

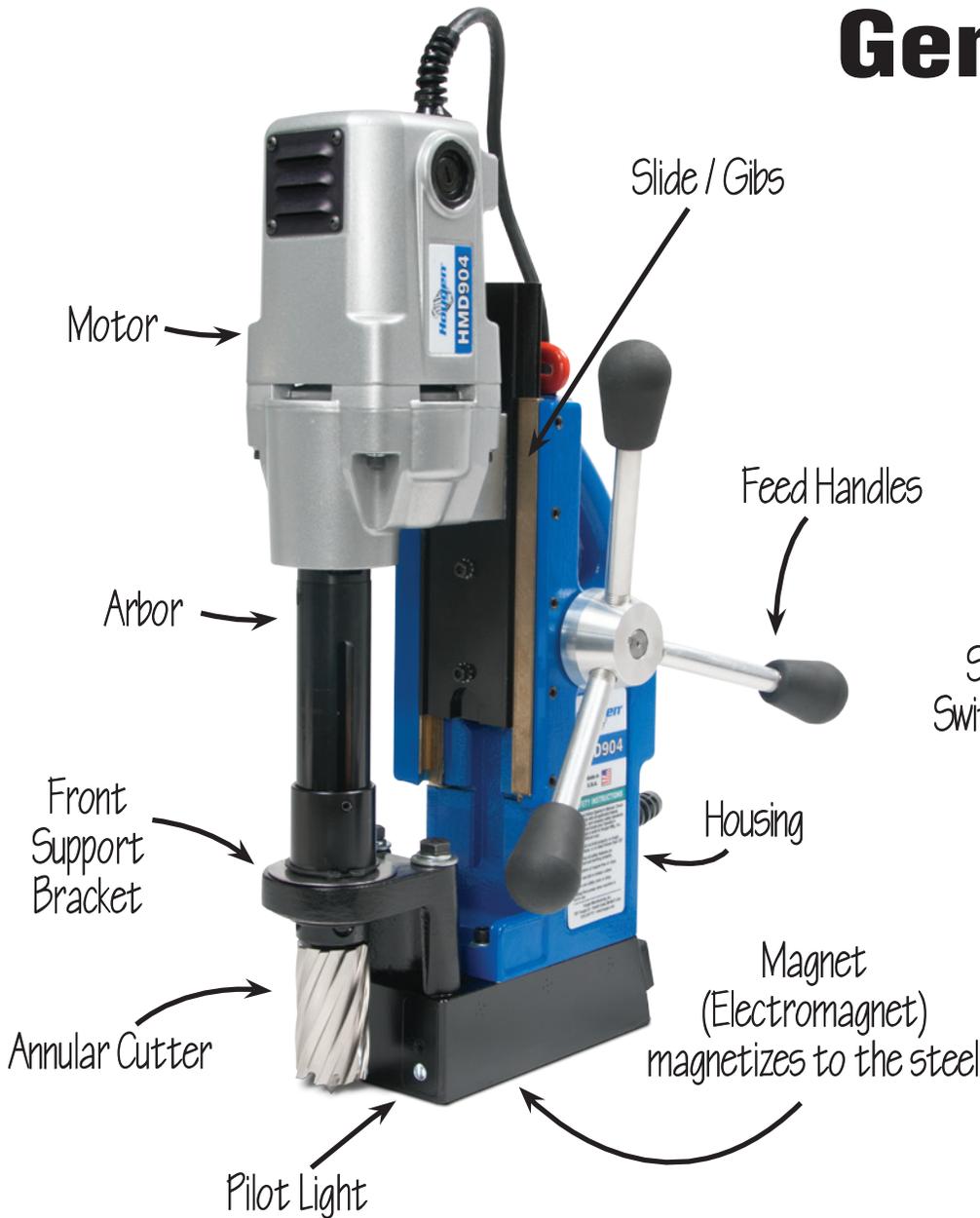


# SAFE OPERATION FOR MAGNETIC DRILLS

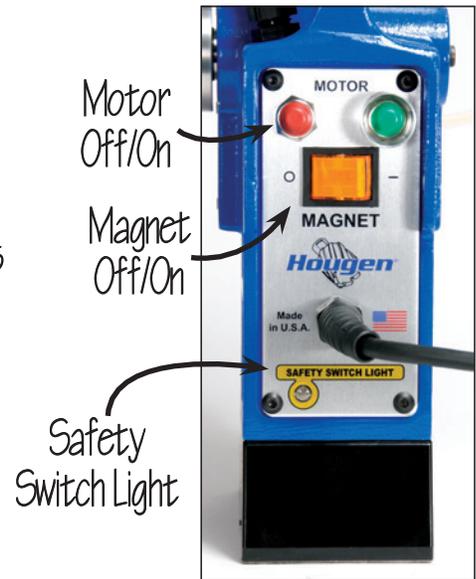
***A General Guide for Safe  
Operating Procedures***



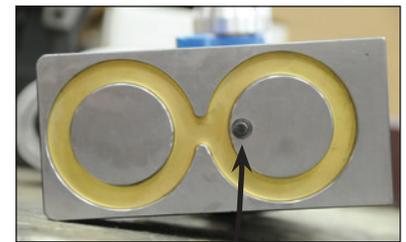
# General Parts



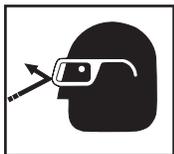
## Typical Control Panel



## Bottom of Magnet



# SAFETY FIRST



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



**CAUTION!** 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.



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



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

**A magnetic drill can be a very useful tool for holemaking. Please read and follow all safety procedures outlined in your operator's manual and according to company policy.**

## IMPORTANT SAFETY INSTRUCTIONS



### WARNING:

Read and understand all instructions. Failure to follow all instructions listed below, may result in electrical shock, fire and/or serious personal injury.

### Work Area

**Keep your work area clean and well lit.** Cluttered benches and dark areas invite accidents.

**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.

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

### Electrical Safety

**Grounded tools must be plugged into an outlet properly installed and grounded in accordance with all codes and ordinances. Never remove the ground prong or modify the plug in any way. Do not use any adapter plugs. Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded.** If the tool should electrically malfunction or breakdown, grounding provides a low resistance path to carry electricity away from the user.

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

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

**Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately.** Damaged cords increase the risk of electric shock.

**When operating a power tool outside, use an outdoor extension cord marked "W-A" or "W";** These cords are rated for outdoor use and reduce the risk of electrical shock.

### Personal Safety

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

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

**Avoid accidental starting. Be sure switch is off before plugging in.** Carrying tools with your finger on the switch or plugging in tools that have the switch on invites accidents.

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

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

**Use safety equipment. Always wear eye protection.** Dust mask, no-skid safety shoes, hard hat, or hearing protection must be used for appropriate conditions.

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

### Tool Use and Care

**Use clamps or other practical ways to secure and support the work piece to a stable platform.** Holding the work by hand or against your body is unstable and may lead to loss of control.

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

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

**Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the tool.** Such preventative safety measures reduce the risk of starting the tool accidentally.

**Store idle tools out of reach of children and other untrained persons.** Tools are dangerous in the hands of untrained users.

**Maintain tools with care. Keep cutting tools sharp and clean.** Properly maintained tools, with sharp cutting edges are less likely to bind and are easier to control.

**Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tool serviced before using.** Many accidents are caused by poorly maintained tools.



## IMPORTANT SAFETY INSTRUCTIONS

Use only accessories that are recommended by the manufacturer for your model. Accessories that may be suitable for one tool, may become hazardous when used on another tool.

### Service

Tool service must be performed only by qualified repair personnel. Service or maintenance performed by unqualified personnel could result in a risk of injury.

When servicing a tool, use only identical replacement parts. Follow instructions in the Maintenance Section of this manual. Use of unauthorized parts or failure to follow Maintenance Instructions may create a risk of electric shock or injury.

### Safe Electrical Connection

Your Mag 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



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 Houghen 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)

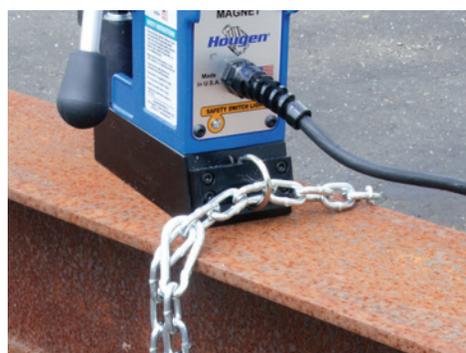
The circuit breaker is a thermal breaker. When it reaches the higher temperature rating it will trip and cause the unit to shut down. This is a protective device and can be reset after 5 to 10 minutes. To reset the breaker, press the breaker button in. If it does not reset, let the unit cool a little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

**Save these instructions.**

## 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 D-Ring 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.



## CONTROL PANEL OPERATION



TYPICAL  
CONTROL PANEL

**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. **READ SAFETY SWITCH INDICATOR LIGHT INSTRUCTIONS.**

**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. (See page 2 for location of safety switch)

**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.**

## SAFETY SWITCH INDICATOR LIGHT

**\*\* SAFETY SWITCH LIGHT WILL COME ON AND REMAIN ON WHILE DRILL IS PLUGGED IN \*\***

The Safety Switch Indicator Light is a Standard Safety Feature on Hougen portable magnetic drills. Its purpose is to inform the user that the lift detector switch is activated.

### If light is Green:

In normal operation the safety switch light will be green. Motor "On" and "Off" Switches function normally.

### If light is Red:

A condition with the safety switch exists that needs to be corrected. Possible causes:

- Safety Switch is defective. Have drill serviced.
- Uneven work surface or material. Check work surface for flatness.
- Dirt or chips under magnet. Clean work surface.



CONTROL PANEL SWITCH PLATE

### Testing Safety Switch:

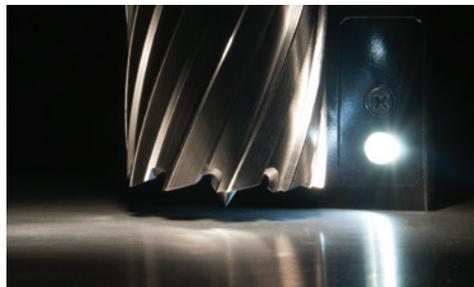
**Before operating the drill always test the safety switch.** To test switch... place drill on work surface and plug into the outlet. Rock drill so magnet lifts off work surface. Safety Switch Light should change from green to red. If light stays green or red, a problem exists with the safety switch that must be corrected. (ie... safety switch defective, safety plunger in the base of magnet is stuck in position, etc) Please correct and retest before operating drill.

**Material must be a least 3/8" thick. Material thinner than 3/8" will cause a "weak" magnet condition. HOUGEN MANUFACTURING RECOMMENDS THAT CONDITIONS ARE CORRECTED SO LIGHT IS GREEN. THIS ALLOWS FOR THE UNIT TO BE OPERATED IN A SAFE MANNER.**

For any questions please contact Hougen Manufacturing's Technical Service at (810) 635-7111.

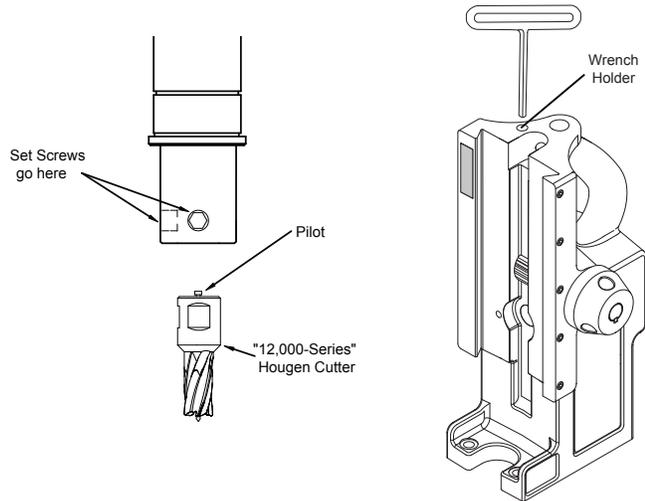
## PILOT LIGHT SWITCH

The Pilot Light is a Standard Feature on Hougen portable magnetic drills. Its purpose is to illuminate the work surface area for easier viewing of pilot.



## 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.



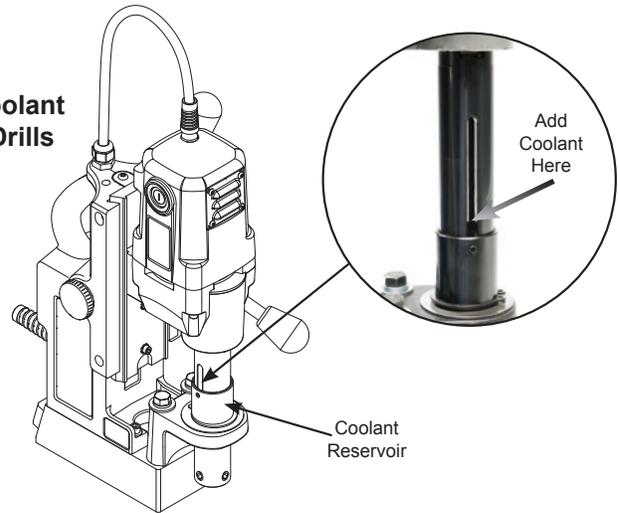
## OPERATION OF CUTTING FLUID RESERVOIR

### FOR BEST RESULTS ALWAYS USE COOLANT

1. With Magnetic Drill in operating position, turn the feed handles so that cutter and pilot are above the work surface.
2. With magnet turned ON & motor OFF,
  - A) For non-coolant bottle drills... fill arbor reservoir by introducing RotaMagic™ cutting fluid through slots in Arbor. **Cutting fluid should not leak out.**
  - B) For drills with a Coolant bottle... attach coolant bottle per diagram and fill with coolant.
3. Test metering capabilities of Arbor/Cutter/Pilot assembly (magnet ON - motor OFF) feeding the Arbor gently toward work surface until pilot is pushed up into Cutter, thus allowing fluid to filter down onto work surface through groove in pilot.

#### Non-Coolant Bottle Drills

**A**

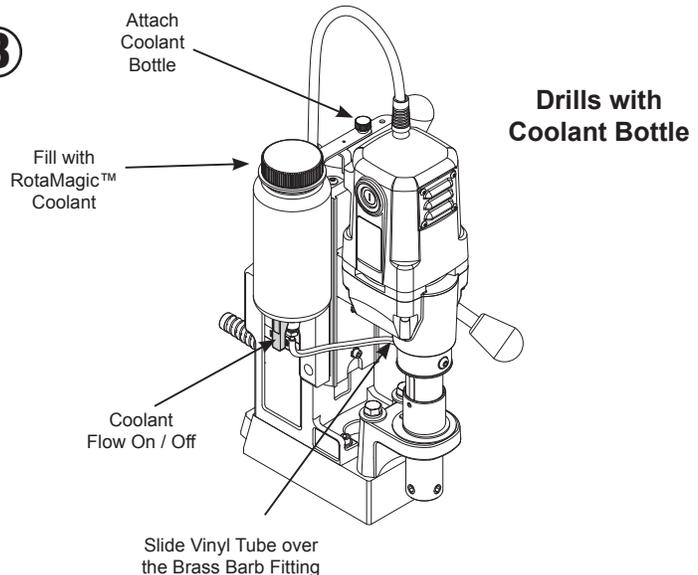


#### Non-Coolant Bottle Drills.....

4. For proper lubrication, all fluid in reservoir should empty onto work surface in no less than 15 seconds and no longer than 30 seconds.
5. Arbor Reservoir holds enough coolant for cutting approximately one hole.
 

\* This method of using coolant can also be used for an attached coolant bottle if the bottle is lost.
6. For drills with a coolant bottle use coolant bottle on/off lever to adjust flow of coolant.
7. For horizontal or drilling overhead holes, use Slick-Stik™ Lubricant.

**B**



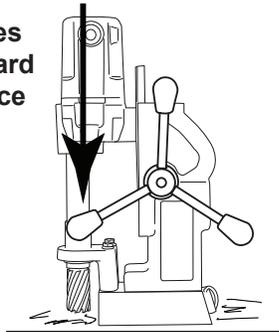
## OPERATING INSTRUCTIONS

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 (See Safety Switch Indicator Light Section)
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. Fill coolant reservoir or fill attached coolant bottle if applicable.
8. Make certain that cutter is clear of workpiece and turn motor "ON" by pressing the motor START switch.
9. Feed Hougén 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.
10. Ease up on feed pressure as cutter starts breaking through.
11. At conclusion of cut, turn motor "OFF" by pressing motor STOP switch. Turn Feed Handles to raise Arbor thereby ejecting the slug, if it hasn't already fallen free.
12. Turn magnet "OFF" by pressing the magnet OFF switch.
13. **Disconnect from power source.**
14. If necessary, remove chips from cutter and magnet, 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**



## 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. Remove arbor and pack the bearing in the front support bracket with grease. Use Shell Cyprina-RA or equivalent.
6. The safety switch plunger should be cleaned 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 and around plunger hole in the magnet. Coat the plunger with anti-seize. Replace plunger and safety switch assembly and tighten down screws. Replace magnet onto drill housing.



## HINTS FOR SMOOTHER OPERATION

1. Keep the inside of Hougen Cutter clear of chips. Chips will interfere with cutting to maximum depth, maybe impede the free oil flow 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)
5. Occasionally check metering of cutting fluid flow. Lack of cutting fluid may cause Hougen Cutter to freeze in cut, slug to stick and may result in poor cutter life.
6. Always start cut with light feed pressure and then increase sufficiently to achieve maximum cutting rate.
7. Ease off on pressure as cutter begins to break through at the end of the cut.
8. Keep slide dovetails, brass gibs and feed rack lubricated and free of chips and dirt.
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. This will 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.**

***When in Doubt, Give Us a Call...  
We'll be Happy to Help!***

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