

LS200H+ • LS300H+

OPERATOR'S MANUAL



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LONESTARDRILLS.COM

MFG BY: Little Beaver, Inc.
1017



LITTLE BEAVER[®]
EARTH DRILLS & AUGERS

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CUSTOMER SERVICE

Ph: 800/227-7515 or 936/327-3121 or Fax 936/327-4025

ORDERS...

Place your orders by telephone, fax, or mail. When calling, please have your parts manual handy for reference. Our hours are 8:00 am - 4:30 pm central time, Monday thru Friday. When ordering by mail or fax, include a description and LITTLE BEAVER part number for the items you are ordering, your return address, and payment or your authorization for COD shipment.

All orders are shipped UPS where possible. Freight charges will be added to your invoice. Some items are oversize, resulting in a higher shipping cost. Power units and larger augers are shipped via motor freight due to their weight.

PAYMENT TERMS...

COD, Cash in Advance, Visa, Mastercard or NET 30 with approved credit. COD limit for new accounts is \$500.00. Personal or company checks on new accounts will be held until they clear the bank. To eliminate this delay, you may pay by wire transfer or send a certified or cashiers check. For a NET 30 open account, please call or write for a credit application.

SERVICE AND REPAIR...

Your Lone Star Hydraulic Water Well Drill Rig has been designed for user repair with ordinary hand tools. No special tools are required. Consult the appropriate section of the parts manual for instructions.

Service or technical consultation is available, free of charge, from the factory in Livingston, Texas. We will be pleased to help you with any problems or questions. Just write, fax, or call. Our hours are 8:00am - 4:30pm central time, Monday thru Friday.

Factory repair is available. If you return a part to the factory, please include the following information: Your name and return address, a description of the problem and payment or authorization to return the repaired item COD for the repair and shipping charges.

RETURNS...

Please call the factory for a return authorization. This will help to ensure that your parts are handled properly. Include your name and address, customer account #, invoice # under which the returned parts were ordered, and a brief description of the problem with the parts or the reason for returning them. Parts to be considered for warranty must be returned to the factory for inspection within 10 days after receipt of replacement parts. Be sure to prepay the shipping charges, we will not accept collect or COD packages.

Our mailing address...

LITTLE BEAVER, Inc.

P. O. Box 840

Livingston, Texas 77351



SAFETY ALERT SYMBOL



The symbol shown above is used to call your attention to instructions concerning your personal safety. **WATCH THIS SYMBOL** — It points out important safety precautions. It means — **ATTENTION! BECOME ALERT! YOUR PERSONAL SAFETY IS INVOLVED!**

Read the message that follows and be alert to the possibility of *Personal Injury or Death!*



1 YEAR LIMITED WARRANTY

For 1 year from the date of original purchase, LITTLE BEAVER, INC. will replace for the original purchaser, free of charge, any part or parts, found upon examination by any factory authorized service center, or by the factory at Livingston, Texas, to be defective in material or workmanship or both. If your equipment can not be repaired, it will be replaced. All transportation charges on parts submitted for replacement under this warranty must be borne by purchaser.

The following parts are specifically excluded from this warranty: Belts, centrifugal clutches or components thereof and wear items such as auger flighting, point, blades or teeth.

There is no other express warranty.

Implied warranties, including those of merchantability and fitness for a particular purpose, are limited to 1 year from purchase and to the extent permitted by law. Any and all implied warranties are excluded. This is the exclusive remedy and liability for consequential damages under any and all warranties are excluded to the extent exclusion is permitted by law.

*Notice: Engines are warranted by the manufacturer of the engine. See separate engine warranty enclosed.



MACHINE SERIAL NUMBER

The machine serial number for your Lone Star Hydraulic Water Well Drill Rig is located on the back side the mast, just below the draw-works bracket. For your convenience, when requiring service or parts information, refer to this number and your model number. Record the model number, machine serial number and date of purchase in the space provided below:

MODEL NUMBER _____

MACHINE SERIAL NUMBER _____

DATE OF PURCHASE _____



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OPERATORS MANUAL


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Scope of Manual


This manual is intended to provide instruction in the safe operation of the drill rig. It is not a complete well drilling reference. Additional information on siting, drilling and completing a water well can be found in the LIFEWATER DRILLING AND WELL CONSTRUCTION REFERENCE MANUAL.





SAFETY INSTRUCTIONS

 **WARNING:** Failure to observe safety instructions and reasonable safety practices can cause Property Damage Serious Bodily Injury and/or Death. BE CAREFUL!! WATCH OUT FOR BYSTANDERS!!

 **DANGER:** NEVER drill holes where there is a possibility of underground power cables or other hazards. The exact location of underground services must be determined prior to drilling. Inadvertent severing of telephone, fiber optic or CATV transmission cable, or damage to sewer pipe is costly; RUPTURING OF GAS OR WATER LINES CAN CAUSE SERIOUS BODILY INJURY AND/OR DEATH. COMING INTO CONTACT WITH BURIED POWER LINES CAN CAUSE SERIOUS BODILY INJURY, SEVERE BURNS, AND/OR ELECTROCUTION. Call local utility companies or your local "One-Call" number at least 48 hours before digging and have underground utilities marked.

 **DANGER:** NEVER run engine inside building or enclosed area. Exhaust gases contain carbon monoxide, an odorless and deadly poison.

 **DANGER:** Keep the machine and drilling tools away from overhead electric wires and devices. Electrocution can occur without direct contact. Failure to keep away will result in Serious Injury and/or Death.

 **WARNING:** Never use hands to search for leaks. Instead, use a piece of cardboard or wood. Escaping hydraulic fluid under pressure can have sufficient force to penetrate the skin, causing serious injury. Before disconnecting lines, be sure to relieve pressure. Before applying pressure, be sure connections are tight and fittings and hoses are not damaged.

If injured by escaping fluid, see a doctor at once. Serious infection and/or reaction can develop if proper medical treatment is not administered immediately.

 **CAUTION:**

1. Read and understand this operator's manual before operating.
2. Read and understand the operator's manual for the Hydraulic Power Source.
3. Read and understand the operator's manual for the Mud Pump.
4. Keep all safety shields and devices in place.
5. Make sure everyone is clear before operating.
6. Keep hands, feet and clothing away from moving parts.
7. Shut off engine to adjust, service, clean or re-fuel.
8. Relieve hydraulic pressure before disconnecting hoses or fittings.
9. Lower rotary head before moving the machine.
10. Never operate drill with damaged or missing parts.
11. Do not leave machine unattended with engine running.
12. Wear safety glasses.

NOTICE

It is the responsibility of the contractor, owner and user to maintain and operate the Lone Star Hydraulic Water Well Drill Rig in compliance with operating instructions provided. Observe all listed safety instructions and other reasonable safety practices. LITTLE BEAVER, INC. accepts no responsibility for damages to this machine, and other property damage and/or bodily injury due to careless or improper operations.


LITTLE BEAVER, INC. does not recommend or condone any unauthorized modifications to the Lone Star Hydraulic Water Well Drill Rig

LITTLE BEAVER, INC. reserves the right to make changes in design and changes for improvements upon its product without imposing any obligation upon itself to install the same upon its products theretofore manufactured.

Your operator's manual offers recommendations for prolonged and satisfactory service




MAINTENANCE AND LUBRICATION

 **CAUTION:** Shut off power to adjust, service, or clean the machine.

 **CAUTION:** Keep all safety shields and devices in place.

IMPORTANT: Keep all nuts, fasteners, and fittings properly torqued. Refer to torque chart (inside back cover)for proper assembly torque.

 **WARNING:** NEVER use hands to search for leaks, instead, use a piece of cardboard or wood. Escaping hydraulic fluid under pressure can have sufficient force to penetrate the skin, causing serious injury. Before disconnecting lines, be sure to relieve pressure. Before applying pressure, be sure connections are tight and fittings and hoses are not damaged.

If injured by escaping fluid, see a doctor at once. Serious infection and/or reaction can develop if proper medical treatment is not administered immediately.

HYDRAULIC OIL LEAKAGE: If any hydraulic oil leakage is encountered, check and properly tighten the associated fitting. (Refer to torque chart for proper assembly torque). If the leakage persists, it may be necessary to replace the associated fitting or hose assembly. If one of the quick disconnect fittings is the source of leakage, the leaking quick disconnect fitting should be replaced.

IMPORTANT: All nuts, fasteners, and fittings must be kept tightened. Refer to Torque Chart (inside back cover) for proper assembly torque.

RECOMMENDED GREASE:

Exxon Unirex N-2
NLGI No. 2 Grade
Available in 14 ounce cartridges.
Individually or in case of 10.

ORDER PART # 9070

GREASE BOLTS:

The 4 grease bolts should be greased every 8 hours of operation using the recommended grease. Apply grease through the grease fittings which are accessible from the side of the mast, top and bottom, and the side of the draw-works drive bracket.

SLIDE PADS AND RAILS:

The slide pads and rails should be kept clean and free of dirt and grease build-up. The pads are made of UHMW plastic and do not require lubrication.



MAINTENANCE AND LUBRICATION CONT...

DRIVE CHAIN:

The drive chain should be checked for tightness every 4 hours of operation and lubricated if necessary. To adjust, open the Rotary Drive assembly by removing one of the 8" bolts, then swing the drive head aside. While holding the adjustment screw from turning, loosen the locking nut. Then tighten the adjustment nut until the chain has very little slack. If the slack cannot be taken up completely, remove a link from the chain. After adjustment is made, tighten both the adjusting and locking nuts. If the chain becomes dry, lubricate the chain with a heavy weight oil or grease.

IMPORTANT: Check the base of the drill mast periodically, around the bottom sprocket, to determine if dirt build-up is present. Clean away the dirt build-up if present.

ROTARY DRIVE HEAD:

The rotary drive head is pre-lubricated and should not require regular lubrication. To lubricate the rotary drive head, disassemble and re-pack the bearings.

WATER SWIVEL:

This machine is equipped with a Mark II commercial quality load bearing swivel. With proper care and maintenance it should last the life of the drill rig. Please follow the instructions below to ensure best operation.

GREASING:

Do not over-grease. Do not over-pressurize. Apply grease twice daily using a grease gun. Pump until resistance is felt, then remove the grease gun and push against the ball of the grease fitting using a screwdriver blade to release pressure. **Do not continue to pump grease against pressure or you may damage a seal.** Initial greasing when the swivel is new or after packing has been replaced may require several pumps to fill the voids.

PACKING:

The packing should be replaced if the swivel begins to leak excessively. Refer to the diagram for proper placement of the nine packing rings.

MOUNTING BOLTS:

Check both the swivel mounting and hydraulic motor mounting bolts daily to ensure that they are properly tightened. Loose bolts can lead to damage to the motor shaft or the swivel.



MAINTENANCE AND LUBRICATION CONT...

DRILL PIPE:

Always lubricate the drill pipe threads with pipe joint compound before making up each connection. After use, clean both male (pin) and female (box) threads with a wire brush to remove dirt and grease residue. Replace the cap on the pin end. Clean all foreign matter from the pipe before storing.

DRILL BITS:

After use, clean the female (box) threads with a wire brush to remove dirt and grease residue. Clean all foreign matter from the bit before storing.



CAUTION: NEVER operate drill rig with damaged or missing parts.



CAUTION: MAKE SURE EVERYONE IS CLEAR BEFORE OPERATING.



CAUTION: Read and understand the operator's manual for the mud pump.

OPERATING INSTRUCTIONS:



DANGER: NEVER drill holes where there is a possibility of underground power cables or other hazards. The exact location of underground services must be determined prior to drilling. Inadvertent severing of telephone, fiber optic or CATV transmission cable, or damage to sewer pipe is costly; **RUPTURING OF GAS OR WATER LINES CAN CAUSE SERIOUS BODILY INJURY AND/OR DEATH. COMING INTO CONTACT WITH BURIED POWER LINES CAN CAUSE SERIOUS BODILY INJURY, SEVERE BURNS, AND/OR ELECTROCUTION.** Call local utility companies or your local One-Call number at least 48 hours before digging and have underground utilities marked.



DANGER: NEVER run engine inside building or enclosed area. Exhaust gases contain carbon monoxide, an odorless and deadly poison.



OPERATING INSTRUCTIONS CONT...:

PRE-DRILLING SETUP:

Site Preparation:

Select a site that is suitable to safe operation of the equipment. It should be as level as possible so that the rig can be set up and leveled with minimal cribbing and the operator and helpers will have safe footing at all times. The mud pits should be positioned down-slope from the rig.

Anchor Kit Installation:

Assemble the table base to the 86" channels using the short stabilizer tubes. Tighten the center bolts to lock the tubes in place. Before attaching the mast prepare a level area for the channels by digging out and placing wood supports completely underneath the area where the channels will sit. Place the table base and channels over the wood cribbing and level the top of the table base by adding or removing soil under the wood cribbing. It is important that this step be done properly so that the rig will remain stable during operation. Once the base is leveled, it must be restrained using the screw anchors and anchor tubes. Lay the anchor tubes across the channels approximately 12" from either end and with the leveling screws positioned in the center of each channel. Mark the point in the soil immediately below the bolt holes, then push the tube aside and install the screw anchors using the driver and T-handle. Install 1 anchor at the end of each anchor tube. Screw them in so that the underside of the U shaped bracket is even with the top of the channel and the U is aligned at a right angle to the channels. Place the tube over the top of the channel and align the hole in the tube with the holes in the anchor. Install the bolt, washer and nut through the holes. Tighten the leveling screws to remove slack and prevent movement of the rig. The mud flow to the pits should be directed so that it does not undermine the support cribbing.

Rig Assembly:

Attach the base of the mast to the table base using the four 1/2" x 1-1/2" bolts provided. Attach the back of the mast to the table base using two 1/2" x 4-1/2" bolts and locknuts. Tighten all bolts securely. Lower the control valve assembly to the operating position and attach the hoses from the hydraulic power unit. After making sure that both control valves are in the center, neutral position, start the power unit. Lower the shuttle plate to approximately 12" from the bottom of its stroke. Attach the rotary drive head by aligning the mounting bushings and securing with long 1/2" bolts dropped through each side. Connect the 5' long down-hole delivery hose between the swivel inlet and the top of the standpipe. Run the rotary drive hydraulic hoses along the down-hole delivery hose and attach at 4 points with buckle ties wrapped completely around the hoses. Connect the hydraulic hoses into the quick disconnects on top of the rotary control valve. Connect the mud hoses. The hose from the center of the 3-way valve connects to the mud pump discharge; the hose from the bottom of the 3-way valve connects to the mud mixer. The suction hose with foot valve connects to the mud pump suction inlet.



CAUTION: Read and understand the operator's manual for the hydraulic power source you are using.



DRILL HEAD CONTROLS:

The left-hand valve controls the rotary drive motor and the right-hand valve controls the draw works drive motor.




Pulling the left-hand valve lever down or toward the operator will cause the swivel stem to turn in the normal clockwise direction for drilling. Pushing the lever up or away from the operator will cause the swivel stem to turn in the reverse direction for "breaking out" the thread connection. The rotary should only be reversed when the drill pipe slip plate is in place, to prevent loss of the drill string down the hole. This valve is detented so that the lever will remain in the position to which it is placed. It must be pulled back to the neutral position to stop rotation.

IMPORTANT: Reverse rotation of the rotary should only be used momentarily and in limited circumstances. Continued rotation in the reverse direction can unscrew the drill pipe and/or bit and lead to loss of these items down the borehole.

Pulling the right-hand valve lever down or toward the operator will cause the rotary and swivel assembly to move downward. Pushing the lever up or away from the operator will cause the rotary and swivel assembly to move up. This valve is spring centered so that movement will stop if the operator lets go of the lever and to prevent unexpected movement when the power source is started.

A bypass flow control is fitted to the downward side of the draw-works hydraulic circuit and functions as a pressure control valve. This valve can be adjusted to control the downward force on the bit. Turning the knob clockwise will increase the force, turning the knob counter-clockwise will decrease the force. The pressure gauge will provide a relative indication of the amount of force.

DRILLING PROCEDURE:

-  **CAUTION:** Keep all safety shields and devices in place.
-  **CAUTION:** Make certain everyone is clear before operating.
-  **CAUTION:** Read and understand the operator's manual for the mud pump.

Before starting the mud pump, place the 3-way valve in the bypass position. Fill the pits, prime the mud pump and start the mud pump by following the procedures found in the mud pump operator's manual. Let it run until good circulation is established.

Raise the rotary head to within 1" of the top stops. Be careful not to jam the shuttle plate into the stops, either top or bottom, as this can cause undue stress on the draw-works drive components and the mast. Apply pipe joint compound to the threads of the swivel stem, the first drill pipe, and the bit. Screw the bit onto the end of the pipe and the pipe onto the swivel stem by hand.



DRILLING PROCEDURE Cont...:

To start drilling, lower the rotary drive head until the bit just contacts the ground. Place the 3-way valve in the drilling position so that drilling fluid flows out the bit. Move the rotary valve lever to start the bit rotating in the clockwise direction.

Turn the pressure control valve knob to the fully counter-clockwise (open) position. Move the draw-works valve lever in the down direction and hold it open. The rotary drive head should not move at this time. Turn the pressure control valve knob slowly clockwise until the rotary drive head starts to move down. Use the pressure control to control the rate of feed of the drill bit. Be careful not to move it too fast or the bit can be plugged. Monitor the cuttings to make sure the feed rate is correct for the type of soil being cut. Harder soils will require more feed force. The pressure gauge will give a relative indication of the downward force.

Continue drilling the pipe down until the rotary head comes to the bottom of its travel. The pipe slip plate may be placed around the pipe as a guide. Be sure to remove it before the breakout lugs on the pipe come into contact with the plate. Let the rotary drive head remain at the bottom for a short time to allow the cuttings to clear. Monitor the up-hole flow to determine when all the cuttings have been removed. Failure to adequately clear the cuttings may result in the bit being trapped as the cuttings fall to the bottom of the hole when the fluid flow is diverted.

Place the 3-way valve in the bypass position to divert the flow of drilling fluid back to the pits. Raise the rotary drive head far enough to allow the slip plate to be inserted around the drill pipe. Turn the rotary to position the breakout lugs in line with the opening in the slip, then lower the rotary drive head so that the bottom of the tool joint is at least 1-1/2" above the slip plate.

Reverse the rotary by pushing the valve lever sharply to the reverse direction and holding it there. The swivel stem pin (male thread) will "break out" of the drill pipe and when the pipe is completely unscrewed it will drop free and fall against the slip plate. Carefully following this procedure will ensure that the threads of the swivel stem and drill pipe remain undamaged.

IMPORTANT: If the drill pipe fails to drop free of the swivel stem pin then the cuttings were not completely removed from the hole.

ADDING PIPE:

- Raise the rotary drive head to the top of the mast, stopping at least 1" below the top stop.
- Apply pipe joint compound to the threads of the swivel stem and the drill pipe.
- Screw the new pipe into the box threads of the pipe resting in the slip plate. Don't completely tighten. Position the swivel stem threads about 1/2" above the top of the new pipe.
- Open the pressure control valve by turning the knob completely counter-clockwise.
- Pull the rotary valve lever partially downward to start the swivel stem turning slowly in the direction that will tighten the threads. Pull the draw-works valve lever in the down direction. The rotary drive head should not move at this time.
- While holding the valve lever open, turn the pressure control knob clockwise until the rotary drive head starts to move downward slowly. Use the knob and/or the lever to control the rate of movement as the threads start to engage. It may be necessary to have a helper hold the pipe to position it in alignment with the swivel stem threads.



ADDING PIPE Cont...:

- Continue to let the rotary drive head move downward as the threads, both top and bottom set, "make up".
- Just as the threads begin to tighten (both top and bottom sets) return the valve levers to the neutral position to stop all movement.
- Push the draw-works valve lever up to raise the rotary drive head and pipe string so that the slip plate can be removed.
- Place the 3-way valve in the drilling position, wait to make sure circulation is re-established and fluid comes out the borehole, and continue as above.

COMPLETING THE BOREHOLE:

When the borehole is completed to the required depth the drill pipe should be removed. Be sure to allow time for the drilling fluid to circulate and completely clear the hole of cuttings. Monitor the outflow to determine when the hole is clear.

COMING OUT:

IMPORTANT: Coming out of the borehole should be done quickly to minimize the possibility of the borehole collapsing.

IMPORTANT: This is the time when drill pipe is most likely to be dropped down the hole. Follow these steps carefully to prevent this from happening.

- Place the 3-way valve in the bypass position. The mud pump is no longer needed and can be shut off.
- Raise the rotary drive head far enough to allow the slip plate to be inserted around the drill pipe. Turn the rotary to position the breakout lugs in line with the opening in the slip, then lower the rotary drive head so that the larger end of the pipe is at least 1" above the slip plate.
- Reverse the rotary by pushing the valve lever sharply to the reverse direction but do not hold it. As soon as the threads start to unscrew return the lever to neutral. Leave no more than a 1/8" gap between the edges of the tool joints.
- Push the draw-works valve lever to raise the rotary power head. The slip plate should remain in place as the pipe rises. When the next joint appears, quickly remove the plate and then re-insert it after the joint passes.
- After the slip plate is in place and the pipe is secured from falling down-hole, reverse the rotary and continue to unscrew the swivel stem threads, but **STOP BEFORE THEY ARE COMPLETELY UNSCREWED.**
- The helper will use a pipe wrench to break the bottom connection, then the pipe can be unscrewed, removed and placed on the rack.



IMPORTANT: At this point it is very important not to "jam" the pipe between the swivel stem and slip plate. As the threads are unscrewed, either the rotary drive head must be raised or the pipe must be allowed to drop. It is preferable that the procedure be started with adequate room below the bottom tool joint so that the pipe can drop free.





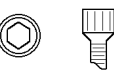

- Lower the rotary drive head and engage the swivel stem threads into the pipe that remains in the slip. It may be necessary to use the rig hammer to align the pipe with the swivel stem.
- Do not tighten the threads, but leave a 1/8" gap between the tool joints.

IMPORTANT: Make sure the threads are adequately engaged. Failure to do so can result in the pipe dropping off the swivel stem.

- Repeat the process until the last pipe reaches the surface. If possible, bring the bit up through the slip plate and then replace the slip underneath before unscrewing the last pipe and bit. Place a cover over the borehole to protect it from falling objects until the casing is ready to be placed.



IMPORTANT: All nuts, fasteners, and fittings must be kept tightened. Refer to torque chart for proper assembly torque.

HEX HEAD					
 TYPE SIZE	 GRADE 5	 GRADE 8	 WRENCH SIZE		 WRENCH SIZE
			inch		
No. 4	8 in lb	12 in lb	1/4"	12 in lb	3/32"
No. 6	16 in lb	23 in lb	5/16"	21 in lb	7/64"
No. 8	30 in lb	41 in lb	11/32"	42 in lb	9/64"
No.10	43 in lb	60 in lb	3/8"	60 in lb	5/32"
1/4"	8 ft lb	12 ft lb	7/16"	12 ft lb	3/16"
5/16"	17 ft lb	25 ft lb	1/2"	24 ft lb	1/4"
3/8"	30 ft lb	45 ft lb	9/16"	43 ft lb	5/16"
7/16"	50 ft lb	70 ft lb	5/8"	69 ft lb	3/8"
1/2"	75 ft lb	110 ft lb	3/4"	105 ft lb	3/8"
9/16"	110 ft lb	150 ft lb	13/16"	158 ft lb	----
5/8"	150 ft lb	220 ft lb	15/16"	195 ft lb	1/2"
3/4"	260 ft lb	380 ft lb	1-1/8"	353 ft lb	5/8"

HYDRAULIC FITTINGS

<u>SIZE</u>	<u>TORQUE</u>	<u>SIZE</u>	<u>TORQUE</u>
1/4 NPT	25 ft.lb.	7/16-20 SAE O-Ring	12 ft.lb.
3/8 NPT	50 ft.lb	9/16-18 SAE O-Ring	20 ft.lb.
1/2 NPT	75 ft.lb.	3/4-16 SAE O-Ring	35 ft.lb.
3/4 NPT	110 ft.lb.	7/8-14 SAE O-Ring	50 ft.lb.
		1-1/16-12 SAE O-Ring	70 ft.lb.



**THINK
SAFETY
FIRST!**



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