PALMGREN®

Mill Drills

Model 9680113

Model 9680114

Read carefully and follow all safety rules and operating instructions before first use of this product.

965171601-0725

GETTING STARTED

STRUCTURAL REQUIREMENTS

Make sure all supporting structures and load attaching devices are strong enough to hold your intended loads. If in doubt, consult a qualified structural engineer.

ELECTRICAL REQUIREMENTS

Refer to Specifications on page 3 for the tools electrical requirements. The standard allowable voltage variation is plus or minus 10%.

TOOLS NEEDED

Standard mechanic's hand tool set.

DESCRIPTION

Palmgren 12-Speed Mill Drills are ruggedly constructed machines providing accurate milling, drilling and boring capabilities. The fully enclosed R-8 spindle has heavy-duty tapered thrust bearings at top and bottom of quill, adjustable depth stop with scale, fine feed adjustment handwheel with .001″ graduations and quill lock down handle for securely clamping spindle at desired depth. One piece cast iron head rotates 360° and travels vertically by rack and pinion.

Hinged pulley cover allows fast and easy speed changes. Large 32-3⁄8″ × 9½″ table has dovetail ways with adjustable gibs and bronze lead screw nuts for accurate and rigid table positioning.
Table has four 5/8″ T-slots, zero-setting handwheel dials with .001″ graduations, adjustable stops for longitudinal feed and cross feed way cover.

A 1½ HP, 1725 RPM, 115/230V, 60 Hz single-phase motor and 115V work lamp are included. Prewired for 230 volt.

UNPACKING

Refer to Figures 1 and 12, pages 1 and 14.

WARNING: Be careful not to touch overhead power lines, piping, lighting, etc. if lifting equipment is used. The mill drill weighs approximately
600 to 660 lbs. Proper tools, equipment and qualified personnel should be employed in all phases of unpacking and installation.

Check for shipping damage. If damage has occurred, a claim must be filed with carrier immediately. Check for completeness. Immediately report missing parts to dealer.

Carefully open crate and remove loose parts box. Unbolt mill drill from shipping pallet and remove from crate using heavy duty lifting equipment such as an overhead crane.

Eyebolts (Fig. 12, Ref. No. 46) are provided to hoist machine. Insert the four eyebolts into base (Fig. 12, Ref. No. 13) and secure in position.

Mill drill is shipped assembled except for certain parts shipped loose in a wooden box. Locate and account for the following parts:

A Drill Chuck Arbor (on machine)
B 1/2″ Drill Chuck with Key
C Face Mill Arbor
D 3″ Face Milling Cutter
E Three Table Handwheels
F Three Handwheel Caps
G Four Crank Handles
H R8/MT3 Adapter
I Three Quill Handles and Knobs
J Four Eyebolts
K Wrench
L Drawbar (on machine)
6 pc. R8 Collet Set (not shown)

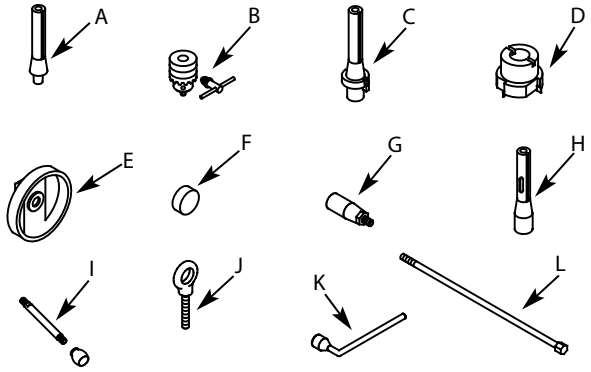


Figure 1 – Unpacking

IMPORTANT: Table is coated with a protectant. To ensure proper fit and operation, remove coating. Coating is easily removed with mild solvents, such as mineral spirits, and a soft cloth. Avoid getting cleaning solution on paint or any of the rubber or plastic parts. Solvents may deteriorate theses finishes. Use soap and water on paint, plastic or rubber components. After cleaning, cover all exposed surfaces with a light coating of oil.

UNPACK

Do not discard packing materials until after machine has been inspected for damage and completeness. Locate loose parts and set aside.

INSPECT

After unpacking the unit, carefully inspect for any damage that may have occurred during transit. Check for loose, missing or damaged parts. Shipping damage claims must be filed with the carrier.

- All tools should be visually inspected before use, in addition to regular periodic maintenance inspections.
- Be sure that the voltage labeled on the unit matches your power supply.

SAFETY RULES

WARNING: For your own safety, read operating instructions manual before operating tool.

PROPOSITION 65 WARNING: Some dust created by using power tools contain chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Some examples of these chemicals are:

- Lead from lead-based paints
- Crystalline silica from bricks and cement and other masonry products.
- Arsenic and chromium from chemically treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals; work in a well ventilated area and work with approved safety equipment. Always wear **OSHA/NIOSH** approved, properly fitting face mask or respirator when using such tools

WARNING: Always follow proper operating procedures as defined in this manual even if you are familiar with the use of this or similar tools. Remember that being careless for even a fraction of a second can result in severe personal injury.

BE PREPARED FOR JOB

- Wear proper apparel. Do not wear loose clothing, gloves, neckties, rings, bracelets or other jewelry which may get caught in moving parts of machine.
- Wear protective hair covering to contain long hair.
- Wear safety shoes with non-slip soles.
- Wear safety glasses complying with United States ANSI Z87.1. Everyday glasses have only impact resistant lenses. They are **NOT** safety glasses.
- Wear face mask or dust mask if operation is dusty.
- Be alert and think clearly. Never operate power tools when tired, intoxicated or when taking medications that cause drowsiness.

PREPARE WORK AREA FOR JOB

- Keep work area clean. Cluttered work areas invite accidents.
- Do not use power tools in dangerous environments. Do not use power tools in damp or wet locations. Do not expose power tools to rain.
- Work area should be properly lighted.
- Proper electrical receptacle should be available for tool. Three-prong plug should be plugged directly into properly grounded, three-prong receptacle.
- Extension cords should have a grounding prong and the three wires of the extension cord should be of the correct gauge.
- Keep visitors at a safe distance from work area.
- Keep children out of workplace. Make workshop childproof. Use padlocks or master switches to prevent any unintentional use of power tools.

TOOL SHOULD BE MAINTAINED

1. Always unplug tool prior to inspection.
2. Consult manual for specific maintaining and adjusting procedures.
3. Keep tool lubricated and clean for safest operation.
4. Remove adjusting tools. Form habit of checking to see that adjusting tools are removed before switching machine on.
5. Keep all parts in working order. Check to determine that the guard or other parts will operate properly and perform their intended function.
6. Check for damaged parts. Check for alignment of moving parts, binding, breakage, and mounting or any other condition that may affect a tool's operation.
7. A guard or other damaged part should be properly repaired or replaced. Do not perform makeshift repairs. (Use parts list provided to order replacement parts.)

KNOW HOW TO USE TOOL

- Use right tool for job. Do not force tool or attachment to do a job for which it was not designed.
- Disconnect tool when changing drill bit or cutter.
- Avoid accidental start-up. Make sure that the tool is in the OFF position before plugging in.
- Do not force a tool. It will work most efficiently at the rate for which it was designed.
- Keep hands away from moving parts and cutting surfaces.
- Never leave tool running unattended. Turn the power off and do not leave tool until it comes to a complete stop.
- Do not overreach. Keep proper footing and balance.
- Never stand on tool. Serious injury could occur if tool is tipped or if drill bit is unintentionally contacted.
- Know your tool. Learn the tool's operation, application and specific limitations.
- Use recommended accessories (refer to page 17). Use of improper accessories may cause risk of injury to persons.
- Handle workpiece correctly. Protect hands from possible injury.
- Turn machine off if it jams. Drill bit or cutter jams when it digs too deeply into workpiece. (Motor force keeps it stuck in the work.)
- Clamp workpiece or brace against column to prevent rotation.
- Feed work into a bit or cutter against the direction of rotation of bit or cutter.
- Use recommended speed for Mill Drill accessory and workpiece material.

CAUTION: Think safety! Safety is a combination of operator common sense and alertness at all times when tool is being used.

SPECIFICATIONS

Models 9680113 & 9680114, Mill Drills	
Horsepower	1½ Hp
12 Speeds	150, 225, 255, 350, 400, 500, 850, 1200, 1500,1600, 2300, 3000 RPM
Table Size	32-3⁄8 × 9½″
T-Slots	5/8″ Slots, Four
Swing	16″
Spindle Taper	R-8 with 7/16″-20 Drawbar
Drilling Capacity	1¼″ Mild Steel
	1½″ Cast Iron
End Mill Capacity	3/4″ Mild Steel
Face Mill Capacity	3″ Mild Steel
Spindle Stroke	5″
Max. Distance Spindle to Table	17″
Head Swivel	360°
Quill Diameter	3″
Quill Collar Diameter	3¾″ (96mm)
Column Diameter	4½″
Left-Right Table Travel (Longitudinal)	23″
Front-Back Table Travel (Cross)	7″
Motor	1½ Hp, 1725 RPM, 115/230V, 23.0/11.5 A, 60 Hz, Single-Phase
2LKP9A Weight	600 lbs
2LKP9A Shipping Weight	666 lbs
2LKR1A Weight	660 lbs
2LKR1A Shipping Weight	705 lbs

ASSEMBLY

Refer to Figures 2, 10, 11 and 12, pages 3, 10, 12 and 14.

CAUTION: Do not attempt assembly if parts are missing. Use this manual to order replacement parts.

MILL DRILL INSTALLATION

Mill drill must be mounted to a flat level surface. Mill drill must be level in both cross and transverse directions. Use shims or machine mounts if necessary. Do not mount machine in direct sunlight. Heat caused by sunlight may deform plastic parts on machine.

Make sure selected location has enough clearance to accommodate full movement of the table. See Figure 2 for minimum work space required.

If stand is used, be sure to bolt Mill Drill to stand and level stand to floor to minimize vibration. Tighten all nuts and bolts that may have loosened in shipping. Secure mill drill base to stand or bench.

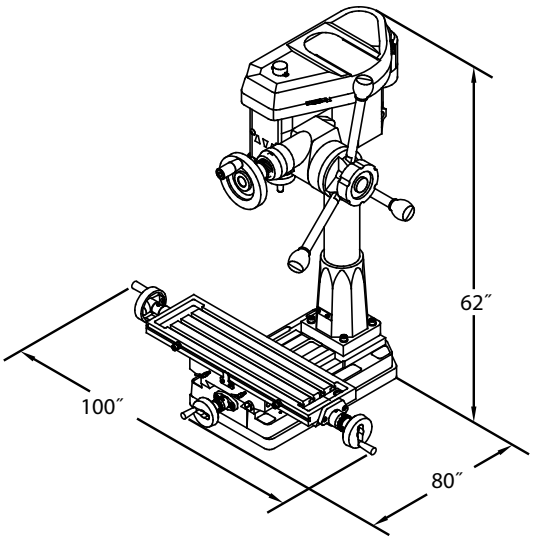


Figure 2 – Required minimum space.

ATTACH QUILL FEED HANDLES

Refer to Figure 10, page 10.

1. Thread knobs (Ref. No. 37) onto handles (Ref. No. 38).
2. Thread handle into hub (Ref. No. 40).
3. Repeat for remaining two knobs and handles.

ATTACH HANDLE AND CRANK

Refer to Figure 10, page 10.

1. Thread handle (Ref. No. 1) into crank (Ref. No. 2).
2. Secure handle in position by tightening hex nut on handle.
3. Secure crank onto worm shaft (Ref. No. 6) with set screws (Ref. No. 56).

MOUNT TABLE HANDWHEELS

Refer to Figure 12, page 14.

1. Remove protective caps from lead screws (Ref. Nos. 12 and 25).
2. Thread handles into table handwheels (Ref. No. 1).
3. Secure two handwheels to left and right ends of longitudinal lead screw (Ref. No. 25) using set screws (Ref. No. 45).
4. Secure remaining handwheel to end of cross feed lead screw (Ref. No. 12) using set screw.

INSTALL DRAWBAR AND ARBOR

Refer to Figures 10 and 11, pages 10 and 12.

Insert draw bar (Fig. 11, Ref. No. 38) into top of spindle. Be sure that arbor and spindle taper are clean of all dirt, metal chips, oil, etc. Insert chuck or face mill cutter, adapter or R8 collet (Fig. 10, Ref. Nos. 48, 51 or 55) into spindle and rotate arbor to engage spindle key in arbor keyway. Push arbor into spindle and thread draw bar into end of arbor. Use a wrench to tighten draw bar securely.

ASSEMBLY (CONTINUED)

TO INSTALL FACE MILL CUTTER:

1. Make sure arbor and cutter are clean and free of debris.
2. Slide face mill cutter on arbor and secure in position using washer and bolt (Fig. 10, Ref. Nos. 52, 53 and 54).

TO INSTALL DRILL CHUCK:

1. Make sure arbor and chuck are clean and free of debris.
2. Slide drill chuck (Fig. 10, Ref. No. 50) with jaws retracted onto arbor and tap chuck with a mallet to seat chuck in place

INSTALLATION

POWER SOURCE

The Palmgren mill drill is prewired for 230 volts, 60 Hz, single-phase power. A qualified electrician should wire a 240 volt, 20 AMP, 3-prong plug to mill drill line cord.

A wiring schematic has been included for your information.

WARNING: All electrical connections must be performed by a qualified electrician.

REWIRING FROM 230V TO 115V

Note several parts will need to be ordered and changed out before rewiring from 230V to 115V. WARNING: Before working on the machine, power off and unplug machine from power source.

1. Purchase the following items, from your local distributor:
   a. Line cord plug, 3 prong, rated for 125V, 30A (Recommended Grainger Part numbers: 4A262 – plug; 4A263 – 125 V connector; 4A261 – NEMA L5-30 Receptacle)
   b. Thermal overload relay 30A (Recommended Grainger part number: 3EA13)
   c. Motor circuit breaker 25A (Part number: 962493300, see parts list)
2. Open the electrical panel, and move transformer wire labeled "L" from 230V to 115V terminal

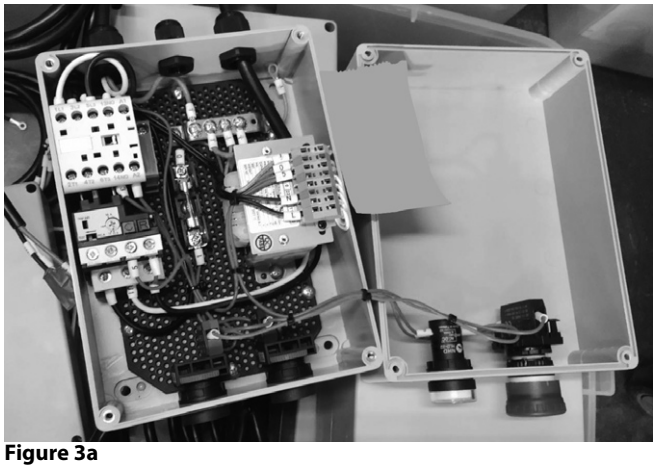


Figure 3a

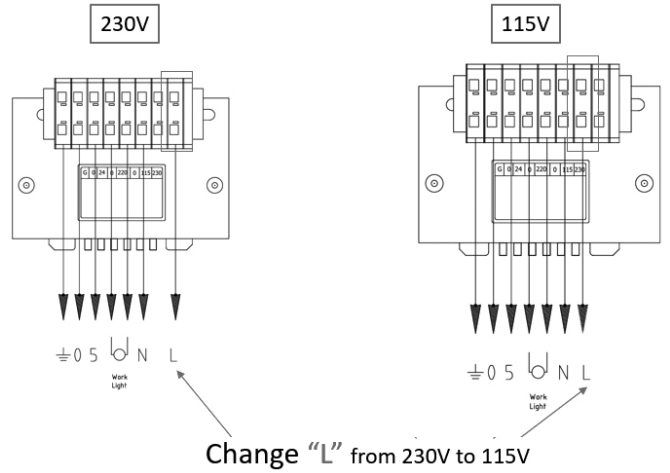


Figure 3b

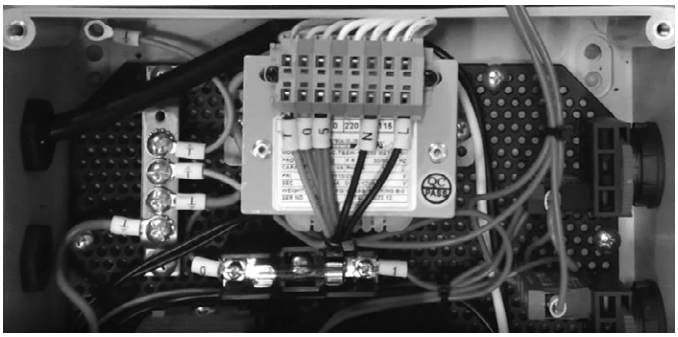


Figure 3c

3. Unplug the thermal overload relay from the motor contactor and replace with 30A Thermal overload relay. See Figs. 3a and 3b, above.

Figure 4

4. Change the motor's circuit breaker to a 25A version, PN962493300. See Fig. 4, above

INSTALLATION (CONTINUED)

Figure 5

5. Rewire motor's terminal block as shown in the wiring diagram.

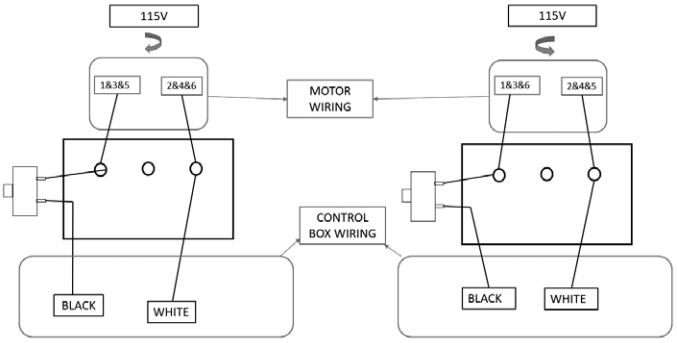


Figure 6a– Wiring diagram.

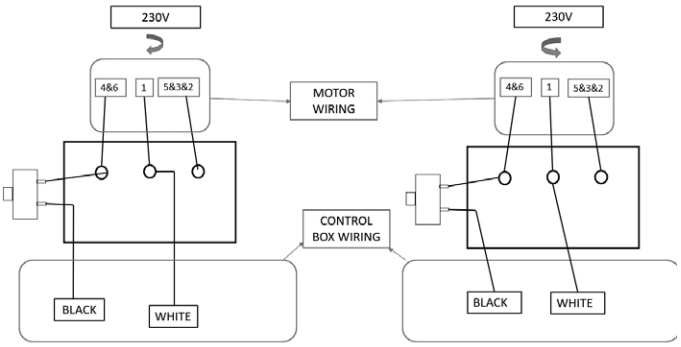


Figure 6b– Wiring diagram.

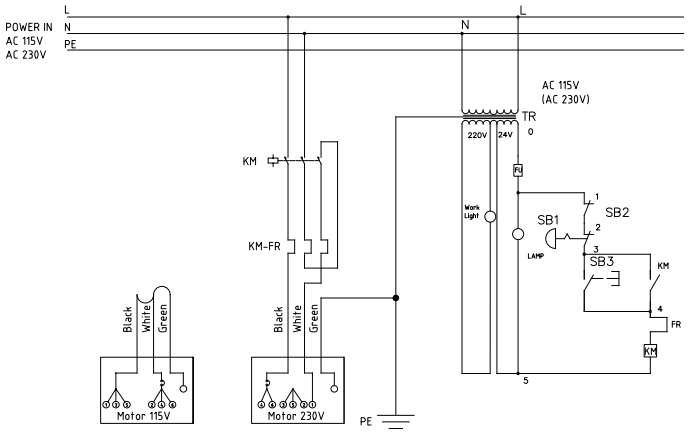


Figure 7 – Wiring schematic.

OPERATION

Refer to Figures 8, 10, 11, and 12, pages 6, 10, 12 and 14.

ADJUSTING HEAD

Refer to Figures 10 and 12.

Loosen hex nut (Fig. 10, Ref. No. 22) with wrench (Fig. 10, Ref. No. 23). Head can be rotated 360° around column by hand. Be sure rack (Fig. 12, Ref. No. 14) does not bind. Raise or lower head by turning head adjusting crank (Fig. 10, Ref. No. 2). Be sure to tighten both hex nuts after adjusting head.

CHANGING SPEED

Refer to Figures 2 and 11.

Palmgren Mill Drill is a 12-speed machine. Spindle speeds are determined by location of V-belts on three pulleys.

Always push stop button and disconnect power from machine before changing speeds.

Open cover access door (Ref. No. 62). Pulley cover (Ref. No. 28) top can be tilted back for speed changes by sliding latches outward. Be sure to close cover when finished.

Loosen handle (Ref. No. 14) and push motor mount plate (Ref. No. 22) toward head. Tighten handle.

Loosen transmitting pulley base (Ref. No. 34) by loosening hex head bolts (Ref. No. 35). Place V-belts on pulleys for desired speed as shown in speed chart (See Figure 4, page 6).

Tension front V-belt (Ref. No. 31) by pushing middle pulley away from spindle pulley. Tighten hex head bolts.

Loosen handle and push motor mount plate away from head to tension rear
V-belt. Tighten handle. Check belt tension and adjust if necessary. Close pulley cover.

Secure pulley cover latches.

Spindle RPM	Belt Location
150	A1-4Z
225	B2-4Z
255	A1-3Y
350	C3-4Z
400	B2-3Y
500	A1-2X
850	D4-3Y
1200	C3-2X
1500	B2-1W
1600	D4-2X
2300	C3-1W
3000	D4-1W

SPINDLE OPERATION

Refer to Figures 10 and 11, pages 10 and 12.

Palmgren Mill Drill is equipped with spindle fine feed handwheel and spindle depth lockdown handle.

Engage fine feed handwheel (Fig. 10, Ref. No. 36) by rotating pinion knob clockwise (Fig. 10, Ref. No. 39) until tight. Disengage fine feed by loosening pinion knob.

Spindle depth can be locked into position by tightening quill lock handle (Fig. 11, Ref. No. 56). Bring spindle down to desired position and tighten quill lock handle to hold spindle position.

DEPTH STOP

Refer to Figures 10 and 11, pages 10 and 12.

Repeated operations where depth of cut is consistent are made easier by using depth scale (Fig. 10, Ref. No. 44) and depth setting knob (Fig. 11, Ref. No. 61).

Depth of cut is shown on depth scale and indicated by depth indicator (Fig. 10, Ref. No. 45).

Depth of cut is set by rotating depth setting knob until desired depth is obtained.

HANDWHEEL SCALES

Refer to Figure 12, page 14.

The cross feed handwheel and right-hand longitudinal handwheel are equipped with graduated collars.

One full rotation of handwheel moves table .100″. Handwheel scales are graduated in .001″.

Scales are used when precise movement of table is required.

Scales can be zeroed by loosening dial screw (Ref. No. 5) and rotating lead screw dial (Ref. No. 4) until zero marks are aligned.

Tighten dial screw.

TABLE STOP BLOCKS

Refer to Figure 12, page 14.

Longitudinal travel can be limited to make repeated operations easier by using the table stop blocks (Ref. No. 27).

Table stop blocks are positioned to contact table stop bracket (Ref. No. 21) limiting table travel.

Adjust stop blocks by loosening socket head bolts (Ref. No. 26) and moving stop blocks to desired position. Secure socket head bolts.

OPERATION (CONTINUED)

TABLE LOCKS

Refer to Figure 10, page 10.

Mill drill table can be locked into position using table lock handles (Ref. Nos. 32 and 41).

Longitudinal position is secured by tightening lock handles on front of saddle.

Cross feed position is secured by tightening lock handles on right side of saddle.

REMOVE ARBOR

WARNING: Be sure mill drill is turned off and is disconnected from power source before removing arbor.

1. Loosen draw bar with one or two turns.
2. Tap draw bar top with mallet to free arbor.
3. Loosen drawbar completely until arbor drops from spindle..

OPERATING CONTROLS

Refer to Figure 11, page 12.

Power Lamp (Ref. No. 64) – This lamp will be illuminated when the machine is connected to power source.

Emergency Stop Switch (Ref. No. 65) – Press to stop machine. The switch must be twisted clockwise until it pops outward in order for the machine to be operable.

Start Switch (Ref. No. 67) – Press to start machine.

Stop Switch (Ref. No. 68) – Press to stop machine during normal operation.

MAINTENANCE

WARNING: Do not attempt under any circumstances, to service, repair, dismantle, or disassemble any mechanical or electrical components without physically disconnecting all power sources.

Refer to Figures 9, 10, 11 and 12.

Keep all moving parts and surfaces clean of dirt, metal chips, etc. Keep a light coating of oil on all exposed surfaces, including table top and slots, all dovetail way surfaces, lead screws, rack and column.

REPLACE WORN V-BELTS.

Check electrical connections and replace any worn or frayed wires or line cords.

Replace worn way cover.

Replace work lamp bulb with maximum 40 watt bulb only.

GIB ADJUSTMENT

Refer to Figures 9 and 12, pages 7 and 14.

Palmgren Mill Drill is equipped with adjustable gibs (See Figure 5) on longitudinal and cross feed that eliminate excess play in table as dovetail ways wear over time.

Rotating gib adjustment bolts (Ref. No. 43) clockwise tightens dovetail ways. Adjust gib bolts until a slight drag is felt when moving the table with handwheels. Loosen bolts if table is too tight.

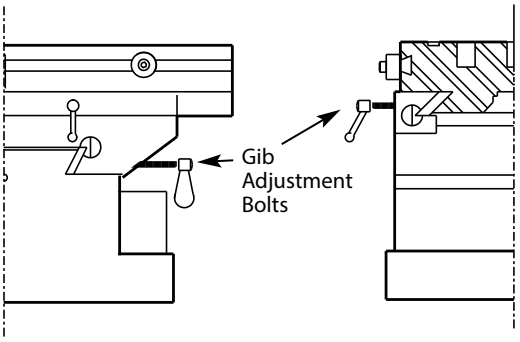


Figure 9 – Gib Adjustment

REPLACE RETURN SPRING

Refer to Figure 10 and 11, pages 10 and 12.

Return spring may wear after extended use and will need replacement. If spindle does not return to full up position when released, then replace return spring.

CAUTION: Spring is under tension and may tend to twist forcefully when relaxed.

To replace return spring, push spindle to fully up position and lock it in place by tightening quill lock handle (Fig. 11, Ref. No. 56).

Loosen spring cover bolt (Fig. 10, Ref. No. 11) slowly and carefully rotate spring and cover clockwise to relax spring tension.

Remove spring cover bolt and washers (Fig. 10, Ref. No. 11, 12 and 13). When tension is released, rotate spring and cover clockwise to release spring from mounting screw.

Remove spring and cover. Place new spring over pinion shaft and slide slot at end of spring over mounting screw (Fig. 10, Ref. No. 24). Press spring and cover against head casting.

Replace washer and spring cover knob. Rotate cover counterclockwise to tension spring. Rotate cover approximately three full turns and tighten cover knob. Release quill lock handle.

Test spring tension by pulling down on crank handle (Fig. 10, Ref. No. 38). Adjust spring tension as needed.

Overtightening spring causes quill to return with excessive force damaging quill and rubber bumper (Figure 11, Ref. Nos. 4 and 9).

MAINTENANCE (CONTINUED)

LUBRICATION

Refer to Figures 10, 11 and 12, pages 10, 12 and 14.

Use medium weight, non-detergent oil.

DAILY:

1. Apply five to six drops of oil on splines at the top of spindle (Fig. 11, Ref. No. 2).
2. Be sure cross feed lead screw (Fig. 12, Ref. No. 12) is clean of dirt and metal chips. Oil if necessary.

WEEKLY:

1. Oil cross feed lead screw (Fig. 12, Ref. No. 12).
2. Oil dovetail ways (Fig. 12, Ref. No. 11).

MONTHLY:

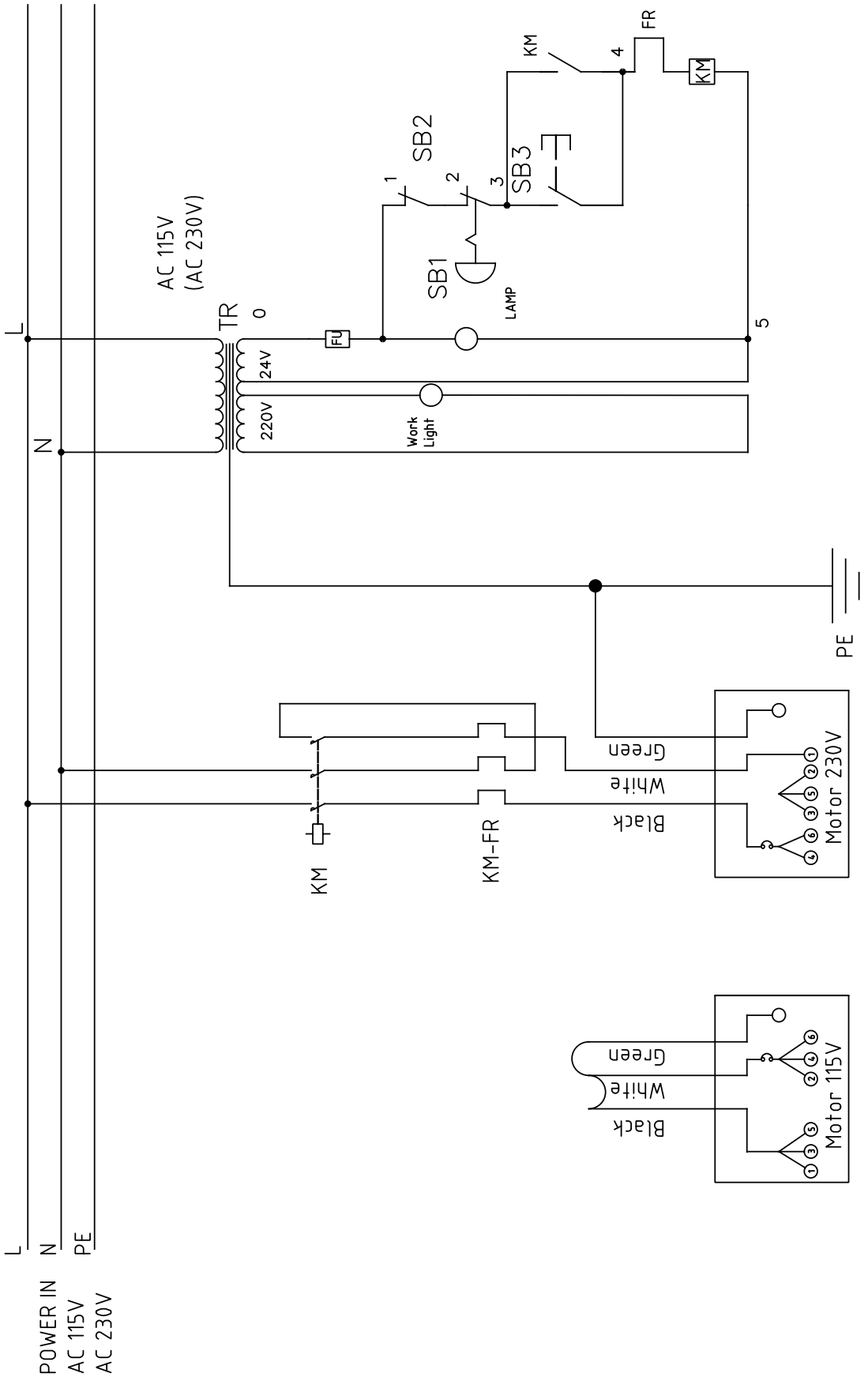
1. Oil handwheel bearings through oil fittings (Fig. 12, Ref. No. 11).
2. Oil gear rack on back of quill where pinion shaft (Fig. 10, Ref. No. 25) engages quill (Fig. 11, Ref. No. 4).
3. Oil depth stop lead screw (Fig. 11, Ref. No. 61).
4. Apply bearing grease to rack (Fig. 10, Ref. No. 14) and pinion shaft (Fig. 10, Ref. No. 25). Remove pinion knob and handle base (Fig. 10, Ref. Nos. 39 and 40) to expose pinion shaft.
5. Grease longitudinal lead screw (Fig. 12, Ref. No. 25).

NOTES

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Motor does not run when start button is pushed	1. No power to motor	1. Check electrical connector and circuit breaker or fuse
	2. Blown fuse on control box	2. Correct wiring problem and replace fuse
	3. Defective switch or contactor	3. Replace defective parts
Motor overheats	1. Low voltage to motor	1. Check voltage
	2. V-belts too tight	2. Tension belts properly
	3. Too deep or too fast a cut	3. Reduce cut depth or speed
	4. Worn contacts in contactor	4. Replace contactor
Spindle overheats	1. Poor quill bearing lubrication	1. Lubricate bearings with bearing grease
	2. Spindle bearings too tight	2. Adjust bearings so that spindle does not bind
	3. Mill drill operated at high speeds for extended period	3. Allow mill drill to cool
Lack of power at spindle	V-belts loose	Tension V-belts properly
Cutting tool chattering	1. Spindle bearings loose	1. Tighten bearings
	2. Table is loose	2. Adjust table and saddle gibs
	3. Worn spindle bearings	3. Replace bearings
	4. Head clamp bolts loose	4. Tighten bolts
	5. Too deep or too fast a cut	5. Reduce cut depth or speed
	6. Loose workpiece	6. Clamp workpiece securely
Spindle does not return to full "up" position	1. Poorly adjusted return spring	1. Increase return spring tension
	2. Worn return spring	2. Replace return spring
Excessive backlash in lead screws	Worn lead screw nuts	Adjust or replace lead screw nuts
Excessive noise	1. Loose spindle bearings	1. Adjust bearings properly
	2. Loose motor pulley	2. Tighten pulley set screws
	3. Dull cutting tools	3. Replace cutting tools
Excessive play in table	Table is loose	Adjust table gibs properly

WIRING SCHEMATIC



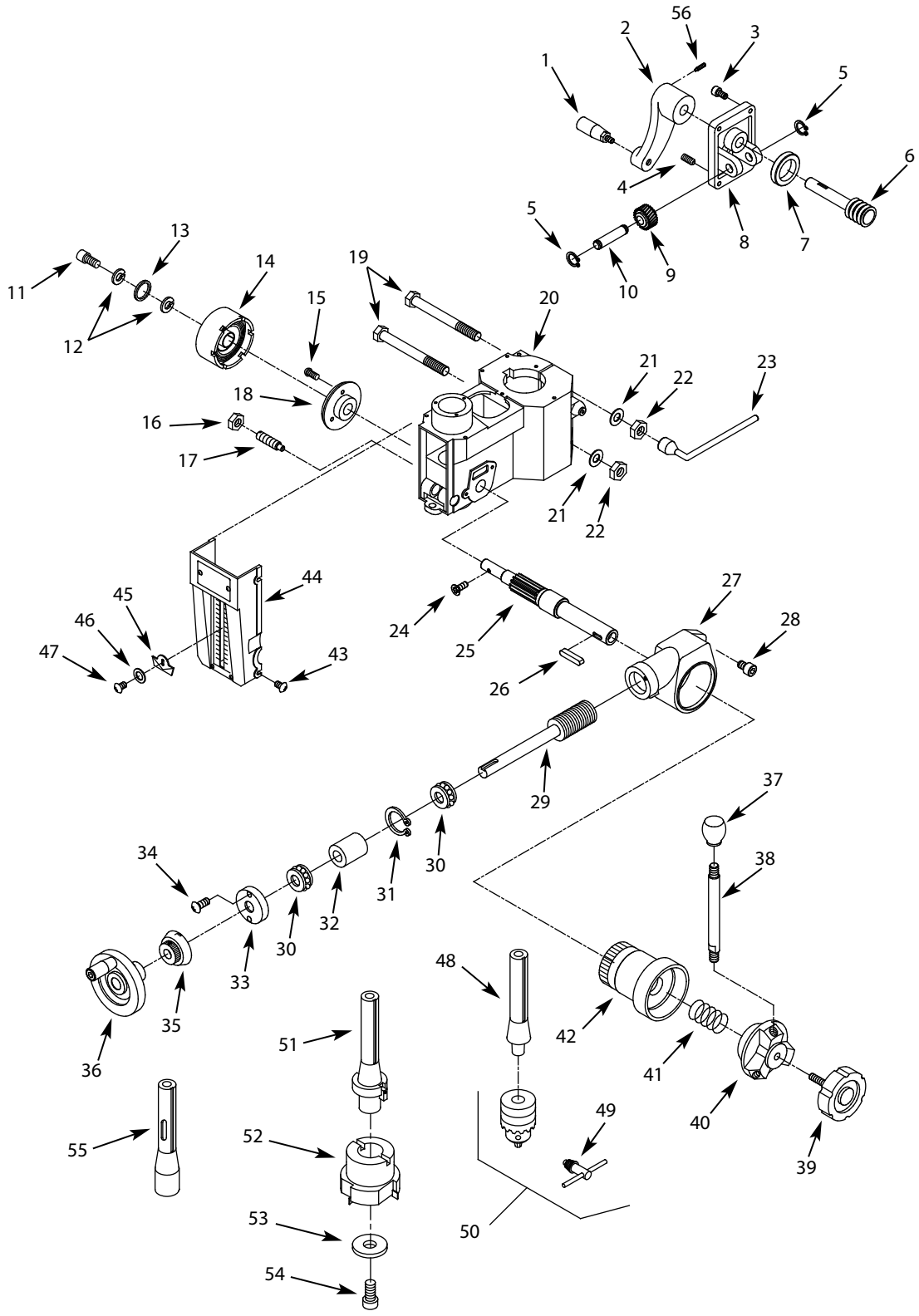


Figure 10 – Repair Parts Illustration for Head

REPLACEMENT PARTS LIST FOR HEAD

Ref. No.	Description	Part No.	Qty.
1	Handle	962659100	1
2	Head Adjusting Crank	962659200	1
3	1/4-20×3/4″ Socket Head Bolt	*	4
4	Oil Fitting	960597900	1
5	3AMI-14 Retaining Ring	960598900	2
6	Worm Shaft	962659400	1
7	Bushing	962659500	1
8	Pinion Housing	962659600	1
9	Worm Gear	962659700	1
10	Worm Gear Shaft	962659800	1
11	1/4-20x 5/8″ Socket Head Bolt	*	1
12	1/4″ Lock Washer	*	2
13	1/4″ Flat Washer (W)	*	1
14	Return Spring and over	962660100	1
15	#10-24×3/4″ Pan Head Screw	*	3
16	3/8″-16 Hex Nut	*	1
17	3/8-16×1½″ Set Screw	961751700	1
18	Spring Base	962660200	1
19	5/8-11×6″ Hex Head Bolt	*	2
20	Head	N/A	1
21	5/8″ Flat Washer	*	2
22	5/8″-11 Hex Nut	*	2
23	Wrench	962660400	1
24	#10-24×1/2″ Flat Head Screw	*	1
25	Pinion Shaft	962660500	1
26	8×7×45mm Key	960477000	1
27	Fine Feed Housing	962660600	1
28	5/16-18×3/4″ Socket Head Bolt	*	2
29	Worm Shaft	962660700	1
30	6202ZZ Ball Bearing	*	2
31	3AMI-15 Retaining Ring	960053300	1
32	Spacer	962660800	1
33	Worm Cover	962660900	1
34	#10-24×3/8″ Pan Head Screw	*	2
35	Fine Feed Scale	962661000	1
36	Handwheel Assembly	962661100	1
37	Handle Knob	962661200	3
38	Crank Handle	962661300	3
39	Pinion Knob	962661400	1
40	Handle Base	962661500	1
41	Compression Spring	962661600	1
42	Ring Gear Housing	962661700	1
43	1/4-20×1/2″ Pan Head Screw	*	4
44	Front Cover Assembly	962662300	1
45	Depth Indicator	962662400	1
46	#5 Flat Washer	*	1
47	#5-40×1/4″ Pan Head Screw	*	1
48	R8 / JT6 Arbor	962662100	1
49	Chuck Key	962662000	1
50	JT6 Chuck with Key	962661900	1
51	Face Milling Arbor	962674400	1
52	Face Milling Cutter	962661800	1
53	1/2″ Flat Washer (R)	*	1
54	3/8-16×1¼″ Socket Head Bolt	*	1
55	R8 / MT3 Adapter	961715700	1
56	3/8-16×1/2″ Set Screw	*	1

(Δ) Not shown. (N/A) Not available as repair part. (*) Standard hardware item, available locally.

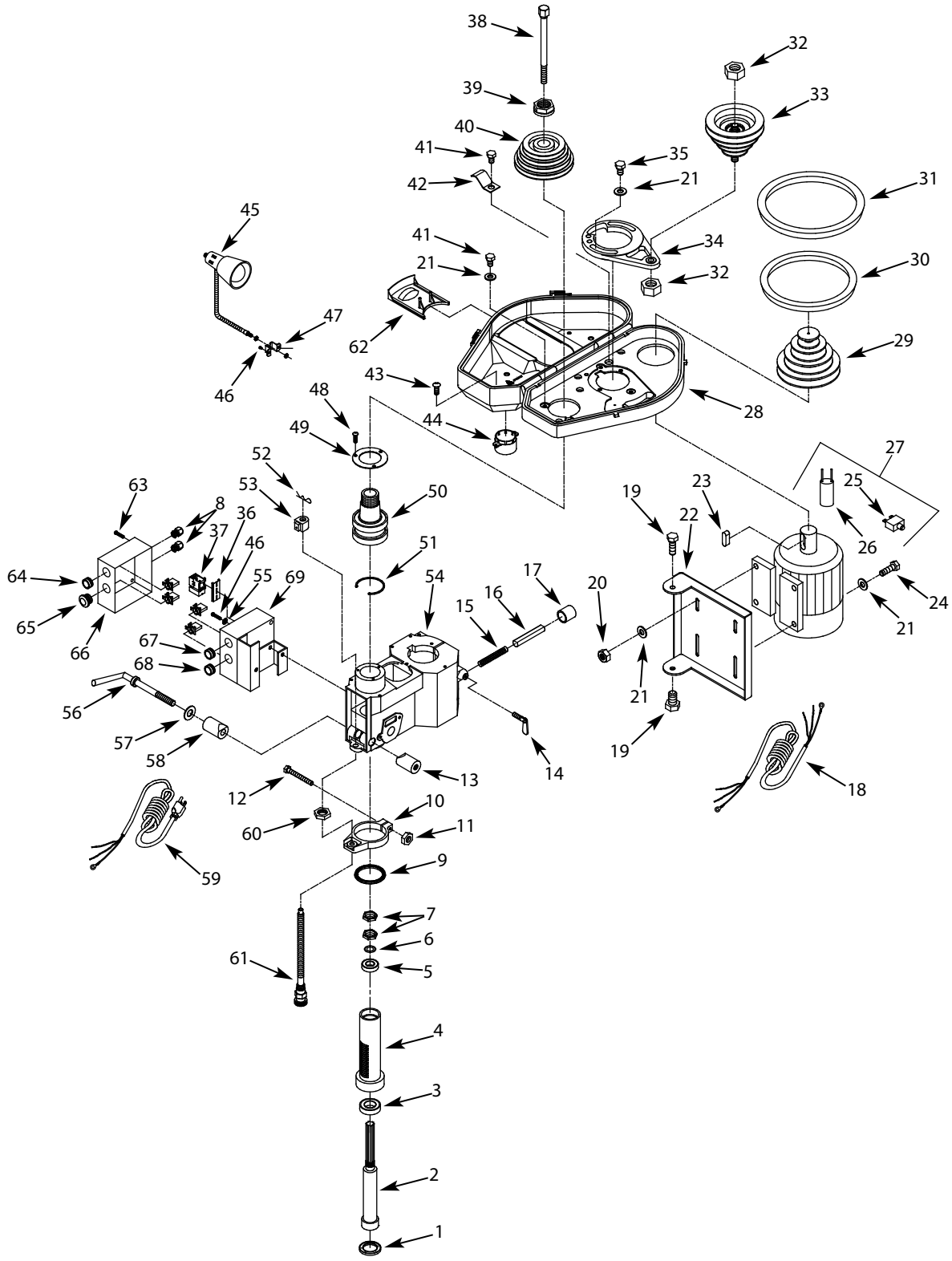


Figure 11 – Repair Parts Illustration for Head

REPLACEMENT PARTS LIST FOR HEAD

Ref. No.	Description	Part No.	Qty.
1	Oil Seal	962662500	1
2	Spindle	962662601	1
3	30207J-N Taper Roller Bearing	960585500	1
4	Quill	962662800	1
5	30206J-N Taper Roller Bearing	960585600	1
6	30mm Keyed Washer	960585700	1
7	Locknut	962662901	1
8	Strain Relief	962673700	2
9	Rubber Bumper	962663100	1
10	Rod Base	962663200	1
11	1/4″-20 Hex Nut	*	1
12	1/4-20 × 2″ Hex Head Bolt	*	1
13	Quill Lock Sleeve	962663300	1
14	3/8″-16 Wing Screw	962663400	1
15	Compression Spring	962663500	1
16	Tension Rod	962663600	1
17	Rod Cap	962663700	1
18	Motor Cord	962663800	1
19	7/16-14 × 3/4″ Hex Head Bolt	*	2
20	5/16″-18 Hex Nut	*	4
21	5/16″ Flat Washer	*	10
22	Motor Mount Plate	962663900	1
23	7 × 7 × 37mm Key	962664000	1
24	5/16-18 × 1″ Hex Head Bolt	*	4
25	Circuit Breaker, 13A	962664100	1
26	Capacitor 150MFD	962664200	1
27	Motor (Includes Ref. Nos. 25 and 26)	962664300	1
28	Pulley Cover	962664400	1
29	Motor Pulley	962664500	1
30	V-Belt	6L209	1
31	V-Belt	3X698	1
32	5/8″-11 Hex Nut	*	2
33	Transmitting Pulley Assembly	962664800	1
34	Transmitting Pulley Base	962664900	1
35	5/16-18 × 1/2″ Hex Head Bolt	*	2
36	Bracket	962673500	1
37	Contactor	962673600	1
38	Draw Bar	962665200	1
39	Spindle Lock Nut	962665300	1
40	Spindle Pulley	962665400	1
41	5/16-18 × 5/8″ Hex Head Bolt	*	5
42	Cable Clamp	962665500	1
43	Screw	962665600	2
44	Draw Bar Cover	962665700	1
45	Lamp Assembly	962665800	1
46	#10-24 × 3/8″ Washer Head Screw	960147700	4
47	Bracket	962665900	1
48	1/4-20 × 1/2″ Pan Head Screw	*	3
49	Bearing Retainer	962666000	1
50	Spindle Taper Sleeve Assembly	962666101	1
51	3BMI-80 Retaining Ring	962666200	1
52	Cotter Pin	962666300	1
53	Depth Indicator Block	962666400	1
54	Head	N/A	1
55	#10 Flat Washer	*	2
56	Quill Lock Handle	962666600	1
57	1/2″ Flat Washer	*	1
58	Quill Lock Bushing	962666700	1
59	Line Cord	962666800	1
60	Nut	962666900	1
61	Depth Stop Lead Screw Assembly	962667000	1
62	Cover Access Door	962667100	1
63	4-0.7 × 12mm Pan Head Screw	*	4
64	Power Lamp	962672900	1
65	Emergency Stop Switch	962673000	1
66	Control Box Cover	962673100	1
67	Start Switch	962673200	1
68	Stop Switch	962673300	1
69	Control Box Housing	962673400	1
Δ	Fuse	962543000	1
Δ	Fuse Holder	962643900	1
Δ	Lamp Switch	961532900	1

(Δ) Not shown. (N/A) Not available as repair part. (*) Standard hardware item, available locally.

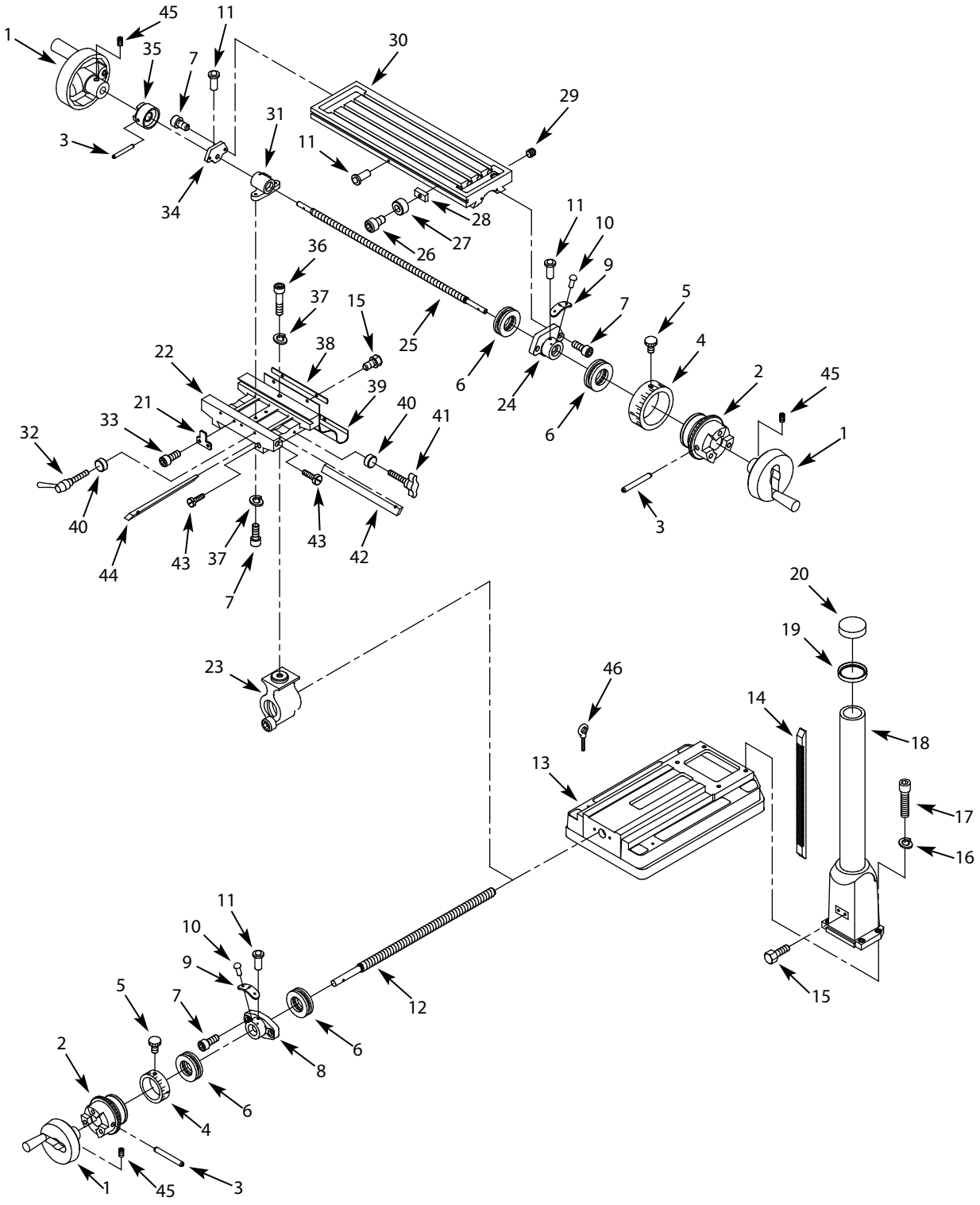


Figure 12 – Repair Parts Illustration for Head

REPLACEMENT PARTS LIST FOR BASE

Ref. No.	Description	Part No.	Qty.
1	Hand Wheel Assembly	962667400	3
2	Lead Screw Coupling	962667500	2
3	5×38mm Spring Pin	962667600	3
4	Lead Screw Dial	962667700	2
5	Dial Screw	962667800	2
6	51103 Thrust Bearing	960593500	4
7	5/16-18×1″ Socket Head Bolt	*	8
8	Cross Feed Flange	962668000	1
9	Scale	962668100	2
10	Rivet	960128600	4
11	Oil Fitting	960597900	5
12	Cross Feed Lead Screw	962668400	1
13	Base	N/A	1
14	Rack	962668600	1
15	5/16-18×1/2″ Hex Head Bolt	*	4
16	5/8″ Lock Washer	*	4
17	5/8-11×2½″ Hex Head Bolt	*	4
18	Column	962668700	1
19	Rack Retaining Ring	962668800	1
20	Column Cap With Screw	962668900	1
21	Table Stop Bracket	962671400	1
22	Saddle	962671500	1
23	Cross Feed Lead Screw Nut Assembly.	962670400	1
24	Right Lead Screw Flange	962669300	1
25	Longitudinal Lead Screw	962669400	1
26	1/4-20×1/2″ Socket Head Bolt	*	2
27	Stop Block	962669500	2
28	Stop Block Nut	962669600	2
29	1/4 NPT×3/8″ Plug	962669700	1
30	Table	962669800	1
31	Longitudinal Lead Screw Nut Assembly.	962669900	1
32	Table Lock Handle	962671300	2
33	5/16-18×3/4″ Socket Head Bolt	*	2
34	Left Lead Screw Flange	962670200	1
35	Left Lead Screw Coupling	962670300	1
36	5/16-18×2¼″ Socket Head Bolt	*	1
37	5/16″ Lock Washer	*	3
38	Lower Cover Plate	962670600	1
39	Way Cover	962670700	1
40	Bushing	962670800	4
41	Saddle Lock Handle	962670900	2
42	Table Gib	962671000	1
43	Gib Adjustment Bolt	962671100	2
44	Saddle Gib	962671200	1
45	6-1.0×10mm Set Screw	*	3
46	12-1.75×22mm Eyebolt	960535600	4
	Recommended Accessories		
	69-Piece Clamping Kit	9638950	
	Max-A-Just Mill Guard	961500000	
	4″ Angle Vise	9611351	
	4″ Drill Press Vise	9612352	
	4″ Standard Vise	9612403	
	4″ Quick Grip Vise	9612421	
	4″ Angle Vise	9611405	
	6″ Standard Vise	9612601	
	6″ Drill Press Vise	9612603	
	6″ Cross Vise	9630601	
	Mill Drill Stand	9680115	

(Δ) Not shown. (N/A) Not available as repair part. (*) Standard hardware item, available locally.

NOTES

NOTES

PALMGREN WARRANTY

C.H. Hanson / Palmgren warrants their products to be free of defects in material or workmanship. This warranty does not cover defects due directly or indirectly to misuse, abuse, normal wear and tear, failure to properly maintain the product, heated, ground or otherwise altered, or used for a purpose other than that for which is was intended.

The warranty does not cover expendable and/or wear part (i.e. v-belts, screws, abrasives, jaws), damage to tools arising from alteration, abuse or use other than their intended purpose, packing and freight. The duration of this warranty is expressly limited to the terms noted below beginning from the date of delivery to the original user.

The Palmgren branded items carry the following warranties on parts:

All arbor presses, vises, clamps, positioning tables, tombstones, jack screws and vise accessories - LIFETIME.

All bench grinders, drill presses, tapping machines, band saws, lathes, milling machines, abrasive finishing machines and work stands - 3 YEARS.

The obligation of C.H. Hanson / Palmgren is limited solely to the repair or replacement, at our option, at its factory or authorized repair agent of any part that should prove inoperable. Purchaser must lubricate and maintain the product under normal operating conditions at all times. Prior to operation become familiar with product and the included materials, i.e. warnings, cautions and manuals.

Failure to follow these instructions will void the warranty.

This warranty is the purchaser's exclusive remedy against C.H. Hanson for any inoperable parts in its product. Under no circumstances is C.H. Hanson liable for any direct, indirect, incidental , special or consequential damages including loss of profits in any way elated to the use or inability to use our products. This warranty gives you specific legal rights which may vary from state to state.

PALMGREN®

Palmgren - a C.H. Hanson Company
2000 N. Aurora Rd., Naperville, IL 60563 U.S.A.
or call ***1-800-827-3398***