DIAMOND
PRODUCTS

OPERATOR'S MANUAL

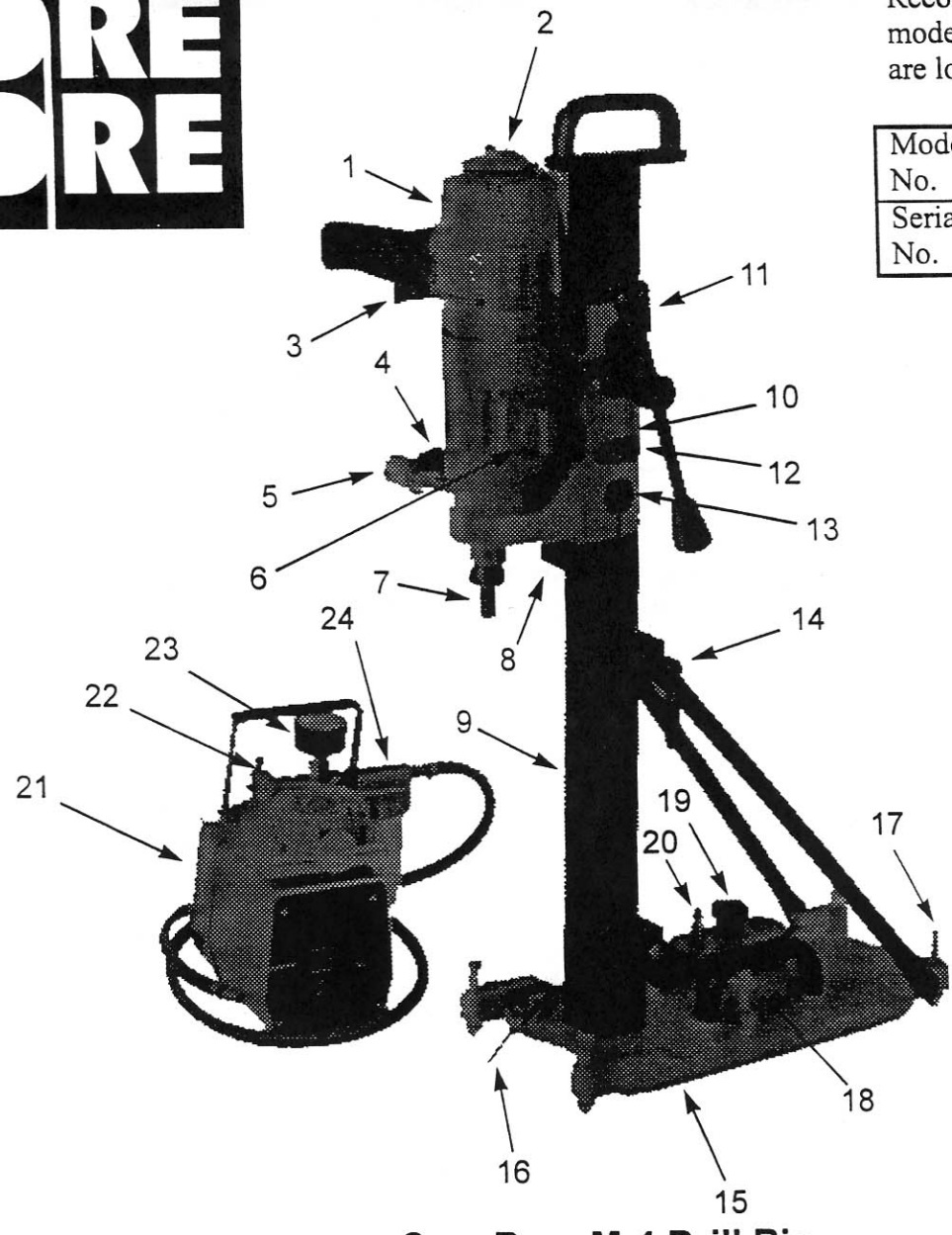
M-4 Core Bore Drilling Machine

IMPORTANT:
READ MANUAL AND SAFETY PRECAUTIONS BEFORE OPERATING!

CORE BORE

Record below and retain motor model and serial numbers which are located on nameplate.

Model No.	
Serial No.	



Core Bore M-4 Drill Rig

1. Weka DK-12 Motor
2. Level
3. Trigger Switch with Lock
4. Water Valve
5. Water Inlet
6. Speed Selector Knob
7. Spindle
8. Depth Gauge
9. Mast
10. Carriage
11. Feed Handle
12. Carriage Lock
13. Carriage Guide
14. Mast Angle Handle
15. Combination Base
16. Centering Pointer
17. Leveling Screw
18. Vacuum Quick Release Valve
19. Slot Cap Knob
20. Vacuum Fitting
21. Gast Vacuum Pump
22. Vacuum Release Valve
23. Vacuum Gauge
24. Water Trap Jar

DESCRIPTION AND SPECIFICATIONS

The Core Bore model M-4 drill rig is a lightweight, yet powerful, core drilling machine. Diamond core bits are capable of drilling through granite, masonry, and steel reinforced concrete, leaving a perfectly formed hole.

Drilling capacity: 1/2" through 6" diameter bits

Base: anchor / vacuum combination (7-7/8" x 16-7/8")

Mast: lightweight extrusion (30" high)

Drill feed system: rack and pinion

Vacuum system: Gast 1/8 Hp, 24 in Hg diaphragm pump with gauge

Motors:

Weka Model DK-12
Power: 110 volt, 14 amp, 60 Hz
Speeds: 580 / 1400 / 2900 RPM
Safety override: slip clutch

Milwaukee Model 4090
Power: 110 volt, 15 amp, 60 Hz
Speeds: 375 / 750 RPM
Safety override: shear pin

Milwaukee Model 4095
Power: 110 volt, 15 amp, 60 Hz
Speeds: 500 / 1000 RPM
Safety override: shear pin

Milwaukee Model 4094
Power: 110 volt, 20 amp, 60 Hz
Speeds: 450 / 900 RPM
Safety override: shear pin

Milwaukee Model 4099
Power: 110 volt, 20 amp, 60 Hz
Speeds: 600 / 1200 RPM
Safety override: shear pin

Milwaukee Model 4004
Power: 110 volt, 20 amp, 60 Hz
Speeds: 300 / 600 RPM
Safety override: slip clutch

Milwaukee Model 4096
Power: 110 volt, 20 amp, 60 Hz
Speeds: 450 / 900 RPM
Safety override: slip clutch

Milwaukee Model 4005
Power: 110 volt, 20 amp, 60 Hz
Speeds: 600 / 1200 RPM
Safety override: slip clutch

SPECIAL FEATURES

The Core Bore M-4 drill rig is a versatile machine with many unique features. To make the most of these time-saving features please note the following:

1. **Quick Release Motor Mounts**
   Quick release motor mounts allow you to separate the motor from the drill stand for ease of transport and storage.

   For Weka DK-12:
   Turn handle on side of motor mount clamp counterclockwise to loosen clamp and remove motor. Note: By pulling handle out, it then may be rotated in either direction without affecting clamping tension on motor.

   For Milwaukee:
   Unscrew knurled nuts on motor mount plate and remove motor with plate and key.

2. **Carriage Lock**
   Pull out knob on the side of the carriage to disengage lock. Turn the feed handle to lower carriage. When carriage is raised to highest level, spring will instantly re-engage carriage lock.

3. **Feed Handle**
   Feed handle can be attached to pinion on either side of carriage. Knob locks handle in place.

4. **Angle Adjustment**
   Handle on mast sliding clamp locks mast at desired angle. Handle direction may be adjusted by pulling handle out while rotating it.

5. **Locking Slot Cap**
   Insert slot cap into slot in drill rig base. While compressing vacuum gasket on slot cap, screw knob on slot cap to lock it firmly into the base. Make sure there are no leaks around slot cap, as this will prevent a vacuum seal from forming.

6. **Quick Release Vacuum Valve**
   Pull up on valve to release vacuum seal when finished drilling, or if relocation of drill rig while vacuum pump is running is desired. If rig does not want to seal when attempting to vacuum it down, push down on vacuum release valve to make sure that there is no leakage around it.

7. **Centering Pointer**
   Centering pointer locates center of spindle of Weka DK-12 drill motor when it is fully extended. Pointer must be fully retracted before drilling.

8. **Depth Gauge**
   Depth gauge controls drilling depth by stopping carriage at a level set by the operator.
   Note: Excessive force used to feed the drill may cause depth gauge setting to be changed.

SAFETY INSTRUCTIONS

Warning: When using electric tools, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and personal injury, including the following:

1. **Know your Core Bore drill rig.** Read operator's manual carefully. Learn the operation, applications and limitations, as well as the specific potential hazards peculiar to this equipment.

2. **Ground machine.** This drill rig should be grounded while in use to protect the operator from electric shock. The rig is equipped with a three-connector cord and three-prong grounding type plug to fit the proper grounding type receptacle. The green (or green and yellow) conductor in the cord is the grounding wire. Never connect the green (or green and yellow) wire to a live terminal.

3. **Extension cords.** Use only three-wire grounded extension cords suitable for use outdoors and of sufficient gage to accommodate power requirements. Replace or repair damaged cords.
4. **Servicing:** Other than routine, maintenance should be performed by an authorized service representative.

5. **Accessories; replacement parts.** When servicing use only identical replacement parts. Use recommended accessories.

6. **Keep work area clean.** Avoid cluttered work areas.

7. **Consider work area environment.**
   - Don't expose power tools to rain.
   - Wear rubber boots to further insulate yourself from your rig
   - Mop up all excessive water around the work area before proceeding.
   - Keep work areas well lit.

8. **Use extreme caution when drilling through floors.** Provide for protection of all personnel and material below the area. Cores generally drop from bit at completion of the hole.

9. **Keep visitors away.**
   - Do not let visitors contact tool or extension cord.
   - All visitors should be kept at a safe distance from work area.

10. **Don't force tool.** Drill should be used at a speed and feed rate that does not overload the motor.

11. **Dress properly.**
    - Do not wear loose clothing or jewelry. They can be caught in moving parts. Rubber gloves and non-skid footwear are recommended when working outside.
    - Wear protective hair covering to contain long hair.

12. **Use safety glasses.**

13. **Don't abuse cord.** Never carry tool by cord or yank it to disconnect from receptacle. Keep cord from heat, oil and sharp edges.

14. **Secure drill stand.** See section on "Drill Rig Securing Instructions"

15. **Don't overreach.** Keep proper footing and balance at all times.

16. **Maintain tools with care.**
    - Keep tools clean for optimum performance.
    - Follow instructions for lubricating and changing accessories.
    - Inspect machine cord 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.

17. **Disconnect power.** When not in use, before servicing, and when changing accessories or bits.

18. **Form a habit of checking** to see if wrenches are removed from tool before turning it on.

19. **Avoid accidental starting.** Make sure motor ON / OFF switch is in OFF position before plugging in power cord.

20. **Check for damaged parts.**
    - Check for alignment of moving parts, binding of moving parts, mounting, and any other conditions that may affect its operation. A part that is damaged should be properly repaired or replaced by an authorized service center unless otherwise indicated elsewhere in this instruction manual.
    - Do not use tool if switch does not turn it on or off.
    - Have defective switches replaced by an authorized service center.

21. **When releasing carriage lock, maintain a firm grip on feed handle** to prevent feed handle from revolving due to weight of drill.

Save these instructions for future reference.

DRILL RIG SECURING INSTRUCTIONS

Caution: It is very important that the drill rig is properly secured to the work surface. Movement during drilling will cause chatter of bit against the work surface, fracturing diamonds. Bit may also bind in hole, causing damage to the bit. The methods for anchoring are as follows:

Anchor Bolt Method to Floor or Wall

1. Measure distance from center of anchor slot in base to center of drill spindle. Centering pointer may be used to locate the spindle center of the Weka DK-12 motor. Pointer DOES NOT locate center of Milwaukee drill motor.

2. Using measurement from Step # 1, locate anchor bolt position from center of hole to be drilled.

3. Drill and set a 1/2 inch anchor bolt at the location found in Step # 2.

4. Place slot in drill rig base over anchor hole and hand tighten anchor bolt.

5. Adjust leveling screws so that base is stable and mast is perpendicular to work surface. Secure machine by tightening anchor bolt.

Vacuum Method to Floor

Warning: DO NOT use the vacuum method for securing to a wall.

Use of vacuum to secure the drill rig is NOT recommended when drilling:
- on rough or cracked floors
- deeper than one bit length
- material with greater steel concentration than standard rebar

1. Insert vacuum gasket in groove under drill rig base. Gasket should be in good condition and groove should be clean.

2. Retract leveling screws in base to minimum height.

3. Plug vacuum pump into a properly grounded receptacle.

4. Insert slot cap into base slot, compressing gasket, and tighten knob to lock slot cap into place.

5. Vacuum gauge must read 20 in Hg (inches of mercury) minimum for drill rig to be secured. If rig does not anchor, press down on vacuum quick release valve. Next, add weight by standing on base. If rig still does not anchor, check hose connections, floor, slot cap gasket, vacuum gasket, vacuum quick release valve, and vacuum release valve on vacuum pump for leaks.

6. Adjust leveling screws so that rig is stable and mast is perpendicular to floor. Use level on top of Weka motor to determine when mast is perpendicular to floor.

7. When drilling, check water level in the vacuum pump water jar frequently. When the jar is half full, stop drilling and empty water.

8. After hole is drilled, turn drill motor off and unplug vacuum pump. Vacuum seal can be released by pulling up on the vacuum quick release valve and/or opening the vacuum release valve on the vacuum pump. Remove, clean, and store vacuum gasket.

OPERATING INSTRUCTIONS

Warning:

1. **For your own safety, read the entire operator's manual before using drill rig.**
2. **If drill rig is not securely anchored, it may result in damage to the rig and injury to the operator.**
3. **DO NOT plug motor into power source until rig is completely set up and ready to drill.**

1. Thread drilling bit onto motor spindle and tighten securely with bit wrench.

   Caution: Never turn drill on with bit resting on the concrete.

2. Check the alignment of bit with hole to be drilled by lowering bit until crown is approximately 1/2 inch above the work surface.

3. Select desired spindle speed by setting knob on the side of the drill motor. Follow recommendations found on bit speed chart below.

   Caution: DO NOT move speed selector while drill spindle is rotating.

BIT SPEED RECOMMENDATIONS

BIT DIA	IDEAL	MIN. RPM	MAX. RPM
1"	3184	2388	3980
2"	1592	1194	1990
3"	1061	796	1326
4"	796	597	995
5"	636	502	838
6"	530	398	663

4. With water control valve shut off, connect water inlet hose to drill and water source.
   Note: Water can be supplied by a standard garden hose or by a pressure tank. Water is fed through inlet hose, down inside of bit, washing cuttings from under bit crown, up and outside of hole. Be sure that any method used has adequate water pressure to supply a flow of 1-2 gallons per minute. Lack of water can cause diamonds to polish or burn the bit, causing bit end to turn blue.

5. With drill motor ON/OFF switch in OFF position, plug power cord into a properly grounded 3-prong receptacle.

6. Open water valve at drill motor allowing water to flow at 1-2 gallons per minute.

   Caution: Before turning drill motor on, be certain that machine is securely anchored by a method described in this manual.

7. Turn drill motor on. On Weka motor, squeeze trigger and engage trigger lock. On Milwaukee motors, flip toggle switch to "ON" position

   Caution: DO NOT apply full load when feeding bit until crown has penetrated material.

8. Turn feed handle to apply load on bit. Remember to release carriage lock rotating feed handle. To prevent bit from wandering, apply light pressure on feed handle when starting to drill.

9. Drill bit feed should be uniform without excessive force. Drilling penetration of 1-4 inches per minute may be achieved depending on material and bit diameter. Too little pressure can polish bit and too much can cause undue wear. When drilling through steel, such as rebar, decrease feed rate. It is recommended that after cutting steel, to stop and break out core and any loose pieces of steel, then proceed.

Caution: When drilling steel embedded in concrete, never switch to high speed if drilling in low speed. These bits are not designed to drill through solid steel.

Warning: Use extreme care when drilling through floors. Provide for protection of all personnel and material below the area. Cores generally drop from drill bit at the completion of the hole.

REMOVING CORES

Breaking a Core

1. If you are not drilling a hole completely through, the core can easily be removed by breaking it out of the hole. Insert a screwdriver between the hole wall and the core and pry core toward the opposite side.

2. Use a second screwdriver to lift the core out.

Removing Broken Core Below the Surface

1. Use a 1/8 inch diameter steel rod.

2. Make a 1/4 inch long, 90° bend at one end of the rod.

3. Insert rod down side of broken core to depth of break, twist 90° and lift core out.

Removing Broken Core Stuck in Bit

Warning: Unplug machine cord from power source.

1. Increase water pressure and try to free the core with your hands.

2. If unable to free core, remove bit from drill.

3. Push core gently through from top of bit with a rod when using a capped bit.

Removing a Lodged Bit from Hole

Warning: Unplug machine cord from power source.

1. Turn water on.

2. Using bit wrench, try to rotate bit in both directions and lift out using feed handle.

3. If unable to free bit, turn water off and disconnect bit from drill spindle. Use bit wrench again, rotating back and forth and rocking until free.

BIT TYPES AND EXTENSIONS

Types of Bits

1. Capped bits have adapter welded onto the bit as one solid piece. The advantages of this type of bit are as follows:
   - simple installation and easy alignment
   - no expansion adapters to lose or forget

2. Open end bits require a three-piece expansion adapter. Top of bit tube is machined to accept adapter which expands, locking itself firmly against the wall of the bit. The advantages are as follows:
   - reusable: several bits of the same size can be used with the same adapter offering a savings in cost on each bit after initial cost
   - if core becomes lodged in the bit, removing the expansion adapter makes core removal easier

Installing Open End Bit Expansion Adapters

1. Screw 3-piece expansion adapter 2 full turns onto drill spindle.

2. Slide open end bit up to the top shoulder of the expansion adapter and turn with hands until snug.

3. Tighten in place with a strap wrench.

Installing Bit Extension Rods

In order to drill deeper than the 13 inch long bit will allow, bit extension rods must be used. Drilling rate will be slower because of the extra amount of drag on the bit walls.

1. Drill to full depth of bit.

2. Back drill out and remove bit and core.

3. Put drill bit back into hole and connect a 4, 6, or 12 inch bit extension rod to bit and secure with bit wrench.

4. Screw bit extension rod onto drill spindle and secure with spindle wrench.

5. Proceed with drilling.

MAINTENANCE INSTRUCTIONS

Warning: Make sure machine is unplugged from power source before making any adjustment.

Motors

Check motor brushes every 50 hours minimum and replace when brushes become worn. For all other repairs, warranty or otherwise, drill motors must be taken to an authorized service center for evaluation and repair . Any attempt to service the motor by any other party will invalidate all warranty claims.

For Weka: Contact Diamond Products to be advised how to proceed with any motor problem aside from brush replacement.

Lubrication

Keep a light coating of oil on rack and pinion and drill spindle.

Carriage

Carriage will become loose due to vibrations. Tighten carriage guides to remove "play." When adjusting the carriage guides, adjust the two guides on the same side of the carriage equal amounts so that carriage travels in a path parallel to the mast. If carriage does not travel parallel to the mast, the bit may bind in the hole.

Mast

Keep grooves in mast free of slurry so that parts that travel along them may move freely without binding.

Vacuum Gaskets

Replace vacuum gaskets on base, slot cap, and slot cap knob if they become mushroomed on bottom edge, cracked, pitted, or worn.

Machine Storage

Rig must be stored indoors or well covered in rainy weather. Always remove vacuum gasket from base of rig.

Bit Replacement

Bit is considered worn when the crown shows excessive wear and has become flush with the tube.

Ventilation

Keep drill motor inlet and air passage clear to ensure proper motor ventilation.

NOTES

WARRANTY

Diamond Products warrants all equipment manufactured by it against defects in workmanship or materials for a period of one (1) year from the date of shipment to Customer.

The responsibility of Diamond Products under this Warranty is limited to replacement or repair of defective parts at Diamond Products' Elyria, Ohio factory, or at a point designated by it, of such parts as shall appear to us upon inspection at such point, to have been defective in material or workmanship, with expense for transportation and labor borne by Customer.

In no event shall Diamond Products be liable for consequential or incidental damages arising out of the failure of any Product to operate properly.

Integral units such as engines, electric motors, batteries, transmissions, etc., are excluded from this Warranty and are subject to the prime manufacturer's warranty.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND ALL SUCH OTHER WARRANTIES ARE HEREBY DISCLAIMED.

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