

Concrete Coring System

Installation and Operation Instructions

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Instructions for Installing and Operating the Concrete Coring System

1.0 Objective

Geoprobe machine operators must often advance tools into the subsurface at locations having a surface covering of concrete, asphalt, brick, or rock. Such materials are generally impenetrable with standard direct push tooling. In order to operate direct push equipment at these locations, a hole must be provided through the otherwise impenetrable surface layer.

This document identifies the procedure for cutting and removing a core from the ground covering using a Concrete Coring System powered by a typical Geoprobe® direct push machine. Instructions are given for units equipped with either a GH40-Series or GH60 Hydraulic Hammer. Direct push tooling may then be advanced through the remaining open hole.

2.0 Required Equipment

General

Concrete Coring Kit, Geoprobe PN 16840

includes: Water Swivel Assembly, Geoprobe PN 15315

Spring Clips (3), Geoprobe PN 15536

Coring Support Plate, Geoprobe PN 16290

Coring Plate Holding Bracket (2), Geoprobe PN 16466

Coring Plate Holding Bracket Handle (2), Geoprobe PN 16468

Flat Washers (2), 5/16-in.

Bit Extension, 1.25-7NC thread x 12-in. length, Geoprobe PN 15050

Diamond Core Bit, 5 in. OD x 13 in. length, Geoprobe PN 15008

Diamond Core Bit, 8 in. OD x 13 in. length, Geoprobe PN 16486

Diamond Core Bit, 12 in. OD x 13 in. length, Geoprobe PN 16080

Adjustable wrenches (2), capable of opening 1-7/16 to 1-13/16 inches (may substitute pipe wrenches of suitable size).

Screw drivers (2), flat blade

Steel hammer

GH40-Series Hammer Only

Anvil Retainer Cap Assembly, Geoprobe PN GH4200

GH60 Hammer Only

GH60 Retainer Cap, Geoprobe PN 7617

GH60 Hex Adapter, 2.5- x 1.0-inch, Geoprobe PN 14779

3.0 Initial Assembly of Coring Tools

Refer to Figure 1 for identification of parts contained in the Concrete Coring Kit (PN 16840).

1. Thread the bit extension (PN 15050) onto the water swivel assembly (PN 15315) as shown in Figure 2. Tighten with adjustable wrenches or pipe wrenches (Fig. 3)
2. Place a 5/16-inch flat washer on each coring plate holding bracket handle (PN 16466). Insert a handle through each of the two small holes in the coring support plate (PN 16290).
3. Thread a coring plate holding bracket (PN 16468) onto each handle. Position the brackets as shown in Figure 4. Tighten only 2 or 3 revolutions at this time.
4. Insert the threaded end of the bit extension/water swivel assembly through the center hole in the coring support plate with the bracket handles toward the water swivel. Thread the extension into the top of a diamond core bit as shown in Figure 5. Tighten the connection using the adjustable wrenches and/or pipe wrenches (Fig. 6).

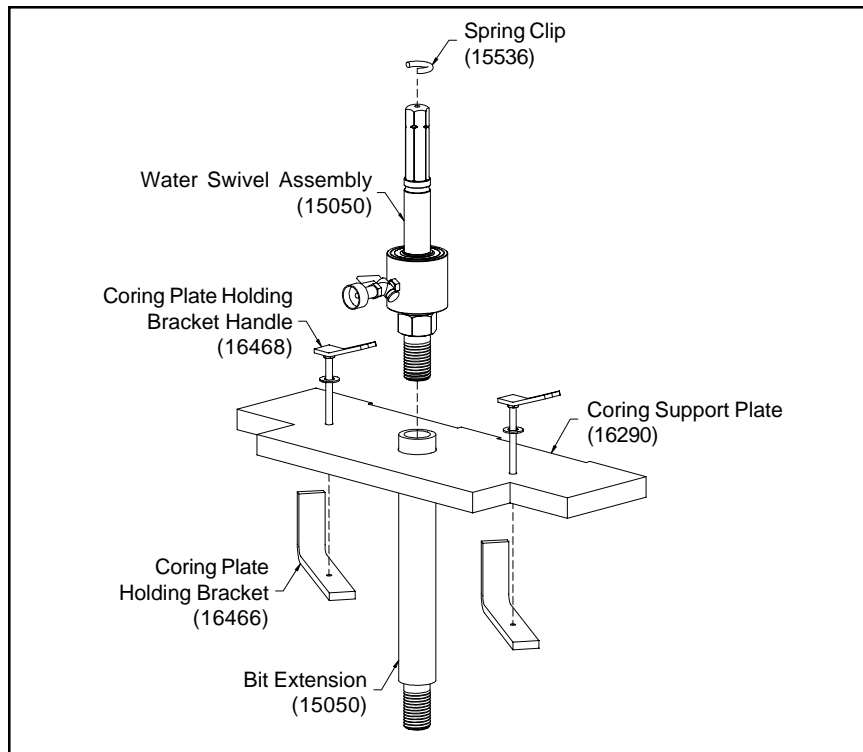


Figure 1. Components of the Concrete Coring Kit (PN 16840).



Figure 2. Thread bit extension onto water swivel assembly.



Figure 3. Tighten assembly with wrenches.



Figure 4. Position bracket as shown and thread onto handle 2 or 3 revolutions.

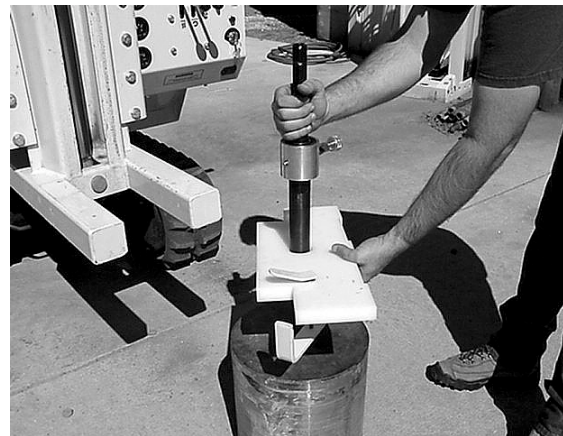


Figure 5. Insert bit extension/water swivel assembly through center of plate and thread into diamond core bit.

5. **For GH40-Series Hammers:** Slide an anvil retainer cap assembly (GH4200) over the water swivel shaft. Install a spring clip (PN 15536) in the lower groove on the shaft using a hammer as shown in Figure 7.

For GH60 Hammers: Slide a GH60 retainer cap (PN 7617) over the water swivel shaft. Place a GH60 hex adapter (PN 14779) on the shaft such that the large hex is “up”. Install a spring clip in the upper groove on the shaft (located on hex flats) using a hammer as shown in Figure 8.

Note: The spring clip may expand with use until it no longer fits tightly in the shaft groove. If this occurs, carefully squeeze the clip in a machine vise to restore the original shape.

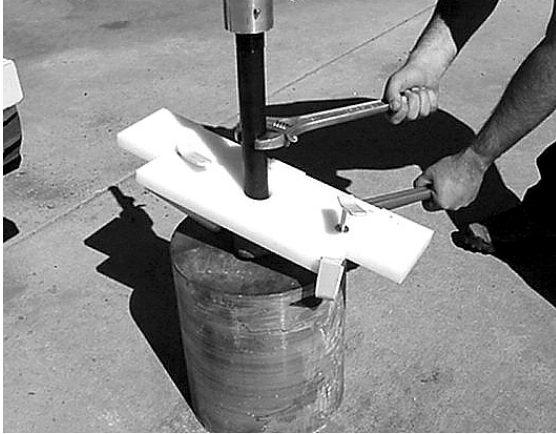


Figure 6. Tighten bit extension to bit with wrenches.



Figure 7. Install a spring clip in the lower groove of the water swivel shaft for GH40-Series applications.



Figure 8. Install a spring clip in the upper groove of the water swivel shaft for GH60 applications.

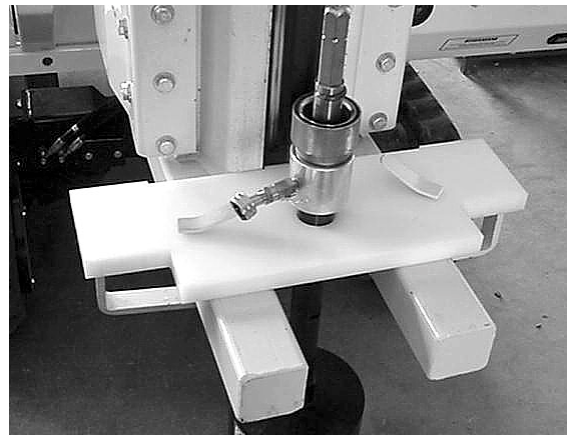


Figure 9. Position support plate with end cutouts facing the operator on 5400-Series units.

4.0 Installation of Coring Assembly on a 5410- and 5400-Series Machine with a GH40-Series Hammer

Size limitations necessitate operating the coring assembly with the bit placed below the toes of the derrick foot to avoid equipment damage. This also allows the use of a coring support plate that clamps onto the foot to stabilize the coring assembly during rotation.

Differences in foot dimensions require that the coring support plate be positioned differently on the Model 5410 than for 5400-Series units. This section contains instructions for installing the concrete coring system on 5400-Series machines with GH40-Series hammers and the Model 5410/GH42 hammer configuration.

Note: The concrete coring system is not compatible with Geoprobe® Model 54LT and 540M machines.

1. Unfold the probe derrick leaving the foot approximately 18 inches from the ground surface. Raise the hammer approximately halfway.

2. Remove the anvil and anvil retainer cap assembly from the hammer if present.
3. **For 5400-Series Machines:** Position the coring assembly under the hammer as shown in Figure 9. Note that the back of the support plate is placed near the derrick and the end cutouts face the operator.

For 5410 Machines: Position the coring assembly under the hammer as shown in Figure 10. Note that the back of the support plate is near the derrick and the end cutouts face the machine (opposite of Figure 9).

4. Ensure that the coring assembly is resting on the ground rather than hanging from the support plate. Lower the hammer until the hex drive contacts the water swivel shaft (Fig. 11). Gently manipulate the hammer rotation control to align the hex drive and water swivel shaft while slowly lowering the hammer. Once the hex drive and shaft align, lower the hammer until the spring clip moves 1 or 2 inches up into the hex drive.
5. Attach the anvil retainer cap to the hex drive as instructed in the Geoprobe® operator's manual for your unit.
6. Ensure that the coring bit is flat on the ground and the water swivel shaft is aligned with the probe derrick.

For 5400-Series Machines: The coring plate holding brackets clamp to the outside of the derrick foot as shown in Figures 9 and 12. Maneuver the coring support plate so that it is centered over the water swivel shaft. Tighten each clamp to secure the plate.

For 5410 Machines: The coring plate holding brackets clamp inside the derrick foot (Fig. 10) onto the two bolts shown in Figure 13. Center the plate over the water swivel shaft and tighten both clamps.

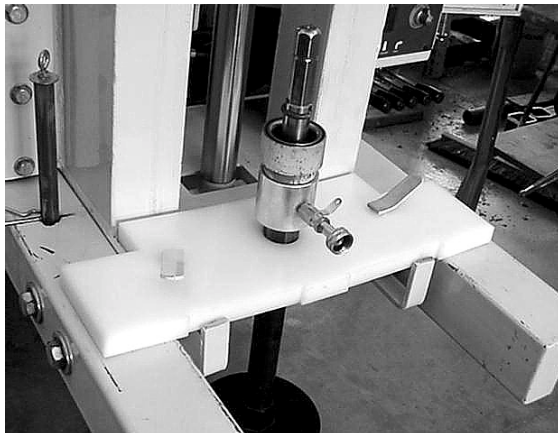


Figure 10. Position support plate with end cutouts facing the machine on 5410 units.

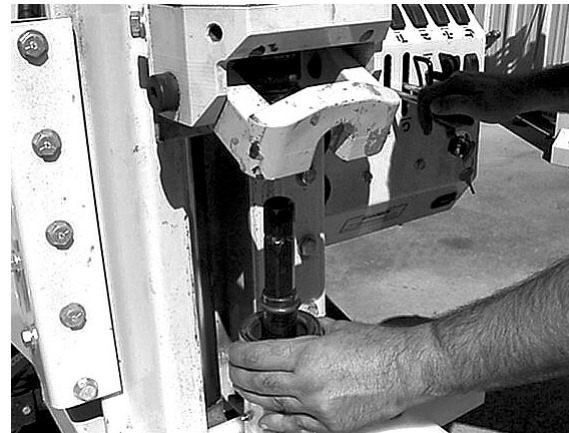


Figure 11. Guide water swivel shaft into hex drive while slowly lowering hammer.

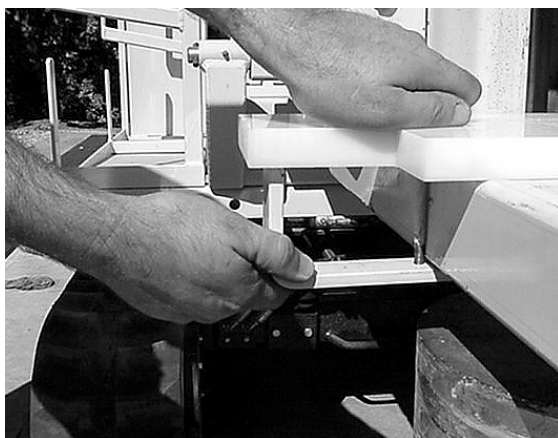


Figure 12. Holding brackets clamp to outside of foot on 5400-Series machines.



Figure 13. Holding brackets clamp to bolts on inside of 5410 foot.

5.0 Installation of Coring Assembly on a 6600-Series Machine with a GH60 Hammer

Size limitations necessitate operating the coring assembly with the bit placed below the toes of the derrick foot to avoid equipment damage. This also allows the use of a coring support plate that clamps onto the foot to stabilize the coring assembly during rotation.

1. Unfold the probe derrick leaving the foot approximately 18 inches from the ground surface. Raise the hammer approximately halfway.
2. Position the coring assembly under the hammer as shown in Figure 14. Note that the back of the support plate is placed near the derrick and the end cutouts face the operator.
4. Ensure that the coring assembly is resting on the ground rather than hanging from the support plate. Lower the hammer until the hex drive contacts the GH60 hex adapter (Fig. 15). Gently manipulate the hammer rotation control to align the hex drive and hex adapter while slowly lowering the hammer. Once the hex drive and adapter align, lower the hammer until the hex drive bottoms out on the adapter.
5. Attach the GH60 retainer cap to the hex drive as instructed in the Geoprobe® operator's manual for your unit.
6. Ensure that the coring bit is flat on the ground and the water swivel shaft is aligned with the probe derrick. The coring plate holding brackets clamp inside the derrick foot (Fig. 16) onto the two bolts shown in Figure 17. Center the plate over the water swivel shaft and tighten both clamps.

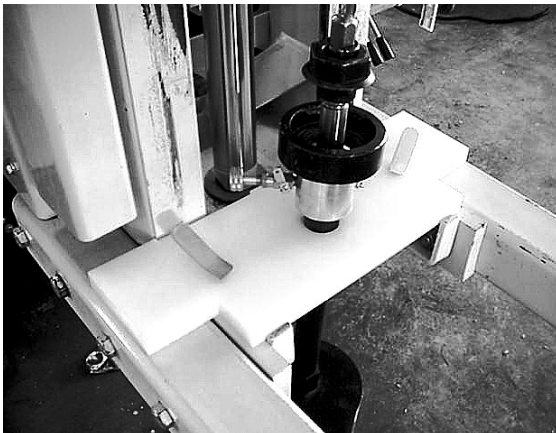


Figure 14. Position support plate with end cutouts facing the operator on 6600-Series units.



Figure 15. Guide GH60 hex adapter into hex drive while slowly lowering hammer. Keep hand below adapter!



Figure 16. Holding brackets clamp to bolts inside of 6600-Series foot.



Figure 17. Tighten holding brackets to secure support plate on foot.

6.0 Water System

Water is pumped through the water swivel assembly and bit extension to lubricate and cool the bit while coring. As a secondary function, water also carries away the fine particles (grit) created as the bit cuts into the surface material.

A standard garden hose fitting and ball valve (Fig. 18) allow the coring system to be connected to a variety of water sources. These sources include a standard water hydrant, an on-board water system installed in a probe carrier vehicle, a tank/12VDC pump assembly mounted on the receiver hitch of a track unit (Fig. 19), or any other arrangement that can provide water at a 1-2 gpm flowrate.



Figure 18. A hose connection, ball valve, and swivel assembly provide water for bit cooling and lubrication.



Figure 19. A 25-gallon tank with 12VDC pump (PN 16434) and carrier assembly (PN 15965) is available for track units.

7.0 Coring System Operation

The following guidelines should be used to efficiently cut and remove cores from surface material.

Setup

1. Begin by assembling and installing the coring tools as described in Sections 3.0-5.0. Connect the water supply to the swivel assembly at this time.
2. Raise the hammer (PROBE control) until the diamond core bit is just below the derrick foot.
3. Lower the derrick (FOOT control) until the bit contacts the ground surface.
4. The bit must be level with the ground surface to provide even contact around the entire circumference of the bit (Fig. 20.) Adjust the machine derrick to level the bit if necessary.

Water Flow

As stated previously, water provides lubrication and cooling for the core bit. Water also removes the grit that develops as the bit cuts through the surface material. This grit provides extra abrasiveness that enhances cutting, however, so too much water flow can actually slow the coring process.

Fully open the ball valve on the water swivel assembly to begin coring. The valve may be closed to approximately 1/2-3/4 flow once the bit cuts a full circle in the surface. If you are unsure of where to set the flowrate, remember that it is better to error on the side of too much water.

Rotation

Bit rotation is in the clockwise direction. Operate the machine at full rotation speed.



Figure 20. System correctly positioned for coring.

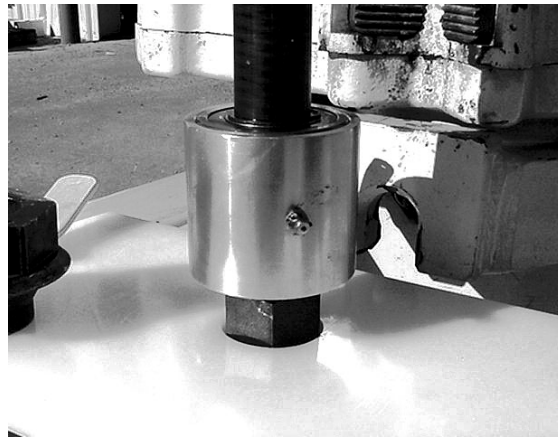


Figure 21. Apply 2 pumps of multipurpose grease to zerk on swivel after every 50 hours of operation.

Probe Cylinder

The hammer and coring assembly are slowly lowered with the PROBE control as the bit cuts into the surface. Lower the assembly at a rate that maintains weight on the bit but does not result in excessive noise such as squealing or chattering. The bit will not make a great deal of noise when it is advanced at the proper rate.

The maximum cutting depth for the tool configuration described in this document is approximately 13 inches for the first core. Once this core is removed, a second core may be cut until the swivel contacts the support plate.

Core Removal

Removing the core from the ground may be accomplished in a variety of ways. Perhaps the most common method is to pry the core out using two screwdrivers placed on opposite sides of the core. Another common method is to utilize two wires with 1/2-inch, 90° bends on one end. Insert each wire on opposite sides of the core, twist the wires to hook under the core, and pull the core out of the hole.

For large cores, two opposing holes may be drilled into the top of the core at an angle using a hammer drill. Insert a rod into each hole and lift the core from the ground. Another option is to drill a hole in the center of the core with a hammer drill or a drill steel/carbide-tipped bit powered by the unit hydraulic hammer. Place an expandable concrete anchor in this hole and lift the core from the ground with the Geoprobe® unit.

Whatever method is to be used to remove the core, first break the bottom of the core loose by driving wedge into the kerf remaining from the diamond core bit. A large screwdriver may also be used in place of the wedge.

Maintenance

The water swivel should be lightly greased every 50 hours of operation. Apply 2 pumps of multipurpose grease to the zerk shown in Figure 21 using a hand-operated grease gun. Do not over-grease the swivel as damage to the internal seals will result in water leakage and eventual bearing failure.



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