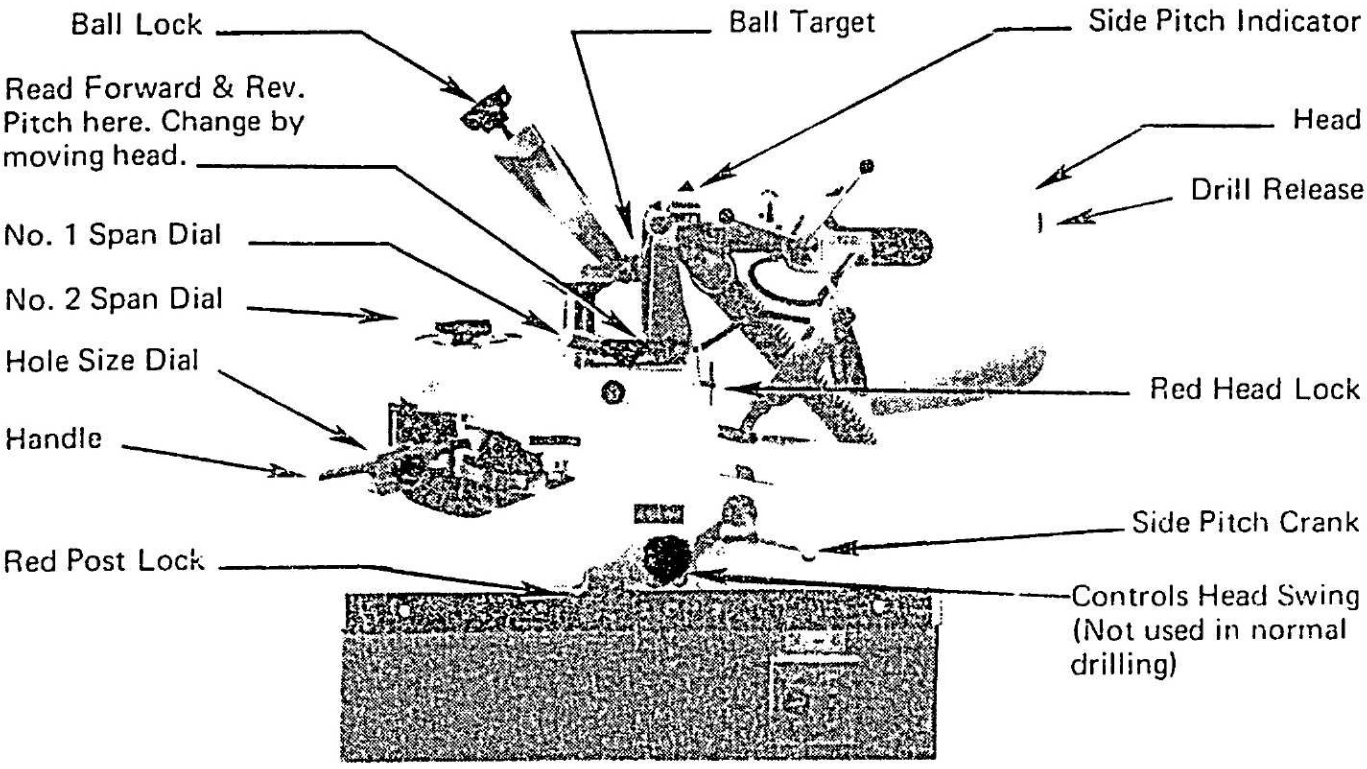


2500 DRILLING CHECK LIST

1.Target ball and tighten the ball clamp knob
2 Set #1 span
3 Set #2 span

THUMB

4. Insert thumb drill
5. Dial thumb hole size on shift handle
6. Shift to thumb position and lock post
7. Set forward or reverse pitch for thumb, then lock head
8. Drill thumb hole 2 ¾" deep
9. Set thumb F&R pitch back to zero

#1 FINGER

10. Insert #1 finger drill
11. Shift handle to center and set dial to #1 finger size
12. Shift handle to #1 position (left, down) and lock post
13. Set forward or reverse pitch for fingers, then lock head
14. Drill #1 finger hole 2 ¾" deep (1-3/4" for fingertip)
15. Set finger F&R pitch back to zero

#2 FINGER

16. Insert #2 finger drill
17. Shift handle to center and set dial to #2 finger size
18. Shift handle to #2 position (left, up) and lock post
19. Set forward or reverse pitch for fingers, then lock head
20. Drill #2 finger hole 2 ¾" deep (1-3/4" for fingertip)
21. Set finger F&R pitch back to zero and remove ball

2500 BALL DRILLING MANUAL

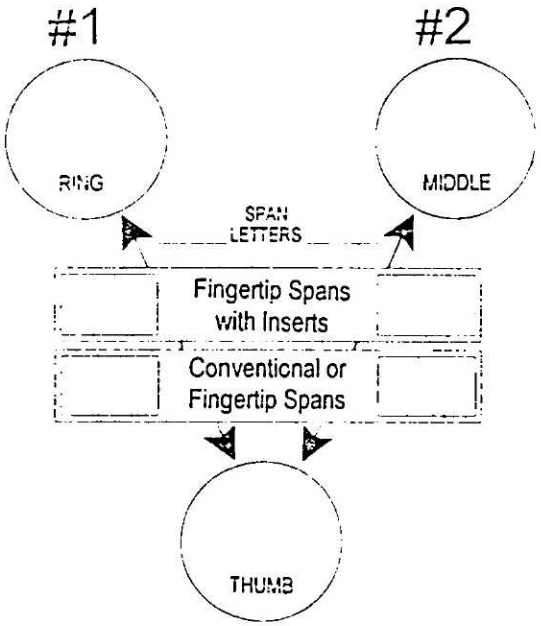
This Manual is a companion to the video and will give the beginning ball driller basic information on how to properly drill a bowling ball. The topics that will be covered in this manual are the following:

TERMS AND DESCRIPTIONS

Gross Weight: The total weight of the bowling ball prior to drilling. It is indicated on the box. Drilling the ball will only remove 2 to 3 ounces and will not effect the overall weight of the ball.
Pitch: The angle or direction the drill bit takes when entering the ball. Determining proper pitch is a key to eliminating mis-drilled balls.
Ball Center Mark: The center balance mark of the ball. This is where you center your drilling layout to insure proper balance of the ball. The ball center mark is located in the label area.
Bridge or Web: The distance between the middle and ring finger holes after drilling.
Span: The distance between the thumb and finger holes after drilling.

FITTING SPECIFICATION SHEET

Left Hand



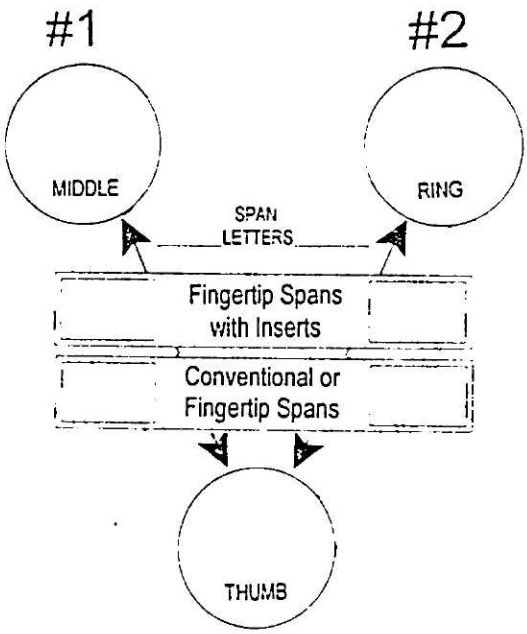
REVERSE PITCH FINGERS

FORWARD PITCH FINGERS

FORWARD PITCH THUMB

REVERSE PITCH THUMB

Right Hand



Pitch Chart

Middle Finger Span Measurement	Thumb Pitch	Finger Pitch
2"-3"	1/2" Forward	3/8" Forward
3-1/8"-- 3-1/2"	1/4" Forward	3/8" Forward
3-5/8"-- 4"	0	1/4" Forward
4-1/8"-- 4-1/2"	1/8" Reverse	0
4-5/8"-- 5"	1/4" Reverse	1/8" Reverse
5-1/8"-- 6"	3/8" Reverse	1/4" Reverse

Initials Requested

INSERT ALLOWANCE CHART

INSERTS #1	INSERTS #2
19/32	19/32
5/8	5/8
21/32	21/32
11/16	11/16
23/32	23/32
3/4	3/4
25/32	25/32
13/16	13/16
27/32	27/32
7/8	7/8

INSERT SIZES

For Insert Sizes: 19/32, 5/8, 21/32, 11/16
Subtract (4) 1/16th Increments from the measured fingertip span

For Insert Sizes: 23/32, 3/4, 25/32, 13/16
Subtract (3) 1/16th Increments from the measured fingert p span

For Insert Sizes: 27/32, 7/8
Subtract (2) 1/16th Increments from the measured fingertip span

USE 31/32 WHEN DRILLING FOR INSERTS

SPAN
-0-
15/16
7/8
13/16
3/4
11/16
5/8
9/16
1/2
7/16
3/8
5/16
1/4
3/16
1/8
1/16

THE SPORTS AUTHORITY

NAME _____ PHONE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

BALL TYPE _____ COLOR _____ WEIGHT _____

SERIAL NUMBER _____

UNDERSTANDING THE SPEC SHEET

Almost every part of the drilling procedure involves getting the correct information on this page. This information is very important and should be completed BEFORE any drilling is attempted.

Work closely with the customer to give them a grip that fits the hand and does not hurt when releasing the ball. If the customer is interested in any specialty drilling techniques, refer them to a local pro shop.

Start by entering the customer's personal information on the bottom of the spec sheet and then enter the initials to be engraved on the ball in the appropriate boxes. The correct order for entering information on the spec sheet is as follows:

Standard or Fingertip Grip Checklist:

1. Check Box for Right or Left Hand
2. Enter Thumb Size
3. Enter #1 Finger Size
4. Enter #2 Finger Size
5. Enter #1 & #2 Span Letters
6. Enter #1 & #2 Spans in *Conventional or Fingertip Span* Boxes
7. Enter Thumb (t) Pitch (Forward or Reverse)
8. Enter Finger (f) Pitch (Forward or Reverse)

Fingertip Grip (with the use of inserts) Checklist:

1. Check Box for Right or Left Hand
2. Enter Thumb Size
3. Circle #1 Finger Size on insert chart
4. Circle #2 Finger Size on insert chart
5. Enter 31/32 for both finger hole sizes on the spec sheet
6. Enter #1 & #2 Span Letters
7. Enter #1 & #2 Spans in *Conventional or Fingertip Span* Boxes
8. Subtract the #1 finger insert wall thickness from the #1 span and enter in the *Fingertip Spans with Inserts* Box.
9. Subtract the #2 finger insert wall thickness from the #2 span and enter in the *Fingertip Spans with Inserts* Box.
10. Enter zero in the Thumb (t) and Finger (f) Pitch Boxes

FITTING A STANDARD OR CONVENTIONAL GRIP:

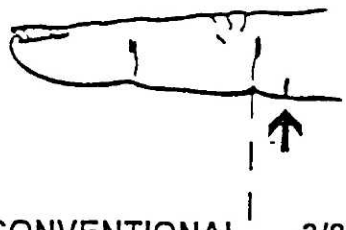
Now you are ready to measure the customer's grip, working closely with the customer to assure the proper grip.

1. Bowling Hand:
First ask the customer if they are right or left handed. Check this area of the spec sheet and work on this half only, for the rest of the fitting procedure.

2. Thumb Size:
The fit of the thumb is very important. By trial and error, fit the proper size sleeve onto the customer's thumb. Select a sleeve that rubs or drags on the thumb somewhat loosely. You should be able to rotate the sleeve about the thumb yet feel it rubbing slightly. Enter the size in the circle marked *thumb* on the spec sheet.

3. Finger Sizes:
Start with the palm side of the #1 finger. The #1 finger is the middle finger on a right-handed bowler and the ring finger on a left-handed bowler. Select a sleeve that will fit up to the main crease at the second knuckle joint. Start small and continue trying sizes until one goes past the crease of the second knuckle. Now go back one sleeve and write that size on the fitting spec sheet in the circle for the *#1 finger.* Do the same procedure for the #2 finger and enter the size on the fitting spec sheet in the circle for the *#2 finger.*

4. Spans
The correct span is important for the overall comfort and the ability to hold and release the ball. A customer's span is determined by measuring 3/8ths of an inch past the main crease at the second knuckle on the middle finger. If the customer allows, it is helpful to mark the measuring point on their middle finger with a washable marker.



CONVENTIONAL -3/8"

Ask the customer to put their thumb all the way into the thumb sleeve in the measuring ball. Now have them comfortably stretch their hand and fingers across the ball. The fingers should lie over the holes marked with capital letters. The mark that was drawn on the customer's fingers should meet the edge of the drilled holes on the measuring ball.

Once the proper span has been determined, it is time to get some feedback from the customer. Have the customer insert their hand into the ball, fingers first and then the thumb. Your customer should then grip the ball normally, lifting and swinging it to make sure the span and ball weight feels comfortable. If the customer feels the grip is too long, have them try the grip one step shorter (for instance, if you selected I and J, move back to try H and I). If the grip feels too short, try one step longer. Record the letters for each span on the spec sheet. Once the proper spans are selected, measure the spans with a span ruler. Hook the span ruler into the thumb sleeve and measure to the edge of the finger holes you have chosen. Now enter the span measurements in the appropriate span boxes on the spec sheet. (See the *Fingertip Measuring with Inserts* section of this manual for entering the adjusted span when inserts are to be used).

5. Pitches

Find the correct **pitches** by using the pitch chart on the fitting specification sheet. Using the measurement you entered in the area for the middle finger span on the spec sheet, go down the first column and find the distance of the span. Following to the right, get the thumb pitch from column t and enter this measurement on the fitting spec sheet in the area marked (t). Now follow to the right, finding column f. Again, record the finger pitch on the fitting spec sheet in the area marked (f).

6. Ball Weight

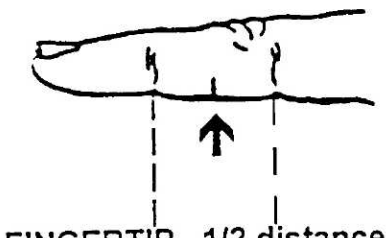
The customer should grip the ball normally, lifting and swinging the ball to get the proper feel of weight. The fitting ball is 13 1/2 lbs.; if the customer is purchasing a 15 or 16 lb. ball, add the weight insert sleeves into the fitting ball to more closely simulate the weight of a heavier ball.

FITTING A FINGERTIP GRIP (without inserts)

Measuring the fingertip grip is done much the same way as a conventional grip with the following exceptions:

1. The measuring ball finger sleeve should comfortably slip over the tip of the finger, up to the first crease.

2. The fingertip span is determined by measuring 1/2 the distance between the first and second crease on the middle finger. Mark the point on the customer's middle finger with a washable marker.



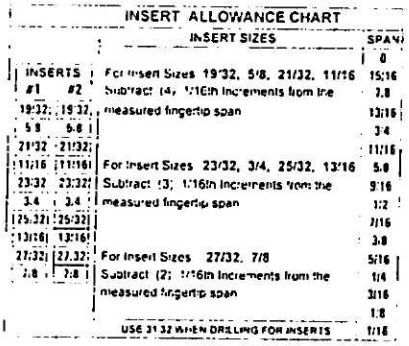
FITTING A FINGERTIP GRIP (with the use of inserts)

Note: If the customer has requested finger inserts, the insert sizes will have to be determined and the span measurements must be adjusted for the wall thickness of the inserts. You will be drilling 31/32 holes for each of the fingers to accommodate the finger inserts.

Use the fingertip method of measuring spans and record in the boxes marked for *Conventional or FingerTip Spans.* (These are unadjusted spans and are for reference only).

Using the insert measuring ball, select the inserts that will comfortably slip over the customer's fingertips. Circle the two insert sizes listed on the spec sheet in the INSERT ALLOWANCE section. Enter 31/32 for the middle and ring finger hole sizes on the spec sheet.

With the insert sizes determined, it is now necessary to move to the **INSERT ALLOWANCE CHART** to adjust the span measurements for the wall thickness of the selected inserts.



INSERT ALLOWANCE CHART

INSERT SIZES			SPAN
INSERTS #1	INSERTS #2		0
19/32	19/32	For Insert Sizes 19/32, 5/8, 21/32, 11/16 Subtract (4) 1/16th increments from the measured fingertip span	15/16
5/8	5/8		7/8
21/32	21/32		13/16
11/16	11/16		3/4
23/32	23/32	For Insert Sizes 23/32, 3/4, 25/32, 13/16 Subtract (3) 1/16th increments from the measured fingertip span	11/16
3/4	3/4		5/8
25/32	25/32		9/16
13/16	13/16		1/2
27/32	27/32	For Insert Sizes 27/32, 7/8 Subtract (2) 1/16th increments from the measured fingertip span	7/16
7/8	7/8		3/8
			5/16
			1/4
			3/16
			1/8
		USE 31/32 WHEN DRILLING FOR INSERTS	1/16

See example on next page

Find the customer's insert sizes on the chart and subtract the suggested number of fractional increments from the span. The list of span increments on the right is meant to help you arrive at the correct fractional increment when subtracting from the measured span.

The adjusted span measurements are to be recorded in the boxes marked for *Fingertip Spans with Inserts* on the spec sheet and should be used when drilling a fingertip ball with inserts.

Use zero F&R pitch when drilling for a fingertip grip with inserts. (The pitch is already built into the grips)...**The drilling operation can now be performed....**

INSERT INSTALLATION:

Once the holes have been beveled, the installation of the inserts, if required, can be done. Place the selected inserts into the appropriate holes, aligning them straight and flush in the ball (Inserts are designed with a slanted edge to conform to the curvature of the ball).

Using a small screwdriver, pry the insert away from the wall of the hole and add a small amount of glue. Continue to tack glue the insert in 4 equal locations around the insert.

INSERT WALL THICKNESS ALLOWANCE CHART

When inserts are to be installed, the wall thickness of the insert must be subtracted from the measured span.

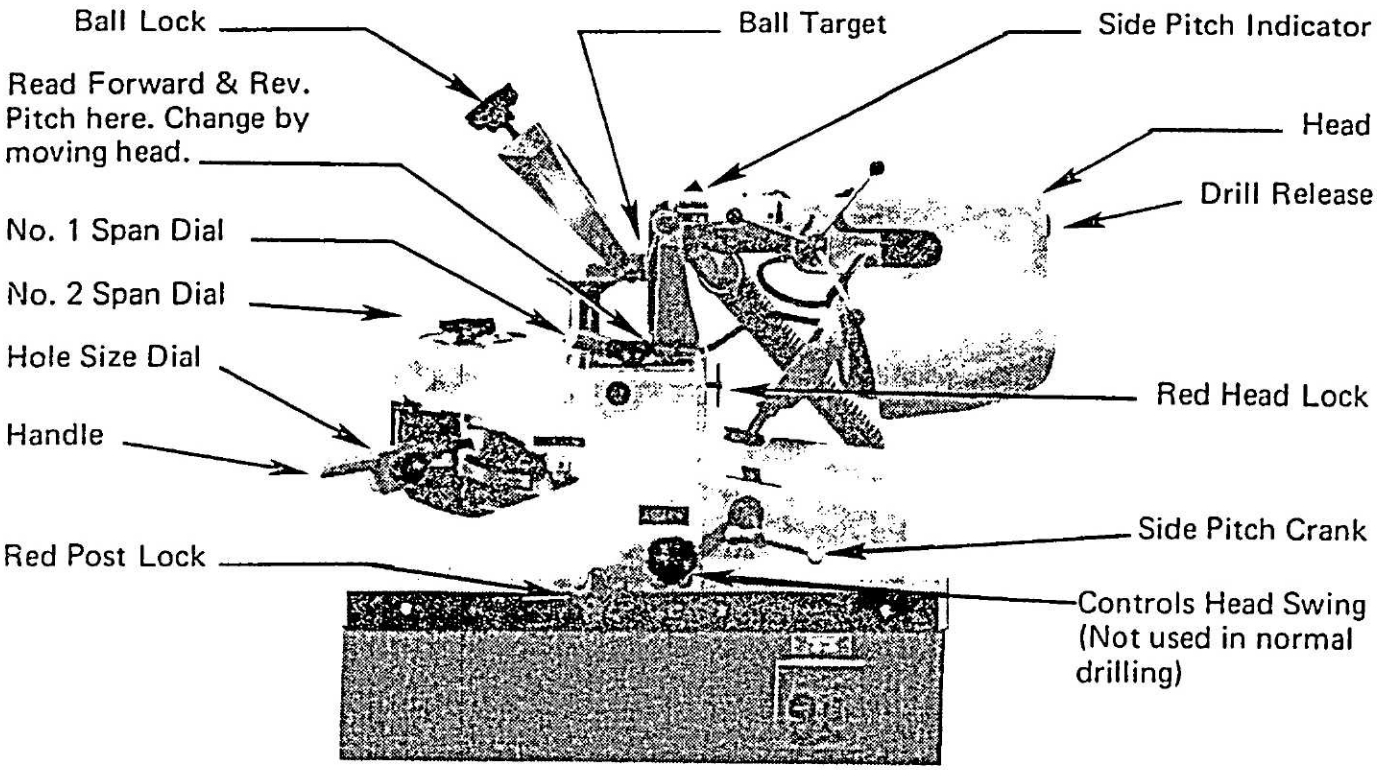
Find the fractional increment of the measured span in the chart below. Moving down the list, subtract the number of 1/16th increments for the specific insert.....This is the new span to be drilled.

INSERT ALLOWANCE CHART

INSERTS #1	INSERTS #2	INSERT SIZES	SPAN
			-0-
19/32	19/32	For Insert Sizes: **19/32, 5/8, 21/32, 11/16** Subtract (4) 1/16th Increments from the measured fingertip span	15/16
5/8	5/8		7/8
21/32	21/32		13/16
11/16	11/16		3/4
23/32	23/32	For Insert Sizes: **23/32, 3/4, 25/32, 13/16** Subtract (3) 1/16th Increments from the measured fingertip span	11/16
3/4	3/4		5/8
25/32	25/32		9/16
13/16	13/16		1/2
27/32	27/32	For Insert Sizes: **27/32, 7/8** Subtract (2) 1/16th Increments from the measured fingertip span	7/16
7/8	7/8		3/8
			5/16
			1/4
			3/16
			1/8
		USE 31/32 WHEN DRILLING FOR INSERTS	1/16

EXAMPLE:

A customer's No.1 fingertip measured span is 4 1/2". The insert size to be used is 25/32. The insert allowance chart indicates that the 25/32 wall thickness is (3) 1/16th increments that must be subtracted from the measured span of 4 1/2". Find 1/2" on the span chart and move down (3) 1/16th increments arriving at 5/16". The span to be drilled is now 4 5/16".



2500 DRILLING CHECK LIST

1.Target ball and tighten the ball clamp knob
2 Set #1 span
3 Set #2 span

THUMB

4. Insert thumb drill
5. Dial thumb hole size on shift handle
6. Shift to thumb position and lock post
7. Set forward or reverse pitch for thumb, then lock head
8. Drill thumb hole 2 ¾" deep
9. Set thumb F&R pitch back to zero

#1 FINGER

10. Insert #1 finger drill
11. Shift handle to center and set dial to #1 finger size
12. Shift handle to #1 position (left, down) and lock post
13. Set forward or reverse pitch for fingers, then lock head
14. Drill #1 finger hole 2 ¾" deep (1-3/4" for fingertip)
15. Set finger F&R pitch back to zero

#2 FINGER

16. Insert #2 finger drill
17. Shift handle to center and set dial to #2 finger size
18. Shift handle to #2 position (left, up) and lock post
19. Set forward or reverse pitch for fingers, then lock head
20. Drill #2 finger hole 2 ¾" deep (1-3/4" for fingertip)
21 Set finger F&R pitch back to zero and remove ball

A **2500 DRILLING CHECKLIST** (illustrated on the previous page) is provided with each drilling machine. Keep this handy checklist near the machine and refer to it often, while drilling.

STEP 1 Target ball and tighten the ball clamp knob

Locate the center of the label, usually but not always, marked with a dot.

Loosen the red post-lock, located at the side of the machine nearest the operator. Shift the handle to the center position (half way between the thumb and the finger) and insert the ball with the label on its side, parallel to the target.

Shift the handle to the fingers, and line up the center mark on the ball with the crosshairs on the plastic target.... Clamp the ball

Bring the handle back to the center to set the spans.

STEP 2 Set #1 span

Always set the No. 1 span first.

The No. 1 span is the measurement between the thumb and the middle finger for the right- handed bowler or the thumb and ring finger for the left-handed bowler.

Always set spans and finger sizes, with the shift handle in the center position. Locking the shift handle in the center position is helpful.

Release the detent lever in the hole below the No. 1 span knob while rotating the span knob to the measurement indicated as span #1 on the Spec Sheet..

STEP 3 Set #2 span

The No. 2 span is always the measurement between the thumb and the ring finger for the right-handed bowler or the thumb and middle finger for the left-handed bowler.

Release the detent lever in the hole below the No. 2 span knob while rotating the span knob to the measurement indicated as span #2 on the Spec Sheet.

THUMB

STEP 4 Insert thumb drill

The thumb hole size is determined by the spec sheet.

Insert the drill bit for the thumb, seating the drill bit securely into the spindle.

STEP 5 Dial thumb hole size on shift handle

STEP 6 Shift to the thumb position and lock post

Lock firmly in this position with the red post-lock knob.

STEP 7 Set forward or reverse pitch for thumb, then lock head

Read the Forward and Reverse Pitch on the decal on top of the machine. The pitch is changed by moving the head.

With the shift handle in the thumb position, loosen the red T-handle located at the rear of the machine.

Turn the F&R knob, located on the side of the machine, until the head swings to the desired pitch as indicated by the letter (t) on the Spec Sheet. Never open the F&R pitch to more than 1/2".

Lock the head swing.....again, using the red T-handle.

STEP 8 Drill Thumb hole 2 3/4" deep

Wearing your safety goggles, close the plastic drill cover and turn on the vacuum and drill motor.

Drill the thumb hole 2 3/4" deep and turn off the vacuum and drill motor.....
Remove the drill bit by tapping the knock-out knob.

STEP 9 Set thumb F&R pitch back to zero

It is recommended that you temporarily set the pitch back to zero after drilling each hole. This will keep the machine from locking up.

#1 FINGER

STEP 10 Insert #1 finger drill

The #1 finger hole size is determined by the Spec Sheet.

Insert the drill bit for the #1 finger, seating the drill bit securely into the spindle.

STEP 11 Shift handle to center and set dial to #1 finger size

STEP 12 Shift handle to No.1 position (left, down), lock post

While shifting to the No. 1 position, push down on the ball slightly as needed, to keep the nylon handle-wedge firmly against the finger guide rail.

While holding the shift handle against the finger cam with left and downward pressure, lock firmly with the red post-lock knob.

STEP 13 Set forward or reverse pitch for fingers then lock head

Loosen the red T-handle and set the forward or reverse finger pitch indicated by the letter (f) on the Spec Sheet.

Lock the head using the red T-handle.

STEP 14 Drill #1 finger hole 2 3/4" deep

Now wearing your safety goggles, close the plastic drill cover and turn on the vacuum and drill motor.

Drill the #1 finger hole 2 3/4" deep and turn off the vacuum and drill motor..... Remove the drill bit by tapping the knock-out knob.

STEP 15 Set finger F&R pitch back to zero

#2 FINGER

STEP 16 Insert #2 finger drill

The #2 finger hole size is determined by the Spec Sheet.

Insert the drill bit for the #2 finger, seating the drill bit securely into the spindle.

STEP 17 Shift handle to center and set dial to #2 finger size

STEP 18 Shift handle to No.2 position (left, up), lock post

While shifting to the No.2 position, lift up on the ball slightly as needed, to keep the nylon handle-wedge firmly against the finger guide rail.

While holding the shift handle against the finger cam with left and upward pressure, lock firmly with the red post-lock knob.

STEP 19 Set forward or reverse pitch for fingers then lock head

Loosen the red T-handle and set the forward or reverse finger pitch indicated by the letter (f) on the Spec Sheet.

Lock the head using the red T-handle.

STEP 20 Drill #2 finger hole 2 3/4" deep

Wearing your safety goggles, close the plastic drill cover and turn on the vacuum and drill motor.

Drill the #2 finger hole 2 3/4" deep and turn off the vacuum and drill motor..... Remove the drill bit by tapping the knock-out knob.

STEP 21 Set finger F&R pitch back to zero and remove ball

Loosen the ball clamp knob and move the clamp to its most upright position.

Now perform the necessary beveling and cleaning operations. Remove the vac hose from the upper vac elbow and vacuum out the holes in the ball using the hole cleaner. Remove ball.

FINGERTIP DRILLING CHECK LIST

(With the use of Inserts)

1. Target ball and tighten ball clamp
2. Set No. 1 span (Allow for insert wall thickness...see chart)
3. Set No. 2 span (Allow for insert wall thickness...see chart)

THUMB

1. Insert the thumb drill bit
2. Shift handle to center and dial thumb size
3. Shift handle to thumb position and lock post. (red knob)
4. Set forward or reverse pitch for thumb and lock head. (red T-handle)
5. Drill thumb hole 2 3/4" deep
6. Set thumb F&R pitch back to zero

#1 FINGER

1. Insert the #1 finger drill bit (size 31/32)
2. Shift handle to center and set the dial to 31/32
3. Shift handle to No.1 position (left, down), and lock post (red knob)
4. Forward & reverse pitch should be at zero.
5. Drill finger hole 1 3/4" deep

#2 FINGER

1. Insert the #2 finger drill bit (size 31/32)
2. Shift handle to center and set the dial to 31/32
3. Shift handle to #2 position (left, up) and lock post (red knob)
4. Forward & reverse pitch should be at zero.
5. Drill finger hole 1 3/4" deep

INSERT INSTALLATION

1. Sand finger holes slightly
2. *Install the #1 finger insert, slanted edge up
3. *Install the #2 finger insert, slanted edge up
3. Glue inserts in place.

*Inserts should be flush with the ball surface. One side of insert is higher cut than the other to compensate for the curvature of the ball.

2500 UNCRATING

1. Cut steel banding and remove lid.
2. Remove the top flat and 2 triangular supports from inside the box.
3. Remove the nails and raise the outside master carton, up and over the entire package.
4. Raise the top skirt up and over the machine.
5. Lift the bottom skirt up and off the corner pieces, and over the machine.
6. Remove the 4 corner pieces.
7. Remove the plastic bag, padding from the handles, and wire from the spindle arms.
8. Take the back panel off the machine and remove all the loose boxes and vacuum from inside the cabinet.
9. Using a 1/2-inch wrench, unbolt and remove the sheet metal shipping bracket from the end of the counterbalance weight. Replace the extra weight on the end of the counterbalance weight, again using the 1/2-inch bolt.
10. Remove the 4 skid bolts and carefully lift machine off the skid.

If you are returning a machine to T&J for rebuilding, reverse these steps to recrate the machine using the crating materials from your new machine.

2500 SETUP

1. Remove the items packed inside the vacuum canister.
2. Place the vacuum inside the cabinet, plug the vac inside the machine, hook up the vac hose, and replace the rear door panel.
3. Unpack the engraver and all other accessories.
4. Engraver is ready to use, refer to instructions.
5. Plug the machine direct into a 20-amp rated outlet. Do not use extension cords.
6. The machine is ready to use, refer to instructions.

PREVENTITIVE MAINTENANCE:

Proper Maintenance is important for keeping the Model 2500 Bowling Ball Machine running properly. The following preventative maintenance must be performed on the drilling machine:

Weekly Maintenance:

1. Using a wand or reducer on the end of the vacuum hose, vacuum all dust and shavings from the top and interior of the machine.

   Note: *A respirator mask must be worn during the following procedure.*

2. Empty the vacuum when the canister is 1/3 full (after drilling approximately 10 to12 balls). Shake out the cloth bag and replace the outer paper bag (45-75-0905p).

Monthly Maintenance:

1. Apply WD40 to the outer surfaces of the spindle case and teeth at the bottom of the spindle case. Item 3 on page 11. Wipe clean with a rag.
2. Apply WD40 to the outer surfaces of the ball post. Item 22 on page 14. Wipe clean with a rag.
3. Spray WD40 on a rag and wipe down all steel parts accessible through the opening in the main cover.

   Note: *A respirator mask must be worn during the following procedures.*

4. Empty vacuum canister (see weekly maintenance).
5. Rinse out the cloth vacuum bag and let it dry completely. If you need a spare cloth bag (45-75-0905c), order from T&J Bowling Products.
6. Tighten the fittings to ensure proper suction. Clean hose if necessary.

6 Month Maintenance:

1. Spray a few drops of WD40 to the threaded portion of the ball clamp knob. Item 19 on page 14.
2. Apply a thin film of grease to the surfaces of the finger cams, Items 10 and 11 on page 12, and the surfaces of the finger stops, item 1 and 4 on page 14.

Yearly Maintenance Check List

1. Inspect all wiring.
3. Inspect drill cover (45-75-0102).
4. Check for target alignment and replace if necessary (45-75-0406).
5. Install cork pads of rubber pads on ball cup if needed.
6. Inspect ball clamp pad.
7. Tighten spindle arms and nuts.
8. Inspect T-handle and replace nylon if needed.
9. Test Drill – Set spans at 3 5/8", set drill size setting to 7/8", and insert a 7/8" drill bit (pitches should be set at '0'). Drill a 3-hole pattern using the same drill for all three holes. Measure web and spans with a span ruler. If the spans or web is off, call T&J Bowling Products. 1-800-892-1309

TROUBLE SHOOTING GUIDE

BALL TARGET ALIGNMENT AND REPLACEMENT

The alignment of the ball target is very important for proper machine operation. Alignment is accomplished by inserting a drill into the spindle with the drill tip in the horizontal position. Take out the two holding screws and put on new target (45-75-0406). Do not tighten screws. Open both spans to 5 ½ ". (Always move #1 span first). Put the handle in the thumb position. Reach into the opening by the handle, hold the thumb stop bracket against the handle, move both back to the center position, and lock the post in the center position. The target will be in front of the drill bit. Move head forward, bringing the drill tip close to the target. (All pitches should be set at '0'). The thumb stop bracket will hold the handle from going up or down. Align the target horizontal cross hair to the drill tip. Rotate the drill tip 90 degrees and align target vertical cross hair with tip of drill. Tighten screws securing target.

CLAMP PAD FALLS OFF

The clamp pad comes off only when the locking knob is screwed back too far. Put the thick washer on the bolt, and then put nylon clamp pad back on. Put on second thinner washer and then retainer ring, using retainer ring pliers. If your machine has a counter-bored washer and permanent ring, a special tool will be supplied for installing the new ring.

DRILL SIZE DIAL IS LOOSE

Move wedge cam out toward handle and position in last detent. Rotate dial until 1 1/8 is entered in the window. Hold socket head cap screw with an Allen wrench and tighten dial adjustment jam nut securely against the bushing. Now reverse the other jam nut against the black knob and tighten.

DISTANCE BETWEEN HOLES (WEB) IS OFF

The web is adjustable by turning the web-adjust knob located inside the cabinet just below the end of the ball post. The recommended web setting should be 5/16" (half way between 1/4" and 3/8" on the decal). Turning the web-adjust knob counter-clockwise will increase the distance between the fingers, while turning the knob clockwise will reduce the web. It is helpful to experiment with a test drill ball when adjusting the new web setting.

MACHINE DRILLS OBLONG HOLES

Either the cork pads rubber insert in the clamp pads are worn or missing, or the drill bits are dull. Inspect cork pads and insert—replace if necessary. If drill bits are dull, resharpened drill bits can be ordered from T&J Bowling Products.

VACUUM IS WEAK

Empty vacuum more often. Refer to maintenance schedule for information on how often to change filter bags. When emptying waste can, change or clean the dust bags. (45-75-0905c for cloth or 45-75-0905p for paper). Tighten all fittings to insure proper suction. Insure hose is clean.

SPAN IS OUT OF ADJUSTMENT

The span is controlled by the span cams. The machine is set up at the factory at 3 5/8" Each of the 3 cams were marked with bluing and a scribe line at the point where the nylon cam follower meets the outside edge of the cam. when the machine is set at 3 5/8" span settings. The rack and two small gears at the bottom of the span cam shafts were also marked with bluing and a scribe line. where they mesh. when the machine is set at 3 5/8 " span settings.

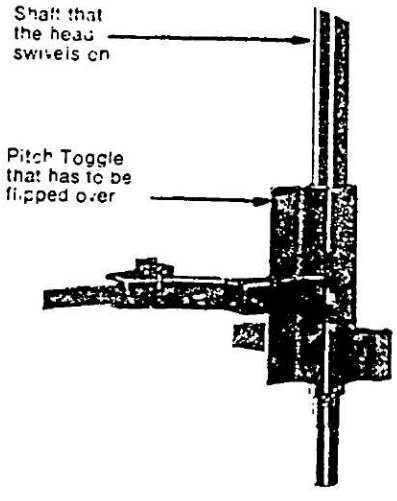
Set the #1 and #2 span dials at 3 5/8" and check for the alignment of the scribe lines described above. Now drill a test pattern using a 7/8" drill bit and measure the spans. If the spans do not measure 3 5/8", adjust the cams accordingly.

To decrease span. rotate cams toward each other To increase span. rotate cams away from each other. If both spans are too large or too small by the same amount, adjust the thumb cam to make the correction. If only the #1 or #2 span is off, adjust the cam accordingly.

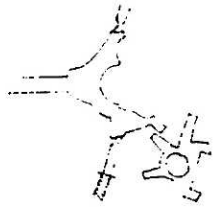
Adjustments in span are made by loosening the 2 set screws which hold the cam hub to the shaft. rotating both hub and cam and retightening the set screws. It is helpful to put masking tape on the surface of the cam and draw a line where the present nylon cam meets the cam. Then draw another line for d the desired change. This gives you a reference point from where to make your changes. After you make the change. retighten the set screws and test drill again.

SHIFT HANDLE LOCKS

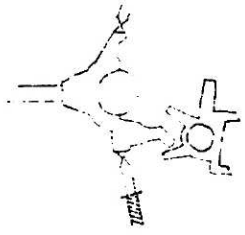
Look through the handle opening. Follow the handle from underneath the handle, to the right of the post and to its end. (A strong light is recommended).
The Casting at the end (45-75-0312) moves a spring fed part called a pitch toggle (45-75-0804). This toggle can easily be located because it is fastened onto the same shaft that the head swivels on. Swing the head back and forth to see pitch toggle casting move. The locking is caused by the toggle casting snapping over while the handle is not in its proper position. To get the machine back in operation, open both spans to 5 ½". Open the forward and reverse pitch knob to ¾" until the pointer indicates ¾" Pitch. The handle will be locked in either the finger or the thumb position. Put the handle in the finger or thumb position. Then pus the toggle away from the handle by reaching through the handle opening with any long tool. (Using the post as a fulcrum makes the toggle snap over easier.). To prevent the problem from reoccurring, always set the pitch back to '0' before shifting to the next position.



LOCKED



GOOD



OPERATING INSTRUCTIONS FOR THE SCOTT ENGRAVER

1. Scribe a line on the ball approximately 3/4" above the finger holes, parallel to the label and perpendicular to the center line of the holes.

2. Center letters to be used in holder and lock tight.

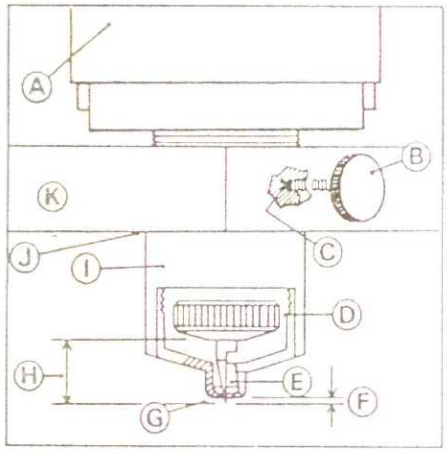
3. Place the previously scribed ball in the Engraver and place Stylus Tracer at the bottom of the center letter. Adjust ball so the Engraver Cutter will fall directly on the scribed line, centered above the finger holes.

4. Check to see if the Engraver Cutter will follow the scribe line by placing the Stylus Tip at the bottom of the far left and far right letters. Adjust ball if needed.

5. Insert Stylus in first letter to be copied, turn motor on and allow Cutter to touch ball by pressing Stylus Holder downward. Guide Stylus through letter and lift out. Proceed with remaining letters.

6. Vacuum dust away from letters and inspect before moving ball. Engrave any missing letters.

Cutter, Depth Control & Motor Relationship



A. Motor
B. Motor Clamping Screw
C. Nylon Plug - protects motor threads
D. Collet Nut
E. Cutter
F. Depth of cut, (exaggerated)
G. This surface rides on the material being engraved.
H. Point of Cutter 3/8" to base of Collet with Collet Nut snug
I. Depth Control
J. Depth Control locks against Motor Link
K. Motor Link

CHANGING CUTTERS AND ADJUSTING CUTTER DEPTH

1. Scott Engravers are shipped from the factory with the Cutter installed, ready to engrave. To change a Cutter, first remove the Motor Mounted Depth Control. Place the Hex Wrench through the hole in the top of the Motor Shaft to prevent rotation and loosen the Collet Nut. Remove Cutter and replace.

2. Insert the new Cutter so that it projects approximately 3/8" from the bottom of the Collet Nut to the tip of the Cutter. Do not tighten at this time.

3. Replace the Motor Mounted Depth Control on the threaded Motor until it locks tight against the Motor Link.

4. The Depth Control rides on the surface of the Bowling Ball. The amount of Cutter that is exposed is the depth of the cut. Adjust the Cutter so the tip can just be felt through the Depth Control or is protruding approximately 1/64th of an inch. Tighten Collect Nut by holding with Pliers and turning the Shaft on top of the Motor with the Hex Wrench.

5. For minor depth adjustments the Motor can be rotated. The Motor Mounted Depth Control must first be loosened. The depth of cut is decreased by rotating the Motor counter-clockwise and increased by rotating the Motor clockwise.

CONTACT INFORMATION

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