SHARP

TURRET MILL

LMV-49-SMD

OPERATING INSTRUCTIONS AND PARTS MANUAL

www.sharp-industries.com

Introduction

The NEW SHARP LMV-49-SMD is a newly designed knee type vertical milling machine that integrates a Servo Motor Drive with many outstanding and unique features, making it the best choice on the market.

This manual is intended to provide comprehensive instructions for the safe setup, operation, and maintenance of the NEW SHARP LMV-49-SMD. It is critical that all users thoroughly read and understand this manual before operating the machine. Proper understanding of the controls, adjustments, and safety protocols will help ensure efficient and safe use of the mill.

Failure to follow the guidelines outlined in this manual may result in machine damage or personal injury. Always adhere to the safety precautions and operational procedures described within.

★ Servo motor featured

Servo Motor will increase productivity via larger depth of cuts in milling, drilling, boring, and tapping applications.

1. The spindle is driven by a servo motor, providing a speed range of 65 to 4,500 rpm.

2. The Servo Motor Drive has an 8.5kW spindle motor that is equivalent to an 11HP drive, which will increase productivity via larger depths of cuts in milling, drilling, boring, and tapping applications.

3. The Servo Motor Drive has fewer working parts to maintain by eliminating High/Low transmission gears, so the milling is easier to operate, and extends the life of the machine.

4. The Servo Motors Drive adjusts the speed and torque dynamically, allowing it to run quieter and with less vibration than traditional variable speed drive mills for improved surface finish and extended tool life.

5. LMV-49-SMD comes with a digital display, and the speed change is controlled by turning a dial to the desired speed.

6. LMV-49-SMD comes standard with a load meter, which provides real-time monitoring of spindle power usage, offering several benefits like preventing tool breakage, improving cutting conditions, and optimizing machine performance

7. High Performance in Intermittent Use - Servo motors are ideal for applications with start-stop operations. They can ramp up and down quickly without consuming excessive energy.

8. Low Energy Loss - Servo motors are designed to minimize energy loss due to heat and friction, contributing to their overall efficiency.

LMV-49-SMD FEATURED

Machine capacity

- This machine has a 9-inch X 49-inch table, with longitudinal travel of 36 inches and cross travel of 12.2 inches.

Precision quill

- The machine is equipped with an R-8 spindle that has 5 inches of quill travel. The quill is hard chrome plated and mounted on a matched pair of high precision angular contact bearings, ensuring spindle runout of no more than two ten thousandths of an inch of Total Indicator Reading (TIR).

Spindle speed and load display

- The spindle speed has a digital display, so the speed change is controlled by just turning a dial to the desired speed, and the load meter provides real-time monitoring of spindle power usage, offering several benefits like preventing tool breakage, improving cutting conditions, and optimizing machine performance.

Power draw bar

- This machine comes standard with a power draw bar for fast and convenient tool changes.

Transformer 110V

- The mill comes equipped with a transformer located in the electrical control cabinet which conveniently provides 110V power to DRO or X, Y, Z-Knee power feeds.

High quality cast iron

- The structural parts of the machine are manufactured with Meehanite Castings which offers several benefits, including high strength, durability, machinability, and vibration dampening. It's also known for its consistent physical properties, reliable performance, and long-wear life.

Hard chromed slideways

- Hardened and Ground Ways on X & Y Axis Coated with Turcite B- which is a linear bearing material that is resistant to various lubricants and coolants, leading to extended product life and minimized wear.

  The slideways of the machine are hard chrome plated to achieve maximum wear-resistance.

Backlash elimination

- The backlash of the table freed screws can be eliminated through the adjustment of the double-nut instead of squeezing a single nut. This design keeps the feed screw in full contact with a pair of bronze nuts for long term usage.

Head swiveling and tilting

- The tilt 90 degrees right and left, and tilt 25 degrees up and 45 degrees down for angular machining.

Motor shaft support

- The bottom of the motor is firmly supported by roller bearings, ensuring proper loading, support and alignment of the spindle.

One shot lubrication system

- The One-Shot Lubrication System with backflow valve ensures Lubrication to all the ways and Lead Screws. (X, Y And Z-Axis)

Important safety instructions

WARNING – Reduce the Risk of Injury:

1. **Read the Manual** – Before assembling or operating, read and understand the entire owner's manual.
2. **Follow All Warnings** – Read and follow safety warnings on the machine and in this manual. Ignoring them may result in serious injury.
3. **Maintain Warning Labels** – Replace any damaged or missing warning labels immediately.
4. **Qualified Users Only** – This turret mill is for trained and experienced personnel. If unfamiliar, seek proper training before use.
5. **Use as Intended** – Do not use this machine for unintended purposes. The manufacturer disclaims any warranty and is not responsible for injuries resulting from misuse.
6. **Wear Proper Safety Gear** – Always wear approved safety glasses or face shields. Regular eyeglasses are not safety-rated.
7. **Dress Appropriately** – Remove ties, rings, watches, and jewelry. Roll sleeves above elbows. Avoid loose clothing and tie back long hair. Do not wear gloves. Use non-slip footwear or anti-skid floor strips.
8. **Protect Your Hearing** – Use earplugs or earmuffs if operating for extended periods.
9. **Stay Alert** – Never operate while tired, or under the influence of drugs, alcohol, or medication.
10. **Power Safety** – Ensure the switch is OFF before connecting to power.
11. **Proper Grounding** – Make sure the machine is properly grounded.
12. **Unplug for Adjustments** – Always unplug before making adjustments or performing maintenance.
13. **Remove Tools Before Use** – Check that all wrenches and keys are removed before turning the machine on.
14. **Handle Coolants Safely** – Some machining coolants contain harmful chemicals. Read coolant labels and take necessary precautions.
15. **Inspect for Damage** – Before using, check for damaged parts, misalignment, or binding. Repair or replace as needed.
16. **Maintain a Safe Workspace** – Ensure adequate space, good lighting, and a clean, non-slip floor around the machine.
17. **Keep the Floor Clear** – Remove oil, grease, and scrap materials from the workspace.
18. **Limit Access** – Keep visitors and children away from the work area.
19. **Stay Focused** – Avoid distractions, conversations, or horseplay while operating the machine.
20. **Maintain Proper Balance** – Keep a stable stance. Do not overreach or use excessive force.
21. **Use the Right Tool** – Select the correct tool, speed, and feed rate for the job. Forcing a tool can be dangerous.
22. **Use Approved Accessories** – Improper accessories can be hazardous.
23. **Maintain Equipment** – Keep cutters sharp and clean. Follow lubrication and maintenance instructions.
24. **Turn Off Before Cleaning** – Disconnect power before cleaning. Use a brush or compressed air, not your hands, to remove chips and debris.
25. **Do Not Stand on the Machine** – The machine could tip, causing serious injury.
26. **Never Leave Unattended** – Turn off the machine and wait for it to stop before walking away.
27. **Clear Work Area – Remove unnecessary tools and workpieces before starting the machine.**
28. **Stay Safe and Follow These Guidelines!**

⚠ CAUTION

This means that if precautions are not heeded, it may result in minor injury and/or possible machine damage.

⚠ WARNING

This means that if precautions are not heeded, it may result in serious or even fatal injury.

Table of Contents

CHAPTER

1

Set-up and installation

This chapter includes:

Set-up and installation

Preparing the Milling Machine for Service:

1. Remove any crating covering the machine on the pallet.
2. Remove accessory items from the pallet or machine table and compare them with the parts list.
3. Install the provided lifting ring into the tapped hole on the ram and ensure it is tight.
4. Check the tightness of the lock handles on the ram (see A Figure 15) to confirm it is securely locked.
5. Remove the nuts and bolts securing the machine to the pallet.
6. Position an overhead crane or suitable lifting device above the lifting ring.
    - **Caution:** The machine is heavy! Ensure the lifting equipment is in excellent condition with an adequate safety factor. The machine may tip forward when lifted; minimize tipping by using a support sling over the front while avoiding damage to components.
7. Lift the machine just enough to clear the pallet, remove the pallet, and avoid placing hands or feet under the machine.
8. Position the machine base over the hold-down system where it will be anchored. Use appropriately sized anchor bolts to secure it to the floor. See the diagram on page 9.
    - **Note:** Allow space for operator movement, servicing access, and oversized workpieces.
9. Once positioned, level the machine using shims as needed. Use a machinist's level on the table for side-to-side and fore-and-aft leveling.
    - **Warning:** Ensure even support under all four corners to prevent column twisting and table binding.
10. When the machine is level, secure the base to the anchor system.
    - **Important:** Before adjusting the mill head, refer to the "Mill Head – Left/Right Adjustment" section in this manual.
11. Loosen the four hex head nuts (see A, Figure 12) about 1/4 turn counterclockwise to allow head rotation.
12. Assist the worm mechanism by applying upward pressure on the motor while turning the worm nut (see B, Figure 12) with the supplied wrench to raise the head upright.
13. Snugly tighten the head bolts without over-torquing.
14. Clean rust-proofing residues from all surfaces using mineral spirits or other solvents before moving parts.
15. Install the table traverse and cross-feed cranks onto their respective shafts and secure them with shaft nuts. (Option)
16. Remove rust-proofing from the drawbar and washer, then insert them into the spindle center.
17. Slide the fine feed handwheel onto the handwheel hub, ensuring the roll pin engages the hub hole.
18. Attach the coarse feed handle onto the feed shaft, tapping lightly until the roll pin engages.
19. Clean and install the knee crank onto its shaft.
20. Install the rubber way covers at the front and rear of the table.

Foundation

Placing on a Solid Foundation

To ensure maximum stability and safety, it is strongly recommended that the machine be anchored securely to the floor, especially to prevent tipping or shifting due to off-center loading during operation.

Please note: Customers are responsible for supplying the appropriate 1/2” anchor bolts and all necessary hardware for floor mounting.

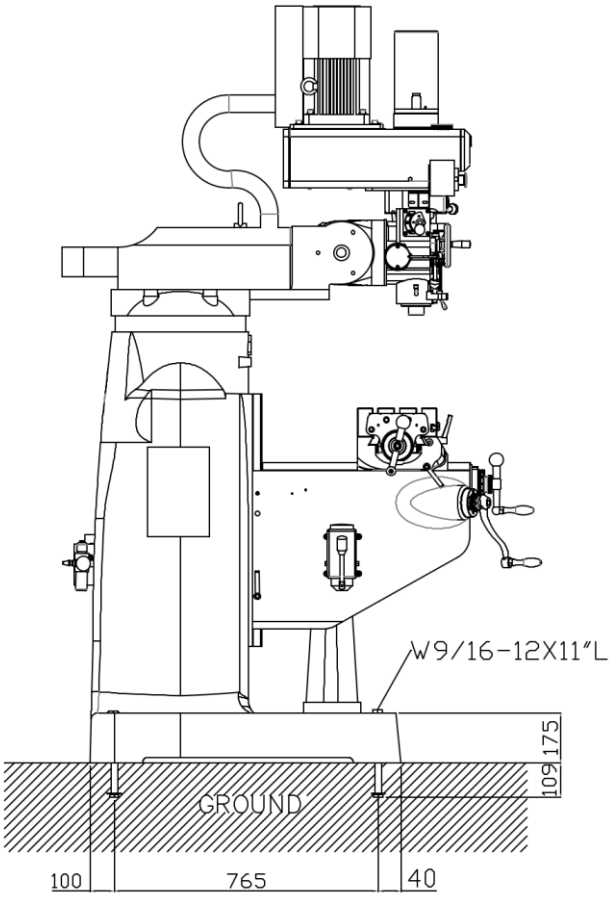
When installing the machine on a concrete foundation, we recommend applying non-shrink grout (thin mortar) beneath the base. This will:

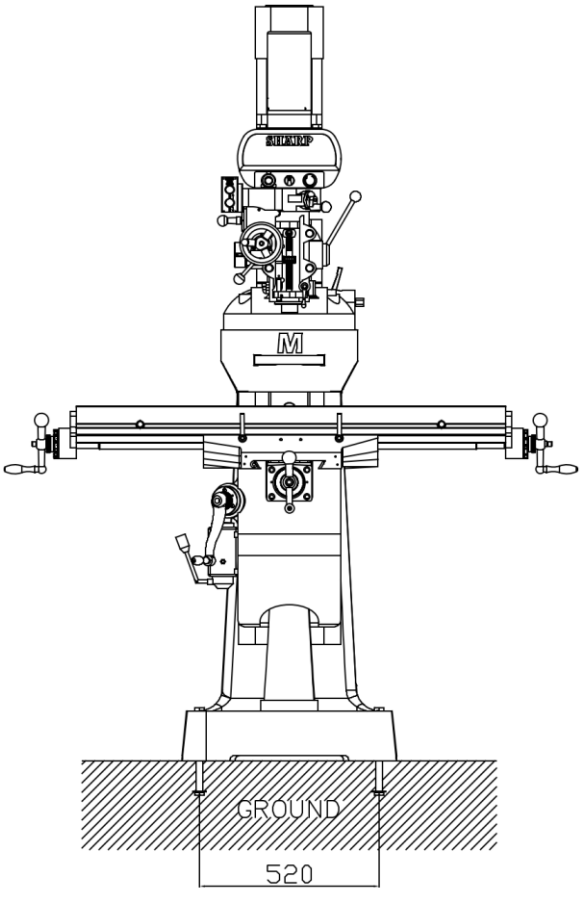
Compensate for any unevenness in the floor surface

Provide full contact under the entire machine base

Improve vibration damping and long-term stability

Allow the grout to fully cure before final leveling and anchoring.





Unpacking

1. **Inspect for Damage** – Open the shipping container and check for any shipping damage. Report any issues immediately to your distributor and shipping agent.
2. **Keep Packaging Materials** – Do not discard any shipping material until the turret mill is fully assembled and operational.
3. **Read the Manual** – Thoroughly review the instruction manual for assembly, maintenance, and safety instructions before proceeding.

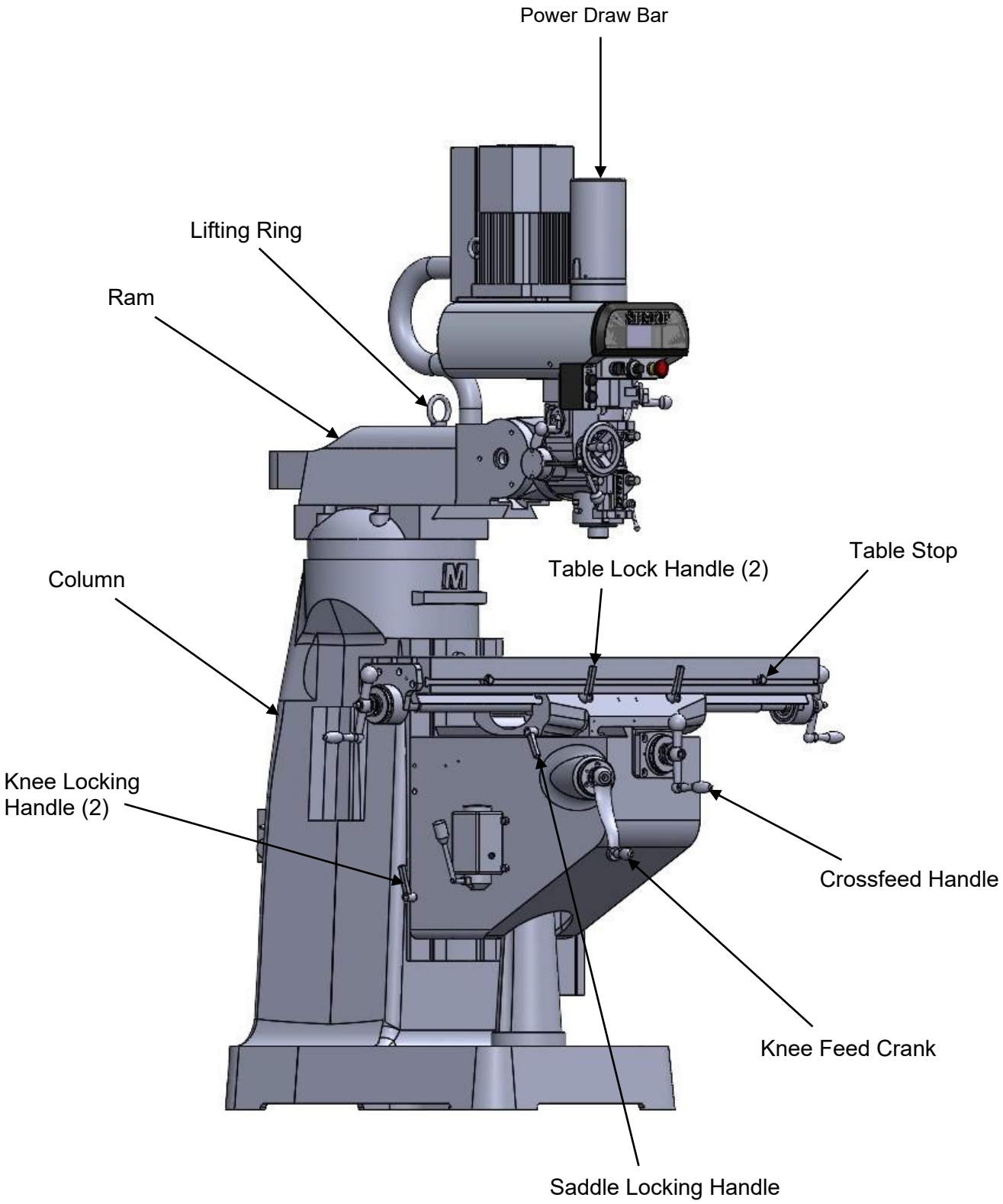
Contents of the Shipping Container

Note: Some parts may be pre-installed on the mill.

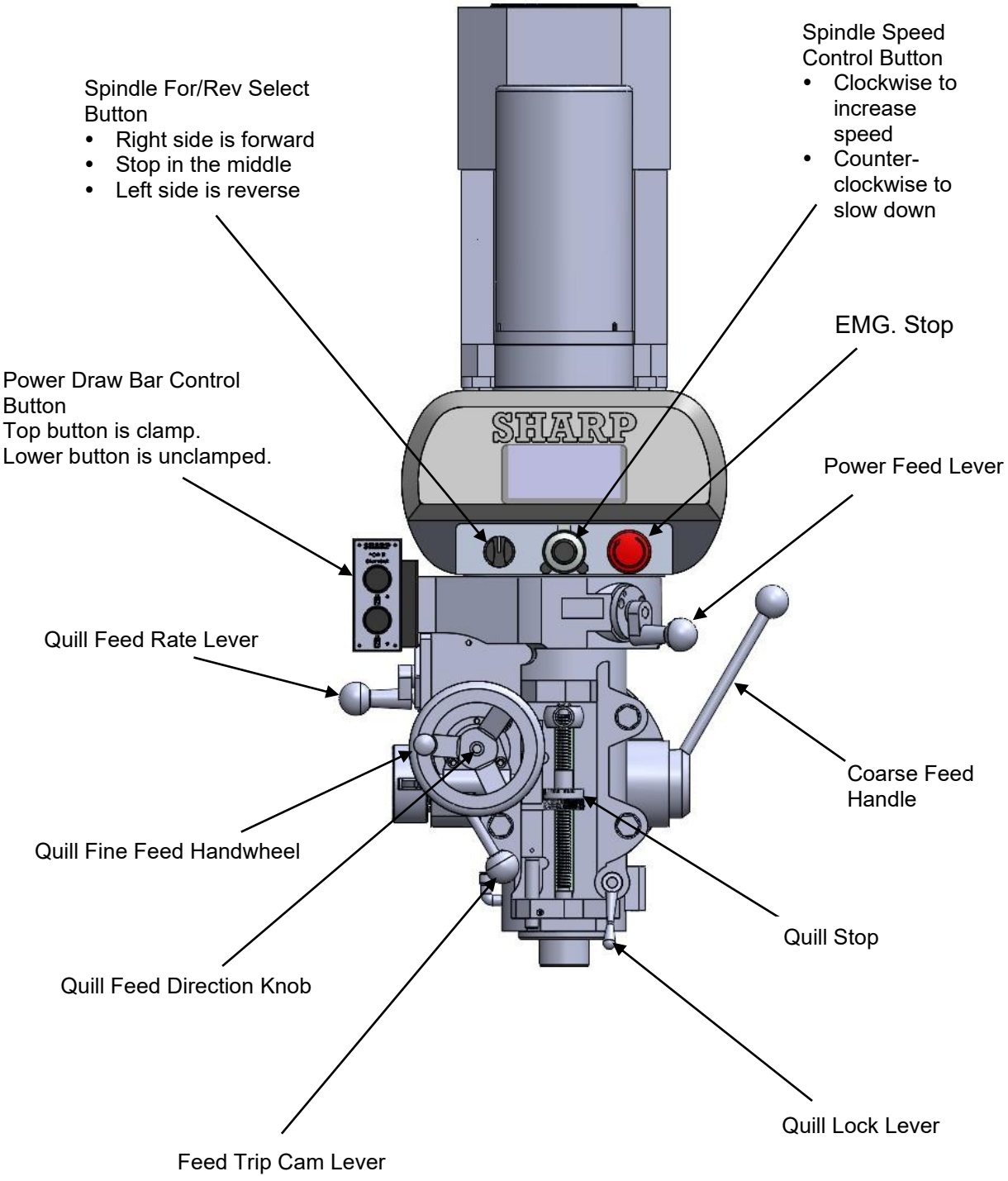
1	Turret Mill (not shown)	1	Draw Bar
1	Flat Way Cover	3	Table Adjustment Handles
1	Pleated Way Cover	1	Tool Box

If your mill is supplied with an optional Table Power feed and/or DRO, be sure to consult the separate instruction materials that accompany them.

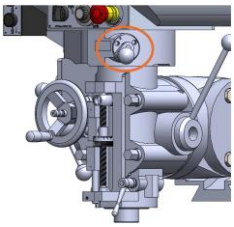
Overview and Terminology (I)



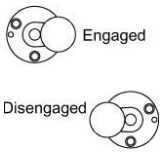
Overview and Terminology (II)

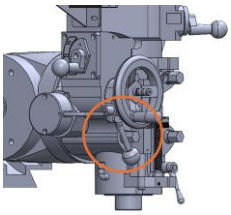


Control Positions

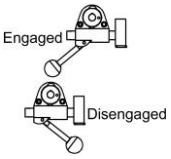


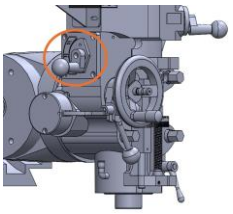
Quill Feed lever



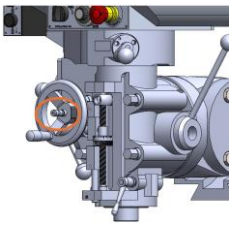


Feed trip Cam lever

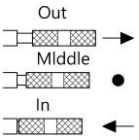




Quill Feed Select lever



Feed direction control



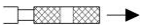
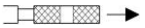
High spindle speeds with Automatic downfeed			Select feed rate	
Low spindle speeds with Automatic downfeed			Select feed rate	
High spindle speeds with Automatic upfeed			Select feed rate	
Low spindle speeds with Automatic upfeed			Select feed rate	
Lever feed				
Find feed using				

Figure 2

CHAPTER

2

Quill Power Feed Lever

This chapter includes:

Quill Power Feed Lever

CAUTION **Do not use power feed at speeds above 3000 R.P.M.**

CAUTION **It is recommended to disengage the power feed worm gear whenever the power feed is not required. This avoids unnecessary wear on the worm gear.**

CAUTION

Do Not Move While Running – Ensure the motor is at a complete stop before adjusting the Quill Power Feed Lever.

Operating Without a Tool Installed – When the quill is running without a tool installed, the drawbar is not locked and may produce noise due to contact with the spindle sleeve. This is a normal condition. The noise will disappear once a tool is installed and the machine is running.

Quill Power Feed Lever Operation

- **Location** – The quill power feed lever is located on the right side of the mill head (Figure 3).
- **Function** – It is used to engage and disengage the quill power feed mechanism.
- **Engaging the Power Feed** – Pull out the knob and rotate the handle to a new locked position. When engaged, the power feed mechanism will drive the spindle upward or downward.
- **Disengaging the Power Feed** – The power feed mechanism will not drive the spindle when the handle is in the disengaged position.
- **Do Not Move While Running** – Ensure the motor is at a complete stop before adjusting the Quill Power Feed Lever.
- **Change Position Gently** – Avoid forcing the lever into position. If it does not engage smoothly, do not apply excessive force.
- **Jogging the Motor** – If the gear does not engage, briefly jog the motor and allow it to stop completely before attempting to change the lever position again.

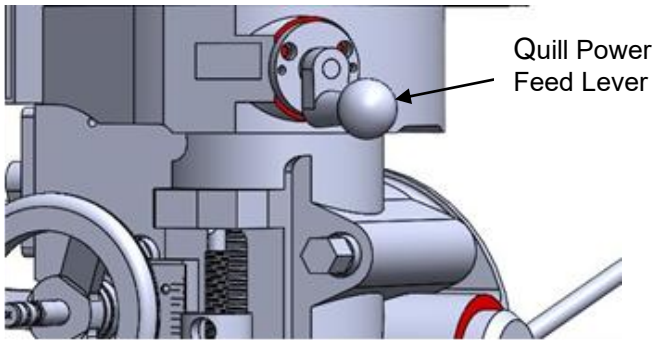


Figure 3

CHAPTER

3

Feed Rate Lever Operation

This chapter includes:

Feed Rate Lever Operation

- **Location & Function** – The Feed Rate Lever (Figure 4) controls the per-revolution feed rate of the power feed mechanism.
- **Available Feed Rates –** Three options: 0.0015-inch, 0.003-inch, and 0.006-inch per revolution. These positions are indicated on a plate beneath the feed rate lever.
- **Selecting the Feed Rate –** Pull out the knob on the feed rate lever and move the handle to the detent of the desired rate.
    - *Note:* The knob is spring-loaded; pull it out to rotate to a new position.
- **Engagement Method –** Unlike other controls, the feed rate lever engages more smoothly when the motor is running and the quill feed lever is engaged.

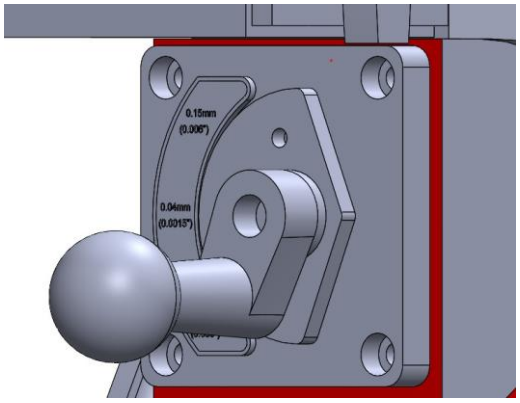


Figure 4

Feed Trip Cam Lever Operation

- **Location** – The Feed Trip Cam Lever (A, Figure 5) is positioned on the left side of the head, behind the Manual Fine Feed Handwheel (B, Figure 5).
- **Function** – This lever engages the overload clutch on the pinion shaft when moved to the left.
- **Automatic Disengagement** – The Feed Trip Cam Lever remains engaged until the Quill Stop (C, Figure 8) contacts the Micrometer Adjusting Nut (A, Figure 8), causing it to disengage automatically.
- **Manual Disengagement** – The lever can also be manually released by moving it to the right.

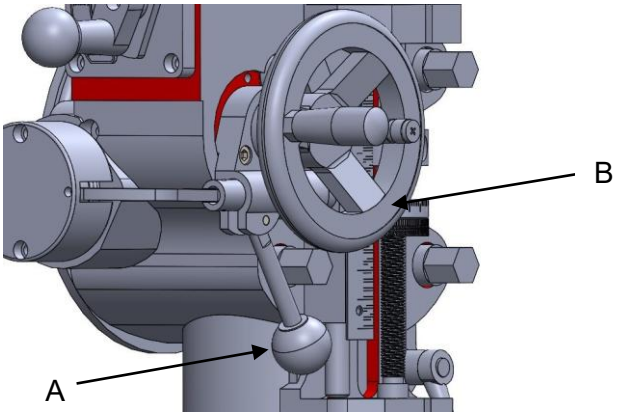


Figure 5

Feed Direction Control

- **Location & Function** – The Feed Direction Control (B, Figure 6) determines the movement direction of the power feed: up, down, or neutral.
- **Changing the Feed Direction** – The control position depends on spindle rotation direction:
    - *Clockwise Spindle Rotation:*
        - **In** = Downfeed
        - **Out** = Upfeed
    - *Counterclockwise Spindle Rotation:*
        - **Out** = Downfeed
        - **In** = Upfeed
    - *Neutral Position:* Located between in and out, disengaging the feed movement.
- **Engagement Tips** – The position of the control may be changed while the system is stopped or running. If engagement is difficult, move the fine feed handwheel (A, Figure 6) back and forth to assist in proper alignment.

⚠ CAUTION **It is recommended that the Feed Direction Knob be left in the neutral position when not in use.**

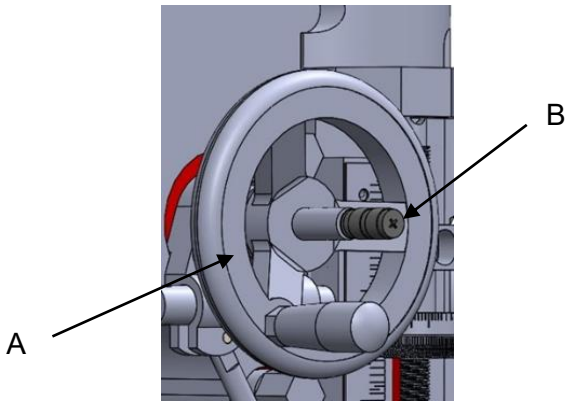


Figure 6

Coarse Feed Handle

- **Location** – The Coarse Feed Handle (A, Figure 7) is located on the right side of the head.
- **Function** – It is used for non-precision drilling operations and for moving the quill to a specific depth.
- **Automatic Retraction** – A return spring will retract the spindle automatically once the handle is released.

Quill Lock Lever

- **Location** – The Quill Lock Lever (B, Figure 7) is located on the right side of the head.
- **Function** – It locks the quill in a desired position.
- **Operation** –
    - Rotate the handle clockwise to lock the quill.
    - Rotate the handle counterclockwise to release the quill.

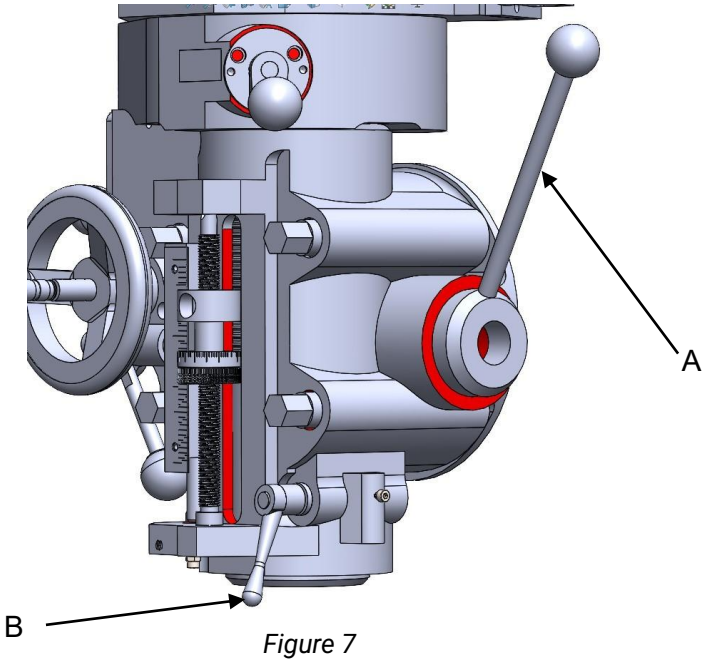


Figure 7

Micrometer Adjusting Nut

- **Location** – The Micrometer Adjusting Nut (A, Figure 8) is positioned on the front of the head.
- **Function** – Used for setting specific spindle depth.
- **Securing the Setting** – After adjusting the depth, secure it with the lock nut (B, Figure 8).

Fine Feed Handwheel

- **Function & Use** – When the controls are set for the Fine Feed using Handwheel position (see Figure 5), the Fine Feed Handwheel (A, Figure 6) allows manual fine feed control.
- **Direction of Movement** – The Handwheel can be used to move the quill in either the upward or downward direction.

⚠ WARNING **Remove the Manual Fine Feed Handwheel when not in use. Failure to comply may cause serious injury.**

Depth Scale and Stop

Referring to **Figure 8**:

- **Function** – The Depth Scale and Stop are essential for setting the depth of a drilled hole during drilling operations.
- **Location** – The depth scale is positioned on the front of the mill head.
- **Components**:
  - **Micrometer Adjusting Nut (A)** – Set to the desired depth.
  - **Lock Nut (B)** – Secures the micrometer nut in place.
  - **Quill Stop (C)** – Provides a positive stop for quill travel.
  - **Quill Stop Screw (D)** – Holds the quill stop in position.
  - **Scale (E)** – Displays the depth measurement.
- **Adjustment & Measurement**:
  - The **Micrometer Adjusting Nut** is graduated in **0.001-inch increments**.
  - Quill travel depth is adjusted by rotating the micrometer nut.

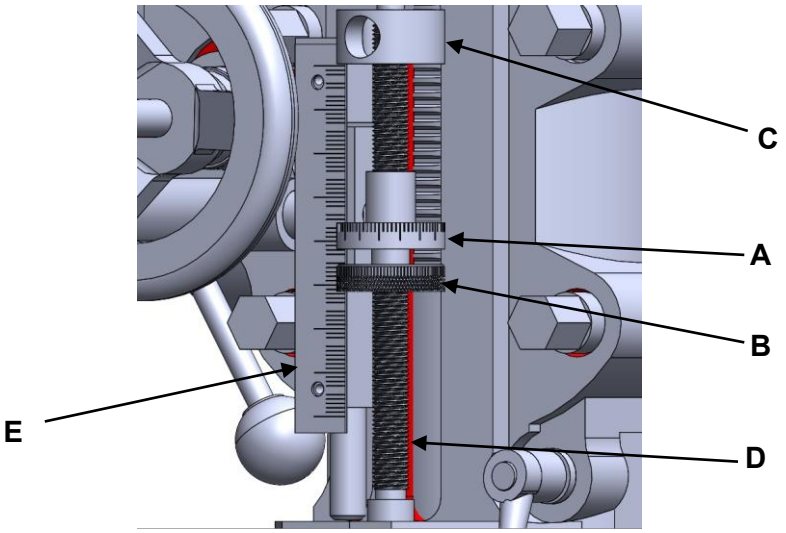


Figure 8

CHAPTER

4

Power Feed Operation

This chapter includes:

Power Feed Operation

The Feed Trip Adjustment sets the point at which the quill will reset during Power Feed.

Referring to **Figure 10**:

⚠ WARNING **Be sure that the Manual Fine Feed Handwheel is removed before proceeding. Failure to comply may cause serious injury.**

Feed Trip Adjustment Steps:

1. Using the **Quill Feed Handle (J),** advance the quill to the point where the feed should stop.
2. **Engage** the **Feed Trip Cam Lever (D)** by pulling it away from the head assembly.
3. Adjust the **Micrometer Adjusting Nut (H)** against the **Quill Stop (G).**
4. Continue turning the **Micrometer Adjusting Nut (H)** until the **Feed Trip Cam Lever (D)** trips.
5. Ensure that the **Quill Lock (K)** is disengaged by rotating it counterclockwise.
6. **Start** the **spindle (A) CW / CCW.**
7. Set the **Feed Rate Lever (B)** to the appropriate feed rate for the tooling and material being used.
8. **Engage** the **Quill Feed Engagement Lever (F).**
9. Select the feed direction by setting the **Feed Direction Knob (C)** to the correct position based on the table provided.

SPINDLE DIR.	FEED DIR.	KNOB POS.
CW	Down	In
	Up	Out
CCW	Down	Out
	Up	In

Figure 9

Following these steps ensures safe and precise operation of the power feed mechanism.

Note: Due to variables in tool diameter, coatings, coolant, and materials, no specific spindle speed or feed rate recommendations are provided. Use general shop manuals that have data applicable to the milling and drilling operations being performed. Or, contact the supplier of the tooling, coolant, and material for specific recommendations.

IMPORTANT: The power feed can be used for drills up to 5/8" in diameter (mild steel). Use manual feed for drills larger than 5/8".

⚠ CAUTION **The overload clutch is factory set to hold up to 200 lbs. downfeed pressure on the quill (accommodates drills up to 5/8"). Do not attempt to adjust clutch pressure.**

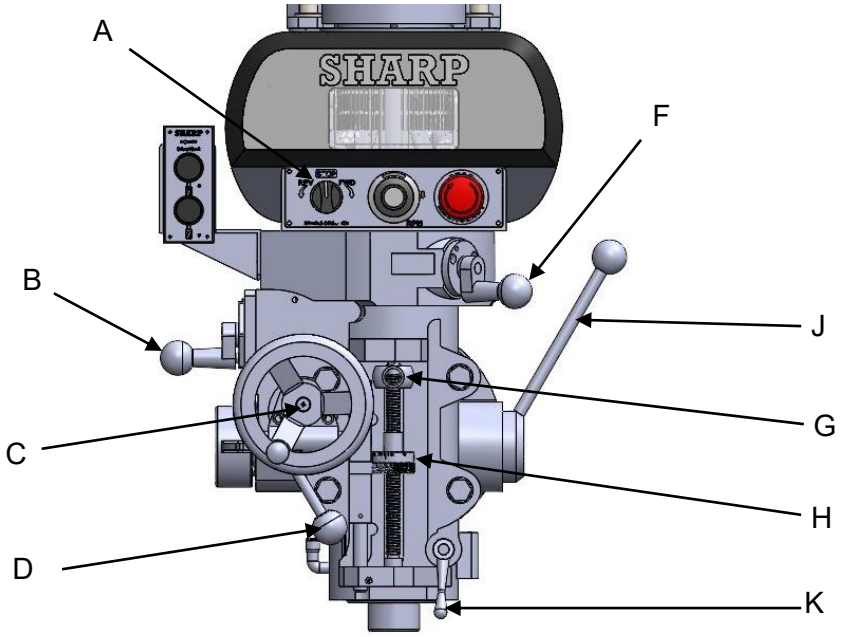


Figure 10

Clamping Work Piece to the Table

1. The worktable has 5/8-inch T-slots for clamping the work piece to the table.
2. Set motor switch to STOP position.
3. Place the work piece on the table.
4. Clamp the work piece using the T-slot clamps, studs, and step blocks as required (Figure 11).

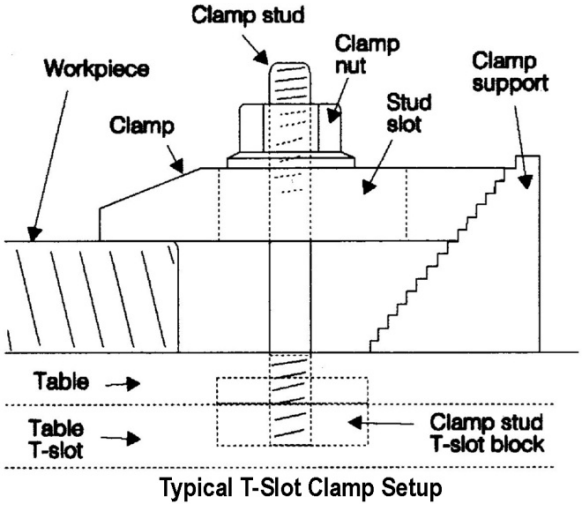


Figure 11

CHAPTER

5

Adjustments

This chapter includes:

Adjustments

Mill Head – Left/Right Adjustment

WARNING **Ensure the machine base is securely anchored to the floor before repositioning the mill head. A shift in the center of gravity can cause the machine to become unstable, potentially tipping over. This could result in serious injury to the operator and significant damage to the machine.**

Steps to Adjust the Mill Head:

1. Loosen the four large hex nuts securing the mill head to the ram adapter (refer to Figure 12).
   - A 1/4 turn should be sufficient to allow movement of the head.

Note: For angles greater than 10 degrees, use your free hand to support the mill head. This helps reduce strain on the brass worm gears, extending their lifespan significantly.

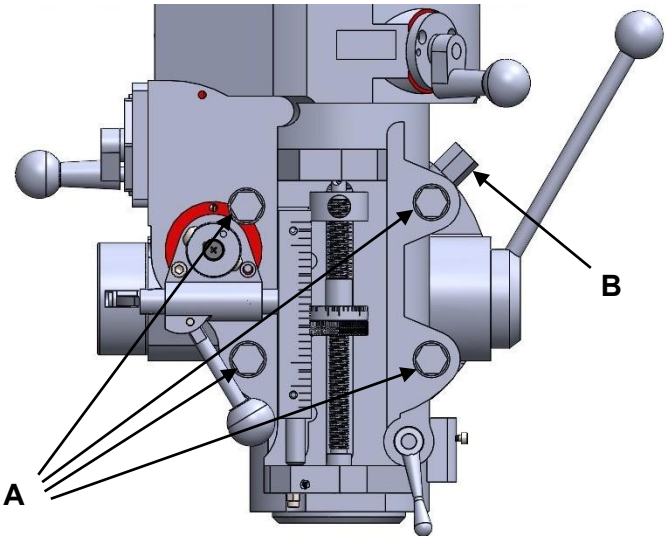


Figure 12

2. Turn the worm nut (B, Figure 12) to tilt the head left or right as needed. Use the scale on the ram adapter to set the desired angle accurately.

   Note: The scales on the ram adapter and for head rotation are guides only. For close tolerance work, use a dial indicator to ensure the head is 90° to the table in both the X and Y axis. Additionally, note that the table is slightly higher in the front, typically by 0.0005”.

CAUTION **Be sure to apply torque in two steps using a crossing pattern when securing the head. Failure to do so could distort the face of the ram adapter.**

3. Tighten the four hex nuts in two steps using a calibrated torque wrench. Apply an initial torque of 25 foot-pounds in a crossing pattern. Before applying the final torque, verify that the mill head is perpendicular to the worktable.
4. Set up a dial indicator in a collet and secure it using the draw bar (refer to Figure 14).
5. Put the spindle drive in neutral.
6. Set the dial indicator plunger on the worktable and zero the indicator.
7. Rotate the spindle 180 degrees. When rotating, raise the dial indicator plunger by hand to prevent it from dropping into the table T-slots.
8. Read the dial indicator. The indicator should read zero. If not, loosen the four hex nuts and reposition the mill head.
9. Recheck perpendicularity using the dial indicator. Repeat the procedure until the dial indicator reads zero in both positions.

⚠ CAUTION **Be sure to apply torque in two steps using a crossing pattern when securing the head. Failure to do so could distort the face of the ram adapter.**

CHAPTER

6

Mill Head – Tilt Up/Down Adjustment

This chapter includes:

Mill Head – Tilt Up/Tilt Down Adjustment

1. Setting the angle:
   a. Loosen the three ram adapter clamp bolts on the ram (A, Figure 13). There is no need to loosen the bolts more than 1/2 turn to allow tilting.

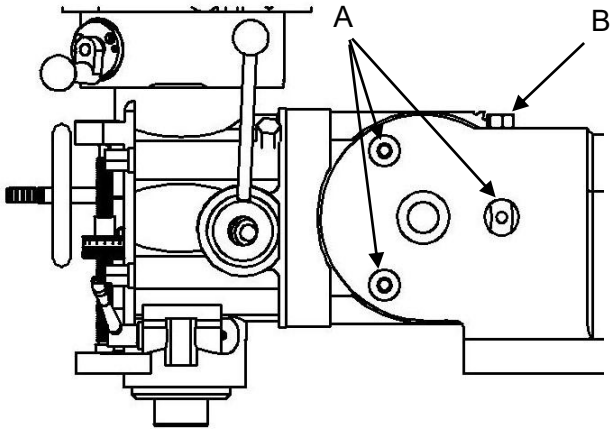


Figure 13

   b. Support the mill head with your free hand. Press upward on the spindle when changing the angle.
   c. Turn the ram adapter worm nut (B, Figure 13) to tilt the head tilt up and tilt down. Use the scale on the ram adapter to locate the desired angle.

2. Returning to upright position:
   a. When returning the mill head to its full upright position, be sure to support the head by applying upward pressure on the spindle while turning the worm nut.
   b. Check to make sure the mill head is perpendicular to the worktable.
   c. Set up a dial indicator in a collet and secure it using the draw bar (refer to Figure 14).
   d. Put the spindle drive in neutral.
   e. Set the dial indicator plunger on the worktable. Zero the indicator.
   f. Rotate the spindle 180 degrees (when rotating, raise the dial indicator plunger by hand to prevent it from dropping into the table T-slots).

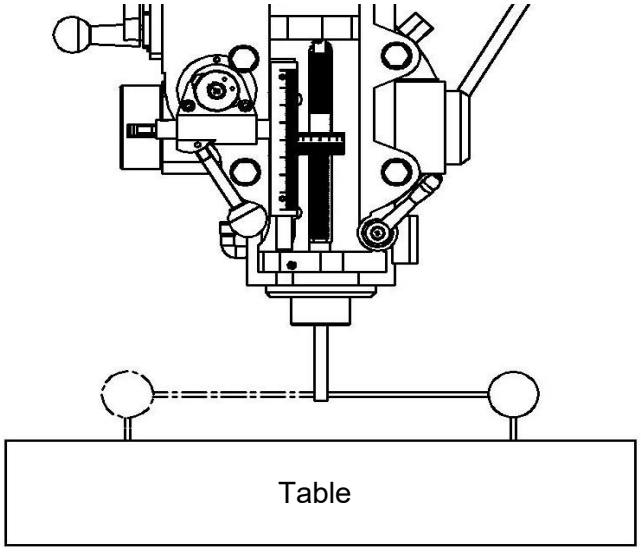


Figure14

   g. Read the dial indicator. The indicator should read zero. If not, loosen the four hex nuts and reposition the mill head.
   h. Recheck perpendicularity using the dial indicator. Repeat the procedure above until the dial indicator reads zero in both positions.
   i. When the indicator reads zero, tighten the ram adapter clamp bolts.

CHAPTER

7

Positioning the Ram

This chapter includes:

Positioning the Ram

Positioning the Ram Fore and Aft

1. Loosen the two bolts (A, Figure 15) that lock the ram to its ways.

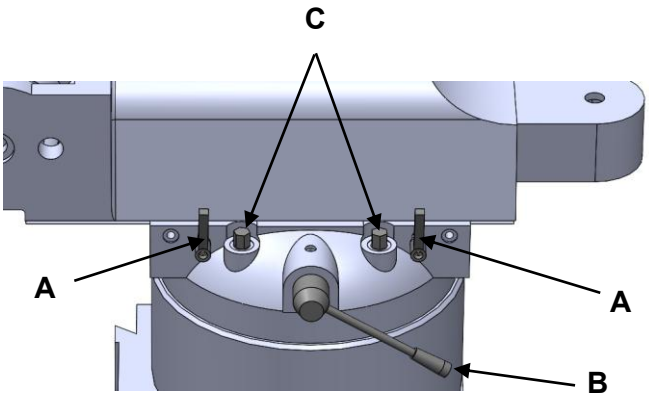


Figure 15

2. Turn the lever (B, Figure 15) to move the ram on its ways.
3. When the desired position is reached, lock the bolts (A, Figure 15) securely.

Positioning the Ram on its Turret

⚠ WARNING **Make sure the machine base is secured to the floor before repositioning the ram. The center of gravity can shift enough to cause the machine to tip over, resulting in serious injury to the operator and damage to the machine.**

4. Loosen four turret lock bolts (C, Figure 15) that clamp the ram to the top of the base. 1/2 turn should be sufficient to allow the turret to move.

NOTE: Use gentle hand pressure to avoid rapid movement.

5. Turn the ram until the spindle is in the desired position. Use the scale on the turret for degree measurement.
6. Tighten the four turret lock bolts (C. Figure 15).

Gib Adjustment

The table, saddle and knee are equipped with adjustable gibs. The gibs may require adjustment if unusual vibration is noted when the locking mechanisms are off, or if you experience unusual vibration when spindle speed, tooth pitch or depth of cut do not account for the vibration.

NOTE: When adjusting gibs, always start with the knee first; adjust the saddle second, and adjust the table last.

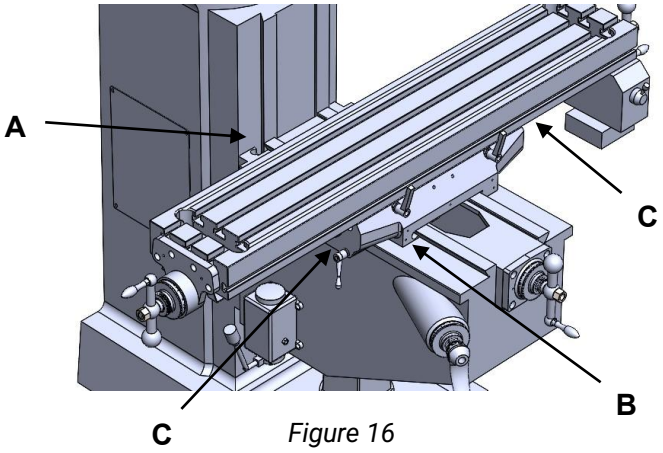


Figure 16

Adjustment of Knee Gib

The knee gib adjustment screw (A, Figure 16) is located under the chip wiper at the rear of the knee where it contacts the column. Remove the way cover and the wiper to expose the gib adjustment screw. Tighten the screw until a slight drag is felt when turning the knee crank.

Adjustment of Saddle Gib

The saddle gib adjustment screw is on the left front of the saddle (B, Figure 16). Tighten the screw until a slight drag is felt when turning the cross-feed cranks

Adjustment of Table Gib

The table gib adjustment screw (C, Figure 16) is on the left-hand side, beneath the table. Tighten the screw until a slight drag is felt when turning the longitudinal table cranks.

Power Feed Trip Lever Mechanism

Refer to Figure 17.

The power feed trip lever mechanism will need to be adjusted if worn or whenever any trip lever mechanism components are replaced.

1. Loosen the feed trip adjusting screw lock nut.
2. Loosen the adjusting screw until it is loose in the lever and no longer contacts the bottom of the feed trip plunger.
3. Using the coarse feed handle, move the quill to the bottom of its travel so the quill stop contacts the micrometer nut. Hold the quill on the stop.
4. Pull the feed handle out to engage the power feed system.
5. Turn the feed trip adjusting screw until the power feed disengages.
6. Tighten the feed trip adjusting screw.
7. Release the quill stop so you can engage the power feed mechanism using the power feed trip lever.
8. Using the coarse feed handle, pull the quill stop back into firm contact with the micrometer nut.

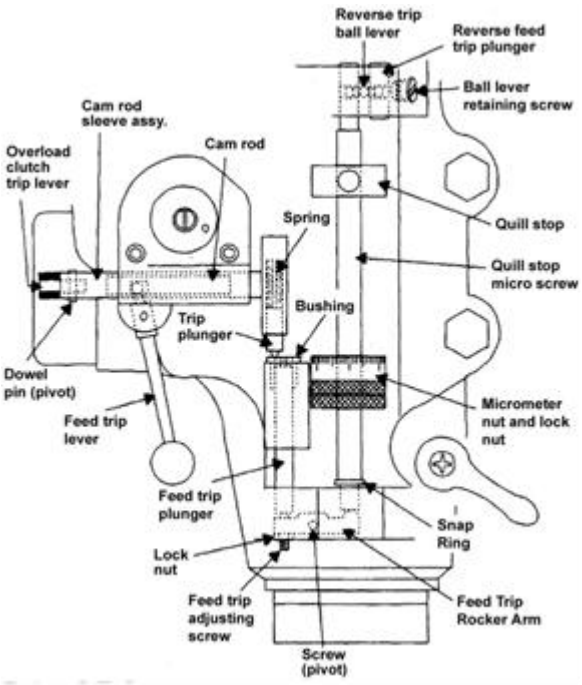


Figure 17

NOTE: The power feed should disengage when the quill stop pushes on the micrometer nut. If it does not disengage, repeat the adjustment steps above.

9. Engage the power feed and move the quill stop to the top of its travel. Make sure that the reverse trip mechanism also disengages the power feed. If not, readjust the mechanism until positive disengagement occurs when the quill is at the top of its stroke.
10. Check for correct operation using the coarse feed handle. If operating correctly, start the drive motor and engage the power feed mechanism. Verify that the power feed lever correctly engages and disengages when driven by the drive motor.

Table Lead Screw Backlash Adjustment

Refer to Figure 18.

The milling machine table is moved by a lead screw and nut for each machine axis. For proper operation, there must be clearance between the lead screw and the nut, which results in backlash. A second lead screw nut is provided to eliminate most of the backlash. The following procedures provide instructions for obtaining acceptable backlash.

Cross Feed Backlash Adjustment

1. Use the cross-feed crank to move the table to the extreme rear of its travel.
2. Remove the pleated way cover.
3. Open the two chip guards enough to expose the cross-feed adjustment nut (the nut that is toward the rear of the nut bracket is not adjustable – only the front nut is adjustable).
4. Loosen the two nut locking screws.
5. Turn the nut slightly to tighten it against the opposing nut.
6. Tighten the two nut locking screws.
7. Using the cross-feed crank, move the table to the middle position.
8. Set up a dial indicator to check cross-feed backlash. Gently move the cross-feed crank back and forth while watching the dial indicator. Backlash should be between 0.003 inch and 0.005 inch.

9. If necessary, repeat the steps above to set backlash.
10. Install the pleated way cover.

Longitudinal Backlash Adjustment

Refer to Figure 18.

1. Only one of the longitudinal lead screw nuts can be adjusted. The other nut is fixed. The left-hand nut is typically adjustable. This can be determined by looking at the nut from the underside of the table.
2. Loosen the two nut locking screws.
3. Turn the nut slightly to tighten it against the opposing nut. Tighten the two nut locking screws.
4. Using the longitudinal table crank, move the table to the middle position.
5. Set up a dial indicator to check longitudinal backlash. Gently move the crank back and forth while watching the dial indicator. The backlash should be between 0.003 inch and 0.005 inch.

If necessary, repeat the steps above to set backlash.

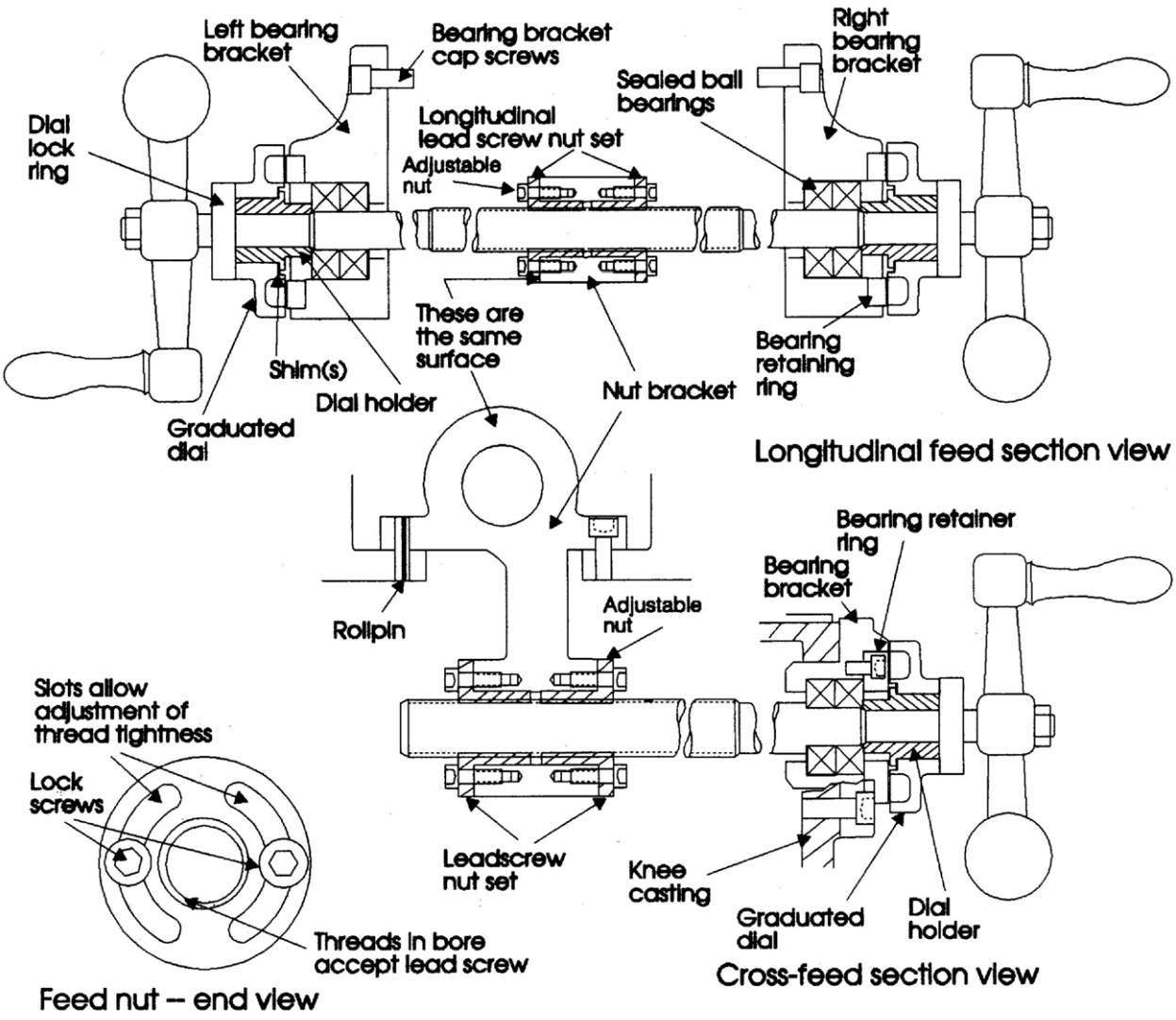


Table Lead Screw Components

Figure 18

CHAPTER

8

Maintenance

This chapter includes:

Maintenance

WARNING **Before any intervention on the machine, disconnect it from the electrical supply by pulling out the plug or switching off the main switch! Failure to comply may cause serious injury.**

Lubrication

The milling machine is equipped with a “one-shot” lubrication system. The system lubricates the lead screws and ways. An oil cup and grease nipple on the mill head provide lubrication for back gear mechanism. Refer to Figures 20 through 21 for lubrication requirements and access points.

Key	Description	Recommended Lubricant	Action
A	Spindle bearing oil cup	Mobil DTE Oil Light, or equivalent	Service daily.
B	One-shot lube system	Mobil Vactra Oil #2, or equivalent	Check oil daily – add if required. Pull lube handle every hour during operations.
C	Knee leadscrew grease nipple	Mobil AW2, or equivalent	Service once each week.
D	Back gear grease nipple	Mobil AW1, or equivalent	Service weekly when operating in back gear mode.

Figure 19: Lubrication Points

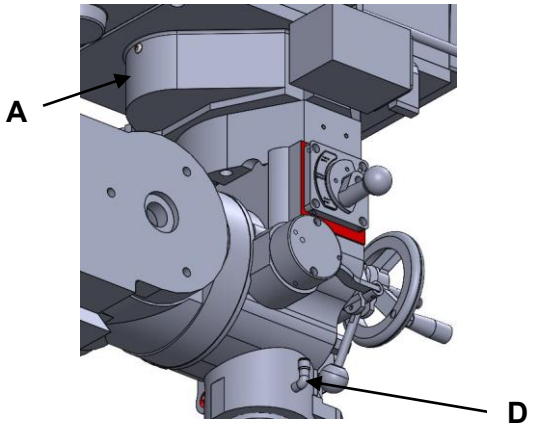


Figure 20

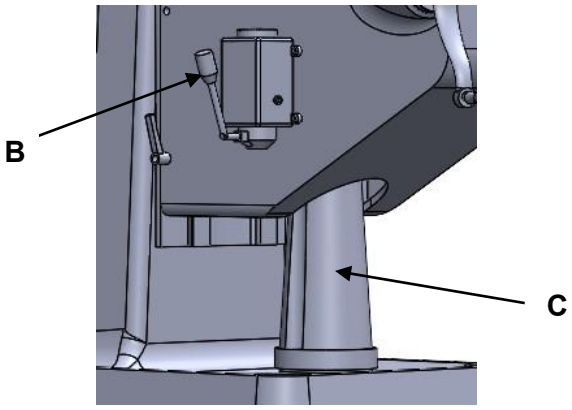


Figure 21

Periodic Maintenance Requirements

During operation, periodically vacuum and brush chips and debris from machine.

Periodically operate knee and table lead screws through full range of movement to evenly distribute lubricant (particularly when applied using the “one- shot” system).

Periodically apply light machine oil to work table and other exposed metal surfaces to prevent rust or corrosion.

Periodically remove vent panels to check pulleys and belts for unusual wear or grooving. NOTE: Operators should vary speed occasionally to prevent formation of grooves on the pulley surfaces.

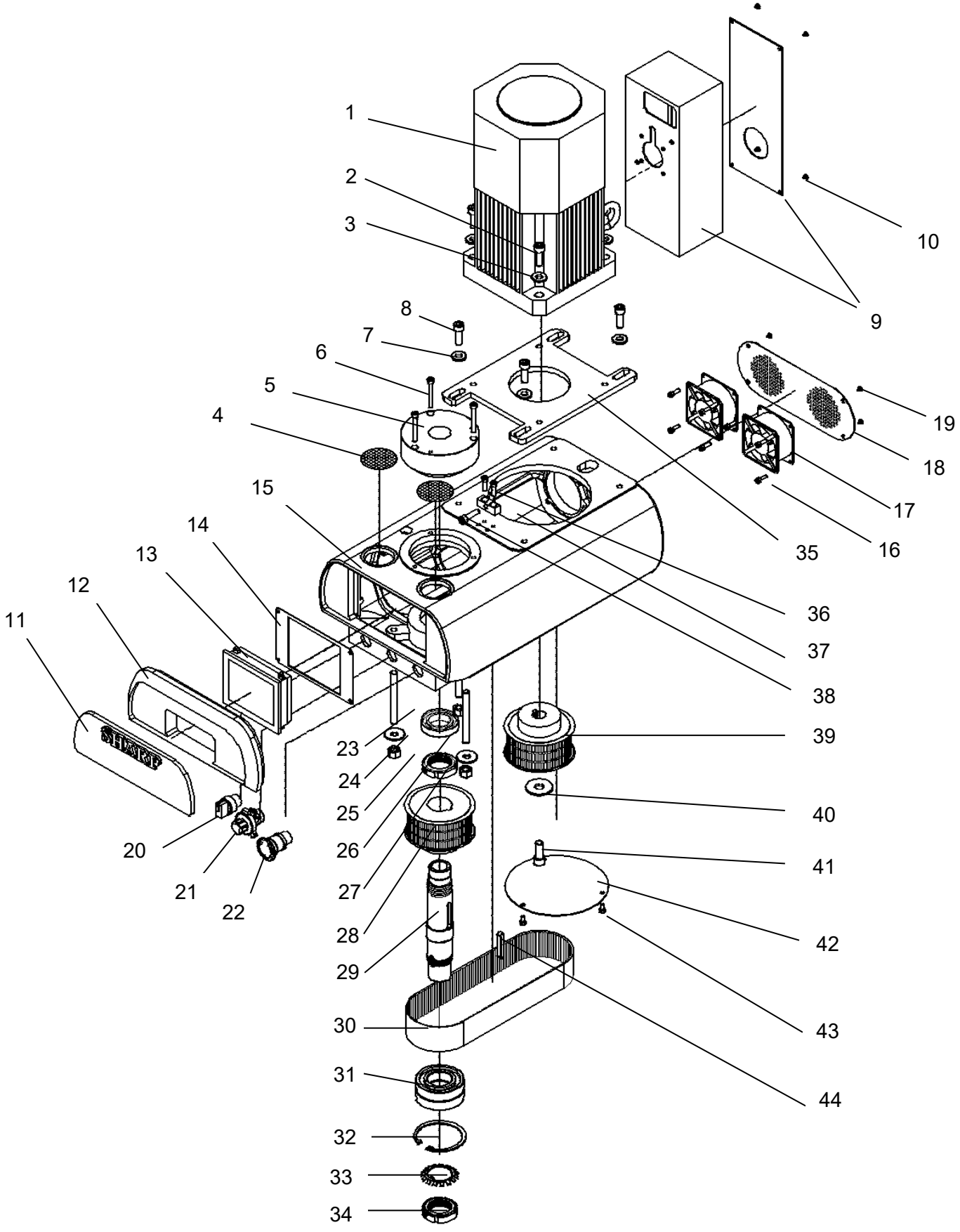
CHAPTER

9

Spare Parts List

This chapter includes:

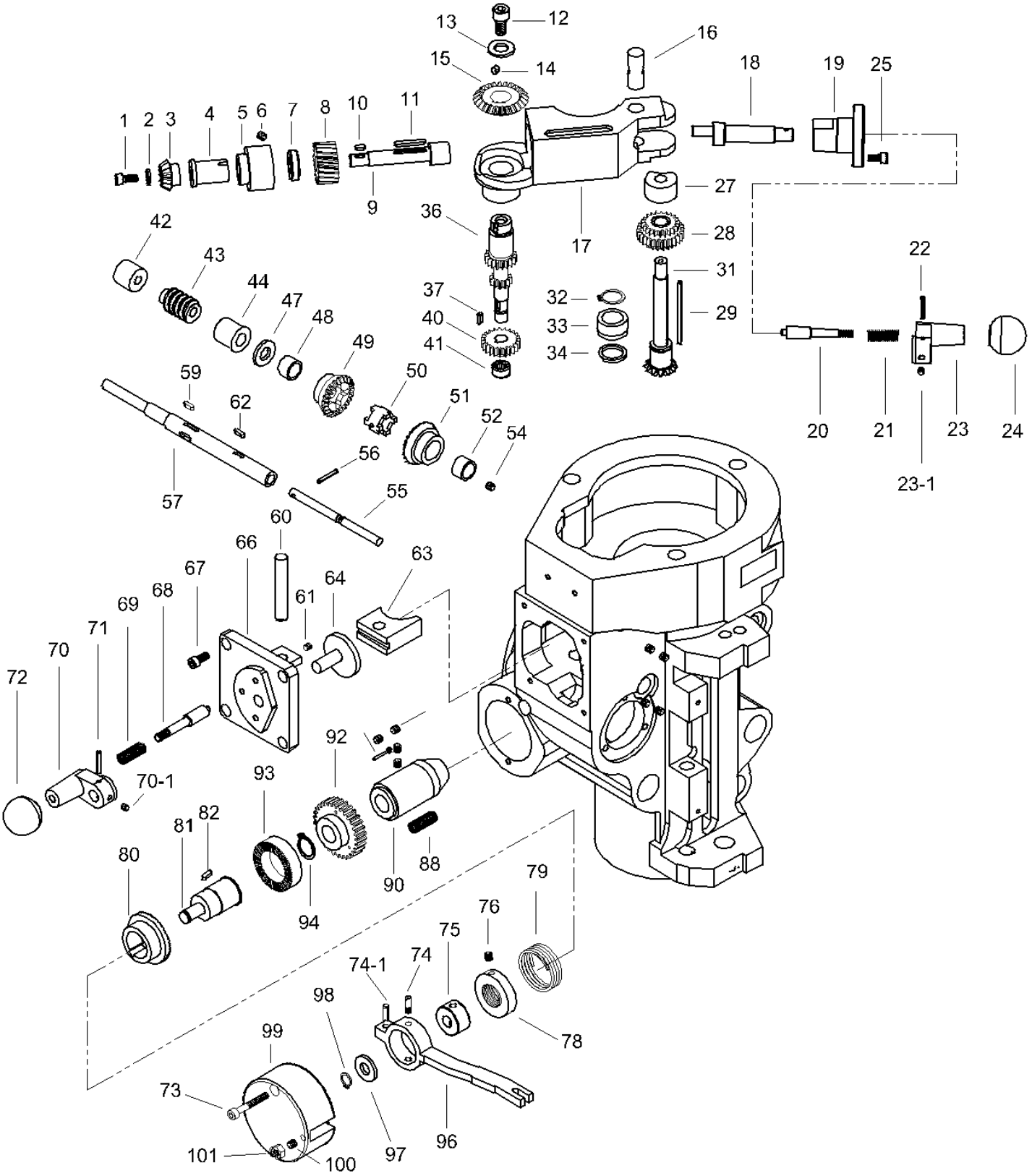
Upper Head Assembly – Exploded View



Upper Head Assembly – Parts List

Index No.	Part No	Description	Index No.	Part No	Description
1	MA-1	Motor	23	MA-23	Bolt - 7/16W14
2	MA-2	Screw - M10	24	MA-24	Washer - 7/16W14
3	MA-3	Washer - M10	25	MA-25	Nut - 7/16W14
4	MA-4	Air intake nets	26	MA-26	Bearing - 6007
5	MA-5	Bearing Cap	27	MA-27	Precision Nut
6	MA-6	Screw - M6	28	DB-31-9	Pulley - 5GT
7	MA-7	Washer - M10	29	A-57P	Inner hexagon drive shaft
8	MA-8	Screw - M10	30	MA-30	Belt
9	3020-1	Cable Terminal Box	31	MA-31	Bearing - 6208
10	MA-10	Screw – M4	32	MA-32	Snap Ring - R80
11	MA-11	Acrylic sheet	33	MA-33	Lock washer
12	MA-12	Head front panel	34	A-74P	Nut
13	MA-13	LCD display panels	35	MA-35	Motor Plate
14	MA-14	Panel holder	36	MA-36	Screw - M8
15	MA-15	Upper Head Cover	37	MA-37	Belt adjustment seat
16	MA-16	Screw – M4	38	MA-38	Screw - M8
17	MA-17	Fan	39	DB-31-8	Pulley - 5GT
18	3017-8	Exhaust cover	40	MA-40	Washer
19	MA-19	Screw – M4	41	MA-41	Screw
20	MA-20	Spindle Speed Control Button	42	MA-42	Lower cover
21	MA-21	Spindle For/Rev Select Button	43	MA-43	Screw – M5
22	MA-22	EMG Stop	44	MA-44	Key

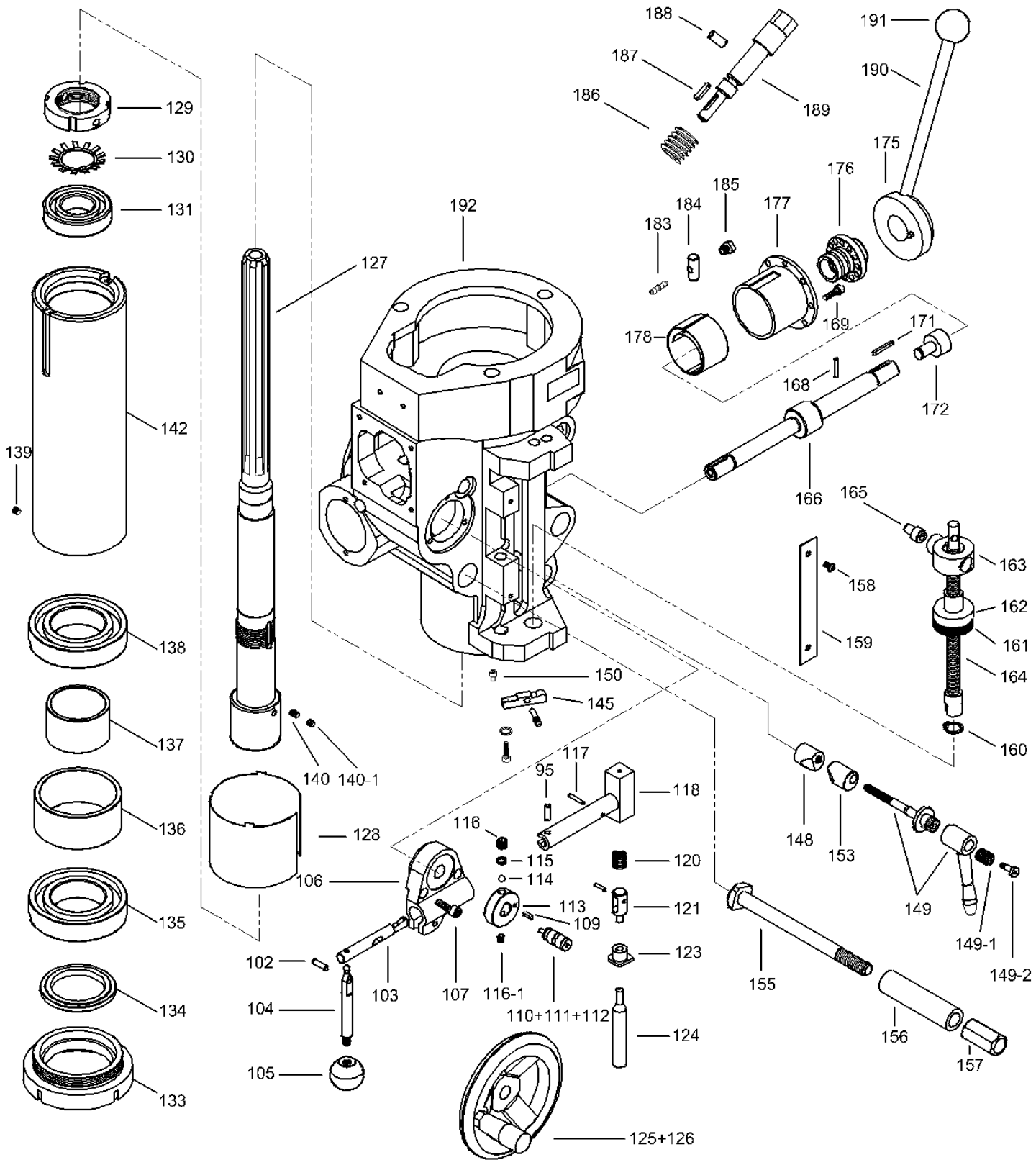
Spindle Assembly – Exploded View（I）



Spindle Assembly (I) - Parts List

Index No.	Part No.	Description	Index No.	Part No.	Description
1	B-1	Screw	51	B-48	Bushing
2	B-2	Bevel Pinion Washer	52	B-49	Feed Reverse Bevel Gear
3	B-3	Feed Gear	54	B-54	Hex Socket Cap Screw
4	B-4	Shaft Sleeve	55	B-55	Reverse Clutch Rod
5	B-5	Worm Cradle Bushing	56	B-56	Spring Pin
6	B-6	Set Screw	57	B-57	Feed Worm Shaft
7	B-7	Worm Gear Spacer	59	B-59	Spring Pin
8	B-8	Feed Drive Worm Gear	60	B-60	Feed Shift Rod
9	B-9	Worm Gear Shaft	61	B-61	Set Screw
10	B-10	Worm Shaft Key	62	B-62	Key
11	B-11	Key	63	B-63	Feed Gear Shift Fork
12	B-12	Hex Socket Cap Screw	64	B-64	Cluster Gear Shift Crank
13	B-13	Washer	66	B-66	Cluster Gear Cover
14	B-14	Cluster Gear Key	67	B-67	Hex Socket Cap Screw
15	B-15	Feed Reverse Bevel Gear	68	B-20	Plunger
16	B-16	Feed Engage Pin	69	B-21	Spring
17	B-17	Worm Gear Cradle	70	B-23	Shift Crank
18	B-18	Worm Gear Throw-Out	70-1	B70-1	Set Screw
19	B-19	Shift Sleeve	71	B-22	Spring Pin
20	B-20	Plunger	72	B-24	Plastic Ball
21	B-21	Spring	73	B-73	Hex Socket Cap Screw
22	B-22	Spring Pin	74	B-74	Clutch Ring Pin
23	B-23	Shift Crank	74-1	B74-1	Pin
23-1	B23-1	Set Screw	75	B-75	Clutch Ring
24	B-24	Plastic Ball	76	B-76	Set Screw
25	B-25	Hex Socket Cap Screw	78	B-78	Overload Clutch Lockout
27	B-27	Upper Bushing	79	B-79	Safety Clutch Spring
28	B-28	Cluster Gear Assembly	80	B-80	Overload Clutch
29	B-29	Key	81	B-81	Overload Clutch Sleeve
31	B-31	Cluster Gear Shaft	82	B-82	Key
32	B-32	Snap Ring	83	B-83	Hex Socket Cap Screw
33	B-33	Bevel Gear Bushing	86	B-86	Set Screw
34	B-34	Thrust Spacer	88	B-88	Spring
36	B-36	Feed Drive Gear	90	B-90	Pinion Shaft Bushing
37	B-37	Key	92	B-92	Overload Clutch Worm Gear
40	B-40	Feed Drive Gear	93	B-93	Overload Clutch Ring
41	B-41	Needle Bearing	94	B-94	Snap Ring
42	B-42	Bushing	96	B-96	Trip Lever
43	B-43	Worm	97	B-97	Washer
44	B-44	Feed Worm Shaft Bushing	98	B-98	Snap Ring
47	B-47	Bevel Gear Thrust Spacer	99	B-99	Clutch Arm Cover
48	B-48	Bushing	100	B-100	Set Screw
49	B-49	Feed Reverse Bevel Gear	101	B-101	Hex Nut
50	B-50	Feed Reverse Clutch			

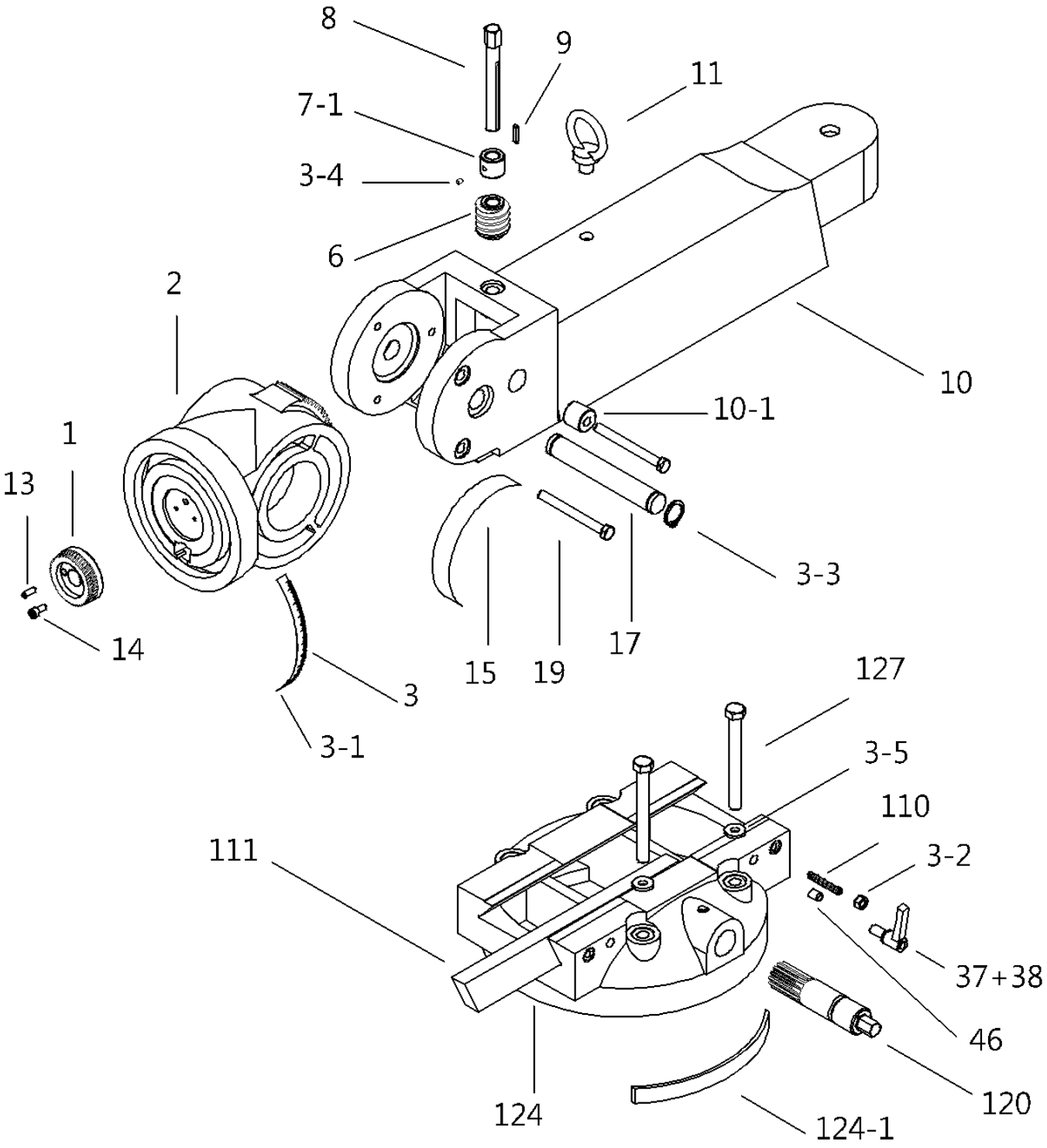
Spindle Assembly – Exploded View(Ⅱ)



Spindle Assembly (Ⅱ)- Parts List

Index No.	Part No.	Description	Index No.	Part No.	Description
95	B-95	Spring Pin	143	B-143	Hex Nut
103	B-103	Cam Rod	144	B-144	Hex Socket Cap Screw
104	B-104	Trip Handle	145	B-145	Feed Trip Lever
105	B-24	Plastic Ball	146	B-146	Trip Lever Pin
106	B-106	Feed Trip Bracket	148	B-148	Quill Lock Sleeve
107	B-107	Hex Socket Cap Screw	149	B-149	Lock Handle (chrome)
109	B-109	Key	150	B-150	Oval Head Screw
110	B-110+1+2	Feed Reverse Knob Stud	153	B-153	Quill Lock Sleeve
111		Reverse Knob	155	B-155	T-Bolt Assembly
112		Snap Ring	156	B-156	Spacer
113	B-113	Handwheel Clutch	157	B-157	Lock Nut
114	B-114	Steel Ball	158	B-158	Hex Socket Cap Screw
115	B-115	Spring	159	B-159	Micrometer Scale
116	B-116	Set Screw	160	B-160	Snap Ring
116-1	B-116-1	Set Screw	161	B-161+2+4	Quill Micro-Stop Nut
117	B117	Spring Pin	162		Micrometer Nut
118	B-118	Cam Rod Sleeve Assembly	164		Quill Micro-Screw
120	B-120	Spring	163	B-163	Quill Stop Knob
121	B-121	Trip Plunger	165	B-165	Hex Socket Cap Screw
123	B-123	Bushing	166	B-166	Quill Pinion Shaft
124	B-124	Feed Trip Plunger	168	B-168	Pin
125	B-125+126	Handwheel (chrome)	169	B-169	Hex Socket Cap Screw
126		Handle (chrome)	171	B-171	Key
127	B-127	Spindle	172	B-172	Pinion Shaft Hub
128	B-128	Quill Skirt	175	B-175	Hub
129	B-129	Lock Nut	176	B-176	Hub Sleeve
130	B-130	Lock Washer	177	B-177	Spring Cover
131	B-131	Double Seal Bearing	178	B-178	Clock Spring
133	B-133	Nose Piece	183	B-183	Lever
134	B-134	Spindle Shield	184	B-184	Plunger
135	B-135	Ball Bearing	185	B-185	Screw
136	B-136	Bearing Spacer (large)	186	B-186	Worm Gear
137	B-137	Bearing Spacer (small)	187	B-187	Key
138	B-138	Ball Bearing	188	B-188	Set Screw
139	B-139	Set Screw	189	B-189	Worm Shaft
140	B-140	Set Screw	190	B-190	Handle
140-1	B-140-1	Set Screw	191	B-191	Plastic Ball
142	B-142	Quill	192	B-192	Quill Housing

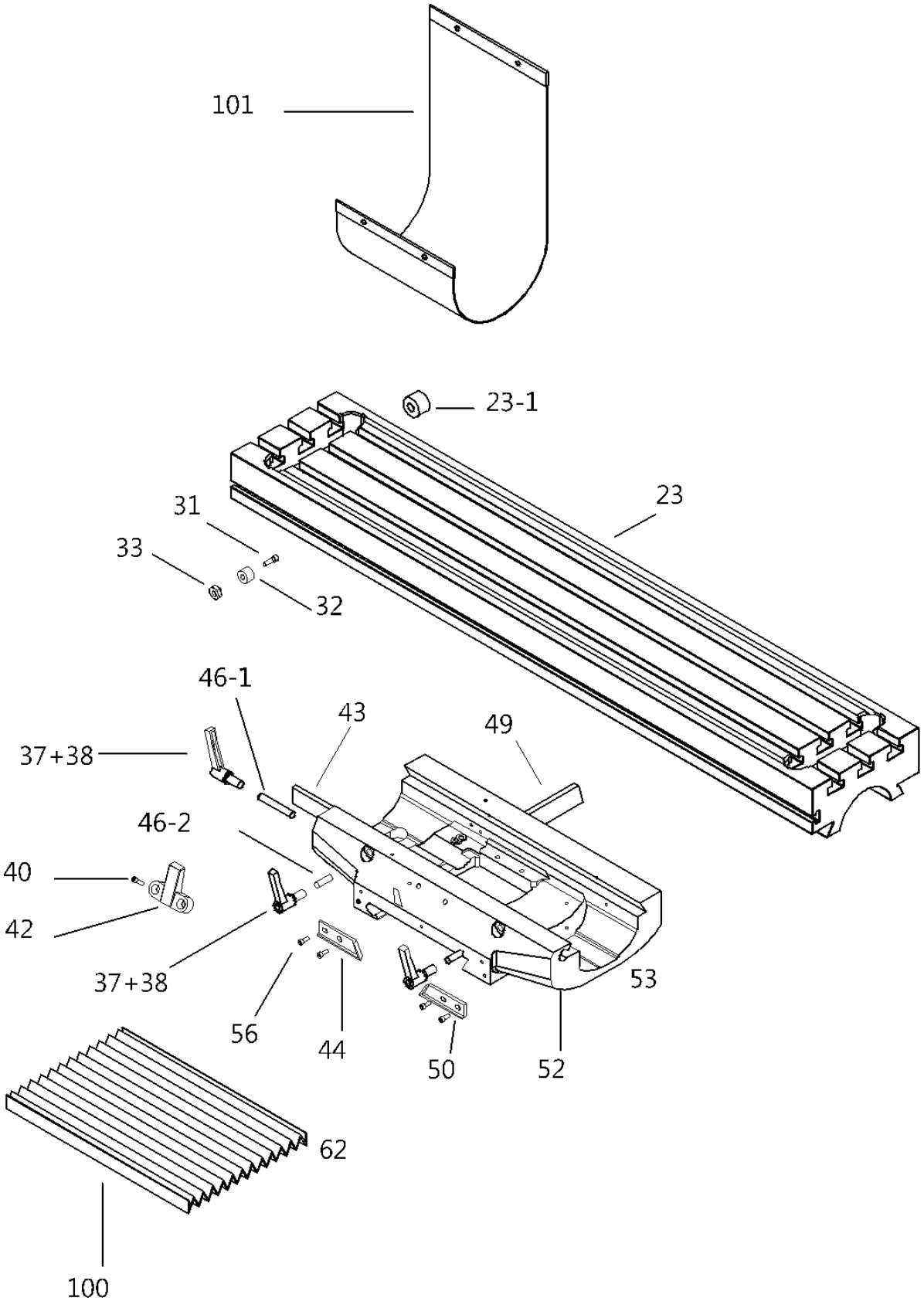
Base Assembly – Exploded View



Base Assembly – Parts List

Index No.	Part No.	Description	Index No.	Part No.	Description
1	C-1	Gear	11	C-11	Hoisting Ring
2	C-2	Ram Adapter	13	C-13	Spring Pin
3	C-3	Adapter Scale	14	C-14	Hex Socket Cap Screw
3-1	C-3-1	Rivet	15	C-15	Adapter Scale
3-2	C-3-2	Hex Nut	17	C-17	Adapter Pivot Stud
3-3	C-3-3	Snap Ring	19	C-19	Adapter Locking Bolt
3-4	C-3-4	Set Screw	37+38	C-37+38	Ram Lock Bolt Handle
3-5	C-3-5	Washer	46	C-46	Lock Plunger
6	C-6	Worm	100	C-100	Pleated Way Cover
7-1	C-7-1	Worm Thrust Washer	101	C-101	Flat Way Cover
8	C-8	Shaft	120	C-120	Ram Pinion
9	C-9	Key	124	C-124	Turret
10	C-10	Ram	124-1	C-124-1	Disc Scale
10-1	C-10-1	Thrust Washer	127	C-127	Lock Bolt

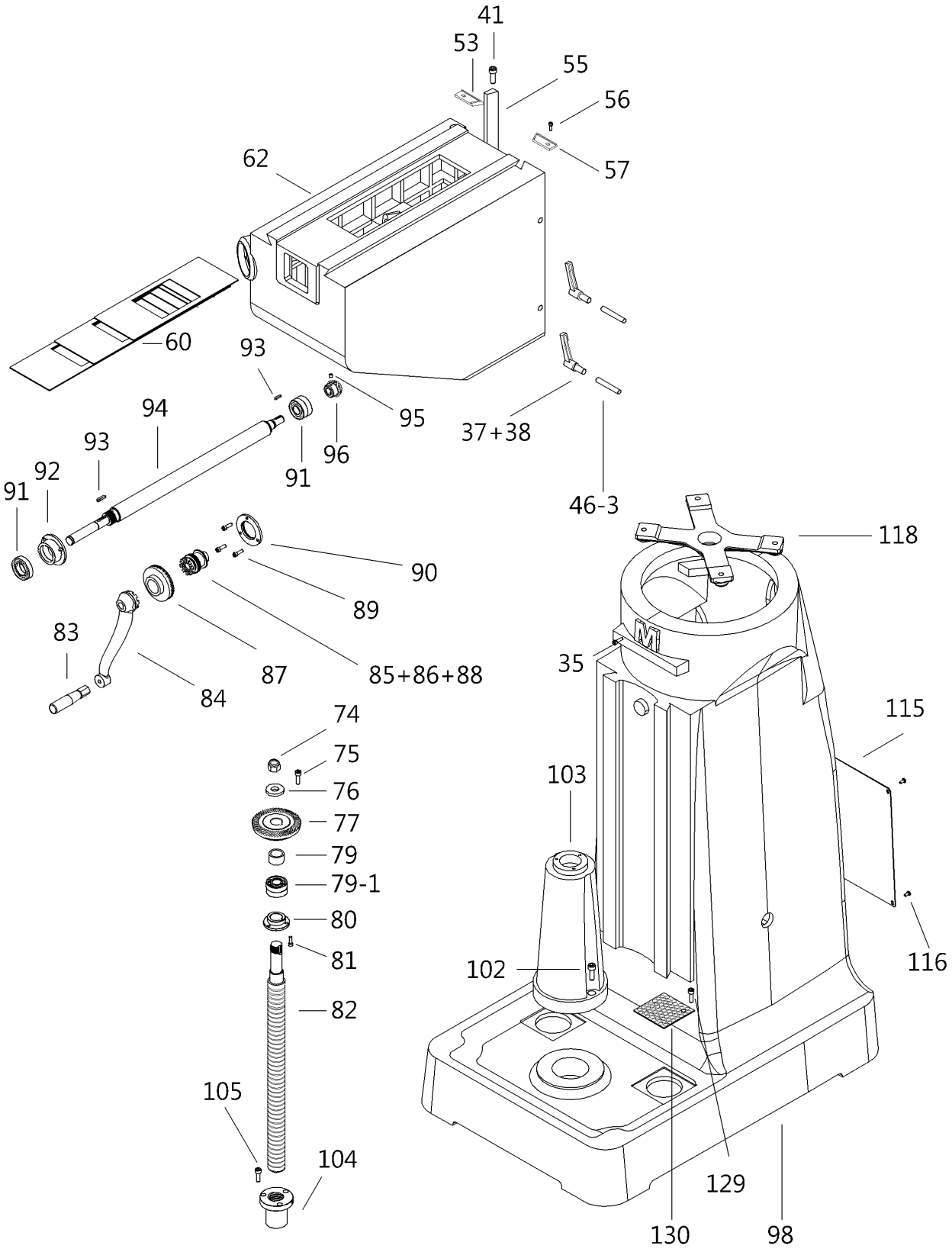
Base Assembly – Exploded View



Base Assembly – Parts List

Index No.	Part No.	Description	Index No.	Part No.	Description
23	C-23	Table	46-1	C-46-1	Lock Plunger
23-1	C-23-1	Oil Plug	46-2	C-46-2	Lock Plunger
31	C-31	Stop Nut	49	C-49	Saddle/knee gib
32	C-32	Table Stop	50	C-50	Felt (right)
33	C-33	Hex Nut	52	C-52	Saddle
37+38	C-37+38	Ram Lock Bolt Handle	53	C-53	Felt (left)
40	C-40	Hex Socket Cap Screw	55	C-55	Knee/Column Gib
42	C-422	Table Stop Bracket	56	C-56	Oval Head Screw
43	C-43	Saddle/Table Gib	100	C-100	Pleated Way Cover
44	C4-44	Felt (left)	101	C-101	Flat Way Cover

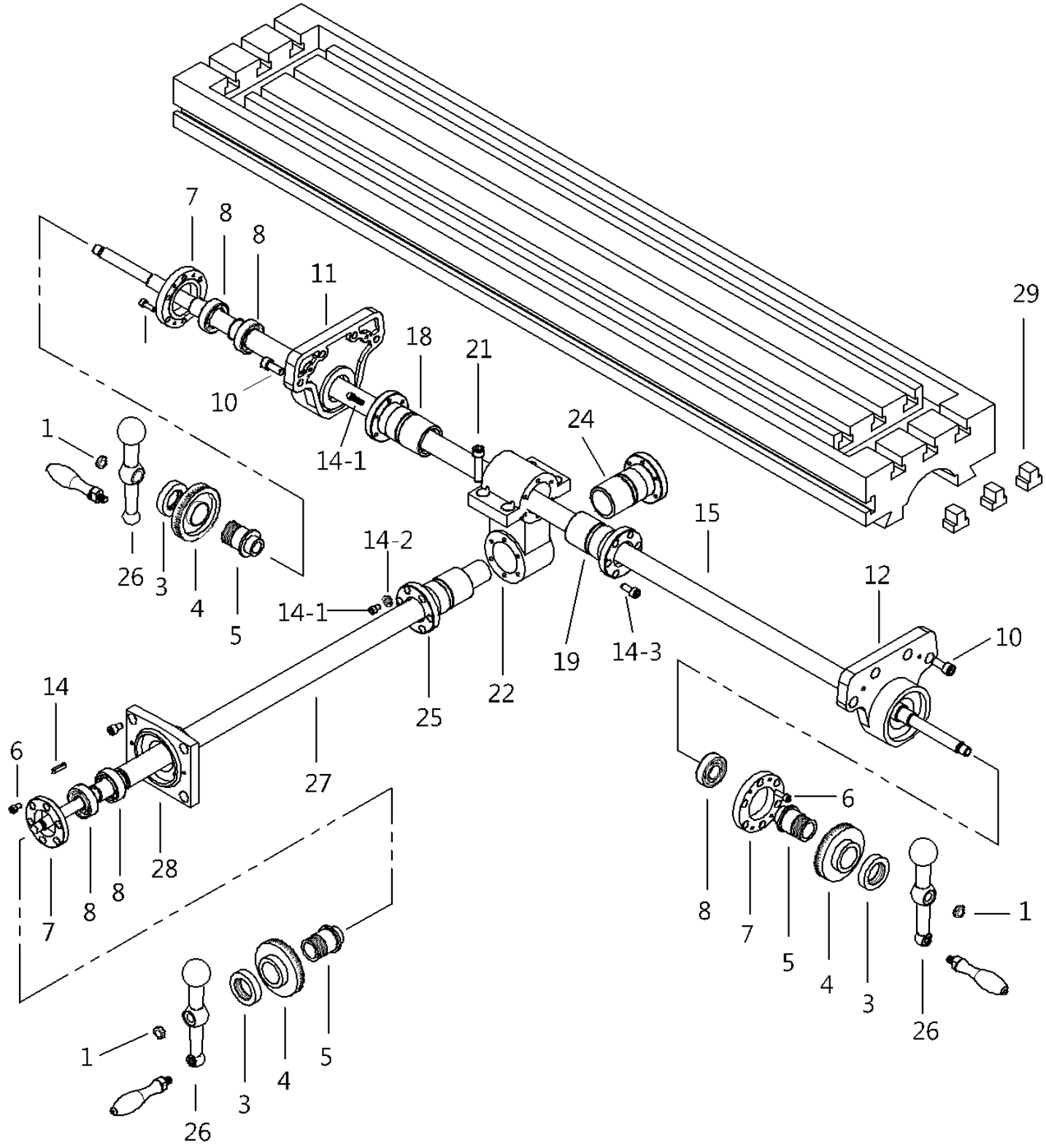
Base Assembly – Exploded View



Base Assembly – Parts List

Index No.	Part No.	Description	Index No.	Part No.	Description
37+38	C-37+38	Ram Lock Bolt Handle	91	C-91	Ball Bearing
41	C-41	Gib Adjusting Screw	92	C-92	Bearing Cap
46-3	C-46-3	Lock Plunger	93	C-93	Key
57	C-57	Felt (right)	94	C-94	Elevating Shaft
60	C60+61	Lower Chip Guard	95	C-95	Set Screw
61	C-62	Upper Chip Guard	96	C-96	Bevel Pinion
62		Knee	98	C-98	Column
74	C-74	Hex Nut	102	C-102	Hex Socket Cap Screw
75	C-75	Key	103	C-103	Elevating Screw Housing
76	C-76	Washer	104	C-104	Elevating Screw Nut
77	C-77	Bevel Gear	105	C-105	Hex Socket Cap Screw
79	C-79	Spacing Washer	110	C-110	Set Screw
79-1	C-79-1	Double Seal Bearing	111	C-111	Ram/Turret Gib
80	C-80	Bearing Retainer Ring	115	C-115	Cover
81	C-81	Hex Socket Cap Screw	116	C-116	Oval Head Screw
82	C-82	Elevating Screw	118	C-118	Spider
83	C-83	Handle	120	C-120	Ram Pinion
84	C-84	Elevating Crank	124	C-124	Turret
85	C-85	Clutch Insert	124-1	C-124-1	Disc Scale
86	C86+88	Dial Lock Nut	127	C-127	Lock Bolt
88		Dial Holder	128	C-128	Ram Pinion Screw
87	C-87	Dial	129	C-129	Oval Head Screw
89	C-89	Hex Socket Cap Screw	130	C-130	Strainer Screen
90	C-90	Bearing Retainer Ring			

Axis Assembly – Exploded View



Axis Assembly – Parts List

Index No.	Part No.	Description
1	D-1	Hex Nut
3	D3+5	Dial Lock Nut
5		Dial Holder
4	D-4	Dial
6	D-6	Hex Socket Cap Screw
7	C-90	Bearing Retainer Ring
8	D-8	Double Seal Bearing
10	D-10	Hex Socket Cap Screw
11	D-11	Right Bearing Bracket
12	D-12	Left Bearing Bracket
14	D-14	Key
14-1	D-14-1	Hex Socket Cap Screw
14-2	D-14-2	Washer
14-3	D-14-3	Hex Socket Cap Screw
15	D-15	Longitudinal Feed Screw
18	D-18+19	Feed Screw Nut
19		Feed Screw Nut
21	D-21	Hex Socket Cap Screw
22	D-22	Feed Nut Bracket
24	D-24	Cross Feed Nut
25	D-25	Cross Feed Nut
26	D-26	Ball Crank Handle
27	D-27	Cross Feed Screw
28	D-28	Cross Feed Bearing Bracket
29	D-29	Rubber T-Nut

CHAPTER

10

Dimensions

This chapter includes:

Dimensions

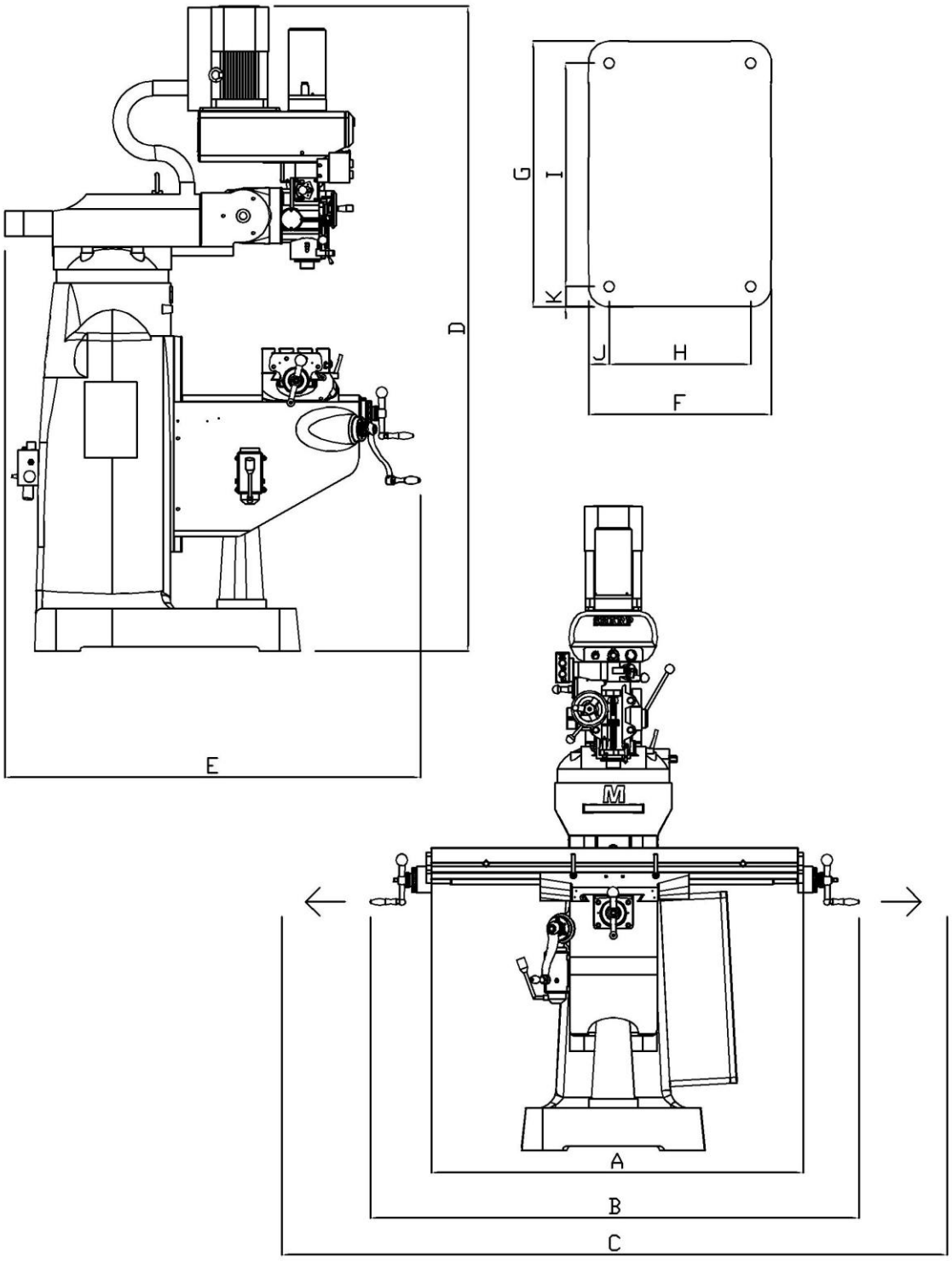


Figure 2: Installation Diagram

		A	B	C	D	E	F	G	H	I	J	K
LMV49	**inch**	**49 "**	**65 "**	**98.8 "**	**85 "**	**67.3 "**	**24.4 "**	**35.4 "**	**20.4 "**	**28.8 "**	**2 "**	**1.5 "**
	mm	**1244**	**1651**	**2511**	**2160**	**1710**	**620**	**900**	**520**	**734**	**50**	**40**

CHAPTER

11

Specifications

This chapter includes:

LMV-49-SMD Specification

CAPACITY	INCH	METRIC
Table Size	9"X49"	230X1244mm
T-slots (No., Size, Pitch)	3.5"X5/8"X2.5"	3X16X63.5mm
Table Travel: X Longitudinal	36"	915mm
Table travel: Y Cross	12.2"	310mm
Quill travel: Z Vertical	5"	127mm
Knee travel: Vertical	16"	406mm
Ram Travel	12"	304.8mm
Spindle Center to Column	6.7"-18.5	171-470mm
Spindle Nose to Table Top	2.55-18.3	45-455mm

HEAD, SPINDLE	INCH	METRIC
Spindle Nose Taper	R8	R8
Spindle Variable Speed Range	65-4500rpm	0-4800rpm
Spindle Motor (220V/440V)	11HP	7.6KW
Quill Feed (Inch/Rev) (3 speeds)	0.0015"-0.003"-0.006"	0.04-0.08-0.15mm
Quill Diameter	3.375"	85.7mm
Head Swivel Angle	360°	
Head Tilt Angle (L/R)	90°	
Head Tilt Angle (Up/Down)	Up25° Down45°	

GENERAL	INCH	METRIC
Floor Area (W x D x H)	56"x65.7"x76.7"	1420X1670X2270mm
Approximate Weight	2050lb	930KG
Power Consumption (220V)	Currently	

Standard Accessories

One Shot Lube System
Hard-Chromed Ways
Front and Rear Rubber Way Covers
Tool box with tools

Optional Accessories	Optional Accessories
Auto Lube Pump with 2 Adjustments	“Maxi Torque Rite” Power Draw Bar
“Sharp” Power Table Feed with Safety Handle	Clamping Kit (52 pcs/Steel Rack)
“Sharp” Power Cross Feed with Safety Handle	Halogen Work light
“Sharp” Power Knee Feed with Safety Handle	CE mark
6 in. “Kurt” Vise with Swivel Base	380V and 575V transformer
Right Angle Milling Attachment with Arbor	UL components upgrade with electrical box
Drill Chuck & Drill Arbor	UL compliance certificate under State of California
6 in. Riser Block	Digital Readout System
Coolant System with Chip Pan (pump included)	Transformer 440V

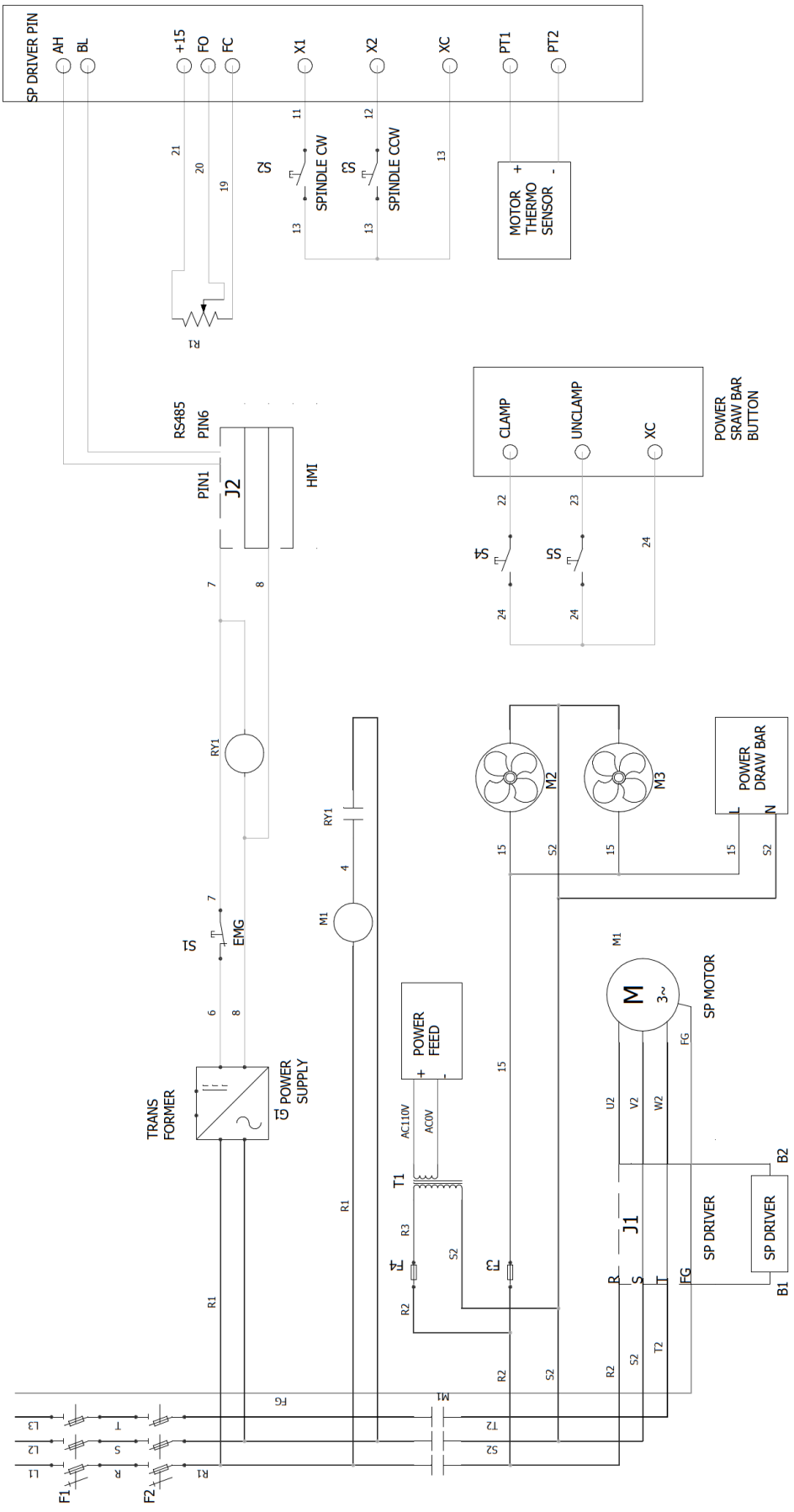
CHAPTER

12

Circuit Diagram

This chapter includes:

Circuit Diagram



SHARP

SHARP-INDUSTRIES

3501 Challenger Street

Torrance, CA 90503

T: (310) 370-5990

Email: info@sharp-industries.com

Parts: parts@sharp-industries.com

Sales: sales@sharp-industries.com

Service: service@sharp-industries.com

www.sharp-industries.com