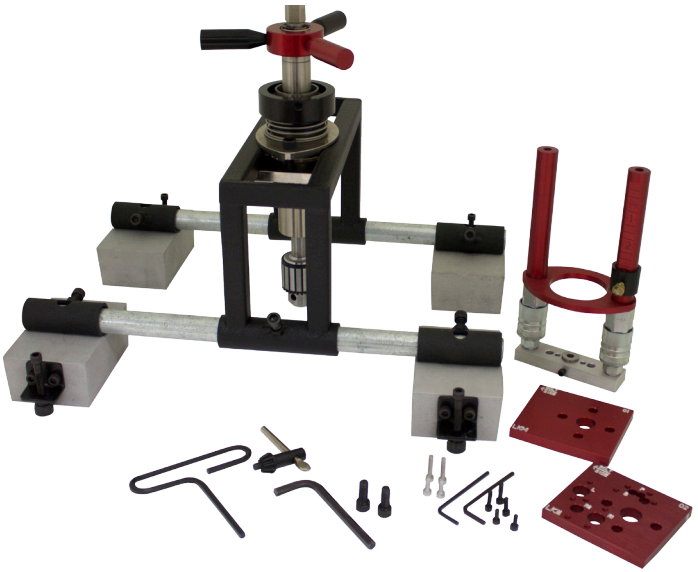
LOCKMASTERS®
INCORPORATED

Magnum

557 Bullet II™ Pro™



Magnum Bullet II™ - MAG55701
Magnum Drill Rig - MAG55702
Magnum Pro™ Drill Rig - MAG55703
(Magnum Pro is a combination of the MAG55701 & MAG55702)

OWNERS MANUAL
& OPERATING INSTRUCTIONS

GENERAL SAFETY RULES FOR ALL POWER TOOLS

Work Area

- KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents.
- AVOID DANGEROUS ENVIRONMENT. Don't use power tools in damp or wet locations. Do not expose power tools to rain. Keep work area well lit.
- AVOID GASEOUS AREAS. Do not operate portable electric tools in explosive atmospheres in presence of flammable liquids or gases. Motors in these tools normally spark, and the sparks might ignite fumes.
- KEEP CHILDREN AWAY. Do not let visitors contact tool or extension cord. All visitors should be kept away from work areas.

Personal Safety

- GUARD AGAINST ELECTRIC SHOCK. Prevent body contact with grounded surfaces such as pipes, radiators, ranges and refrigerator enclosures. Rubber gloves and non-skid footwear are recommended when working outdoors, where damp or wet ground may be encountered. A Ground Fault Circuit Interrupter protected power line must be used for these conditions.

- DRESS PROPERLY. Do not wear loose clothing or jewelry. They can be caught in moving parts. Wear protective hair covering to contain long hair.

- USE SAFETY EQUIPMENT. WEAR SAFETY GOGGLES or glasses with side shields. Wear hearing protection during extended use of power tools and dust mask for dusty operations.

- STAY ALERT. USE COMMON SENSE. Watch what you are doing. Do not operate tool when you are tired or under influence of drugs.

- REMOVE ADJUSTING KEYS AND WRENCHES. Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.

- AVOID ACCIDENTAL STARTING. Don't carry plugged in tool with finger on switch. Be sure the switch is OFF before being plugged in.

- DON'T OVERREACH. Keep proper footing and balance at all times.

- BEFORE CONNECTING THE TOOL to a power supply (receptacle, outlet, etc.) be sure the voltage supplied is the same as that specified on the tool's nameplate. A power supply with voltage greater than that specified for the tool can result in serious injury to the user - as well as damage to the tool. If in doubt, DO NOT PLUG IN THE TOOL. Using a power supply with voltage less than the nameplate rating is harmful to the motor.

NOTE

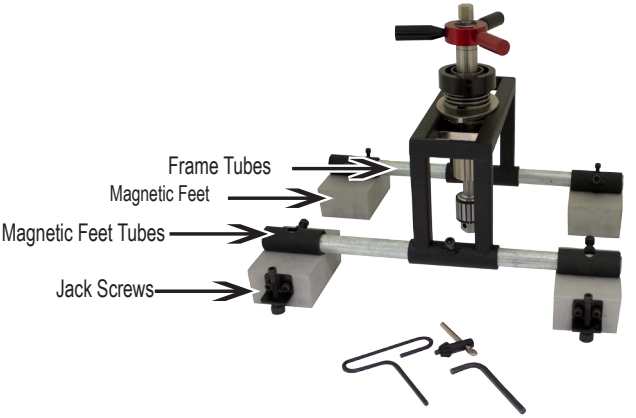
"Volts AC" designated tools are for Alternating Current 50-60 Hz only. "Volts DC" designated tools are for Direct Current. Do not use AC designated tools with DC power supply. Do not use electronic speed controlled tools with DC power supply.

TOOL USE AND CARE

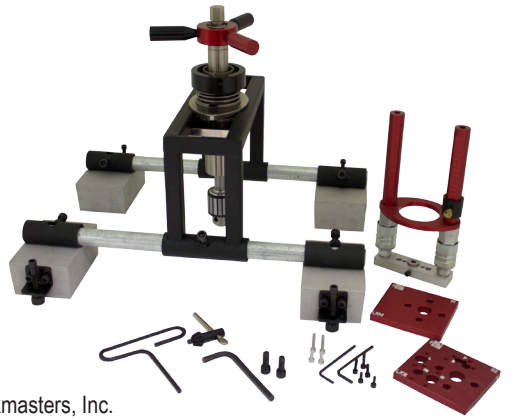
- DON'T FORCE TOOL. It will do the job better and safer at the rate for which it was designed.
- USE RIGHT TOOL. Don't force small tool or attachment to do the job of a heavy-duty tool. Don't use tool for purpose not intended - for example; don't use a circular saw for cutting tree limbs or logs.
- SECURE WORK. Use clamps or a vise to hold work. It's safer than using your hand and it frees both hands to operate the tool.
- DON'T ABUSE CORD. Never carry tool by cord or yank it to disconnect from receptacle. Keep cord from heat, oil, and sharp edges. Always keep cord away from the spinning blade, bits or any other moving part while the tool is in use.
- OUTDOOR USE EXTENSION CORDS. When tool is used outdoors, use only extension cords suitable for use outdoors and marked with suffix W-A (for UL), or W (for CSA).
- DISCONNECT TOOLS. When not in use, before servicing, or when changing blades, bits, cutters, etc.
- STORE IDLE TOOLS. When not in use, tools should be stored in dry, high or locked up place - out of the reach of children.
- DO NOT ALTER OR MISUSE TOOL. These tools are precision built. Any alterations or modifications not specified is misuse and may result in a dangerous condition.
- THE USE OF ANY ACCESSORIES not specified in this manual may create a hazard.
- MAINTAIN TOOLS WITH CARE. Keep tools sharp and clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect tool cords periodically and if damaged, have repaired by authorized service facility. Inspect extension cords periodically and replace if damaged. Keep handles dry, clean and free from oil and grease.
- CHECK DAMAGED PARTS. Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be promptly and properly repaired or replaced. Have defective switches replaced. Do not use tool if switch does not turn it on or off.
- ALL REPAIRS, ELECTRICAL OR MECHANICAL should be attempted only by trained repairmen.

Magnum Bullet II™
MAG55701

Magnum Drill Rig
MAG55702



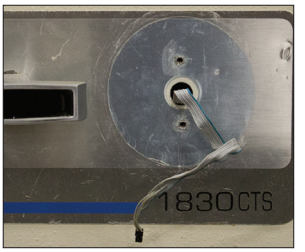
Magnum Pro™ Drill Rig
MAG55703
(Pro is a combination of the MAG55701 & MAG55702)



MAGNUM Bullet II™ MAG55701 Instructions

Prepping the Safe

1a. Prepare the door or area of penetration (remove dial, dial ring, center punch the drill site, etc.)



1a. Prepped Safe

Prepping the Drill Rig

2a. Remove the Barrel and Quill Assembly, by pushing in on the Quick Release Coupling Ring and sliding the Barrel and Quill Assembly completely out of the Quick Release Coupling. (**Figure 1**)

Figure 1

2a. Prepping the Drill Rig, **(Figure 1)**

Drill Point Template

3a. The Drill Point Template provided with the *Magnum Bullet II* has been designed to target the Fence, Lever Screw, Relock Trigger and a Scope Hole for Sargent & Greenleaf, Ilco and LaGard Combination Locks. **(Figure 2)**

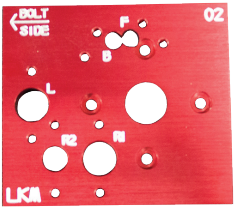


Figure 2

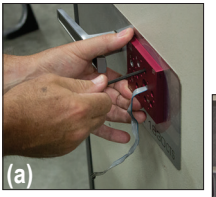
Note: Other templates available for other locks.

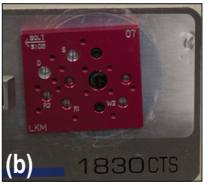
Attaching The Drill Template

4a. The mounting pattern for the Drill Point Template matches the Dial Ring mounting pattern in the four (4) mounting positions, RH, LH, VU, VD.

b. Align the selected drill template with the dial ring mounting pattern on the safe.

c. Attach the selected drill template to the safe with the two (2) 8-32 x 3/8" socket head cap screws provided and tighten securely.





4 **(a)** Attaching the Drill template

4 (b) Template attached.

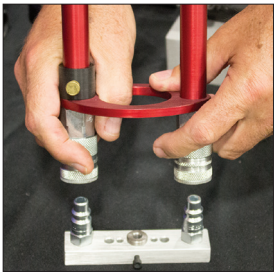
Preparing the Magnum Bullet II™

5a. Remove the Tower from the Drill base. (Figure 3).

Figure 3

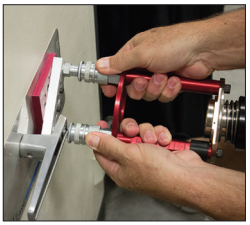
b. Attach the Bullet Drill Base to the template at the desired drill point using two (2) 8-32 socket head cap screws provided and tighten securely.

c. Attach the Quick Disconnect Bullet Tower to the Bullet Drill Base.



5a. Removing Tower from Bullet Drill Base.

5b. Attaching the Bullet Drill Base to the template.



5c. Attaching the Quick Disconnect Bullet Tower to the Bullet Drill Base.

Operating the Magnum Bullet II

6a. With the Barrel and Quill Assembly in hand, and viewing from the chuck end, hold the chuck collar with one hand while rotating the chuck sleeve counterclockwise with the other hand. Open chuck to approximate drill bit diameter.

b. Insert a clean bit up to the drill bit flutes for small bits, or as far as it will go for larger bits.

6a. Prepping the Barrel and Quill Assembly by rotating the chuck sleeve counterclockwise, opening the chuck to approximate drill bit diameter. Inserting a clean drill bit in the Barrel and Quill Assembly.

c. Close chuck by rotating the chuck sleeve clockwise. Use chuck key and tighten chuck in all three positions.

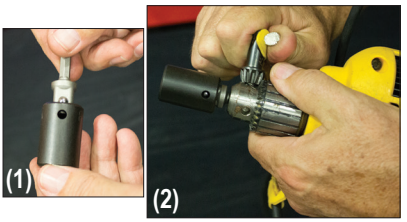
6c. Using the chuck key, tighten in all three positions.

d. Slide the Barrel and Quill Assembly into the Quick Release Coupling by aligning the red dot on the Coupling with the indents on the Barrel. Lock in the first position (closest to the end cap).

6d. Slide the Barrel and Quill Assembly into the Quick Release Coupling; align the red dot on the coupling with the indents on the Barrel.

Attaching the Drill Motor to the Drill Rig

7a. Put the socket onto the nut driver, both are provided. Place the nut drive into your drill motor chuck, tighten.



7a.
(1) Inserting the socket in the nut driver.

(2) Placing the nut drive into the drill motor chuck and tightening.

b. Insert nut driver into the hex drive socket on the end cap of the Barrel and Quill Assembly. You are now ready to penetrate the safe.

"S" Model NOTE: If you have the style Barrel with a spindle that protrudes from the back, tighten the Drill motor on to the spindle.

7b. Insert the nut driver into the hex drive socket, now you are ready to penetrate the safe.

Begin Drilling

8a. Start the drill motor and feed the bit into the safe using the end cap handles. Feed the bit steadily; fast enough to work the drill motor, but not lug it down and overheat it. Listen to the sound of the drill motor and feel the difference in the Barrel Assembly's feed resistance to recognize contact with different layers of safe material. When you contact hardplate, the feed will depend on the type of hardplate.

8a. Start the drill motor and feed the bit into the safe using the end cap handles.

b.. If the bit becomes bound in the work piece, back off the feed pressure but continue the rotation of the drill bit. If the drill bit will not turn, stop drilling. Do not reverse direction of the drill motor. Try turning the chuck of the drill counterclockwise by hand.

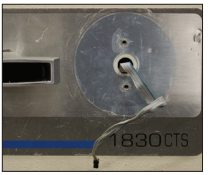
c. If the above procedure does not work, or cannot be performed, remove the drill from the Barrel and Quill Assembly. Release the drill bit from the chuck. Use a pair of pliers to hold the shank of the drill bit and turn the drill bit in a counter-clockwise rotation to loosen from workpiece. Inspect the drill bit for damage and replace if necessary.

d. When drilling with successively longer bits (4", 6", 8", etc.) to penetrate a thick door, simply remove the Barrel and Quill Assembly from the Quick Release Coupling and change drill bits. Be sure to back off the Quill until it stops and then turn clockwise 1/2 turn before replacing the Barrel and Quill Assembly into the Quick Release Coupling.

MAGNUM Drill Rig MAG55702 Instructions

Prepping the Safe

1a. Prepare the door or area of penetration (remove dial, dial ring, center punch the drill site, etc.)



1a.Prepped Safe

Prepping the Drill Rig

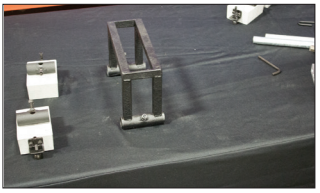
2a. Remove the Barrel and Quill Assembly, by pushing in on the Quick Release Coupling Ring and sliding the Barrel and Quill Assembly completely out of the Quick Release Coupling.

Figure 1

2a.Prepping the Drill Rig (**Figure 1**)

Assembling the Magnum 557 with Magnets

3a. Set the Frame on a flat surface, (floor, table or ground) with the Frame Tubes down.



3a. Setting the Frame on a flat surface, Frame tubes down.

b. Place the Pipes (2) through the Frame Tubes and tighten the cap screws. Ensure that the Pipes are centered on the frame.

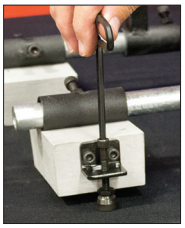
3b. Placing the pipes (2) through the Frame Tubes.

c. Place the Magnetic Feet (4) on the Pipes by sliding the Magnetic Feet Tubes over the pipe.

Note: For most applications there should be approximately 1/2 inch (13 mm) of Pipe protruding from the left and right sides of the Magnetic Feet Tubes.

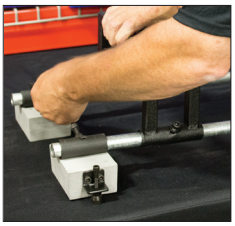
3c. Placing the Magnetic Feet (4) on the Pipes.

d. Extend the jack screw on each Magnetic Foot raising the Magnetic Feet approximately 1/4 inch (6 mm) off the flat surface.



3d. Extending the jack screw on the Magnetic Foot.

e. Tighten the cap screws on each Magnetic Foot.

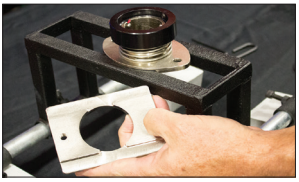


3e. Tightening the cap screws on each foot.

f. Remove the Quick Release Coupling from the Barrel Assembly by removing the (2) cap screws with the provided allen wrench.

3f. Removing the Coupling from the Barrel Assembly.

g. Attach the Quick Release Coupling to the center of the frame with the notched plate. Attach with the two (2) socket head machine screws provided and tighten firmly. *Note: The notched side of the Plate goes against the Frame.*



3g. Attaching the Coupling to the center of the frame.

h. Pick up the assembled Drill Rig Frame (minus the Barrel and Quill Assembly) and position it on the safe or vault door with the center of the Coupling over the drill point.

3h. Placing the assembled Drill Rig Frame on the Safe or Vault Door.

i. With the Drill Rig positioned on the safe or vault door, loosen the cap screws on the Magnetic Feet Tubes. This will allow the Magnetic Feet to fully seat on the surface giving a good bond to the surface of the safe.

3i. Loosening the cap screws on the Magnetic Feet Tubes.

j. Retract the jack screws on each of the Magnetic Feet. Check to insure that the Magnetic Feet are fully seated on the surface of the safe.

3j. Retracting the jack screws on the Magnetic Feet Tubes to insure the frame is secure on the Safe or Vault door.

k. Back off the Quill Assembly from the Barrel by turning the end cap counterclockwise until it stops. Then, turn the end cap one complete turn clockwise. This allows some play between the Barrel and Quill Assembly.

Operating the Magnum 557 with Magnets

4a. With the Barrel and Quill Assembly in hand, and viewing from the chuck end, hold the chuck collar with one hand while rotating the chuck sleeve counterclockwise with the other hand. Open chuck to approximate drill bit diameter.

b. Insert a clean bit into the drill bit flutes for small bits, or as far as it will go for larger bits.

4a. Holding the chuck collar and rotating the chuck sleeve counterclockwise.

c. Close chuck by rotating the chuck sleeve clockwise. Use chuck key and tighten chuck in all three positions.

4c. Closing chuck with Drill Bit in position.

d. Slide the Barrel and Quill Assembly into the Quick Release Coupling by aligning the red dot on the Coupling with the indents on the Barrel. Lock in the first position (closest to the end cap).

4d. Sliding and aligning the Barrel & Quill Assembly.

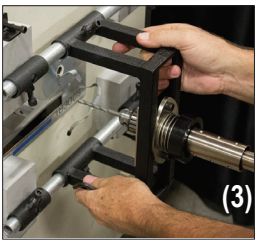
Positioning the Drill Rig

5a. Horizontal Alignment (Left to Right)
Tighten the cap screws on the Magnetic Feet Tubes to snug (do not over-tighten). Loosen the Frame's cap screws on the Pipes to move the Frame to the left or right. Once in position re-tighten the Frame's cap screws

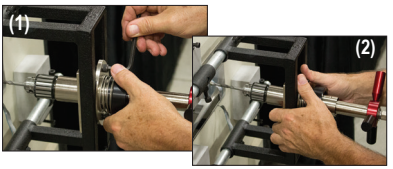
5a. **(1)** Tightening the cap screws on Magnetic Feet,

(2) Loosening the Frame's cap screws,

(3) Positioning the Frame from Left to Right.



b. Vertical Alignment (Top to Bottom)
Loosen the (2) mounting screws on the Quick Release Coupling and slide the Coupling up or down and re-tighten the screws once in position.



5b.
(1) Loosening the mounting screws on the Quick Release Coupling.

(2) Positioning the Barrel & Quill Assembly

Attaching the Drill Motor to the Drill Rig

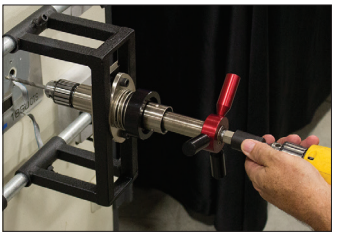
6a. Put the socket onto the nut driver, both are provided. Place the nut drive into your drill motor chuck, tighten.

6a.
(1) Inserting the socket in the nut driver.

(2) Placing the nut drive into the drill motor chuck and tightening.

b. Insert nut driver over the hex drive on the end cap of the Barrel and Quill Assembly. You are now ready to penetrate the safe.

"S" Model NOTE: If you have the style Barrel with a spindle that protrudes from the back, tighten the Drill motor on to the spindle.



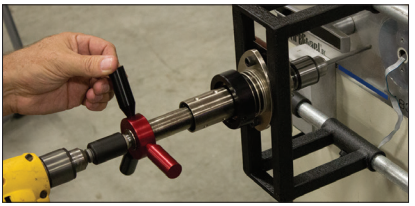
6b.
Inserting nut driver onto the hex drive, begin drilling.

Begin Drilling

7a. Start the drill motor and feed the bit into the safe using the end cap handles. Feed the bit steadily; fast enough to work the drill motor, but not lug it down and overheat it. Listen to the sound of the drill motor and feel the difference in the Barrel Assembly's feed resistance to recognize contact with different layers of safe material. When you contact hardplate, the feed will depend on the type of hardplate.

b. If the bit becomes bound in the work piece, back off the feed pressure but continue the rotation of the drill bit. If the drill bit will not turn, stop drilling. Do not reverse direction of the drill motor. Try turning the chuck of the drill counterclockwise by hand.

c. If the above procedure does not work, or cannot be performed, remove the drill from the Barrel and Quill Assembly. Release the drill bit from the chuck. Use a pair of pliers to hold the shank of the drill bit and turn the drill bit in a counter-clockwise rotation to loosen from workpiece. Inspect the drill bit for damage and replace if necessary.



7a.
Rotating the drill motor and feeding the bit into the safe.

d. When drilling with successively longer bits (4", 6", 8", etc.) to penetrate a thick door, simply remove the Barrel and Quill Assembly from the Quick Release Coupling and change drill bits. Be sure to back off the Quill until it stops and then turn clockwise 1/2 turn before replacing the Barrel and Quill Assembly into the Quick Release Coupling.

TROUBLESHOOTING

1. *The magnetic feet will not stay on the safe or vault door.*
   a. Insure that the magnetic feet are clean and free of any metal shavings and debris.

   b. Several coasts of paint can affect the magnets. If this occurs, you may need to reduce the drilling pressure.

2. *How can I angle drill with the Magnum?*
   a. The Magnum 357 and the old 457 Magnum had a three part frame that allowed angle drilling in 5 degree increments up to 25 degrees. The 557 Magnum does not have this capability.

   b. Use a lever rig, the "*Equalizer II*". Call *Lockmasters, Inc*. Customer Service.
   • Press coupler ring and slide barrel and quill assembly until the drill bit touches the surface, release coupling.

3. *Is it possible to drill at a compound angle?*
   a. Only with the Magnum 357 and the old 457 Magnum with magnets. With the drill rig installed at the desired position for angle drilling, extend the jack screws on the magnetic feet and rotate the entire rig to the desired position. Make sure you retract the jack screws prior to any drilling.
   b. Use a lever rig, the "*Equalizer*." Call *Lockmasters, Inc.* Customer Service.

4. *The hex drive is worn out. Can I replace this or do I have to send the 457/557 Magnum back to Lockmasters, Inc.?*
   a. You can replace the hex drive (Part# MAGHEXDRIVE). Call *Lockmasters, Inc.* Customer Service.

5. *The hex drive shaft is worn down on the ends, what can I do?*
   a. Grind 1/32 inch (1 mm) off of each end of the hex drive shaft. Insure that when grinding that you maintain a square edge.
   b. Order a new hex drive shaft. Call *Lockmasters, Inc.* Customer Service.

6. *Is the 457 Magnum capable of side drilling a safe?*
   a. The 457 Magnum is capable of side drilling a safe only if the drill point is 5 inches (13 cm) or greater from the edge of the safe.
   b. If the drill point is less than 5 inches (13 cm) from the edge of the safe, use the "*Bullet II*".

7. *I need to drill a safe that has a door thickness of 5-1/2 inches (14 cm). How do I drill this with the Bullet II?*
   a. Start with a 6 inch (15 cm) drill bit. This will allow 3-7/8 inches (10 cm) of penetration with the drill bit fully inserted into the chuck. Remove the barrel and quill assembly and replace the 6 inch (15 cm) drill bit with an 8 inch (20 cm) drill bit. Replace the barrel and quill assembly. This will allow 5-7/8 inch (15 cm) of penetration with the drill bit fully inserted into the chuck.
   b. The 457 Magnum is capable of drilling this same depth with a 6 inch (15 cm) drill bit.

HELPFUL HINTS ON: DRILL BITS, TOOLS AND EQUIPMENT

Drilling hardplate in the safe begins with drilling the outside of the safe. Center punching the location of the hole is strongly recommended. This will prevent the bit from "walking" before it begins to drill. The outside surface of a safe is soft enough to be dimpled by a punch. Use a standard pointed punch and hit it with a hammer. An automatic center punch, powered by an internal spring, is another easy way to do this. Carefully measure the exact location, mark it, then punch the spot. The goal is to make a depression that will hold the tip of the drill until it forms a socket in the metal.

Drill Bits are available in several types and many sizes. Generally it is a good idea to use sharp, new bits. If a bit becomes dull, it may be resharpened, but this must be done with care. Bits sharpened improperly may drill unevenly, causing the hole to enlarge or veer off course. A silicon carbide grinding stone (green wheel) may be used on a bench grinder to resharpen carbide bits. Drill bits must be considered as expendable items. They should be used properly, and discarded when no longer usable.

High Speed Steel bits should be used to begin the hole. This bit can be used to drill the skin, some insulation, mild steel or stainless steel.

Cobalt bits may also be used on any of these materials. A cobalt bit is more expensive than a high speed steel bit, but it is harder and so will hold its edge much longer. Being harder, it is slightly more brittle and more likely to break.

Carbide-Tipped bits have a wedge of tungsten carbide at the tip. These bits are designed for drilling hard metals. There are basically two types, straight-fluted and spiral-fluted, and each has advantages. The straight-fluted style **(Champion)** has a greater cross-section and so has a stronger shank. The spiral-fluted style **(MP3)** will carry chips out of the hole, helping to prevent the bit from binding. One spiral-fluted bit **(Mr. Twister)** has notches in the cutting edge which increases the cutting surface by more than 17%. Carbide-tipped masonry bits are used for drilling concrete, and this is the insulation used in some fire safes. They are not well suited for drilling hard metals, because their cutting edge is sharpened to a very steep angle. Sometimes drilling with a carbide-tipped bit must be alternated with punching to break up or dislodge carbide chips. Solid carbide bits should not be used. They are brittle and may shatter and plug the hole.

Diamond-Tipped Core Drill Bits (Diamatip) is used for drilling various types of carbide hardplate. It is hollow and is filled with a lubricant which flushes debris from the hole. It is more expensive than any other type of bit, but it can save hours of time in penetrating some hardplates. The bit is somewhat fragile, and it would quickly be damaged by any rough protrusions on the hardplate surface. Grinding a (used) carbide-tipped bit against the surface to smooth and pocket it, will prepare the surface. Drilling is done with slow speed and light pressure. A hole saw, punch or carbide bit is used to remove the carbide core from the hole.

Punches may be needed in some cases to break up or dislodge pieces of brittle hardplate. A variety of **(Chisel Punches)**, **(Pin Punches)** and **(Two Piece Punches)** should be available.

Drill Motors (Bosch-BOS1194VSR) should have good ventilation and feel comfortable when hand-held. They should draw at least 4.5 amps, to withstand the pressure that may be applied by

a leverage or fixed drill rig. They should have variable speed: sometimes a slow speed is required (below 500 rpm), and sometimes a high speed (1500 rpm or greater) is desirable. The chuck should have a capacity of at least 3/8" and preferably 1/2" in order to accommodate drill bits of those sizes.

Drill Rigs are used for greater control in drilling. A leverage rig **(The Equalizer)** applies pressure to the drill bit by means of a lever attached to the safe and the drill motor. It allows versatility in terms of the angle of drilling, and can be used with a variety of drill motors. A fixed rig **(Magnum)** attaches to the safe by means of chain, straps, magnetic or pneumatic force **(M-4 Vacuum Base Drill Rig)**. It gives great control over pressure and rate of feed.

BARRIER MATERIALS AND TECHNIQUES FOR DRILLING THEM

Close attention should be paid to the equipment as it is being used, to determine what techniques or tools are appropriate. The sound of the drill motor, the forward progress of the bit in the hole, the condition of the bit and the sound of the bit as it drills — all of these must be monitored as drilling proceeds.

The drill motor will be running at maximum speed before the bit contacts the safe. As material is drilled, this "load" on the motor will cause it to slow down slightly. This will be indicated by the sound of the motor dropping in pitch. If there is an air gap after the material is penetrated, the motor will speed up, because there is now no resistance. But if at this point another layer of material is reached, the drill motor may either speed up or slow down. If the bit is able to drill the second layer, the motor will slow down as the material is being drilled. If the bit is unable to drill it, the motor will speed up as the bit spins on the surface of the material.

HELPFUL HINTS ON:
HARDPLATE AND BARRIER MATERIALS

"Hardplate" is a generic term used to describe barrier materials in safes and vaults. Its purpose is to protect the lock(s), relock device(s) and/or boltwork against attempted penetration by drilling, torching, etc. Most safes have hardplate only in the door. High-Security safes have this type of material on all sides, and so are said to provide "six-sided" protection.

Case Hardened Tool Steel is commonly used as a barrier material in lower-grade safes. It is hardened on the surface only, and once this is penetrated should drill easily. Depending on how hard it is, it may be drilled with cobalt or carbide-tipped bits.

Stainless Steel is non-magnetic and has a slight yellowish tint. It is tough, but not hard. It may be drilled with a cobalt bit, without needing a drill rig.

Manganese Steel will "work harden" as it is drilled. That is, the heat of drilling will leave the material harder than it was before. Slow speed (rpms) should be used, and once drilling is begun, it should be continued nonstop until the hole is through.

Flame Sprayed Carbide hardplate consists of small carbide chips flame sprayed onto steel plate. This can be drilled with carbide tipped bits, but it will dull them. A drill rig, medium to heavy pressure and low rpms, and possibly more than one bit, are required.

Relsomite is a hard surfacing material bonded to a base metal. It can be drilled with a carbide-tipped drill bit and a fixed drill rig. Use 1000 rpm or less, and steady medium to heavy pressure. If one bit wears out before penetrating, punch the hole sharply with a pointed punch, attempting to crack the surface. Continue drilling with another carbide-tipped bit.

Kymloy is made by bonding together tungsten carbide fragments and steel powder. It can be drilled with a drill rig and carbide-tipped drill bit.

Carbide Welded hardplate is made by welding a carbide material onto a steel plate. When this is used in a safe, the carbide side will be what the drill hits first. A fixed drill rig, carbide-tipped bits, and low rpm drilling, combined with lots of punching, will succeed. Alternating bits with different tip angles is often helpful. This may be drilled quicker and more easily with a diamond-tipped core drill, after a carbide-tipped bit is used to smooth the surface. Use a fixed drill rig, slow speed (no more than 500 rpm) and light pressure. After the carbide chip portion has been drilled, use a hole saw of the same diameter to remove the core which has been cut or simply break off the core. Half an hour or more may be necessary to penetrate the hardplate.

Carbide Matrix hardplates, such as Shwayder's **"Maxalloy"** (also known as **"Relsom"**) are made by sprinkling carbide chips in a mild steel pan of copper wash. These can be identified by the copper color of the material, and by the way it gouges drill bits. This cannot be penetrated by drilling alone, even if carbide-tipped bits are used. Punching will be necessary to break up and dislodge the carbide chips, and the drilling and punching are alternated and continued until the hole is completed. A diamond-tipped core drill may also be used.

Carbide Rods are sometimes used in the door or in the safe, inserted side by side in parallel holes. Punching will fracture these, and alternating drilling and punching will penetrate them.

Ceramics are usually white. They are very hard but also very brittle, and may be penetrated by alternating punching and drilling. Punching will fracture and crush ceramics. The pieces may be blown or probed from the hole.

Composite materials are used on many high security safes. These will have hardened nuggets of various types bonded within aluminum, steel or some other substance. Drilling composites requires close attention to the progress of the hole and condition of the tip of the bit, to learn what material is being encountered. Punching may be necessary to break or dislodge hardened inclusions.

Ball Bearings may be used as a barrier material. Sometimes the ball bearings are bound in an epoxy-like layer. This material protects against radiological (X-Ray) attack as well as drilling. It can be drilled, using slow forward speed and prying out ball bearings as they become loose. An envelope of loose ball bearings has been used to deter drilling. The ball bearings may be removed with a magnet, or held out of the way with glue. LaGard made a hardplate which sandwiches a layer of ball bearings between two dimpled pieces of Zamac. This hardplate may be drilled using a drill rig, moderate to heavy pressure and a carbide-tipped drill bit.

Rough-Surface materials present certain difficulties because the bit does not contact the surface evenly. This would be the case with a welded-surface or open-faced carbide matrix hardplate. It is essential that a pocket be formed in the material in order to drill it. Often this may be done by using an already-dull bit to wear off the rough surface of the hardplate.

Offset surfaces must sometimes be overcome. The offset is intended to push a drill off course or break the bit. When in doubt about the material being drilled, look in the hole to detect such surfaces. Drilling with slow feed is the best way to deal with these.

Angled materials, called deflectors, may be built into the safe to discourage drilling. Use a sharp carbide-tipped bit and light pressure to form a pocket in the material. Once the pocket is formed, drill as usual. There may be more than one of these, so check with a scope after penetrating each one.

Torch-Resistant materials are sometimes found in higher-rated safes. A layer of copper or aluminum will dissipate heat rapidly, preventing a torch from melting the material. Sometimes a layer of rubber will be used, and attempts to penetrate it by torching will release smoke. This will be noticeable and would be detected by a smoke alarm. The smoke would also make breathing difficult for the technician.

HAWKEYE™ 17 INCH AFB SERIES BORESCOPE

Hawkeye AFB series 17 inch borescope. Straight view probe is the slim line - only 4.20 mm in diameter. This kit has an adjustable focusing eyepiece to allow for wider range of visual distances. A 42° field-of-view is achieved with the straight view probe. A rotating 90° direction-of-view is achieved by sliding a Slim Mirror Tube onto the scope. 4.80 mm diameter fits easily into a 1/4 in hole Kit Includes: 17" Straight view probe & 90 degree mirror sleeve Mini-Mag Light power supply with one spare bulb, and shipped in a foam lined box. Factory repairable with 1 year limited warranty.

LKM1208AFB

MR. TWISTER™ CARBIDE TIPPED DRILL BITS

It's The First Of Its Kind With A Spiral Design.

Note in the photo above, the cross section for the spiral shank has nearly as much "meat" as our straight flute bit and therefore achieves the desired results in strength and heat dissipation. Also notice the cutting edge. By sharpening the bit in a notched fashion, we end up with more cutting surface as compared to common straight-edge sharpening techniques.

MRT3/16X4C
MRT1/4X4C
MRT1/4X6C
MRT1/4X8C
MRT1/4X10C
MRT5/16X6C
MRT5/16X8C
MRT3/8X6C
MRT1/2X6C

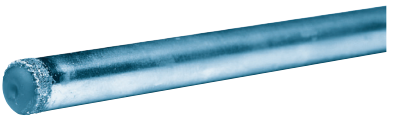
HAWKEYE™ PRECISION BORESCOPE

All probes are the slim line - only 4.2 mm in diameter. All kits have a built-in adjustable focusing eyepiece to allow for wider range of visual distances. A 40º field-of-view is achieved with the straight view probe and the 90º probe.

Includes:

- 17" Probe
- Mirror Tube
- Power Handle
- Hard Side Carrying Case

LKM1208C



DIAMATIP™ CORE DRILL BITS

Specifically Designed to Cut Hardplate With Either Solid Carbide Or A Carbide Chip Matrix.

Diamatip's specially designed tip is coated with diamond chips and works with a blue lubricant inserted in the core of the drill bit. As the Diamatip starts cutting, it creates heat that melts the special lubricant, flushing all surfaces of unwanted debris. With the Diamatip, it's possible to achieve a 20-25 minute penetration through the carbide matrix used in many GSA containers - without having to use a "punch or drill" technique. With care, you should be able to penetrate 1 1/2" - 2" plates per cutter. A small tube of lubricant is included with each bit.

MAG1001DC
1/4" Diamatip

MAG1002DC
5/16" Diamatip

MAG1001DC4
1/4" x 4" Diamatip

MAG1003DC
3/8" Diamatip

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MAG55701, MAG55702, MAG55703 INSTRUCTIONS

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