENDER WASHER 6MM
28	PCAP26M CAP SCREW M6-1 X 12
29	PSB1363029 BACKLASH DIRECTION LABEL
30	FK65M KEY 4 X 4 X 7
31	PSB1364031 TAPER SLEEVE MT#2
32	PCAP18M CAP SCREW M4-.7 X 8
33	PSB1364033 BRASS WASHER
36	PS950M SET SCREW M4-.7 X 20
37	PNO4M HEX NUT M4-.7

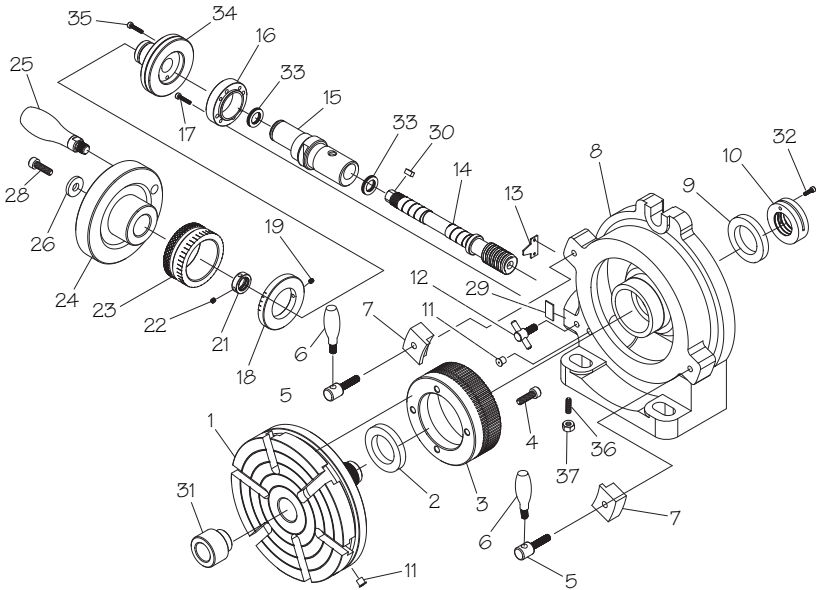
## SB1367



REF PART #	DESCRIPTION
1	PSB1367001 TABLE
2	P620B-OPEN BALL BEARING 620B-OPEN
3	PSB1367003 WORM GEAR
4	PCAP95M CAP SCREW M5-.8 X 30
5	PSB1367005 CLAMP BOLT M6-1 X 32
6	PSB1367006 CLAMP BOLT HANDLE M6-1 X 13
7	PSB1367007 CLAMP
8	PSB1367008 MAIN CASTING
9	P32007 TAPER ROLLER BEARING 32007
10	PSB1367010 LOCK COLLAR M32-1.5
11	PLUBE001 TAP-IN BALL OILER 1/4
12	PSB1367012 BACKLASH ADJUST LOCK
13	PSB1367013 POINTER
14	PSB1367014 WORM SHAFT
15	PSB1367015 ECCENTRIC WORM HOUSING
16	PSB1367016 BACKLASH ADJUSTMENT RING
17	PCAP164M CAP SCREW M3-.5 X 12

REF PART #	DESCRIPTION
18	PSB1367018 VERNIER RING
19	PSG05M SET SCREW M5-.8 X 10
20	PSB1367020 BACKLASH RING LEVER
21	PSB1367021 LOCK COLLAR M17-2
22	PSG07M SET SCREW M5-.8 X 5
23	PSB1367023 HANDWHEEL SCALE
24	PSB1367024 HANDWHEEL
25	PSB1367025 HANDWHEEL HANDLE 3/8-16 X 1/2
26	PWF06M FENDER WASHER 6MM
28	PCAP26M CAP SCREW M6-1 X 12
29	PSB1367029 BACKLASH DIRECTION LABEL
30	PK05M KEY 4 X 4 X 10
31	PSB1367031 TAPER SLEEVE MT#3
32	PCAP18M CAP SCREW M4-.7 X 8
33	P51103 THRUST BEARING 51103
36	PSG50M SET SCREW M4-.7 X 20
37	PN04M HEX NUT M4-.7



**SB1368**

REF	PART #	DESCRIPTION
1	PSB1368001	TABLE
2	P6208-OPEN	BALL BEARING 6208-OPEN
3	PSB1368003	WORM GEAR
4	PCAP95M	CAP SCREW M5-.8 X 30
5	PSB1367005	CLAMP BOLT M6-1 X 32
6	PSB1367006	CLAMP BOLT HANDLE M6-1 X 13
7	PSB1367007	CLAMP
8	PSB1368008	MAIN CASTING
9	P32007	TAPER ROLLER BEARING 32007
10	PSB1367010	LOCK COLLAR M32-1.5
11	PLUBE001	TAP-IN BALL OILER 1/4
12	PSB1367012	BACKLASH ADJUST LOCK
13	PSB1367013	POINTER
14	PSB1368014	WORM SHAFT
15	PSB1368015	ECCENTRIC WORM HOUSING
16	PSB1368016	BACKLASH ADJUSTMENT RING
17	PCAP164M	CAP SCREW M3-.5 X 12
18	PSB1368018	VERNIER RING

REF	PART #	DESCRIPTION
19	PS505M	SET SCREW M5-.8 X 10
21	PSB1367021	LOCK COLLAR M17-2
22	PS507M	SET SCREW M5-.8 X 5
23	PSB1368023	HANDWHEEL SCALE
24	PSB1368024	HANDWHEEL
25	PSB1367025	HANDWHEEL HANDLE 3/8-16 X 1/2
26	PWF06M	FENDER WASHER 6MM
28	PCAP26M	CAP SCREW M6-1 X 12
29	PSB1367029	BACKLASH DIRECTION LABEL
30	PK05M	KEY 4 X 4 X 10
31	PSB1367031	TAPER SLEEVE MT#3
32	PCAP18M	CAP SCREW M4-.7 X 8
33	P51103	THRUST BEARING 51103
34	PSB1368034	KNURLED BACKLASH RING
35	PCAP158M	CAP SCREW M3-.5 X 16
36	PS550M	SET SCREW M4-.7 X 20
37	PNO4M	HEX NUT M4-.7



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