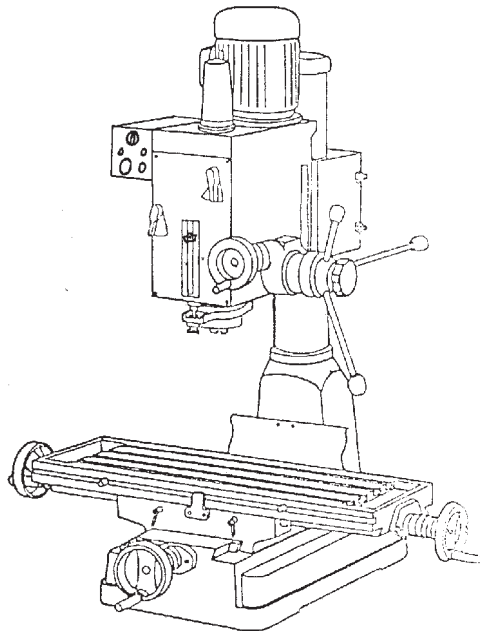


CENTRAL MACHINERY®

GEARED HEAD DRILL / MILL MACHINE

Model 42827

SET UP AND OPERATING INSTRUCTIONS



Distributed exclusively by Harbor Freight Tools®.

3491 Mission Oaks Blvd., Camarillo, CA 93011

Visit our website at: <http://www.harborfreight.com>



**Read this material before using this product.
Failure to do so can result in serious injury.
SAVE THIS MANUAL.**

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For technical questions or replacement parts, please call 1-800-444-3353.

Cover Revised 09b

SPECIFICATIONS

Motor:	110V/60Hz / 1 - Phase 1.5 HP	Drill Cap:	1-1/4"
		Face Mill Cap:	3"
6 Speeds (rpm):	95-175-310-450-850-1500	End Mill Cap:	3/4"
Motor rpm's:	1720	Tapping Cap:	1/4"
Spindle Taper:	R8	Max. Y-Travel:	6-13/16"
Spindle Collar:	1.740"	X-Travel:	19-13/16"
Spindle Stroke:	5"	Table Dimensions:	27-1/2"L x 9-1/2"W
Spindle to Table:	17-3/4"		

INCLUDED ACCESSORIES

5 and 6mm Hex Wrenches	14 / 17mm Open End Wrench
Draw Bar	Slotted Screwdriver
R-8/JT2 Chuck	Head Wrench

FEATURES

1. This machine may be used for surface cutting, drilling, milling, and tapping.
2. The high quality of this machine, and its ease of operation makes it suitable for use by students, amateurs, and home hobbyists, as well as skilled technicians.
3. Drilling and milling may be done using hand operated feeding, or worm-gear feeding.
4. Many of the adjustable nuts are bronze, for adjusting thread clearance and reducing wear. These bronze parts also allow screws to rotate smoothly and improve accuracy.
5. The vertical column is very strong and stiff, which makes the machine very stable and improves accuracy of manufactured parts.
6. The machine head is cast steel, and has been heat-treated, stress-relieved, and precision machined.
7. Machine gears are precision ground for smooth operation.
8. Speeds can be easily changed.
9. Thread tapping operations can be done in either rotation, and working depth can be controlled using a positive stop gauge.

SAVE THIS MANUAL

You will need the manual for the safety warnings and cautions, assembly instructions, operating procedures, maintenance procedures, trouble shooting, parts list, and diagram. Keep your invoice with this manual. Write the invoice number on the inside of the front cover. Keep both this manual and your invoice in a safe, dry place for future reference.

NOTICE

The Warnings, Cautions, and Instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

SAFETY WARNING & CAUTIONS

READ ALL INSTRUCTIONS BEFORE USING THIS TOOL!

1. **KEEP WORK AREA CLEAN.** Cluttered areas invite injuries.
2. **OBSERVE WORK AREA CONDITIONS.** Do not use tools in damp, wet, or poorly lit locations. Don't expose to rain. Keep work area well lit. Do not use electrically powered equipment in the presence of flammable gases or liquids.
3. **KEEP CHILDREN AWAY.** Children must never be allowed in the work area. Do not let them handle machines, tools, or equipment.
4. **STORE IDLE EQUIPMENT.** When not in use, tools must be locked up in a dry location to inhibit rust. Always lock up tools and keep out of reach of children.
5. **DO NOT FORCE THE TOOL.** It will do the job better and more safely at the rate for which it was intended. Do not use inappropriate attachments in an attempt to exceed the tool's capacities.
6. **USE THE RIGHT TOOL FOR THE JOB.** Do not use a tool for a purpose for which it was not intended.
7. **DRESS PROPERLY.** Do not wear loose clothing or jewelry, as they can be caught in moving parts. Non-skid footwear is recommended. Wear restrictive hair covering to contain long hair. Always wear appropriate work clothing.
8. **USE EYE, EAR AND BREATHING PROTECTION.** Always wear ANSI approved impact safety goggles if you are producing metal filings or wood chips. Wear an ANSI approved dust mask or respirator when working around metal, wood, and chemical dusts and mists. Use ANSI approved ear protection when working in a loud or noisy environment.
9. **DO NOT ABUSE THE POWER CORD.** Protect the power cord from damage, either from impacts, pulling or corrosive materials. Do not yank machine's cord to disconnect it from the receptacle.
10. **DO NOT OVERREACH.** Keep proper footing and balance at all times. Do not reach over or across running machines.
11. **MAINTAIN TOOLS WITH CARE.** Keep tools sharp and clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect power cord periodically and, if damaged, have it repaired by an authorized technician. Inspect all hydraulic seals for leaks prior to use. Control handle and power switch must be kept clean, dry, and free from oil and grease at all times.
12. **REMOVE ADJUSTING KEYS AND WRENCHES.** Be sure that keys and adjusting wrenches are removed from the tool or machine work surface before operation.
13. **AVOID UNINTENTIONAL STARTING.** Be sure that you are prepared to begin work before turning the start switch on.

14. **STAY ALERT.** Watch what you are doing. Do not operate this machine when you are tired.

15. **DO NOT OPERATE THIS MACHINE WHILE UNDER THE INFLUENCE OF ALCOHOL, DRUGS, OR PRESCRIPTION MEDICINES.**

16. **CHECK FOR DAMAGED PARTS.** Before using any tool, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment and binding of moving parts, any broken parts or mounting fixtures, and any other condition that may affect proper operation. Any part that is damaged should be properly repaired or replaced by a qualified technician. Do not use the tool if any switch does not turn on and off properly.

17. **REPLACEMENT PARTS AND ACCESSORIES.** When servicing, use only identical replacement parts intended for use with this tool. Replacement parts are available from Harbor Freight Tools. Use of any other parts will void the warranty.

18. **USE THE RIGHT TOOL FOR THE JOB.** Do not attempt to force a small tool or attachment to do the work of a larger industrial tool. There are certain applications for which this tool was designed. Do not modify this tool and do not use this tool for a purpose for which it was not intended.

19. **MAINTENANCE.** For your own safety, maintenance should be performed regularly by a qualified technician.

SPECIAL WARNINGS WHEN USING THIS DRILLING / MILLING MACHINE

Using this machine may create special hazards.

Take particular care to safeguard yourself and those around you.

Electrical Safety. *Never operate any tool if there is an electrical hazard.* Never operate an electrical tool in wet conditions. Never operate a tool with an improper electrical cord or extension cord. Never operate an electrical tool unless you are plugged into a properly grounded outlet, which supplies 110 Volts at 60 Hz. We recommend you use a circuit which is protected by an appropriate circuit breaker.

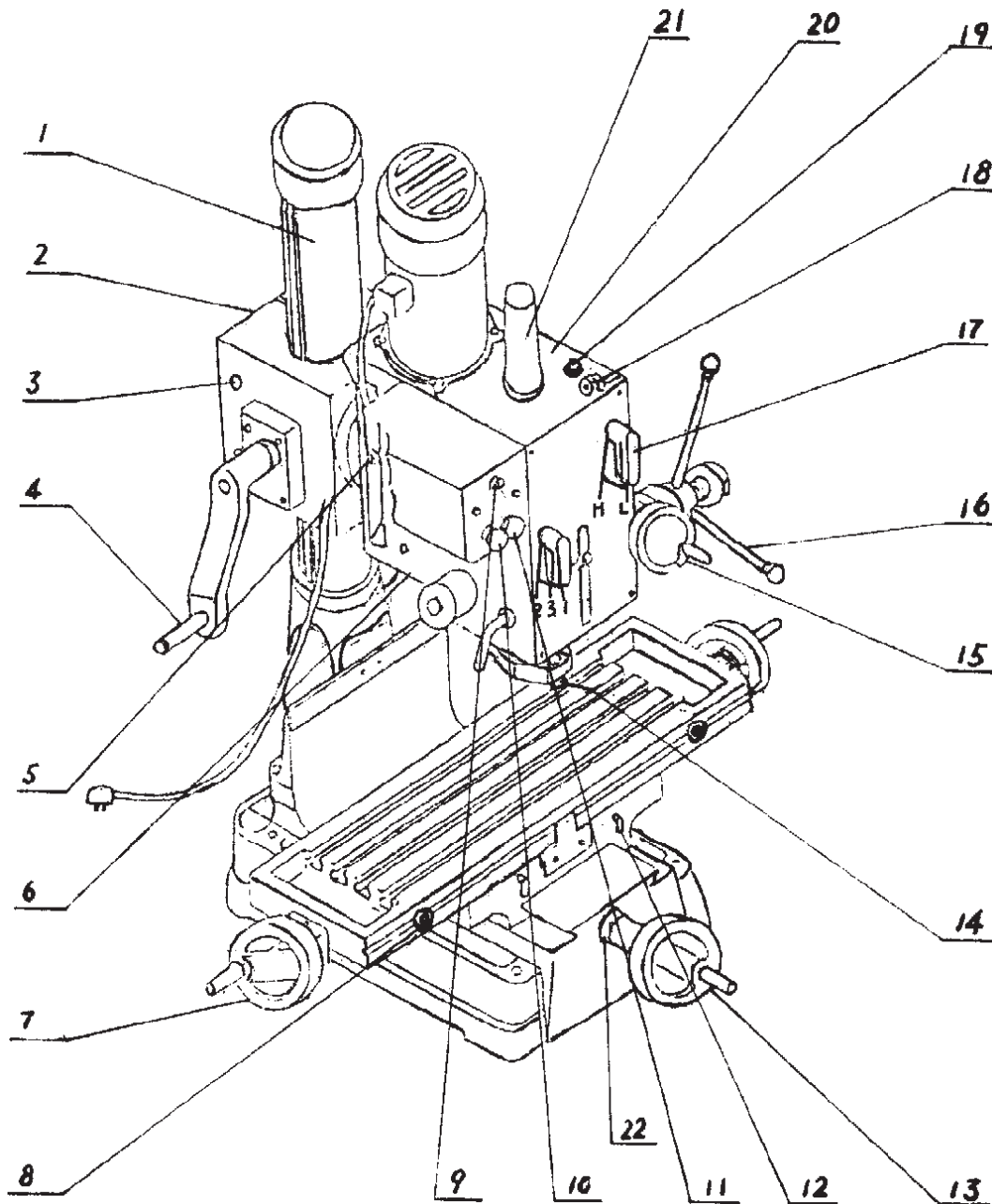
Ejected Material. *Use safe practices to avoid injury from ejected material.* Because milling tools and workpieces turn at high speed, there is a danger of being injured by materials that may be ejected. Always wear ANSI-certified eye protection. Never attempt to machine any item if it is not adequately held. Always stand to one side of the plane in which the materials are spinning, to avoid being hit if an item is ejected. Never allow bystanders to be in the proximity of this machine while in operation.

Entanglement. *Use extreme caution to prevent loose materials from being caught in the machine.* Never operate this machine with loose clothing, long hair, jewelry, or other items which may become caught in the tools or workpieces. In case of entanglement, press the OFF switch immediately.

NOTICE: No list of warnings can be all inclusive. The operator must supply common sense, and operate this tool in a safe manner.

FEATURES AND CONTROLS OF THE #42827 DRILL / MILL MACHINE

Figure 1.



- | | | | |
|-----|-----------------------|-----|---------------------------|
| 1. | Column | 12. | Leaf Screw |
| 2. | Head Collar | 13. | Cross Table Feed Wheel |
| 3. | Head Collar Lock Bolt | 14. | Positive Depth Stop Gauge |
| 4. | Head Crank | 15. | Spindle Micro Feed Handle |
| 5. | Lock Nut | 16. | Spindle Feed Handle |
| 6. | Oil Drain Plug | 17. | Speed Lever |
| 7. | Table Feed Wheel | 18. | Air Flow Plug |
| 8. | Travel Stop | 19. | Oil Filler Plug |
| 9. | Knob | 20. | Head Body |
| 10. | Red Bush Button | 21. | Arbor Bolt Cover |
| 11. | Green Push Button | 22. | Scale |

UNPACKING AND INSTALLATION

1. Remove protective crating and skids carefully. In the event of damage in transit, contact Harbor Freight Tools immediately.
2. Read the owner's manual and become familiar with the parts and controls on the drawings before using this machine, as familiarity with the controls will enhance your ability and safety in using it.

INSTALLATION

1. It is important that the machine be located on a hard, solid, level floor. Find a location that supplies easy access to 110 Volt electrical service. Make sure this machine is located in a well lighted and well ventilated area. The floor should be resistant to vibration.
2. Before moving the machine, be sure the head is fixed on the column. Before moving the machine, lower the head as much as possible to lower the center of gravity. When moving the machine be careful to keep it balanced, and not allow it to topple over.
3. To set the machine on a solid concrete foundation, it's advisable to apply a little grout to touch up any unevenness in the concrete in order to get a solid foundation at all points.
4. When setting machine on a floor that has any surface irregularities, shims should be used to correct this condition to the greatest extent possible.
5. There are 4 holes in the base for mounting the machine permanently to a smooth, solid, and level floor.

CLEANING AND LUBRICATION

1. Thoroughly clean the machine with a commercial degreaser. Do not use gasoline, kerosene or other flammable liquids. Avoid getting solvent on rubber parts, or into the electrical controls or motor.
2. After cleaning, coat all bright metal with a light lubricant to prevent corrosion.
3. Lubricate all points indicated in *Figure 2* with a 10 weight machine oil.
4. Remove the oil filler plug and fill the reservoir with heavy motor oil, until the oil level reaches the middle of the oil fluid level indicator. Replace the plug.

LEVELING THIS MACHINE

1. Before operation, it is critical to level the work surface both lengthwise and crosswise, using a precision level. It will not be possible to maintain accuracy of machined parts if the mill is not properly leveled to start.

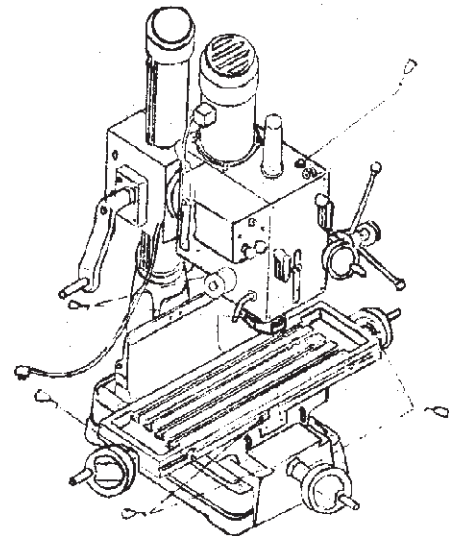


Figure 2. Lubrication Points.

BASIC OPERATION

Prior to Operation

1. Check the oil level, and if necessary fill to the mid point of the oil level window.

Basic Controls

Please refer to Figure 1 on page 5.

1. Raise and lower the Head by using the Head Crank (#4).
2. Feed the Spindle using Spindle Feed Handle (#16). Precise movements may be made using the Spindle Micro Feed Handle (#15).
3. Move or feed the table from side to side by using the Table Feed Wheel (#7).
4. Move the Table front to back using the Cross Table Feed Wheel (#13).

Adjusting the Head

1. To raise or lower the head, loosen the 2 heavy duty head lock nuts shown in *the left part of Figure 3*. Use the left side head handle to raise or lower the head on its rack and pinion mechanism.
2. The head may be rotated 360° by loosening the same bolts mentioned in item 1. Adjust the head to the desired angle, then fix the heavy-duty head lock nuts. Periodically check the tightness of these nuts, especially during prolonged use of the machine.
3. To set the head at an angle, loosen the three nuts shown in *the right part of Figure 3*. Retighten the nuts when you have set the angle at the desired degree. Refer to the scale on the right side of the head to read the angle.

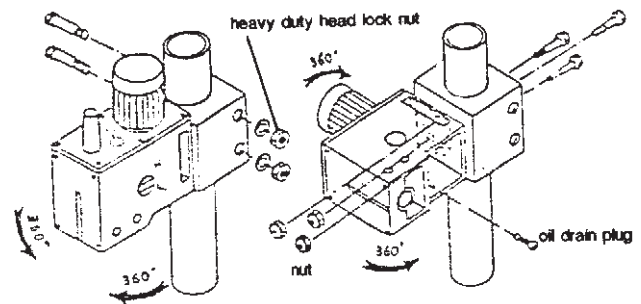


Figure 3. Adjusting the Head

Preparing for Drilling

Please see Figure 4.

1. Rotate the knob in the center of the spindle feed handle (#16) counterclockwise to loosen the spindle for vertical travel.
2. You can move the spindle vertically by operating the spindle feed handle.
3. For more precise movement of the spindle, operate the micro feed handle (#15).
4. For drilling blind holes (which do not pass through the workpiece), set the positive depth stop gauge (#14). To do so, first determine the desired depth. Then adjust the positive stop gauge so that the distance from the tip of the drilling bit to the end of the gauge is equal to the desired depth.
5. For drilling holes that pass through the workpiece, set the stop gauge in its uppermost position.

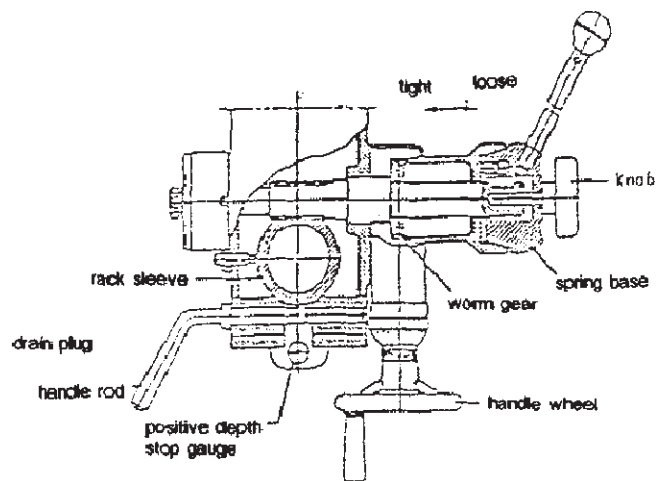


Figure 4. Settings for Drilling

Preparing for Milling

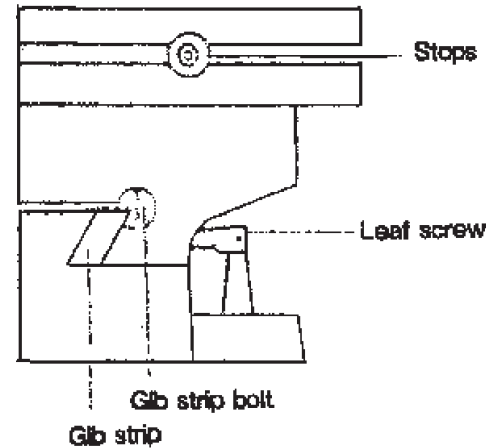
1. Adjust the positive stop gauge to its uppermost position.
2. Using the spindle feed handle, adjust the bit to approximately the correct height. Tighten the knob in the center of the spindle feed handle (#16).
3. Set the final vertical adjustment using the micro feed handle.
4. Lock the rack sleeve at this height with the fixed bolt.

Preparing for Tapping

1. Adjust the positive depth gauge to the required position.
2. Loosen the knob in the center of the spindle feed handle.

Adjusting Table Slack and Compensating for Wear

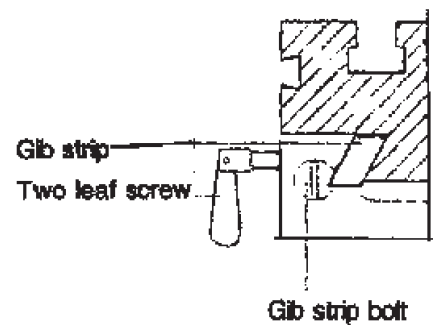
1. Your machine is equipped with gib strip adjustment to compensate for wear and excess slack on cross and longitudinal travel.
2. Rotate the gib strip bolt slightly counterclockwise to tighten the gib strip. Rotate it slightly clockwise to loosen the gib strip.
3. Adjust the gib strip bolt until very slight drag is felt when moving the table.



Cross feed view

Locking the Table Base and Machine Base

1. When milling using the longitudinal feed, it is a good idea to lock the cross feed table to ensure the accuracy of your work. To do this, tighten the small leaf screw located on the right side of the table base.
2. When milling using the cross feed, lock the longitudinal travel. Do this by tightening the two small leaf screws on the front of the table base.
3. Adjustable travel stops are mounted on the front of the table to limit cross travel, and therefore milling length.



Longitudinal feed view

Changing Machine Speed

1. Turn the power off.

Levers	L-1	L-2	L-3	H-1	H-2	H-3
RPM @ 60Hz	95	175	310	450	850	1500

Figure 6. Machine Speed Lever Settings.

2. To select the proper speed, move the speed lever to the desired position. See Figure 6.
3. If the lever does not move smoothly and completely, remove the arbor bolt cover (#21). Rotate the spindle slightly to engage the gears, then replace the arbor bolt cover.
4. Recheck the lever setting, and then turn the power on.

Figure 5. Adjusting the Gib Strips.

Installing and Changing Tools

WARNING: Turn off the power and unplug the machine before installing or changing tool bits.

Removing Face Mill or Drill Chuck Arbor

1. Remove the arbor bolt cover (#21) on the top of the head body (#20).
2. Loosen the arbor bolt at the top of the spindle shaft approximately 2 turns with a suitable wrench.
3. Rap the top of the arbor bolt with a mallet.
4. After the taper has broken loose, hold the chuck arbor with one hand, and detach the arbor bolt with the other hand.
5. Replace the arbor bolt cover.

Installing a Face Mill or Cutter Arbor

1. Remove the arbor bolt cover (#21) on the top of the head body (#20).
2. Insert the cutter and cutter arbor into the taper of the spindle.
3. Tighten the arbor bolt securely, but do not overtighten.
4. Replace the arbor bolt cover.

Additional Tools and Accessories You Will Find Helpful

Your Drill Mill machine is equipped with an R-8 spindle taper. Many tools, bits, and accessories are available for this standard.

1. Taper Drills
2. Reamers
3. End Mills
4. Cutter Arbors
5. Taps
6. Collets
7. Adapters and Sleeves.
8. Table Power Feed

Additional Safety Rules for Drilling and Milling

1. Be sure the drill bit or cutting tool is securely locked in the chuck.
2. Be sure the chuck key is removed from the chuck before turning on the power.
3. Adjust the table or depth stop to avoid drilling into the table.
4. Shut off the power, remove the drill bit or cutting tool, and clean the table before leaving the machine.
5. Always use clamps or a vise to hold the workpiece, to prevent it from moving, rotation or flying off while being machined.
6. Never wear gloves when machining, as they can become entangled in the bit, causing injury.

Specification of the T-Slot.

Please refer to Figure 7. Purchase or make T-bolts and other table top fixtures to fit these dimensions.

NOTE: These dimensions are in millimeters

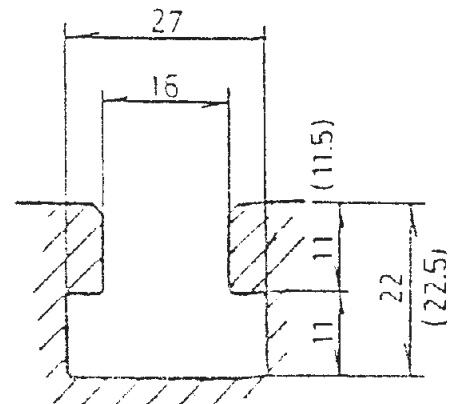


Figure 7. T-Slot Dimensions.

TROUBLESHOOTING

The machine doesn't run when the power switch is turned ON.

1. The knob (#9) is in the STOP position.
2. A fuse has burned out. Check in the switch box, and replace if necessary.
3. If there is a surge in the current, the circuit breaker may have opened. Press the circuit breaker back in, if it is in the open position.
4. The gears may not be engaged. Adjust the speed lever to be sure it is engaged.
5. A capacitor may have failed. Check the capacitance and replace if necessary.

The motor overheats, or there is insufficient power.

1. The machine is overloaded. Reduce the feed rate, and/or increase the spindle speed.
2. The voltage supply is too low. If you have an unreliable power supply, check with a qualified electrician to repair it.
3. The magnetic switch may have a burned or broken contact point. Replace the switch.
4. The contactor relay may be broken. Replace it.
5. The motor carbon brushes may be worn or cracked. Check them and replace if needed.
6. There may be a poor electrical connection. Have a qualified electrician check the wiring and power supply.
7. The motor may be burned out. After a long period of heavy use, the motor may burn out. If so, replace the motor.
8. The drill bit or cutting blade may be worn. Sharpen or replace the bits as needed.

The spindle bearing is very hot.

1. There is insufficient lubrication. Turn off the power, and check the bearing for lubrication. If necessary, apply a medium weight bearing grease.
2. The spindle bearing is worn, or is fixed too tight. Turn off the power, unplug the electrical connection, and rotate the spindle by hand. It must turn freely. If not, check the bearing adjustment. If you feel unevenness in the bearing, you will have to replace it.
3. The spindle has been turning at high speed for a long time. After long use, turn the machine off for a while to give it a rest, and allow it to cool off.

The Table Travel is not Balanced

1. The spindle taper gap is too wide. Adjust the arbor bolt properly.
2. One of the leaf bolts may be loose. Check and tighten them if necessary.
3. The feed is too deep. Reduce the depth of the cut, and make several passes to reach the required depth.
4. The gib strip may be out of adjustment. Check it and adjust it if necessary.

There is a vibration, and the cut is not smooth

1. The spindle bearing may be improperly adjusted or is worn. Check it and adjust or replace as necessary.
2. The spindle is loose up and down. Check the adjustment of the two inner bearing covers. Adjust them so there is no free play in the taper bearing, and the bearing turns freely. Tighten them against each other to save this adjustment.
3. The gap of the taper sliding plate is too wide. Adjust the bolt tension.
4. The chuck is loose. Tighten the chuck.
5. The drill bit or cutter is dull. Sharpen or replace it. Use cutting fluid to preserve tool life.
6. The workpiece is not held firmly. Check the clamps or vise you are using, and assure that the workpiece cannot move.

The micro feed does not work smoothly

1. The clutch may be loose. Check this and tighten if necessary.
2. The worm or worm shaft may be worn. Check these and replace if necessary.
3. The handwheel fixed screw may be loose. Check it and tighten if necessary.

The workpiece is not machined accurately

1. A heavy workpiece may be out of balance. Check to see that heavy workpieces are held in balance.
Out of balance pieces may shift when being machined.
2. A hammer has been used on the workpiece. Never strike the workpiece with a hammer.
3. The table may not be level. Check the table with a spirit level to be sure it is level both side to side and front to back.
4. The machine may not be stable in the floor. Check to be sure the machine is firmly mounted to the floor.

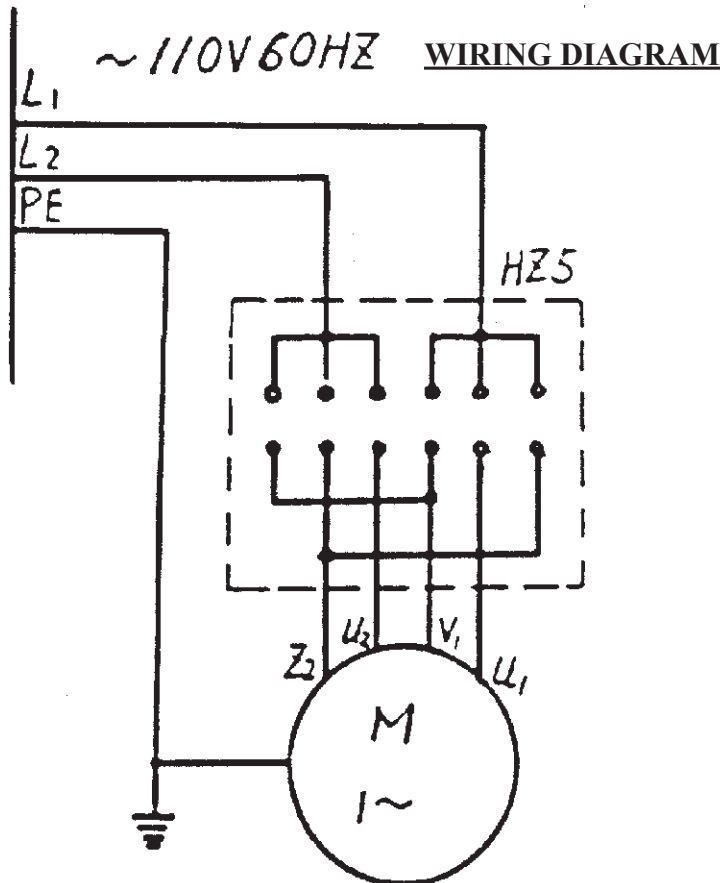
ELECTRICAL WIRING

NOTE: This machine is designed to operate on 110 Volt/60 Hz Single Phase power supply only. This machine is supplied with a 3-prong grounded plug. Use only a power supply which is grounded, and which is protected by an appropriate circuit breaker. Check with a qualified electrician before using this machine.

Serious injury or damage to property can result from improper electrical connection.

NOTICE: 110 Volt systems deliver highly energetic currents which are capable of causing lethal injury.

Do not operate this machine without first obtaining professional installation and safety inspection to prevent operator injury.



WIRING DIAGRAM KEY

	1	0	2
L1-V1	X	-	-
L1-Z2	-	-	X
L2-Z2	X	-	-
L2-V1	-	-	X
L1-U1	X	-	X
L2-U2	X	-	X

Figure 8. Wiring Diagram.

MAINTENANCE

After each use:

1. Turn off the power switch and unplug the machine from its power source.
2. Remove any tool bits, clean and lubricate them, and return them to their storage case.
3. Using a stiff bristle brush, brush off all chips and shavings left from the machining operation.
4. Using a rag, wipe off any excess or dirty oil or cutting fluid left on the machine.
5. Lubricate the points indicated in *Figure 2*. Apply light grease or oil to all unpainted metal to prevent corrosion.
6. Cover the machine to prevent dust or dirt contamination when not in use.

Daily Maintenance:

1. Fill the oil reservoir to the proper level before each use.
2. Check the tightness of the bolts holding the head in place.
3. If overheating is observed, or unusual noises are produced, stop the machine immediately to check for lack of lubrication, faulty adjustments, dull tool bits, or other deficiencies. Correct any problems before resuming work.
4. Keep the work area clean. If chips or shavings accumulate on the table or fixtures, shut off the power and clean the chips away with a stiff bristle brush. Re-check the lubrication before continuing.

Weekly Maintenance:

1. Clean and coat the lead screw with oil.
2. Check the lubrication of the sliding parts of the table. Apply light grease if needed.

Monthly Maintenance:

1. Adjust the accuracy of the slides on both the cross and longitudinal feeds.
2. Lubricate the bearings, worm gear and worm shaft with light grease.

Yearly Maintenance:

1. Adjust the table to assure that it is level in all directions.
2. Check the electrical cord, plug, circuit breakers and related connections to assure that they are secure and safe.
3. Drain the lubricant from the gear box and replace it with heavy grade motor oil.

NOTE: Some parts on the following pages are listed and shown for illustration purposes only and are not available individually as replacement parts.

PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY: NEITHER THE MANUFACTURER NOR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT: IN FACT THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

GEARED HEAD DRILL MILL MACHINE, HEAD PARTS LIST

Please refer to Parts Diagrams on Page 16 and 17

Part	Description	Qty.
1-01	Arbor Bolt Cover	1
1-02	Arbor Bolt	1
1-04	C-Retainer Ring	1
1-05	Ball Bearing (80108)	2
1-06	Spindle Sleeve Cover	1
1-07	Oil Seal	1
1-08	Seal Retainer	1
1-09	Cap	1
1-10	C-Retainer Ring	1
1-11	Head Body	1
1-12	Rubber Flange	2
1-13	Feed Base	1
1-14	Lock Nuts	2
1-15	Taper Roller Bearing (7206E)	1
1-16	Rack Sleeve	1
1-17	Spindle Shaft	1
1-18	Taper Roller Bearing (7207E)	1
1-19	Bearing Cap	1
1-20	Gear Shaft	1
1-21	Gear	1
1-22	Grip	4
1-23	Ring	1
1-24	Handle Rod	1
1-25	Fixed Tight Collar	1
1-26	Fixed Tight Collar (thread)	1
1-27	Screw Key	1
1-28	Oil Seal	1
1-29	Gear	1
1-30	Spring and Ball	3
1-31	Gear Shaft	1
1-32	Key	1
1-33	Ring	1
1-34	Gear	1
1-35	Bearing Spacer	1
1-36	Sleeve	1
1-37	Gear	1
1-38	Key	1
1-39	Handle Rod	1
1-40	Knob	3
1-41	Ball Bearing (80202)	3
1-42	Inner Ring	1
1-43	Shaft	1
1-44	Micro Adjusting Indicator	1
1-45	Worm Cover	1

Part	Description	Qty.
1-46	Ball Bearing (202G)	2
1-47	Worm Shaft	1
1-48	Key	2
1-49	Gear	1
1-50	Oil Seal	1
1-51	Ball Bearing (80107)	1
1-52	Head Body Fix Bolt	2
1-53	Oil Drain Plug	1
1-54	Graduated Rod	1
1-56	Switch Box	1
1-57	Main Cable	1
1-58	Head Handle	1
1-59	Worm Shaft	1
1-60	Worm	1
1-61	Shaft	1
1-62	Handwheel	1
1-63	Nuts	3
1-64	Spring Washer	3
1-65	Bolt	3
1-66	Lever Bracket	2
1-67	Lever (Left)	1
1-68	Lever (Right)	1
1-69	Screw	2
1-70	Lever Shaft (Right)	1
1-71	Lever Shaft (Left)	1
1-72	Name Plate	1
1-73	Screw	4
1-74	Screw	4
1-75	Speed Lever	2
1-76	Degree-Meter	1
1-77	Rivet	2
1-79	Head Collar	1
1-80	Motor Cable	1
1-81	Oil Filler Plug	2
1-82	Bolt	6
1-83	Pin	2
1-84	Head Body Cover	1
1-85	Screw with Plumb Knob	1
1-86	Motor	1
1-87	Fluid Level Indicator	1
1-89	Airflow Plug	1
1-90	C-Ring	2
1-91	Set Distance Nut	1
1-92	Set Position Block	1

DRILL MILL MACHINE, PARTS LIST

Please refer to Parts Diagrams on Page 16 and 17

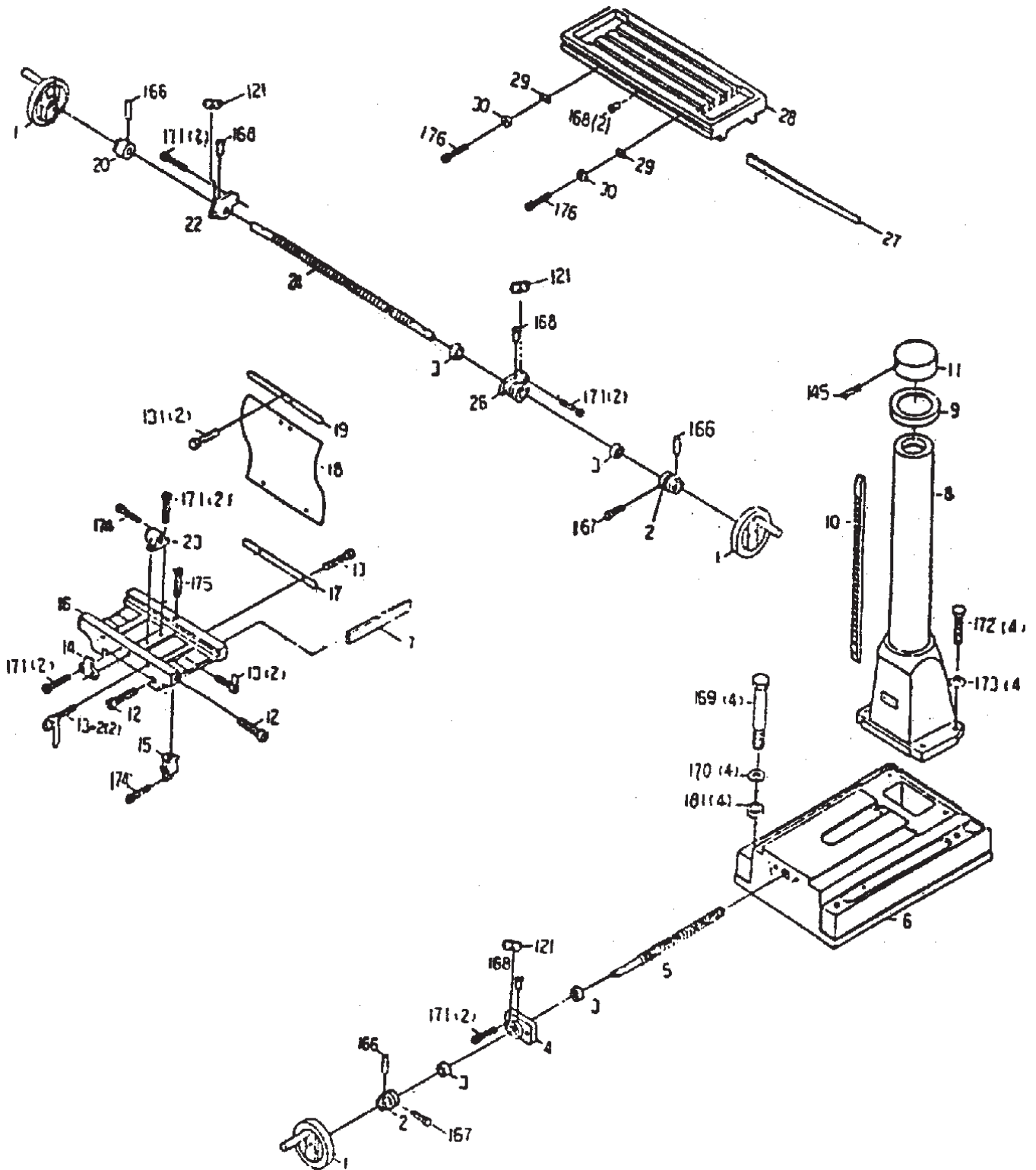
Part	Description	Qty.
1-93	Lock Nut	1
1-94	Support Base	1
1-95	Handle	1
1-96	Oil Seal	2
1-101	Head Raise Bracket	1
1-102	Limit Plate	4
1-103	Spring Cover	1
1-104	Spring	1
1-105	Spring Base	1
1-106	Pinion Shaft	1
1-107	Worm Gear	1
1-108	Feed Cover	1
1-110	Spring Base	1
1-111	Lock Bolt with Knob	1
1-115	Spring	1
1-134	Hex Head Bolt	1
1-135	Hex Nut	1
1-136	Spring Pin	1
1-137	Lock Washer	1
1-139	Phillips recessed round head screw	3
1-140	Travel Switch	2
1-141	Hex Nut	1
1-142	Key	1
1-143	Hex Socket Head Screw	2
1-145	Hex Set Screw	3
1-146	Hex Set Screw	1
1-147	Hex Set Screw	2
1-148	C-Retainer Ring	1
1-150	Locknut	2
1-151	Washer	2
1-153	Hex Set Screw	1
1-154	C-Retainer Ring	2
1-155	Hex Set Screw	4
1-156	Rod	1
1-157	Retainer	1
1-158	Knob	1
1-184	Screw	1
1-185	Washer	1
1-187	Washer	1
1-188	Phillips Head Recessed Screw	1
1-189	Travel Switch Base A	1
1-190	Travel Switch Base B	1
2-01	Table Handle with Wheel	3
2-02	Dial Clutch	2

Part	Description	Qty.
2-03	Thrust Bearing (8103)	4
2-04	Square Flange	1
2-05	Table Screw	1
2-06	Base	1
2-07	Gib Strip	1
2-08	Column Base	1
2-09	Column Base Ring	1
2-10	Rack	1
2-11	Column Head	1
2-12	Gib Strip Bolt	2
2-13	Leaf Screw	2
2-13-2	Knob	2
2-14	Moveable Fixed Bock	2
2-15	Table Base Nut	1
2-16	Center Base	1
2-17	Antidust Plate	1
2-18	Antidust Plate	1
2-19	Antidust Plate	1
2-20	Table Clutch	1
2-22	Left Flange	1
2-23	Table Nut	1
2-24	Table Screw	1
2-26	Right Flange	1
2-27	Gib Strip	1
2-28	Table	1
2-29	Fixed Block	2
2-30	Moveable Fixed Ring	2
2-37	Base Screw Collar	1
2-121	Meter Indicator	4
2-131	Hex Head Bolt	4
2-143	Hex Set Screw	10
2-145	Hexagon	1
2-166	Spring Pin	3
2-167	Indicated Zero with Screw	2
2-168	Oil Ball	5
2-169	Hex Head Bolt	4
2-170	Washer	4
2-171	Hex Set Screw	10
2-172	Hex Head Bolt	4
2-173	Spring Washer	4
2-174	Hex Set Screw	2
2-175	Hex Set Screw	1
2-176	Hex Set Screw	2

VERTICAL MILLING MACHINE, BASE PARTS DIAGRAM

Please refer to Parts List on Page 15.

*NOTE: When ordering parts from this diagram, use prefix "2".
(example: P/N 2-01 Table Handle with Wheel)*



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