

Driving the Grader



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Operator's Cab Entry and Exit

- Use the handholds and steps provided with at least three points of support. Use two hands and one foot or two feet and one hand.
- Do not climb the steps or operate the grader with wet or greasy hands, muddy shoes or boots.
- Keep the steps, operator's platform, seat, pedals and controls clean and clear of debris, mud, ice, grease, tools and other objects.



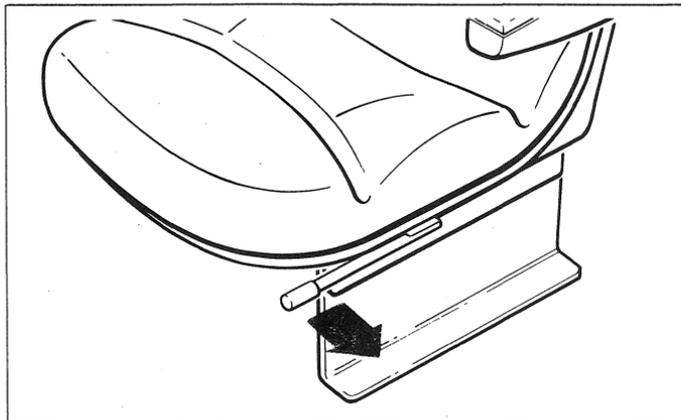
Seat Adjustments

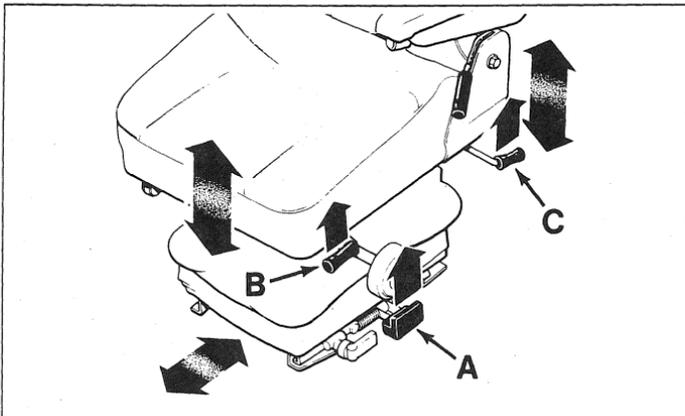
Adjust the seat before starting the grader. Ensure the hand brake is applied.

Standard Seat

The standard seat incorporates two adjustments.

- To move the seat forward or back, pull on the lever located on the lower left-hand side of the seat.
- Ensure that it latches securely.

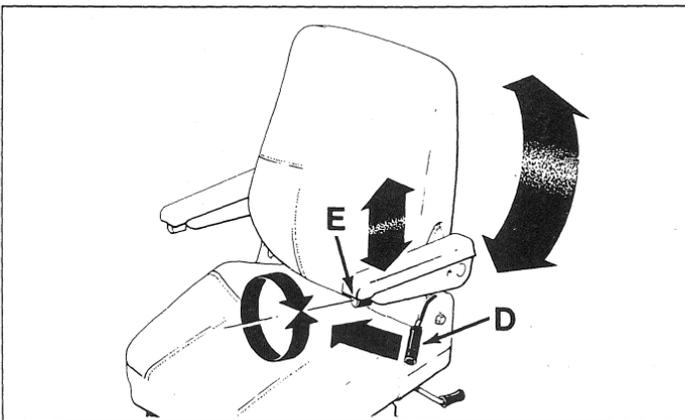




Suspension Seat

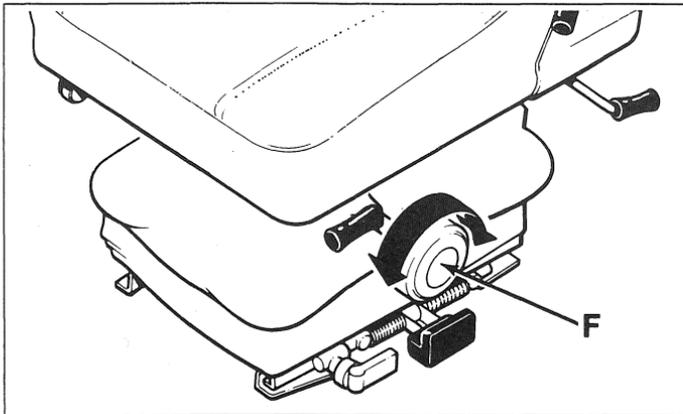
The optional suspension seat has six adjustments. All adjustment levers are on the left side.

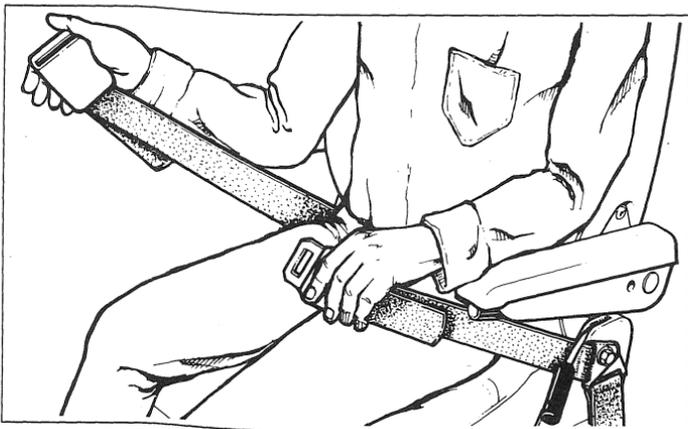
- To move the seat forward or backward, pull on the lever mounted on the seat track (A).
 - Ensure that it latches securely.
 - To raise or lower the front of the seat, pull up on lever (B) located near the front left corner of the seat cushion.
 - To raise or lower the rear of the seat, pull up on the lever (C) located near the rear left corner of the seat cushion.
 - Use levers (B and C) to adjust the seat height.
 - Ensure the seat latches securely.
-
- To change the angle of the seat back, pull up on lever (D) located near the lower left corner of the seat back.
 - To adjust the height of either arm rest, lift the arm and rotate the knurled knob (E).



Suspension Seat continued

- To adjust the suspension for your weight, rotate the outer ring of the numbered dial (F) until the portion of the dial corresponding to your weight shows in the orange window.

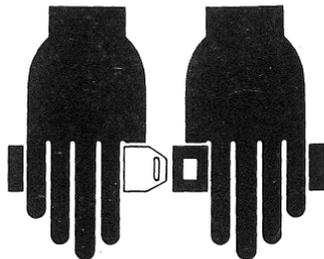




Seat Belt

- Pull both ends of the seat belt away from the seat.
- Ensure that the belt is fully extended and not tangled or caught in the seat.
- Fasten the clasp.
- Pull the belt to fit snug and low around your hips.
- The holding strap must be free of slack.

WARNING

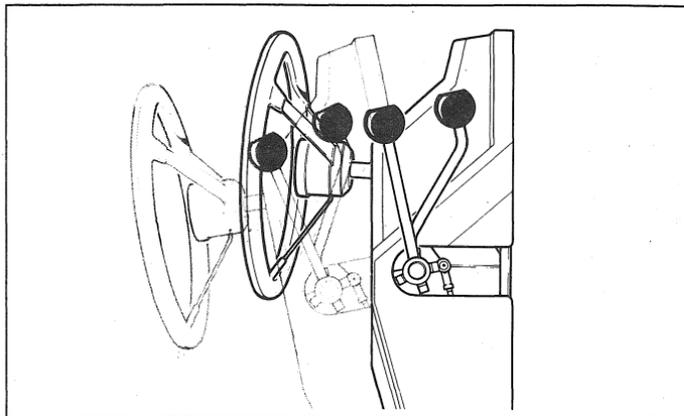


**Wear seat belt when
operating the grader.**

Pedestal

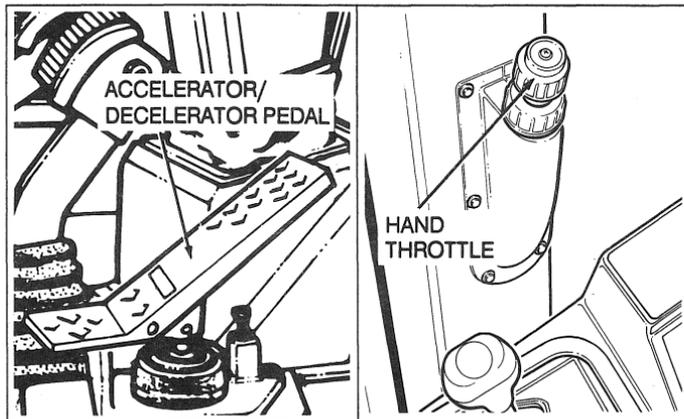
The Champion control pedestal allows fast, simple adjustment of the steering wheel and levers.

- To change the pedestal position, grasp the steering wheel.
- Turn the center knob counter-clockwise. This releases the locking mechanism.
- Move the pedestal to the desired position.
- Turn the center knob clockwise. This locks the pedestal.



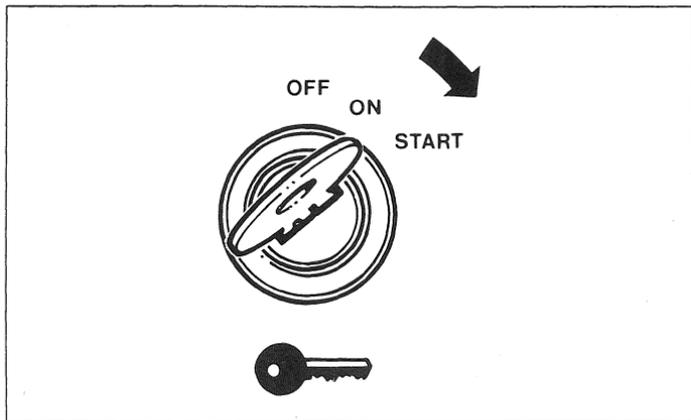
Accelerator/Decelerator Pedal

- Depress the pedal toe to increase rpm.
- Release the pedal to decrease engine rpm.
- Use the pedal to override the hand throttle setting.
- Depress the heel of the pedal to decrease engine rpm when the hand throttle is set.
- When you remove your foot from the pedal, the engine speed will return to the preset hand throttle position. Refer to section - **Operating the Controls - Hand Throttle** page 9-11.



Engine Start and Shut Down

- Prior to starting the grader, check the grader for 'DO NOT OPERATE' or similar warning tags. Turn the battery isolation switch(es) to the ON position.
- Start and operate the grader only from the operator's seat.
- Know how to shut the engine down before attempting to start it.
- Check the transmission mode lever to ensure it is in NEUTRAL before starting the engine.
- Ensure the hand brake is applied.
- Sound the horn before starting the engine.
- Do not operate the engine in an enclosed area without adequate ventilation.

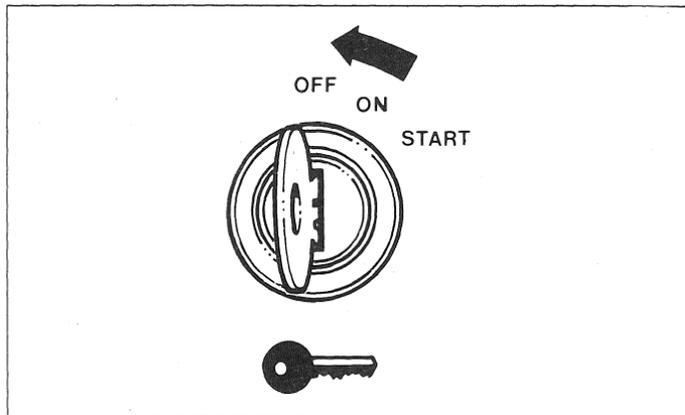


Starting the Grader

- Insert the ignition key in the switch.
- Rotate the key clockwise to the START position.
- Do not crank engine for more than 30 seconds.
- Release the key and wait two minutes before trying again.
- Release key when engine starts.

Engine Shut Down

Turn the ignition key counterclockwise to the OFF position to shut down the engine. Refer to the section - **Pre-Start Checks - Shut Down Position** page 7-5.

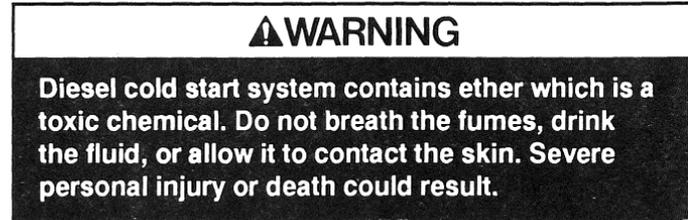
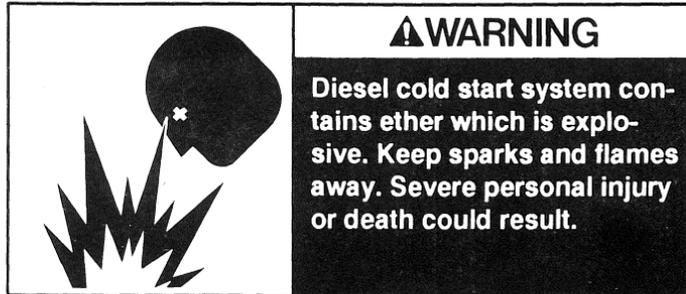


Cold Weather Start Up Procedure

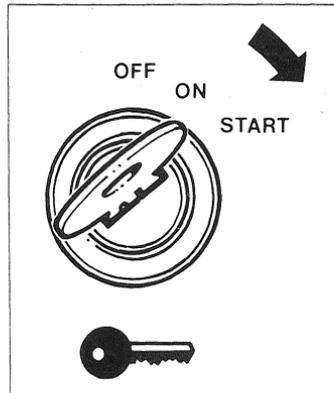
If oil in the hydraulic circuit is cold, hydraulic functions may move slowly. Do not attempt grader operations until the hydraulic oil is warmed up. If you do not follow the proper warm up procedure, hydraulic pump damage may result.

- Run the engine at approximately 1000 rpm for five minutes. Do not put load on the hydraulic system.
- Cycle all hydraulic cylinders through their working range several times until the hydraulic functions operate normally.
- The grader is now ready to operate under load.

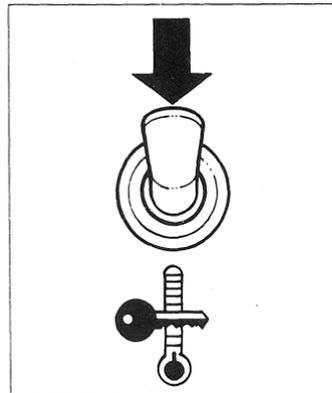
Cold Start



- If swallowed, breathed or contact with skin or eyes seek medical attention immediately.



Ignition Switch



Cold Start Switch

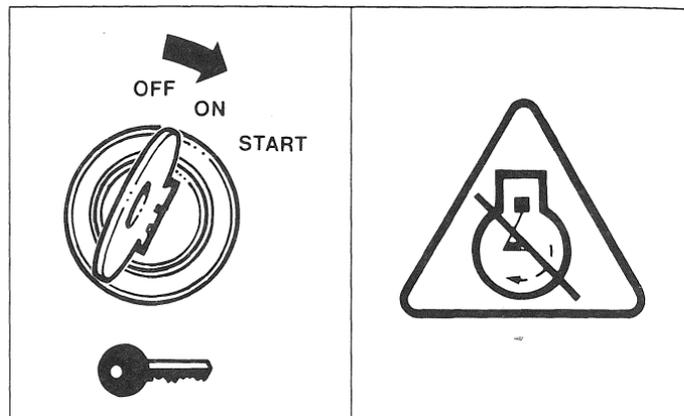
Your grader may be equipped with a Cold Start kit to make starting easier in cold weather.

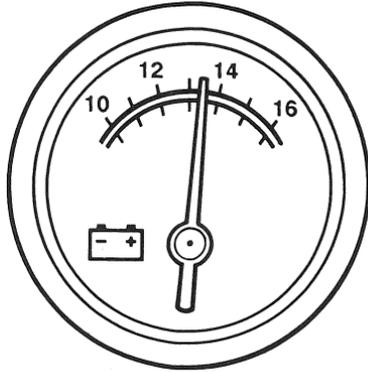
- To use Cold Start, turn the ignition switch to the START position and depress the Cold Start switch for two seconds.
- Do not crank engine more than 30 seconds.
- Release the key and wait two minutes before trying again.
- Release key when engine starts.

Engine Warning System

This combination warning light and alarm is activated by either high coolant temperature or low engine oil pressure or both.

- Before starting the engine, turn the ignition switch to the ON position. The warning light and alarm should energize.
- Start the engine. The warning light and alarm should de-energize within ten seconds. If they do not de-energize, shut down the engine. Report the problem and have it repaired by a qualified service technician.
- If the warning light and alarm energizes while operating the grader, stop the grader as quickly as possible.
- With the engine still running, check the engine coolant temperature and oil pressure gauges and note the readings.
- Place the grader in the Shut Down Position by doing the following. Park the grader on a level surface. Place the transmission in NEUTRAL and apply the hand brake. Lower the moldboard and all attachments to the ground. Do not apply down-pressure. Shut down the engine. Remove and retain the ignition key. Turn the battery isolation switch(es) to the OFF position.
- Fasten a 'DO NOT OPERATE' or similar warning tag on the steering wheel.
- Report the problem and have it repaired by a qualified service technician.



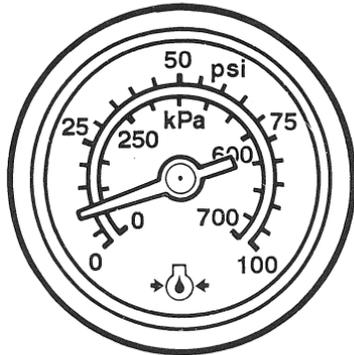


Gauges

Check the engine oil pressure gauge and voltmeter immediately after starting the engine. Check the gauges often during operation. Refer to the Engine Manual.

Voltmeter

The voltmeter should show 13 to 14 volts with the engine running. Any other readings indicate an electrical problem. Report the problem and have it repaired by a qualified service technician.

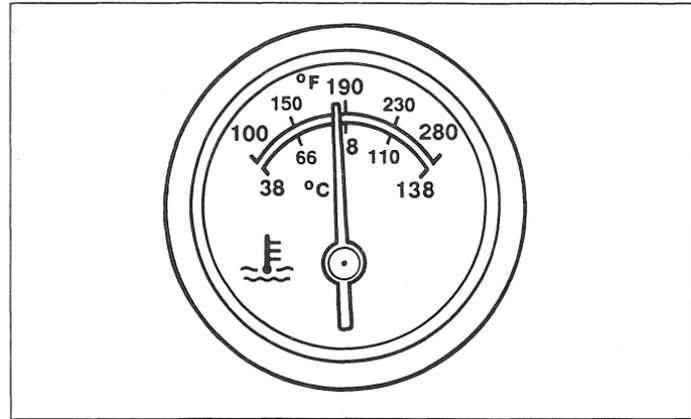


Engine Oil Pressure Gauge

- This gauge should show 10 psi (69 kPa) with the engine idling.
- If the engine oil pressure does not reach this figure within fifteen seconds, shut down the engine.
- Do not operate the grader.
- Report the malfunction to a qualified service technician.
- If the oil pressure is significantly higher, allow the engine to reach full operating temperature and recheck the oil pressure gauge.

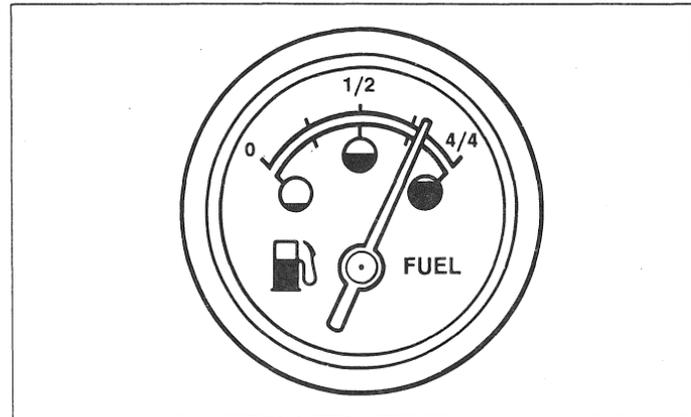
Engine Temperature Gauge

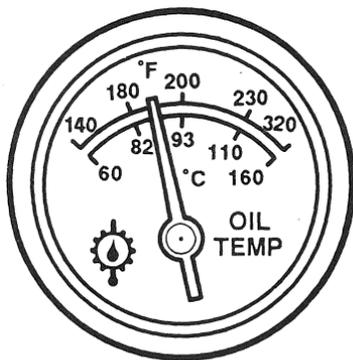
This gauge monitors the temperature of the engine cooling system. The gauge should show between 160°F to 212°F (71°C to 100°C). A constant lower or higher reading indicates an engine cooling problem. Report the problem and have it repaired by a qualified service technician.



Fuel Level Gauge

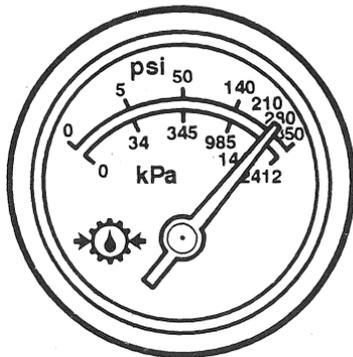
This gauge monitors the amount of fuel in the fuel tank. The gauge shows 1/4 increments. Check your fuel supply when the grader is on level ground. At the end of each working shift, it is recommended the fuel tank be filled. This reduces the chance of condensation forming in the fuel tank. Do not fill the fuel tank to capacity. Leave room for fuel expansion.





Transmission Temperature Gauge (Optional)

This gauge monitors the temperature of the transmission hydraulic oil. The gauge should show between 170°F to 225°F (77°C to 107°C). A constant lower or higher reading indicates a cooling problem. Report the problem and have it repaired by a qualified service technician.

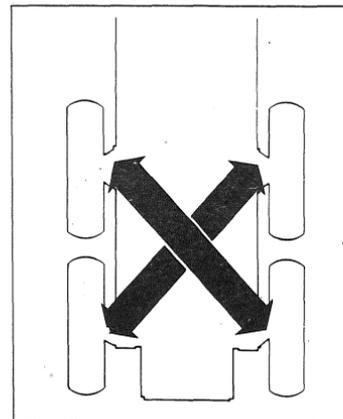
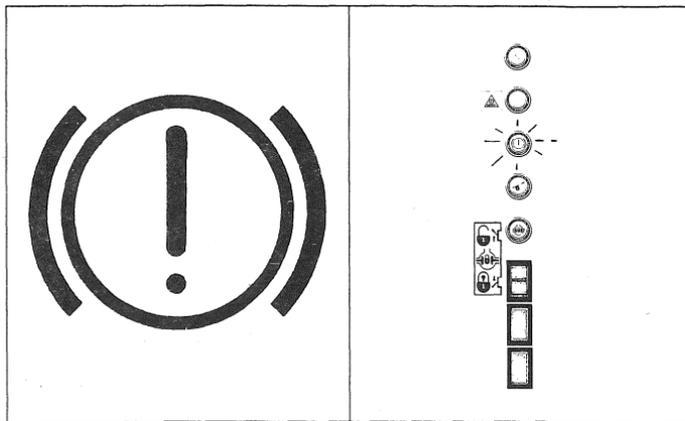


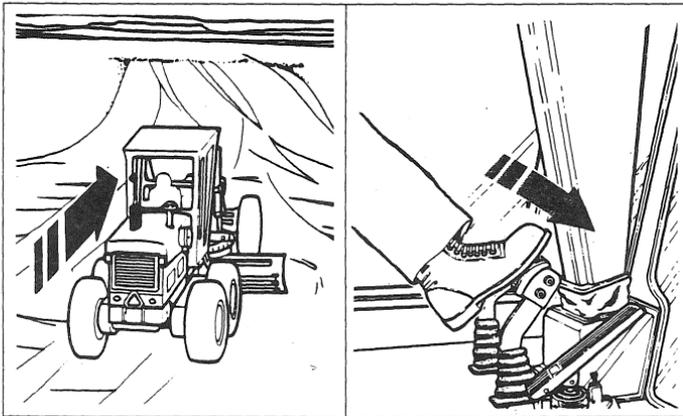
Transmission Oil Pressure Gauge (Optional)

- This gauge should show 210 psi (1447 kPa) to 235psi (1622 kPa) at maximum engine rpm.
- If the transmission oil pressure does not reach or exceed this range, shut down the engine.
- Do not operate the grader.
- Report the malfunction to a qualified service technician and have it repaired.

Service Brakes

- Push down on the brake pedal to apply the service brakes.
- The brake warning light is mounted on the right-hand door post. If the brake warning light and alarm energize during grader operation, the brake system is faulty and must be repaired by a qualified service technician. Do not drive the grader.
- A supplementary power source automatically supplies hydraulic power assist in the event of an engine failure or any situation where hydraulic oil flow is interrupted to the service brake system.
- This reserve system provides power assisted braking capability at a reduced level and automatically resets when hydraulic oil flow is restored.
- The service brake system has two brake circuits. The system provides reduced braking capability in the event of a brake line rupture or other failure in one circuit.
- Each of the two circuits function on one front and opposite rear tandem wheel. Should one circuit fail, braking remains effective on all tandem wheels through the tandem chains.
- If the brake warning light and alarm energize, the brake system is faulty and must be repaired by a qualified service technician. Do not drive the grader.
- If the system is functioning on only one of the brake circuits, the brake warning light and alarm energize when the brake pedal is depressed.
- The brake warning light and alarm actuate when there is a loss of hydraulic oil flow.





⚠ WARNING

Unless you need braking action, do not depress brake pedal when ignition key is in OFF position. Service brakes electric motor pump will energize using battery power only. Subsequent loss of braking effectiveness could result in personal injury or death. Apply hand brake before shutting down engine.

Brake Function Check

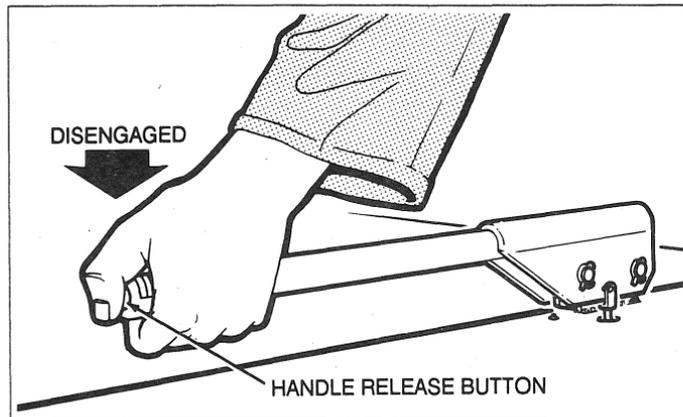
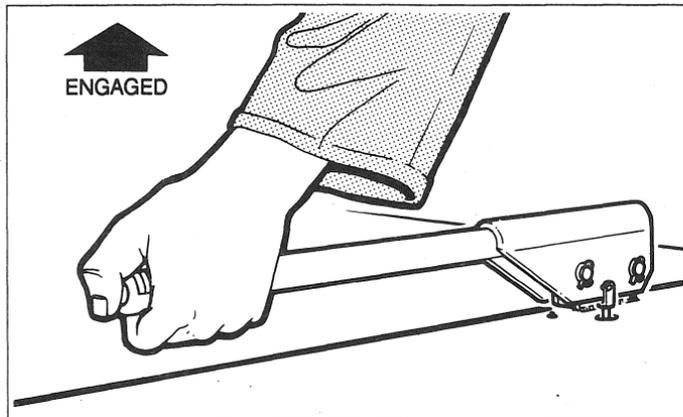
- Perform this brake function check once every week.
- Check the hand brake operation. Refer to the section **Pre-Start Checks - Hand Brake** page 7-16.
- Make a visual check around the machine. Ensure all personnel are clearly away from the area. Signal your intention to start the engine. Start the engine when it is safe to do so.
- Back the grader up a slight incline where it is safe to allow the machine to roll forward without power.
- Stop the grader, place the transmission in NEUTRAL and apply the hand brake (this should require approximately 60 lb [27 kg] of effort). Shut down the engine and keep the ignition key in the OFF position.
- Release the hand brake when it is safe to do so. Allow the grader to roll ahead at about 2 to 3 mph (3 to 5 km/h). Apply the service brakes. The grader must stop abruptly.
- If the grader does not stop, use the hand brake to stop the machine. Immediately have the brake system repaired by a qualified service technician.

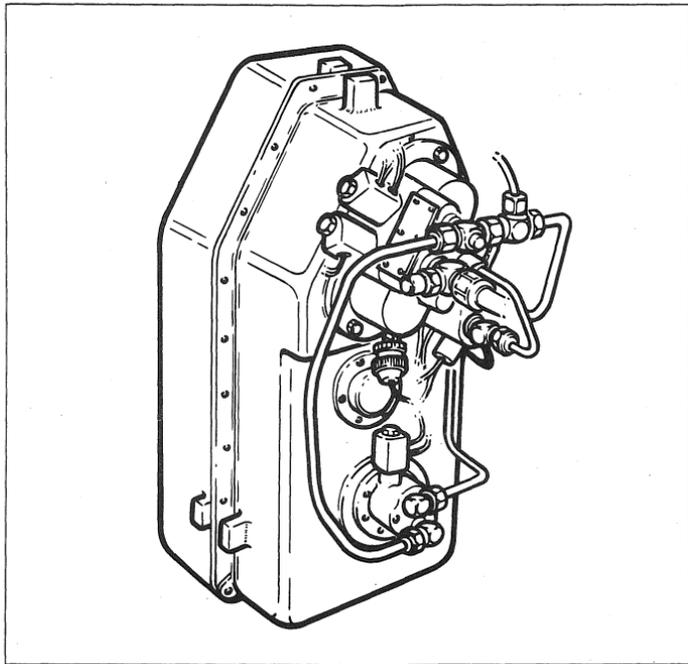
Hand Brake Operation

- Always apply the hand brake when parking the grader.
- Pull the hand brake lever up to apply the hand brake (this should require approximately 60 lb [27 kg] of effort).
- Apply the hand brake only when the grader is stopped and the transmission is in the NEUTRAL mode.
- Release the hand brake before moving the grader.
- The hand brake warning light and alarm will energize when the hand brake is engaged and the transmission FORWARD or REVERSE mode is selected.
- Select NEUTRAL or disengage the hand brake to de-energize the warning light and alarm.
- The hand brake can also be applied to stop the grader in an emergency. After using the handbrake for an emergency stop, it must be inspected and adjusted by qualified service personnel. Refer to the Section - **Pre-Start Checks - Hand Brake** page 7-16.
- To release the hand brake, press the handle release button and push the handle down.

⚠ WARNING

Hand brake may not provide same braking capability after use for an emergency stop. Severe personal injury, death or machine damage could result. Have hand brake caliper assembly inspected and adjusted by qualified service personnel before moving grader.





Transmission

- Champion motor graders are equipped with Gearco model 8400 transmissions.
- The transmission is a direct drive, full powershift transmission with eight forward and four reverse gears.
- An electric shift control and a full engine master clutch disconnect the engine from the drivetrain. In the event of engine stalling, stop the grader.
- Leaving the transmission in gear will not hold grader. Place transmission in NEUTRAL and apply hand brake.

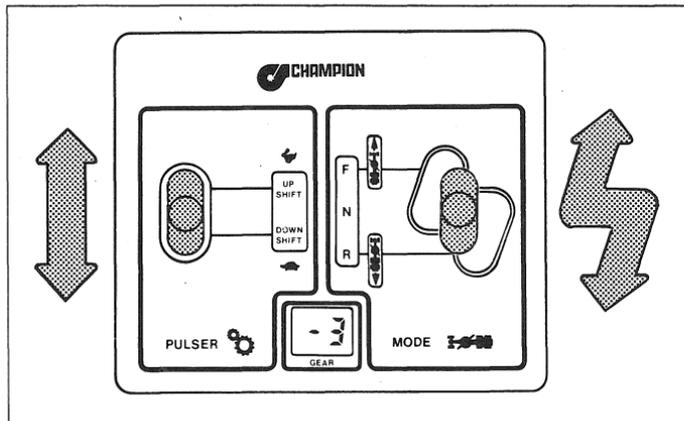
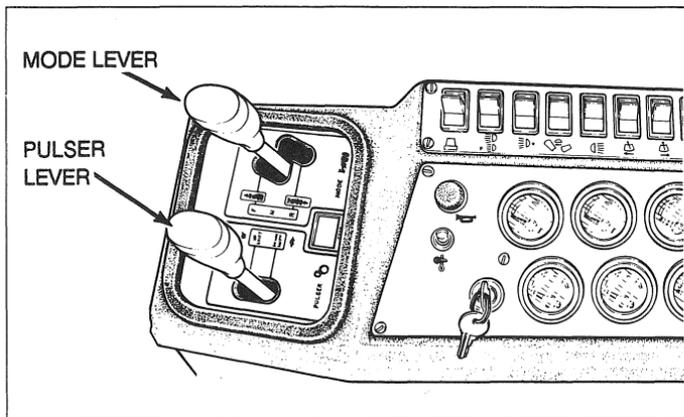
⚠ WARNING

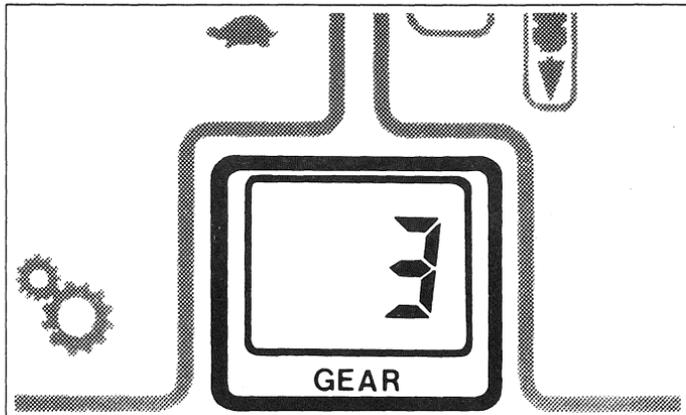
Do not coast downhill. Excess speed could cause serious transmission damage and loss of control of grader. Severe personal injury or death could occur.

- Always select a gear that will prevent excessive speed when going downhill.

Controller

- The transmission controller is mounted in the console on the operator's right-hand side. It has two red handled levers.
- The Pulser lever controls gear changes.
- The Mode lever controls the direction of travel.
- The controller also incorporates a digital display to show you which gear the transmission is in. Move the pulser lever straight forward to change to a higher gear or straight back to change to a lower gear. It returns to the center position when you release it.
- The mode or direction lever has three positions, FORWARD, NEUTRAL and REVERSE. The mode lever will remain in any of the three positions until moved.





Display

- With the mode lever in the FORWARD position, the LCD (Liquid Crystal Display) shows the number of the forward gear; for example '3'.
- With the mode lever in the REVERSE position, the display shows a negative number; for example '-2'.
- The display also communicates other useful information in the form of simple, two digit codes.

CODE	MEANING
CH	'Champion'
6.0	Controller identification (example)
.8.8	Display test
1	Last gear memorized (example)
-1	Opposite gear (example)

Start Code Sequence

When you start the engine the display will show a series of codes called the start sequence.

Controller I.D. Codes

1.7 → First one

1.8

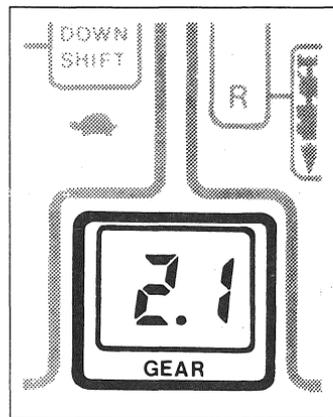
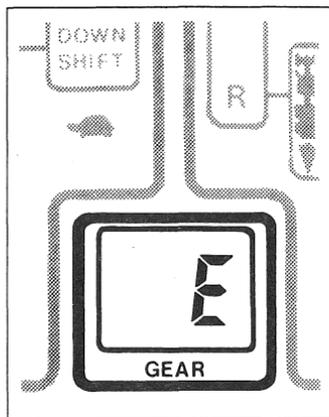
2.7

6.0 → Mach. s/w 21134 + up

Error Codes

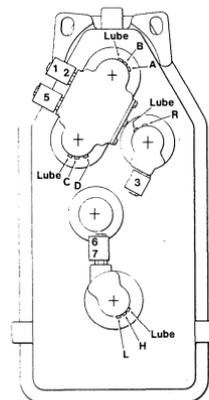
The controller continuously monitors the transmission electrical system. If a failure occurs:

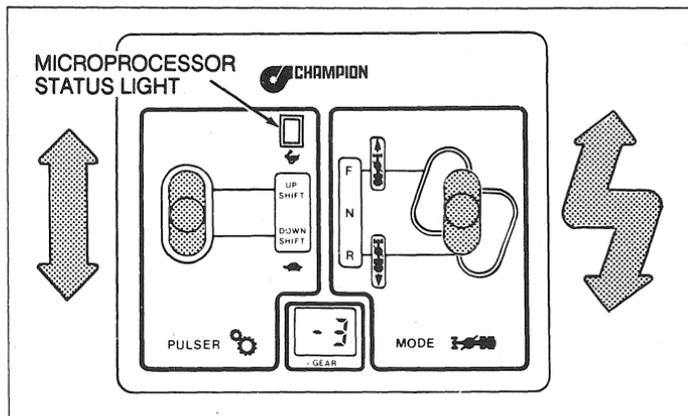
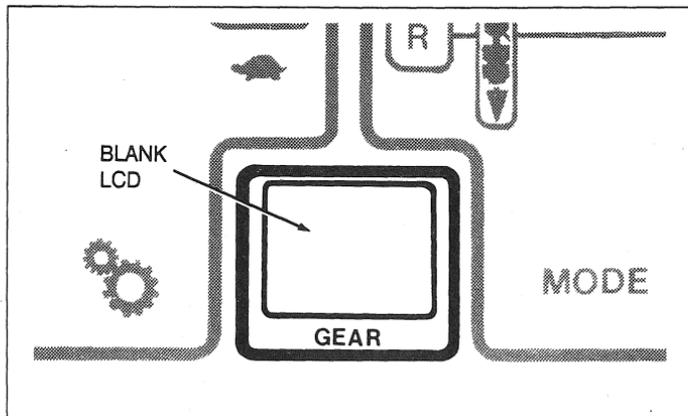
- The display shows the letter 'E' followed by a two-digit numeric code.
- The controller disables both levers and places the transmission in NEUTRAL.
- The display alternates between 'E' and the code until the operator returns the mode lever to the NEUTRAL position.
- Have the transmission electrical system repaired by a qualified service technician.



Code	Malfunction	Code	Malfunction
1.0	Electric power is below 9.5 vdc	3.1	Short circuit, solenoid 3
2.0	Open circuit, solenoid 2	3.3	Short circuit, solenoid 6
2.1	Open circuit, solenoid 3	3.4	Short circuit, solenoid 7
2.3	Open circuit, solenoid 6	3.5	Short circuit, solenoid 5
2.4	Open circuit, solenoid 7	3.6	Short circuit, solenoid 1
2.5	Open circuit, solenoid 5	4.0	Forward/Neutral input error
2.6	Open circuit, solenoid 1	4.1	Reverse/Neutral input error
2.7	No power to solenoid circuits	4.2	Neutral restart error
3.0	Short circuit, solenoid 2	4.4	Forward/Reverse input error

Solenoid Identification





'Limp-home'

An electronic fault within the controller will cause the transmission to shift to NEUTRAL. If this happens, while operating the grader, stop the grader as quickly as possible. The LCD (liquid crystal display) will also be blank. The 'Limp-home' feature provides 4th gear FORWARD or 1st gear REVERSE.

To activate 'Limp-home':

- Depress the clutch and brake pedals.
- Move the MODE lever to the NEUTRAL position.
- Then move it to either FORWARD or REVERSE position. The PULSER lever does not function with the 'Limp-home' feature activated.
- Slowly release the brake and clutch pedals. The grader is now in motion.

The 'Limp-home' feature can only be activated when there is an electronic fault in the controller's microprocessor.

Microprocessor Status Light

- A GREEN light indicates the controller's microprocessor is functioning properly.
- A RED light indicates an electronic fault in the controller's microprocessor. Have the controller repaired by a qualified technician.

Driving the Grader - Starting Out

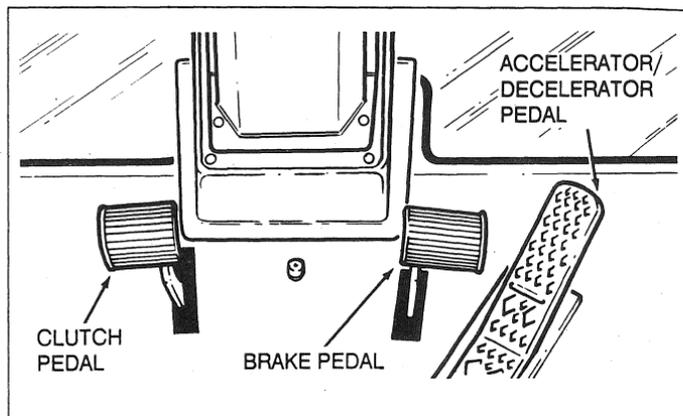
- Raise the moldboard and all attachments off the ground. Refer to the section - **Operating The Controls** page 9-1.
- Position the moldboard inside the tires; steer the front wheels to make sure they do not strike the moldboard.

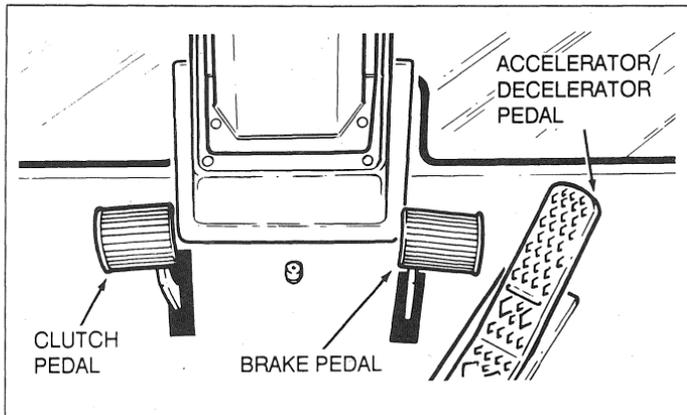
Clutch Pedal

Use the clutch pedal when you are starting from a complete stop or changing directions. Do not start to move the grader in any forward gear higher than 4th or any reverse gear higher than -2nd.

To put the grader in motion:

- Depress the clutch and brake pedals.
- Move the MODE lever into the FORWARD or REVERSE position.
- Select the starting gear using the PULSER lever.
- Release the hand brake.
- Slowly release the clutch and brake pedals.
- Depress the accelerator as required. The grader is now in motion.
- Do not rest your feet on the clutch or brake pedals when driving the grader. This can cause unnecessary wear.





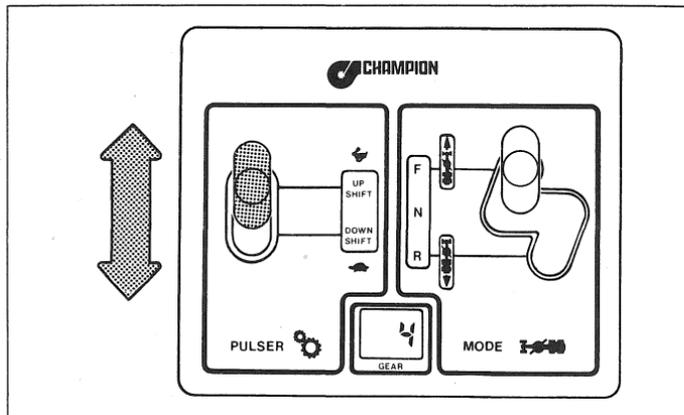
Stopping the Grader

- Reduce engine speed.
- With the transmission in the proper gear, slowly depress and hold down the clutch and brake pedals. Depressing the clutch pedal only, may not stop the grader. You must depress the brake pedal also to stop the grader.
- Stop the grader.
- Use brake pedal to hold grader when transmission is in gear and engine is running.
- Move the mode lever into the NEUTRAL position.
- Apply the hand brake.
- Release the clutch and brake pedals.
- Lower the moldboard and all attachments to the ground.
- Shut down the engine.

Changing Gears

You do not have to use the clutch pedal to change gears.

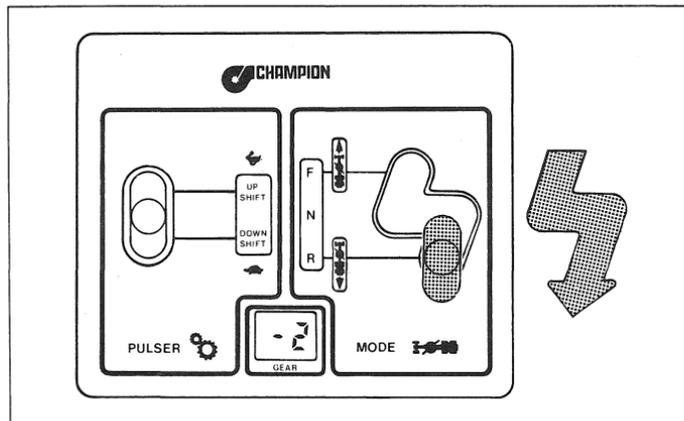
- To shift to a higher gear, push forward on the PULSER lever and release it.
- To shift to a lower gear, pull backward on the lever and release it.
- When not using the moldboard or attachments, lower the engine's rpm as you change gears.
- Do not shift to a lower gear at maximum engine rpm. Damage to the transmission could result.

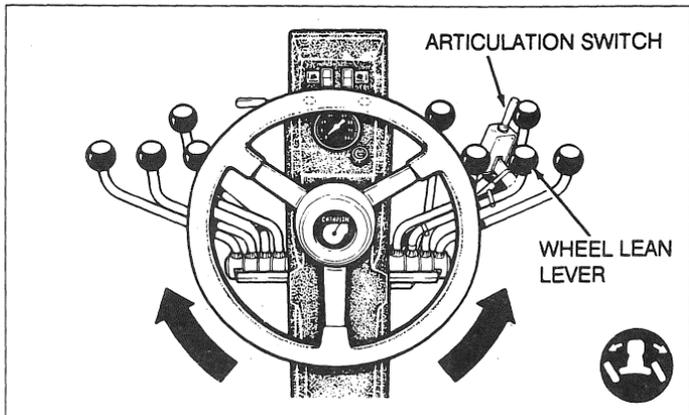


Changing Directions

Stop the grader to change directions.

1. Downshift to 4th FORWARD, -2nd REVERSE or lower.
2. Depress the clutch pedal and bring the grader to a complete stop using the service brakes.
3. Move the MODE lever to change direction.
4. Release the brake and clutch pedals.
5. The grader is now in motion.



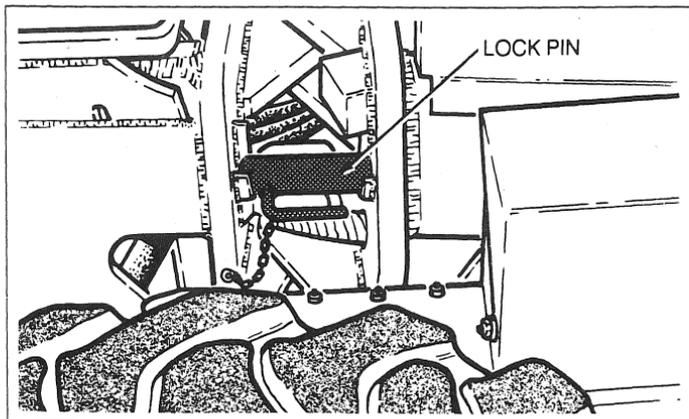


Steering

- Turn the steering wheel to steer the grader to the left or right.
- Use the front wheel lean lever to reduce the grader's turning circle. Do not use at high speeds. Reaction is quick.
- Use the articulation switch to further reduce the grader's turning circle. Ensure the articulation lock pins are removed before articulating, and install them when not using the articulation function. Do not use at high speeds. Reaction is quick.

⚠ WARNING

Power assist for steering only operates when engine is running. If engine stalls, stop the grader.



- If the engine stalls, the steering system will revert to 'manual' and requires more effort to turn the steering wheel. Stop the grader. Place transmission in NEUTRAL and apply hand brake. Start the engine, if possible. If the engine cannot be started refer to the section - **Safety Precautions - Stopping Precautions** page 4-10. Have the engine repaired.

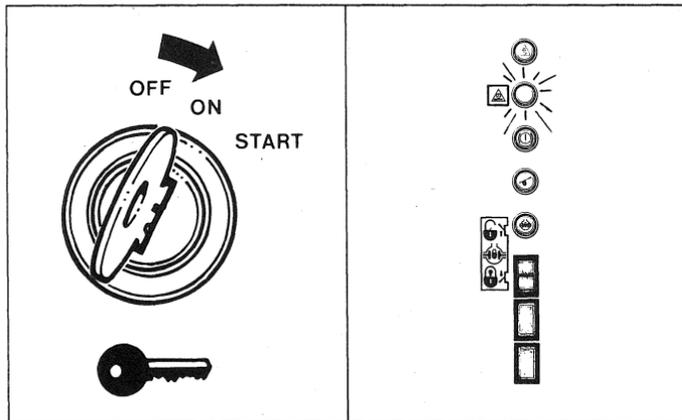
Supplemental Steering System

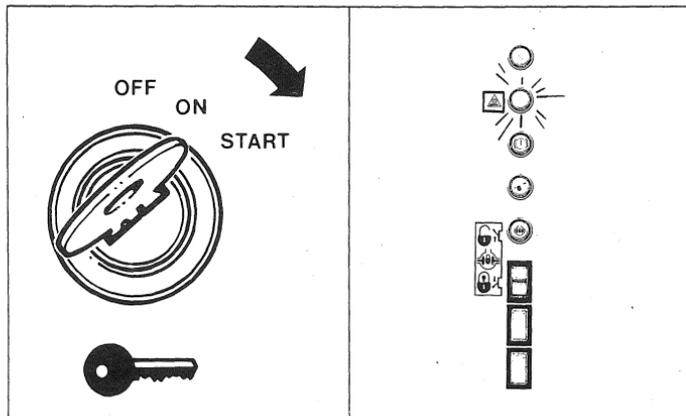
- This auxiliary hydraulic system allows the operator to make steering corrections more easily in the event of engine failure.
- Turn the ignition switch to the ON position to operate the system.
- Operate the system only long enough to make a steering correction.



Supplemental Steering System Check

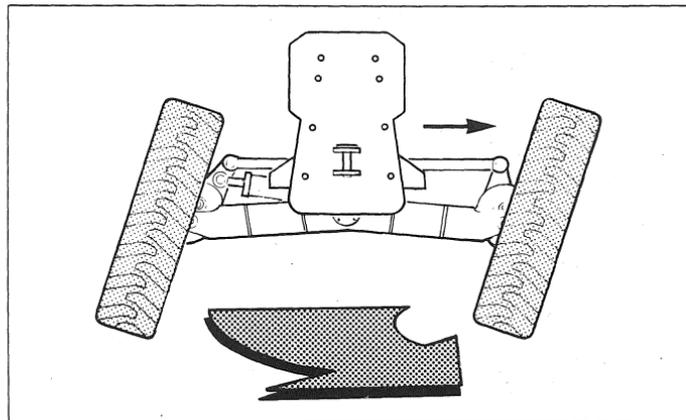
- Insert and turn the ignition key to the ON position.
- The supplemental steering warning light and alarm should energize.
- Check the system by turning the steering wheel. If it does not turn easily, there is a fault in the system. Have the system repaired by a qualified service technician.





Supplemental Steering System Check continued

- Leave the ignition key in the ON position only long enough to check the system.
- Start the engine. The warning light and alarm will de-energize, but the system is ready if the engine stalls.
- If the warning light and alarm stay on with the engine running, do not drive the grader. The system is faulty and must be repaired by a qualified service technician.



Front Wheel Lean

You can reduce the turning circle of your grader by using the front wheel lean lever. Lean the wheels in the direction you will turn. Position the front wheels vertically again after completing the turn. Refer to the section - **Operating the Controls - Front Wheel Lean** page 9-8, and the section **Operating Techniques** page 10-1.

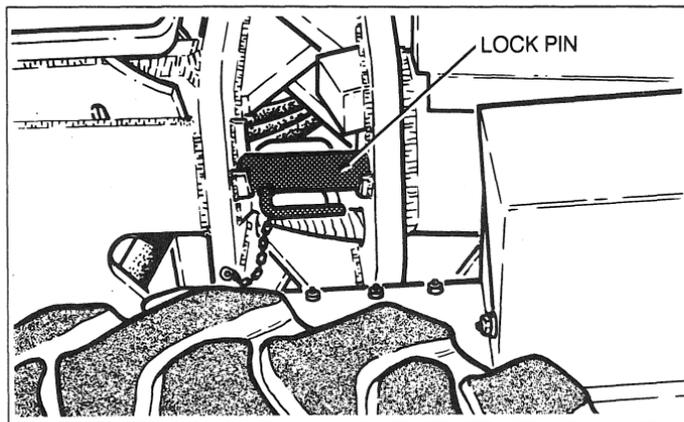
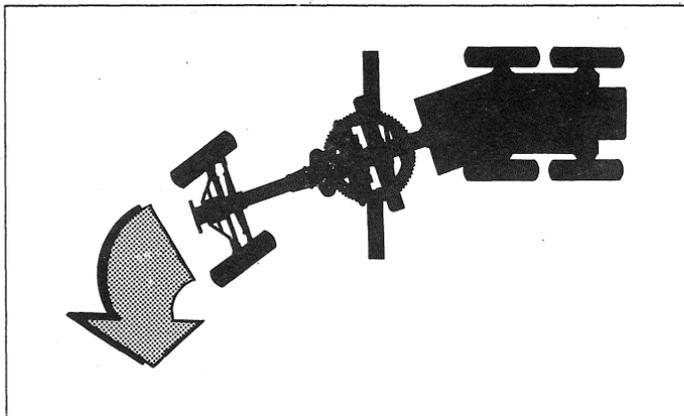
Articulation

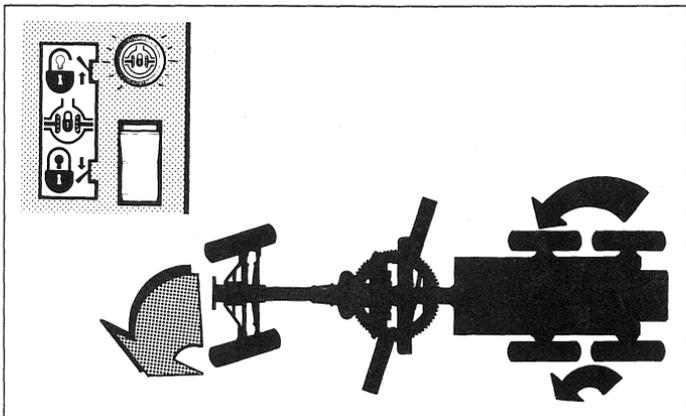
⚠ WARNING

Do not articulate the grader when operating on steep slopes. Grader could roll over. Severe personal injury or death could result.

If your grader has an articulated frame, you can reduce the turning circle. Before articulating, remove the locking pins. Reinstall them when not using the articulating function. Articulation can also be used to make some grading operations easier. Use the articulation switch to articulate the grader in the direction you will turn. Refer to the section - **Operating the Controls - Articulation Switch** page 9-10.

- Ensure the articulation lock pins are installed when roading the grader.





⚠ CAUTION

Do not lock the differential while the tandem wheels are spinning. Damage to the differential could result.

Final Drives

The lock/unlock differential control switch is mounted in the electrical panel on the right-hand door post.

- Put the control switch in the 'UNLOCK' position when differential action is required; for example, to reduce the turning radius of the grader. The warning light above the switch will energize.
- Put the control switch in the 'LOCK' position for normal grading operations. The warning light will de-energize. It is advisable only to use the lock mode when operating the grader on off-road situations.
- Unlock the differential on paved surfaces. This will avoid tire scuffing when steering the grader around corners.
- Lock or unlock the differential ONLY when the grader is stopped or driving in a straight line.

⚠ CAUTION

Do not lock or unlock the differential while making a turn. Damage to the differential could result.