BUCYRUS®

49HR

BLAST HOLE DRILL

OPERATOR'S MANUAL

Manual No.
10568
SN: 141275

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SAFETY PRECAUTIONS

General Precautions:

- The employment of qualified maintenance personnel, through a scheduled maintenance program, is the best way to minimize machine downtime and maximize productivity of equipment.
- Keep hands, feet, and clothing away from rotating parts.
- Wear a hard hat, safety shoes and protective lenses at all times.
- Replace any and all safety and warning placards if they are defaced or removed from the machine.
- Think before you act. Carelessness is one luxury the service man cannot afford.
- Excessive or repeated skin contact with sealants or solvents may cause skin irritation. In case of skin contact refer to the Material Safety Data Sheet (MSDS) for that material and the suggested method of cleanup.
- Inspect safety catches (keepers) on all hoist hooks. Do not take a chance, the load could slip off of the hook if they are not functioning properly.
- If a heavy item begins to fall, let it fall, don't try to catch it.
- Keep your work area organized and clean. Wipe up oil or spills of any kind immediately. Keep tools and parts off of the ground. Eliminate the possibility of a fall, slipping or tripping.
- Floors, walkways and stairways must be clean and dry. After fluid draining operations be sure all spillage is cleaned up.
- Electrical cords and wet metal floors make a dangerous combination.
- Regularly inspect for any loose bolts or locking devices and properly secure them.
- Use extreme caution while working near any electrical lines or equipment whether it be high or low voltage. Never attempt electrical repairs unless you are qualified.
- Check limit switches for proper operation.
- After servicing, be sure all tools, parts or servicing equipment are removed from the machine and secured in an appropriate storage area.
- Mechanical Brakes are designed for use as static holding brakes only. Use as a motion (dynamic) brake in emergency situations only.
- Use proper interior and exterior lighting.
- Install and maintain proper grounding and ground fault protection systems.
- Perform functional tests of all safety circuits.
- Allow electrical inspection and maintenance to be performed only by a qualified electrician.
- Use extreme caution when working around drilled holes.

OPERATION NEAR ELECTRICAL LINES

DANGER: HIGH VOLTAGE! The following precautions shall be complied with whenever operating around or near electrical distribution and transmission lines.

Working in the vicinity of electrical power lines presents a very serious hazard and special precautions must be taken. For purposes of this manual we are considering the entire machine or its load, in any position, that can reach to within the minimum distance specified by local, state and federal regulations.

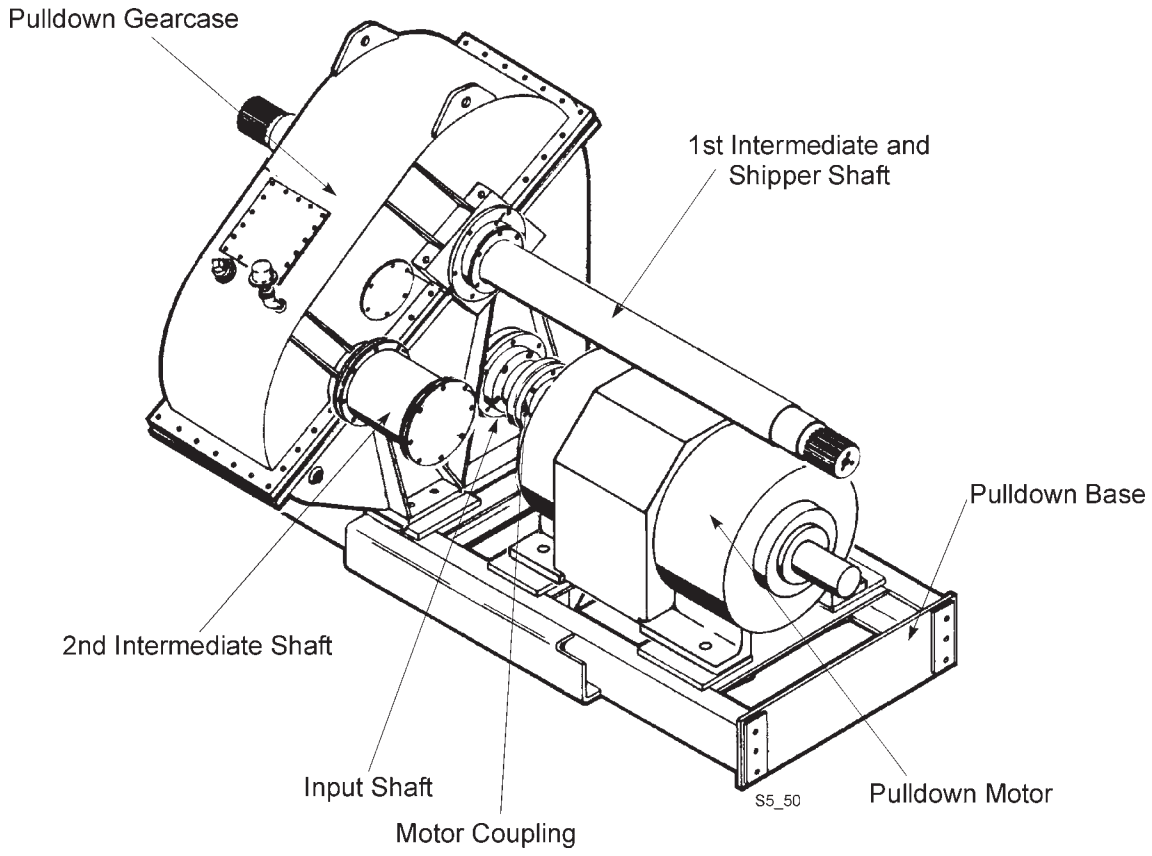
Safe operating practices require that you maintain the maximum possible distance from the lines and never violate the minimum clearances.

Before working in the vicinity of power lines, always take the following precautions:

- Always contact the owners of the power lines or the nearest electric utility before beginning work.
- You and the electrical utility representative must jointly determine what specific precautions must be taken to insure safety.
- It is the responsibility of the user and the electric utility to see that necessary precautions are taken.
- Consider all lines to be power lines and treat all power lines as energized even though it is known that the power is shut off and the line is visibly grounded.
- Slow down the operating cycle. Reaction time may be too slow and distances may be misjudged.
- Caution all ground personnel to stand clear of the machine at all times.
- Use a signal person to guide the machine into close quarters. The sole responsibility of the signal person is to observe the approach of the machine to the power line. The signal person must be in direct communication with the operator and the operator must pay close attention to the signals.

DANGER: HIGH VOLTAGE! Death or injury could result should any part of the machine approach the minimum distance of an energized power line specified by local, state and federal regulations.

PULLDOWN GEARCASE



TOOL WRENCH SWITCH

The tool wrench switch (12) is a three-position spring return switch. Turning the switch to the EXTEND position will cause the tool wrench to extend to clamp the drill pipe. Turning the switch to the RETRACT position will retract the wrench, releasing the drill pipe. This switch is functional whenever the hydraulic pumps are running.

DUST CURTAIN SWITCH

The dust curtain switch (13) is a three-position switch. Turning the switch to the UP position will raise the dust curtains. Turning it to the LOWER position will lower the dust curtains.

In the AUTO position, the curtains are raised automatically when the operating mode selector switch on the propel control panel is in the PRIMARY PROPEL, SECONDARY PROPEL, or REMOTE PROPEL position. The curtains are not lowered automatically, but must be lowered by moving the switch to the LOWER position.

BIT VIEW HATCH SWITCH

This is a two-position switch (14) that is used to move the hatch for viewing the drill bit on the ground. Moving the switch to the CLOSE position will close the hatch. Turning the switch to the OPEN position will open the hatch.

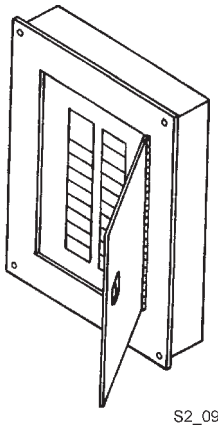
MACHINERY HOUSE CONTROLS

NOTE: The controls shown on the following illustrations are typical of the controls on a machine. Because of the variations of controls that can be supplied for customers needs, be sure to become acquainted with the controls on the cabinets of your machine. All controls will be identified with nameplates.

LIGHTING LOAD CENTER

The lighting load center is located on the right side of the front wall of the machinery house.

The lighting load center contains the breakers to control the interior and exterior lights and various auxiliary functions.



LIGHTING LOAD CENTER

Each breaker is labeled as to its particular function on any particular machine.

The controls are three-position lever operated circuit breakers. Moving the lever in one direction (ON) will close the circuit, while moving it in the opposite direction (OFF) will open the circuit. The center position is the tripped position. The breaker may be reset by moving the lever to the OFF position and then back to the ON position.

MACHINERY CHECK

The following is a list of points and equipment that should be checked for proper operation immediately following start-up of the drill. If operating difficulties are not found during this procedure, they probably will not be noticed until some point in time at which the system or component will cease to function and cause serious damage to the machine.

1. Check the main air system for leaks.
2. Verify that the air compressor radiator fan is operating correctly. Check the coolant system for leaks.
3. Check for leaks in the hydraulic system.

BREAK-IN OF NEW COMPONENTS

When a machine is new, is returned to service after a long period of storage, or is returned to service after major repairs, certain precautions must be taken upon initial start-up and for a time following the start-up. These precautions are necessary to insure that the full service life of the components is realized.

ROTARY DRIVE UNIT BREAK-IN

Break-in of the rotary gear case is limited to reduced loading during the first 100 hours of operation and a complete oil change at the end of the break-in period.

This break-in period applies only to new gearcases or gearcases in which a new gear has been installed.

HOIST/PULLDOWN GEARCASE BREAK-IN

Break-in for the hoist/pulldown gearcase is limited to reduced loading during the first 100 hours of operation and a complete oil change at the end of the break-in period.

The break-in period applies only to new gearcase or gearcases in which a new gear has been installed.

ELECTRIC MOTOR BREAK-IN

Break-in of the rotary and hoist/pulldown motors is limited to reduced loading and inspection for the first 8 hours of operation. This break-in period is intended to spot any problems in the motors before they lead to serious damage to the motors or the machine. Inspection should include monitoring the motor temperature and listening for unusual noises which might indicate a problem. Inspection should also include verifying that all blower vents and intake openings are open.

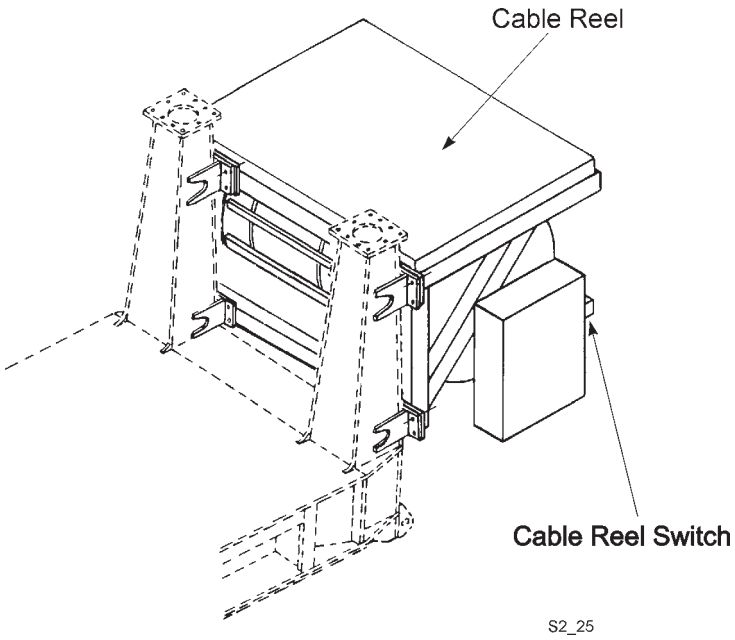
CABLE REEL OPERATION

When the cable reel switch is in the AUTO position, it is designed to pick up trail cable as the drill moves toward its power source. It is not designed to drag the trail cable over the ground.

The line pull is proportional to operating pressure. The correct line pull is when there is sufficient pull on the cable to wind it on the reel, but not too great to put unnecessary strain on the trail cable.

The line speed is dependent on the volume of hydraulic oil flowing through the system. The correct line speed is slightly faster than the travel speed of the machine.

To manually operate the cable reel, proceed as follows:



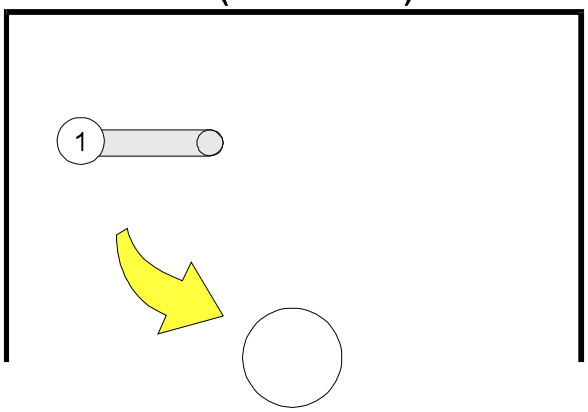
CABLE REEL

1. Start the main air compressor motor or turn ON the external cable reel switch. This will automatically start the cable reel hydraulic system motor. Allow the oil to circulate for about 5 minutes.

2. To spool the trail cable onto the reel, turn the cable reel switch to the REEL IN position.

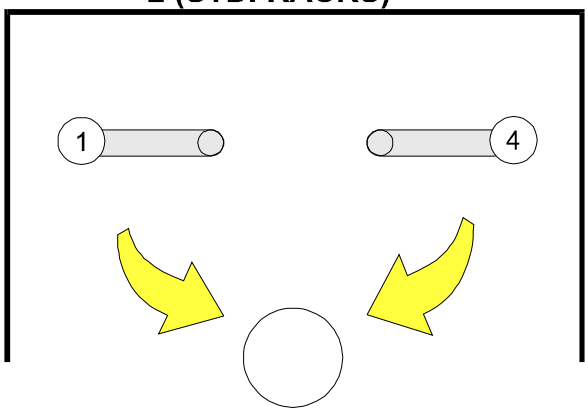
3. To spool the trail cable off of the reel, turn the cable reel switch to the REEL OUT position.

1 PIPE RACK
1 (STD. RACK)



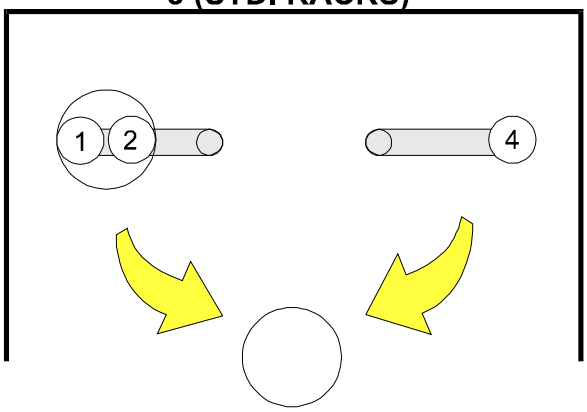
A. Selector Switch in #1 Position
B. Pull Joystick To Swing Out
C. Push Joystick To Store Rack

2 PIPE RACKS
2 (STD. RACKS)



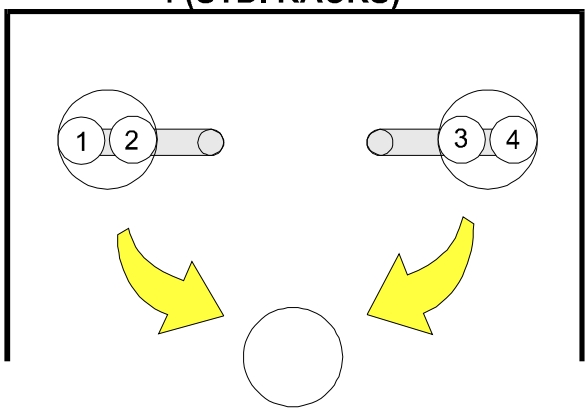
A. Selector Switch In #1 Position - Left Rack or #4 Position - Right Rack
B. Pull Joystick To Swing Out
C. Push Joystick To Store Rack

3 PIPE RACKS
3 (STD. RACKS)



A. For Standard Rack Use Procedure For Right Rack of 2 Pipe Rack Arrangement
B. For Carousel, Use Selector Switch In #1 Position
C. Pull Joystick To Swing Carousel Out
D. Push Joystick To Store Carousel
E. To Rotate Carousel, Put Selector Switch In #2 Position
F. Push Joystick To Rotate The Carousel In One Direction And Pull The Joystick To Rotate The Carousel In The Opposite Direction

4 PIPE RACKS
4 (STD. RACKS)



A. Carousel Operation Is Same As For Carousel For 3 Pipe Rack Arrangement
B. Positions #1 And #4 Of The Selector Switch Control The Swing Out Of The Carousels
C. Positions #2 And #3 Of The Selector Switch Control The Rotation Of The Carousels

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PIPE RACK OPERATION

DRILL TOOL STRING DISASSEMBLY

The tool string is disassembled in reverse of assembly, that is the bit is removed first, then the drill pipe and lastly the stabilizer.

To remove the bit from the tool string, proceed as follows:

1. Raise the tool string 2 to 3 ft (0.6 to 0.9 m) above the drill deck. Install the bit basket in the hole in the drill deck.

2. Using the breakout wrench, break the joint between the stabilizer and the bit. After breaking the joint, use rotary power to disassemble the joint. Use a slight amount of hoist power to lift the tool string off of the bit to facilitate the disassembly.

3. Hoist the tool string 2 to 3 ft (0.6 to 0.9 m) off of the drill deck. Secure the rotary/pulldown unit and controls. Attach a lifting bell to the bit. Attach the auxiliary winch line to the lifting bell and lift the bit out of the bit basket.

4. After removing the bit, a new bit may be installed or the bit basket may be removed, allowing removal of the drill pipe.

To remove the drill pipe from the rotary drive unit, proceed as follows:

1. Lower the tool string until the slots on the upper end of the stabilizer are aligned with the tool wrench. Clamp the stabilizer in the tool wrench. Using the breakout wrench to break the joint between the stabilizer and the drill pipe. After breaking the joint, use the rotary unit to disassemble that joint completely. Raise the rotary/pulldown unit and drill pipe 2 to 3 ft (0.6 to 0.9 m).

2. Press the drill/propel control OFF push-button and set hoist brake. Go to the drill deck and clean the pocket of the pipe rack to be used of dirt, cuttings or any material that will interfere with the entrance of the pipe or the operation of the pipe rack gate controls. Verify that the gate controls are intact.

3. Clean and lubricate the threads and shoulder on the lower end of the pipe. This is to prevent rusting while stored in the pipe rack. After performing this function, return the controls to operating condition.

4. After selecting the pipe rack to be used by turning the pipe rack selector switch to #l or #4, swing the pipe rack over the hole. Then return the joystick to the NEUTRAL position.

5. Slowly lower the rotary/pulldown unit and place the lower end of the pipe into the pipe rack

selector switch to the LOW position and the hoist/pulldown rheostat in the hoist direction. Hoist the tool string until the hole is cleared. Leave the rotary motion activated since this will help clear the hole. If the pressure is noticed slowly rising during drilling, reducing the penetration rate momentarily may eliminate the need to cease pulldown and hoist the tool string.

4. Continue normal drilling until the hole is at the desired depth. It may be necessary to add drill pipe to complete the hole. Refer to the appropriate sections in this manual for the procedures necessary for adding drill pipe.

The operator's display screen on the operator's display terminal will show the hole depth in feet.

5. Once the finished hole depth is reached it is necessary to clean or ream the hole before it is completed.

ENDING THE HOLE

Once the finished hole depth is reached normal drilling ceases. It is now necessary to ream the hole before preparing the drill to move to the next hole. Reaming the hole removes cuttings that have fallen to the bottom of the hole and also straightens and increases the diameter of the hole.

As the bit and tool string are cutting through the formation, the bit may tend to wander slightly. This wandering is due to the fact that the stabilizer cannot be exactly the same diameter of the bit or it would wear out quickly and create operation problems. The stabilizer tends to keep the bit on course, but it cannot keep the hole exactly straight. Reaming the hole straightens the hole and therefore increases the diameter of the hole slightly. Reaming the hole also removes any cuttings that are lodged in the hole. These cuttings must be removed or they will eventually fall to the bottom of the hole, reducing the drilling depth.

To complete the drilling procedure the hole is reamed as follows:

1. When the hole is drilled to the finished depth, leave the main air stream on and the rotary rheostat to the MINIMUM position and the motion activated. Return the hoist/pulldown rheostat to the "0" position and set the hoist brake. Allow the tool string to rotate and the air to bail the hole for a moment. This removes all of the cuttings in suspension from the hole.

2. Turn the hoist/pulldown speed selector switch to the LOW HOIST position and the hoist/pulldown rheostat in the HOIST direction while simultaneously releasing the hoist brake. Slowly hoist the tool string out of the hole. If resistance is met, or if vibration increases, return the hoist/pulldown rheostat to "0" position and set the hoist brake. Allow the obstruction to be removed by the bit before continuing. If the hole is very crooked (indicating a worn stabilizer) it may be necessary to repeat this procedure of hoisting, then stopping and allowing the bit to clear, many times before reaching the top of the hole. This procedure straightens the hole and allows the tool string to be removed.

8. Inspect the machine for obvious damage or wear. Make note of any operating difficulties discovered while drilling and any problems discovered during this inspection. Report the difficulties to the appropriate personnel.

9. Close all doors and windows tightly.

SHORT TERM STORAGE

If the machine is to be shut down for more that 3 eight hour shifts, but less than 3 weeks, short term storage precautions are necessary. These precautions are necessary to insure that the machine is not damaged or does not deteriorate during the storage period.

Short term storage is primarily concerned with placing all components in a safe position and providing additional protective lubrication to normally lubricated components.

To store the machine for a maximum of 3 consecutive weeks, proceed as follows:

1. If not already done so previously, complete all shut down procedures as detailed in the MACHINE SHUT DOWN topic in this manual. During the shut down procedure it is necessary to remove and store the complete tool string. Remove the bit from the stabilizer and store it in a protected place. Coat the bit with a suitable oil to prevent rusting while stored. As the drill pipe is being disassembled, clean and lubricate the threads on each end of the pipe before storing in the pipe racks.

2. Lower the rotary/pulldown unit to the lowest position and set the hoist brake. Inspect the rotary/pulldown unit for damage or wear and note any problems discovered. Cover the rotary and pulldown motors with waterproof tarps or covers. Raise the dust curtains. Retract the casing tong cylinder.

3. Check the oil level in the rotary/pulldown unit. Check the cases to see if there is water in the oil. If there is water in the cases, drain and refill the cases with suitable oil. If no water is present, fill the cases to the proper level.

4. Manually cycle the lube system and verify that all points on the mast are receiving lubricant. If the auto lube system is not functioning properly, repair or replace components as necessary.

5. Lower the leveling jacks until the jack pads are resting on the ground, but no machine weight is on them.

6. Inspect the air compressor for signs of wear or damage. Make note of any damage discovered.

7. If the air compressor motor is equipped with anti-condensation heaters, turn them on at this