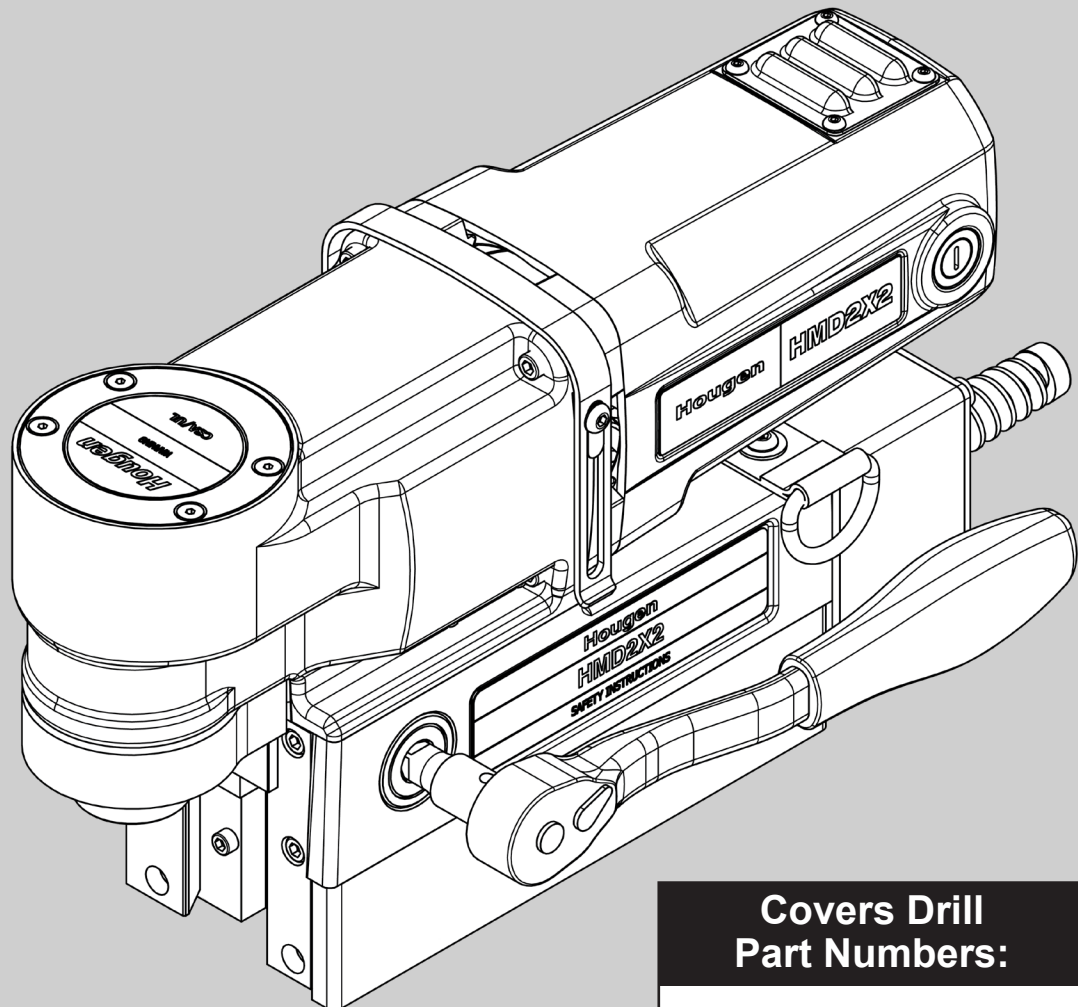




# OPERATOR'S MANUAL

## HMD2X2 SERIES PORTABLE MAGNETIC DRILL



Covers Drill  
Part Numbers:

0202101

STANDARD "12,000-SERIES" CUTTERS

# HOUGEN® PORTABLE MAGNETIC DRILL MODEL HMD2X2 SERIES

## Welcome to Hougen

Congratulations on your purchase of the Hougen HMD2X2 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..... "12,000-Series" Annular Cutters  
or Copperhead Carbide Tip Cutters  
Hole Capacity..... 2" (50mm)  
Depth of Cut..... 2" (50mm)  
Motor..... 9A  
Net Weight..... 29.2 lbs.

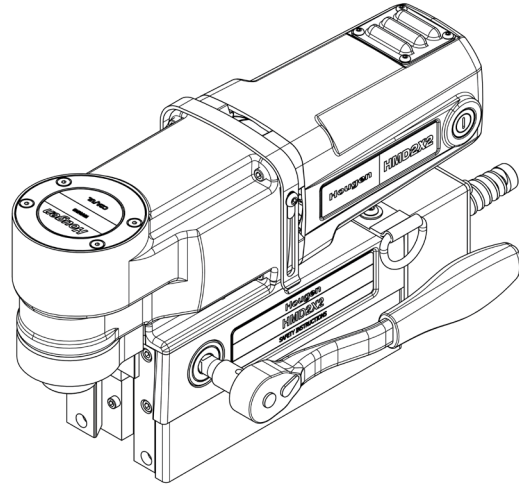


Approved Duty Cycle Rated: 2 minutes "ON", 3  
Minutes "OFF"

Refer to the Serial/Part number Label on your housing to  
direct you to the correct breakdown.

## Part Number

0202101 HMD2X2 115V



## UNPACKING YOUR NEW 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](http://Hougen.com) to register your unit now. It is important that Hougen Manufacturing has a record of product ownership.
4. Open hardware package and check contents.  
**17059 Safety Strap**
5. Lift unit out of the shipping case.
6. Remove all packing and securing material from the drill unit.
7. Your Magnetic Drill was factory adjusted prior to shipping. Check to make sure that all motor mount screws and magnet mounting screws are snug and have not vibrated loose in transit.
8. Your new Low profile Magnetic Drill uses Hougen "12,000-Series" Annular Cutters
9. **Reread Safety Warnings listed in the Operator's Manual and on the drill unit to avoid injury. Follow operating procedures.**

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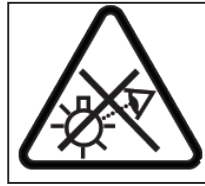
# WARNING



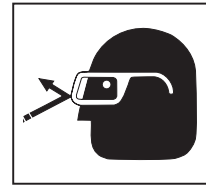
Cutters are sharp. Wear gloves when installing or removing cutter from arbor. Do not grab a rotating cutter.



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

- Keep your work area clean and well lit. Cluttered or 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 children and bystanders away while operating a power tool. Distractions can cause you to lose control.

### 2. Electrical Safety

- 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.
- 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.
- 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 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.
- 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.
- 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

- 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.
- 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.

- 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.
- 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.
- Do not overreach. Keep proper footing and balance at all times. This enables better control of the power tool in unexpected situations.
- 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.
- 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.
- 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.
- Always use safety chain. Mounting can release.

### 4. Power Tool Use and Care

- 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.
- 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.
- 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 accidentally.  
(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

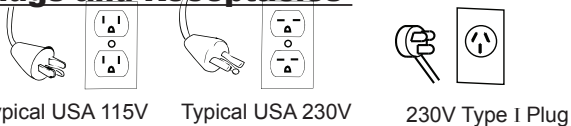
- a) Have your power tool serviced by a qualified repair person using only identical replacement parts. *This will ensure that the safety of the power tool is maintained.*

## 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



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.

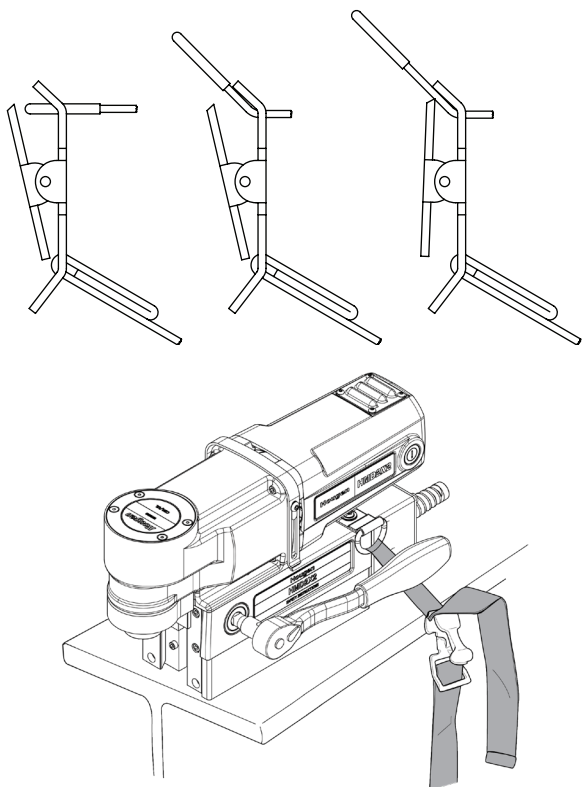
### Circuit Breaker Operation (If Applicable)

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 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.**

# OPERATING INSTRUCTIONS

1. Place drill on material (at least 3/8" thick) and locate for drilling hole.
2. Press magnet switch to "ON"
3. Thread safety strap through opening between motor and drill housing. Ensure that strap does not interfere with operation of feed handle. Insert tab of strap into buckle. Cinch strap tight to material and drill housing. Check for slack and adjust as needed.



6. Feed Cutter slowly into workpiece. Only after cutting path is established to a depth of about 1/16" can additional force be applied to feed handles. Ease up on feed pressure as cutter starts breaking through.

**CAUTION:** Do not over-feed cutter. Excessive feed pressure may cause the magnet to break free from material.

### **DRILLING MULTIPLE LAYER MATERIALS:**

Second layer penetration may be difficult. Slight additional feed pressure may be required (avoid over-feed as noted above).

**CAUTION:** For drilling through multiple layers, utilize "12,000-Series" Annular Cutters with **Stack Geometry to avoid breakage!**

If unable to penetrate second layer, withdraw cutter from material ejecting slug and clean away any remaining chips. Feed cutter in hole and continue cut.

- Turn motor off when cut is finished.
- Fully retract cutter from material, ejecting the slug.
- Remove safety strap.

7. Turn magnet switch to "OFF" position. **CAUTION:** Retain firm hold on drill to prevent dropping.

Cutter Inside Diameter may collect chips, restricting depth of cut. Cutter should be frequently inspected and any chips or debris removed.

### **OPTIONAL FEED METHODS:**

- Ratchet with 3/8"
- **NO PLIERS OR OPEN END WRENCH** (They will damage feed handle mounting surfaces)

### **CAUTION:**

- Keep strap clear of cutting area, chips, and rough edges on material.
  - Inspect strap periodically for fraying and damage. Do not use a damaged safety strap.
4. Apply liberal amount of cutting fluid or stick lubricant to cutter. Additional lubrication may be required to finish cut.
  5. Make certain that cutter is clear of workpiece and turn motor ON by pressing the motor START button.

## HMD2X2 RECOMMENDED RPM'S

### **450 RPM**

7/16" - 1" Dia. (12mm - 25mm)

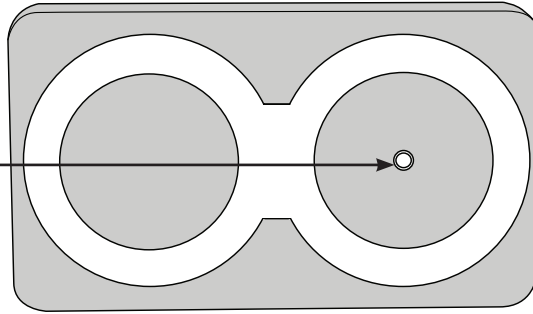
### **300 RPM**

1-1/16" - 2" Dia. (27mm - 51mm)

RPM recommendations are based on using your HMD2X2 drill with Hougén "12,000-Series" H.S.S. Cutters. The RPM's do not represent optimum speeds for any given cutter diameter and application. For more information refer to Hougén's Speed & Feed Calculator located on Hougén.com, or call 1-800-426-7818 for Technical Support.

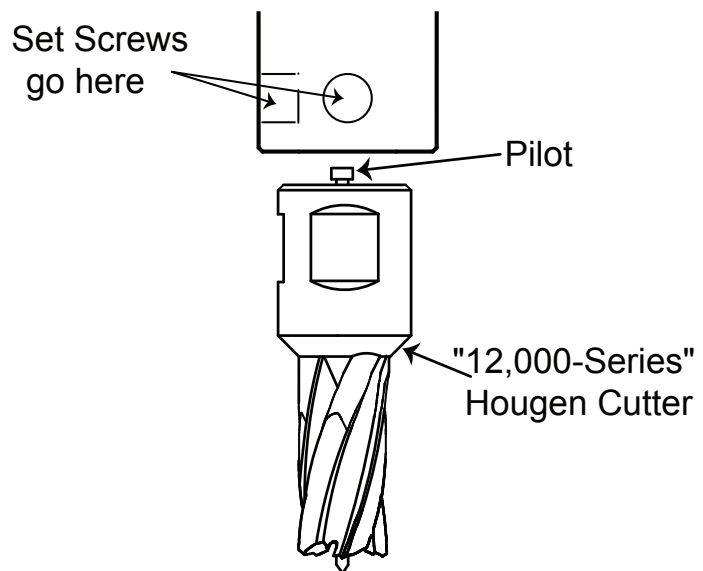
## SAFETY SWITCH

**NOTE:** The Safety Switch located in the base of the unit shuts off the motor when the unit lifts. The magnet will stay engaged until you turn off the magnet. It is important to keep this area clean and free from chips. Periodically check this switch for proper function and if for some reason it is not working properly, send the unit to an authorized repair center for service.



## "12,000-Series" CUTTER INSTALLATION

1. Disconnect from power source.
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 arbor until cutter mounting set screws are exposed and completely remove the set screws.
4. Insert proper pilot in shank end of Hougén Cutter.
5. Insert Hougén 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.



# “12,000-SERIES” ANNULAR CUTTERS

The “12,000-Series” Annular Cutters are equipped with a 3/4" diameter double-flatted shank and consist of premium M2 high speed steel.

“12,000-Series” Annular Cutters			
Cutter Dia. (Inches)	Decimal Equiv.	Part Number	
		1" D.O.C.	2" D.O.C.
<b>Use with Pilot</b>		<b>10531</b>	<b>10532</b>
7/16	.4375	12114	12214
29/64	.4531	----	12010
31/64	.4844	----	12011
1/2	.5000	12116	12216
33/64	.5156	----	12012
17/32	.5313	12117	12217
9/16	.5625	12118	12218
19/32	.5938	----	12219
<b>Use with Pilot</b>		<b>10527</b>	<b>10528</b>
5/8	.6250	12120	12220
21/32	.6563	12121	12221
11/16	.6875	12122	12222
23/32	.7188	----	12223
3/4	.7500	12124	12224
49/64	.7656	----	12020
25/32	.7812	12125	12225
13/16	.8125	12126	12226
7/8	.8750	12128	12228
59/64	.9219	----	12025
15/16	.9375	12130	12230
1	1.0000	12132	12232
1-1/16	1.0625	12134	12234
1-1/8	1.1250	12136	12236
1-3/16	1.1875	12138	12238
1-1/4	1.2500	12140	12240
1-5/16	1.3125	12142	12242
1-3/8	1.3750	12144	12244
1-7/16	1.4375	12146	12246
1-1/2	1.5000	12148	12248
1-9/16	1.5625	12150	12250

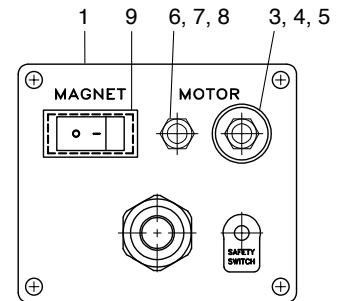
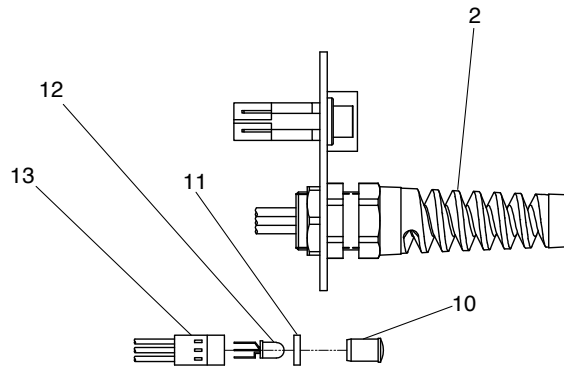
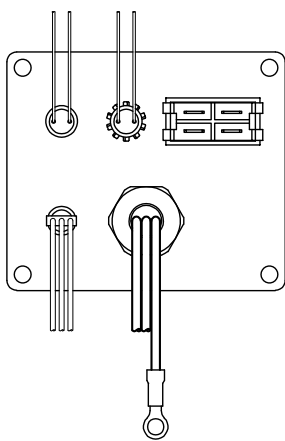
“12,000-Series” Annular Cutters			
Use with Pilot		10527	10528
1-11/16	1.6875	12154	12254
1-3/4	1.7500	12156	12256
1-13/16	1.8125	12158	12258
1-7/8	1.8750	12160	12260
1-15/16	1.9375	12162	12262
2	2.0000	12164	12264

“12,000-Series” Annular Cutter Kits		
Part #	Description	D.O.C.
12001	Plastic tool case contains (2) Pilots, (2) Wrenches and (5) Cutters (9/16, 11/16, 13/16, 15/16 & 1-1/16")	1"
12002	Plastic tool case contains (2) Pilots, (2) Wrenches and (5) Cutters (9/16, 11/16, 13/16, 15/16 & 1-1/16")	2"
12005	Plastic tool case contains (2) Pilots, (2) Wrenches and (5) Cutters (5/8, 3/4, 7/8, 1, 1-1/8)	1"
12006	Plastic tool case contains (2) Pilots, (2) Wrenches and (5) Cutters (5/8, 3/4, 7/8, 1, 1-1/8)	2"
12007	Plastic tool case contains (3) Pilots, (2) Wrenches and (5) Cutters (7/16, 17/32, 21/32, 25/32, 7/8")	2"
12980-1	Plastic tool case contains (3) Pilots and (3) Cutters (1/2, 5/8 & 3/4")	1"
12981-1	Plastic tool case contains (3) Pilots and (3) Cutters (9/16, 11/16 & 13/16")	1"
12982-1	Plastic tool case contains (3) Pilots and (3) Cutters (5/8, 3/4 & 7/8")	1"
12983-1	Plastic tool case contains (3) Pilots and (3) Cutters (11/16, 13/16 & 15/16")	1"
12985-1	Plastic tool case contains (3) Pilots and (3) Cutters (13/16, 15/16 & 1-1/16")	1"
12980-2	Plastic tool case contains (3) Pilots and (3) Cutters (1/2, 5/8 & 3/4")	2"
12981-2	Plastic tool case contains (3) Pilots and (3) Cutters (9/16, 11/16 & 13/16")	2"

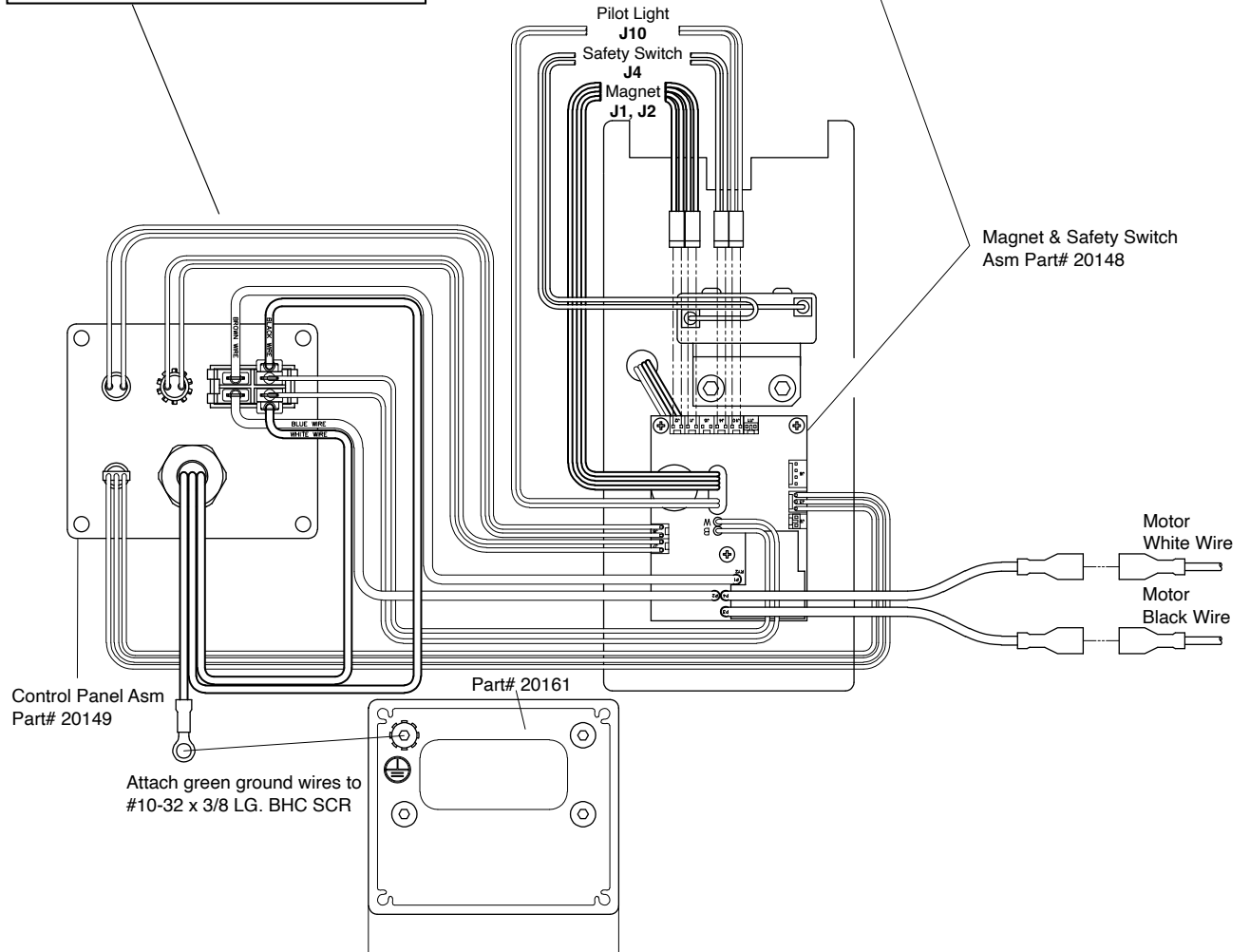
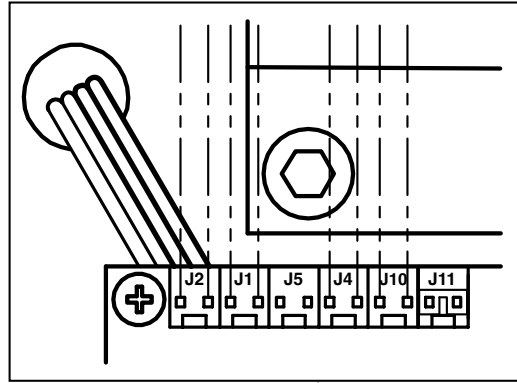
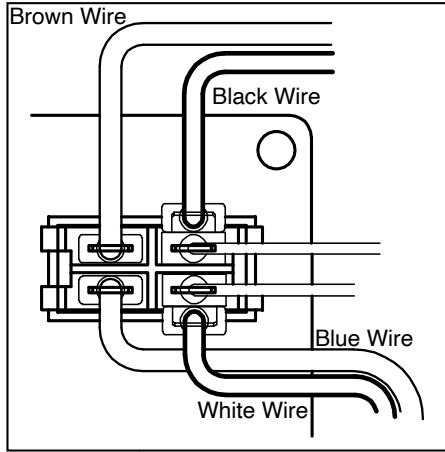
\*Additional kits available

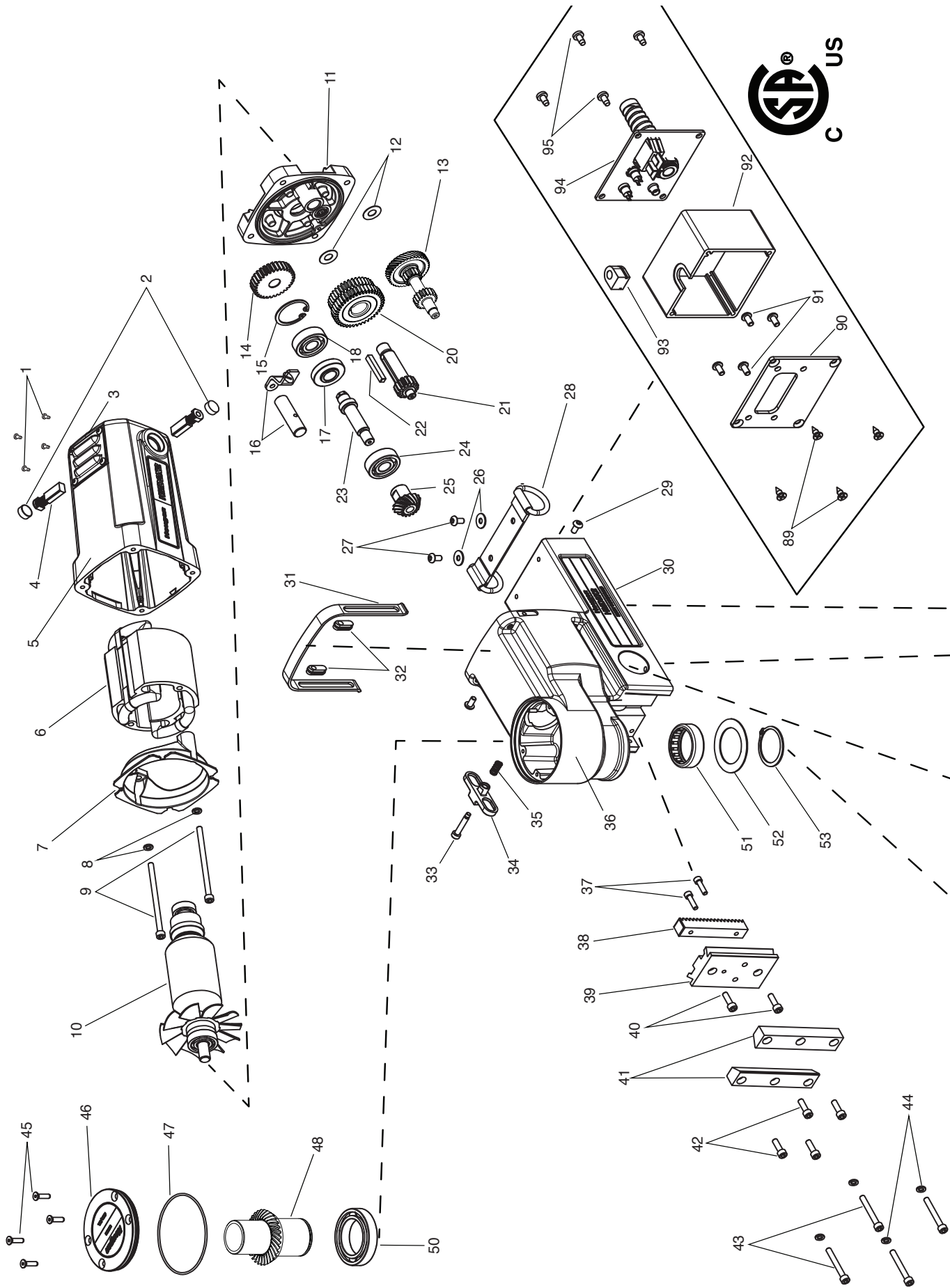
# CONTROL PANEL ASSEMBLY

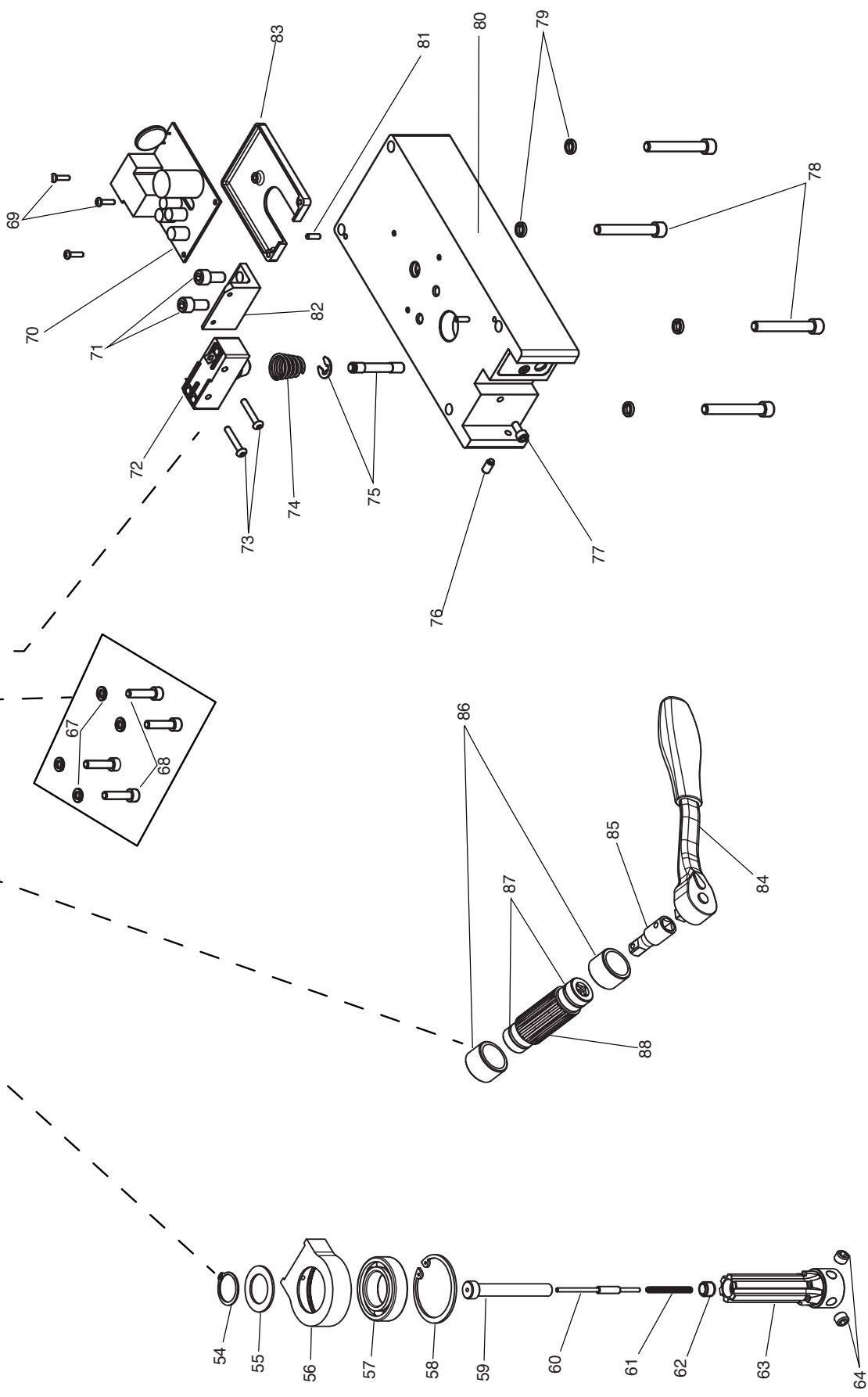
<b>20149 Control Panel Assembly</b>			
Item	Part #	Description	Qty
1	20204	Faceplate	1
2	90571	Power Cord Assy	1
3	08831	Guard - Switch	1
4	08832	Switch - Motor On	1
5	08834	Cover - Switch Green	1
6	08833	Switch - Motor Off	1
7	08835	Cover - Switch Red	1
8	08830	Switch - Rocker, Illuminated	1
9	04879	Lens - LED	1
10	04878	Spacer - LED	1
11	04881	Bulb - LED	1
12	04877	Wire Harness	1
13	90065	Washer - Tooth Lock	1



# CONTROL PANEL ASSEMBLY







# HMD2X2 PARTS LIST

Item #	Part #	Description	Qty
1	02385	SCR-BHC 6-32 x 1/4	4
2	07960	Cap Brush Holder	2
3	07848	Cover-Brush Access with Anodiz	1
4	07961	Carbon Brush	1 PR
5	20150	Motor HSG/ Brush Holder Assy	1
6	20172	Field Asm 2.50 Stack	1
7	07958	Baffle-.8HP Motor	1
8	50038	Washer-Helical Lock #10 Reg	2
9	08025	SCR-SHC 10-32 x 3 1/4	2
10	07956	Armature- .8HP 2.5 Stack	2
11	20147	Gear Box Cover Assy	1
12	17610	Flat Washer 8mm	2
13	20151	Gear Assy #2 & #3	1
14	20507	Gear-Spur Removable #6	1
15	08453	Retaining Ring INT 1.259 Bore	1
16	20155	Shift Control Rod Assy	1
17	20157	Spacer	1
18	17270	BRG-Ball	1
20	20152	Gear-Change Assy	1
21	20156	Gear-Spur Removable #5	1
22	27059	Key-3/16 SQ x 1.30 LG	1
23	20506	Spindle	1
24	17270	BRG-Ball	1
25	09595	Gear-Bevel Assy	1
26	90237	Washer-Flat #10	2
27	41044	SCR-BHC 10-32 x 3/8	2
28	08436	Safety Strap w/ Rings	1
29	41044	SCR-BHC 10-32 x 3/8	2
30	20144	Housing-Drill Assy	1
31	09600	Handle	1
32	20171	Stand Off	2
33	08069	SCR-SHSLD 3/16 x 7/8	1
34	07908	Switch-Gear	1
35	07910	Spring-Comp .26 x .50 x .030	1

Item #	Part #	Description	Qty
36	20145	Gear Box Assy	1
37	20179	SCR-SHC #8-32 x 5/8	2
38	20167	Gear-Rack	1
39	20166	Slide-Dovetail	1
40	40038	SCR-SHC 10-32 x 5/8	2
41	20168	Rail	2
42	40038	SCR-SHC 10-32 x 5/8	4
43	41048	SCR-SHC 10-32 x 1-1/2	4
44	50038	Washer-Helical Lock #10 Reg	4
45	90448	SCR-FHSC Mach #8-32 x 5/8	4
46	20146	Gear Box Cap Assy	1
47	20195	O-Ring 3.004 x 2.864 x .070	1
48	20154	Gear-Bevel Assembly	1
50	20191	Bearing-Ball 35 x 55 x 10	1
51	20192	Bearing-Roller 35 x 42 x 12	1
52	20170	Washer-Thrust 35 ID x 52 OD	1
53	20176	Ring-Retaining Ext 1-3/8 Shaft	1
54	20175	Ring-Retaining Ext 1.00 Shaft	1
55	20169	Washer-Thrust 1 ID x 1.56 OD	1
56	20165	Front Support Bracket	1
57	20173	Bearing-Ball 30 x 55 x 13	1
58	20177	Ring-Retaining INT 2-3/16 Bore	1
59	20163	Ejector Pin	1
60	20164	Plunger	1
61	20174	SPG-Comp	1
62	20181	SCR-SET 5/16-18x 1/4	1
63	20162	Arbor	1
64	40222	SCR-SOC Set 7/16-14 x .305	2
67	50038	Washer-Helical Lock #10 REG	4
68	10649	SCR-SHC 10-32 x 3/4 (S-298-2)	4
69	08494	SCR-PAN HD #4-40 x 7/16	3
70	08646	Circuit Board 120V	1
71	10971	SCR-SHC 1/4-20 x 1/2	2
72	04885	Safety Switch Assembly	1

## HMD2X2 PARTS LIST

Item #	Part #	Description	Qty
73	10972	SCR-BHC 6-32 x 7/8	2
74	17271	SPG-COMP/TPD	1
75	20200	Plunger Assy	1
76	20180	SCR-SET #10-32 x 3/8 Half Dog	3
77	40194	Pin-Roll 5/16 DIA x 1-1/4	1
78	90054	SCR-SHC 1/4-20 x 1-3/4	4
79	04721	Washer-Split Lock 1/4 HI COLLR	4
80	20199	Magnet/ Winding Assy	1
81	01169	Pin-Dowel 1/8 x 3/8	2
82	04909	Bracket-Safety Switch Non-Adj	1
83	08493	Spacer-Circuit Board	1
84	20212	Wrench-Socket 3/8 SQ	1
85	20219	Ext-3/8 x 3/8 x 1.75 Socket	1
86	40231	Bushing-Bronze 15/16 x 1-3/16	2
87	20188	O-Ring	2
88	20185	Gear-Feed	1
89	17459	Scr-Self Tap #10 x 1/2 Type AB	4
90	20161	Plate-Back Electrical Box	1
91	41044	SCR-BHC 10-32 x 3/8	2
92	20160	Housing-Electrical Box	1
93	08674	Grommet-Horseshoe .31DIA	1
94	20149	Control Panel Assy.	1
95	24081	SCR-Self Tap 10x3/8 Typ B	4

## 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.

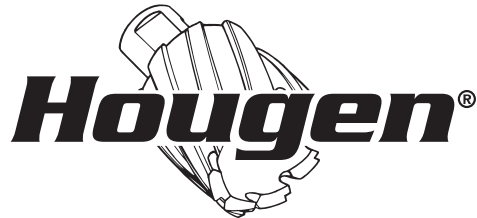
This warranty is in lieu of any other warranty, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

*Photographs and Specifications shown are accurate in detail at time of printing. Manufacturer reserves the right to make improvements and modifications without prior notice. Hougen, Rotabroach, and Hougen-Edge are proprietary trademarks of Hougen Manufacturing Inc.*

## AUTHORIZED WARRANTY REPAIR CENTER

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](http://www.hougen.com)



**Hougen Manufacturing, Inc.**  
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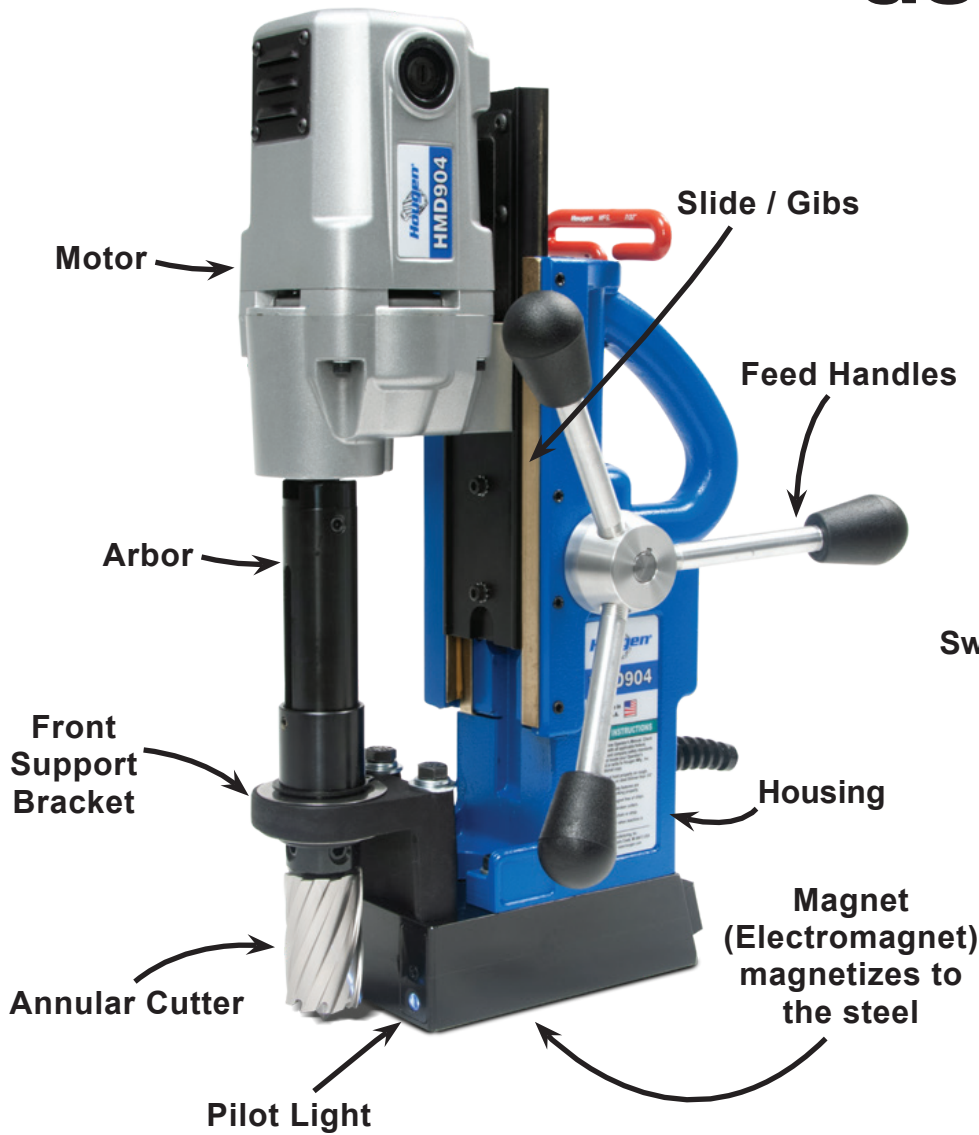

**Hougen<sup>®</sup>**

# SAFE OPERATION FOR MAGNETIC DRILLS

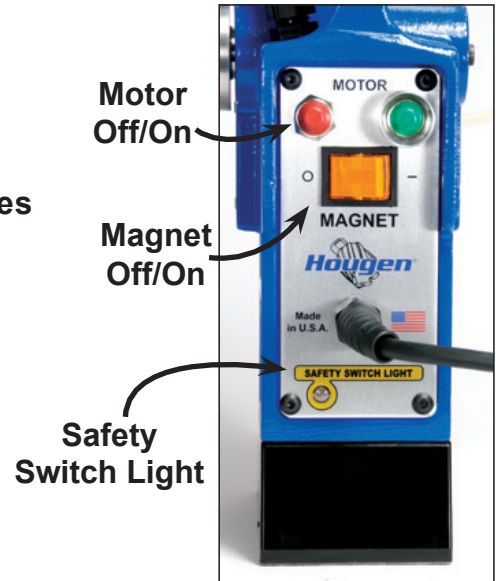
***A General Guide for Safe  
Operating Procedures***



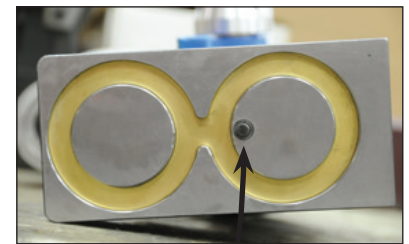
# General Parts



## Typical Control Panel



## Bottom of Magnet



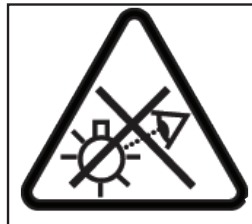
# SAFETY FIRST



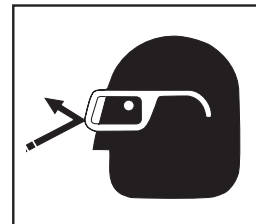
Cutters are sharp. Wear gloves when installing or removing cutter from arbor. Do not grab a rotating cutter.



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.

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 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 a 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 wrenches 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.*
- h) 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.*
- i) Always use a 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 accidentally.*

*(Continued on page 4)*

**Save all warnings and instructions for future reference.**



## IMPORTANT SAFETY INSTRUCTIONS

- d) Store idle power tools out of the 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. *Properly 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 tool 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

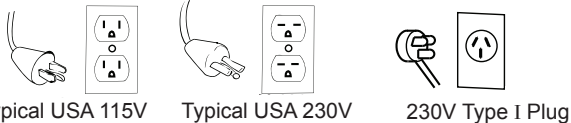
- a) Have your power tool serviced by a qualified repair person using only identical replacement parts. *This will ensure that the safety of the power tool is maintained.*

## ADDITIONAL SAFETY INSTRUCTIONS

### Safe Electrical Connection

Your Drill is rated for use on 115VAC or 230V at 50-60Hz. Do not attempt to use the 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 a tool is used outdoors, use only extension cords intended for use outdoors and so marked.

### Additional Safety Precautions

The 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 the cutter and arbor after each hole. With the 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 the jammed cutter by turning the arbor counterclockwise. Never attempt to free the jammed cutter by starting the motor. Service at an 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 the 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 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 re-energize, 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.

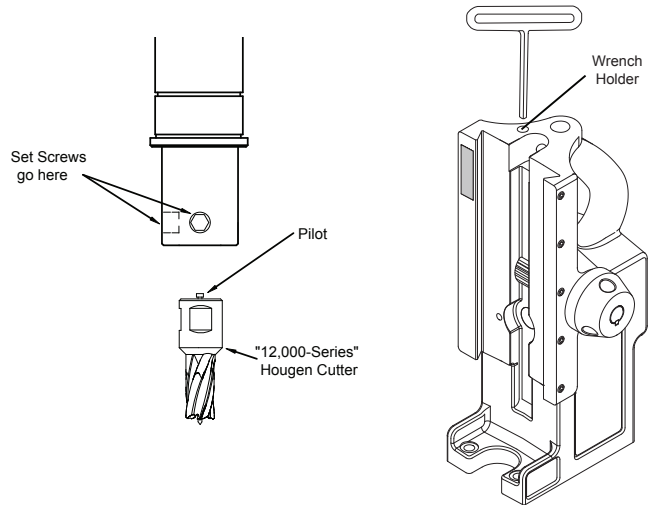
## PILOT LIGHT SWITCH

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 the pilot.



## INSTALLING THE HOUGEN CUTTER IN THE ARBOR

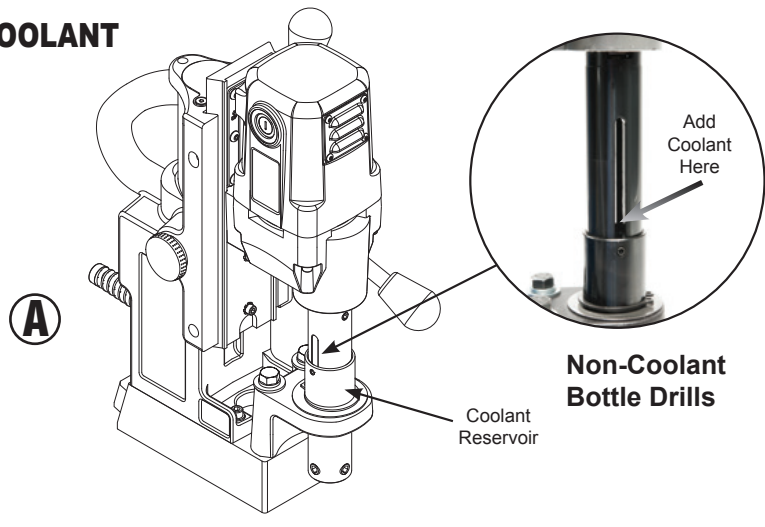
1. Disconnect from the power source and remove T-Handle wrench from holder at top of drill.
2. Lay drill on its side with the feed handles up or be sure the Arbor clears table if unit is in normal operating position.
3. Turn the Feed Handles until the cutter mounting set screws are exposed and completely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



## OPERATION OF THE CUTTING FLUID RESERVOIR

### FOR BEST RESULTS ALWAYS USE COOLANT

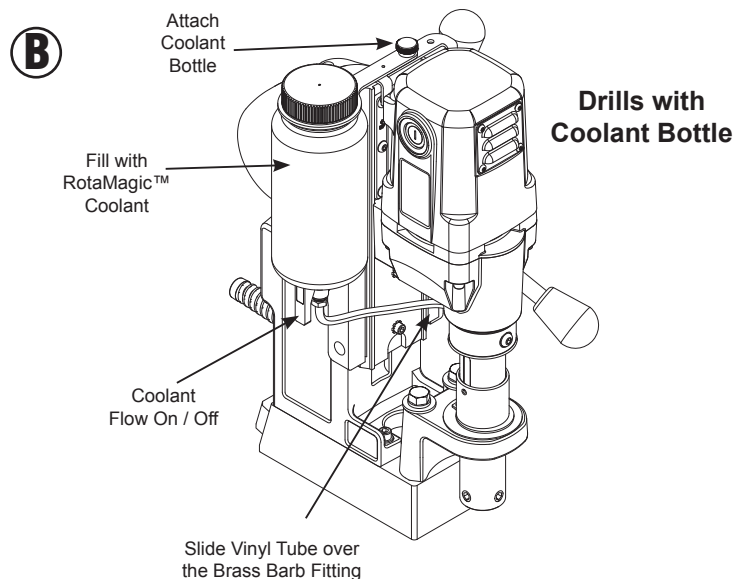
1. With Magnetic Drill in the operating position, turn the feed handles so that the cutter and pilot are above the work surface.
2. With the magnet turned ON & motor OFF,
  - A) For non-coolant bottle drills... fill the arbor reservoir by introducing RotaMagic™ cutting fluid through the slots in Arbor.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



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

4. For proper lubrication, all fluid in the reservoir should empty onto the work surface in no less than 15 seconds and no longer than 30 seconds.
5. The 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 the coolant bottle on/off lever to adjust the flow of the coolant.
7. For horizontal or drilling overhead holes, use Slick-Stik™ Lubricant.



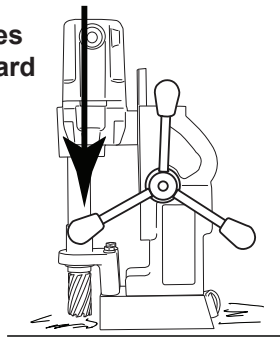
## OPERATING INSTRUCTIONS

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 the workpiece and bottom of the magnet are free of chips, oil, etc.
2. Verify that the Safety Switch works properly (See Safety Switch Indicator Light Section)
3. Position the drill by sliding it and gently feeding the Arbor so that pilot point is touching the center of hole to be drilled.
4. **Secure the unit to the workpiece with a safety chain.**
5. Turn the magnet "ON" by pressing the magnet ON switch.
6. Turn the Feed Handle, raising the cutter until the pilot is above the work surface.
7. Fill the coolant reservoir or fill the attached coolant bottle if applicable.
8. Make certain that the cutter is clear of the workpiece and turn the motor "ON" by pressing the motor START switch.
9. Feed the Hougén Cutter slowly into the workpiece. Only after a cutting path is established to a depth of about 1/16" can the full force be applied to the feed handles.
10. Ease up on the feed pressure as the cutter starts breaking through.
11. At the conclusion of cut, turn the motor "OFF" by pressing the motor STOP switch. Turn the Feed Handles to raise the Arbor thereby ejecting the slug, if it hasn't already fallen free.
12. Turn the magnet "OFF" by pressing the magnet OFF switch.
13. **Disconnect from the power source.**
14. If necessary, remove the chips from the cutter and magnet, preferably wearing leather work gloves and/or with pliers. Disconnect the safety chain and you are ready to move the unit to the 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 the magnetic holding power.**

**Use handles  
to feed toward  
the work  
surface**



**Never pull  
handles away  
from the 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 the motor brushes and replace if worn.
3. Check the 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 the 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 the drill and remove the safety switch assembly from magnet. Push the plunger out of the magnet. Clean out any debris from inside and around the plunger hole in the magnet. Coat the plunger with anti-seize. Replace the plunger and the safety switch assembly and tighten down the screws. Replace the magnet onto the drill housing.



## HINTS FOR SMOOTHER OPERATION

1. Keep the inside of the 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 the work, machine, arbor and the 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 the Hougen Cutter to freeze in the cut, slug to stick and may result in poor cutter life.
6. Always start the cut with light feed pressure and then increase sufficiently to achieve the maximum cutting rate.
7. Ease off on the pressure as the cutter begins to break through at the end of the cut.
8. Keep the slide dovetails, brass gibs and feed rack lubricated and free from chips and dirt.
9. When the slug hangs up in cutter, turn off the motor and bring the 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!***

**(810) 635-7111  
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