# MACTECH
# MT4 LRA X 24 BORING MILL

# SETUP AND OPERATION MANUAL

| | |
|---|---|
| **Model** | MT4 LRA X 24 |
| **Description** | Boring Mill with a 24” Linear Rail |
| **Part Number** | 605-6944, 600-6944 |
| **Serial Number** | |
| **Manual Document Number** | 900-0062 |
| **Manual Revision** | Rev C |


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| Revision History | | | |
|---|---|---|---|
| **Revision Level** | **ECO No.** | **Description** | **Date** |
| A | | Release | 8/23/2016 |
| B | | Updated Manual Format and Drawing Package | 10/16/2019 |
| C | | Updated Format, Separated Drawing Package, Updated Spindle Info | 6/2/2022 |

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# SECTION 1 - DESCRIPTION

The MT4 LRA x 24 Boring Mill is a heavy-duty mill designed to drill or bore holes through most materials, including steel, steel alloys, aluminum and other materials. Features included are a servo driven feed mechanism and a large bore diameter capability. The MT4 LRA x 24 Boring Mill is available with air drive.

***CAUTION:*** *Users must read and understand these instructions before operating this equipment. Failure to comply with these instructions can result in death, serious injury, or damage to the equipment.*

***CAUTION:*** *Keep away from moving parts. Do not reach into moving machinery. Keep the work area clear of personnel and non-essential materials. Always turn off power before adjusting the machine or clearing material. Lift the machine using the specified lifting points only. Always use appropriate personal protective equipment. Always follow all site safety procedures and regulations.*

***NOTE:*** *Before each use thoroughly inspect the machine. Check for loose or missing fasteners. Make sure all guards are in place and securely fastened. Make sure the tooling is sharp and in good condition. Make sure there are no hydraulic fluid leaks. Correct any problems that require maintenance or replacement before using the machine.*

### Capabilities

The MT4 LRA x 24 Boring Mill is capable of boring up to 6-1/2 inch diameter holes through most materials.

### Tooling

- The mill is supplied with an 1-1/4 Straight Spindle. Other adapters and tooling are available from Mactech.

### Power Requirements

- Air Power Requirement: 100 cfm @ 100 psi
- Hydraulic Motor Requirement: 8 gpm @1000 psi hydraulic power supply
- Electric Drives: 110V or 220V, 50/60 Hz
- Servo Feed Electrical Power Requirements: 110V, 50/60 Hz

### Weights

- MT4 LRA x 24 Boring Mill 220 lbs.
- Air Drives: 22 lbs
- Air Drive Right Angle: 20 lbs
- Hydraulic Drives: 11.5 lbs
- Electric Drives: 22 lbs

# SECTION 1 - DESCRIPTION

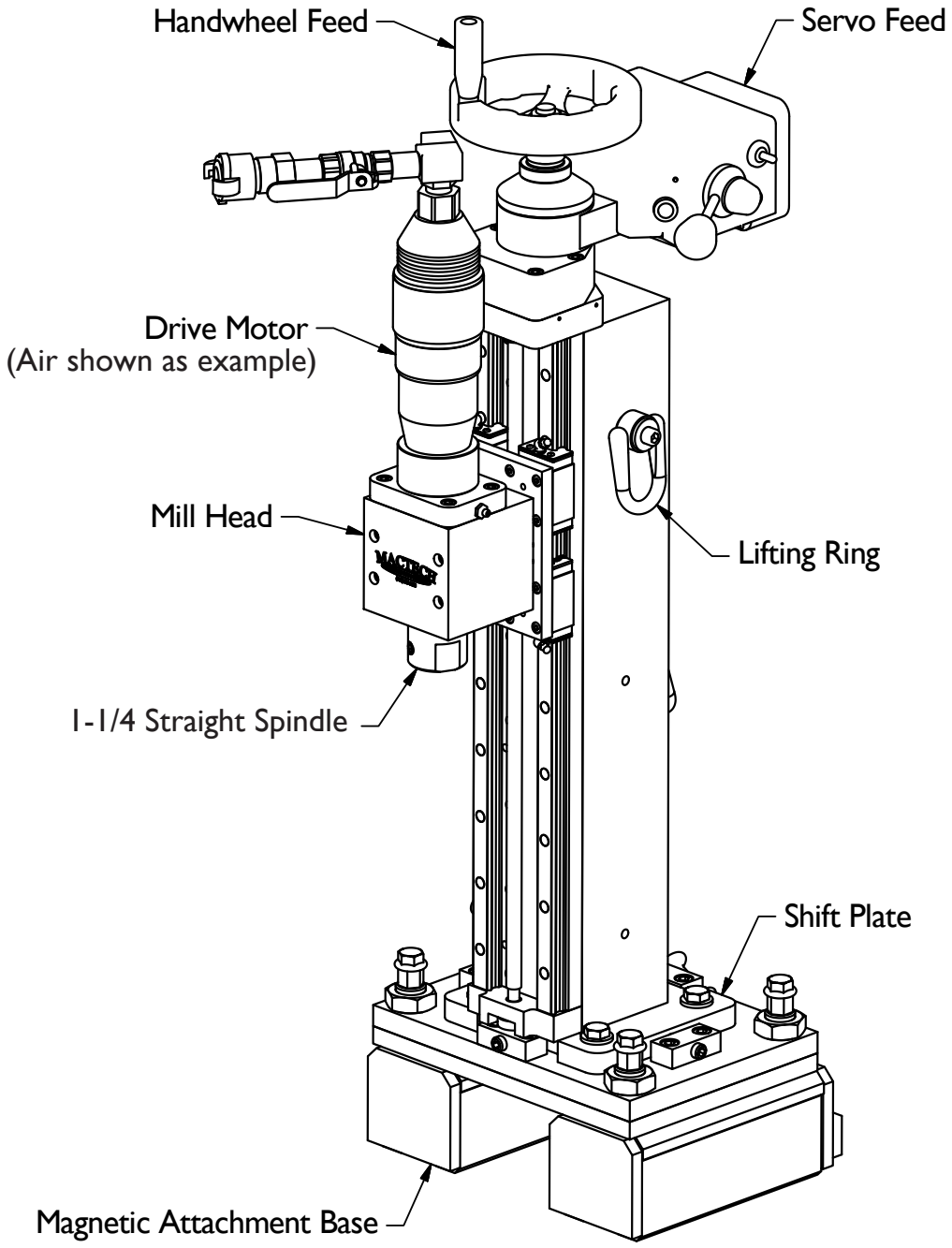
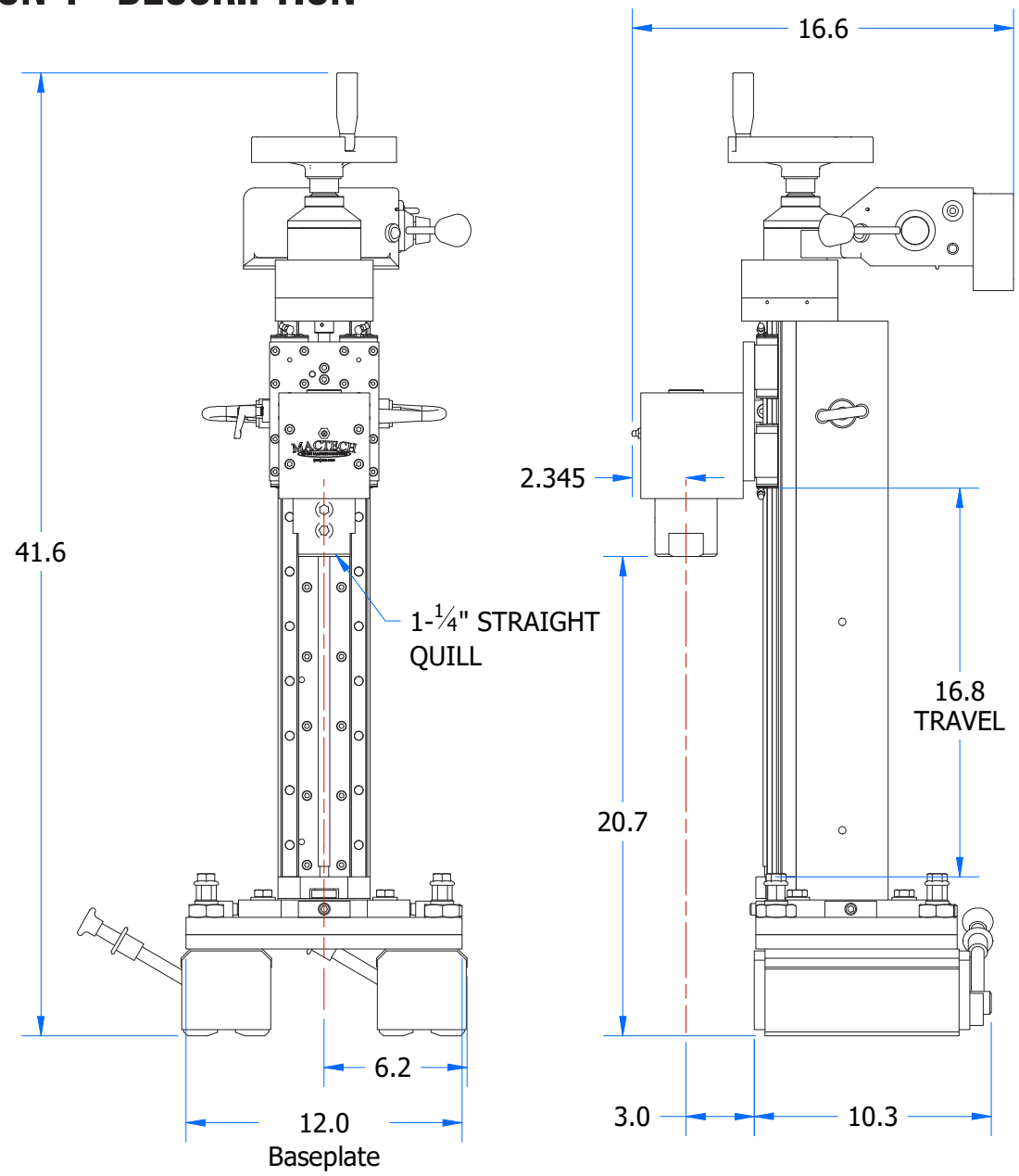



***Figure 1-1 MT4 LRA x 24 Boring Mill Components***

# SECTION 1 - DESCRIPTION




| Drive Heights Added to Mill Head | |
|---|---|
| **Air Drives** | 13.5 Inches |
| **Air Drives (Reversible)** | 16 Inches |
| **Electric Drives** | 17 inches |
| **Hydraulic Motors** | 6.5 Inches |

***Figure 1-2 - Dimensions***

# SECTION 2 - SETUP

### Lifting the Boring Mill

**1.** The boring mill is supplied with three lifting rings. The lifting rings can be installed in different locations to allow the mill to be lifted vertically, horizontally, or at an angle. Select the lifting ring mounting locations that will best balance the load. See Figure 2-1 for lifting ring mounting locations.

> ***CAUTION:*** *Always use the lifting rings to lift the machine. Do not lift the machine in any other manner. The lifting rings must be securely attached to the machine. Balance the load when lifting. Failure to lift the machine properly may result in damage to the machine or injury to the operator.*

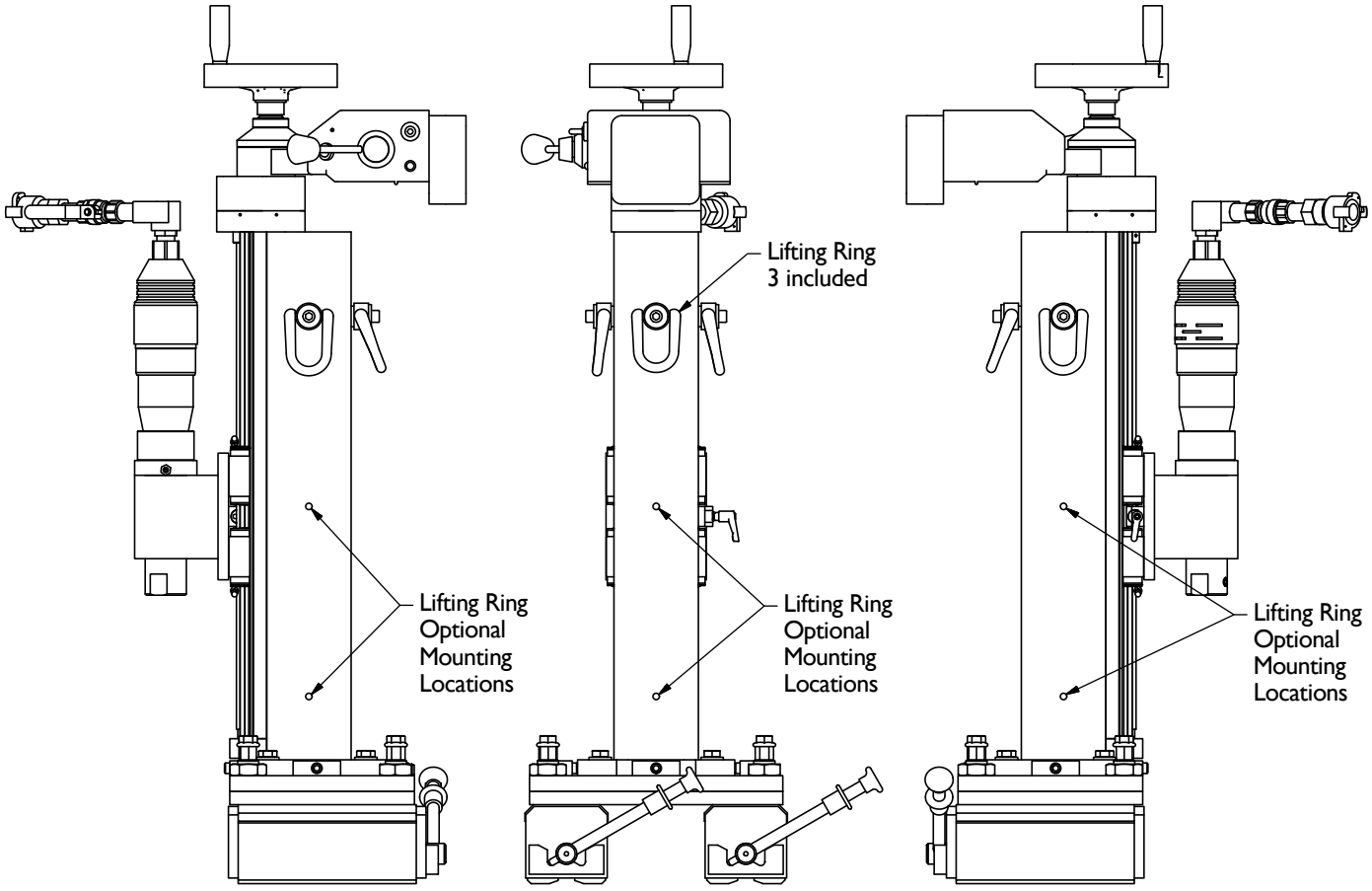



***Figure 2-1 - Lifting Ring Mounting Locations***

### Mounting Options

The boring mill can be attached to the workpiece in several ways:

- Clamp
- Weld
- Magnetic Attachment Base

Select the mounting option best suited to your application.

# SECTION 2 - SETUP

**Clamp or Weld Boring Mill to Workpiece**

See Figure 2-2

1. To clamp or weld the boring mill to the workpiece, first remove the two magnetic attachment bases and the magnet plate. The magnet plate is held in place by the four jack screws.

2. Back out the four jack screws to allow the mounting plate to sit flush on the workpiece.

3. Position the mill over the area to be machined. Clamp or weld the mounting plate to the workpiece. Make sure the mill is securely fastened to the workpiece. A stable and rigid setup is essential for accurate milling and safe operation of the machine.

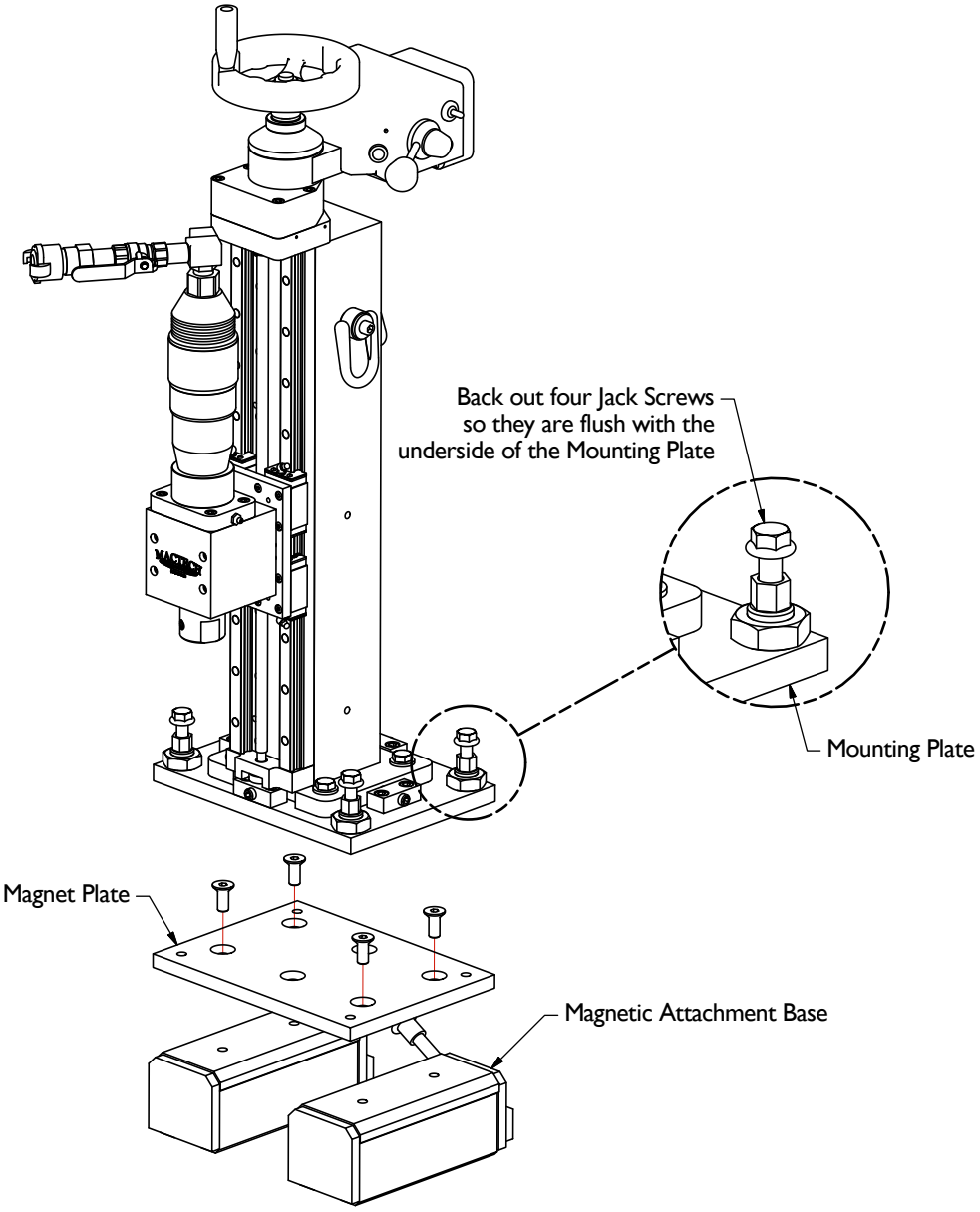



***Figure 2-2 - Clamp or Weld Mounting***

# SECTION 2 - SETUP

**Magnetic Attachment Base**
See Figure 2-3

***CAUTION:*** *The steel workpiece surface for the magnetic attachment bases must be clean and free of rust, scale, oil, and other contaminants. The magnets require a clean surface at least 0.8 inches thick to ensure maximum holding strength. Failure to provide a clean attachment surface of required thickness could result in the machine breaking free, which may cause damage to the machine or injury to the operator.*

**1.** Place the mill with magnetic attachment bases on the workpiece surface, over the area to be machined. Make sure the workpiece surface is clean.

**2.** Position the mill over the area to be machined. Lock the mill onto the workpiece by turning the magnet levers fully to the left (counter-clockwise). This will activate the magnet and secure the mill to the surface.

**3.** Make sure the mill is securely fastened to the workpiece. A stable, rigid and secure setup is essential for accurate milling and safe operation of the machine.

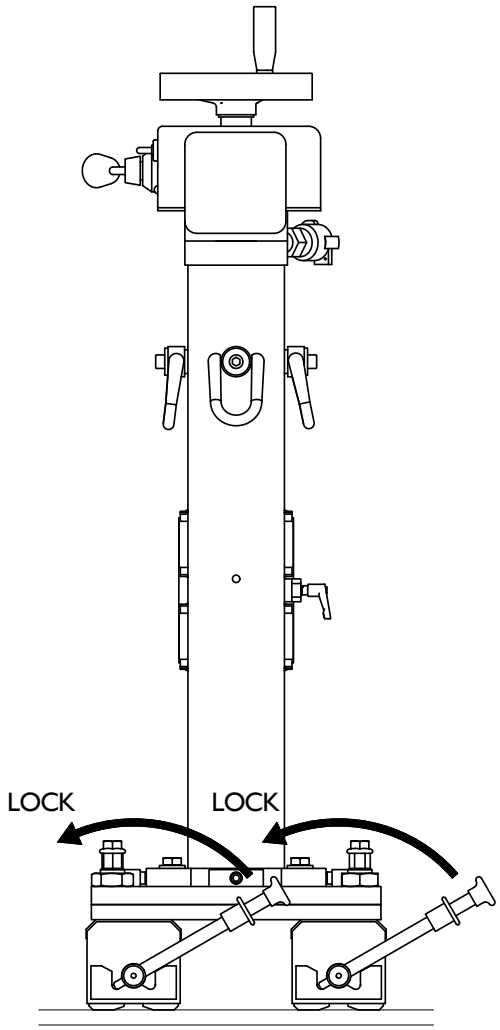



***Figure 2-3 - Magnetic Attachment Base Mounting***

# SECTION 2 - SETUP

**Position and Square the Boring Mill**
See Figure 2-4

**1.** The shift plate allows ±1/4 inch positional adjustment in the X and Y directions. Use the shift plate to position the mill head exactly over the area to be machined. Loosen the four shift plate screws and move the vertical support block to the desired position. Firmly tighten the shift plate screws when the mill is at the desired position.

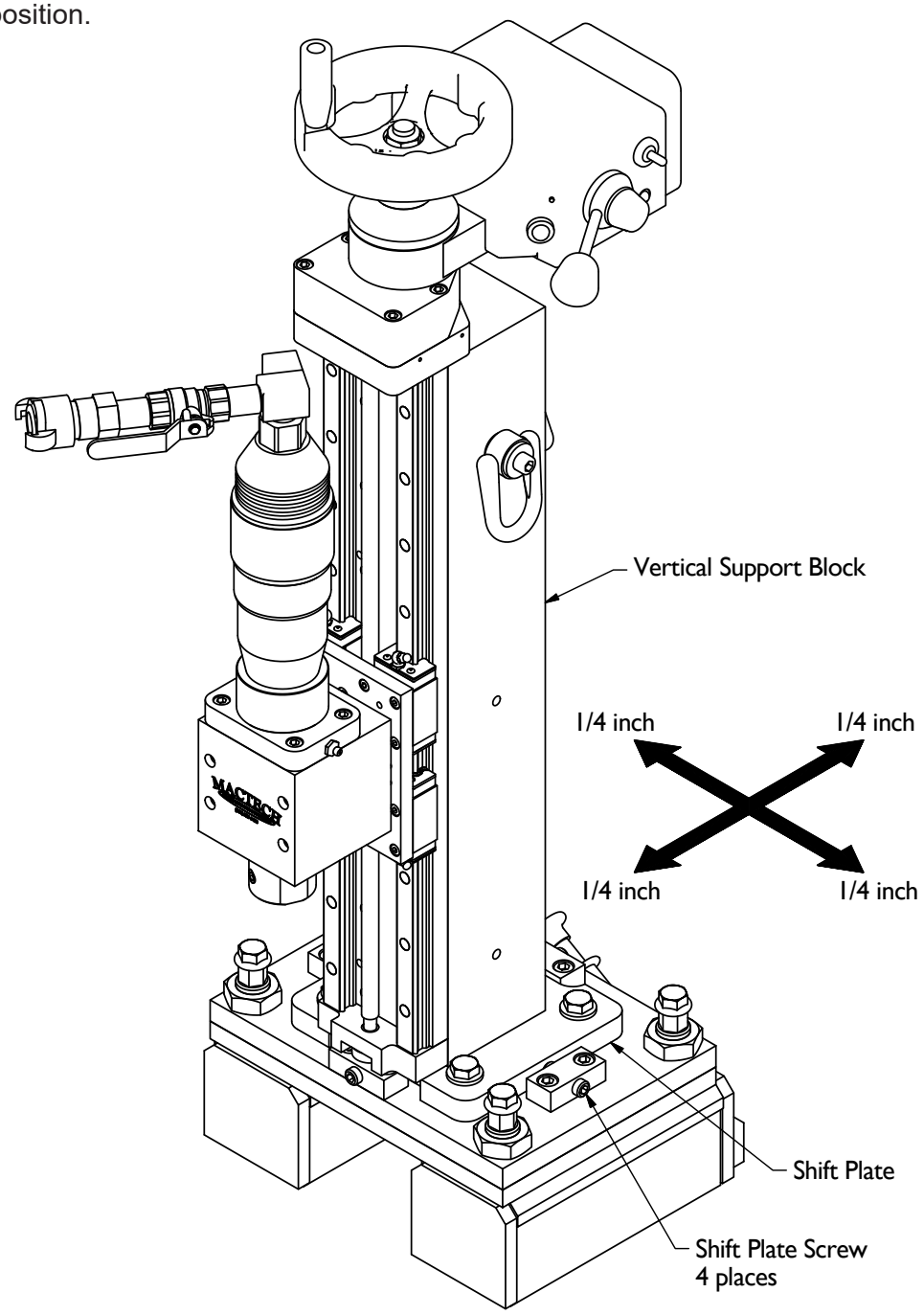



***Figure 2-4 - Shift Plate***

# SECTION 2 - SETUP

**2.** Level the mill to the workpiece by adjusting the mounting plate with the four jack screws. Lock the jack screws in place with the nut. See Figure 2-5.

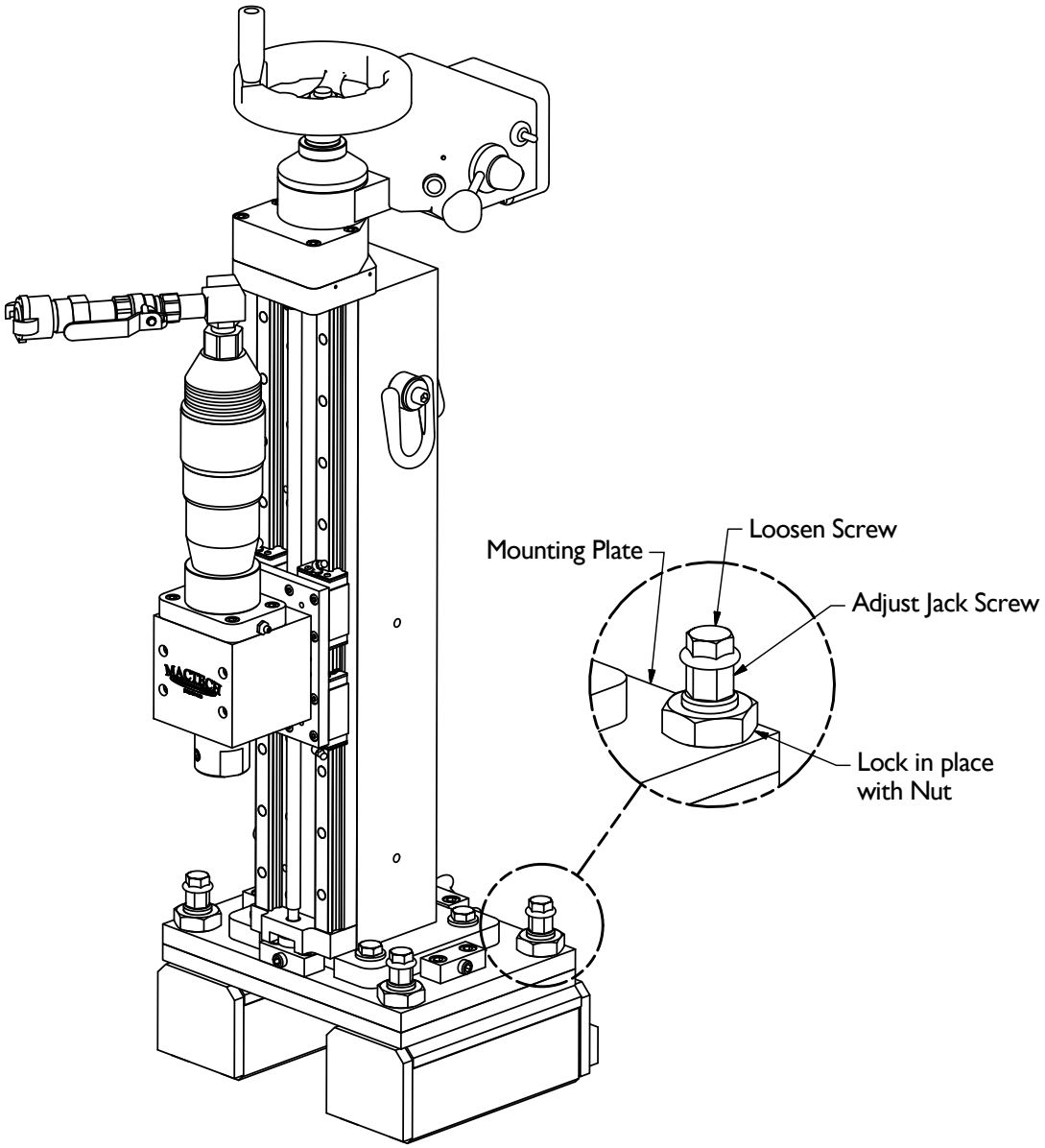



***Figure 2-5 - Jack Screws***

**3.** With the boring mill secured, positioned and leveled to the workpiece, install tooling. The mill is now ready for operation.

# SECTION 3 - OPERATION

**1.** Connect power supply lines to the spindle motor. Connect the servo motor to a 110v electrical power supply. Move the servo direction control lever to the center 'stop' position. Make sure the magnetic attachment base levers are in the locked position. See Figure 2-6.

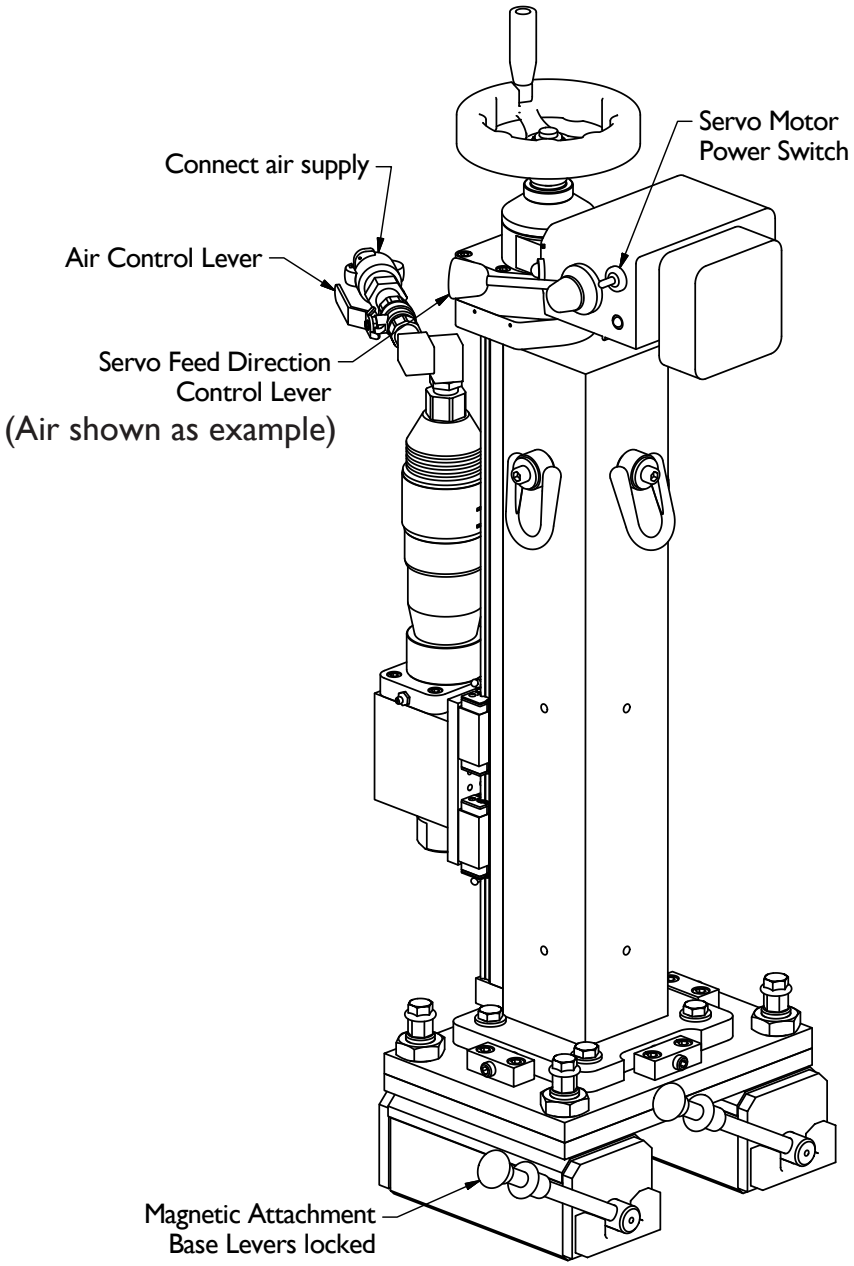



***Figure 2-6 - Connect Power Supplies***

# SECTION 3 - OPERATION

**2.** Start supply power. Switch on the servo motor power. Engage power source to the drive motor (see Fig 2-8 on next page). Use the servo feed to slowly lower the cutter into the workpiece. Use the servo speed control dial to adjust the mill head travel speed. The manual feed handwheel may be used in place of the servo feed. Place the control lever in the 'stop' position when using the handwheel. See Figure 2-7.

**3.** When the milling operation is completed, move the control lever to the 'stop' position. Reverse the control lever direction to retract the mill head away from the workpiece.

> ***NOTE:*** *Allow the mill head travel to come to a full stop before changing the servo feed direction. Move the direction control lever to the center 'stop' position, allow the mill head to stop, then change direction. Failure to do so may damage the servo motor.*

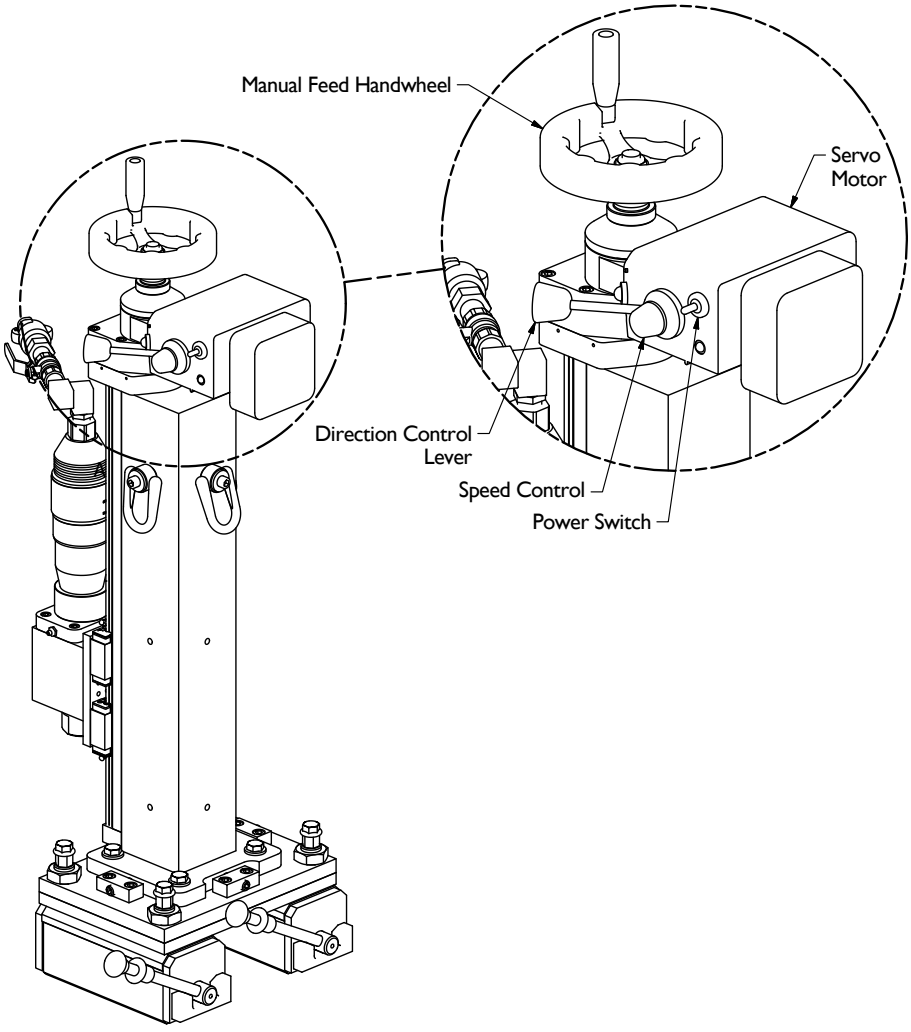


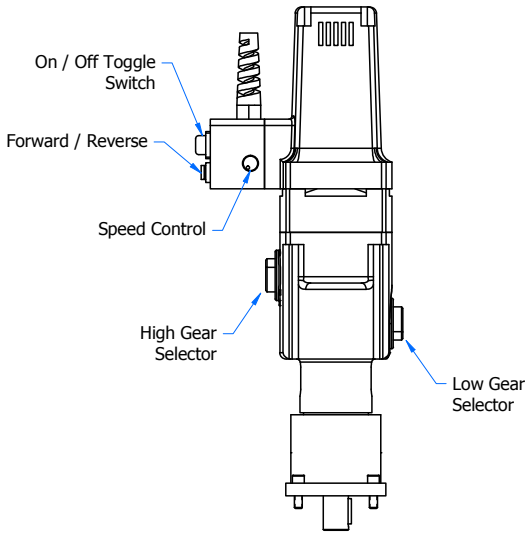

***Figure 2-7 - Mill and Servo Controls***

**4.** Stop power supply. Bleed off any remaining pressure. Disconnect supply lines and power to the servo motor.

# SECTION 3 - OPERATION

### Motor Operation Controls

**Electric Motors:** Both the 110 and 220vac electric motors utilize the same controls. The motors have 4 speeds and are also reversible. The motor must be stopped between any gear changes or directional changes. You select the speed via a combination of dial selections on the two gear selectors and control the RPM with the Speed Control knob. See Figure 2-8.




| Selector Settings | | |
|---|---|---|
| High Gear | **Min / Max RPM** | Low Gear |
| O | 30-80 | O |
| OO | 60-130 | O |
| O | 130-360 | OO |
| OO | 210-570 | OO |

***Figure 2-8: Electric Motor Operation***

**Air Motors:** Open the air control valve on the Air Caddy to supply power to the motor. Both the standard upright Air Drive motor and Right Angle Air Drive Motor have a control valve at the top that can be turned Left (LH) or Right (RH) to determine the spin of the drill bit. The locking lever must be pressed down while turning to free it from the catch that locks it in the OFF position. See Figure 2-9.

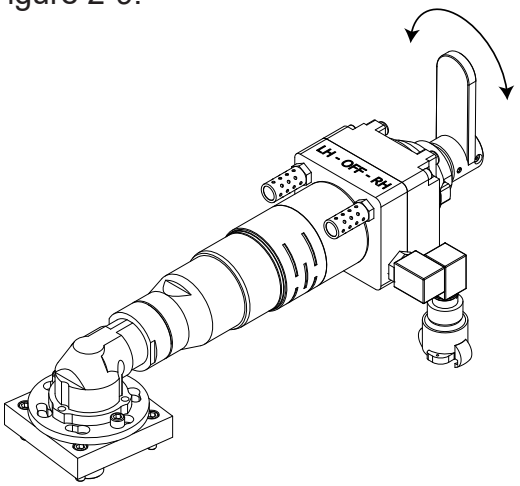
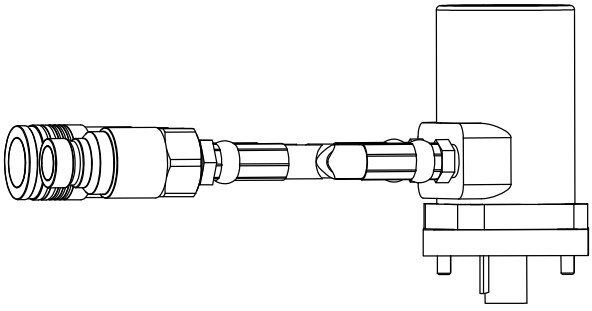



***Figure 2-9: Air Motor Operation***

**Hydraulic Motor:** There is no controls directly on the Hydraulic Motor itself. The spin and speed is all controlled via your hydraulic supply. The direction the fluid flows into the motor is what determines the rotation of the drill. In most cases this can be changed at the source of the hydraulic fluid suppy. See figure 2-10



***Firgure 2-10: Hydraulic Motor Operation***

# SECTION 4 - MAINTENANCE

***NOTE:*** *Cleaning and maintenance of the boring mill is critical to maintain the life and performance of the machine. If the machine is immersed or exposed to water, all sub-assemblies must immediately be disassembled, flushed with freshwater, and thoroughly dried. All bearings must be inspected and packed with grease to prevent corrosion. The feed screw and slides must be cleaned, dried and lubricated with grease.*

***NOTE:*** *Always check for hydraulic fluid leaks before and after each use of the machine. If any leaks are detected, immediately remove the machine from service and replace worn or damaged seals; or repair or replace the component where the leak is found. Do not use the machine if hydraulic leaks are present.*

**General Maintenance**

General maintenance must be performed after each use to ensure the life and performance of the machine.

1. Inspect the entire machine for hydraulic leaks and worn or damaged seals, including hose whips and hydraulic fittings. Replace worn or damaged seals.

2. Inspect the mill head and spindle. Remove all metal shavings, dirt and debris. The spindle must turn freely and smoothly. Inspect all components for excessive wear or damage. If necessary, disassemble and clean the mill head bores. Apply a light coat of grease to all housing bore surfaces. Apply anti-seize lubricant to screw threads. Pump fresh grease into the mill head grease zerk.

3. Inspect the mill slide assembly. Make sure that metal shavings, dirt and debris are removed. Make sure there is no damage to components and all parts are functional. Lubricate the feed screw with machine oil.

   ***NOTE:*** *Do not remove the mill head carrier from the linear rails. The carrier holds loose ball bearings, which will fall out of the carrier if removed. If the carrier or linear rails require replacement, return the machine to Mactech for service.*

4. Check the machine for damage, loose or missing parts and excessive wear to components.

5. Make sure all lifting rings are present and undamaged. If the lifting rings have been subjected to an impact load, replace the lifting rings.

**Storage**

***NOTE:*** *Follow this procedure when storing the machine in offshore or other harsh environments, or for long-term storage. This storage procedure will help prevent corrosion and other damage to the machine.*

1. Remove the drive and servo motor and store separately. When storing the machine for long periods, or when storing in offshore environments, apply a light coat of SP400 protectant over the entire outside surfaces of the machine. Do not apply protectant to seals or any non-metallic components.

***NOTE:*** *Do not over-apply SP400 protectant. SP400 is used as a protectant only, and may damage the machine if used on internal or moving components. Limit the application to the outside surfaces of the machine.*