16” HD Integral Bearing Swivel Cutter Head Installation FA44723F

Instruction No. 050066A

The swivel cutter head is the upsizing tool between the pilot tube adapter and the lead thrust casing for hard ground use over 35 blow count. The cutter head allow pilot tubes to remain stationary while the cutting teeth rotate through ground at a full 17.5” OD cut. The spoils are removed using the standard Akkerman augers and casings to the launch shaft. The cutter head is equipped with fluid ports at the cutter bit reducing cutting torque through lubrication.

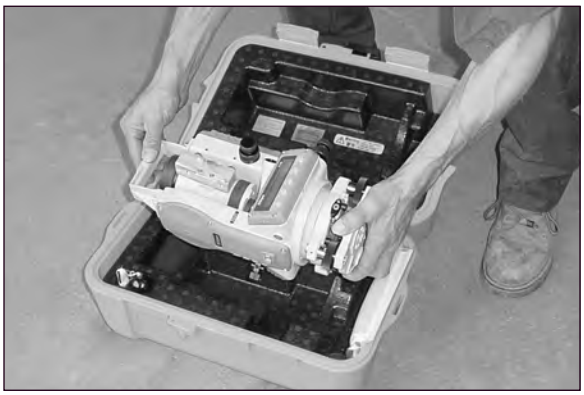
Use the procedure on the following pages to assure proper swivel cutter head installation with the GBM 4812A frame.

This procedure allows the pilot tubes to be removed while continuing to supply jetting water pressure to the swivel cutter head. Though, there must be enough jetting hose and space in the reception shaft to remove three or four pilot tubes before the jetting supply must be shut down.

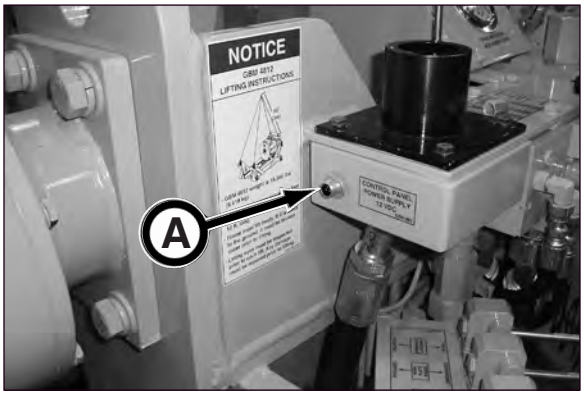
REQUIREMENTS

- Must have a minimum of 16 gpm @ 1,000 psi jetting water pressure.
- Must use full length augers and casings:
  16” HD - 5 feet

1. Remove guidance system from shaft and store in protective case.



2. With the control pendant power cord removed from the tablet PC assembly control box, insert the connector into the control panel power supply 12VDC connection (A). This connection will supply power to the electronic controls (Jacking Speed, Rotation Pressure, PCH Auger Drive Rotation, and PCH Cutter Drive Rotation) on the control panel.



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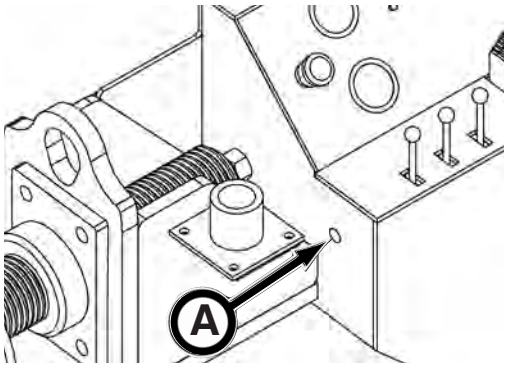
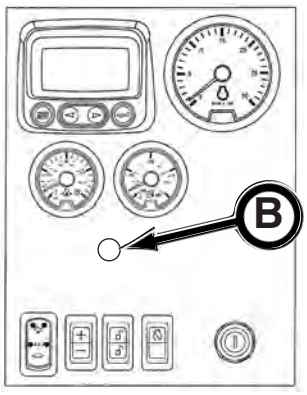


SN 4 & After

3. With the power pack engine running at 1,500 rpm (100 ton tooling) or full rpm (200 ton tooling), flip the pendant 12V To Monitor & Control Panel switch (B) to the ON position.



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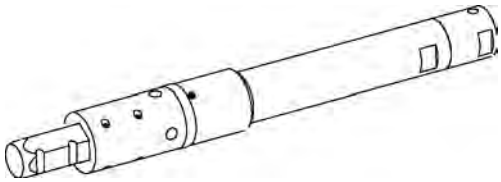
4. If not already removed, remove the drive adapter swivel and the swivel support from push plate.

⚠CAUTION The drive swivel adapter weighs approximately 101 lbs. (46 kg). Be careful when handling swivel.



5. Lower the pilot tube adapter and Insert the pilot tube adapter hex into the thrust block internal hex.

6. With the last pilot tube locked into the make-up tool, thread the adapter into the pilot tube by rotating the adapter in the CW direction with the drive rotation control, while advancing the push plate with the thrust cylinder control.

7. Continue to tighten the connection to 500 psi (2,000 ft-lb) torque as shown on the gear box cover pressure gauge.

8. Release make-up tool.

9. Advance adapter into ground until there is enough room to pin the pilot tube adapter to the cutter head assembly.

NOTICE For ease of installing cutter head, you may need to rotate the adapter to be sure the four pin holes are in the vertical (up and down) position (see inset).

10. Remove make-up tool.

11. Move rabbit/push plate to the back of the GBM frame to allow enough room for the dirt bucket and reaming head assembly using the thrust cylinder control.

(continued on next page)

12. Remove hex coupler from pilot tube adapter by removing pins.

13. Mount a roller bracket (A) to shaft wall or make-up tool mount.

14. Remove middle operator platform.

15. Lower dirt bucket into shaft. Be sure to position dirt bucket so the push plate does not contact dirt bucket while jacking. Doing so will cause damage to dirt bucket and jacking frame.

NOTICE There are various sizes of dirt buckets available depending on jacking frame elevation. The larger the dirt bucket, the less it will need to be emptied, resulting in higher productivity.

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16. In the reception shaft, remove steering head.

a. Remove set screw.

b. Drive out pins.

c. Remove pins.

d. Remove steering head.

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17. Once the steering head adapter and the pilot tubes reach the reception shaft, each joint must be loosened with the breakout tool.

    Hook up the breakout tool as follows:

    Clean the areas around the oil ports. Install base end cylinder hose to port A and rod end cylinder hose to port B.

    Selector Position:
    Port A - Extend
    Port B - Retract

⚠WARNING Electrical shock hazard could cause severe injury or death.
Be sure the breakout tool power unit, plug and receptacle (must be three-pronged) are properly grounded and dry before plugging in and during operation.

Plug the breakout tool into 120 VAC outlet. If an extension cord is necessary, you must use a three-prong grounded extension cord.

18. Use the pilot tube scraper to remove mud from steering head adapter (shown) and pilot tubes.

19. Place jaw insert on notches of back pilot tube.

(continued on next page)

20. With the cylinder retracted, slide the breakout tool onto the pilot tube and over the previously installed jaw insert from step 19 as shown.

NOTICE The cylinder side of the breakout tool is deeper than the other side. This allows the breakout tool to slide over both jaw inserts when loosening the pilot tube joints.

21. Slide other jaw insert on notches of the steering head adapter or the front pilot tube.

22. Slide breakout tool over both jaw inserts.

NOTICE You may have to extend or retract the cylinder to line up the jaw insert teeth with the breakout tool gear teeth.

(continued on next page)

23. Move the control lever to port A to extend the cylinder.

24. Extend cylinder by depressing the switch on the remote controller.

NOTICE The rocker switch on the pump unit can also be used to control the cylinder.

25. Continue to extend the cylinder until the joint is loosened. You should be able to hear and feel a “snap” when the joint is loosened.

26. Release switch on controller.

27. Once the joint is loosened, move the control lever to port B.

28. Slightly retract the cylinder until the breakout tool can be slid towards the launch shaft.

29. Remove the front jaw insert.

30. Slide the breakout tool towards the end of the tube and remove the back jaw insert.

31. Slide the breakout tool towards the launch shaft for the next joint removal.

32. Remove the steering adapter. Install a cap on the steering head adapter.

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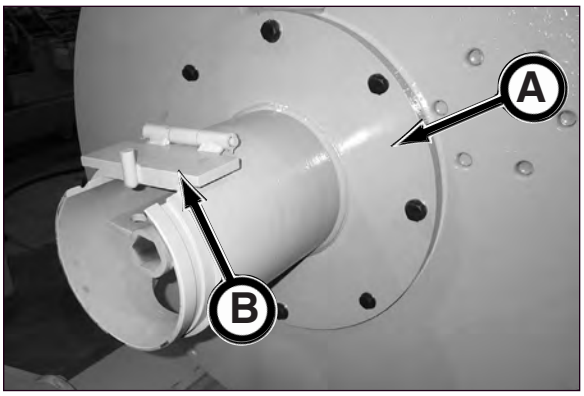
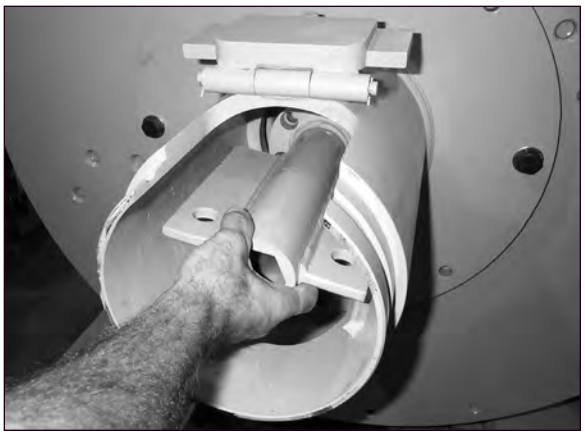
NOTICE To increase productivity, providing there is enough room in the reception shaft, remove three to four pilot tubes before shutting down jetting supply and removing jetting hose from pilot tubes. Pilot tube threads **MUST** be kept clean.

33. Continue to remove pilot tubes (and jetting hose) as they reach the reception shaft. Install a cap on the end of the next pilot tube to be removed to prevent dirt from entering the pilot tube. Place the pilot tubes in the pilot tube racks.

34. Install casing thrust adapter (A) to push plate with
    (SN1-2) sixteen 3/4 x 1.5 in. bolts and washers.
    (SN3-4) eight 3/4 x 2 in. bolts and washers or
    sixteen 3/4 x 2 in. bolts and washers
    depending on casing thrust adapter.



⚠WARNING NEVER operate GBM without hinged cover (B) lowered in place as shown. Failure to do so can cause serious personal injury from contact of moving auger.



35. Install auger drive adapter into thrust hub.

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36. Route a supply hose through the pilot tubes and pilot tube adapter from reception shaft to launch shaft to lubricate the cutter bit.

⚠WARNING Suspended loads may fall and cause severe personal injury or death.

If a hydraulic hose from the boom of a crane or excavator breaks, the boom and load can fall instantly.

Do not stand or walk under a load.

⚠WARNING Auger may fall out of casing and cause severe injury or death if casing tips or hits an obstruction.

Properly install safety chain assembly to augers and casings before lowering into or lifting out of shaft. Refer to Installing Safety Chain Assembly To Auger & Casing in this section.

Do not stand or walk under a load.

37. Lower cutter head assembly into launch shaft.

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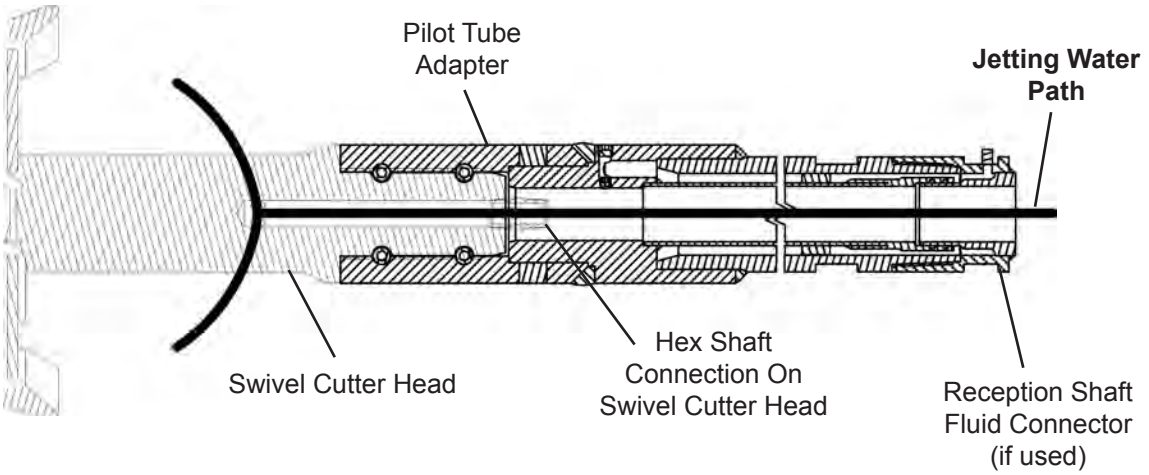
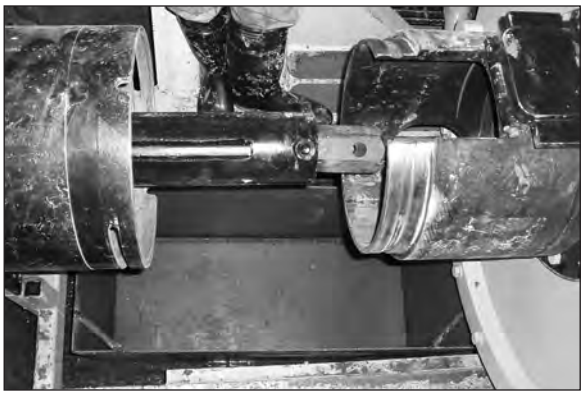
38. Connect jetting hose to hex shaft connection on swivel cutter head and secure cutter head to pilot tube adapter with four roll pins.



39. Install auger drive adapter onto auger shaft.

NOTICE For best assembly, align flats on outside of auger shaft adapter and flats on auger drive shaft. Failure to do so will cause premature wear to auger components.

40. Align and engage auger drive adapter with the cutter head auger shaft and the hex opening in thrust block using the drive rotation control and thrust cylinder control.



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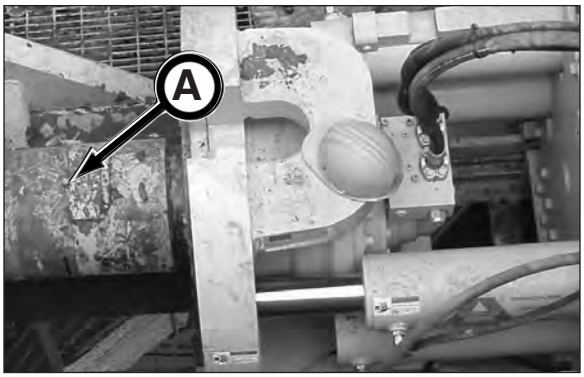
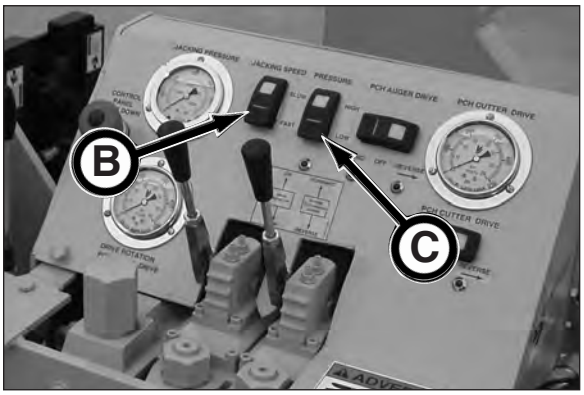


41. Using hoist, align notches in cutter head casing with top alignment guide (A) and bottom alignment guide (not shown) on thrust plate.

⚠WARNING Flying sparks and debris from torching operation can cause severe injury. Approved personal protection must be worn while torching opening into shaft.

42. Cut an opening in the shaft large enough for the reaming head, thrust casings, powered cutter head (if used) and product pipe to pass through.



43. Select the jacking speed (B) and rotational pressure (C) switches on the control console as follows:

a. When using the standard/100 ton thrust casings (2” hex), set jacking speed to Fast and set rotational pressure to Low.

NOTICE NEVER use the standard/100 ton thrust casings (2” hex) in the Slow jacking speed position and the High rotational pressure position. Doing so will damage the thrust casings and augers.

b. When using the heavy duty/200 ton thrust casings (3” hex), set jacking speed to desired Fast or Slow position, and set rotational pressure to High.

NOTICE Rotation operating range in low pressure is up to 2,000 psi (13.789 MPa) with a maximum pressure of 2,500 psi (17.236 MPa). Rotation operating range in high pressure is up to 4,000 psi (27.579 MPa) with a maximum pressure of 5,000 psi (34.474 MPa).

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⚠WARNING NEVER open chamber door on casing thrust adapter while auger is rotating. Severe injury may result from contact with rotating auger.

NOTICE

- Jetting to the cutter bit needs to be on at all times while advancing the cutter bit to prevent plugging (as shown) of the cutter head.
- Vary water volume if excessive amount of water to spoils ratio is experienced.

IMPORTANT:
Once cutter head is plugged, it will be difficult, and may require excavation to the cutter head, to clear the plugging. DO NOT PLUG CUTTER HEAD.

Plugged Swivel Cutter Head
Due To Lack Of Jetting Water

44. Test the jetting pump water supply to the cutter bit of the swivel cutter head. The jetting requires 16 gpm @ 1,000 psi.

45. Advance the swivel cutter head with jetting water on, by extending the thrust cylinders with the thrust cylinder control and rotate the augers in the clockwise direction with drive rotation control.

46. Continue to advance the cutter head assembly the full length of the frame.

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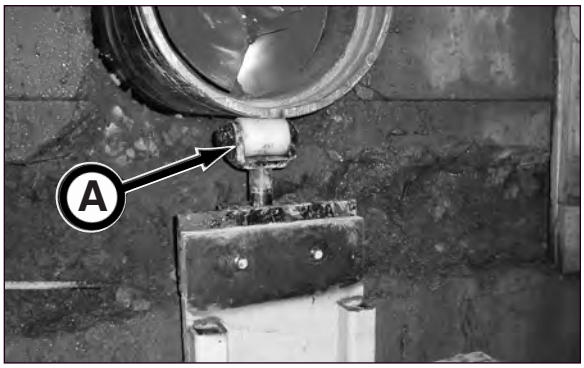
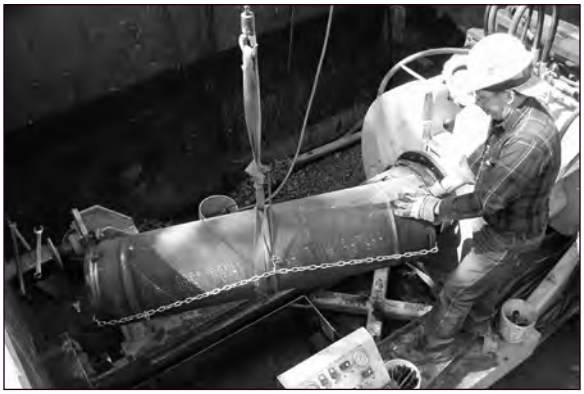
47. Before retracting rabbit/push plate, adjust roller bracket (A) to casing by loosening clamp, slide roller into position, and retighten clamp. The roller will support the casing while the rabbit/push plate is retracted.

48. Move the rabbit/push plate to the back of the GBM frame using the thrust cylinder control.



⚠WARNING Moving parts or the mishandling of parts can cause severe personal injury. Handle parts carefully to avoid crushing and pinch point hazards. Properly install safety chain assembly to augers and casings before lowering into or lifting out of shaft.

49. Lower thrust casing/auger into launch shaft.



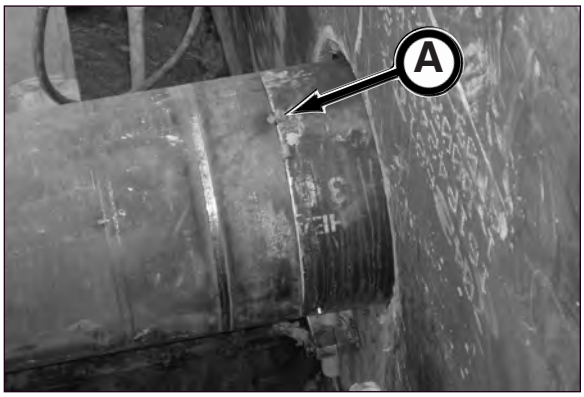
⚠WARNING Safety glasses must be worn while using power equipment (air tools). Failure to do so could cause severe injury from flying debris.

50. Slide the thrust casing auger onto the end of the reaming head assembly auger shaft.

NOTICE Auger hex connection bolt hole from cutter head assembly must be beyond end of casing to be able to mount bolt in auger joint.

51. With the auger flighting lined up, attach the auger ends with one 3/4 x 6 in. bolt and nylock lock nut. Tighten the nut so the end of the nut is flush with the end of the bolt. Do not overtighten.

52. Advance the casing to the swivel cutter head casing and align with alignment guides in the 12 o’clock (A) and 6 o’clock positions.



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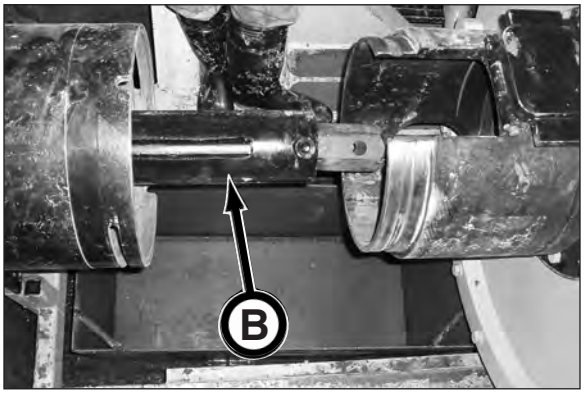
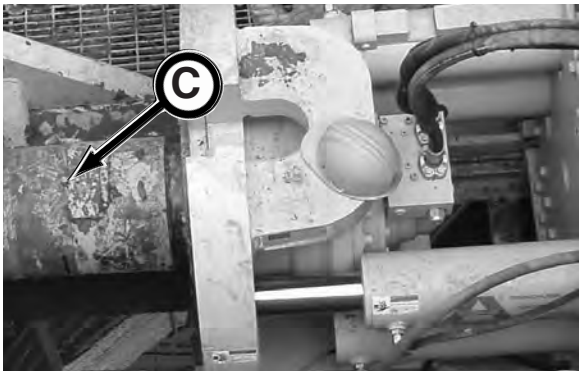
53. Install four casing joint keepers at the 2 o’clock, 4 o’clock, 8 o’clock, and 10 o’clock positions to lock the casings together.

54. Remove auger drive adapter (B) from thrust hub and insert onto casing auger shaft.



55. Align the auger drive adapter into the thrust hub while aligning the notches in the casings with the alignment guides (C) on thrust adapter using the drive rotation control and thrust cylinder control.



NOTICE BEFORE rotating augers, the casings must be fully engaged with alignment guides on thrust plate. This prevents the casings from rotating with the augers.

56. Start rotating augers with rotation (CW) control and then advance the casing/auger with the thrust cylinder control.

NOTICE Jetting MUST BE ON while advancing casings.

NOTICE With the addition of each section of casing/auger, a section of pilot tube will be removed in the reception shaft. Refer to procedure starting with step 17 on page 6.

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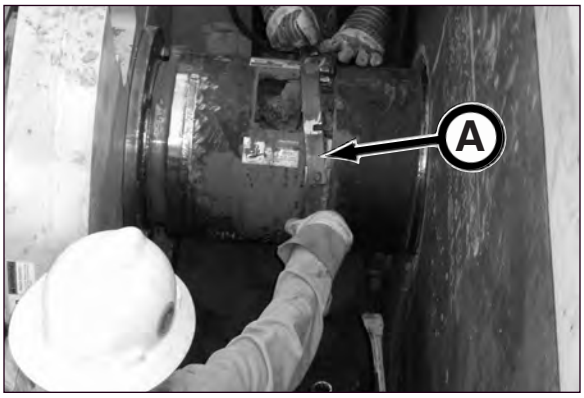
NOTICE (5 ft thrust casings only) Once the 5 ft thrust casing is fully advanced, a thrust casing spacer (A) must be placed between the casing thrust adapter and the casing. Then advance the casing with the thrust cylinder control. This step provides additional space for ease of installing the next casing and auger.



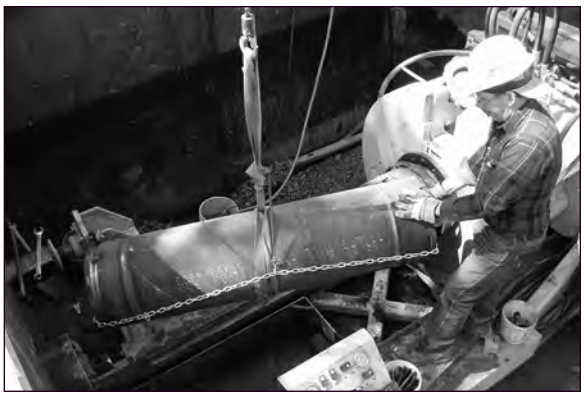
NOTICE Turn off jetting during the process of positioning the next casing/auger in the jacking frame. Failure to do so may cause over-excavation.

57. Periodically empty the dirt bucket.

NOTICE Do not allow dirt bucket to overflow and interfere with machine travel. Keep rails clear of debris.

58. Replace dirt bucket.

NOTICE Be sure dirt bucket will pass between legs on the push plate trolley. Failure to do so will cause damage to frame and dirt bucket during frame operation.



59. Continue to add casings and augers until all pilot tubes and the swivel cutter head are removed from reception shaft.

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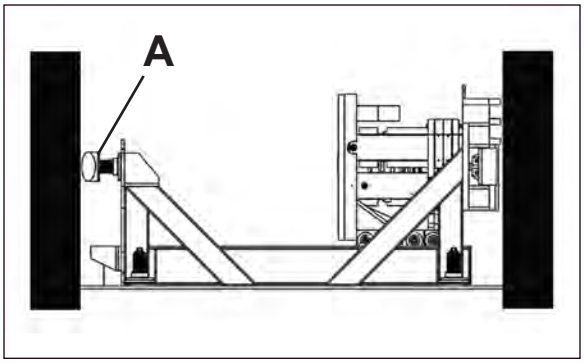
NOTICE Regularly maintain anchor block (A) tension on shaft wall during pilot tube installation by periodically checking screw tension while extending pilot tubes. Securing the frame to the shaft wall will keep the frame properly aligned with the pipe line.

NOTICE When advancing thrust casings, PCH or product pipe, ALL FOUR thrust block assembly wheels MUST be contacting the jacking frame rails. Failure to do so will result in wheel bearing failure. If this misalignment occurs, the GBM frame must be readjusted so the frame is on the same line and grade as the PCH/product pipe.



60. Once the pilot tube adapter reaches the reception shaft, remove the last pilot tube with the breakout tool from the pilot tube adapter, cap and plug the pilot tube, and place into pilot tube rack.

NOTICE The 30” pilot tube is shown.

61. Remove the pilot tube adapter by removing four roll pins from the pilot tube adapter and swivel cutter head connection. Be sure to cap the threaded end of the adapter.

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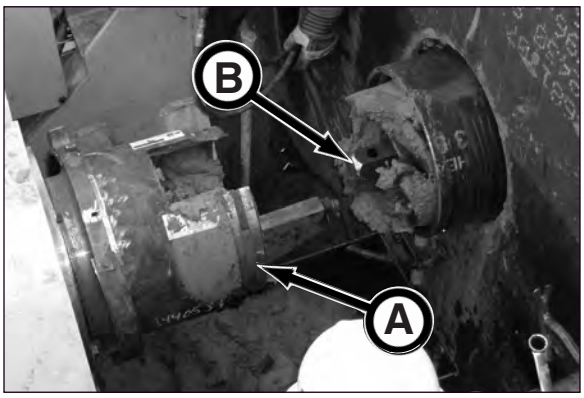
⚠WARNING Contact with rotating auger can result in serious injury. Before operating the auger, be sure all personnel in the launch and reception shafts are clear of any moving parts. DO NOT operate augers when removing auger in the reception shaft.

62. Once the cutter head can be removed from the reception shaft, remove the keepers from the cutter head and lead casing.

NOTICE Using a hoist to keep the cutter head in line with the pipe line, remove bottom keepers first, otherwise the weight of the casing and auger will make it difficult to remove the bottom keepers once the top keepers are removed.

63. Slide the cutter head casing forward to gain access to the auger connection.

64. If your next step is to install the final product pipe, place a block/spacer between auger thrust adapter (A) and auger (B). Push the auger forward with the thrust cylinder control to gain access to the auger connections in the reception shaft for removal.



NOTICE If using a PCH, the auger hex connection must be exposed for connecting the PCH front section to the auger.

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65. In the reception shaft, remove the cutter head auger by removing the auger bolt and nut that was installed in the launch shaft (back bolt as shown). Replace auger into the cutter head assembly casing.

⚠WARNING Auger may fall out of casing and cause severe injury or death if reaming head assembly tips or hits an obstruction.

Properly install safety chain assembly to augers and cutter head/casings BEFORE lowering into or lifting out of shaft.

Do not stand or walk under a load.

66. Install safety chain assembly to auger to secure auger into reaming head assembly. For proper installation of safety chain, refer to Installing Safety Chain Assembly To Auger & Casing in the Operator’s Manual.

67. Remove the cutter head assembly from reception shaft.

68. Proceed to “Three Step Method: Installing Product Pipe” in the Operator’s Manual, subsection Installing Product Pipe.

OR

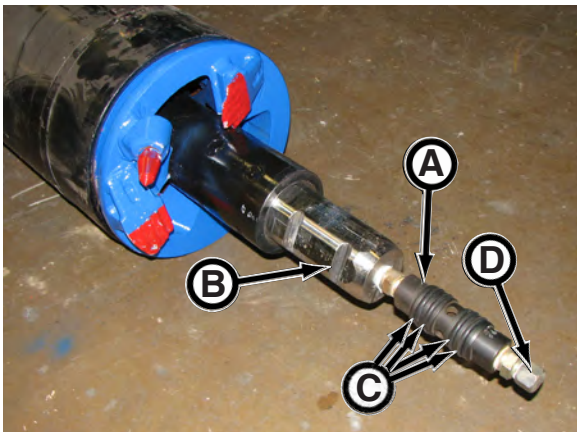
If using powered cutter head, proceed to Three Step Method: Installing Powered Cutter Head in the Operator’s Manual.

NOTICE **There is an alternative jetting fluid supply option. This option requires that the jetting water supply MUST be shut off before removing pilot tubes.**

Alternative Option
With this option, the jetting water pressure must be shut off before removing pilot tubes.

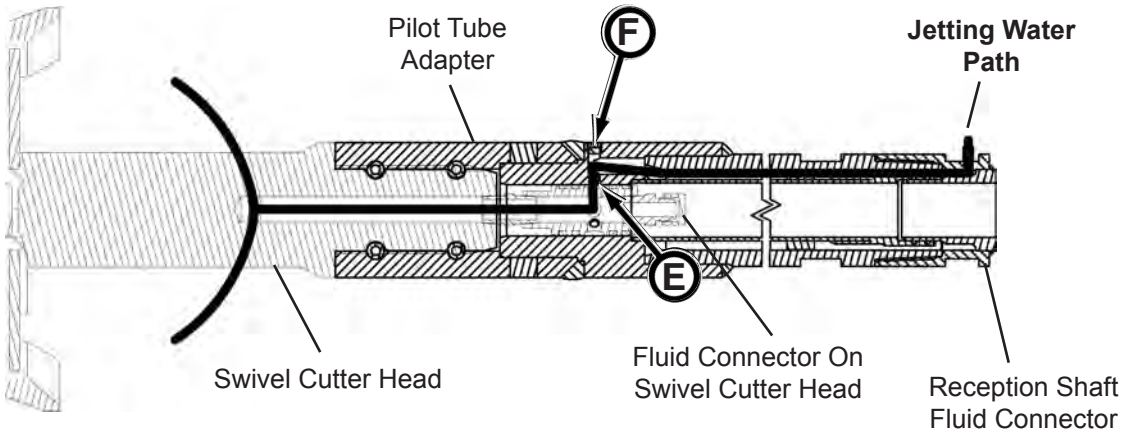
1. Connect fluid connector (A) to hex shaft (B) on swivel cutter head. Be sure o-rings (C) are in good condition (if nicked or cut, replace o-rings) and seated in its proper location. The jetting is supplied through the annular space of the pilot tube.

2. The end adapter must to be capped (D).



3. Install Swivel Cutter Head to pilot tube adapter.

4. The pilot tube adapter must have the 1/8 NPT port (E) open and the 1/4 NPT port (F) plugged.



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Alternative Option (continued)

5. Install the four spiral pins to secure swivel cutter head to the pilot tube adapter.

6. Install fluid connector on the pilot tube in reception shaft.

7. Connect hose from jetting pump to fluid connector.

8. Test the jetting pump water supply to the cutter bit of the swivel cutter head. The jetting requires 16 gpm @ 1,000 psi.

(Alternative Option continued on next page)

Alternative Option (continued)

9. When removing pilot tubes in reception shaft, stop forward advancement, and turn off jetting supply. Once pilot tube is removed, follow steps 6 through 9.

10. Advance swivel cutter head with thrust casings until it reaches the reception shaft. Remove pilot tube adapter from swivel cutter head by removing four spiral pins.

NOTICE

- Jetting to the cutter bit needs to be on at all times while advancing the cutter bit to prevent plugging (as shown) of the cutter head.
- Vary water volume if excessive amount of water to spoils ratio is experienced.

IMPORTANT:
Once cutter head is plugged, it will be difficult, and may require excavation to the cutter head, to clear the plugging. DO NOT PLUG CUTTER HEAD.

Plugged Swivel Cutter Head
Due To Lack Of Jetting Water

Please contact your Akkerman After Market Support representative if you have any questions.

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