

Product: EXCAVATOR

Model: 225 EXCAVATOR 61X

Configuration: 225 EXCAVATOR 61X00381-UP (MACHINE) POWERED BY 3208 ENGINE

## **Operation and Maintenance Manual 225 EXCAVATOR**

**Media Number -SEBU5813-01**

**Publication Date -01/03/1985**

**Date Updated -11/10/2001**

### **Foreword**

#### **SMCS - 7606**

This publication is a reference for the new operator and a refresher for the experienced one. Read - study - and keep it handy.

Illustrations guide the operator through the correct procedures of checking, starting, operating and stopping the machine and attachments.

Operating techniques outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and its capabilities.

Your safety and the safety of others depends upon care and judgment in the operation of this machine. A careful operator is good insurance against an accident.

Some photographs in this publication may show details or attachments that may be different from your machine. Also, guards and covers may have been removed for illustrative purposes.

Continuing improvement and advancement of product design may have caused changes to your machine which may not be included in this publication.

Whenever a question arises regarding your machine, or this publication, please consult your Caterpillar dealer for the latest available information.

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## Safety

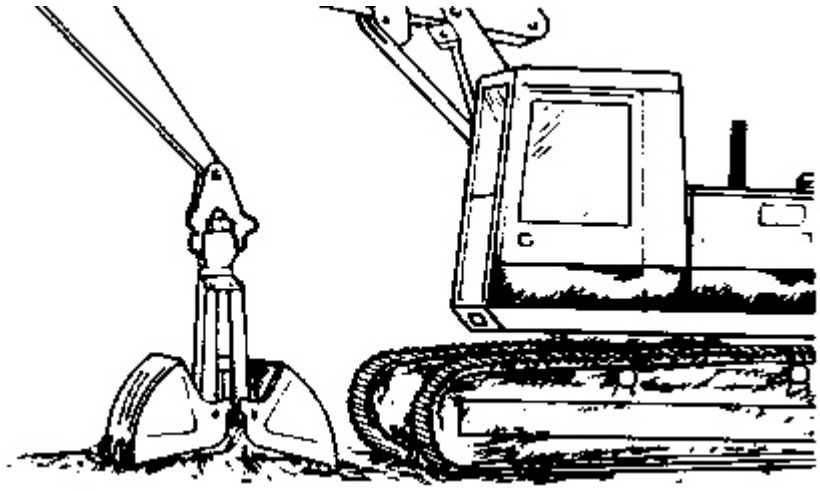
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### Safety Practices



**WARNING**

**Do not operate this machine unless you have read and understand the instructions in the "Operator's Guide." Improper operation is dangerous and could result in injury or death.**





## WARNING

**Lower all equipment before leaving the machine, making adjustments or performing maintenance on the machine. Lower the clamshell (if equipped) in the open position.**

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## WARNING

**Watch boom clearances when moving the machine. Uneven ground can cause the boom to move from side to side or up and down.**

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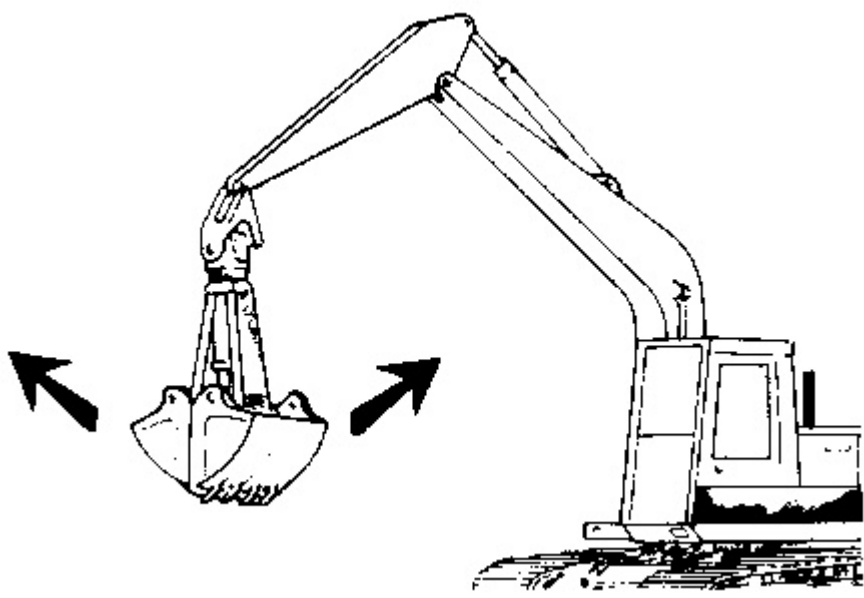
## WARNING

**Know the maximum height and reach of your machine.**

**Serious injury or death by electrocution may occur if the machine and attachments are not kept a safe distance from electrical power lines. Keep the distance at least 3 meters (10 feet). Keep an additional 10 mm (.4 inch) distance away for each 1000 volts over 50,000 volts.**

**For safety, local or state codes or jobsite operating directives may require a greater distance.**

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## **WARNING**

**Personal injury may result if the clamshell swings into the cab or into a person in the work area. The clamshell can swing in all directions.**

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### **General**

Wear a hard hat, protective glasses and other protective equipment as required by job conditions.

Do not wear loose clothing or rings that can catch on controls or parts of the machine.

Keep the steps and walkways free of foreign material. Secure all loose items such as lunch boxes, tool, etc.

Know hand signals and who gives them. Accept signals from one person only.

Be alert - always keep your eyes on the moving load. If you cannot see the load, have a signal man in full view.

Keep the boom away from all overhead lines. Treat all lines at "hot" until you have reliable information to the contrary.

If a power line is hit, stay on the machine until the line is clear or the power is disconnected.

Warn people to stay away from the machine if it is in contact with power lines.

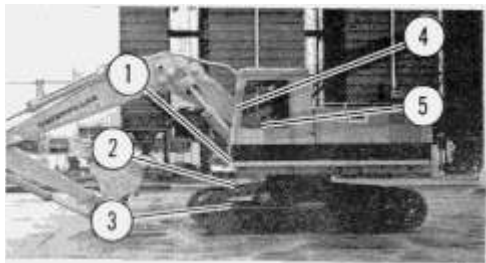
### **Mounting and Dismounting**

Climb on or off the machine only where steps and/or grab irons are provided. Never jump on or off of the machine.

Use both hands and face the machine when mounting or dismounting.

Never get on or off of a moving machine.

Learn the location of the emergency exits.



Use steps (1), (2) and (3) and grab irons (4) and (5) when entering or leaving the operator's compartment.

### **Preparing to Start the Engine**

Inspect the condition of the seat belt. Replace it if it is worn or damaged.

Make certain all protective guards and covers are secured in place.

Inspect the machine for potential fire hazards.

Make sure the machine is equipped with proper lighting as required by job conditions.

### **Starting the Engine**

Do not start the engine or move any of the controls if a DO NOT OPERATE or warning tag is attached to the controls.

Make sure no one is working on, under, or close to the machine before starting the engine.

Move all implement controls to hold or neutral before starting the engine.

Start and operate the engine only in a well ventilated area. In an enclosed area, vent the engine exhaust to the outside.

### **Preparing to Operate**

Fasten the seat belt securely.

Check all controls and protective devices to make sure they are working properly while moving slowly in an open area:

1. Steering
2. All brakes
3. Governor control
4. Hydraulic functions
5. Devices such as lights, travel alarm, horn, etc.

See the "Service Manual" for adjustments if they are needed.

## **Operating**

Operate the controls only while seated.

Do not allow riders on the machine unless an additional seat, seat belt and rollover protection is provided for each rider.

The operator must satisfy himself that no one will be endangered before moving the machine.

Be careful to avoid tipping when working on hills, banks or slopes and also when crossing ditches, ridges or other obstructions.

Stay a safe distance from the edge of cliffs, overhangs or slide areas.

If the machine begins to slide on a grade, dispose of the load immediately and turn the machine downhill.

Do not exceed the rated load capacity of the machine. If the machine is not on level ground, capacities will vary.

When loading trucks, never swing over the cab. Make sure the driver is out of the truck during loading.

Avoid fast swings and hoists or sudden stops.

Check for adequate tail swing clearance before operating the machine.

Beware of reduced stability when swinging over the side of the track.

When working in a pit or near a high bank, alert pit men immediately if a cave-in appears imminent.

Do not swing a load or equipment over workmen.

Use short slings to prevent excessive load swing when lifting pipe or other items.

Use caution on slopes. Tipping can occur if you operate with a load beyond a safe operating radius.

Keep other machines away from the edge of an excavation when you are digging.

Swing the boom to the upper side of a hill to avoid tipping, except when using it as a crutch.

For long moves, position the boom in the direction of travel.

Know the exact location of buried cables and pipes. Mark them clearly.

Move the machine away from the excavation before leaving it.

## **Parking the Machine**

Lower the equipment to the ground with slight down pressure. Engage the hydraulic and antitravel lock lever. Stop the engine. Turn off the disconnect switch and remove the key.

If the machine must be parked on a steep grade, block both tracks.

## **Fire Prevention**

Do not smoke while refueling or when near batteries.

Always have a fire extinguisher on hand and know how to use it. Inspect and service the extinguisher as recommended on the instruction plate.

Do not start the machine or move any of the controls if there is a warning tag attached to the controls or starter switch.

Do not carry flammable fluids such as starting fluid (ether), gasoline or fuel on the machine in loose containers.

Before operating, inspect for trash or leaks which could cause a fire. See "Before Starting" for the walk-around inspection procedure.

Loose or damaged lines, tubes or hoses, which leak, can cause fires.

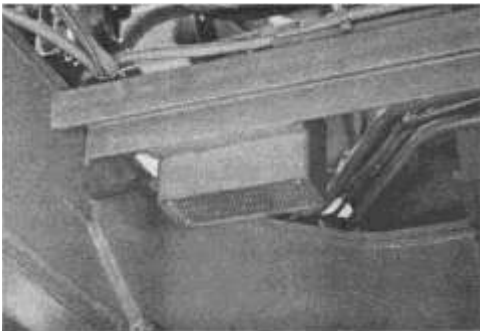
Do not bend or strike high pressure lines. Do not install bent or damaged lines, tubes or hoses.

Inspect all lines, tubes and hoses carefully. Tighten all connections to the recommended torque.

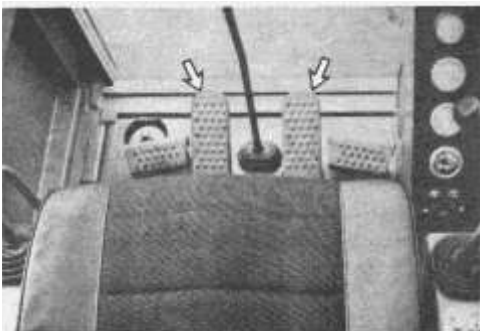
Make sure that all clamps, guards and heat shields are installed correctly. This will help to prevent vibration, rubbing against other parts, or excessive heat during operation.

Shields which protect hot exhaust components from oil or fuel spray, must be installed correctly. This will help prevent fires, in the event of a line, tube or seal failure.

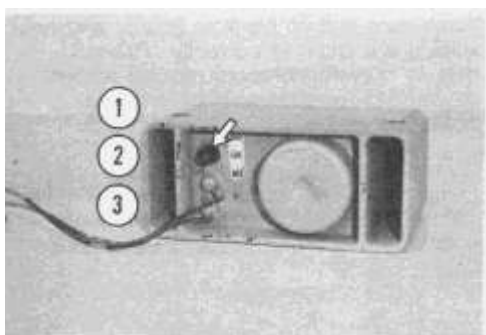
## **Travel Alarm (if equipped)**



The travel alarm, located under the rear of the upper structure, sounds to warn nearby personnel of machine movement.



The alarm sounds anytime that either the forward or reverse travel pedal is depressed.



A switch at the rear of the alarm adjusts the sound level.

(1) High

(2) Low

(3) Medium

The alarm is usually set at the High sound level when shipped from the factory.

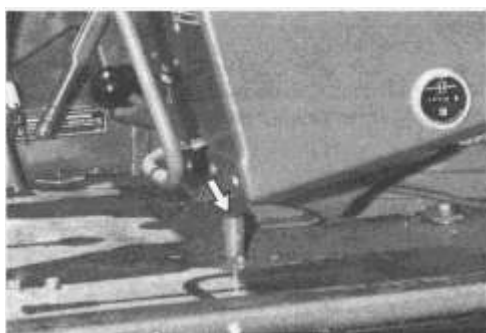


To stop the alarm when it is not needed, press the button, at the top of the steering control.

When the button is depressed momentarily while traveling, the alarm will sound for 10 seconds, then it will turn off.

It will remain off until the machine is stopped and travel is resumed in either direction.

## **Horn**



Push down the button to sound the horn.



## **Fire Extinguisher**

Always have a fire extinguisher on the machine and know how to use it.

Have the extinguisher inspected as recommended on its instruction plate.

## **Emergency Exit**



Use the front windshield as an emergency exit if the door is blocked.

See the "Operators Compartment" section for windshield opening instructions.

## **Seat Adjustment**



**WARNING**

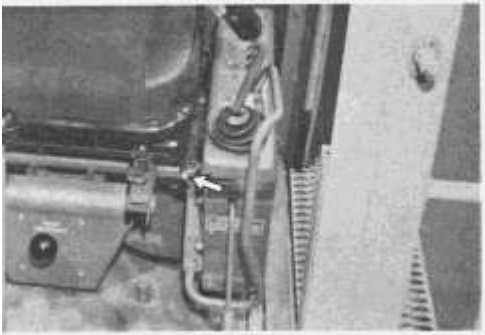
**Adjust the seat at the beginning of each shift or when changing operators.**

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Adjust the seat to allow full travel of the pedals when the operator is seated against the seat back.



To permit raising or lowering of the seat, push the lever down.



To permit moving the seat forward or rearward, push the lever, at the left side of the seat, toward the operator.



To adjust the seat back tilt, lift the back and tilt it to one of 3 positions. Release the back.

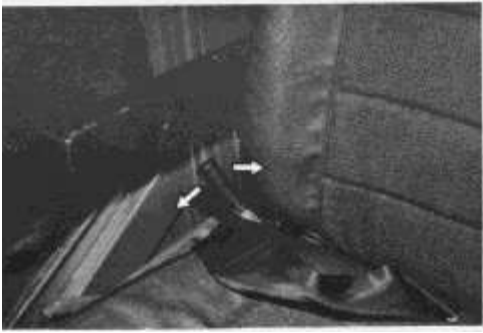
### **Suspension Seat**



The optional suspension seat has a ride adjustment lever, located at the right rear corner of the seat cushion. Adjust the ride with the operator seated.

### **For a Softer Ride:**

1. Pull out on the lever handle and twist it to the left on the shaft.



2. Allow the handle to spring back into a catch. Then ratchet the lever to the left and right several times.



3. The ride is properly adjusted when the indicator is even with the seat frame upright.

### **For a Firmer Ride:**

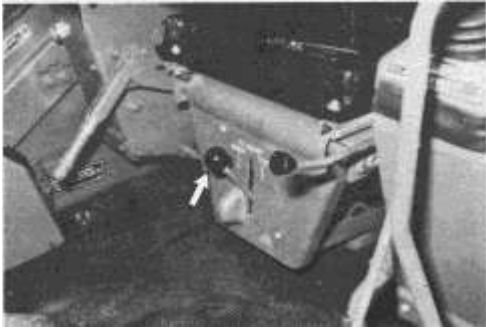


1. Pull out on the lever handle and twist it to the right on the shaft.

2. Allow the handle to spring back into a catch. Then ratched the handle to the left and right several times.

3. The ride is properly adjusted when the indicator is even with the seat upright.

### **Suspension Seat with Tilt Control**



The lever on this optional seat, that is used for height adjustment is also used for seat tilt. Pull the lever up then tilt the entire seat forward or to the rear as desired. Release the lever.

## Seat Belt



**Replace the seat belt or mounting hardware if they are damaged or worn. Replace the belt at least every three years. Adjust and fasten the seat belt before operating the machine.**

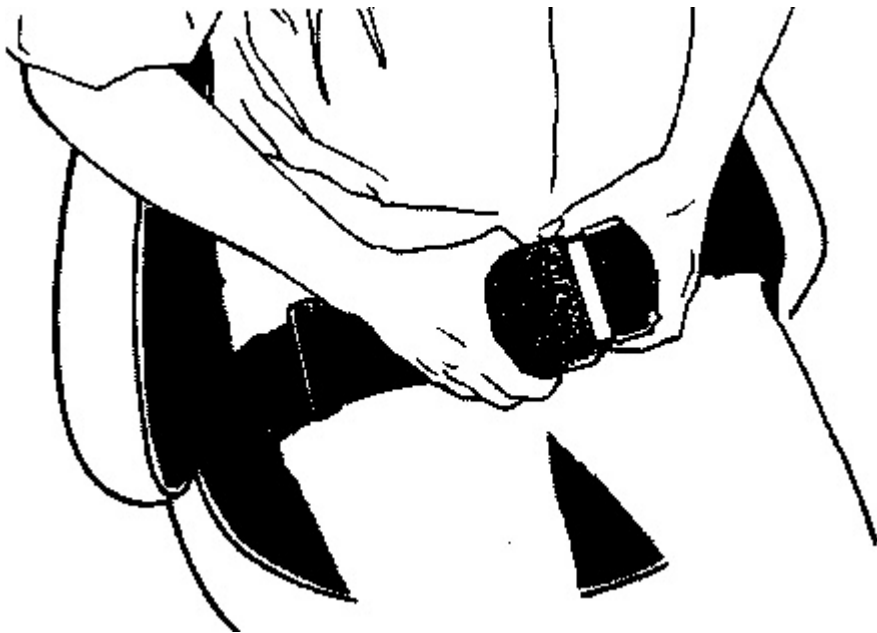
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Inspect for worn or frayed webbing. Check for worn or damaged buckle or anticreep slide, on each half of the belt. Replace the belt, buckle or slides if they are worn or damaged.



Inspect the belt mounting hardware. Replace any worn or damaged hardware.

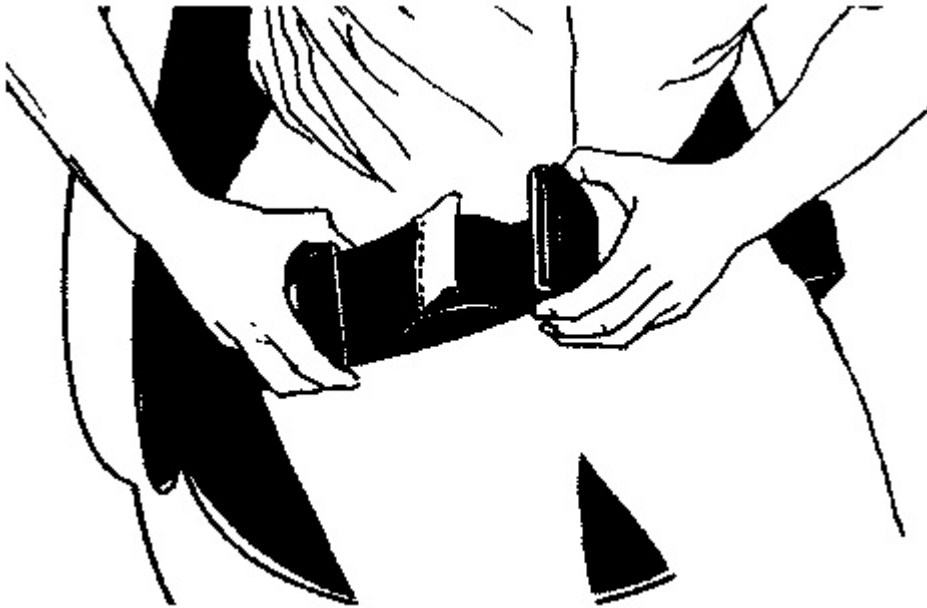


Adjust both ends of the belt. The belt should be snug but comfortable.

**To Lengthen the Belt**

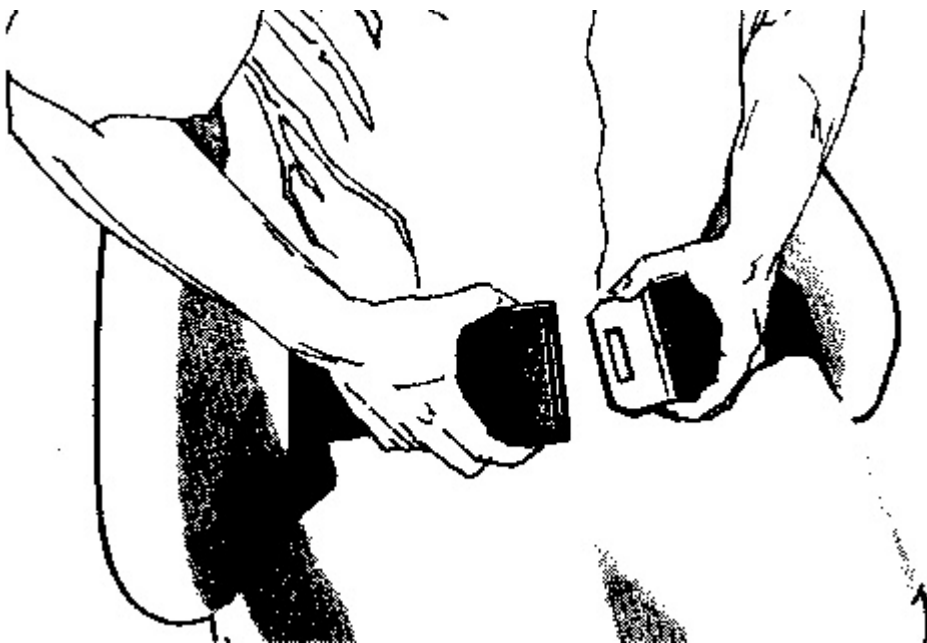


1. With the belt unfastened, move the anticreep slide toward the buckle.



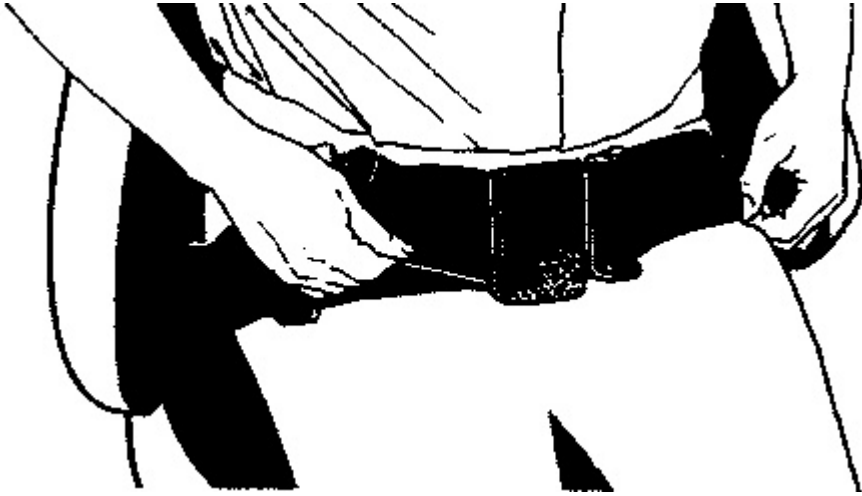
2. To remove the slack in the outer loop, rotate the buckle to free the lock bar. This permits the belt to move through the buckle.

3. Pull on the buckle until the outer and inner belt loops are tight.

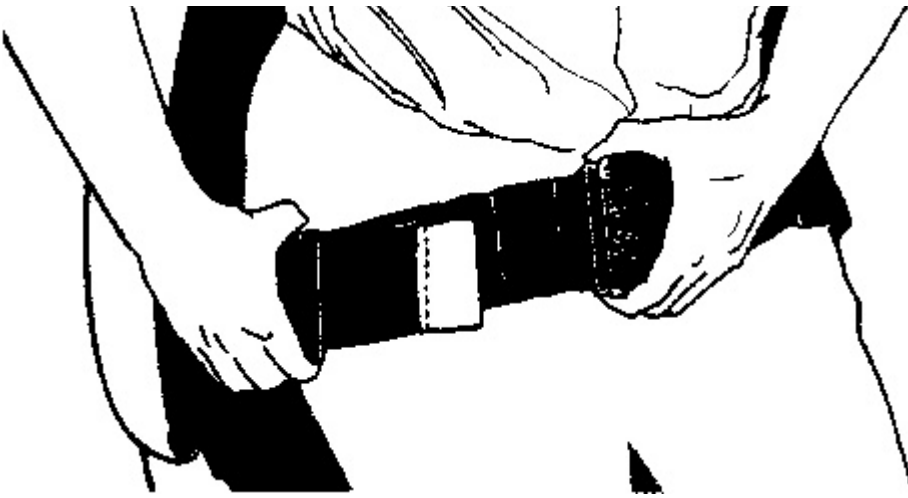


4. Loosen the other half of the belt in the same manner. Readjust the belt if it does not fit properly with the buckle in the center.

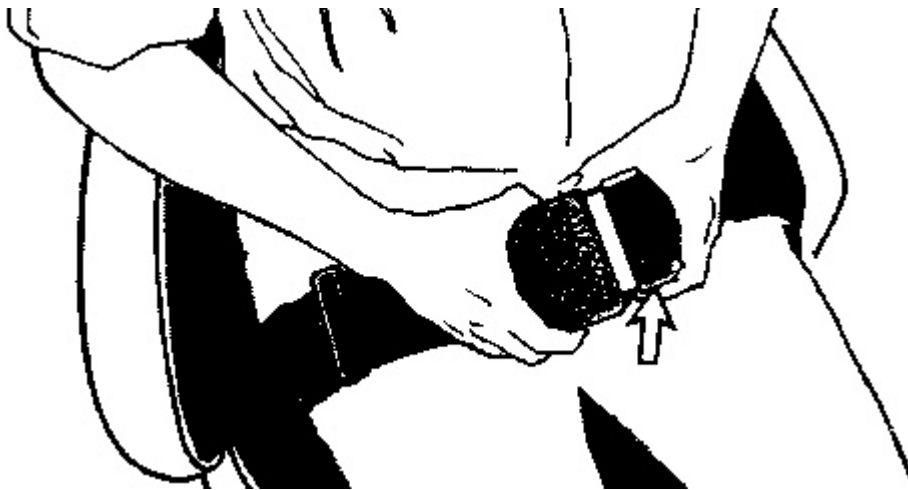
### **To Shorten the Belt**



1. With the belt fastened, pull on the outer loop to tighten the belt.



2. Move the anticreep slide toward the anchor end of the belt to take up the slack in the outer loop.



3. Adjust the other half of the belt in the same manner.

4. Readjust the belt if it does not fit properly with the buckle in the center.

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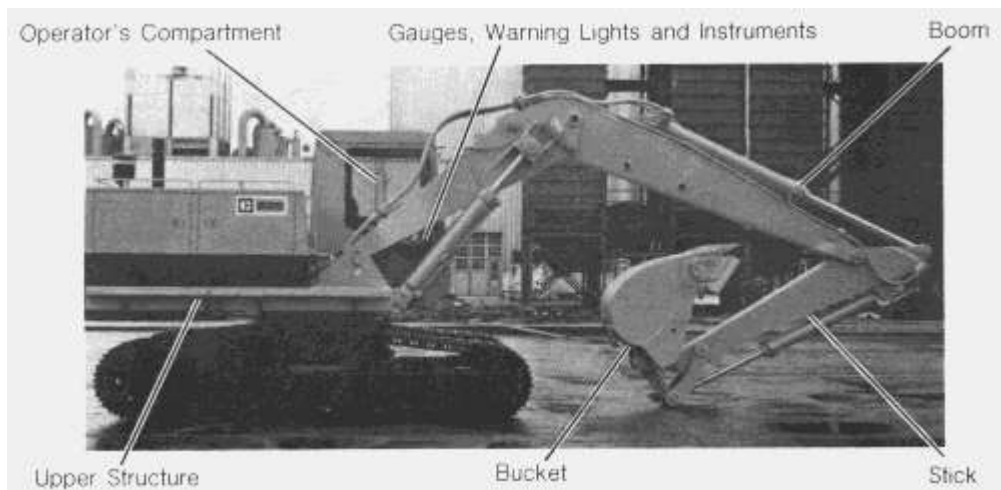
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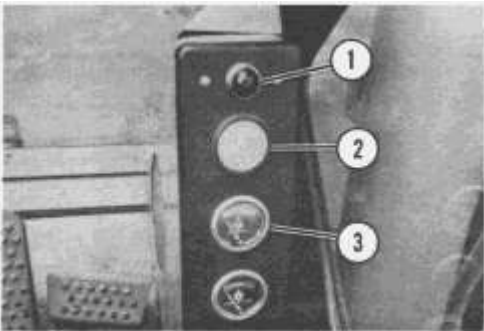
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# Operator's Compartment

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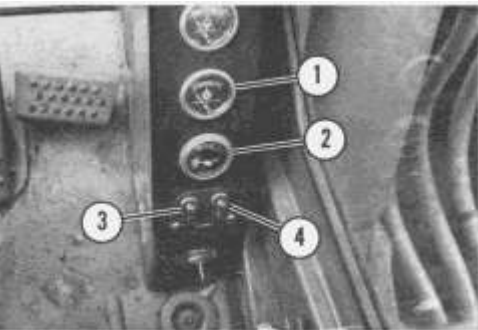
## Gauges, Warning Lights and Instruments.



**Malfunction Warning Flasher (1.)** - Flashes to warn the operator to take immediate action to prevent machine damage. The flasher operates if engine oil pressure is too low, or if engine coolant temperature is too high.

**Engine Oil Pressure Gauge (2.)** - The gauge should register in the white range at low idle engine speed, or in the green range at full load speed.

**Engine Coolant Temperature Gauge (3.)** - The gauge should register in the green range during operation.

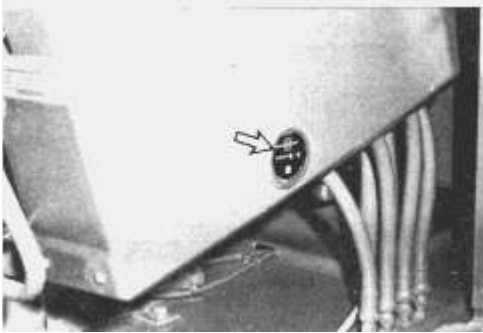


**Hydraulic Oil Temperature (1.)** - The gauge should register in the green range during operation.

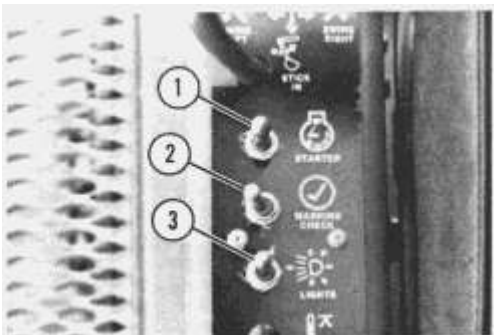
**Voltmeter (2.)** - Indicates the alternator output.

**Hydraulic Oil Filter Indicator (3.)** - Have the filter changed if the indicator lights when the hydraulic oil is warm, and the engine is running at high idle.

**Engine Air Filter Indicator (4.)** - Have the air filter elements serviced if the indicator lights when the engine is running at high idle.



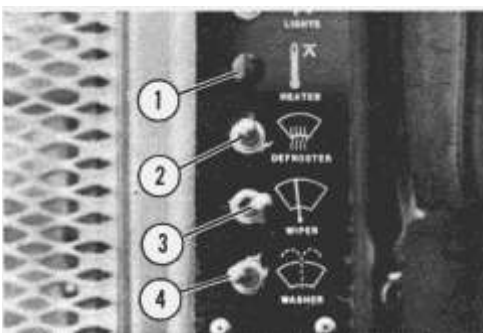
**Service Meter** - Indicates the total service hours on the engine. Use it to determine service intervals.



**1. Start Switch** - To crank the engine, pull up on the switch and move it to the right. If equipped with electric engine shutoff, move the switch to the left to stop the engine.

**2. Monitoring Systems' Test Switch** - Used to test the malfunction warning flasher and the filter indicator lights. With the disconnect switch on, move the switch to the right. The flasher and indicator lights should go on.

**3. Light Switch** - Move the switch to the right to turn on the flood lights and instrument panel light. Move the switch to the left to turn all lights off.

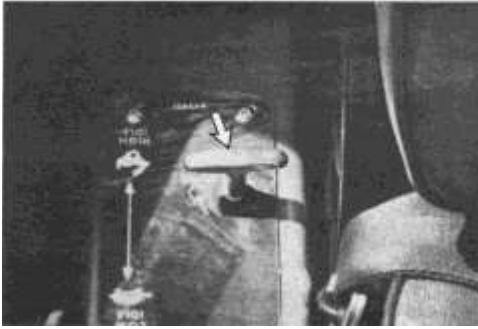


**1. Heater Switch** - Center the switch for low heater fan speed. Move the switch to the right for high fan speed. Move the switch to the left to turn the fan off.

**2. Defroster Switch** - Center the switch for low defroster fan speed. Move the switch to the right for high fan speed. Move the switch to the left to turn the fan off.

**3. Windshield Wiper Switch** - Center the switch for slow wiper speed. Move the switch to the right for fast speed. Move the switch to the left to stop the wipers.

**4. Windshield Washer Switch** - Move the switch to the right to spray window washing solvent onto the windshield. The switch goes off when released.



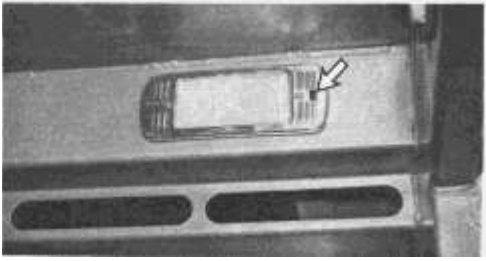
**Mechanical Starting Aid Switch (if equipped)** - Used in cold weather only, to inject starting fluid (ether) into the intake manifold to aid in starting the engine. Pull up on the knob. Push the knob down to inject a metered amount of starting fluid.



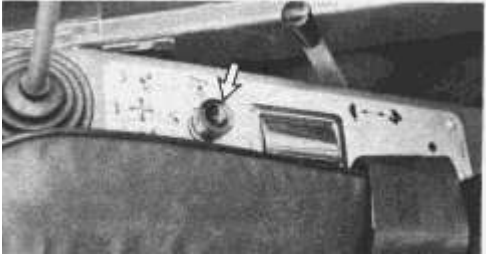
**Electric Starting Aid Switch (if equipped)** - Used in cold weather only, to inject starting fluid (ether) into the intake manifold to aid in starting the engine. Move the switch to the right, only while cranking the engine, to inject a metered amount of starting fluid.



**Battery Disconnect Switch** - To activate the electrical system, insert the key and turn the switch to the right. When parking the machine, turn the switch to the left to open the electrical circuit, and remove the key. This will prevent battery drain.

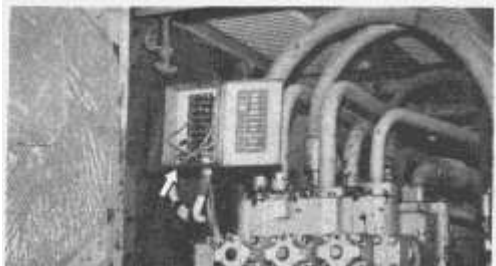


**Interior Light Switch** - Move the switch to turn the light on or off



**Lighter** - Push down the knob. The lighter will move up when it is ready for use.

## **Fuses**



The fuse box is located inside the left front access door.

Fuses protect the electrical system from damage caused by overloaded circuits. Change a fuse if the element separates. If the element of a new fuse separates, have the circuit checked.

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### **NOTICE**

**Replace fuses with the same type and size only.**

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The circuits protected by each fuse are listed below.

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