



Technical Manual

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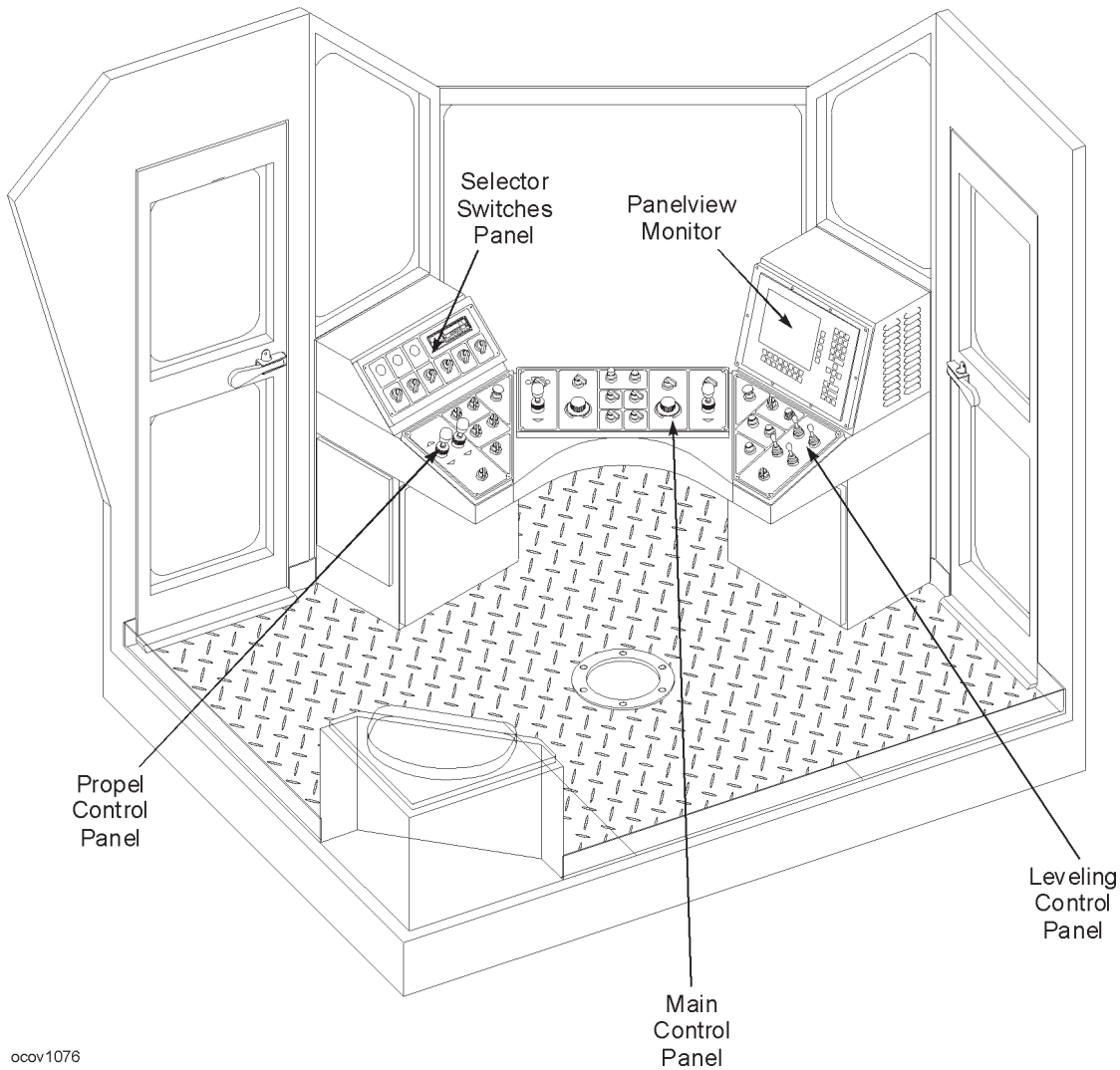


FIRE PREVENTION

- Always have a charged fire extinguisher on hand and know how to use it. Inspect and service the extinguisher as indicated on its instruction plate.
- DO NOT smoke while handling flammables or when near batteries.
- Inspect all lines, tubes, and hoses carefully. Tighten all connections to their recommended torque specification. See Section 4 ~ *PREVENTIVE MAINTENANCE* for the scheduled maintenance recommendations.
- Repair or replace loose or damaged lines, tubes, and hoses as soon as possible.
- Make certain that all clamps, guards, and shields are replaced correctly so as to prevent vibration and the chafing of parts during operation.
- DO NOT carry flammable fluids such as gasoline or solvents on board the machine.
- DO NOT over-bend or strike pressurized lines or hoses. DO NOT install bent or damaged lines, tubes, or hoses. Replace them immediately.
- DO NOT start the machine or move any of the controls if a warning tag is attached to the controls or the start panel.
- Keep all cleaning rags properly stored. DO NOT discard them into a pile on board.
- Keep all structural frame compartments, walkways, and work areas clean and free of lubricant residue.
- NEVER weld, burn, or perform service on the machine alone.

OPERATOR'S CAB

The sound insulated operator's cab of the 49RIII provides a sealed, comfortable enclosure from which the operator can perform the tasks involved with the operation of the machine. The location and design of this compartment have been structured to provide the optimum viewing angles with immediate accessibility. The swivel mounted chair provides easy access to all required controls. The cab is provided with two doorways to the main deck.

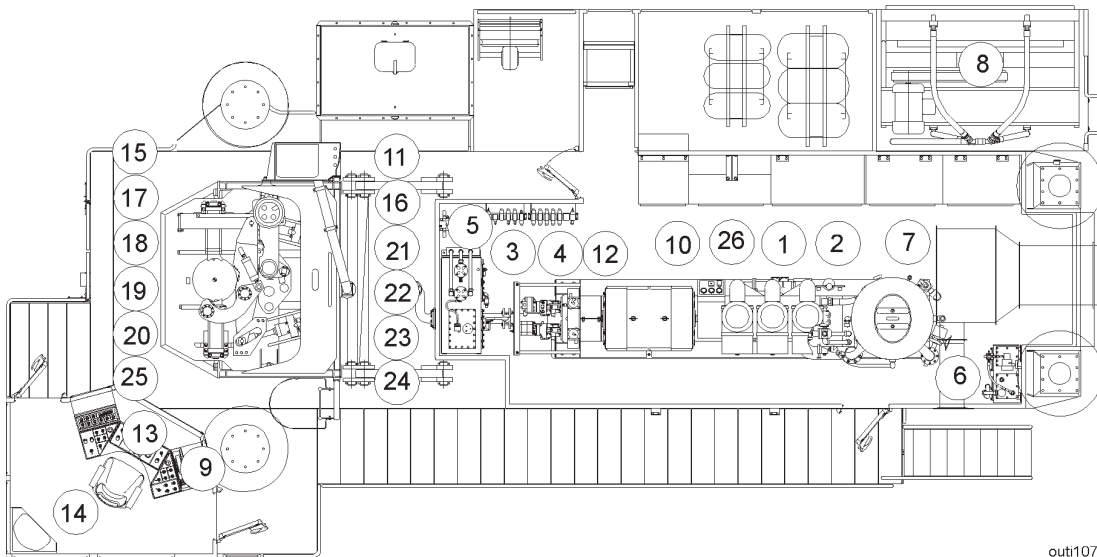


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Operator's Cab

ONBOARD INSPECTION

1. Inspect the air compressor lubrication lines for leaks. Correct any leaks found immediately.
2. Check the condition of the air compressor intake filter. Replace the filter cartridge if the red flag is visible in the service indicator. Empty the dust hopper and clean the pre-cleaner element. Inspect the housing and ductwork for damage or leaks. Repair or replace leaking components.
3. Check the oil level in the hydraulic tank. Fill the tank to the proper level as described on the instruction plate on the tank.
4. Check hydraulic system for leaks. Correct all leaks immediately and clean up all oil spills immediately.
5. If the machine is equipped with a bit lubricator for the main air system, check that the lubricator is full.
6. Inspect the automatic lubrication central pumping station for proper operation. Check the supply of lubricant and refill as necessary.
7. Close and lock all electrical cabinet doors.



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CAUTION: Assume all parts inside of the electrical cabinets are energized. All electrical components should be serviced by qualified electrical personnel only.

8. Inspect the compressor radiator and fan. Check for signs of deterioration or damage to hoses, valves, fittings, etc. Check for leaks at all joints. Check the radiator core for blockage by dust, dirt, leaves, paper, etc. and clean as necessary.
9. Check the operator's display terminal for any faults.



PROPEL SPEED SELECTOR SWITCH

This two-position switch is used to set the propel speed. In the SLOW position, the propel is in the low speed range (about 30% of maximum). This position is used when maneuvering in tight spots and in drilling patterns. NORMAL position is used when moving from one site to another.

COMPRESSOR STOP PUSH-BUTTON

This push-button is used to shutdown the compressor motor. The compressor will have to be restarted from the machinery house.

COMPRESSOR VENT/DRILL SWITCH

This switch 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 four-position switches.

One switch selects the mode being used and has the following positions: OFF, FAN, HEAT, and COOL.

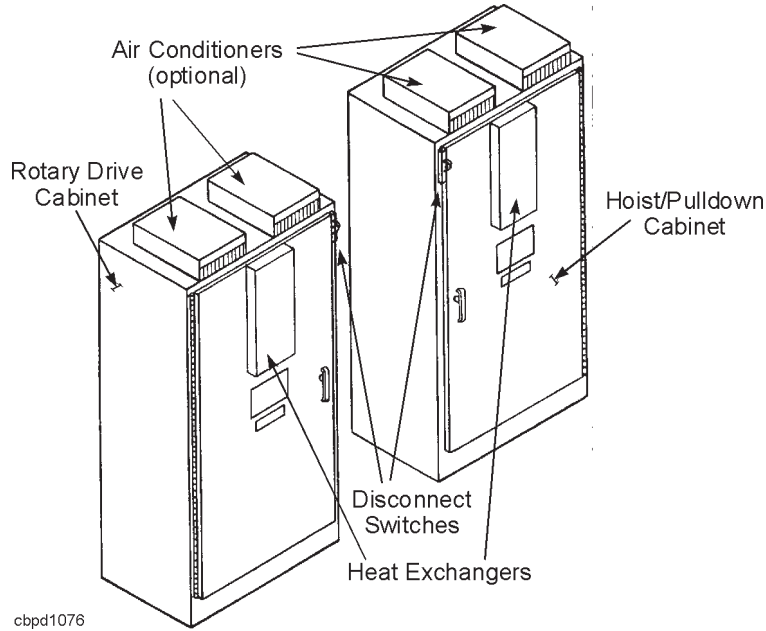
The other switch controls fan speed for vented air and circulated air. The four positions are: VENT HIGH, VENT LOW, CIRCULATE HIGH, and CIRCULATE LOW.

OPERATING MODE SELECTOR SWITCH

The Operating mode selector switch 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.

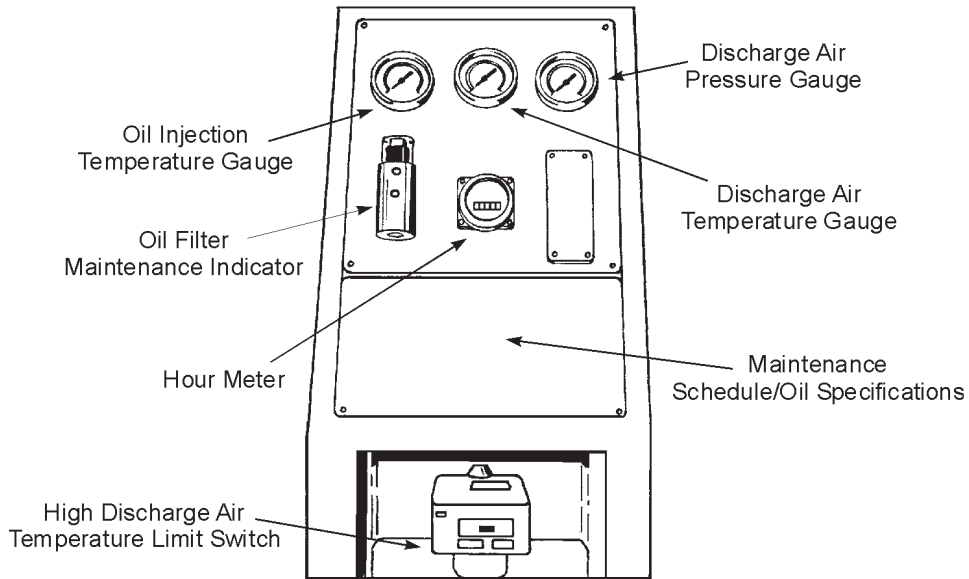


Controls on the Hoist/Pulldown and Rotary Drive Control cabinets are shown in the figure below.



Hoist/Pulldown and Rotary Drive Control CABINETS

The controls, monitors and indicators located on or near a screw type air compressor are shown in the figure below.



Air Compressor Controls

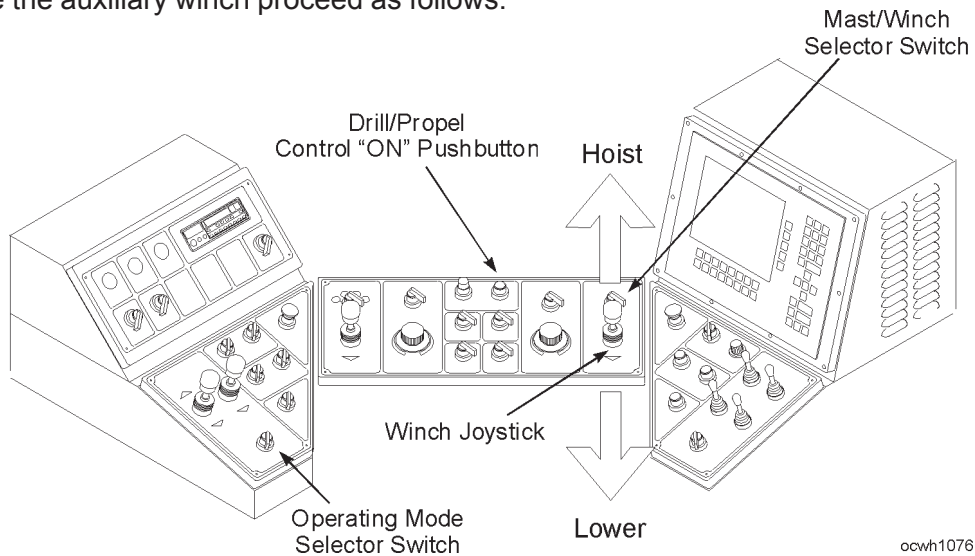
3. Press the drill/propel control ON push-button. "Pulldown" readout will show on the operator's display terminal operator's display screen.
4. Turn the hoist brake switch to the RELEASE position. "Head Brake Released" will appear on operator's display terminal operator's display screen.
5. Rotate the hoist/pulldown rheostat in the hoist direction to hoist the rotary/pulldown unit. The farther the rheostat is turned to the right the faster the unit will be raised.
6. Rotate the pulldown force rheostat in the pulldown direction to lower the rotary/pulldown unit. The farther the rheostat is turned to the left the faster the unit will be lowered.
7. When the hoist/pulldown operations are complete, set the hoist/pulldown speed rheostat to the "0" position and then turn the hoist brake switch to the SET position.



CAUTION: Whenever the hoist/pulldown speed rheostat is in the "0" position, the hoist brake switch must be in the SET position. This will prevent the rotary/pulldown unit from creeping downward due to the weight of the unit.

AUXILIARY WINCH OPERATION

To operate the auxiliary winch proceed as follows:



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Controls for Operating the Winch

1. Place the winch/mast control selector switch in the WINCH position.
2. Place the operating mode selector switch in the DRILL position. The main air compressor must be energized.



NOTE: Verify that the upper gate on the pipe rack is open before retracting the pipe rack. Retracting the pipe rack with the gate closed will cause damage to the pipe rack.

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. Press the drill/propel control OFF push-button.

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. To install the bit, proceed as follows:

1. Hoist the completed drill pipe/stabilizer assembly 2 to 3 Ft. (0.6 to 0.9 m) off the drill deck. Place the bit basket (furnished with machine) into the hole left by the guide bushing in the drill deck. Remove all personnel from the drilling deck and the immediate area. Turn on the main air stream to blow any contaminants from the drill pipe and stabilizer.
2. Place the bit into the bit basket. Coat the threads and shoulders of the bit and stabilizer with drill pipe thread compound.
3. Turn the rotary rheostat clockwise until the tool string begins to turn at approximately 5 RPM as shown on operator's display terminal operator's display screen. Release the hoist brake and slowly lower the rotary/pulldown unit and tool string onto the bit. Lower the drive unit in small increments until the threads catch and the stabilizer starts to thread itself onto the bit. As soon as the threads start to catch, set the hoist brake and let the stabilizer screw itself onto the bit.
4. When the joint is tight the rotary unit will slow down and the rotary load meter will show an increased load. At this point return the rotary rheostat to the neutral position.



motor is accomplished by reducing the pulldown force on the bit. In some cases it may even be necessary to hoist the tool string slightly to reduce the loading.

Monitoring the air pressure bar graph will indicate the condition of the hole. If penetration is too fast and the bailing air cannot remove the cuttings as fast as they are generated, the hole will plug and the air pressure will rise. Varying the penetration rate will vary the air pressure. Keep the air pressure in the normal working range (45 PSI for machines with water injection and 50 PSI for machines with dry-type dust control) by increasing or reducing the penetration rate. Keep the vibration levels to a minimum by varying the rotary speed and the pulldown force.

6. When the bit passes through the fragmented material (approximately 3-5 Ft. [0.9-1.5 m]) and into the consolidated material underneath, the vibration and rotary current will reduce drastically. When this occurs, the hole has been collared and normal drilling may commence.

NORMAL DRILLING

After the bit has passed through the unconsolidated material at the top of the hole, it is no longer necessary to reduce the load on the bit to reduce vibration and rotary motor loading. More rapid penetration and increased pulldown force may now be used to complete the hole as fast as possible with minimum vibration. This is the normal drilling condition for the machine.

Normal drilling follows the same guidelines as collaring the hole. Penetration is increased to the maximum determined by the rotary motor load, the vibration of the tool string, and the air pressure. By keeping the penetration at or slightly below the optimum, the hole can be completed in the shortest possible time.

To begin normal drilling proceed as follows:

1. Normal drilling requires added pressure to the bit in addition to the deadweight of the tool string and rotary/pulldown unit. This pressure is furnished with the electric motor and pulldown gearcase. To activate the pulldown motor, turn the hoist/pulldown rheostat in the pulldown direction as required for maximum drill rate and pulldown force. Turning the control in the pulldown direction will increase the pressure on the bit by calling for a desired pulldown speed.

Apply enough pulldown force to allow the bit inserts to chip the material being drilled, rather than pulverizing it. If the pulldown force is not sufficient enough, the bit will ride over the top of the material being drilled and will not create chips. This condition can be observed by monitoring the cuttings. If the cuttings are finely pulverized material, the pulldown force is not enough. Another cause of poor cutting is a worn bit. If pulldown force is high, but the cuttings are fine and penetration is slow, change the bit.

2. Monitor the rotary motor load (current) and adjust the pulldown force to keep the bar graph in the lower (green) portion of the graph. It is permissible for the load to increase momentarily into the yellow, but continuous running in the yellow or red portions will cause rotary motor damage.

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