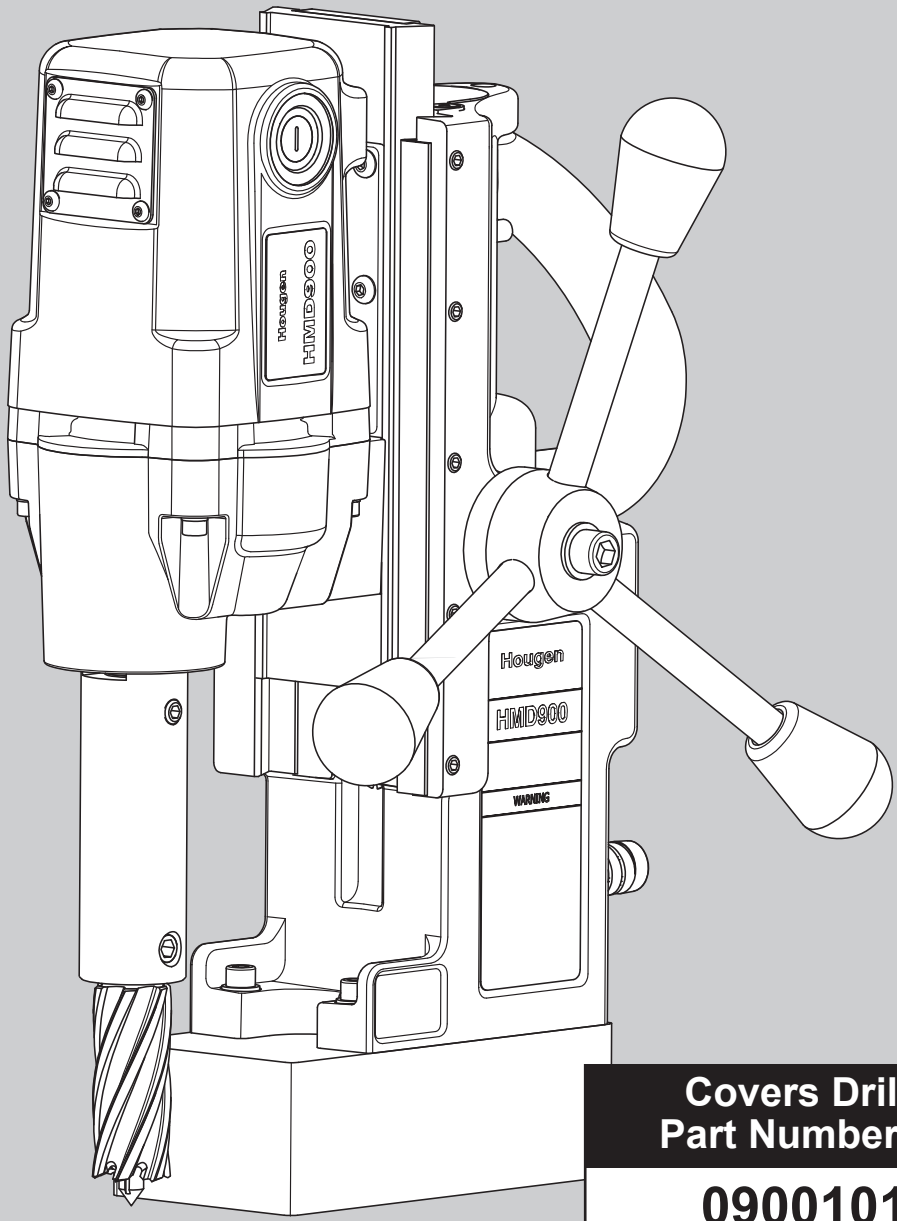
Hougen®

Solving holemaking problems through innovation™

OPERATOR'S MANUAL

HMD900 PORTABLE MAGNETIC DRILL



Covers Drill Part Numbers:

0900101

OM900 Printed in U.S.A.
10/2023

HOUGEN® PORTABLE MAGNETIC DRILL
HMD900 MODEL

Welcome to Hougen

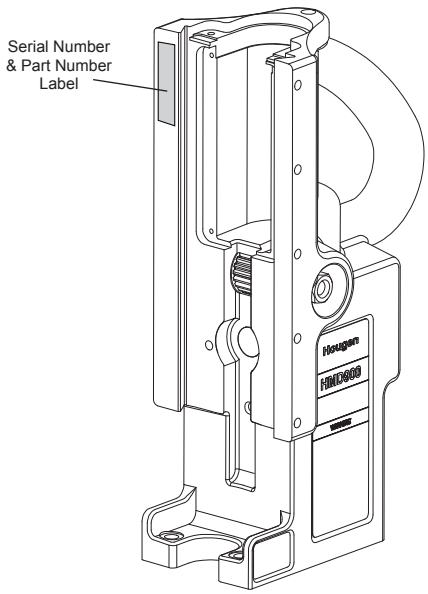
Congratulations on your purchase of the Hougen® Portable Magnetic Drill. Your model is designed to produce superior holes quickly and efficiently. Through constant innovation and development, Hougen is committed to provide you with hole producing tools and products to help you be more productive.

Before attempting to operate your new Portable Magnetic Drill, please read all instructions first. These include the Operator's Manual and Warning Label on the unit itself. With proper use, care, and maintenance, your model will provide you with years of effective hole drilling performance. Once again, thank you for selecting our product and welcome to Hougen.

Specifications

Cutter Type.....Hougen "12,000-Series" and Copperhead™ Cutters
Hole Capacity..... 7/16" to 1-1/2" (12mm - 38mm)
Depth of Cut.....2" (50mm)
Motor.....450 RPM, 8A, 920W (115V)
Net Weight.....27.7 lbs. (12.6 kg)

Please refer to the Serial/Part number label on your housing to direct you to the correct breakdown.



Part Number

0900101 HMD900 115V

UNPACKING YOUR NEW MAGNETIC DRILL

1. Open shipping carton and remove the literature and hardware packages.
2. **Read and Follow All Instructions** before attempting to operate your new Magnetic Drill.
3. Please visit Hougen.com to register your unit. It is important that Hougen Manufacturing, Inc. have a record of product ownership.
4. Open hardware package and check contents:
   - **04558** Feed handles (3)
   - **04532** Feed handle knobs (3)
   - **40222** Set screw for cutter installation (2)
   - **10730** Safety chain
   - **09405** 7/32" Hex wrench
5. Using the handle of Magnetic Drill, lift unit out of the shipping box.
6. Remove all packing and securing material from the drill unit.
7. Screw the three knobs into the three feed handles and then screw handles into the hub assembly. Do not over tighten or may strip the knobs.
8. Your Magnetic Drill was factory adjusted prior to shipping. Check to make sure that all gib adjustment screws, motor mount screws, and magnet mounting screws are snug and have not vibrated loose in transit.
9. Your new Magnetic Drill comes complete with arbor mounted. The 3/4" diameter arbor bore fits all 3/4"-shank "12,000-Series" Hougen Cutters and Copperhead Carbide Tip Cutters.

Reread all Safety Warnings listed in the Operator's Manual and on the drill unit to avoid injury. Follow all operating procedures.

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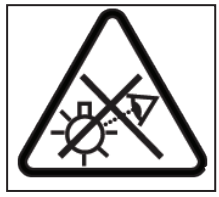
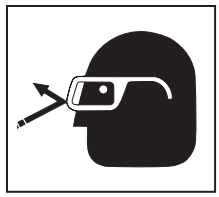
WARNING

Cutters are sharp. Wear gloves when installing or removing cutter from arbor. Do not grab a rotating cutter.

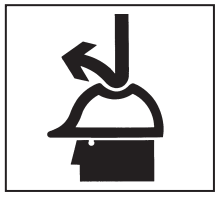
To prevent electric shock, do not use power tools near wet areas, or where power tool may become wet.



Do not stare at operating light.



Always wear eye protection while using cutting tools, or in the vicinity of cutting.



The slug is ejected at the end of the cut. Do not aim cutter or arbor so that ejected slug may hit someone around, or below you.

IMPORTANT SAFETY INSTRUCTIONS

⚠ WARNING: **Read all safety warnings, instructions, illustrations and specifications provided with this power tool.** *Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.*

1. Work Area Safety

a) Keep your work area clean and well lit. *Cluttered or dark areas invite accidents.*

b) Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust. *Power tools create sparks which may ignite the dust or fumes.*

c) Keep children and bystanders away while operating a power tool. *Distractions can cause you to lose control.*

2. Electrical Safety

a) Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools. *Unmodified plugs and matching outlets will reduce risk of electrical shock.*

b) Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges and refrigerators. *There is an increased risk of electric shock if your body is earthed or grounded.*

c) Don't expose power tools to rain or wet conditions. *Water entering a power tool will increase the risk of electric shock.*

d) Do not abuse the cord. Never use the cord for carrying or unplugging the power tool. Keep cord away from heat, oil, sharp edges or moving parts. *Damaged or entangled cords increase the risk of electric shock.*

e) When operating a power tool outdoors, use an outdoor extension cord suitable for outdoor use. *Use of cord suitable for outdoor use reduces the risk of electric shock.*

f) If operating a power tool in a damp location is unavoidable, use a residual current device (RCD) protected supply. *Use of an RCD reduces the risk of electric shock.*

3. Personal Safety

a) Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol, or medication. *A moment of inattention while operating power tools may result in serious personal injury.*

b) Use personal protective equipment. Always wear eye protection. *Protective equipment such as dust mask, non-skid shoes, hard hat or hearing protection used for appropriate conditions will reduce personal injuries.*

c) Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool. *Carrying power tools with your finger on the switch or energizing power tools that have the switch on invites accidents.*

d) Remove any adjusting keys or wrench before turning the power tool on. *A wrench or a key that is left attached to a rotating part of the power tool may result in personal injury.*

e) Do not overreach. Keep proper footing and balance at all times. *This enables better control of the power tool in unexpected situations.*

f) Dress properly. Do not wear loose clothing or jewelry. Keep your hair and clothing away from moving parts. *Loose clothes, jewelry or long hair can be caught in moving parts.*

g) If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used. *Use of dust collection can reduce dust-related hazards.*

f) Do not let familiarity gained from frequent use of tools allow you to become complacent and ignore tool safety principles. *A careless action can cause severe injury within a fraction of a second.*

g) Always use safety chain. *Mounting can release.*

4. Power Tool Use and Care

a) Do not force the power tool. Use the correct power tool for your application. *The correct power tool will do the job better and safer at the rate for which it is designed.*

b) Do not use the power tool if the switch does not turn it on or off. *Any power tool that cannot be controlled with the switch is dangerous and must be repaired.*

c) Disconnect the plug from the power source and/or remove the battery pack, if detachable, from the power tool before making any adjustments, changing accessories or storing power tools. *Such preventative safety measures reduce the risk of starting the tool accidently.*

(Continued on page 4)

Save all warnings and instructions for future reference.

IMPORTANT SAFETY INSTRUCTIONS

d) Store idle power tools out of reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool. *Power tools are dangerous in the hands of untrained users.*

e) Maintain power tools and accessories. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use. *Many accidents are caused by poorly maintained power tools.*

f) Keep cutting tools sharp and clean. *Proper maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.*

g) Use the power tool, accessories and tool bits etc. in accordance with the instructions, taking into account the working conditions and the work to be performed. *Use of the power till for operations different from those intended could result in a hazardous situation.*

h) Keep handles and grasping surfaces, clean and free from oil and grease. *Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.*

5. Service

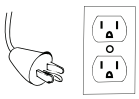
a) Have your power tool serviced by a qualified repair person using only identical replacement parts. *This will ensure that the safety of the power tool is maintained.*

ADDITIONAL SAFETY INSTRUCTIONS

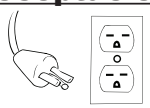
Safe Electrical Connection

Your Drill is rated for use on 115VAC or 230V at 50-60Hz. Do not attempt to use drill on power sources rated other than this.

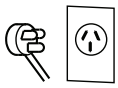
Plugs and Receptacles



Typical USA 115V

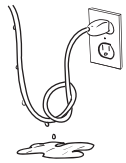


Typical USA 230V



230V Type I Plug

Wet electrical connections are shock hazards. To prevent the cutting fluid from traveling along the cord and contacting the plug or power outlet, tie a drip loop as shown. Also elevate extension cords or gang box connections.



Extension Cords

Use only 3-wire extension cords that have a 3-prong grounding type plug and 3-pole receptacles that accept the tool's plug. Replace or repair damaged cords. Make sure the conductor size is large enough to prevent excessive voltage drop which will cause loss of power and possible motor damage.

LENGTH OF CORD, FEET	RECOMMENDED WIRE GAUGE	RECOMMENDED WIRE GAUGE
	115V MOTOR 10 - 12 AMPS	230V MOTOR 5 - 6 AMPS
Up to 25	16	18
26 - 50	14	18
51 - 100	10	16
101 - 200	8	14
201 - 300	6	12
301 - 500	4	10

Outdoor Extension Cord Use

When tool is used outdoors, use only extension cords intended for use outdoors and so marked.

Additional Safety Precautions

Arbor and cutter should never be used as a handhold or handle. Keep hands and clothing away from all moving parts. Do not use Hougen Cutters where ejected slug might cause injury (slug ejected at end of cut). Also, adhere to all operating instructions. Do not drill through any surface that may contain live electrical wiring. Drilling into a live wire could cause exposed metal parts of the drill to be made live. Remove chips wrapped around cutter and arbor after each hole. With motor off and power disconnected, grasp chips with leather gloved hand or pliers and pull while rotating counterclockwise. Should the cutter become jammed in the work, stop the unit immediately to prevent personal injury. Disconnect the drill from the power supply and loosen jammed cutter by turning the arbor counterclockwise. Never attempt to free the jammed cutter by starting the motor. Service at authorized repair center only.

Operating Near Welding Equipment

DO NOT operate this unit on the same work surface that welding is being performed on. Severe damage to the unit, particularly the power cord, could occur. This could also result in personal injury to the operator.

Circuit Breaker (If Applicable)

Changing of the circuit breaker to a higher amp rated breaker, or bypassing the circuit breaker is not recommended and will void product warranty.

Circuit Breaker Operation (If Applicable)

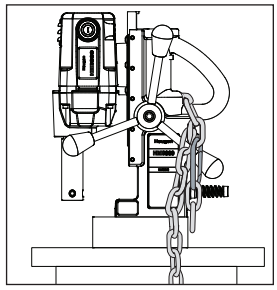
The circuit breaker is a thermal breaker. When it reaches the higher temperature rating it will trip and cause the unit to shut down. This is a protective device and can be reset after 5 to 10 minutes. To reset the breaker, press the breaker button back in. If it does not reset, let the unit cool a little longer until you can push the button in and it stays in position.

Save all warnings and instructions for future reference.

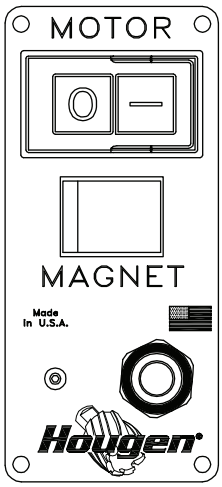
SAFETY CHAIN INSTRUCTIONS

A safety chain should ALWAYS be used whenever operating the drill.

The safety chain prevents the drill unit from falling, in the event of a power failure or if the magnet breaks loose from the work surface. The safety chain attaches to the drill by running the chain thru the Handle on the back of the unit and then continuing around the material and/or work surface. Adjust the chain so it is tight and secure. Please refer to the diagram.



OPERATION OF CONTROLS BEFORE INSTALLING HOUGEN CUTTER



CONTROL PANEL SWITCH PLATE

IMPORTANT: Before turning on the machine, it is important that the operator understands the interrelated functions of the SAFETY SWITCH, MAGNET SWITCH, AND MOTOR SWITCHES.

SAFETY SWITCH — Located in base of drill. Enables motor operation only when magnet is properly seated on a clean and flat work surface. Turns motor off if switch detects lift of unit.

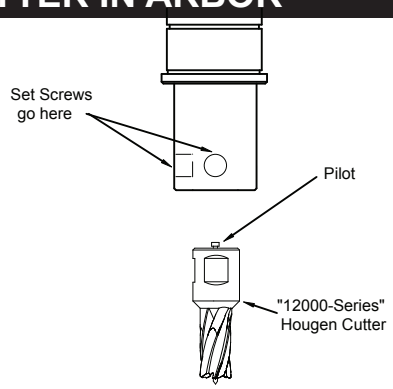
MAGNET ON/OFF SWITCH — Energizes and De-energizes the magnetic base and activates the safety switch. Motor can now be started by pushing the motor START switch.

MOTOR START/STOP SWITCHES — Starts and stops the motor

1. Place Magnetic Drill on clean, flat steel plate that is at least 3/8" thick.
2. Plug unit into proper AC power source. **DO NOT use with DC Power.**
3. Locate the Magnet **ON** and **OFF switch** and the motor **STOP** and **START** switch.
4. **NOTE: A loss of power will de-energize the magnetic base and deactivate the motor. When power is restored, the magnet will reenergize, however, the motor START switch must be depressed before the motor will start.**

INSTALLING HOUGEN CUTTER IN ARBOR

1. Disconnect from power source and remove T-Handle wrench from holder at top of drill.
2. Lay drill on its side with feed handles up or be sure Arbor clears table if unit is in normal operating position.
3. Turn Feed Handles until cutter mounting set screws are exposed and completely remove the set screws.
4. Insert proper pilot in shank end of Hougen Cutter.
5. Insert Hougen Cutter until flat on cutter shank is aligned with set screw holes and is exactly perpendicular to axis of set screw holes.
6. Insert set screws and tighten. Check to be certain that cutter is secure.



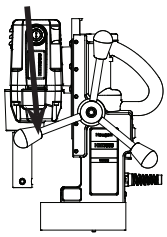
OPERATING INSTRUCTIONS

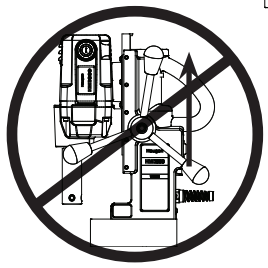
Always remember that the magnet's holding power is directly related to the workpiece thickness and surface condition. Since magnetic attraction diminishes with thinner material or rough surfaces, mechanical clamping of drill unit to the workpiece should be used when cutting thin material (3/8" or less) or material with uneven surfaces.

1. Make sure workpiece and bottom of magnet are free of chips, oil, etc.
2. Verify Safety Switch works properly
3. Position drill by sliding it and gently feeding Arbor so that pilot point is touching center of hole to be drilled.
4. **Secure unit to workpiece with safety chain.**
5. Turn magnet "ON" by pressing the magnet ON switch.
6. Turn Feed Handle, raising the cutter until the pilot is above the work surface.
7. Make certain that cutter is clear of workpiece and turn motor "ON" by pressing the motor START switch.
8. Feed Hougen Cutter slowly into workpiece. Only after cutting path is established to a depth of about 1/16" can full force be applied to feed handles.
9. Ease up on feed pressure as cutter starts breaking through.
10. At conclusion of cut, turn motor "OFF" by pressing motor STOP switch. Turn Feed Handles to raise arbor.
11. Turn magnet "OFF" by pressing the magnet OFF switch.
12. **Disconnect from power source.**
13. If necessary, remove chips from cutter and magnet, remove slug from cutter, preferably wearing leather work gloves and/or with pliers. Disconnect safety chain and you are ready to move unit to new drilling position.

When drilling, especially in horizontal or overhead positions, always apply feed pressure toward the work surface. Never pull away from the work surface as this can weaken magnetic holding power.

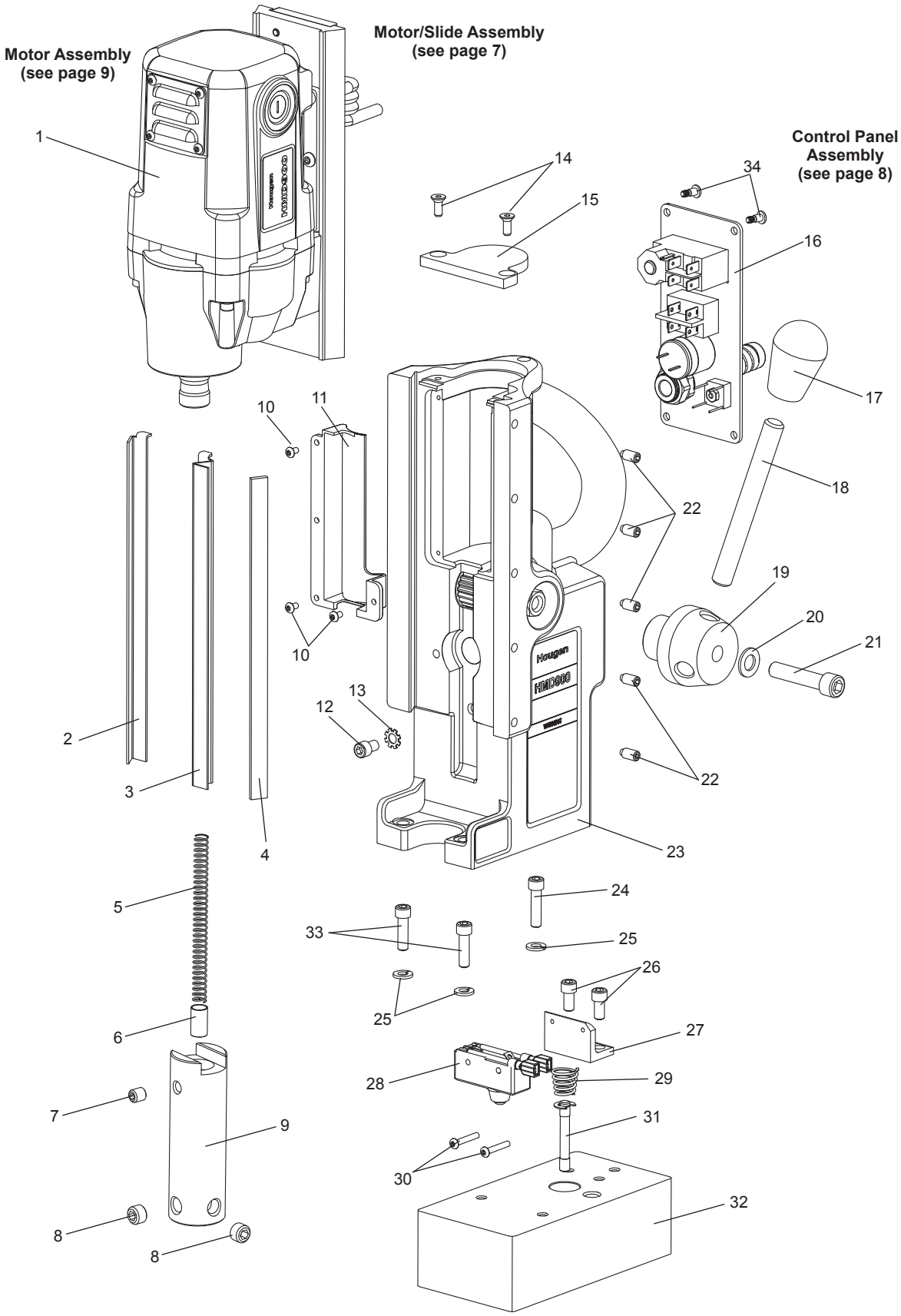
Use handles to feed toward work surface





Never pull handles away from work surface.

HMD900 115V MAG BASE DRILL

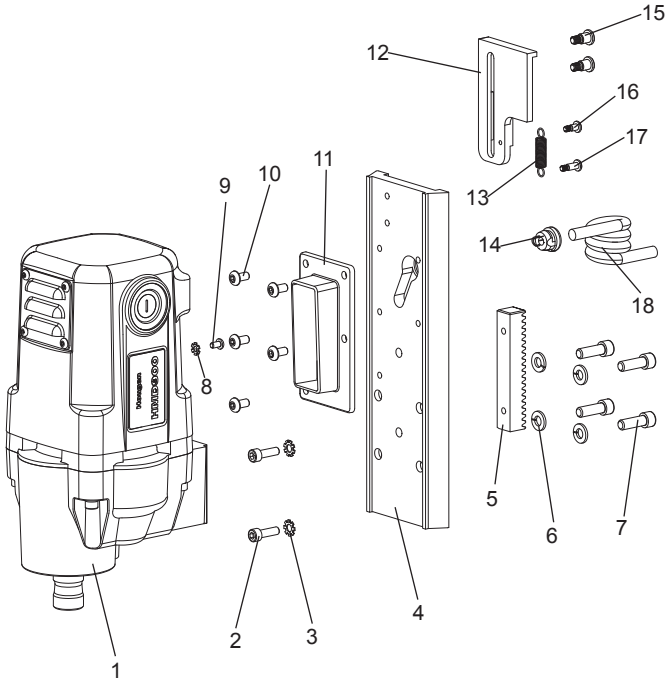


HMD900 Breakdown			
Item	**Part #**	**Description**	**Qty**
1	**09381**	Motor Slide Assembly - 3 speed	1
2	**09400**	Brass Gib - Right Hand	1
3	**09399**	Brass Gib - Left Hand	1
4	**09403**	Steel Gib	1
5	**09392**	Spring-Comp	1
6	**09366**	Spring Seat	1
7	**40256**	SCR-SOC Set 5/16-18 x 3/8 Oval	1
8	**40222**	SCR-SOC Set 7/16-14 x .305	2
9	**09365**	Arbor	1
14	**05988**	SCR-FHSC #1-32 x 1/2	2
15	**09402**	Stop Plate	1
16	**09391**	Face Plate/Control Asm	1
19	**09393**	Feed Hub	1
20	**40058**	Washer-Flat 3/8 Nom	1
21	**01960**	SCR-SHC 3/8-16 x 1-3/4	1
22	**40237**	SCR-SS 1/4-28 x 1/2	5
24	**40077**	SCR-SHC 1/4-20 x 1	1
25	**90028**	Washer- Helical Lock 1/4”	3
33	**10553**	SCR-SHC 1/4-20 x 7/8	2
34	**41044**	SCR-BHC 10-32 x 3/8	4
Accessories Included			
17	**04532**	Feed Handle Knobs	3
18	**04558**	Feed Handles	3
	10730	Safety Chain 3/16 GR 30	1
	09405	Hex Key Short Wrench 7/32	1

09370 Magnet Assembly			
Item	**Part #**	**Description**	**Qty**
26	**10971**	SCR-SHC 1/4-20 x 1/2	2
27	**04909**	Bracket - Safety Switch	1
28	**09385**	Magnet Switch Assembly	1
29	**17271**	Spring-Comp	1
30	**10972**	SCR-BHC 6-32 x 7/8	2
31	**04910**	Plunger Assembly	1
32	**09369**	Magnet Assembly	1

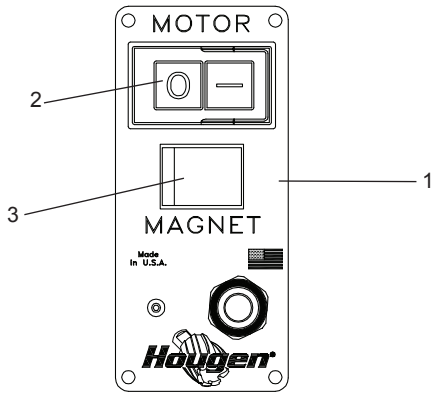
09384 Housing Assembly			
Item	**Part #**	**Description**	**Qty**
23	**09384**	Drill Housing	1
10	**02385**	SCR-BHC 6-32 x 1/4	3
11	**09144**	Guard	1
	09383	Feed Gear *(not shown)*	1
	40231	Bushing Bronze *(not shown)*	2
	09401	Label - Housing *(not shown)*	1
	09404	Label - Warning *(not shown)*	1
12	**51042**	SCR-SHC 1/4-20 x 3/8	1
13	**90065**	Washer-1/4 Ext. Tooth Lock	1

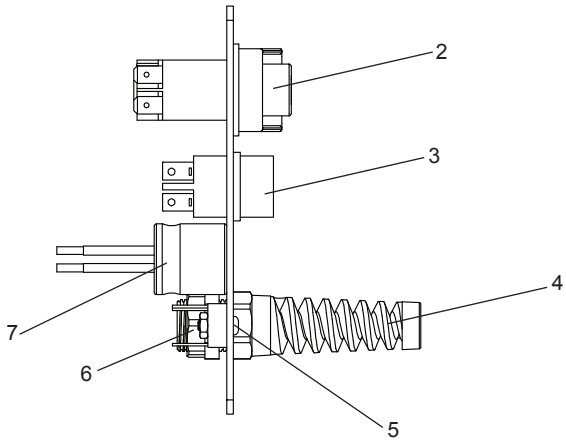
MOTOR SLIDE ASSEMBLY BREAKDOWN



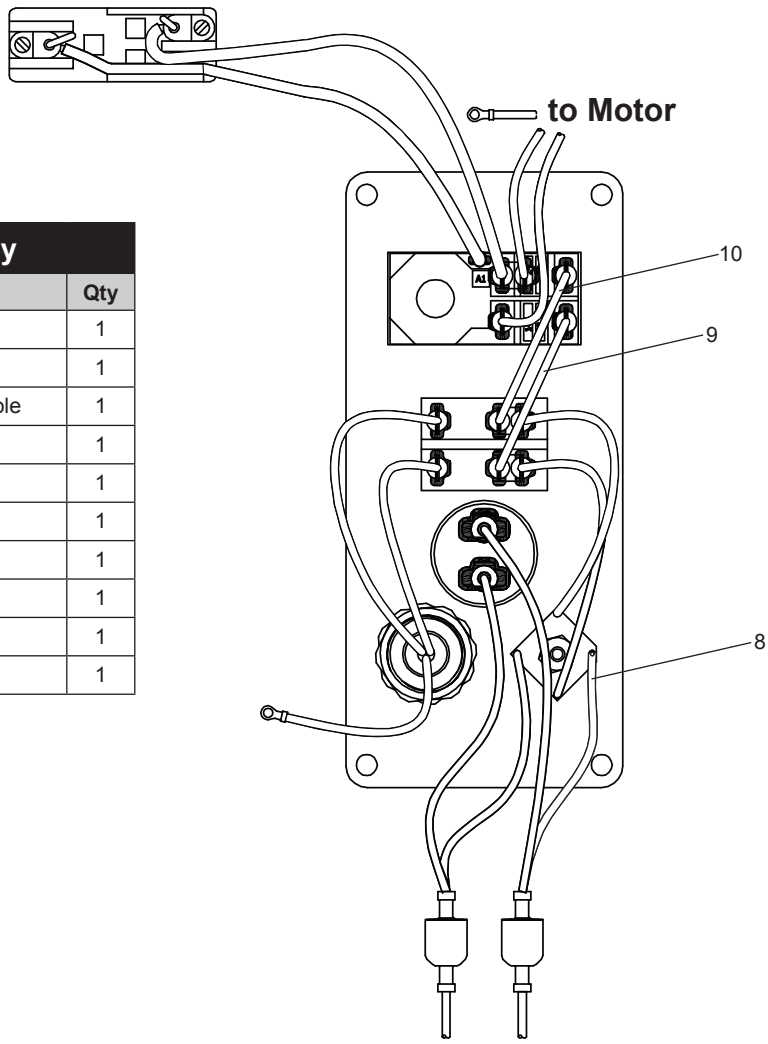
09193 Motor Slide Assembly			
Item	**Part #**	**Description**	**Qty**
1	**09374**	Motor Complete Assembly	1
2	**40038**	SCR-SHC 10-32 x 5/8	2
3	**10560**	Washer #10 Ext. Tooth Lock	2
4	**09379**	Dovetail Slide	1
5	**09378**	Rack Gear	1
6	**90028**	Washer-Helical Lock 1/4	4
7	**10624**	SCR-SHC 1/4-20 x 3/4	4
8	**90052**	Washer-Lock #6 External Tooth	1
9	**02385**	SCR-BHC 6-32 x 1/4	1
10	**41044**	SCR-BHC 10-32 x 3/8	5
11	**09143**	Cover	1
12	**09380**	Slide Plate	1
13	**09398**	Spring	1
14	**51033**	Strain Relief	1
15	**09395**	SCR-SHSLD 1/4 x 1/8 #10-32	2
16	**09397**	SCR-SHSLD 5/32 x 3/16 #6-32	1
17	**09396**	SCR-SHSLD 5/32 x 5/16 #6-32	1
18	**09150**	Motor Cord Assy - Coil	1

CONTROL PANEL BREAKDOWN & WIRING



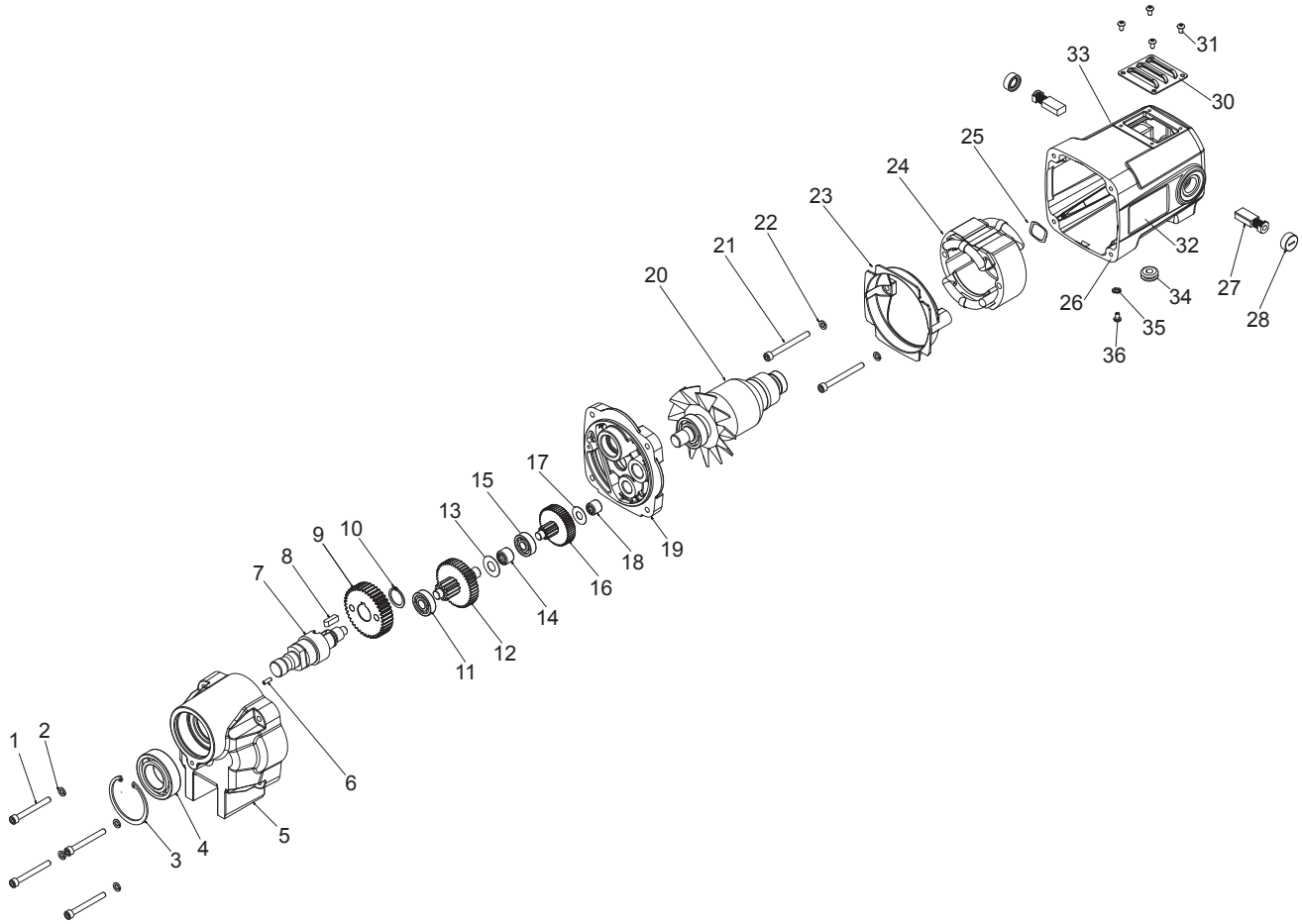


Safety Switch



09391 Panel Assembly			
Item	**Part #**	**Description**	**Qty**
1	**09386**	Faceplate	1
2	**09394**	ON/OFF Switch	1
3	**04614**	Rocker Switch, Double Pole	1
4	**90571**	Power Cord Assembly	1
5	**17032**	SCR-BHC 6-32 x 1/2	1
6	**01835**	Nut- Hex Nylon	1
7	**09388**	Capacitor Assembly	1
8	**09387**	Rectifier Assembly	1
9	**09389**	Jumper	1
10	**09390**	Jumper	1

MOTOR PARTS DIAGRAM



09134 Motor Assembly							
Item	**Part #**	**Description**	**Qty**	**Item**	**Part #**	**Description**	**Qty**
1	**08234**	SCR SHC #10-32 X 1-5/8 LG	4	19	**07857**	Gear Box Cover	1
2	**50038**	Washer - Lock Helical #10	4	20	**17630**	Armature	1
3	**07860**	Retaining Ring	1	21	**07849**	SCR SHC #10-32 x 2 LG	2
4	**40274**	Bearing 25mm x 47mm x 12mm	1	22	**50038**	Washer - Lock Helical #10	2
5	**08004**	Gear Box Housing	1	23	**07846**	Baffle	1
6	**01169**	Pin - Dowel 1/8 x 3/8	1	24	**17628**	Field	1
7	**09371**	Spindle - Motor Drive	1	25	**08000**	Washer - Spring	1
8	**17611**	Key	1	26	**09136**	Motor / Brush Holder	1
9	**17609**	Spur Gear #6	1	27	**17621**	Carbon Brush	2
10	**17626**	Retainer Ring	1	28	**17622**	Cap Brush Holder	2
11	**17603**	Bearing 24mm x 9mm x 7mm	1	30	**07848**	Cover - Brush Access	1
12	**17608**	Gear Assy - Second Intermediate	1	31	**02385**	SCR BHC #6-32 x 1/4	4
13	**17613**	Washer, Flat 10mm	1	32	**09375**	Motor Label	1
14	**17660**	Needle Bearing	1	33	**07841**	Specs Label	1
15	**17602**	Bearing 22mm x 8mm x 7mm	2	34	**09151**	Grommet	1
16	**17607**	Gear Assy - First Intermediate	1	35	**90052**	Washer-Lock #6	1
17	**17610**	Washer - Flat 8mm	1	36	**02385**	SCR BHC 6-32 x 1/4	1
18	**17659**	Needle Bearing	1				

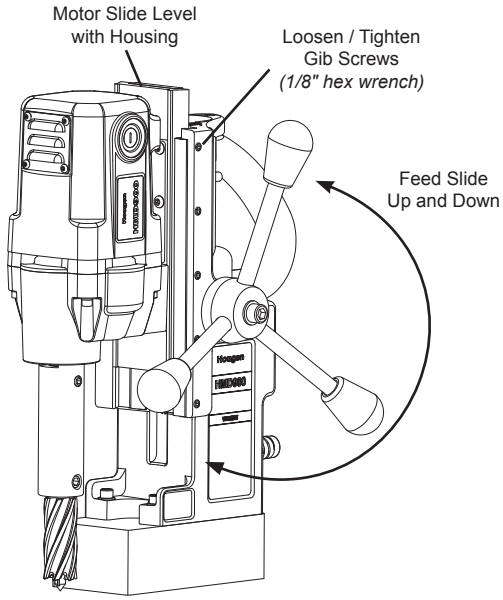
MAINTENANCE

In order to minimize wear on moving parts and to insure smoother operation and longer life for your magnetic drill, the following maintenance should be done periodically, based on use.

1. Regularly tighten all fasteners and replace all worn parts.
2. Check motor brushes and replace if worn.
3. Check power cord and cord from panel to motor and, if cracked or frayed, return to an authorized repair center for replacement.
4. Apply grease to the slide dovetails, brass gibs, and the feed gear rack. For best results use Shell Cyprina-RA or equivalent.
5. The safety switch plunger should be clean and lubricated with penetrating oil periodically. As necessary remove the magnet from drill and remove safety switch assembly from magnet. Push the plunger out of magnet. Clean out any debris from inside an around plunger hole in magnet. Coat the plunger with anti-seize. Replace plunger and safety switch assembly and tighten down screws. Replace magnet into drill housing.

ADJUSTMENT OF GIBS

1. Check gibs regularly to make certain they are tight. Tighten as required.
2. Loosen all Gib Screws.
3. Feed the drill in and out a few times and then, with top of motor slide flush with top of housing, tighten the Gib Screws until you feel them touch the Steel Gib.
4. Feed the drill in and out again.
5. Adjust Gib Screws so that there is uniform pressure from top to bottom. (Top of motor slide flush with top of housing.)
6. Turn each Gib Screw in about 1/8 to 1/4 turn, depending upon your preference.
7. Gibs should be tight enough so that slide moves up and down smoothly with no wobble or shaking. (Looseness will cause cutter breakage.)



Gibs <u>MUST</u> be adjusted correctly & lubricated regularly for the drill to function properly.

HINTS FOR SMOOTHER OPERATION

1. Keep insides of Hougen Cutter clear of chips. Chips will interfere with cutting to maximum depth and can cause cutter breakage.
2. Keep work, machine, arbor and Hougen Cutter free of chips and dirt.
3. Tighten all bolts and fasteners regularly.
4. We highly recommend using a light viscosity cutting fluid (preferably Hougen Cutting Fluid - Part No. 11742-4)
5. Always start cut with light feed pressure and then increase sufficiently to achieve maximum cutting rate.
6. Ease off on pressure as cutter begins to break through at the end of the cut.
7. Keep slide dovetails, brass gibs and feed rack lubricated and free of chips and dirt.
8. Keep gib screws adjusted to keep the slide snug.
9. When slug hangs up in cutter, turn off motor and bring cutter down on a flat surface. This will normally straighten a cocked slug, allowing it to be ejected.
10. When cutting large diameter or deep holes it may be necessary to stop in the middle of the cut to add cutting fluid and remove the chips from around the arbor. (When doing this **DO NOT** raise the cutter out of the hole. Doing so can allow chips to get under the teeth of the cutter and make it difficult to restart the cut.)

#1 cause of cutter breakage and prematurely dull teeth is too little feed pressure*

*** "Babying" the cutter through the cut will only decrease tool life.**

REMEDIES FOR HOLEMAKING PROBLEMS

1. **Trouble: Magnetic base won't hold effectively to work**.
   - a. Cause: Chips or dirt under magnet.
     Remedy: Clear area of chips and dirt.
   - b. Cause: Irregular surface on bottom of magnet or on workpiece.
     Remedy: Lightly surface grind the bottom of the magnet flat and/or file imperfections flat on the work surface as needed.

2. **Trouble: Cutter tends to move across surface of work.**
   - a. Cause: Magnetic base not holding effectively.
     Remedy: See causes and remedies under No. 1 above.
   - b. Cause: Too much feed pressure at start of cut.
     Remedy: Light pressure until a groove is cut. The groove then serves as a stabilizer.
   - c. Cause: Worn pilot.
     Remedy: Replace pilot
   - d. Cause: Worn cutter
     Remedy: Replace or have cutter resharpened.
   - e. Cause: Loose gib screws
     Remedy: Adjust/tightened gibs screws.

3. Trouble: Out of round holes.
   - a. Cause: Misaligned or loose arbor set screws.
     Remedy: Tighten set screws.

4. **Trouble: Motor and slide won't stay in set position**
   - a. Cause: Gibs too loose
     Remedy: Adjust gibs

5. **Trouble: Erratic or intermittent feed.**
   - a. Cause: Worn or pinion and/or rack.
     Remedy: Replace worn parts.

6. **Trouble: Motor doesn't run when motor START button is pushed.**
   - a. Cause: Magnet is not turned on
     Remedy: Push magnet ON button.
   - b. Cause: Magnet on rough or dirty work surface and safety switch not fully depressed.
     Remedy: File work surface flat and clean all chips and oil from under magnet.
   - c. Cause: No power
     Remedy: Check power source and extension cords.
   - e. Cause: Worn motor brushes
     Remedy: Replace brushes
   - f. Cause: Faulty motor START switch
     Remedy: Return unit to an authorized repair center to have switch replaced.

NOTE: If you are unable to correct any malfunction after trying the above, do not attempt to operate the drill. Return the unit to the factory or an authorized repair center for service.

COMMERCIAL / INDUSTRIAL LIMITED WARRANTY

Hougen Manufacturing, Inc. warrants its Portable Magnetic Drills, Trak-Star Rail Drills, Hydraulic Rail Saw and Tornado II Paint Shakers for two (2) years, Electro-Hydraulic Hole Punchers for one (1) year, and it's Husqvarna Saw and other products for ninety (90) days from date of purchase against defects due to faulty material or workmanship and will repair or replace (at its option) without charge any items returned. This warranty is void if the item has been damaged by accident or unreasonable use, neglect, improper service, or other causes not arising out of defects in material or workmanship. No other expressed warranty is given or authorized. Hougen Manufacturing, Inc. disclaims any implied warranty of Merchantability or fitness for any period beyond the expressed warranty and shall not be liable for incidental or consequential damages. Some states do not allow exclusion of incidental or consequential damages or limitation on how long an implied warranty lasts and, if the law of such a state governs your purchase, the above exclusion and limitation may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

To obtain warranty service, return the item(s), transportation prepaid to your nearest Factory Authorized Warranty Service Center, or to Hougen Manufacturing, Inc., 3001 Hougen Drive, Swartz Creek, MI 48473.

This warranty is in lieu of any other warranty, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

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HOUGEN AUTHORIZED WARRANTY REPAIR CENTERS

Hougen Authorized Warranty Repair Centers have been factory trained to properly service and repair Hougen Portable Magnetics Drills. To locate an Authorized Warranty Repair Centers near you, please visit:

www.hougen.com

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