BI624058

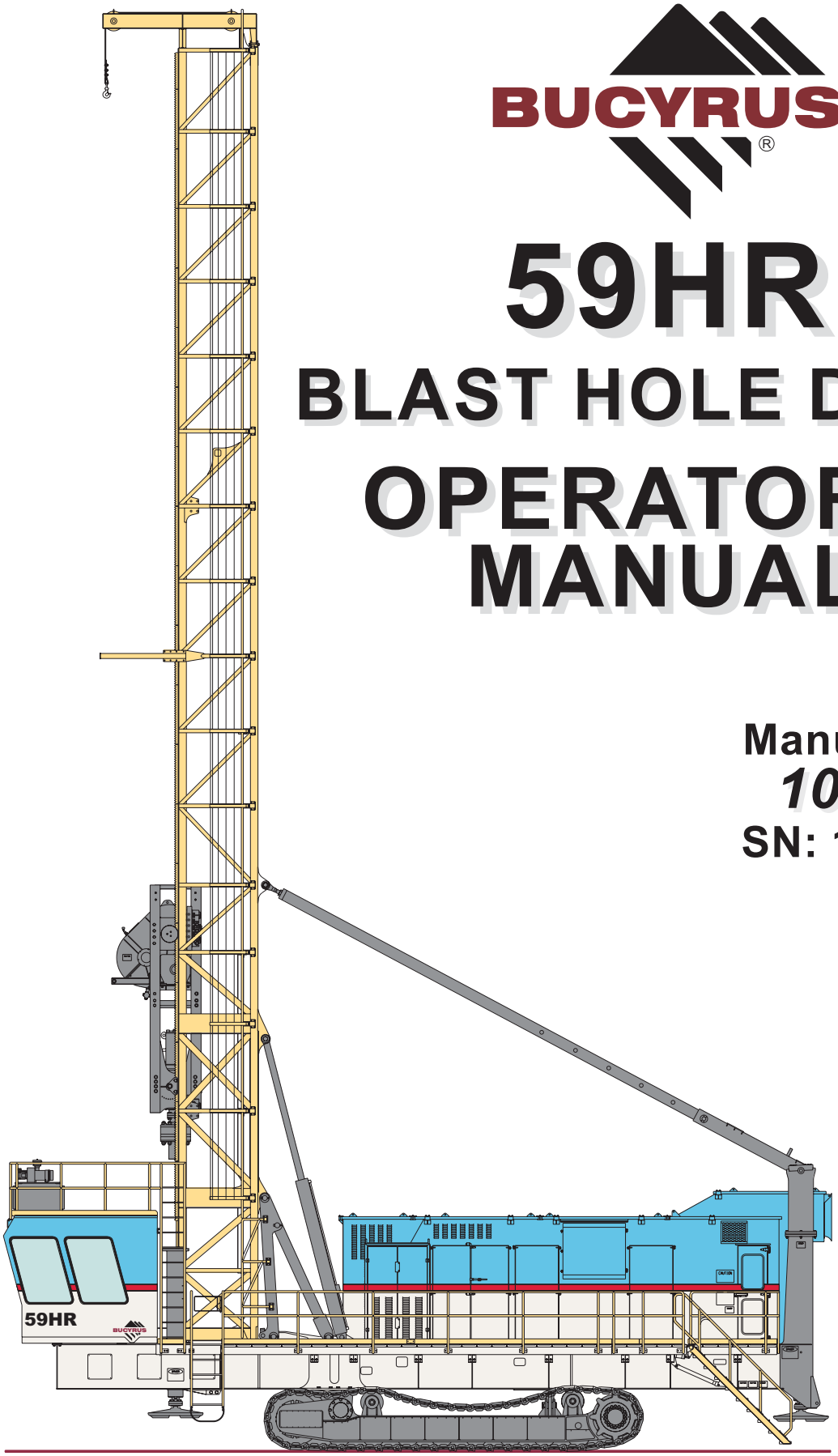
BUCYRUS®

59HR

BLAST HOLE DRILL

OPERATOR'S MANUAL

Manual No.
10681
SN: 141341



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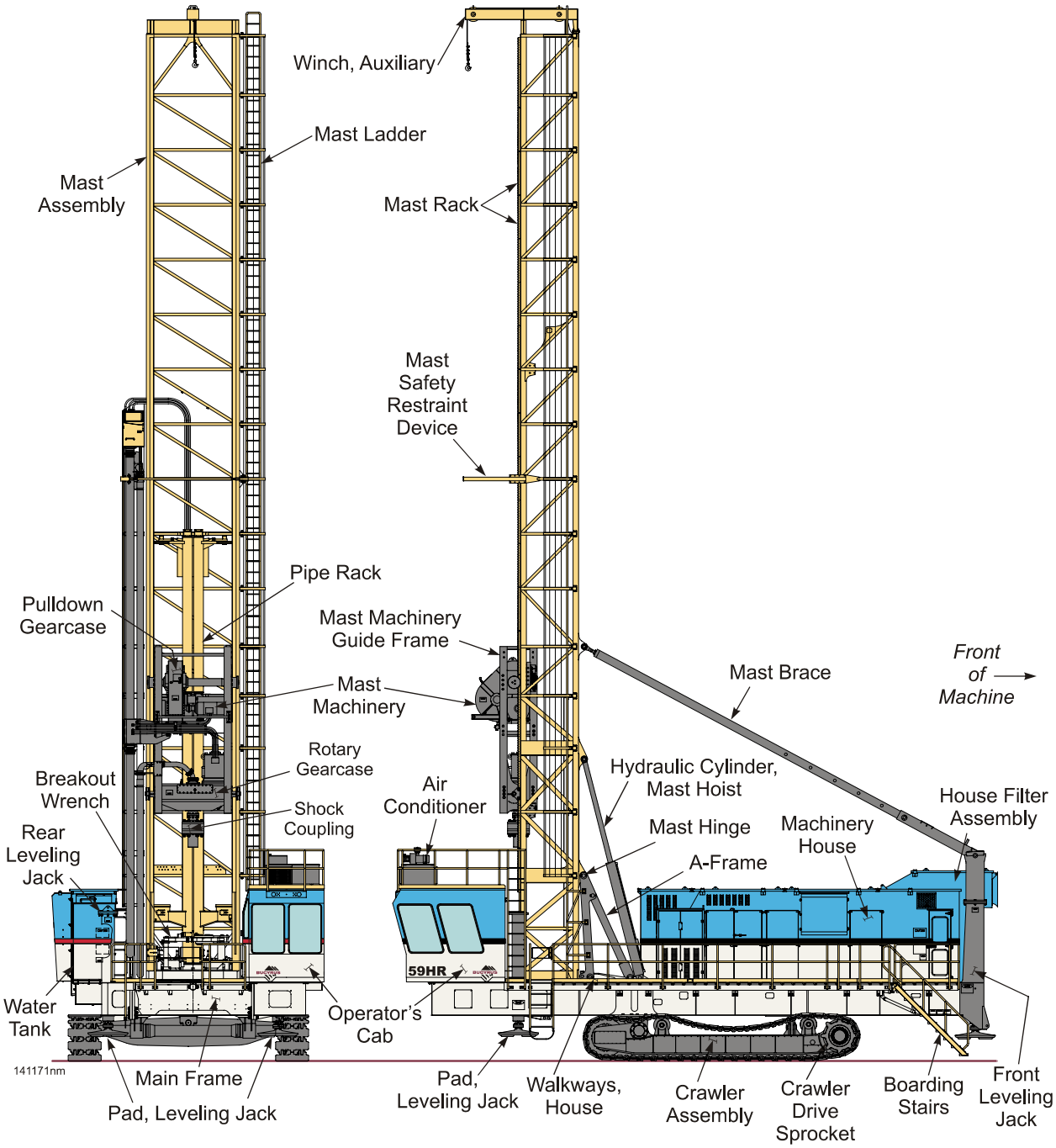
SAFETY PRECAUTIONS

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.

MACHINE OVERVIEW

The 59HR Blast Hole Drill is designed and constructed to provide efficient service under the most severe conditions. The machine is built to the highest possible standards and will provide trouble free operation if properly maintained.



COMPRESSOR STOP PUSHBUTTON

This pushbutton (3) is used to shutdown the compressor motor. The compressor will have to be restarted from the machinery house.

COMPRESSOR VENT/DRILL SWITCH

This switch (4) is used to open or close the butterfly valve in the compressor discharge line. In the VENT position, the butterfly valve will close and the compressor will unload and vent air to the atmosphere. In the DRILL position, the butterfly valve will be opened and the air will be routed to the drill bit to bail the hole of cuttings.

HEATER/VENT/AIR CONDITIONER CONTROLS

The heater/vent/air conditioner controls consist of two (2) four-position switches (5 & 6).

One switch (5) selects the mode being used and has the following positions: OFF, FAN, HEAT, and COOL. The other switch (6) controls fan speed for vented air and circulated air. The four positions are: VENT HIGH, VENT LOW, CIRCULATE HIGH, and CIRCULATE LOW.

OPERATING MODE SELECTOR SWITCH

The operating mode selector switch (7) is a four-position switch. Turning the switch to the DRILL position will allow the drill controls of the machine to be operated. Turning the switch to the PRIMARY PROPEL position will allow the propel joystick controls on this panel to control the propelling motion of the machine. Turning the switch to the SECONDARY PROPEL position will allow the propel joysticks on the Main Control Panel to control the propelling motion of the machine. Turning the switch to the REMOTE PROPEL position enables the optional portable remote propel control function.

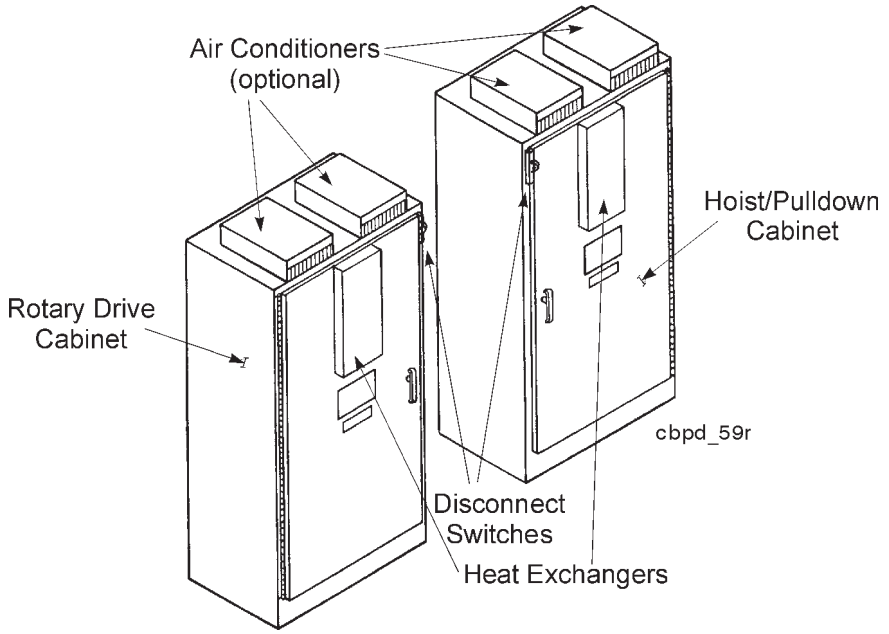
PROPEL JOYSTICKS

For the joysticks (8 & 9) to control the crawlers, the operating mode selector switch (7) must be in the PRIMARY PROPEL position. Pushing the right (8), left (9), or both joystick levers forward will cause the machine to move forward, straight, right, or left, depending upon which lever(s) were pushed. Moving the levers to the rear will cause the machine to move rearward, straight, right, or left, depending upon which lever(s) were moved.

Full forward or rearward movement of the joystick levers will supply the fastest motion. The joysticks are equipped with a lock feature. To move the levers out of NEUTRAL position, the switch knob must be lifted.

HOIST/PULLDOWN AND ROTARY DRIVE CONTROL CABINETS

Typical controls on the Hoist/Pulldown and Rotary Drive Control cabinets are shown in the figure below.



Hoist Pulldown and Rotary Drive Cabinets

9. Check the operator's display terminal for any faults.

10. Inspect the machinery house for general cleanliness. Clean all dirt and debris from the machinery house.

NOTE: Do not use compressed air to clean the machinery house. Compressed air will only move the dirt around. Use a vacuum cleaner to remove the dirt from the machine. Failure to clean the inside of the machinery house will cause damage to many of the components located there.

11. Inspect the auxiliary winch and auxiliary winch line.

12. Check the oil level in the pump drive gearbox. Fill with recommended oil to the proper level.

13. Check all controls for free operation. Return all controls to the OFF or SET position.

14. Inspect the operator's cab for housekeeping and cleanliness. Clean dirt and debris from the cab. Clean the windows to give full visibility for proper operation.

NOTE: Do not use compressed air to clean the operator's cab. Compressed air will only move the dirt around. Use a vacuum cleaner to remove the dirt from the cab.

15. Inspect the tool wrenches for free operation, broken or missing parts, proper lubrication, lubricant leaks or dirt accumulation. Repair or replace parts as necessary and clean the drilling platform.

CAUTION: Before working near or under the rotary drive/pulldown unit, make sure all of the operator's controls are off and tagged and the hoist brake set to prevent movement of the unit. Serious personal injury or death could result should the rotary drive/pulldown unit fall when personnel are working near or under it.

16. Inspect the automatic breakout wrench for free operation, broken or missing parts, proper lubrication, lubricant leaks or excessive dirt accumulation. Repair or replace parts as necessary. Be certain that the breakout wrench is retracted.

17. Inspect the pipe racks for broken or missing parts, proper operation, dirt accumulation, or lubricant leaks. Be certain that the upper gate is closed and that the rack is in the stored position.

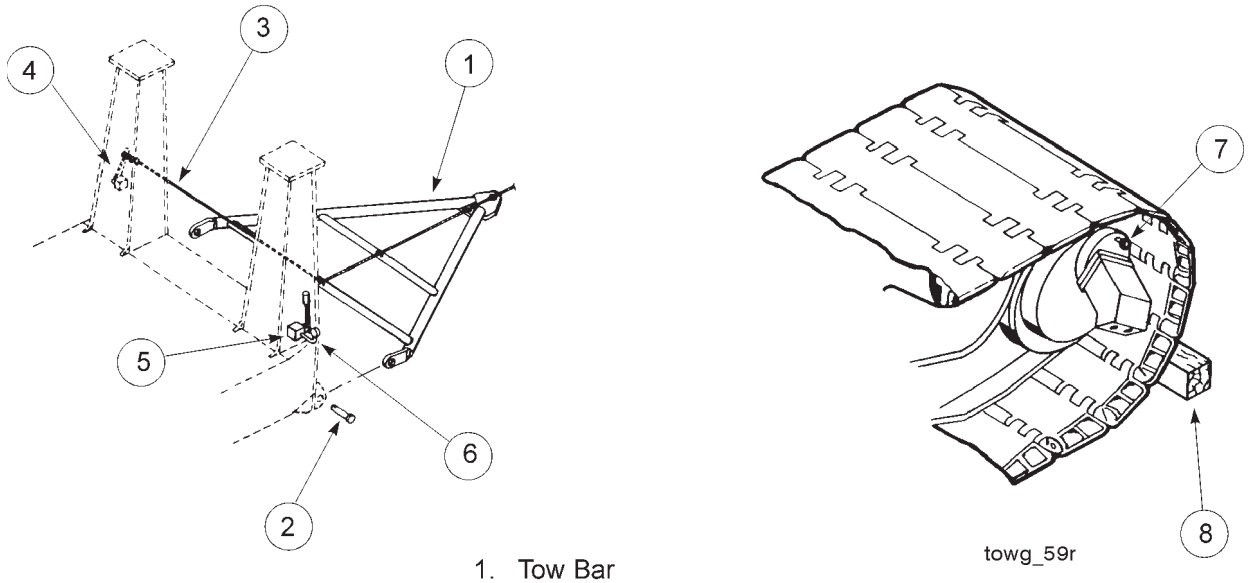
18. Inspect the guide bushing for excessive wear or dirt accumulation. Also inspect the retainer lugs to be sure they are intact. Do not operate the machine without both retainer lugs intact and securely welded to the deck.

TOWING PROCEDURE

CAUTION: Be sure crawlers are securely blocked before disengaging gearbox clutch for towing.

1. Secure the machine by blocking crawlers.

2. Secure the tow bar to the towing vehicle.



1. Tow Bar
2. Tow Bar Pin
3. Lanyard
4. Safety Valve
5. Hand Pump
6. Hydraulic Pressure Gauge
7. Gearbox Disengaging Knob
8. Blocking

3. Fasten a lanyard to the towing safety valve lever. The valve is mounted to the left front jack casing. Run the lanyard down the casing, along the tow bar and secure it to the towing vehicle. If during towing the tow bar should come loose from either the drill or the towing vehicle, the lanyard will trip the safety valve and set the drill propel brakes.

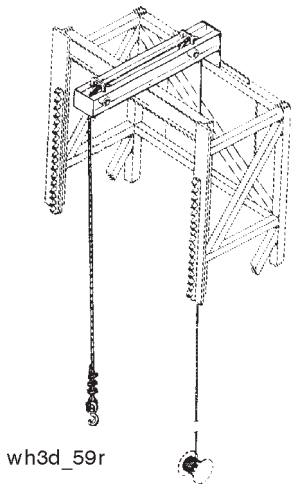
4. Disconnect the drive tumbler gearbox from the propel motor as follows:

   a. Ensure that the propel pump controls are in neutral position

   b. Loosen shifter lever lock screw

   c. Pull out shifter lever to disengage clutch

   d. Tighten shifter lever lock screw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3. To hoist the auxiliary winch line, lift and move the mast/winch joystick, located on the main control panel, forward. To stop the line, return the joystick to the NEUTRAL position.

4. To lower the winch line, lift and move the joystick rearward. To stop the line, return the joystick to the NEUTRAL position.

PIPE RACK OPERATION

The machine can be equipped with 1 to 4 pipe racks and depending upon the number of pipe racks the pipe rack configuration and operation will be different.

- On a machines with one pipe rack, the rack will be on a swing out arm and will be in #1 position .

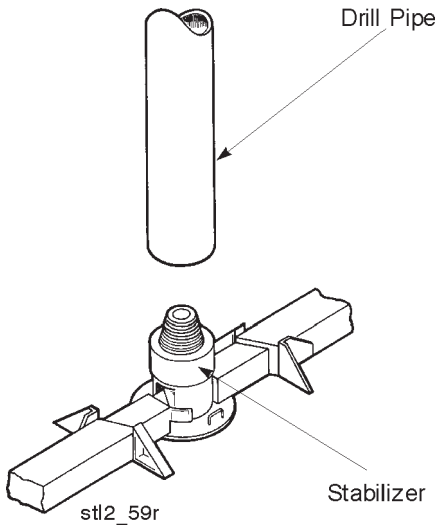
- On a machine with two pipe racks, the racks will be on swing out arms and will be in #1 and #4 positions.

- On a machine with three pipe racks, two pipe racks will be located on a carousel that swings out and then is rotated. This carousel houses pipe racks in #1 and #2 positions as shown. The third pipe rack is a swing out rack that will be in #4 position.

- On a machine with four pipe racks, there are two swing out carousels with two racks in each carousel. The carousels rotate to make each rack available for use. The left carousel houses racks #1 and #2 and the right carousel racks #3 and #4.

10. Once the pipe rack has been stored the pipe should be cleaned out using the bailing air. Remove all personnel from the area and turn on the bailing air for a moment. After cleaning the pipe, clean and lubricate the threads and shoulder on the lower end of the pipe and the upper end of the stabilizer.

CAUTION: Before working around the tool string set the hoist brake. Depress the drill/propel control OFF pushbutton.



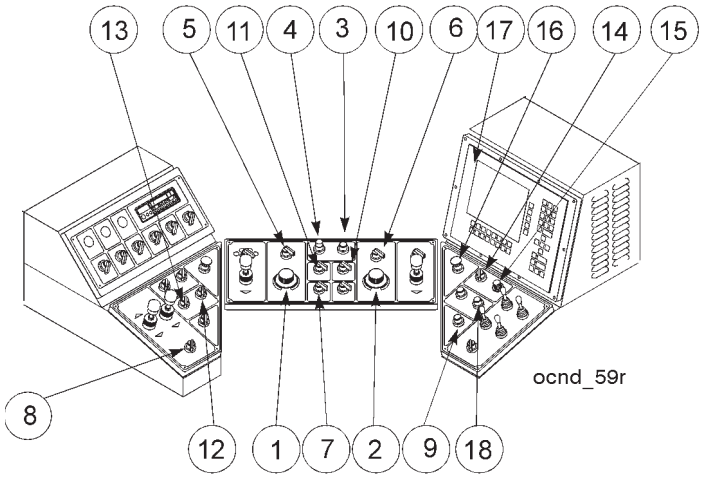
Stabilizer Installation

11. Release the hoist brake and lower the rotary/pulldown unit until the drill pipe is approximately 1 foot above the upper end of the stabilizer. Reset the hoist brake.

12. Turn the rotary rheostat clockwise until the drill pipe begins to turn at approximately 5 RPM as shown on operator's display terminal operator's display screen. Release the hoist brake and carefully lower the rotary drive unit until the drill pipe contacts the stabilizer. Allow the rotary drive unit to continue to lower under gravity while the drill pipe is threading onto the stabilizer.

13. When the stabilizer begins to turn with the drill pipe, check the joint between the stabilizer and the pipe. The shoulders on the pipe and stabilizer must be together. If there is clearance between the shoulders, it will be necessary to tighten the joint some more before the stabilizer is released. If the shoulders of the pipe and stabilizer are contacting, the joint is made up.

Installation of the drill bit is the last step in preparing the tool string.



1. Hoist/Pulldown Rheostat
2. Rotary Speed Rheostat
3. Drill/Propel Control “ON” Pushbutton
4. Drill/Propel Control “OFF” Pushbutton
5. Hoist/Pulldown Speed Selector Switch
6. Rotary Speed Selector Switch
7. Hoist Brake Switch
8. Operating Mode Selector Switch
9. Signal Horn
10. Dust Curtain Switch
11. Bit Viewing Hatch Switch
12. Compressor “STOP” Pushbutton
13. Compressor Vent/Drill Switch
14. Water Injection “ON/OFF” Switch
15. Water Injection Flow Control
16. Emergency “STOP” Pushbutton
17. Panelview Monitor
18. Depth Indicator Reset Pushbutton

Controls for Normal Drilling

During the actual drilling the operator’s display terminal should be turned on and the operator display screen shown on the monitor. All of the drilling parameters noted in the following paragraphs will appear on the operator’s display screen.

NOTE: The bar graphs on the operator’s screen on the operator display terminal shows the condition of each of each functions. If a function operates beyond its normal operating range, especially for rotary current and hoist/pulldown force, the bar graph color will change from green to yellow or red when the graph valve raises into that particular range. For details, refer to the Operator Display Manual.

STARTING THE HOLE (COLLARING)

Since the first few feet of a hole are usually in unconsolidated material, the procedure for drilling through this material will be different than for the remainder of the hole. This procedure is commonly referred to as collaring the hole.

To begin, or collar the hole, proceed as follows:

1. Verify that the tool wrench and breakout wrench are retracted fully. Clear the drill deck of personnel and material which is not necessary for the drilling procedure (i.e. oil drums, tools, spare bits, etc.).

2. Place the operating mode selector switch in the DRILL position. Place the hoist/pulldown speed selector switch in the PULLDOWN position. Depress the drill/propel control ON pushbutton. Release the hoist brake and allow the tool string to lower so that the guide bushing is firmly seated in the hole in the drill deck. Make sure that the slots in the bushing align with

5. Press the drill/propel control ON pushbutton.

6. Place the compressor vent/drill switch in the DRILL position.

7. Verify on the operator's display terminal that no PDC faults exist. If a fault exits, it must be cleared before the PDC control can be activated.

8. With the operator's display screen shown in the operator's display terminal, press the depth indicator reset pushbutton to reset the hole depth and bit depth indicators to zero.

9. Place hoist brake control in the RELEASE position.

10. On the operator's display terminal with operator's display showing, depress keypad button F5 to turn on PDC The readout above the F5 key will then read "PDC on."

After the above start-up procedure has been initiated the automatic controls will take over the actual drilling of the hole. Water injection (if so equipped) will be shut off at preset depth. When the total depth of the hole is reached, as preset, the tool string will be automatically hoisted and when the bit approaches the top of the hole, the control will stop the bit, shut off the air and set the hoist brake.

If problems arise in the PDC functions, the system will have to be corrected by a qualified electrician. In most cases, if a malfunction occurs in the automated system, the automated system can be turned off and the drilling completed manually.

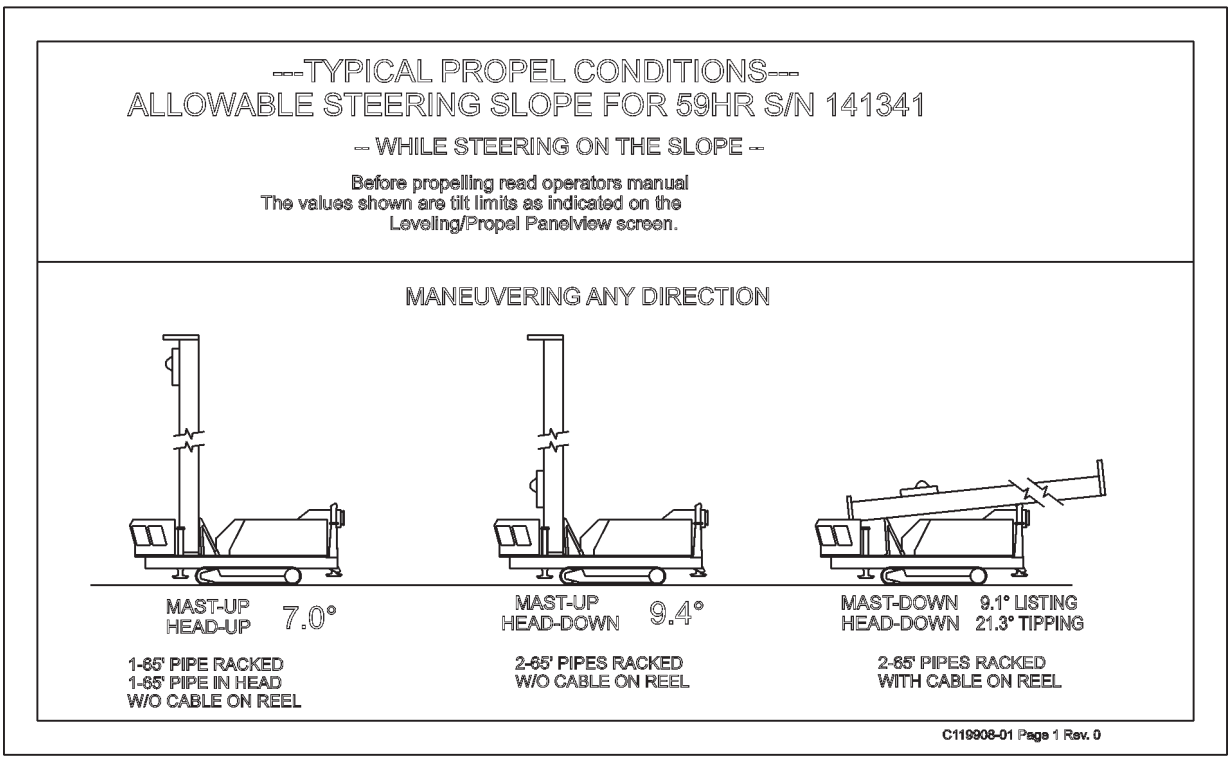
PREPARING TO MOVE

Once the hole has been completed and the tool string removed from the hole it is necessary to move the drill to the next hole location to prepare to drill the next hole. Preparing to move the drill consists of proper storage of the tool string, lowering the machine to the ground, and inspection of the machine and travel route prior to propelling.

To prepare the drill to move, proceed as follows:

1. Upon completion of the current hole, hoist the tool string from the hole. If using multiple pipe sections, remove and store all pipe necessary to remove the entire tool string from the hole. Turn off the dust control system and raise the dust curtains.

2. Clamp the stabilizer with the tool wrench to prevent movement of the tool string during propel.


---TYPICAL PROPEL CONDITIONS---
ALLOWABLE STEERING SLOPE FOR 59HR S/N 141341
-- WHILE STEERING ON THE SLOPE --
Before propelling read operators manual
The values shown are tilt limits as indicated on the
Leveling/Propel Panelview screen.
MANEUVERING ANY DIRECTION
MAST-UP
HEAD-UP
7.0°
1-65' PIPE RACKED
1-65' PIPE IN HEAD
W/O CABLE ON REEL
MAST-UP
HEAD-DOWN
9.4°
2-65' PIPES RACKED
W/O CABLE ON REEL
MAST-DOWN 9.1° LISTING
HEAD-DOWN 21.3° TIPPING
2-65' PIPES RACKED
WITH CABLE ON REEL
C119908-01 Page 1 Rev. 0

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