

TO THE OWNER _____

TO THE OWNER OF A CASE EXCAVATOR

Use this manual as your guide. If you follow the instructions given in this manual, your Case excavator will work well for many years.

Your Dealer can give you assistance with Case Company made parts and persons with special training that know the best methods of repair and maintenance for your excavator.

Call your Dealer if you need any assistance or information.

Your Authorized Case Dealer

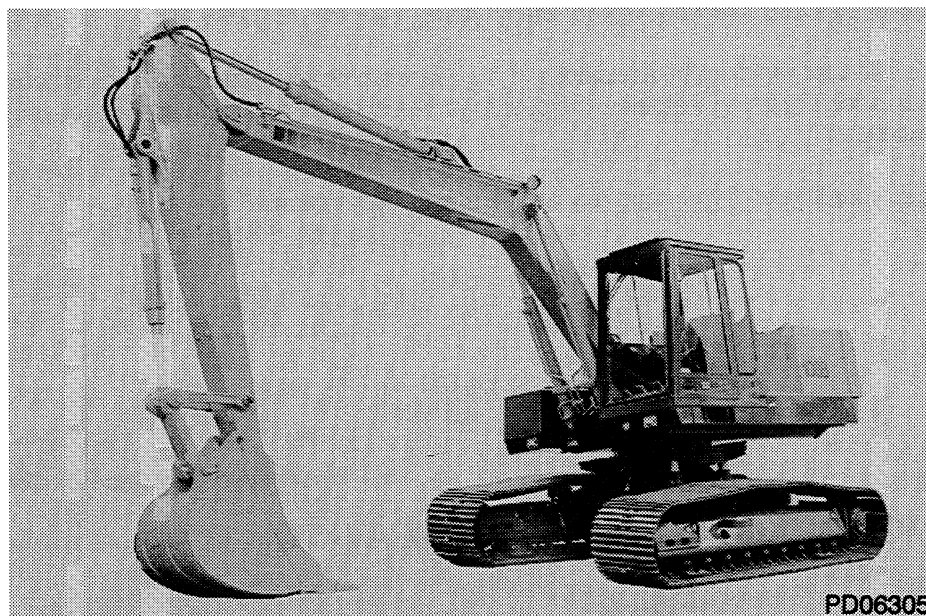
MODEL 1088 LONG TRACK EXCAVATOR



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TO THE OWNER _____

**MODEL 1088 LONG TRACK EXCAVATOR
With Turntable Leveler**



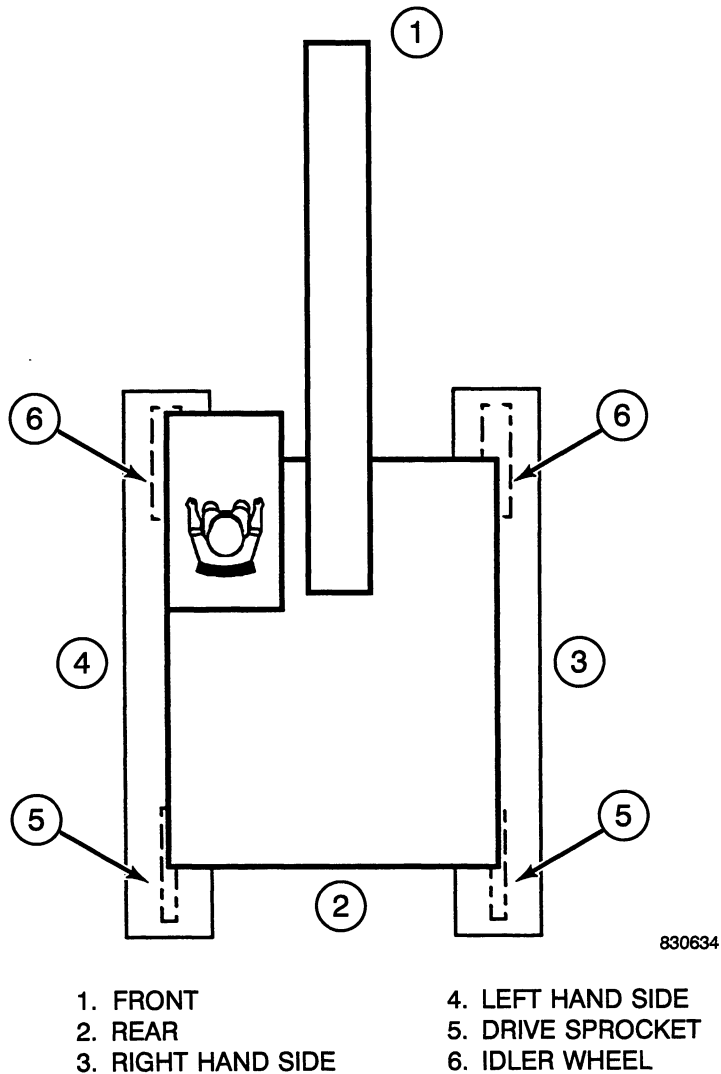
TO THE OWNER _____

RIGHT, LEFT, FRONT AND REAR OF THE MACHINE

Right, left, front and rear, when used in this manual, indicate the sides of the machine as seen from the operators seat with the cab over the idler wheels.

The following illustration shows the machine in the normal TRAVEL and WORKING position.

The normal TRAVEL and WORKING position is with the cab over the idler wheels. The drive sprockets are at the rear of the turntable.



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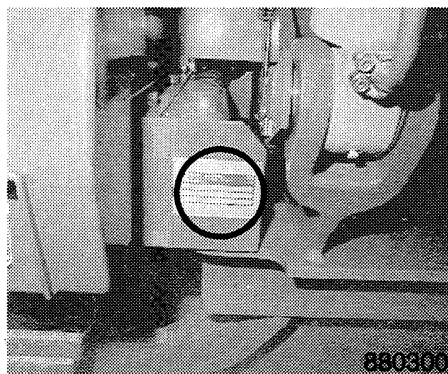
IDENTIFICATION NUMBERS _____

PRODUCT IDENTIFICATION AND SERIAL NUMBERS

When ordering parts or when requesting information or assistance always give the identification numbers of your machine.

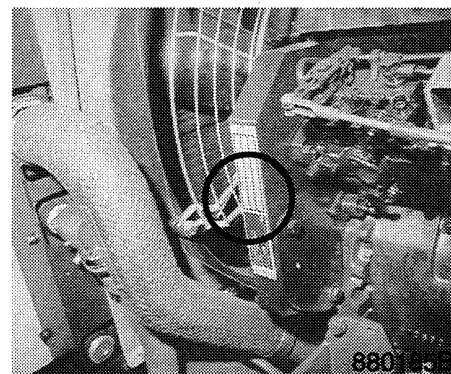
Write the model and serial numbers of your machine on the lines below.

MODEL/PIN NUMBERS



Model Number _____
Pin Number _____

ENGINE



Serial Number _____

SAFETY/DECALS/HAND SIGNALS _____

SECTIONAL INDEX

Decals	12 - 15
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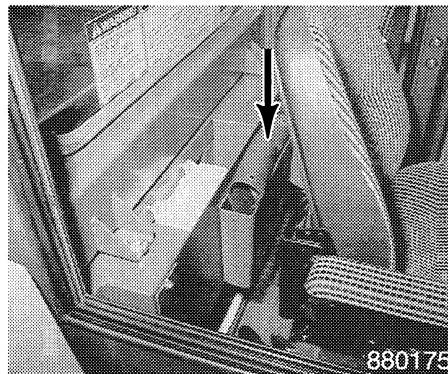


SAFETY/DECALS/HAND SIGNALS

SAFETY

Your safety and safety of persons in the area depend on you. It is your responsibility to understand this operators manual for the correct operation, inspection, lubrication, and maintenance of this machine.

Know the positions and operation of each control before you start. **MAKE SURE YOU CHECK ALL CONTROLS IN A SAFE, CLEAR AREA BEFORE YOU START WORKING.**



MANUAL STORAGE

READ THIS MANUAL COMPLETELY and make sure you understand the characteristics of speed, stability, brakes, and steering, of this machine. If you have any questions, see your dealer.

Do not remove this manual from the machine. See your dealer for additional manuals.

The safety provisions applicable to individual or public contracts, regardless of the job concerned (earthmoving, handling, boring, etc.) are those which comply with safety regulations prevailing in the country and in the field.

When working on a public highway, use the standard traffic signs and take into consideration the working area of the upperstructure and attachments. Local regulations stipulate the number, type and location of panels and reflectors.

The information given in this chapter is a summary of basic rules to be observed at all times and does not free the user from the obligation to abide by the legal provisions outlined above.

	THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH. M171
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IMPORTANT: *Safety messages in this section point out situations which can be encountered during the normal operation and maintenance of your machine. These safety messages also give possible ways of dealing with these conditions.*

Additional safety messages are used in the text of the manual to show specific safety hazards.

SAFETY/DECALS/HAND SIGNALS



Machine Operation



Check all controls in a clear area and make sure the machine is operating correctly.

Do not allow another person to ride on the machine. This other person can fall or can cause an accident.

Be careful when driving the excavator; the working area contains zones of poor visibility.

Ask the assistance of a signalman for all work where the operator does not have full visibility.

Get to know the possibilities and limitations of the excavator, also the working space required for the machine. Accidents can be prevented if the operator is careful.

Do not work near a live overhead electric cable without first making certain you have taken steps to observe the minimum distances.

Less than 57 000 volts 10 ft (3 m)

More than 57 000 volts 16 ft (5 m)

If this machine rolls over you can be injured or killed. You must make a judgement if weather, road, or earth conditions will permit safe operation on a hill, ramp, or rough ground.

Stay away from hazardous areas such as ditches, overhangs, etc. Walk around the work area before you start and look for hazards.

The operator must be alone on the machine.

Check to see that there is nobody beneath or on the excavator.

Do not allow someone to stand in the working area of the excavator.

An accident can be caused if the operator unintentionally actuates the swing or an attachment control. Stop all movements until the person has moved away.

Use the controls gradually for smooth operation.

Under no circumstances must the attachment be swept along the ground to spread out spoil or push objects (universal stresses on attachment).



Parking the Excavator



After parking your machine and before you leave the working area, align the attachment with the centreline of the machine and lower the boom until the bucket is resting on the ground.

Stop the engine, even during short stops. Follow the instructions of this manual with regard to parking your excavator.

SAFETY/DECALS/HAND SIGNALS



Fire or Explosion Prevention



Engine fuel can cause an explosion or fire. Do not fill the fuel tank with the engine running, if you are near an open fire, or if you are welding, smoking, etc. Use a non-flammable cleaning solvent to clean parts.

Sparks or flame can cause the hydrogen gas in a battery to explode. To prevent an explosion, do the following :

1. When disconnecting the battery cables, disconnect the negative (–) cable first. When connecting the battery cables, connect the negative (–) cable last.
2. When connecting jumper cables to start the engine, use the procedure shown in this manual.
3. Do not short circuit the battery posts with a metal item.
4. Do not weld, grind, or smoke near a battery.

Sparks from the electrical system or engine exhaust can cause a fire or an explosion. Before you operate this machine in an area with flammable dust or vapors, use good ventilation to remove all flammable dust or vapors.

A fire can cause injury or death. Always have a fire extinguisher near the machine. Make sure the fire extinguisher is serviced according to manufacturers instructions.

Remove all trash or debris from the machine. Make sure that oily rags or other flammable materials are not stored on the machine.

Check for fuel, oil and hydraulic fluid leaks. Replace worn or damaged hoses/lines. After repairs are made, clean the machine before you operate.



Burn Prevention



Battery acid causes severe burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing.

Antidote – EXTERNAL : flush with water. INTERNAL : drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call a doctor immediately. EYES : flush with water for 15 minutes and get prompt medical attention.

When the battery electrolyte is frozen, the battery can explode if :

(1) You try to charge the battery.

(2) You try to jump start and run the engine.

To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others in the area can be injured.

Hot coolant can spray out if the radiator cap is removed. To remove the radiator cap, let the cooling system cool, turn the cap to the first notch, then wait until the pressure is released.

SAFETY/DECALS/HAND SIGNALS



When you service the machine, put a Do Not Operate tag on the instrument panel. A Do Not Operate tag part number 312-4614 is included with each new machine. Extra tags are available from your dealer.



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Improper service or repair can cause injury or death if you do not understand a service or adjustment procedure, see the machine manual for this machine or see your dealer.

Unauthorized modifications to this machine can cause injury or death. Do not make unauthorized modifications to this machine.

The cab structure complies with the "FOPS" protection standards. Any modifications (drilling, welding, tempering) can result in the cancelation of this protection.

If you must service this machine with the engine running, have another person help you. Follow the instructions in this manual or the service manual. Do not

leave the operators seat with the engine running.

Metal chips or debris can cause eye injury. Always wear eye or face protection when you use a hammer on this machine. Use a hammer with a soft face, such as brass, to drive hardened pins.

Hydraulic fluid or grease injected into your skin can cause severe injury or death. Keep your hands and body away from any pressurized leak. If fluid is injected into your skin, see a doctor immediately and have the fluid removed.

There is high pressure inside the track adjusting cylinder. Follow the procedure in this manual to increase or decrease the track tension.



Raised equipment or machine movement without an operator can cause injury or death. Before you service this machine, do the following :

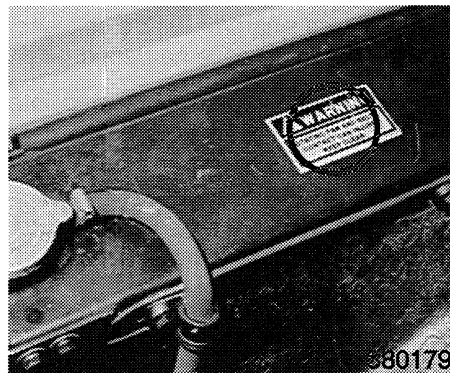
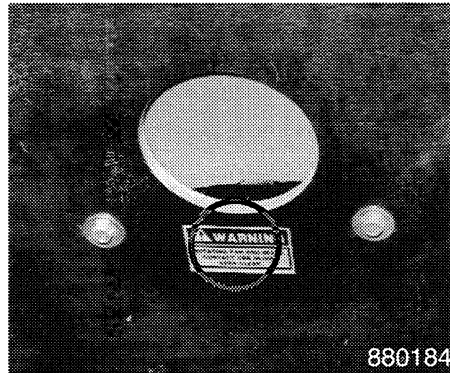
- 1. Park the machine on a level surface.***
- 2. Support or lower the equipment (backhoe, blade, boom, bucket, etc.) to the ground (if equipped).***
- 3. Apply the parking brake (if equipped).***
- 4. Stop the engine.***
- 5. Block the machine (wheels, tracks, etc.) to prevent machine movement.***

SAFETY/DECALS/HAND SIGNALS _____

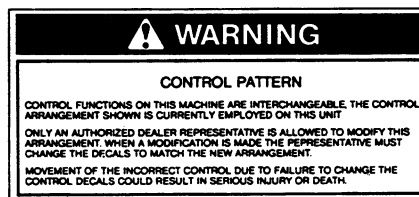
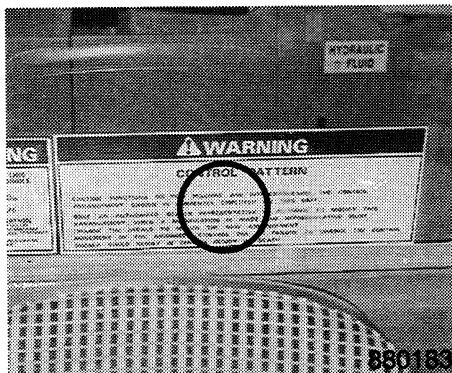
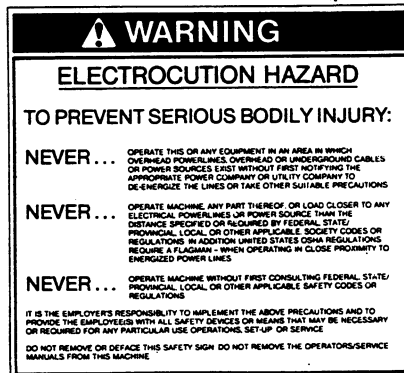
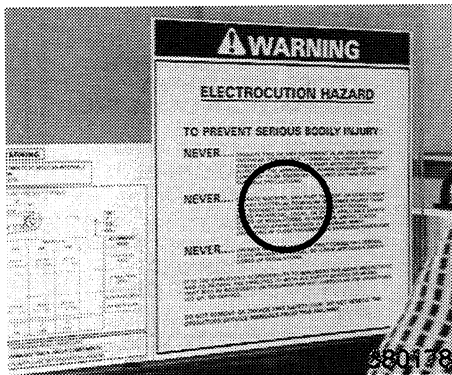
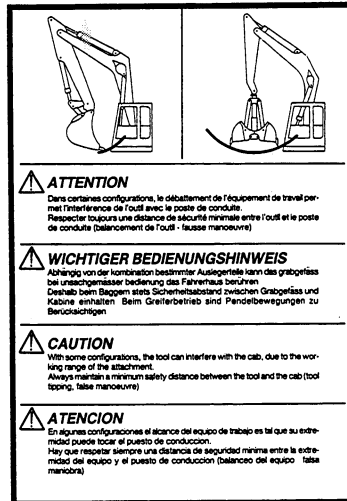
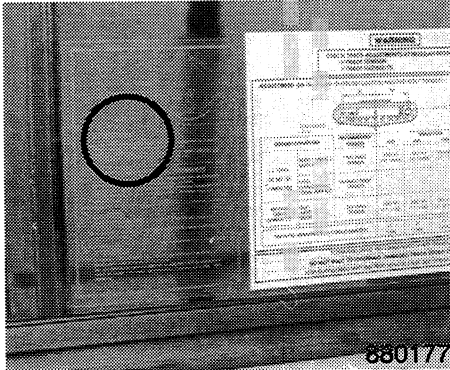
DECALS

IMPORTANT: *Install new decals if the old decals are destroyed, lost, painted over or can not be read. When parts are replaced that have decals, make sure you install a new decal with each new part.*

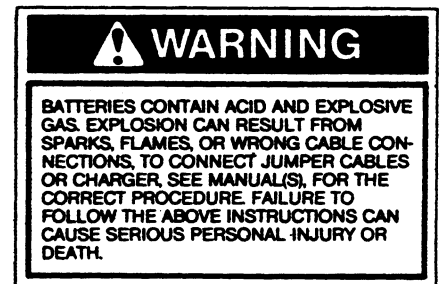
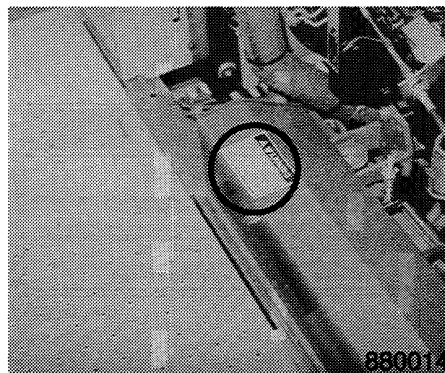
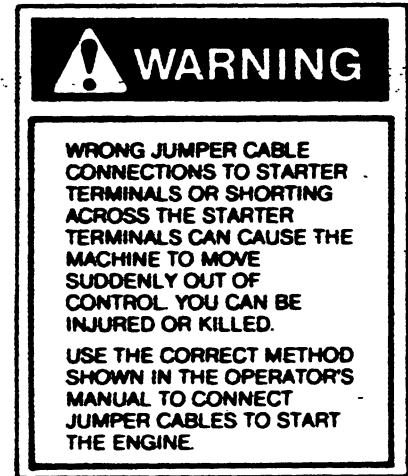
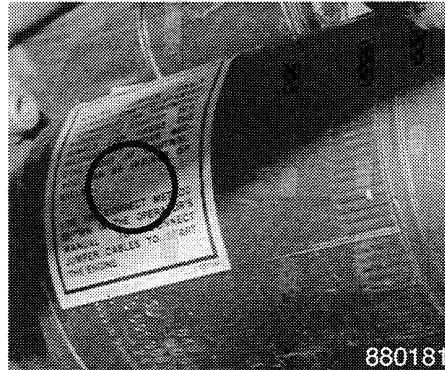
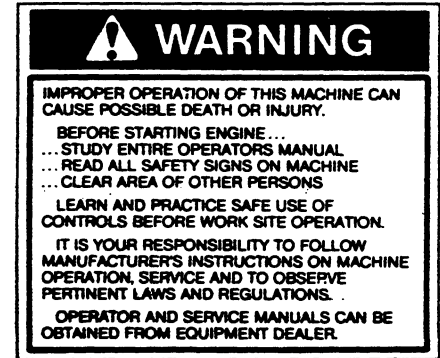
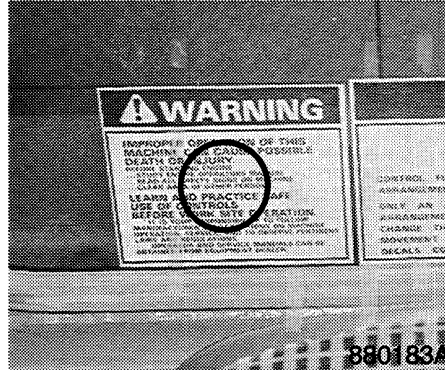
NOTE: *Obtain new decals from your Dealer. Part numbers are shown under the decal.*



SAFETY/DECALS/HAND SIGNALS



SAFETY/DECALS/HAND SIGNALS



SAFETY/DECALS/HAND SIGNALS



WARNING

CHECK TRACK ADJUSTMENTS AT REGULAR INTERVALS:

- TRACK TENSION.
- TRACK PAD BOLTS.

ADJUSTMENT DATA (TRACK CHAIN DEFLECTION AND PAD BOLT TORQUE):

GROUND CONDITIONS	RECOMMENDED TENSION	DEFLECTION			RECOMMENDED SPEED
		500	800	1000	
ROCKY, UNIFORM, SMOOTH	HIGH TRACK TENSION	250 mm (10" 16/64)	250 mm (10" 16/64)	250 mm (10" 16/64)	SLOW TRAVEL SPEED
LEVEL, FIRM SURFACE, COMPACTED	NORMAL TRACK TENSION				NORMAL TRAVEL SPEED
CLAY, SAND, BROWN, COMPACTED	LOW TRACK TENSION	250 mm (10" 16/64)	250 mm (10" 16/64)	250 mm (10" 16/64)	SLOW TRAVEL SPEED, BEWARE OF SLOPE

TRACK PAD MOUNTING BOLT TORQUE (mm N·m)

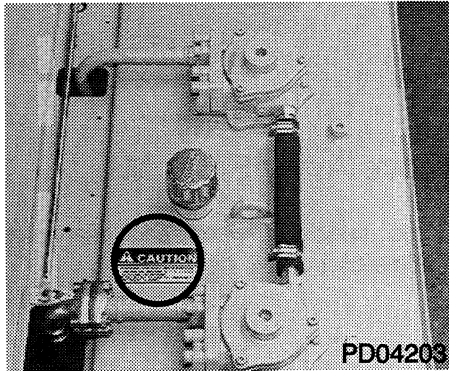
37 (150)	37 (150)	40 (160)
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FORWARD DRIVE RECOMMENDED WHEN TRAVELLING.

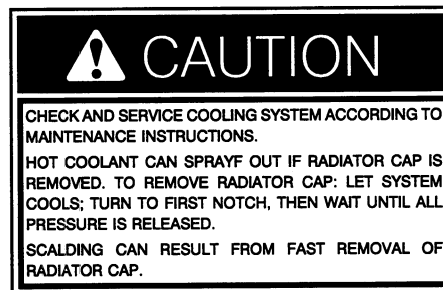
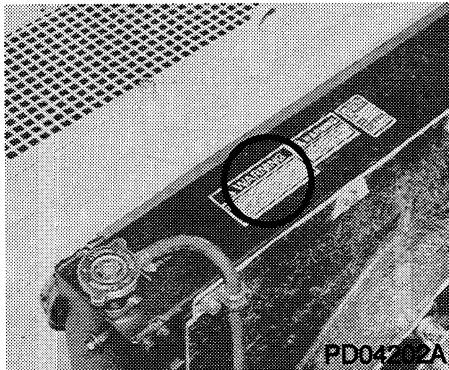
DO NOT WAIT TO OVERHAUL DAMAGED TRACK GROUP COMPONENTS.

FOR SUPPLEMENTARY INSTRUCTIONS PLEASE SEE OPERATOR'S MANUAL.

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SAFETY/DECALS/HAND SIGNALS

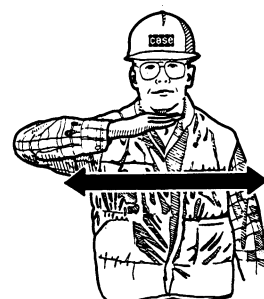
HAND SIGNALS

It is recommended that you and the flagman on the job use hand signals for communications. Before you start, make sure that you both understand the signals that will be used.

Start Engine



Stop Engine



Come To Me

Move hand forward and rearward, (palms in).



Move Away From Me

Move hands forward and rearward, (palms out).



Go This Far



All Stop And Hold

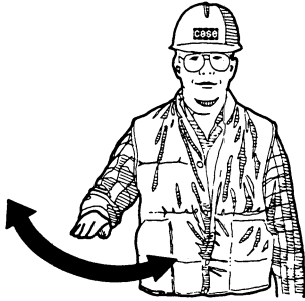


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SAFETY/DECALS/HAND SIGNALS

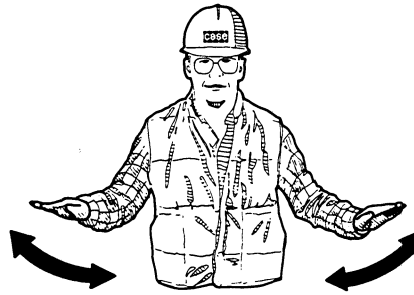
Stop

Move one hand back and forth.



Emergency Stop

Move both hands rapidly back and forth.



Raise Load Or Bucket



Lower Load Or Bucket



Raise Load Or Bucket Slowly



Lower Load Or Bucket Slowly

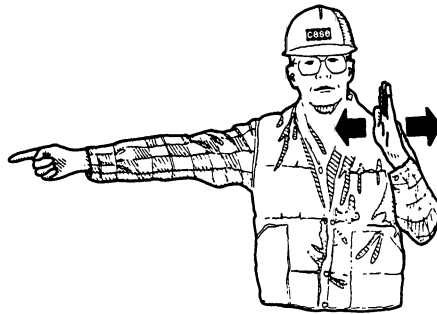


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SAFETY/DECALS/HAND SIGNALS

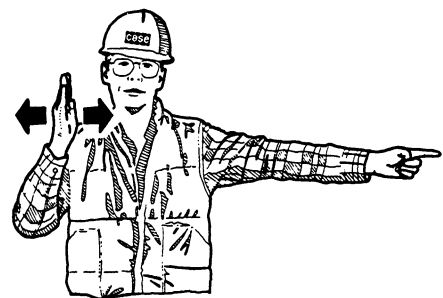
**Turn Machine Left
(Swing Load Left)**

To stop movement, stop moving hand and make a fist.



**Turn Machine Right
(Swing Load Right)**

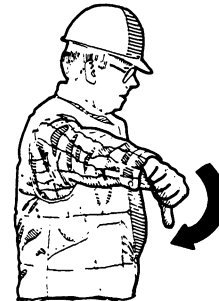
To stop movement, stop moving hand and make a fist.



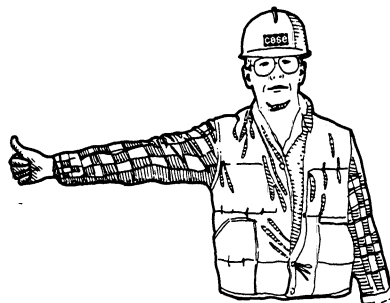
Roll Back Bucket



Dump Bucket



Raise Boom



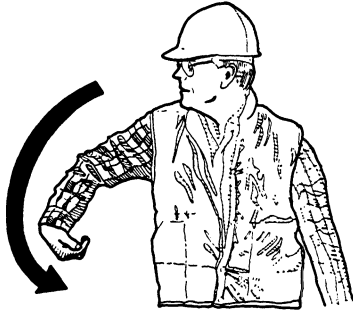
Lower Boom



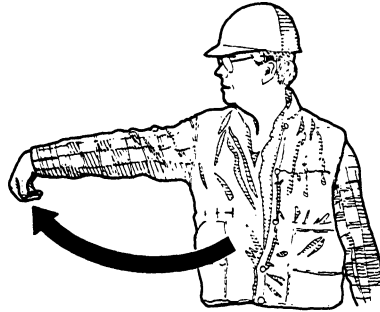
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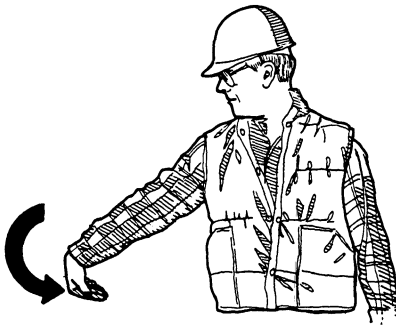
Dipper In



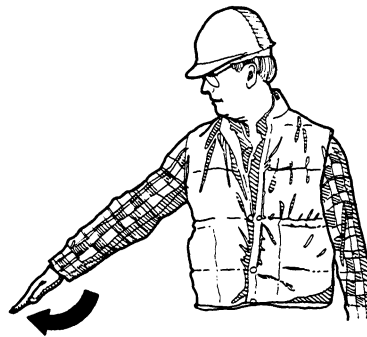
Dipper Out



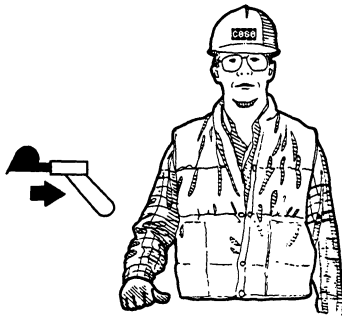
Bucket Dig



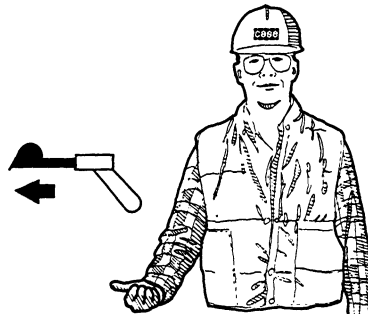
Bucket Dump



Extendahoe Dipper
Retract



Extendahoe Dipper
Extend



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SPECIFICATIONS

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SPECIFICATIONS

DIESEL ENGINE

Model	CASE 6T-590 Turbocharged
Type	Six Cylinder, Four Stroke Cycle
Firing Order	1-5-3-6-2-4
Bore	4.02 inch (102 mm)
Stroke	4.72 inch (120 mm)
Piston Displacement	359 in ³ (5880 cm ³)
Compression Ratio	17.5 to 1
Governor Engine Speed Without Load	2130 to 2230 rpm
Rated Engine Speed	2040 to 2070 rpm
Engine Idle Speed	950 to 1050 rpm
Rocker arm to valve clearance (Exhaust)	0.020 inch (0.508 mm)
(Intaket)	0.010 inch (0.254 mm)

Engine Lubrication System

Oil Pressure	30 to 50 psi (207 to 345 kPa) with Engine Warm and Operating at Rated Speed
Type System	Pressure and Spray

Fuel System

Fuel Injection Pump	Bosch
Fuel injectors	Bosch

Air Filtration System

Type	Dry Type Air Induction System, Two Stage
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Cooling System

Type	Pressure System, Thermostat Controlled Bypass, Impeller Type Pump
Radiator	Heavy Duty Fin and Tube Type
Thermostat	Starts to Open at Approximately 180°F (82°C) Fully open at 202°F (94°C)
Radiator Cap	15 psi (103 kPa)

SPECIFICATIONS

HYDRAULIC CIRCUIT

Type Variable flow with independent and simultaneous operation of all functions.

Maximum operating pressure 350 bar (5 076 psi) (34 975 kPa)

Pump two bodies:

One variable flow body for travel and attachment circuits.

 flow attachment 53 US gal/min (200 L/min)

 flow travel circuit (with swing flow reinjected) 81 US gal/min (306 L/min)

One fixed flow body for upperstructure swing.

 Flow rate 15 US gal/min (56 L/min)

Fixed flow pump for servo-steering.

 Direct drive by flexible coupling.

Parallel-type valve bank with closed center for attachments and machine travel, acting on pump regulation (Load sensing). Flow rates per function, independent of pressures.

Oil cooler cooled by engine fan.

High pressure multispiral hoses

 Minimum safety pressure 2 to 4 four times operating pressure.

Swing joint Self lubricated

SPECIFICATIONS

TURNTABLE

Welded frame.
Modular structures.
Transverse walkway for access to components.
Soundproofed cowling with lock, meets all current regulations.
Tool compartment.

Swing.....Driven reduction gear with automatic static brake
Turntable swing speed.....6.11 rpm
Swing gearAlternate rollers and internal teeth
Lubrication of swing ring gear and teeth..... Centralized

CAB

Removable, soundproofed, installed on flexible mounts.
Up-and-over windshield - Tinted windows.

OPERATION

Seat with adjustable arm-rests.
Hydraulically-assisted controls.
Attachment and swing 2 levers
Travel2 pedals
Two-speed windshield wiper, windshield washer, defrosting, two-speed ventilation,
dome light, cigarette-lighter.

SPECIFICATIONS

SAFETY FEATURES

Upperstructure lock for road travel or transportation, operated from cab.

In the event of engine failure, attachment can be grounded.

Tinted safety glass, horn.

Safety valves Optional

Fire extinguisher Optional

Indicator dials: Engine temperature gauge, hourmeter, fuel gauge.

Warning lights: Engine oil pressure, battery charging, engine oil and air filter restriction indicator.

Warning light test device.

Cancellation of controls by raising left hand lever console.

UNDERCARRIAGE

Monoblock undercarriage, all-welded components.

Lifetime greased rollers.

Tractor-type tracks; hydraulic track tensioning; spring-type shock-absorber.

Removable sprocket.

Ground Bearing Pressure

Ground pressure with 110 inch (2.80 m) dipper

and 1.37 yd³ (1.05 m³) bucket 0.368 bar (5.34 psi) (36.8 kPa)

With turntable leveler (if equipped) 0.390 bar (5.65 psi) (39.0 kPa)

TRAVEL

Drive Gearwheel drive by means of hydraulic motors.

Independent crawler drive.

Travel speeds 1.96 mph (3.16 km/h)

Motors with brakes (automatic static braking).

Gradeability 80% steady climb

Drawbar pull 40 942 lb (18 200 daN)

Automatic, hydraulic travel speed limiter prevents downhill runaway.

SPECIFICATIONS

WEIGHTS

Excavator with 223 inch (5.40 m) boom, 110 inch (2.80 m) dipper
and 1.37 yd³ (1.05 m³) bucket 45 160 lbs (20 480 kg)

Weights of attachments:

223 inch (5.40 m) Boom with dipper cylinder 3 300 lbs (1 500 kg)
87 inch (2.20 m) Dipper with Links and bucket cylinder 2 000 lbs (910 kg)
110 inch (2.80 m) Dipper with Links and bucket cylinder 2 220 lbs (1 010 kg)
Boom Cylinder (each) 637 lbs (290 kg)
Arm Cylinder 440 lbs (200 kg)
Bucket Cylinder 318 lbs (145 kg)

Counterweight

8 360 lbs (3 800 kg)

Cabin

605 lbs (275 kg)

NOTE: For machines equipped with a turntable leveler add 2 719 lbs (1 236 kg).

BUCKETS

Weights and Capacities of Buckets

NOTE: The capacity of the buckets depends on the density of the material and composition of the attachment, as well as the compactness and nature of the ground.

Width	Heaped Capacity	Weight
24 inch (0.60 m)	0.60 yd ³ (0.46 m ³)	1 200 lbs (545 kg)
30 inch (0.75 m)	0.81 yd ³ (0.62 m ³)	1 300 lbs (590 kg)
34 inch (0.85 m)	0.95 yd ³ (0.73 m ³)	1 365 lbs (621 kg)
42 inch (1.05 m)	1.23 yd ³ (0.94 m ³)	1 585 lbs (721 kg)
46 inch (1.15 m)	1.37 yd ³ (1.05 m ³)	1 655 lbs (752 kg)
50 inch (1.25 m)	1.52 yd ³ (1.16 m ³)	1 810 lbs (822 kg)
56 inch (1.40 m)	1.74 yd ³ (1.35 m ³)	1 905 lbs (867 kg)

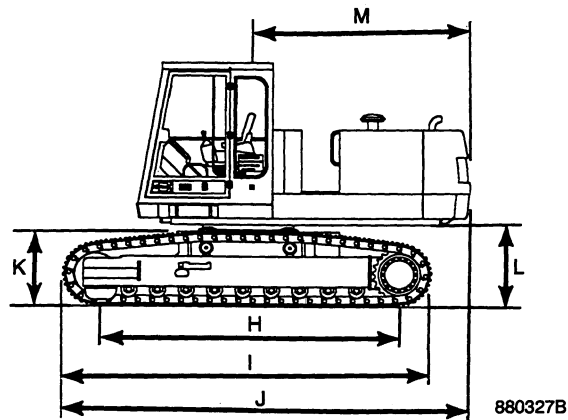
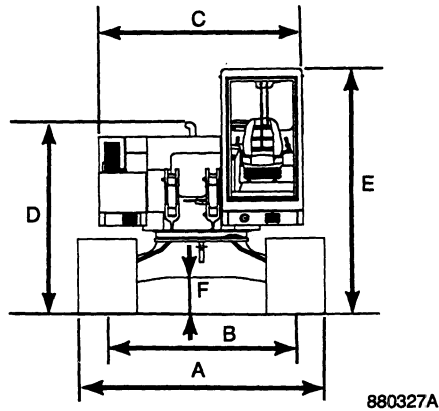
All earthmoving buckets are fitted with teeth with removable tips.

Heavy duty supplement as optional (add 5% to given capacity).

Sidecutters as optional (3 inch (8 cm) extra width).

SPECIFICATIONS

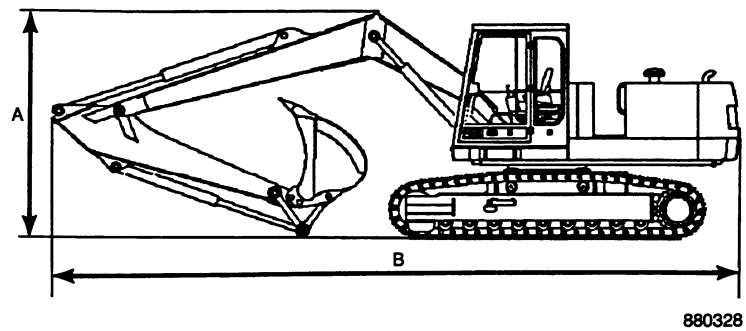
APPROXIMATE OVERALL MEASUREMENTS



A.	9 ft 8 inch (2.95 m)
B.	7 ft 4 inch (2.25 m)
C.	8 ft (2.44 m)
D.	7 ft 9 inch (2.35 m)
E.	9 ft 9 inch (3.00 m)
E. Turntable leveler (if equipped)	10 ft 5 inch (3.21 m)
F.	1 ft 6 inch (0.45 m)
H.	11 ft 9 inch (3.63 m)
I.	14 ft 3 inch (4.40 m)
J.	16 ft (4.87 m)
K.	2 ft 11 inch (0.89 m)
L.	3 ft 7 inch (1.10 m)
M.	8 ft 8 inch (2.67 m)

SPECIFICATIONS

TRANSPORT



87 inch (2.20 m) Dipper 110 inch (2.80 m) Dipper

A. 10 ft 4 inch (3.15 m) 10 ft 6 inch (3.20 m)
B. 31 ft 2 inch (9.50 m) 31 ft 2 inch (9.50 m)

Turntable Leveler (If Equipped)

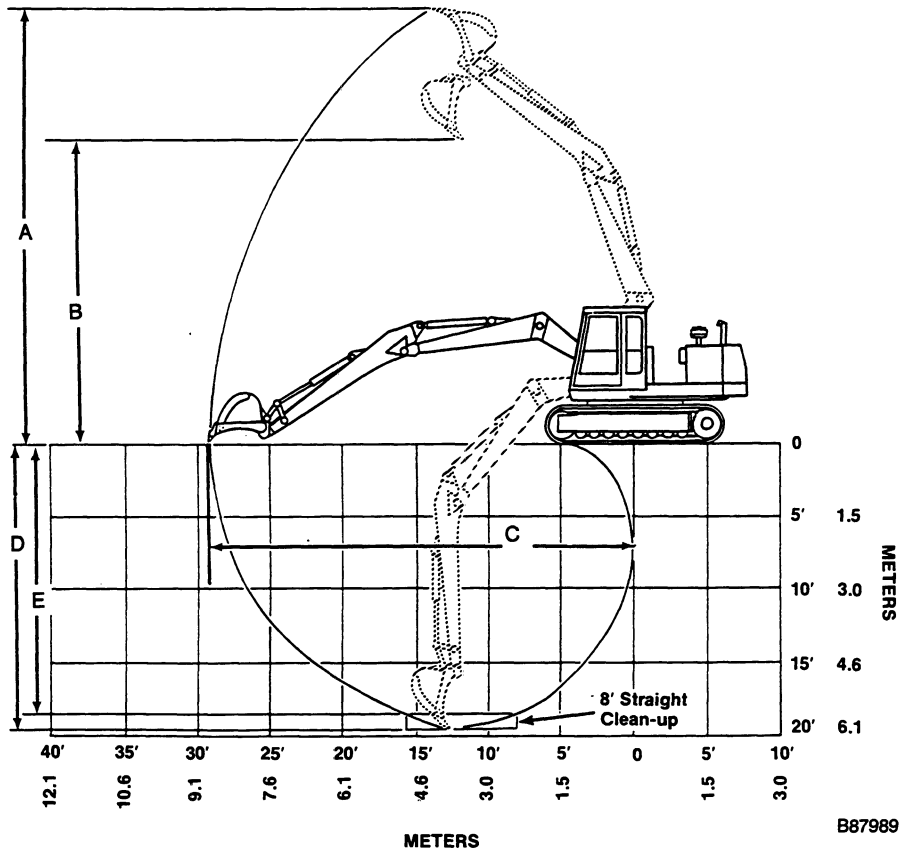
87 inch (2.20 m) Dipper 110 inch (2.80 m) Dipper

A. 10 ft 2 inch (3.12 m) 10 ft 3 inch (3.15 m)
B. 31 ft (9.45 m) 31 ft (9.47 m)

SPECIFICATIONS

OPERATING DATA

With 87 inch (2.20 m) Dipper

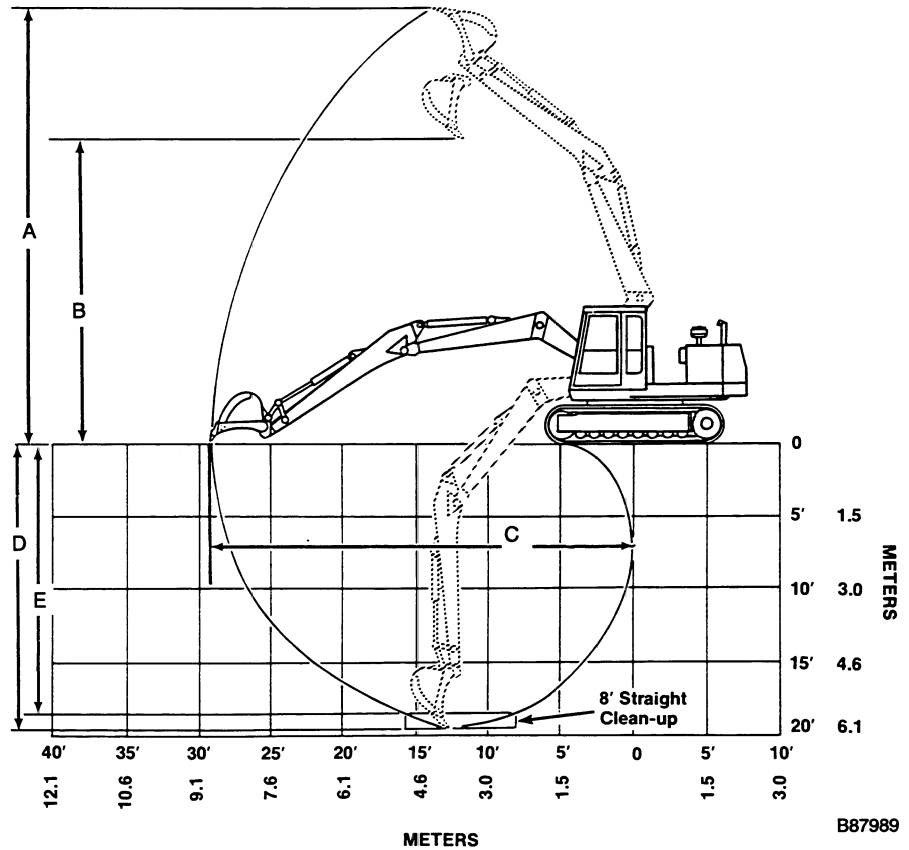


B87989

- A. Overall height 31 ft 8 inch (9.65 m)
- B. Loading height 21 ft 10 inch (6.65 m)
- C. Maximum reach at ground level 30 ft 1 inch (9.20 m)
- D. Maximum digging depth (to tip of teeth) 19 ft 4 inch (5.90 m)
- E. Maximum depth for 8 ft (2.44 m) flat bottom 18 ft 8 inch (5.70 m)

SPECIFICATIONS

With 110 inch (2.80 m) Dipper



B87989

- A. Overall height 32 ft 9 inch (10 m)
- B. Loading height 23 ft (7 m)
- C. Maximum reach at ground level 32 ft (9.75 m)
- D. Maximum digging depth (to tip of teeth) 21 ft 4 inch (6.50 m)
- E. Maximum depth for 8 ft (2.44 m) flat bottom..... 20 ft 8 inch (6.30 m)

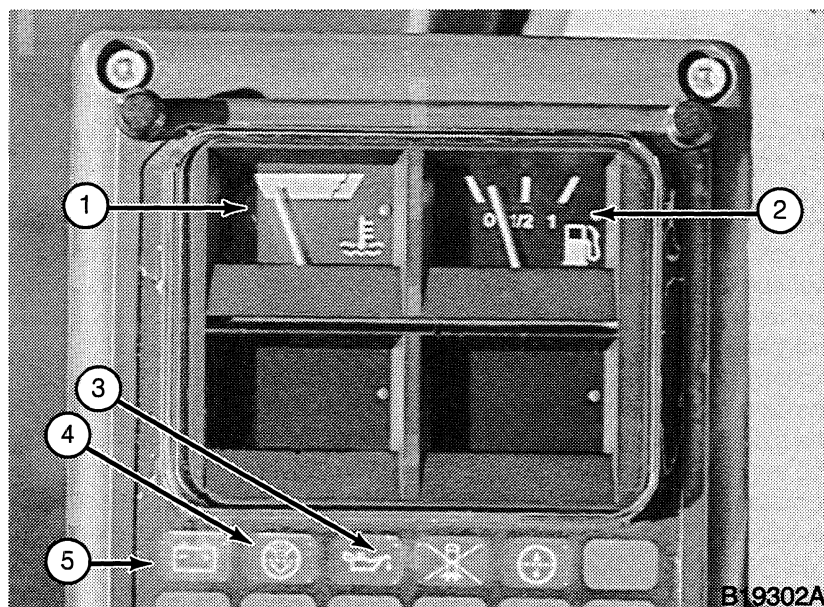
INSTRUMENTS/CONTROLS

SECTIONAL INDEX

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INSTRUMENTS/CONTROLS

CONTROL PANEL



1. ENGINE TEMPERATURE GAUGE - This gauge indicates the engine temperature. If the gauge pointer enters the red zone of the gauge, stop the engine immediately and check for the problem.

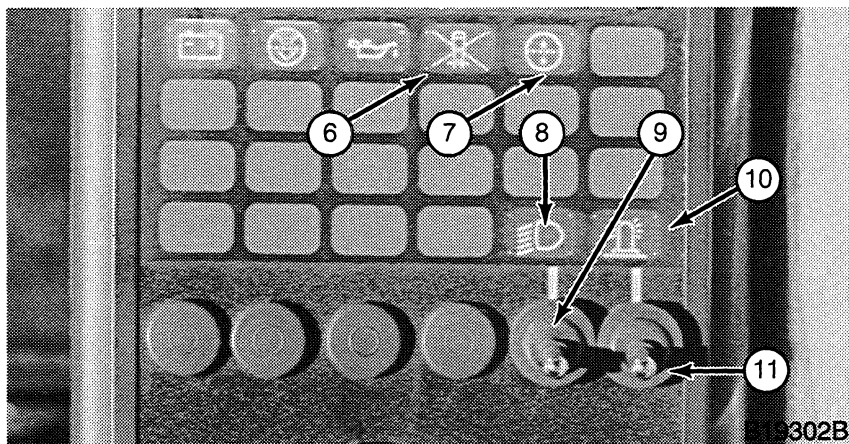
2. FUEL GAUGE - This gauge indicates the level of fuel in the fuel tank.

3. ENGINE OIL PRESSURE WARNING LAMP - This lamp will illuminate when the key switch is in the ON position and the engine is not running, or when the engine oil pressure is low. If the lamp illuminates during operation, stop the engine and check for the problem.

4. AIR CLEANER RESTRICTION WARNING LAMP - This lamp will illuminate when the air cleaner filter elements are in need of service.

5. BATTERY WARNING LAMP - This lamp will illuminate when the key switch is in the ON position and the engine is not running or when the engine is running and the alternator is not charging the batteries. If the lamp illuminates when the engine is running, stop the engine and check for the problem.

INSTRUMENTS/CONTROLS



6. PILOT PRESSURE WARNING LAMP - This lamp will illuminate when the pressure for the control circuits is too low or when the left hand control console is raised into the PARK position. See page 37. If the warning lamp illuminates while you are operating the machine, stop the engine and check for the problem.

7. HYDRAULIC FILTER WARNING LAMP - This warning lamp will illuminate, when the fluid is cold 41°F (5°C), or when the filter elements need servicing. If the lamp illuminates during operation, stop the engine and service the filters.

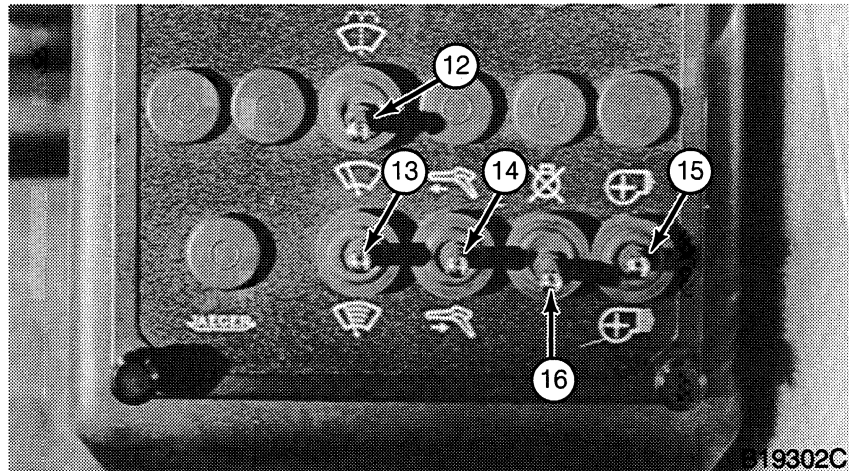
8. WORKING LIGHT INDICATOR LAMP - This lamp will illuminate when the working lamp switch (item no. 9) is put in the ON position.

9. WORKING LIGHT SWITCH - This switch has two positions, OFF and ON. When the switch is in the ON position the upperstructure headlamps, attachment working lamps and tail lamps will illuminate and the indicator lamp (item no. 8) will illuminate.

10. Not used.

11. Not used.

INSTRUMENTS/CONTROLS



12. WINDSHIELD WASHER SWITCH - This switch has two positions, OFF and ON. When the switch is held in the front position the windshield washer will operate. This switch will return to the OFF position when released.

13. WINDSHIELD WIPER CONTROL - This control has three positions. With the lever moved forward: intermittent action; lever vertical: stop; lever moved backwards: continuous action.

14. Not used.

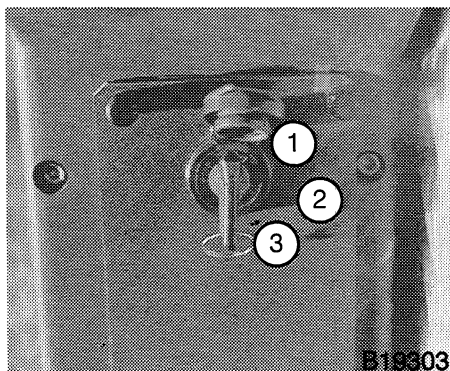
15. VENTILATION BLOWER SWITCH - This switch has three position. Lever tilted to front position : low speed. Lever in vertical position : stop. Lever tilted to back position : high speed. When in front or back position the ventilated air will be cold or hot depending on the position of the heating control, see chapter "heating system".

16. WARNING LAMP CHECK SWITCH - This switch has two positions. Use this switch to check the warning lamp bulbs. Turn the key switch to the ON position. Warning lamps 3, 5 and 6 will illuminate. Push the lever to the front position. Warning lamps 4 and 7 will illuminate. If any of the warning lamps do not illuminate, replace the bulb. This switch will return to the OFF position when released.

INSTRUMENTS/CONTROLS

OPERATING CONTROLS

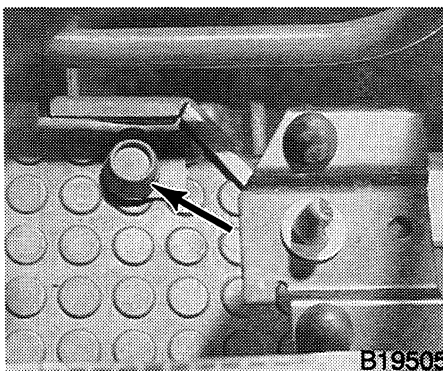
Starter Key Switch



Position of the key

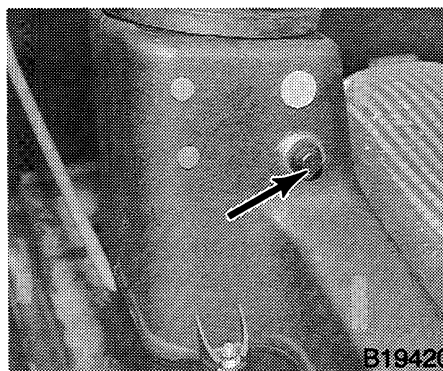
1. OFF
2. ON
3. START

Engine Stop Control



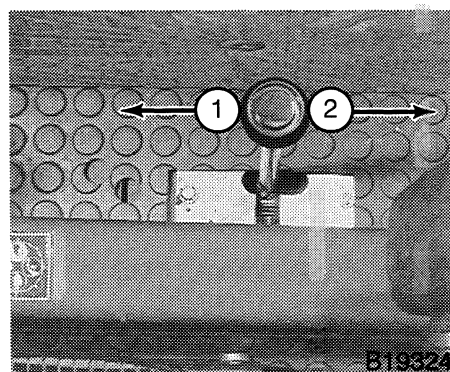
Push the control and wait until the engine has stopped before releasing the control.

Ether Button



This button is on the left hand control lever console. See Cold Temperature Starting in Operating Instructions.

Hand Throttle



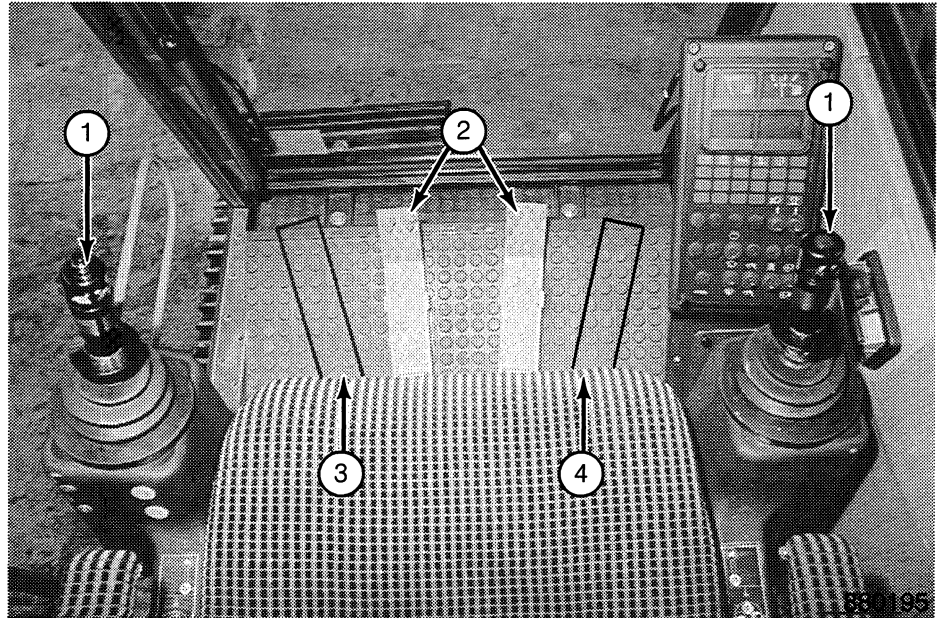
By using this control, the speed of the engine can be increased or reduced.

1. "Slow Idle" position - Move the lever forward.
2. "Maximum speed" position - Move the lever rearward.

IMPORTANT: When working, it is mandatory to place the lever in the "Maximum speed" position.

INSTRUMENTS/CONTROLS

Control Levers and Pedals



There are optional control patterns available for this machine. Before you start the engine, make sure you know the location and function of each control. Wrong operation of the controls can cause injury or death.

1. ATTACHMENT AND SWING CONTROL LEVERS - See section "Operating instructions". The speed of the movement depends on the tilting angle of the lever. When the lever is in a half way position, two functions are obtained at the same time.

2. TRAVEL CONTROL PEDALS - See section "Operating instructions". If both pedals are pressed forward or rearward, the machine moves in a straight line.

"Forward drive" - This means that the machine moves forwards while the travel hydraulic motors are located behind the operator.

Depressing the pedals increases the travel speed, releasing the pedals decreases the travel speed.

To change the direction either press on only one pedal or toe down on one pedal and heel down on the other (pivoting on the spot).

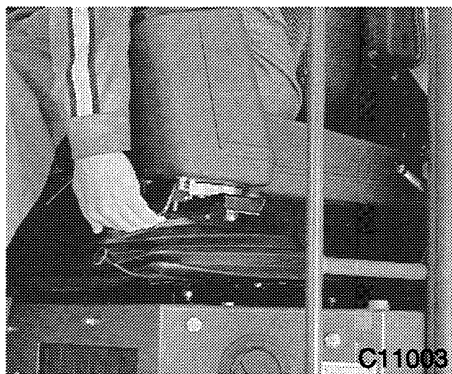
3. PEDAL FOR OPTIONAL EQUIPMENT - See section "Operating instructions".

4. PEDAL FOR TURNTABLE LEVELER (if equipped) - See section "Operating instructions".

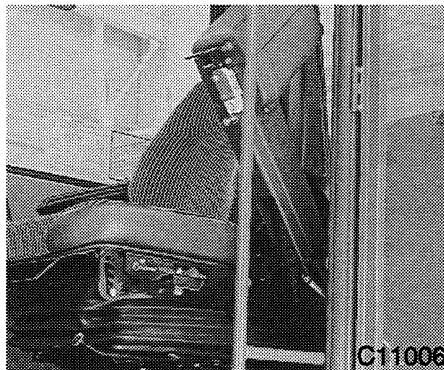
INSTRUMENTS/CONTROLS

Control Cutout Armrest

Raise left-hand armrest to cutout the controls.



To unlock the left hand console, pull the latch located under the front of the console.



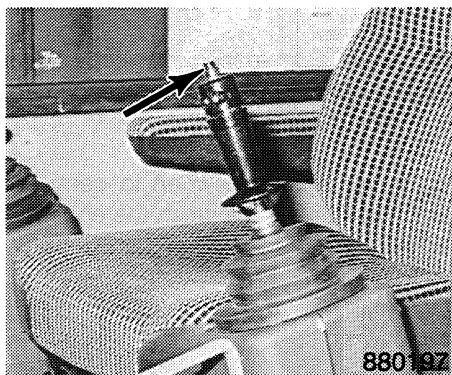
When the console is raised, all hydraulic controls are disconnected by an electrical contact which cuts out the hydraulic pilot circuit.

NOTE: Before you start operation, make sure that the console is locked correctly.



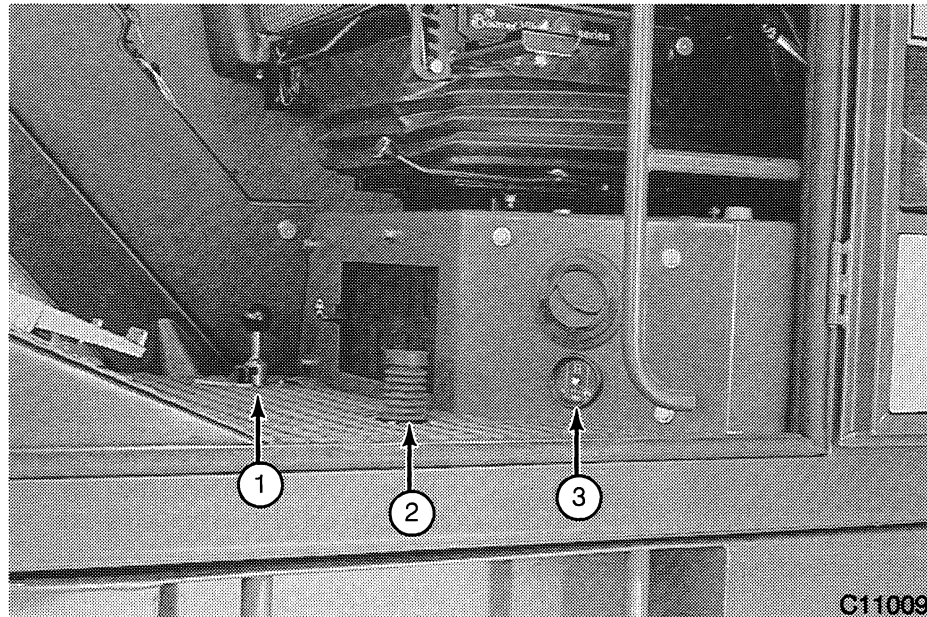
It is very important to raise the left hand control console before leaving the cab. This is to prevent accidental operation of the left hand control lever which could cause injury or death.

Horn Button



The control lever is equipped with a button at the tip which operates the horn.

INSTRUMENTS/CONTROLS



1. **TURNTABLE LOCKING LEVER** - The lever located on the front right-hand side, controls the turntable locking pin. The locking device is used to lock the turntable so that it does not swing.

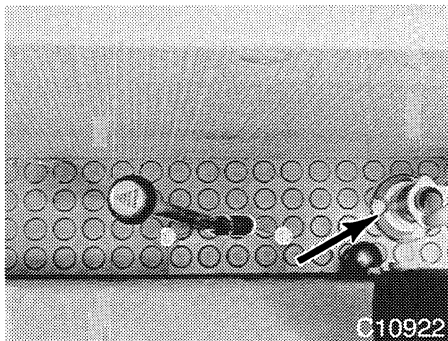
There are two locking points on the undercarriage frame, one for locking the upperstructure in the front position and the other for locking the upperstructure in the rear position. The upperstructure pin is controlled by a lever located on the front right-hand side of the operator's seat. See section "Operating Instructions".

2. **EMERGENCY PUMP** - In the event of engine failure, actuate the emergency pump to lower the bucket to the ground, while maintaining one or other of the attachment controls in the desired position.

3. **HOURMETER** - The hourmeter enables you to determine when to carry out servicing operations. It adds hours in the same way as a clock when the engine is running. See section "Lubrication/Filters/Fluids".

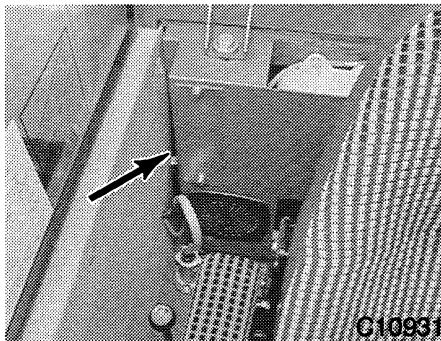
INSTRUMENTS/CONTROLS

Power Line Connection



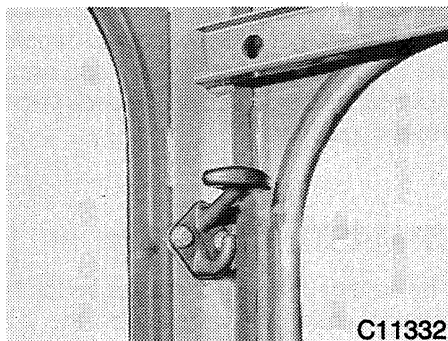
This connection is used to feed the cab electrical equipment.

Location for Cab Radio

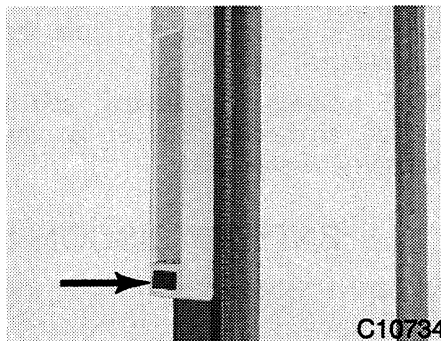


This location is provided for mounting a 12V car radio.

Coat Hook

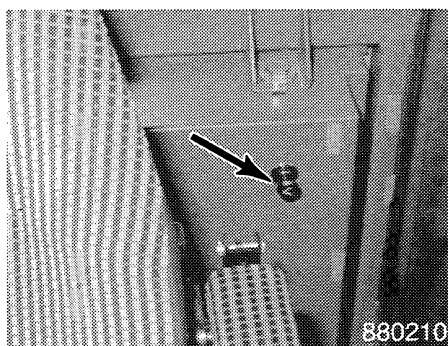


Cab Lamp



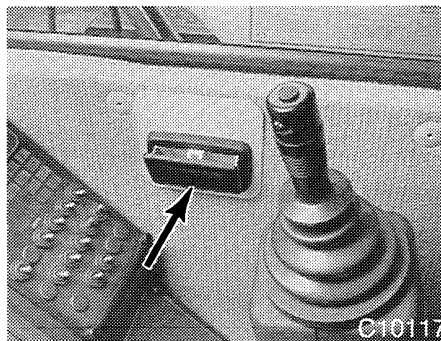
The cab lamp is controlled by a switch built into the lamp support.

Cigarette Lighter



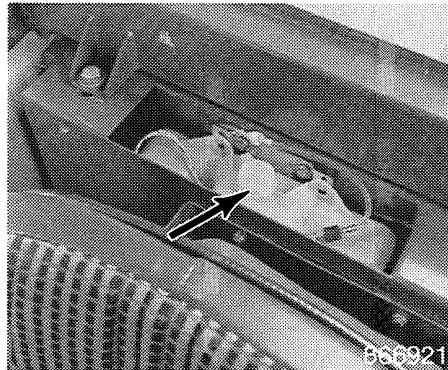
The lighter is located to the rear of the seat on the left hand side.

Ashtray



INSTRUMENTS/CONTROLS

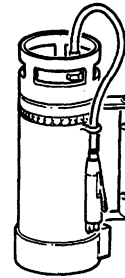
Windshield Washer Reservoir



Located behind the operator's seat, near the manual compartment. The reservoir holds 2.1 quarts (2 litres) and is fitted with an electric pump operated from the control panel.

NOTE : During cold weather, add a washer antifreeze additive to the windshield washer water.

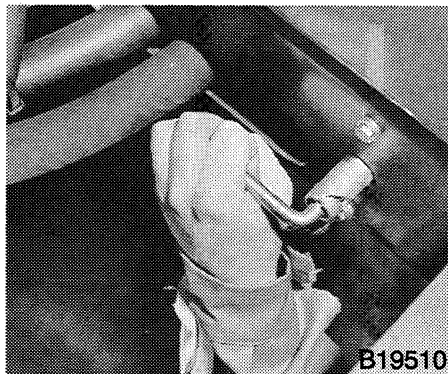
Fire-Extinguisher (Optional)



It is not necessary to drill the cab body to install the fire-extinguisher as it is secured by screws to the left hand pillar.

IMPORTANT : As soon as the excavator is delivered, get to know how to handle the fire-extinguisher. The operating instructions are printed on the body of the fire-extinguisher.

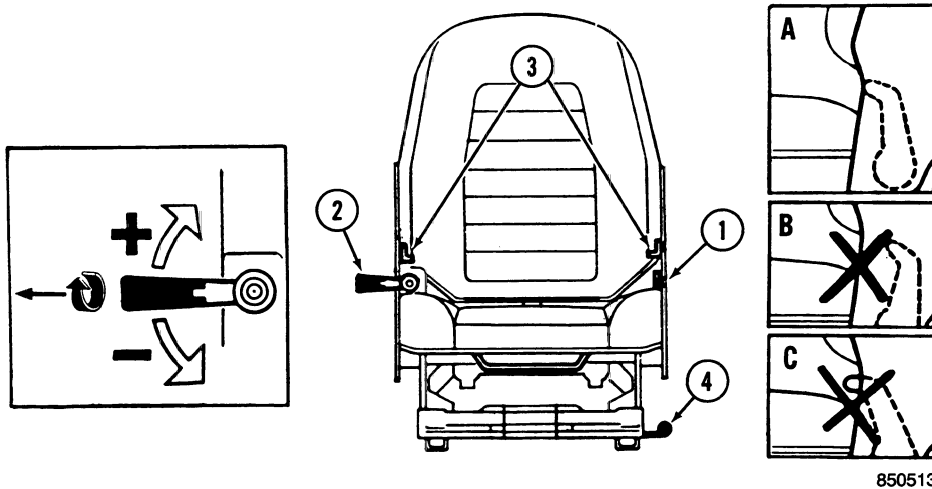
BATTERY DISCONNECT MASTER SWITCH



The battery disconnect master switch is located under the walkway on the left hand side of the machine and is used to totally disconnect the batteries from the electrical circuit. When the switch is in the vertical position, the circuit is disconnected.

INSTRUMENTS/CONTROLS

OPERATORS SEAT



Before operating the machine, adjust the seat.

Suspension Adjustment

To check and adjust the seat for correct suspension do the following:

1. Sit in the seat.
2. Check the tension indicator (item 1).

Figure A shows the correct tension. The pointer is even with the seat back frame.

Figure B shows the pointer indicating not enough tension. Increase tension.

Figure C shows the pointer indicating too much tension. Decrease the tension.

3. To increase the tension, use the tension adjustment lever (item 2). Pull the handle out and rotate the handle until the + (plus) decal faces upward, then release the lever.
4. Move the tension adjustment lever up and down until the tension indicator, Figure A, shows the correct tension.
5. To decrease the tension, pull the handle out on the tension adjustment lever and rotate the handle until the - (minus) decal faces upward, release the lever.
6. Move the tension adjustment lever up and down until the tension indicator, Figure A, shows the correct tension.

INSTRUMENTS/CONTROLS

Backrest Adjustment

To adjust the backrest, push down the backrest catch (item 3 previous page) and move the backrest to one of the three angles.

Fore/Aft Adjustment

Move the seat adjustment lever (item 4 previous page) to the right and slide the seat forward or rearward to the position needed. Release the lever and lock the seat into the position.

Cushion Tilt

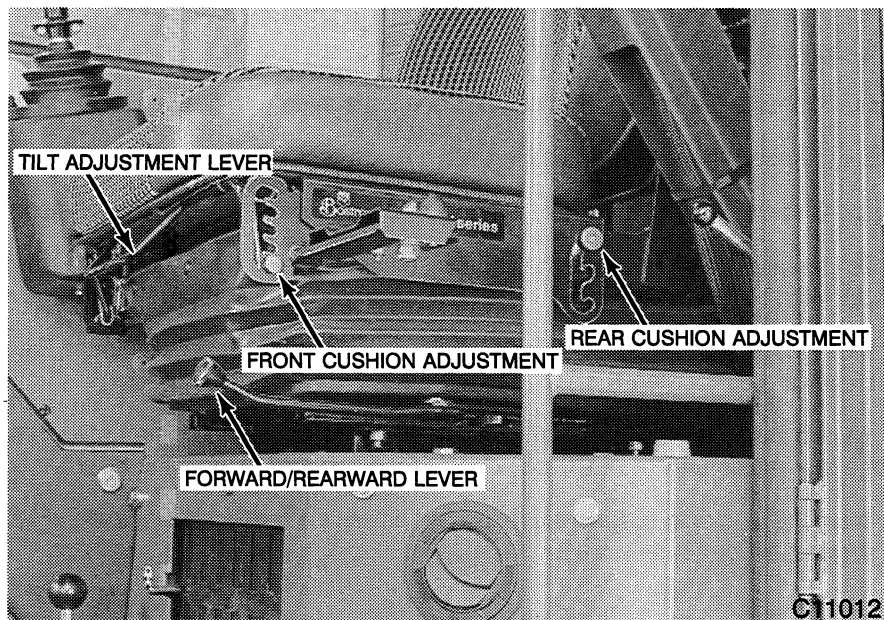
To raise or lower the front of the cushion, pull up on the tilt adjustment lever and select one of the four positions at the front cushion adjustment.

To raise or lower the back of the cushion, pull up on the tilt adjustment lever and push the cushion rearward select one of the three positions at the rear cushion adjustment.

Armrest Adjustments

The armrests can be adjusted to various angles. Raise the front part of the armrest to obtain the angle required, adjust the knurled knob situated under the armrest, then lower the armrest completely.

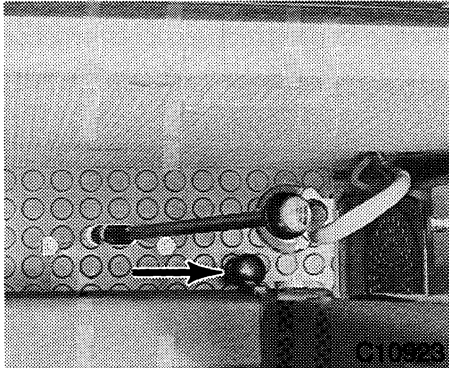
- a. Lift front of armrest all the way up.
- b. Lower armrest completely.



INSTRUMENTS/CONTROLS

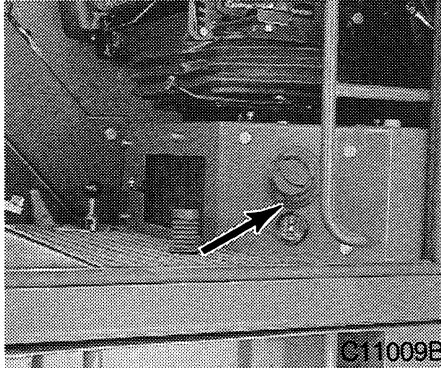
HEATING SYSTEM

Heating Control



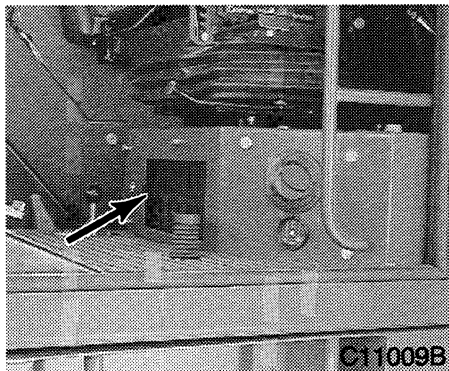
The control enables the heater feed shutoff to be gradually opened and closed. To adjust, move the control vertically.

Recirculation Inlet



Tilt inlet flaps to adjust suction. Turn the inlet to position suction in the right direction.

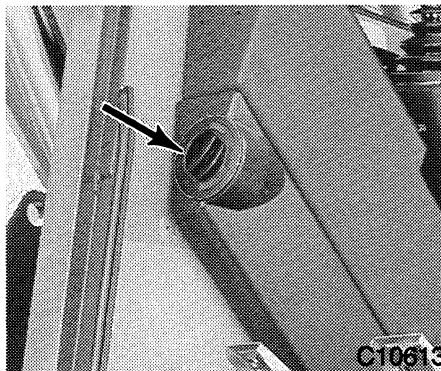
Air Distributor



Use handle, to adjust the flow rate. The handle can be moved horizontally (gradually).

NOTE : Hot or cold air can be given off, depending on the position of the heating control.

Windshield Defrosting Air Distributor

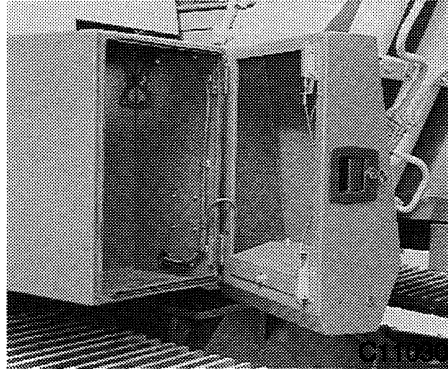


Tilt distributor flaps to adjust the flow rate. Turn the distributor to direct the flow in the right direction.

NOTE : Hot or cold air can be given off, depending on the position of the heating control.

INSTRUMENTS/CONTROLS

TOOL COMPARTMENT



Located on the right side of the turntable, at front, the tool compartment gives storage for parts required for emergency repairs and the tools for maintenance operations.

IMPORTANT : *Before travelling, make sure the compartment door is correctly locked.*

OPERATING INSTRUCTIONS

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OPERATING INSTRUCTIONS _____

BEFORE USING THE MACHINE

1. Get to know the site safety organization.
2. Walk around the excavator, and check for leaks. Tighten loose parts and make replacements where required.
3. Remove everything which can prevent visibility. Clean the windshields and windows.
4. The operator must be alone on the machine.
5. Make sure that there is nobody beneath or on the excavator.
6. Do not allow someone to stand in the working area of the machine.
7. Clean or replace any safety decals which cannot be read.
8. See the maintenance schedule and do the operations as required.

NOTE : *If this machine is a new machine or if the engine has been rebuilt, see run-in period chapter for additional information.*

OPERATING INSTRUCTIONS

RUN-IN PERIOD

To ensure greater longevity, better characteristics and more economical operation, pay particular attention to the engine during the first 20 operating hours.

During that period, follow the recommendations listed below

1. Warm up the engine before you use it under load.
2. Do not run the engine at idle for a long time.
3. Frequently watch the control panel instruments giving oil pressure and coolant temperature.
4. Frequently check oil and coolant levels.

The following operations must be done in addition to those provided in the Maintenance Programme :

AFTER FIRST 20 HOURS

Check torque of track pad bolts..... See section "Tracks" .

AFTER FIRST 100 HOURS

Check torque of track pad bolts.....See section "Tracks".

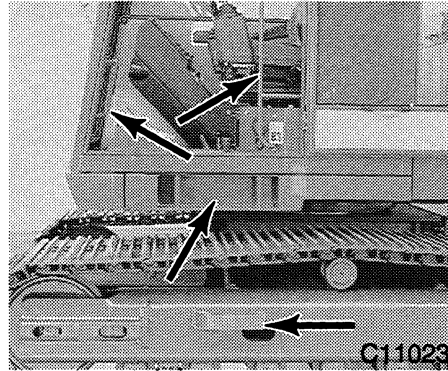
AFTER FIRST 500 HOURS

Change swing reduction gear housing oil... See section "Lubrication/Filters/Fluids"

Change travel reduction gear housing oil ... See section "Lubrication/Filters/Fluids"

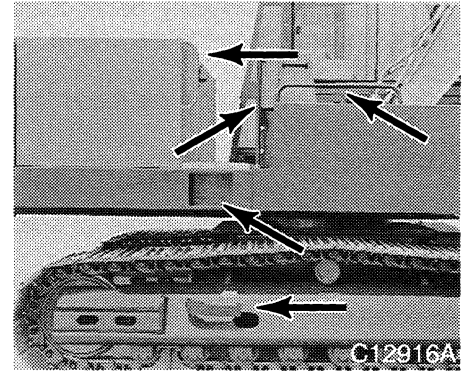
OPERATING INSTRUCTIONS

FOOTBOARD AND ACCESS HANDLES



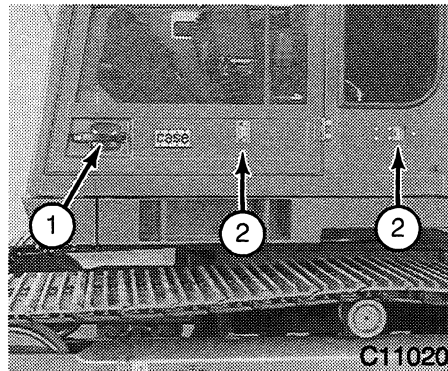
To climb into or out of the cab, align the turntable with the undercarriage centreline, then use the steps and access handles.

IMPORTANT: *Never pull on a lever or the door handle to get in or out of the cab.*

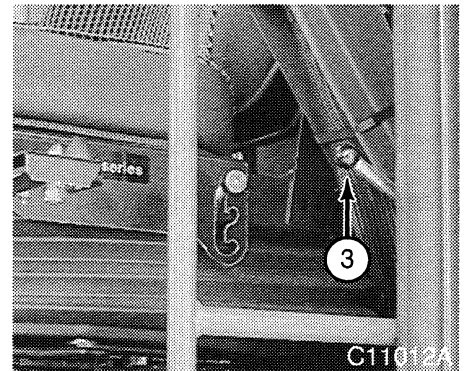


To climb on or off the turntable align the turntable with the undercarriage centreline, then use the steps and access handles.

CAB DOOR



Use handles (1) to open the door. The door can be kept open, using locking device (2).



To unlock the cab door, push levers (3) downwards.

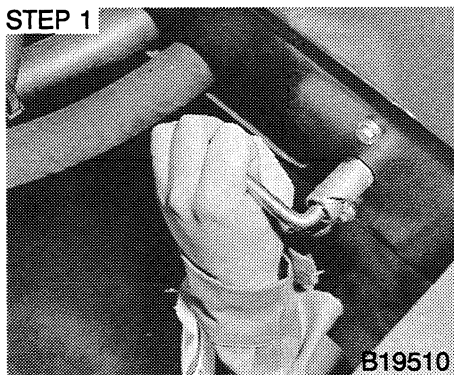
IMPORTANT : *The door must always be locked in open or closed position. Do not leave it in a half-open position.*

OPERATING INSTRUCTIONS

NORMAL STARTING PROCEDURE

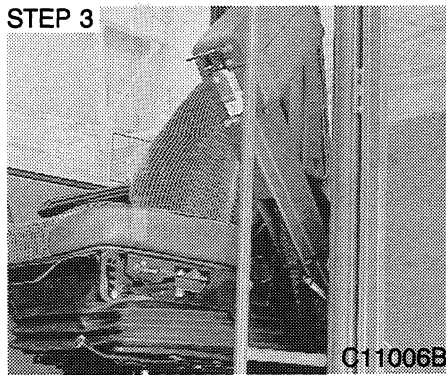
IMPORTANT : *It is important that enough lubricant reaches the turbocharger bearings before operating the engine at rated speed.*

STEP 1



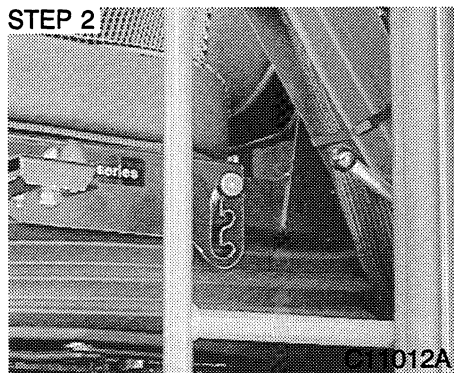
Turn the master disconnect switch to the ON position.

STEP 3



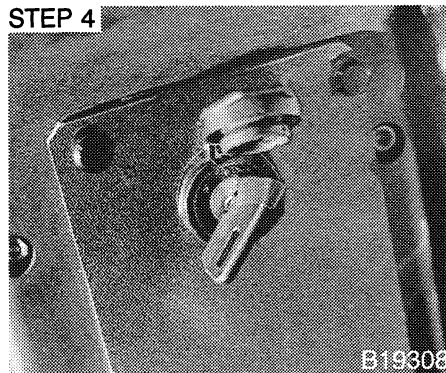
Raise the left hand control console into the PARK position.

STEP 2



Adjust the seat.

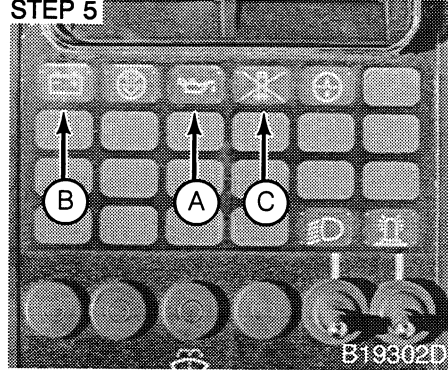
STEP 4



Turn the key switch to the ON position.

OPERATING INSTRUCTIONS

STEP 5

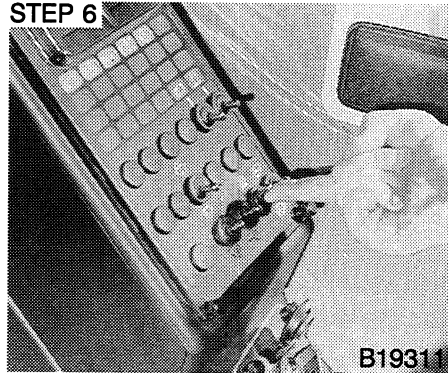


Check the following warning lamps on the instrument panel.

- Engine oil pressure warning lamp.
- Battery charging warning lamp.
- Pilot pressure warning lamp.

Replace any lamps that are not illuminated.

STEP 6



Hold the warning lamp check switch. Check the following warning lamps.

Air cleaner restriction warning lamp.

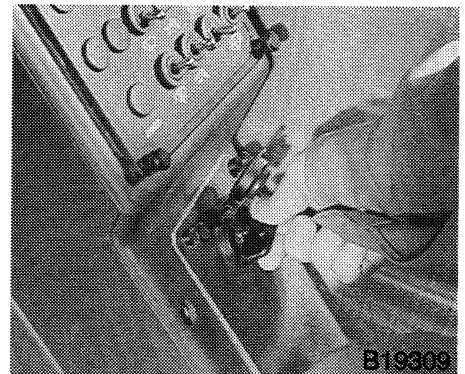
Hydraulic filters warning lamp.

Release the warning lamp check switch.

Replace any lamps that are not illuminated.

IMPORTANT : It is very important that enough lubricant reaches the turbocharger bearings and engine parts before operating the engine at rated speed.

STEP 7

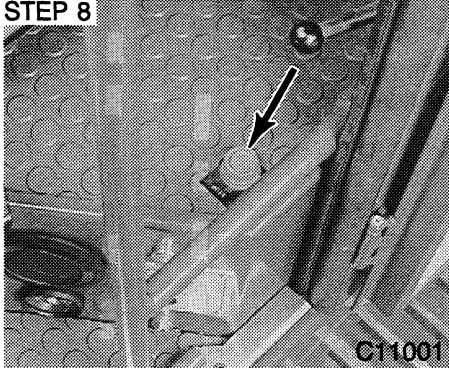


Push and hold the emergency engine stop control to prevent the engine starting.

At the same time turn the key switch to the START position and hold for 15 seconds. Release the key switch.

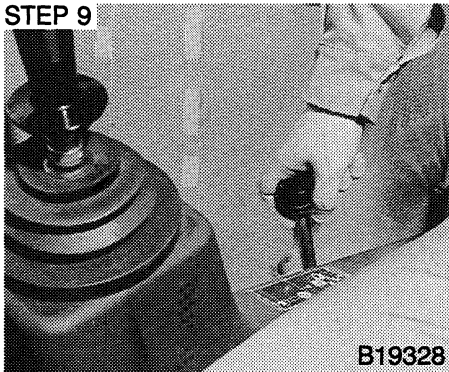
OPERATING INSTRUCTIONS

STEP 8



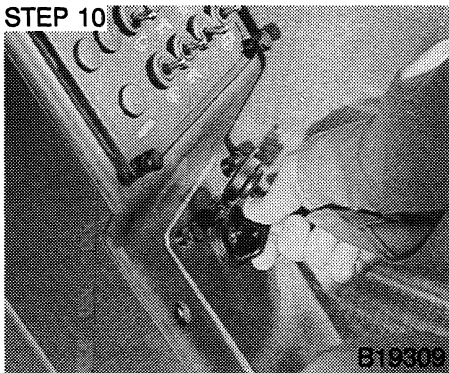
Release the emergency engine stop control.

STEP 9



Move the throttle control lever to 1/4 throttle.

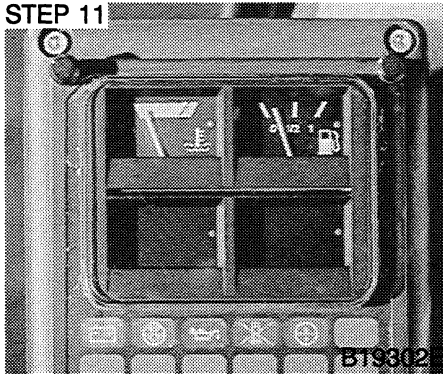
STEP 10



Turn the key switch to the START position. Release the key as soon as the engine begins to run. If the engine begins to run, and then stops, wait for one minute before trying to start again.

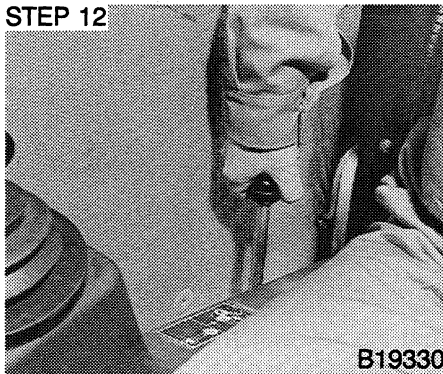
Do not operate the starter motor for more than 30 seconds at one time. Do not operate the starter motor with the engine running.

STEP 11



After the engine starts and runs, check the gauges and warning lamps to make sure that all systems are working correctly.

STEP 12



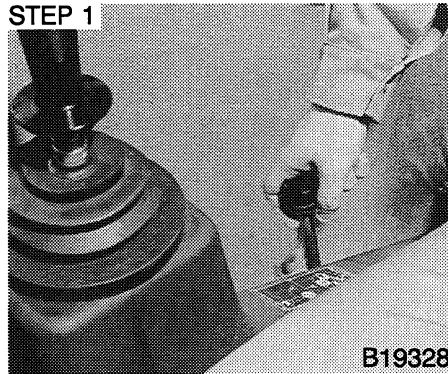
Run the engine at 1/2 throttle until the engine is at operating temperature.

OPERATING INSTRUCTIONS

ENGINE STARTING USING ETHER STARTING FLUID

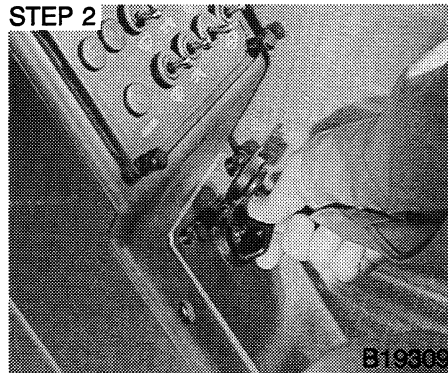
To start the engine at cold ambient temperatures of 20°F (-6.7°C) or lower, use ether starting fluid according to the following procedure.

STEP 1



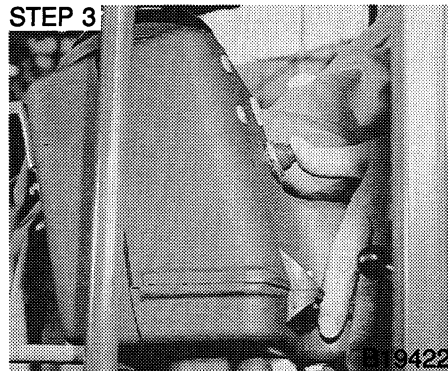
Put the throttle lever in the 3/4 to FULL throttle position.

STEP 2



Turn the key switch to START position and crank the engine.

STEP 3



While cranking the engine, press the ether button for one second and release, repeat after ten seconds. Do not operate the starter for more than 30 seconds.

NOTE: Only use ether when the engine is being cranked. If the engine does not start after operating the ether button twice, check for an empty ether container. If the engine does not start after 30 seconds, wait 2 minutes, then repeat steps 2 and 3.

STEP 4



As soon as the engine starts, move the throttle lever to 1/3 to 1/2 throttle position until the engine is at operating temperature.

When the engine starts, check the oil pressure gauge. If there is no oil pressure, stop the engine and check for the cause.

IMPORTANT: If the hydraulic oil is cold and the hydraulic filter warning lamp illuminates operate the swing circuit until the fluid is warm and the warning lamp stops illuminating.

OPERATING INSTRUCTIONS

ENGINE OPERATION

As far as possible work with the engine running at full speed.

Use the control levers and pedals to control the operating speed of the machine and attachments.

Frequently watch the gauges and warning lamps.

COLD TEMPERATURE OPERATION

Checks

1. Batteries.

These must be fully charged.

2. Fuel

a) To prevent condensation in the fuel tank and water entering the fuel system, fill the fuel tank after each operating day and drain water and sediment before each day's work.

b) To prevent crystal formation at 28.4°F (-2°C), use a fuel which is rated for ambient temperature conditions or add an appropriate antifreeze to the fuel.

3. Engine oil

This should have a viscosity corresponding to the outside temperature. See Lubrication/filters/fluid section.

4. Hydraulic fluid

This should have a viscosity corresponding to the outside temperature. See Lubrication/filters/fluids section.

5. Cooling system

This must be suitable for the ambient temperature conditions and must contain a minimum of 50% ethylene glycol.

Starting the Engine

To start the engine, see chapter "Engine starting using ether starting fluid".

Stopping the Engine

Let the engine idle for 3 to 5 minutes, in order to allow the engine temperature to drop before switching off.

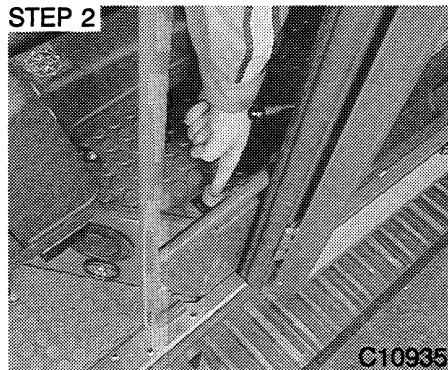
OPERATING INSTRUCTIONS

STOPPING THE ENGINE

STEP 1

IMPORTANT : *Run the engine at low idle speed for approximately 1 minute to prevent the turbo-charger from seizing.*

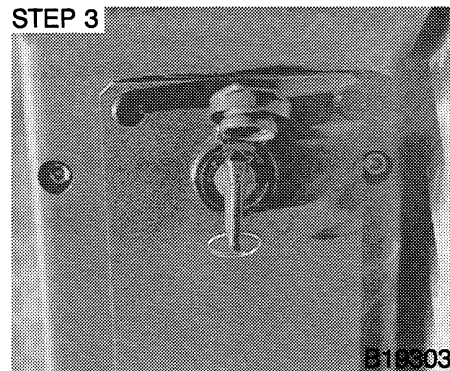
STEP 2



Press the engine stop control and wait until the engine has stopped, then release the control.

NOTE : *If you temporarily stop the machine, see chapter "Parking the machine".*

STEP 3



Turn the key switch to the OFF position.

IMPORTANT: *If the ambient temperature is cold, run the engine at low idle for 3 to 5 minutes, so that the temperature can decrease before stopping the engine.*

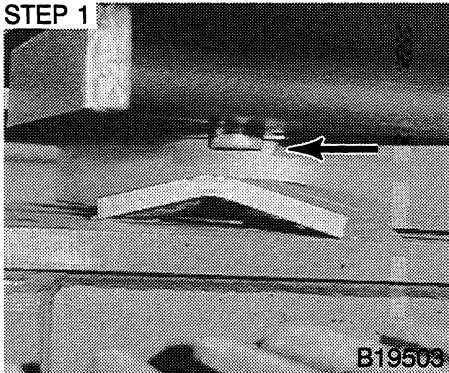
OPERATING INSTRUCTIONS

LOCKING THE UPPERSTRUCTURE

NOTE: Machines equipped with Turntable Leveler are not equipped with an upperstructure locking system.

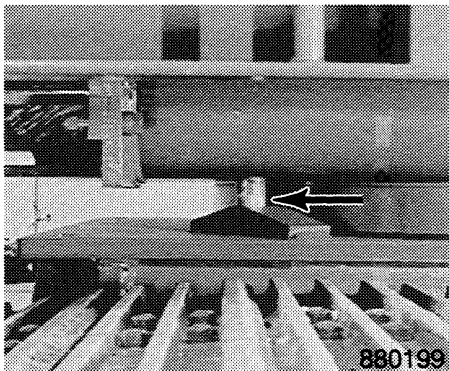
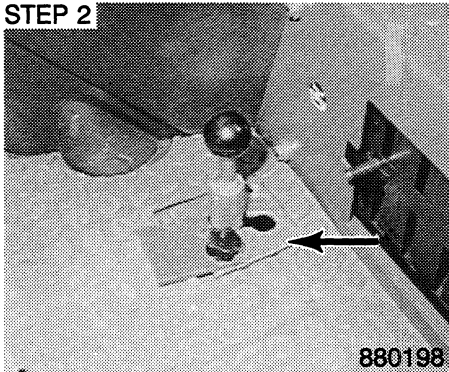
Locking

STEP 1



Swing the upperstructure to align the locking pin with the locking bracket.

STEP 2

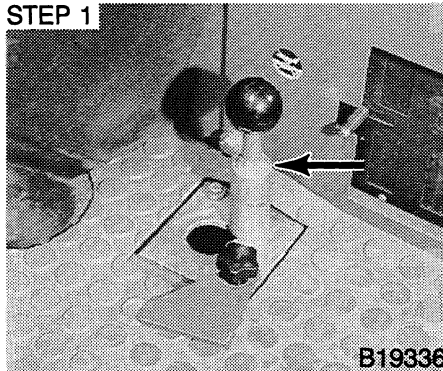


Pull the lever up and forward then slowly lower the locking pin into the bracket.

NOTE : Operate the swing control to align the pin with the hole in the bracket.

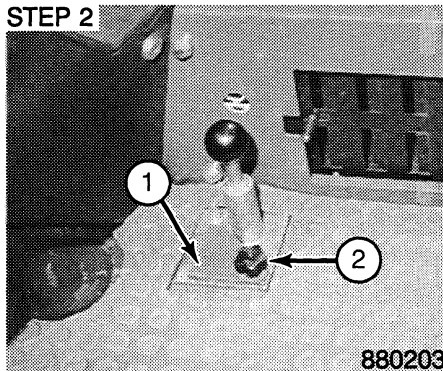
Unlocking

STEP 1



Pull the lever up and rearward to raise the pin from the locking bracket.

STEP 2



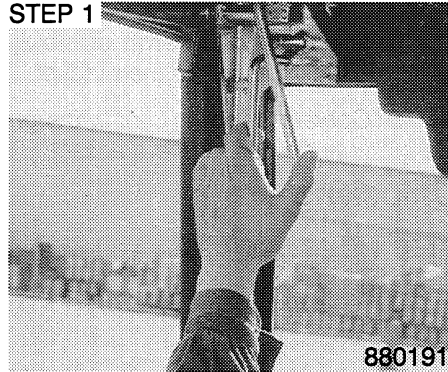
Lock the lever in this position with the stop (1) and screw (2).

OPERATING INSTRUCTIONS

WINDSHIELD

Opening the Windshield

STEP 1



Depress the levers to disengage the latch on each side of the windshield then pull the windshield backwards.

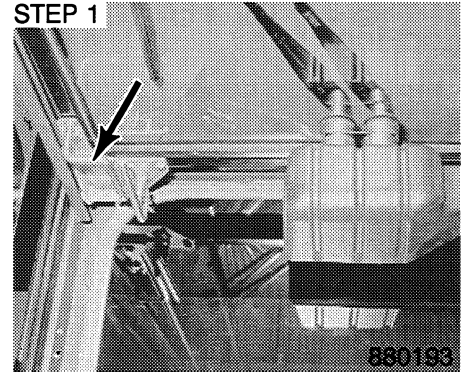
STEP 2



Slide the windshield backwards, into the horizontal position using the inner handles, then pull until it engages in the locking ports.

Closing the Windshield

STEP 1

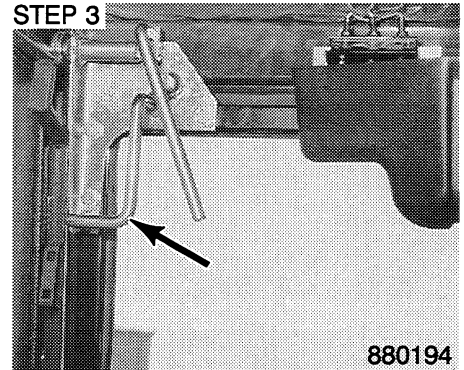


Depress the levers to disengage the latches.

STEP 2

Slide the windshield forwards and down to the lower position.

STEP 3



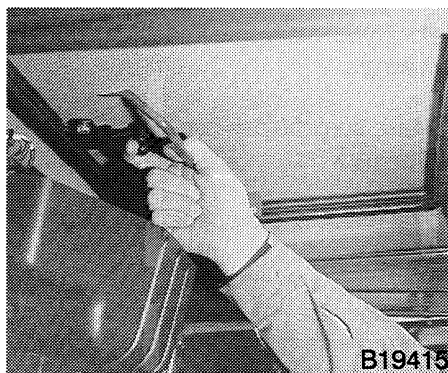
Push the windshield, using the upper handles, until the latches engage.



In some configurations, the tool (bucket) can hit the windshield when open, due to the working range of the attachment. Always observe a minimum safety distance between the tool and the windshield (swinging of tool or wrong manoeuvre).

OPERATING INSTRUCTIONS

ROOF HATCH

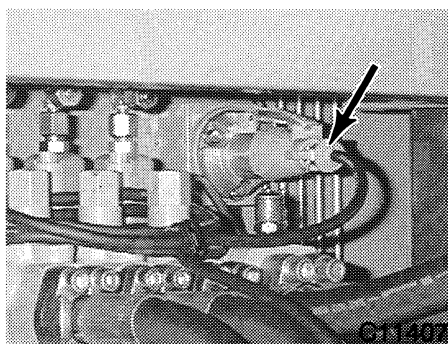


To open the hatch, pull the lock lever rearwards and push the hatch up.

To close the hatch, pull the hatch down with the handle until the lock engages.

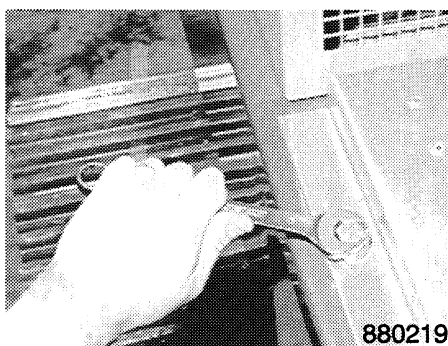
POWER LINE SOCKETS

Valve Bank Partition

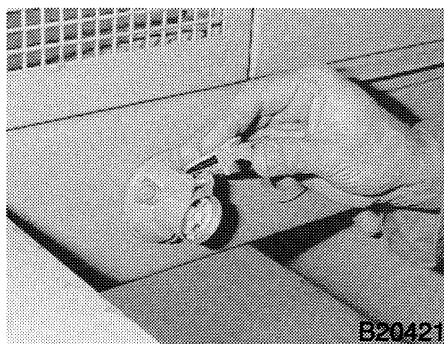


The 24 volt power line socket is fastened to the valve bank partition. This socket supplies the attachment working light.

Walkway



To gain access to the power socket open the walkway. Loosen the screws at each end of the walkway.



Another power line socket (24 volts) is located below the walkway, on the right hand side and can be used to connect the fuel filler pump, an inspection light or any other 24 volts accessory.

OPERATING INSTRUCTIONS

MACHINE OPERATION

Before operating the machine make sure all the access panels and doors are closed and locked.

If the cab door is open make sure the door is latched in the open position.

Use a slow engine speed while you learn to operate the hand and foot controls. At first, operate the hand and foot controls separately, then operate two or more controls at the same time. Gradually increase the engine speed until the engine is running at full throttle.

Before you move the machine, do the following :

1. Make sure the cab is over the idle end of the track frame (TRAVEL position).
2. Make sure the dipper and bucket are fully retracted.
3. Make sure the swing lock pin is engaged when travelling, to prevent the turntable from turning.

OPERATING INSTRUCTIONS

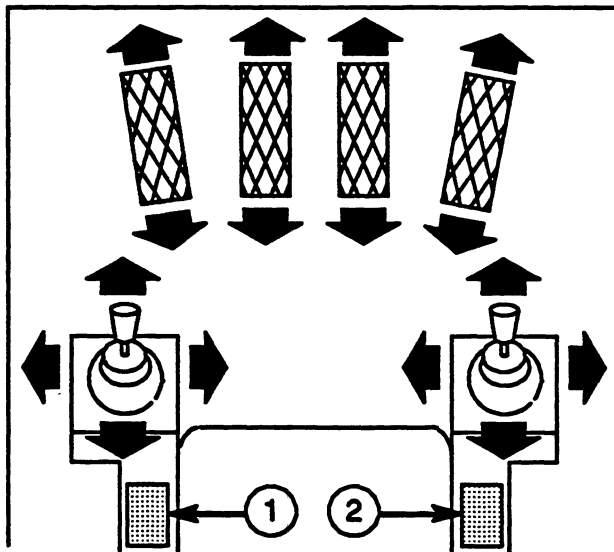
HAND AND FOOT CONTROLS



There are optional control patterns available for this machine. Before you start the engine, make sure you know the location and function of each control. Wrong operation of the controls can cause injury or death.

The control pattern decals in the cab show the control pattern installed on your machine. The decals are located on the arm of the control consoles. The left hand decal is for the left hand control lever and the two left floor control pedals. The right hand decal is for the right control lever and the right floor control pedal.

For the two control patterns authorized see section "Control Pattern C and D". Any change to the control pattern must be done by your dealer. New decals will be installed in the cab to show the pattern on the machine.



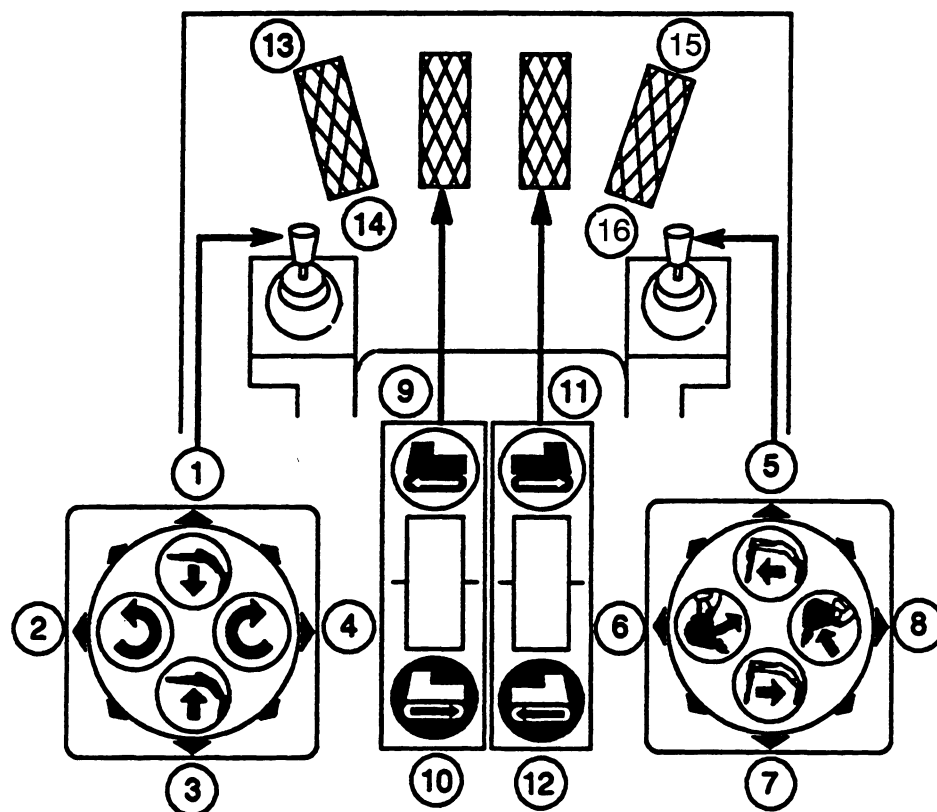
880364R

1. LEFT CONTROL PATTERN DECAL
2. RIGHT CONTROL PATTERN DECAL

OPERATING INSTRUCTIONS

CONTROL PATTERN C

Cab in normal working and travel position



880365R

LEFT CONTROL LEVER

1. Hoist down (boom down)
2. Swing left (turntable)
3. Hoist up (boom up)
4. Swing right (turntable)

RIGHT CONTROL LEVER

5. Crowd out arm, (dipper out)
6. Tool in (bucket in)
7. Crowd in arm, (dipper in)
8. Tool out (bucket out).

LEFT PEDAL, INSIDE

9. Left track forward
10. Left track reverse

RIGHT PEDAL, INSIDE

11. Right track forward
12. Right track reverse

LEFT PEDAL, OUTSIDE

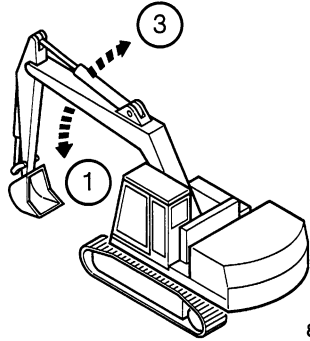
13. Optional
14. Optional

RIGHT PEDAL, OUTSIDE (If Equipped)

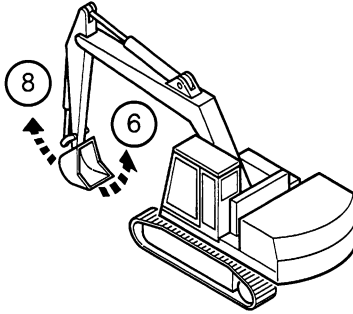
15. Tilt right
16. Tilt left

OPERATING INSTRUCTIONS

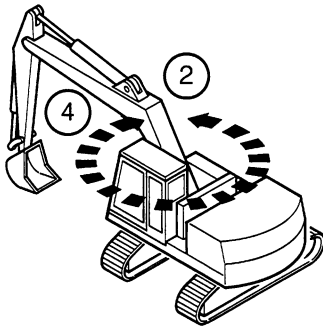
Control Pattern C



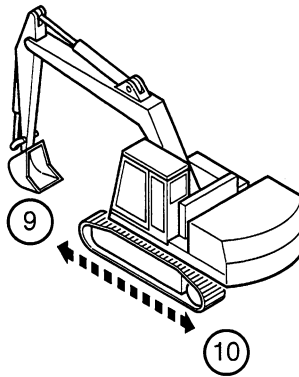
880368E



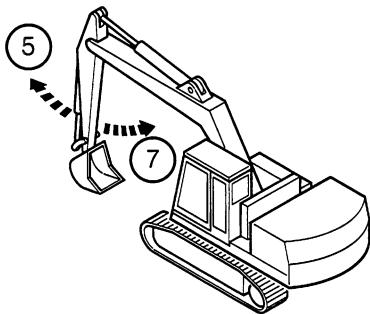
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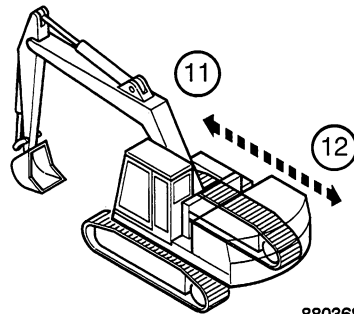
880368C



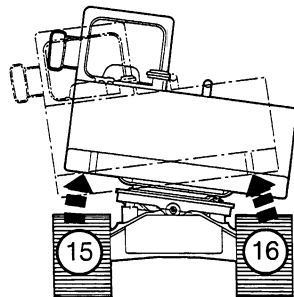
880368D



880368A



880368F

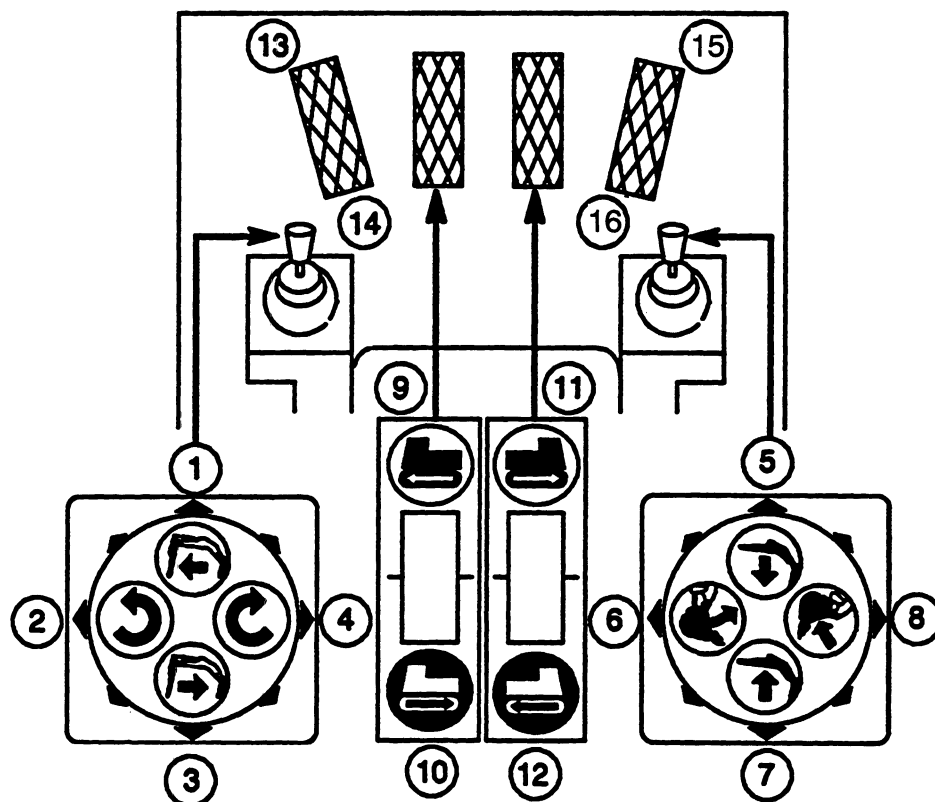


PDD0003

OPERATING INSTRUCTIONS _____

CONTROL PATTERN D

Cab in normal working and travel position



880367R

LEFT CONTROL LEVER

1. Crowd out arm, (dipper out)
2. Swing left (turntable)
3. Crowd in arm, (dipper in)
4. Swing right (turntable)

RIGHT CONTROL LEVER

5. Hoist down (boom down)
6. Tool in (bucket in)
7. Hoist up (boom up)
8. Tool out (bucket out)

LEFT PEDAL, INSIDE

9. Left track forward
10. Left track reverse

RIGHT PEDAL, INSIDE

11. Right track forward
12. Right track reverse

LEFT PEDAL, OUTSIDE

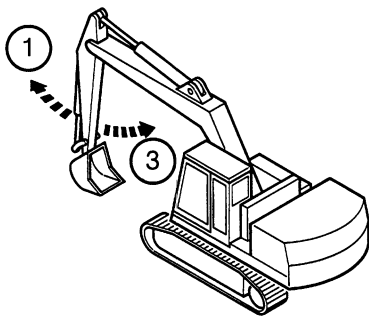
13. Optional
14. Optional

RIGHT PEDAL, OUTSIDE (If Equipped)

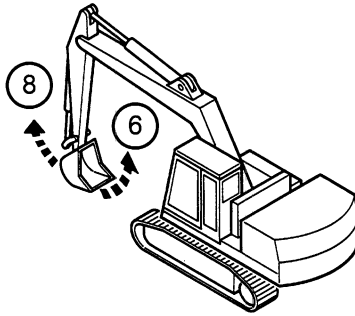
15. Tilt right
16. Tilt left

OPERATING INSTRUCTIONS

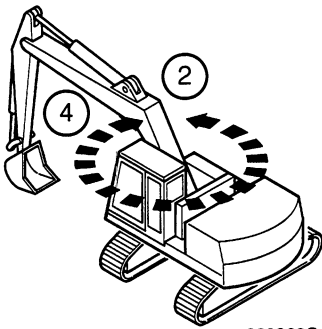
Control Pattern D



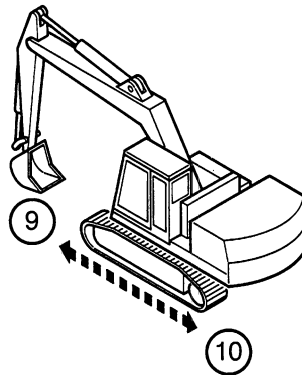
880368A



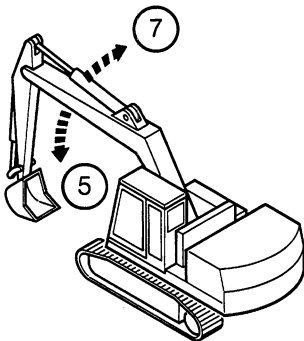
880368B



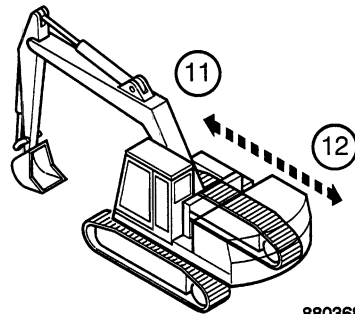
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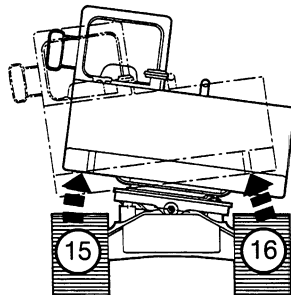
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880368E



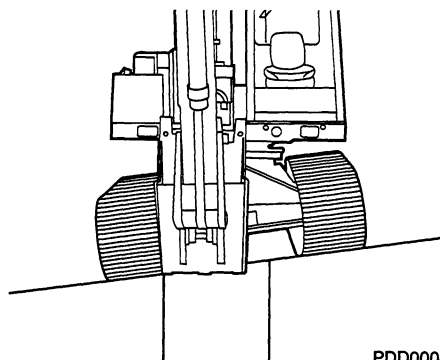
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PDD0003

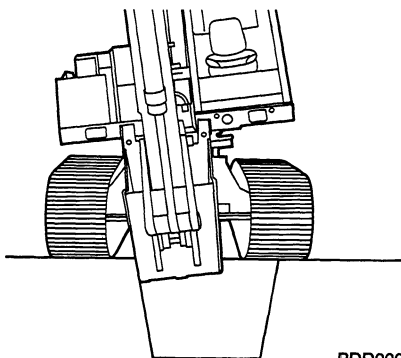
OPERATING INSTRUCTIONS

TURNTABLE LEVELER (If Equipped)



PDD0004

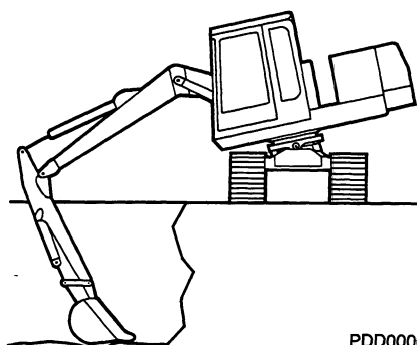
When digging on a slope, tilt the upper structure for a level, flat bottom trench.



PDD0005

To reduce cave-ins, tilt the upper structure to taper the trench.

You can also increase digging penetration when you rip frost at an angle.

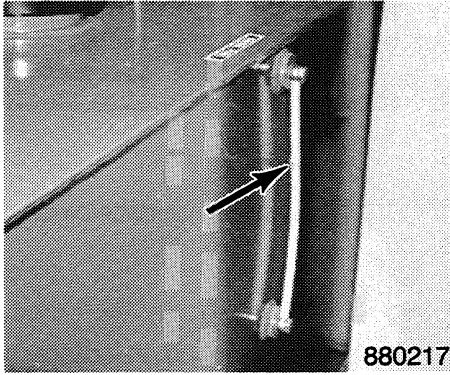


PDD0006

With this feature, you can increase the dumping height of the machine without losing any digging depth.

OPERATING INSTRUCTIONS

FUEL TANK



The capacity of the tank is 87 U.S. gal. (330 litres) which gives a running time of approximately 20 hours.

Carefully clean all round the fill cap before removing and avoid splashing when filling. During cold weather, fill the

tank after each day's work to prevent condensation from forming.

When filling, do not remove the filter.

Every week remove the filter and clean it with clean fuel.

When filling, the level can be checked by looking at the indicator fastened to the tank.

The maximum level must not go beyond the top of the indicator.

NOTE: *When the temperature is very cold, the use of a mixture of Number one and Number two Diesel Fuel is permitted for a short period of time. See your fuel Dealer for winter fuel requirements in your area.*



Never refuel the machine when the engine is hot or running. Never smoke while refueling.

M139B

FUEL TANK FILLER PUMP (Optional)

This pump is located inside the tool compartment and must only be used for the fuel.

Operation:

1. Connect the filler pump feed cable to the lower socket located below the walkway.

2. Install the suction and delivery pipes.

3. Turn the key switch to the ON position.

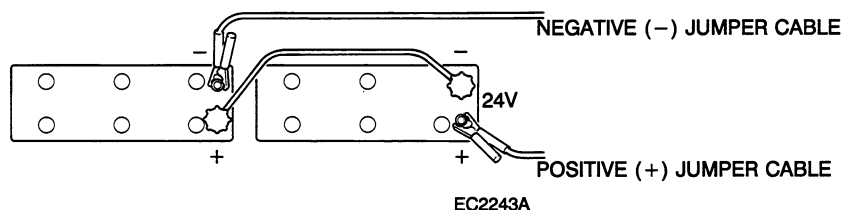
NOTE: *After using the filler pump disconnect the feed cable.*

OPERATING INSTRUCTIONS _____

CONNECTING A BOOSTER BATTERY



Wrong jumper cable connections to starter terminals or shorting across the starter terminals can cause an accident. Connect the jumper cables according to the instructions in this manual.

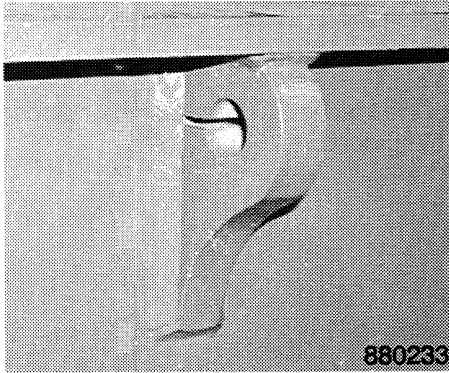


Two persons are required to carry out this procedure. Make sure that the booster battery has the same voltage as those of the machine (24 volts).

1. Connect the positive (+) jumper cable to the positive (+) terminal of the first battery, on the machine.
2. Connect the negative (-) jumper cable of the negative (-) terminal of the second battery, on the machine.
3. Start the engine.
4. Disconnect the negative (-) jumper cable, then the positive (+) jumper cable from the machine batteries.

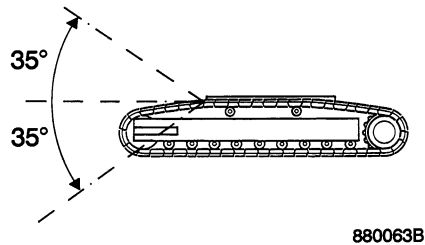
OPERATING INSTRUCTIONS

TOWING

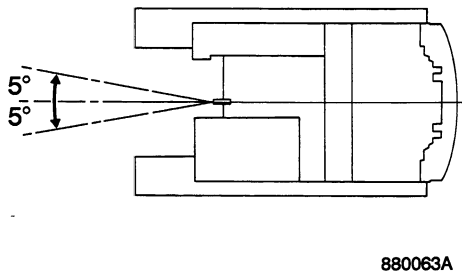


The towing capacity of the ring is 46 295 lb (21 000 kg).

Directional limits of stress



VERTICAL PLANE



HORIZONTAL PLANE

IMPORTANT: *Towing is a delicate operation, which is always done at the users risk. The manufacturer's guarantee does not apply to breakdowns and accidents which may occur when towing.*

The excavator should be towed very slowly and only if really necessary.

This towing method is only accepted for a short distance.

NOTE: *If the excavator is to be towed (engine failure), the travel reduction gear brakes must be released.*

A special tool is required to do this operation.

We recommend to apply to your dealer.

OPERATING INSTRUCTIONS

PARKING THE MACHINE

1. Park the machine on level and horizontal ground, away from any unstable ground area or inadequately shored up excavation or cavity.
2. Align the attachment with the centreline of the machine, fully retract the cylinder rods and dig the bucket or clamshell in the ground.
3. Put all control levers in neutral position.
4. Install the turntable lock pin.
5. Stop the engine and remove the ignition key.
6. Release pressure in the hydraulic circuit.
7. Raise the left-hand console before leaving the cab
8. Disconnect the electrical circuit using the master disconnect switch.
9. Lock the cab door.
10. Make sure that the cowlings are locked.
11. Make sure that no part of the machine projects onto the highway. If this cannot be done, install approved traffic signalling equipment.

OPERATING INSTRUCTIONS

PREPARING MACHINE FOR TRANSPORT



This machine can slip and fall from a trailer or ramp and cause injury or death. Make sure the trailer and ramp are clean and dry. Carefully move the machine off or onto the trailer with the machine centered on the trailer and ramp.

Know the safety rules and laws before you transport this machine. Make sure the truck and machine are equipped with the correct safety equipment.

1. Put a block at the front and rear of each trailer wheel.

2. Place the undercarriage so that the drive sprockets are at the front.

3. Carefully engage the machine on the trailer tailgate ramps.

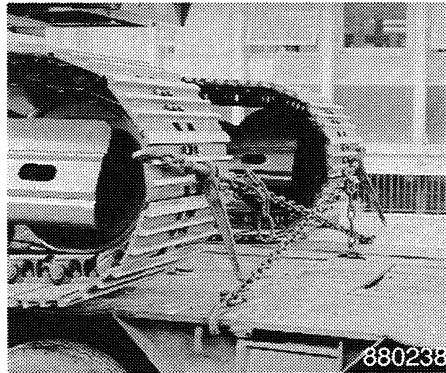
4. Prior to placing the machine at the front of the trailer, swing the turntable so that the attachment is towards the rear of the trailer.

5. Place the machine at the front of the trailer, as far as possible.

6. Lower the dipper and bucket to the floor of the trailer.

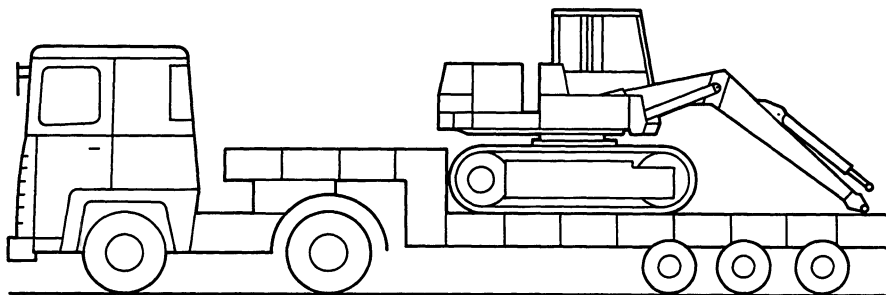
7. Engage the swing lock pin.

8. Make sure all doors and access panels are closed and locked.



9. Use chains to fasten the dipper bucket and machine to the trailer.

10. Measure the distance between the ground and the highest point of the machine. You must know the total height of the machine and trailer. See section "Specifications".



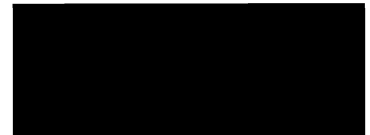
P70

READY FOR TRANSPORT

JOB SITE OPERATION _____

SECTIONAL INDEX

Backhoe buckets	75
Operating tips.....	72 - 74
Replacing a backhoe bucket.....	77
Replacing a sidecutter on a backhoe bucket	77
Replacing teeth tips on backhoe bucket.....	76



JOB SITE OPERATION

OPERATING TIPS

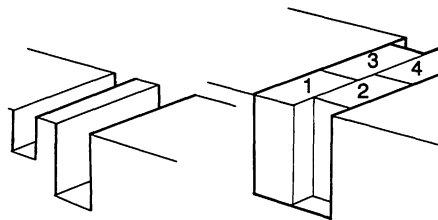


Holes, obstructions, debris and other work area hazards can cause injury or death. Always walk around and look for these and other hazards before you operate your machine in a new work area.



Be alert, always know the location of all workers in your area. Keep all other persons completely away from your machine. Injury or death can result if you do not follow these instructions.

Backhoe Attachment

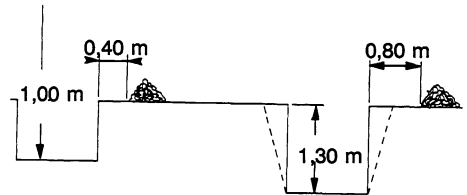


EX2883G

When laying a double pipeline, two parallel trenches can be dug at different depths (for example water and gas). It is recommended to move the excavator sideways to dig one trench and then the other, while remaining perfectly within the centreline.

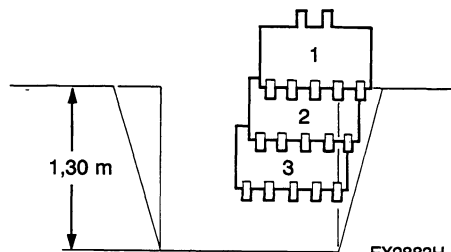
Two pipelines can also be laid in the same trench, even if they are not at the same depth. The work will be carried out as shown in the figure. Move the excavator by a distance equal to the width of the bucket to prevent offset and make the trench.

To make trenches between 1 m and 1,30 m (beyond this depth they have to be timbered), the trench must be opened with a V-section bucket to prevent caving in. To do so, first open by following the centreline, then gradually shift and trim the trench so that it has a V-section.



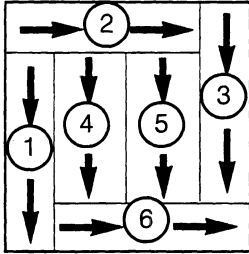
EX2883L

When opening a trench, leave a side free to store the tools and material. On the other side dump the spoil and leave 0,40 m between the spoil and the edge of the trench. If the depth of the trench is between 1 m and 1,30 m, increase this space to 0,80 m so that the trench can be opened with a V-section.



EX2883H

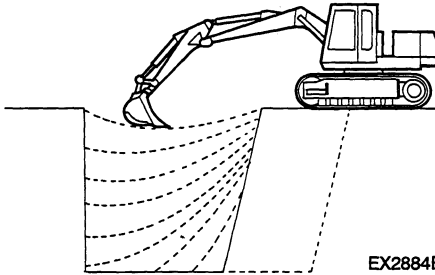
JOB SITE OPERATION



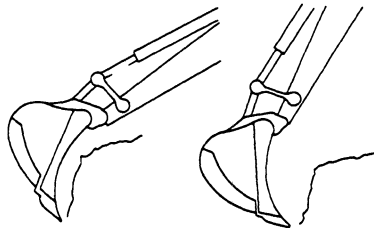
EX2884A

To carry out an excavation (for example to built a detached house), first make the angles. To do so, follow the sequence shown on the figure, the final side an final angle will be done last of all, when leaving the excavation.

To do so, close the bucket at the start of the movement so as to put the teeth in the horizontal position. The teeth not the bucket must rest on the ground, to prevent bumping and enable the teeth to hold all the stress.



EX2884B



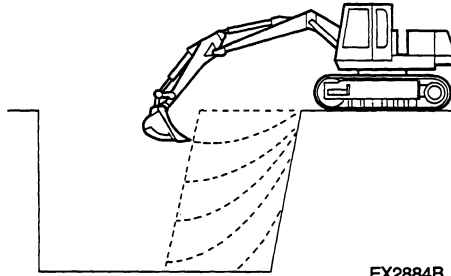
WRONG

CORRECT

EX2884A

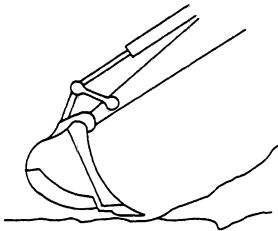
The position of the teeth is essential. To prevent breaking them, and to get the best output, cut the ground without tearing it.

When earthmoving, the bucket must be filled over a length of ground equal to the length of the dipper.



EX2884B

The output will be better if the beds are removed successively. The teeth must be in the correct position right from the start. The thickness of the beds to be removed depends on the hardness of the ground.



EX2884A

To carry out the best work with a backhoe attachment, place the teeth in the correct position right from the start.

JOB SITE OPERATION

To carry out perfect horizontal earthmoving operations (excavation, trench bottom, etc.), it is important to synchronize the movements of the boom, dipperstick and bucket. At the start of the movement, extend the dipper and lower the boom. Close the bucket and retract the dipper, while at the same time watching the position of the teeth to prevent the bucket from rubbing against the ground. Raise the boom until the dipper is vertical. When the dipper is horizontal, gradually open the bucket so that it remains flat, and lower the boom.

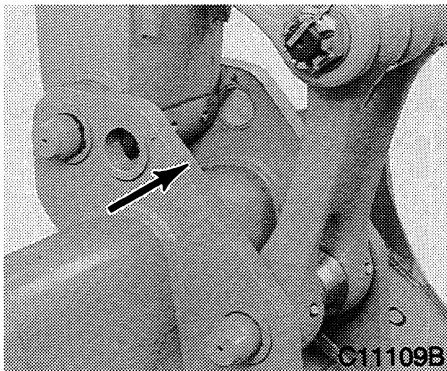
To make it easier to carry out earthmoving with backhoe, it is recommended to proceed as follow : Always position the cab on the side of the truck to be loaded, or the obstacle if present (to ensure better visibility when working). Start working on the truck side so as to clear the ground for subsequent swing movements, in order to reduce the cycle time and avoid having to raise the bucket to go over the ground not yet excavated.

JOB SITE OPERATION

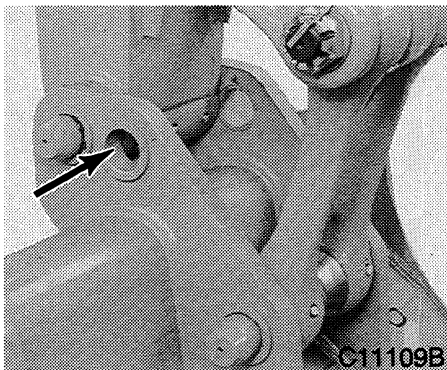
BACKHOE BUCKETS

Working Range and Stress Points

The position of the bucket linkage on the dipper can be adapted to the work to be done.

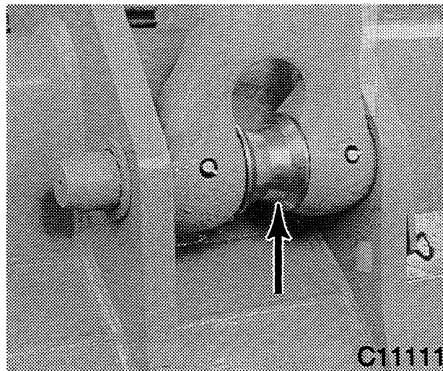


Maximum working range position.



Maximum stress position.

Handling Point

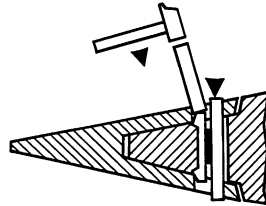


The slings and chains for handling loads must be fixed at connecting rod/bucket linkage.

JOB SITE OPERATION _____

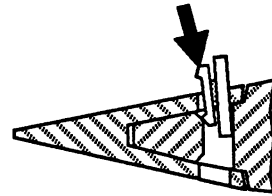
REPLACING TEETH TIPS ON BACKHOE BUCKET

Removing a Tooth Tip



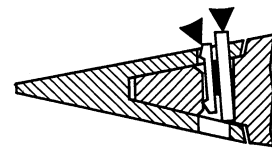
880375F

Remove the wedging from the support by hitting the front part in the direction shown, then alternately at the back and front until the assembly is ejected.



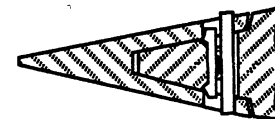
880375D1

3. Hit the front of the wedging assembly, in the direction shown.



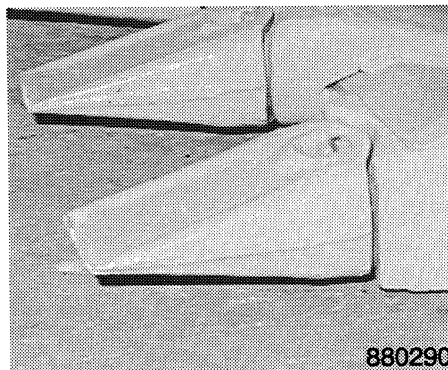
880375B

4. Hit alternately at the front and back until the wedging assembly engage on the support.



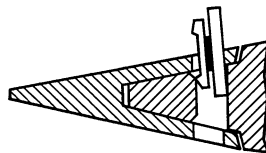
880375E1

5. Check that the wedging assembly is in the correct position. The front parts of the key must be fully engaged in the support nose.



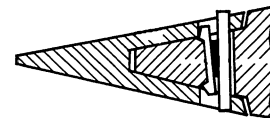
880290

1. Install the tip on the support with the mark of the tip and support in the correct direction.



880325A

2. Install the wedging assembly as shown.

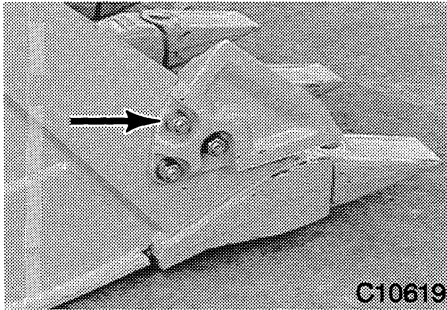


880375C

6. If not engaged correctly check the position of the tip on the support. If necessary, slightly grind the support nose.

JOB SITE OPERATION _____

REPLACING A SIDECUTTER ON A BACKHOE BUCKET



1. Remove the bolts.
2. Clean the edge of the bucket and the securing holes.
3. Install a new sidecutter, using the bolts and new washers.

REPLACING A BACKHOE BUCKET

Removal

STEP 1

Place the bucket flat on a horizontal ground.

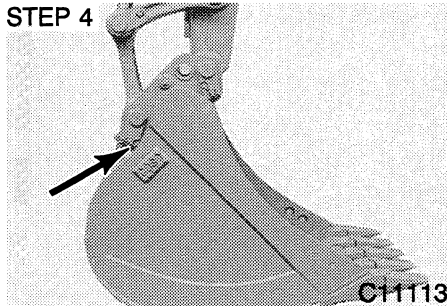
STEP 2

Stop the engine.

STEP 3

Release pressure in the bucket cylinder circuit.

STEP 4



Remove the cotter pin from the linkage pin between the connecting rod and the bucket then remove the pin.

STEP 5

Start the engine.

STEP 6

Retract the bucket cylinder connecting rod.

STEP 7

Place the bucket in a safety position (stability).

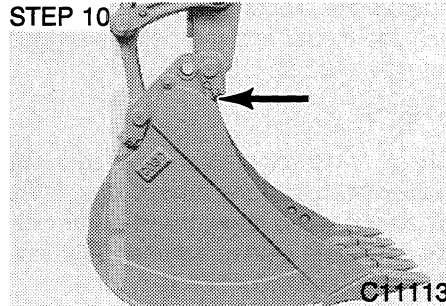
STEP 8

Operate the attachment controls so the linkage pin between the dipper and the bucket is not stressed by the load.

STEP 9

Stop the engine.

STEP 10



Remove the cotter pin from the linkage pin between the connecting dipper and the bucket then remove the pin.

STEP 11

Start the engine.

STEP 12

Operate the attachment controls to disengage the dipper from the bucket.

JOB SITE OPERATION

Installation

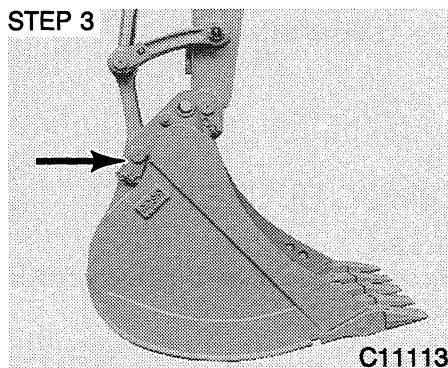
STEP 1

Start the engine.

STEP 2

Extend the bucket cylinder rod to engage the connecting rod in its location.

STEP 3



Install the linkage pin and the cotter pin between the connecting rod and the bucket.

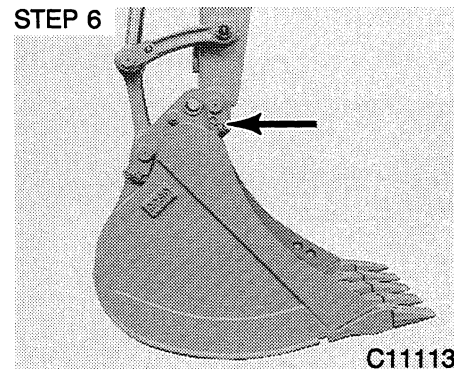
STEP 4

Slightly raise the attachment, then operate the dipper and bucket controls until the dipper hitching point is aligned with the bucket's lugs.

STEP 5

Check side clearance between the dipper head and the bucket lugs. If the clearance is too large, insert shims until the clearance ranges between 0.64 inch (0.2 mm) and 0.05 inch (2.5 mm).

STEP 6



Install the linkage pin and the cotter pin between the dipper and the bucket.

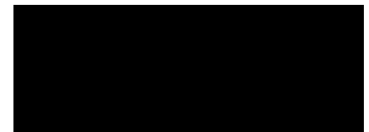
STEP 7

Lubricate the linkages.

TRACKS

SECTIONAL INDEX

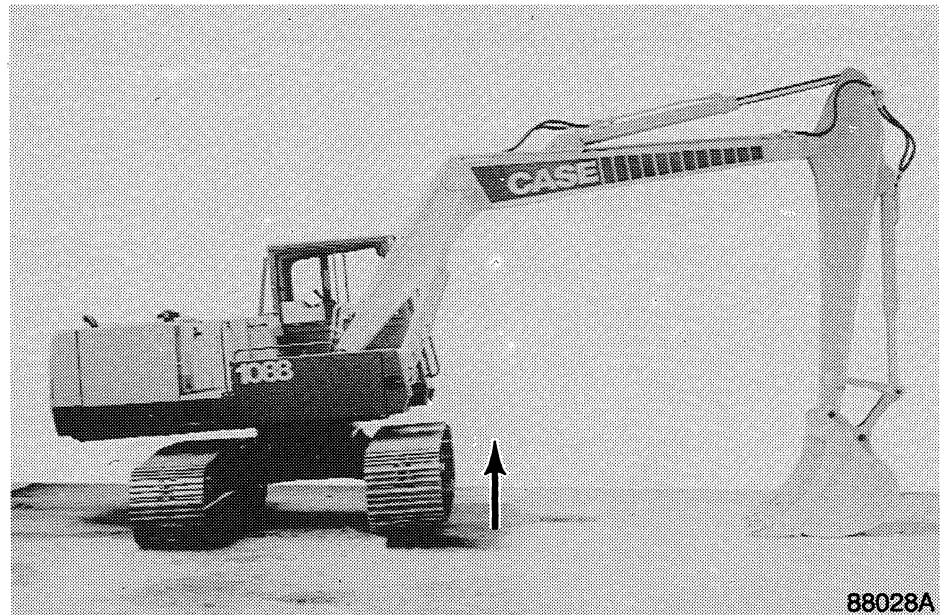
Adjusting tension.....	82
Checking tension	81
Cleaning	80
Track shoes.....	81



TRACKS

CLEANING

When the machine has been working in muddy ground, a sudden temperature drop can cause the mud collected on the tracks to freeze.



1. Rotate the turntable to the side of the machine.
2. Use the bucket to raise the track above the ground.
3. Run the engine at full throttle.
4. Actuate the track control in FORWARD or REVERSE to remove the dirt, mud and debris from the track.
5. Repeat steps 1, 2, 3 and 4 for the other track.
6. If necessary, manually remove the remaining dirt, mud and debris from the track frame and rollers.

TRACKS

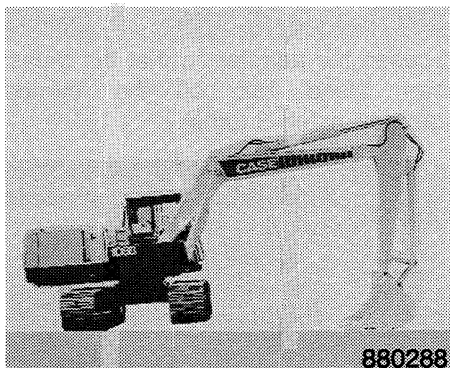
CHECKING TENSION

Check the tension of each track every 100 hours of operation.

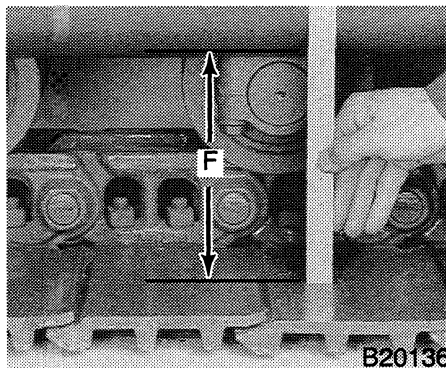
Park the machine on a flat hard surface to check the track tension.

Clean the tracks before you check the track tension.

1. Use the attachment to raise one side of the machine until the track pads are above the ground.



2. Measure the track deflection at the center of the track between the bottom of the track frame and the track pad.



3. The deflection (F) must be 11 to 11 1/2 inches (280 to 290 mm).

4. Adjust the track tension according to the information on the following page.

TRACK SHOES

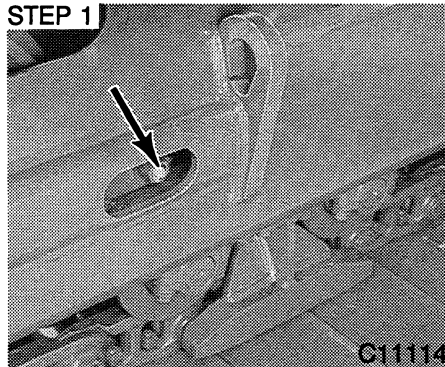
Check the torque of the track shoe bolts every 250 hours of operation. The torque is 304 lb. ft. (410 Nm, 41 kg/m).

TRACKS

ADJUSTING TENSION

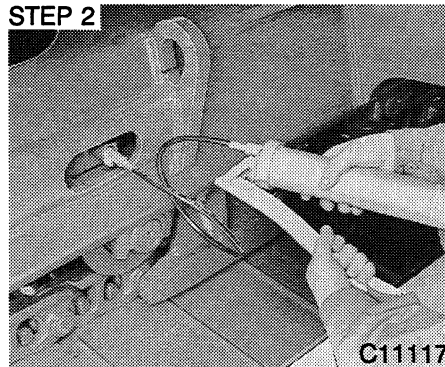
To Increase Tension

STEP 1



Locate and clean the grease fitting.

STEP 2



Connect a grease gun to the grease fitting.

STEP 3

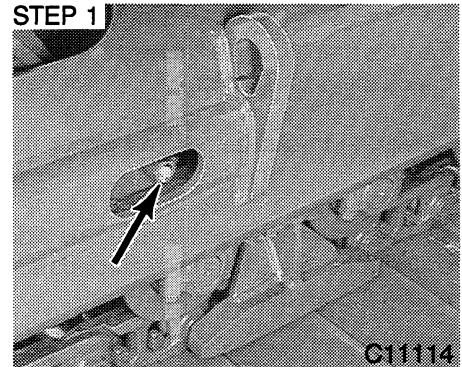
Inject grease into the adjusting cylinder until the track tension is correct.

STEP 4

Remove the grease gun and clean the grease fitting.

To Decrease Tension

STEP 1



Loosen the adapter so that the grease can bleed out of the cylinder (approximately 3 turns).



Never remove the adaptor completely to facilitate outflow of grease. The grease inside the cylinder is highly pressurized.

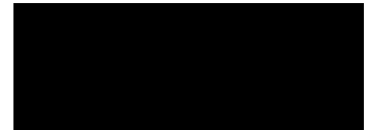
STEP 2

Tighten the adapter when the desired tension is reached.

LUBRICATION/MAINTENANCE CHART _____

SECTIONAL INDEX

Hourmeter	86
Lubrication maintenance chart	84 - 85



LUBRICATION/MAINTENANCE CHART

LUBRICATION/MAINTENANCE CHART

P A G E	SERVICE POINTS	N O F P O I N T S	HOURLY INTERVALS				
			C L E A N	R E P L A C E	C H E C K	G R E A S E	D R A I N
91	Bucket linkage	5			10		
99	Coolant level	1			10		
124	Coolant radiator	1			10		
96	Engine oil level	1			10		
125	Fan belt inspection	1			10		
110	Fuel filter sediment removal	1					10
110	Fuel tank sediment removal	1					10
117	Hydraulic fluid level	1			10		
91	Boom and dipper pivot	2				50	
91	Boom and dipper foot	2				50	
91	Boom and dipper head	2				50	
91	Boom foot	2				50	
91	Bucket cylinder foot	1				50	
91	Dipper cylinder foot	1				50	
92	Leveler cylinders	12				50	
92	Pin leveler table to undercarriage	2				50	
91	Swing ring gear	3				50	
91	Swing ring gear teeth	1				50	
115	Swing reduction housing	1			100		
81	Track tension	2			100		
99	Check and tighten coolant hose clamps				250		
124	Coolant radiator	1			250		
96	Engine oil	1		250			
98	Engine oil filter	1		250			

LUBRICATION/MAINTENANCE CHART

P A G E	SERVICE POINTS	N O O F P O I N T S	HOURLY INTERVALS				
			C L E A N	R E P L A C E	C H E C K	G R E A S E	D R A I N
118	Anti-surge valve filter	1		500			
104	Coolant concentration	1			500		
107	Fuel filters	2		500			
134	Alternator	1			1000		
125	Fan belt	1			1000		
135	Starter motor	1			1000		
135	Temperature gauge	1			1000		
119	Hydraulic oil	1		2000			2000
101	Engine coolant	1		2000			2000
128	Extinguisher	1			2000		
116	Swing reduction gear oil	1		2000			2000
116	Travel reduction gear oil	1		2000			2000
112	Air filter (Note 3)	1					
132	Battery electrolyte level (Note 5)	2					
117	Hydraulic reservoir filters (Note 4)	2					
127	Leveler cylinder bleed screw (Note 6)	4					
112	Primary air filter element (Note 1)	1					
112	Secondary air filter element (Note 2)	1					

NOTE 1: Replace once annually or after six cleanings.

NOTE 2: Replace once annually or after three cleanings of the primary element.

NOTE 3: Clean when the warning lamp illuminates on the dashboard.

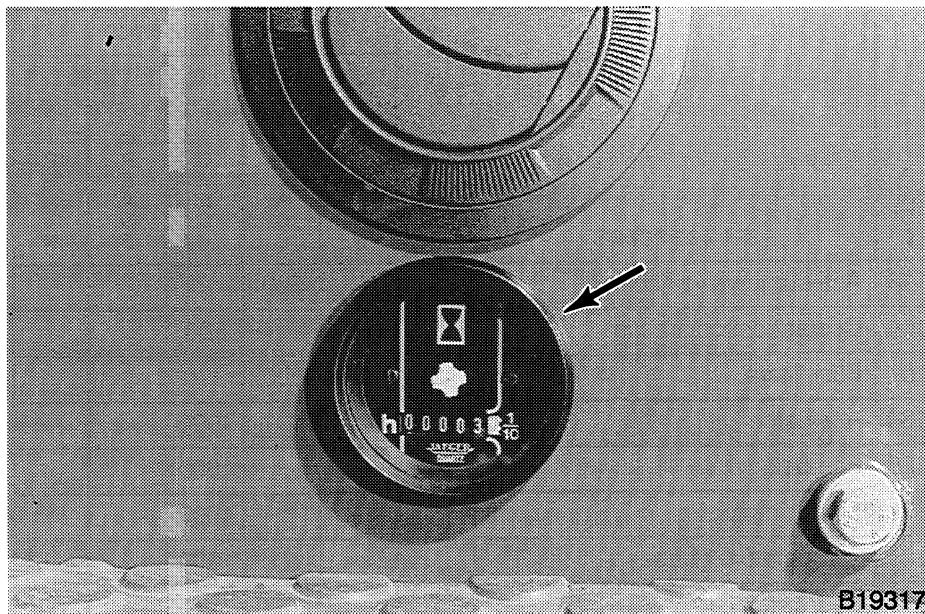
NOTE 4: Replace when the warning lamp illuminates on the dashboard.

NOTE 5: Check the level once annually.

NOTE 6: Bleed the leveler cylinders each time after servicing.

LUBRICATION/MAINTENANCE CHART _____

HOURLMETER



The hourmeter which operates whenever the engine is running, indicates the accumulated hours of operation. The hourmeter will enable you to determine when to carry out the maintenance.

Scheduled maintenance and lubrication are the normal operations required to provide safe and efficient operation of your machine.

The maintenance intervals indicated in this manual must be carefully observed.

If the machine is operated in severe conditions it is recommended to shorten the intervals.



Improper service or repair can cause injury or death. If you do not understand the service procedures for this machine, see your dealer or the Service manual.

LUBRICATION/FILTERS/FLUIDS

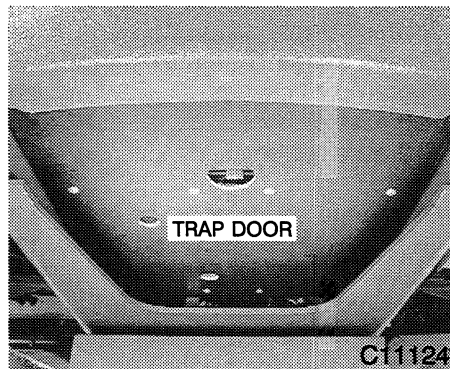
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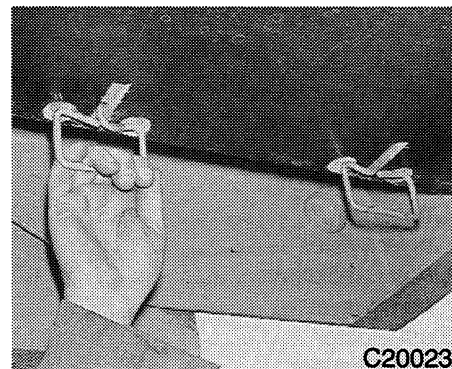
LUBRICATION/FILTERS/FLUIDS

ACCESS PANELS

To do maintenance on the different machine systems the panels will have to be removed.



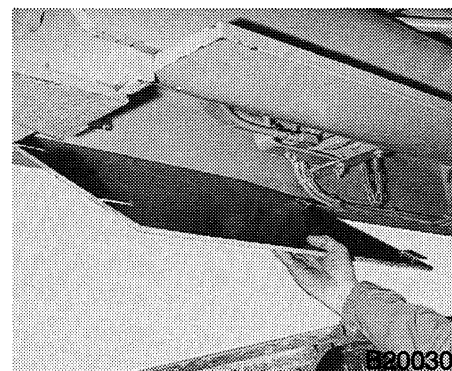
The central panel gives access to the engine crankcase, oil filter and engine cooling circuit.



To remove or install the left hand and right hand panel turn the handles a quarter revolution.



To remove or install the panel, pull the handle downwards then remove the panel backwards.

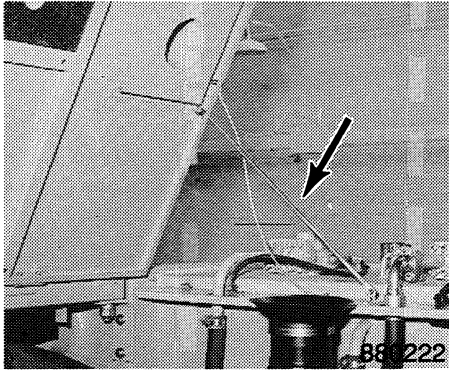


The left hand panel gives access to the anti surge valve shutoff valve and hydraulic oil tank drain plug.

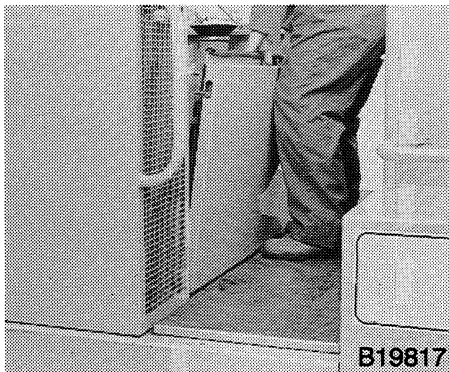
NOTE: After closing the panels, make sure they are correctly locked, so that they do not open when the machine is working.

LUBRICATION/FILTERS/FLUIDS

ENGINE COVERS



Always install the support rod when the engine upper cover is raised.



To gain access to the engine components it is necessary to remove the front cover by lifting upwards and forwards.

insert 11x17 pg.91-94

LUBRICATION/FILTERS/FLUIDS

ENGINE LUBRICATION

Engine Oil Type

Case IH N° 1 engine oil is recommended for use in your Case engine. Case IH engine oil will lubricate your engine under all operating conditions. If Case IH N° 1 multi-viscosity engine oil is not available, Case IH N° 1 single grade engine can be used.

If Case IH N° 1 multi-viscosity or single grade engine oil is not available, use only oil meeting API engine oil service category CC/CD.

See the chart below for recommended viscosity at ambient air temperature ranges.

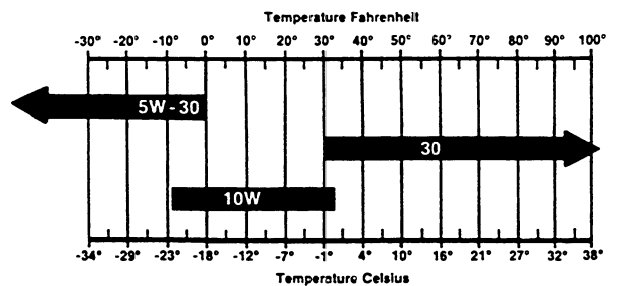


46018

NOTE: Do not put performance additives or other oil additive products in the engine crankcase. The oil change intervals given in this manual are according to tests with Case IH lubricants.

Engine Lubrication Oil Viscosity

AMBIENT AIR TEMPERATURE RANGES



211L8

NOTE: Do not use multi-viscosity oil in place of the SAE-10W or 30 oil specified. When 5W-30 oil is used, this oil must be changed after every 100 hours of operation. For prolonged full load operation, SAE-10W oil must be used.

LUBRICATION/FILTERS/FLUIDS

Service specifications

Oil level check interval 10 hours or daily

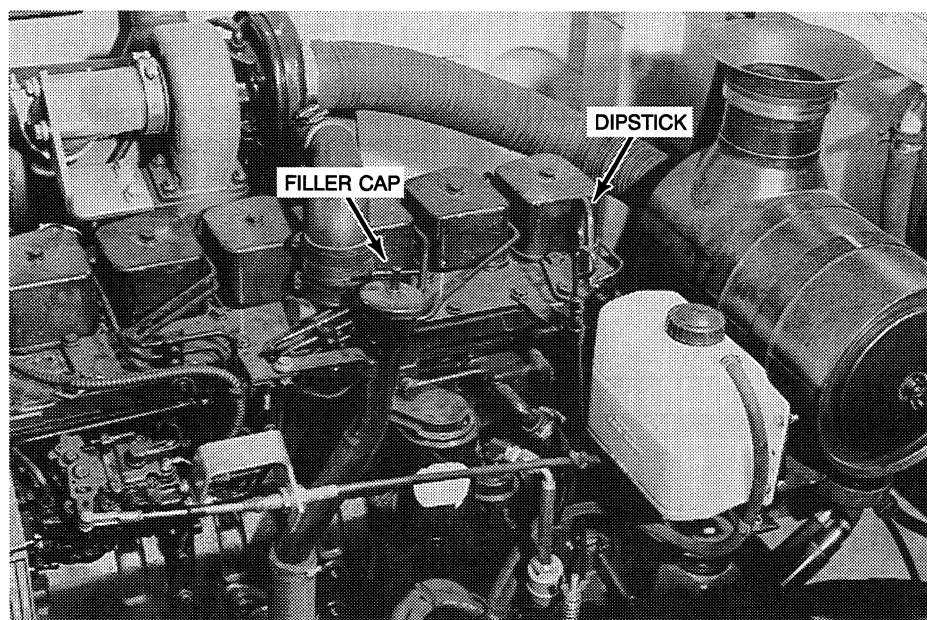
Oil change interval Every 250 hours of operation

Oil type See engine oil

Oil capacity - without filter change 15 U.S. Quarts (14.4 litres)
with filter change 16 U.S. Quarts (15.4 litres)

Engine oil level

To check the engine oil level, put the machine on level ground and stop the engine. Remove the dipstick, wipe dry, install the dipstick again in the guide tube, as far as it will go, then remove it again. If the oil level is below the ADD mark, add oil to the FULL mark. Do not raise the oil level above the FULL mark.

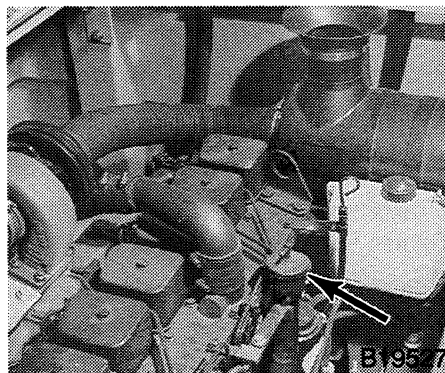
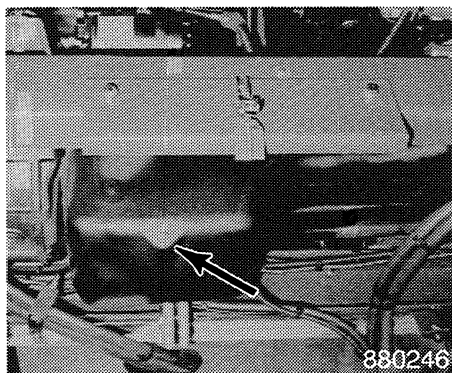


LUBRICATION/FILTERS/FLUIDS

Engine Oil Change

To change the engine oil, put the machine on level ground and stop the engine. Change the engine oil as follows :

NOTE : *For best results, change the oil while the engine is still warm from operation.*



1. Put a container under the crankcase drain plug.
2. Remove the drain plug and drain the oil from the engine.
3. See ENGINE OIL FILTER section if the filter is to be changed.
4. Install a new seal on the drain plug and install the plug.
5. Put the correct type and amount of new oil into the engine.
6. Check oil level using the dipstick.
7. Run the engine for a few minutes, make sure that there are no leaks, then check the oil level once again.

NOTE : *Always wait 15 minutes so that the oil can return to the crankcase before checking the oil level.*

LUBRICATION/FILTERS/FLUIDS

Replacing Engine Oil Filter

Change interval Every 250 hours of operation

IMPORTANT : *Change the oil filter at the recommended time interval. Your dealer has approved filters. Do not use other type of filters.*

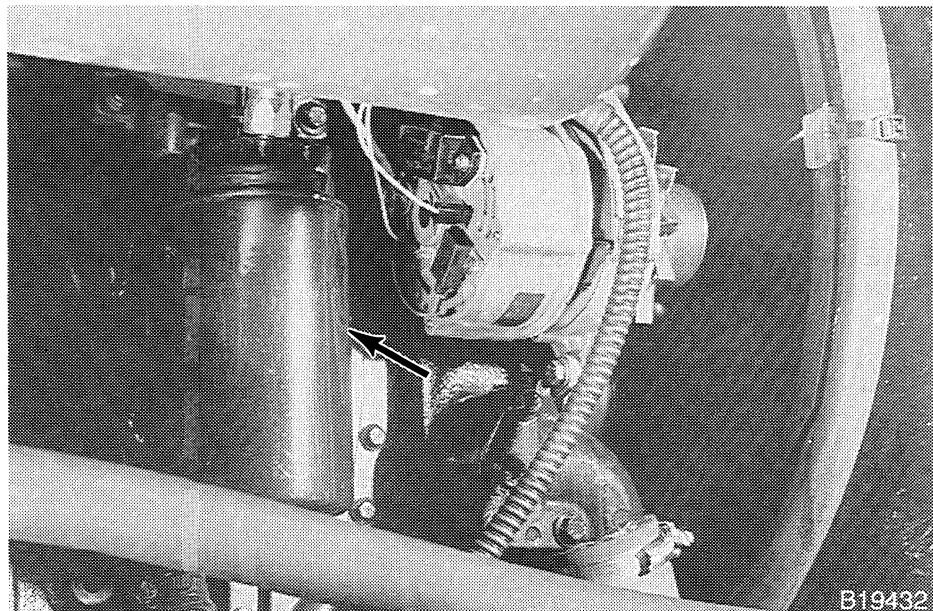
Change the engine oil filter as follows :

1. Drain the oil from the engine.
2. Clean the area around the filter.
3. Remove the oil filter. Use a strap wrench, if necessary.
4. Apply clean oil to the gasket on the new filter.
5. Install the filter. Turn the filter until the gasket comes in contact with the filter head. Tighten filter an additional one half turn by hand.

IMPORTANT : *Do not use a filter wrench to install the oil filter. When the filter is too tight you can cause damage to the gasket and filter.*

6. Fill the engine with the correct type and amount of oil.
7. Check the oil level with the dipstick.
8. Run the engine for a few minutes, and make sure there are no leaks. Check the level once again.

NOTE : *Always wait 15 minutes so that the oil can return to the crankcase before checking the oil level.*



LUBRICATION/FILTERS/FLUIDS

COOLING SYSTEM

Service Specifications

Coolant recovery reservoir level check interval	Every 10 hours of operation
Radiator level check interval	Every 10 hours of operation
Check and tighten coolant hose clamps	Every 250 hours of operation
Check the concentration of coolant solution	Every 500 hours of operation
Coolant system change interval	Every 2000 hours or every two years
Coolant system capacity	5.05 gallons (19.2 litres)
Thermostat range	180°F to 202°F (82 to 94°C)
Radiator cap pressure	103 kPa (15 psi)

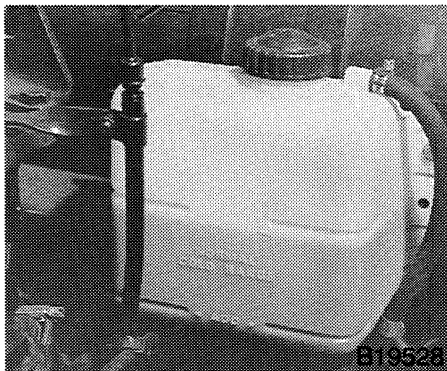


Hot coolant can spray out if radiator cap is hot. To remove radiator cap, let system cool, turn to first notch, then wait until all pressure is released. Scalding can result from fast removal of radiator cap.

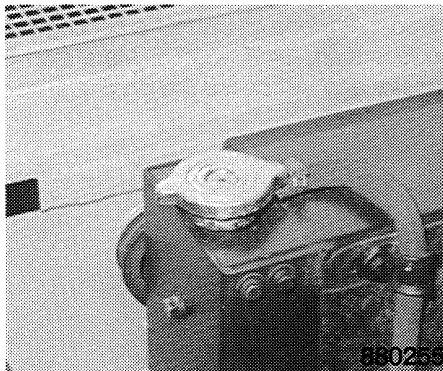
Coolant Level

IMPORTANT: *It is essential for the engine to be cold when checking the coolant level.*

IMPORTANT: *Correct level in the recovery reservoir does not necessarily mean the level in the radiator is correct.*



The coolant level must be between the "Mini" marks. If necessary top up the level with the coolant solution specified in this manual and bleed the system. See "Bleeding the cooling system".



The coolant in the radiator must come up to the base of the filling hole. If necessary top up the radiator to this level and bleed the system. See "Bleeding the cooling system".

LUBRICATION/FILTERS/FLUIDS

Coolant Solution

Machines are shipped with the cooling systems filled with a 50 percent mixture of water and ethylene glycol solution.

IMPORTANT : *Change the coolant solution every 2000 hours or every two years as recommended in this manual. The heat generated by the diesel engine causes a natural change in the inhibitors in the coolant which results in loss of corrosion protection. The loss of the inhibitors may cause water pump cavitation and cylinder block erosion.*

Install only ethylene-glycol coolant solution in the cooling system. Use a good quality, high boiling point, ethylene glycol that does not have any additives to stop leaks. Do not install any rust inhibitors that are not approved. It is possible that the rust inhibitors and ethylene glycol will not mix and may work against each other to decrease corrosion protection, form deposits in the cooling system and cause damage to the cooling system and the radiator.

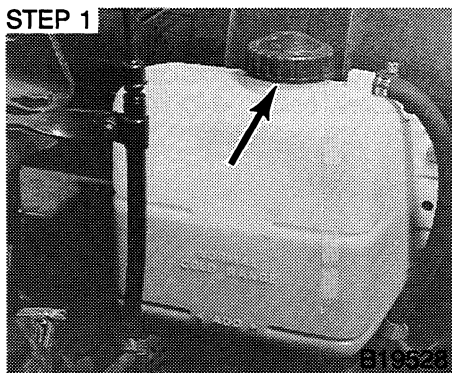
Do not use a low boiling point, alcohol type coolant solution. Because the boiling point of alcohol is below the excavator minimum operating temperature, loss of coolant from evaporation can be too much.

IMPORTANT : *When using ethylene glycol coolant solutions, always have a minimum of 50 percent ethylene glycol coolant in the cooling system. Do not install more than 50 percent ethylene glycol in the cooling system unless the ambient air temperature will be less than -34°F (-36°C). More than 50 percent ethylene glycol decreases heat transfer and will cause the engine surface temperature to be higher than normal.*

LUBRICATION/FILTERS/FLUIDS

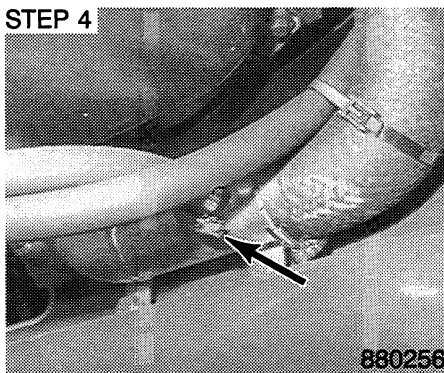
Draining

STEP 1



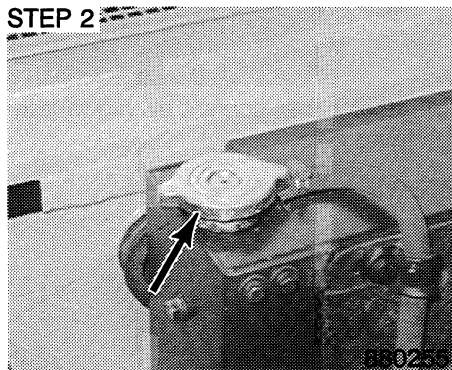
Remove the cap from the recovery reservoir.

STEP 4



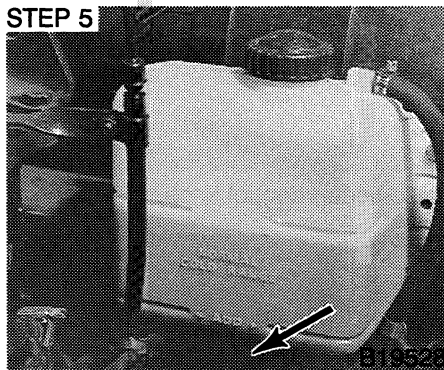
Disconnect the hose at the water manifold.

STEP 2



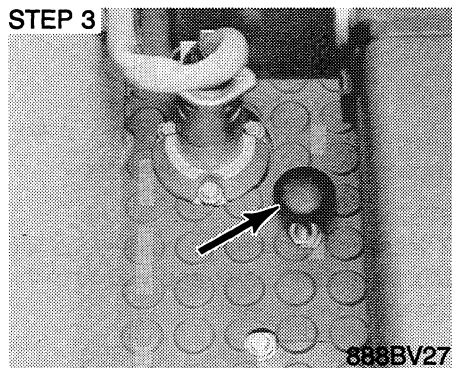
Remove the radiator cap.

STEP 5



Disconnect the hose at the coolant reservoir.

STEP 3



Pull the heater control up.

STEP 6

After emptying the system completely, reconnect the hose and then tighten the clips.

STEP 7

Flush the system with clean water.

STEP 8

Drain the system again, reconnect the hoses and tighten the clips.

LUBRICATION/FILTERS/FLUIDS

Filling

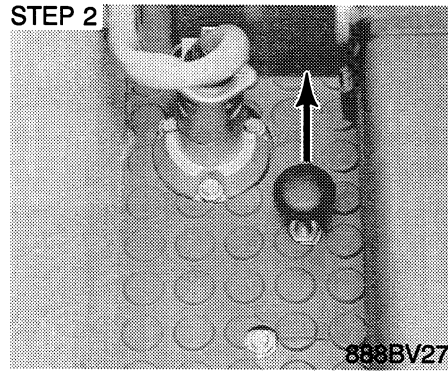
NOTE: Use antifreeze at all times to protect the coolant system from corrosion and freezing.

For areas with ambient temperature above -34°F (-36°C), use a mixture containing 50% ethylene glycol-based antifreeze. For temperatures below -34°F (-36°C), it is recommended to use a mixture of 40% water and 60% antifreeze.

STEP 1

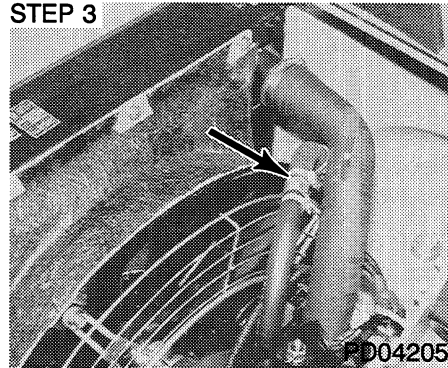
Place the machine on level ground.

STEP 2



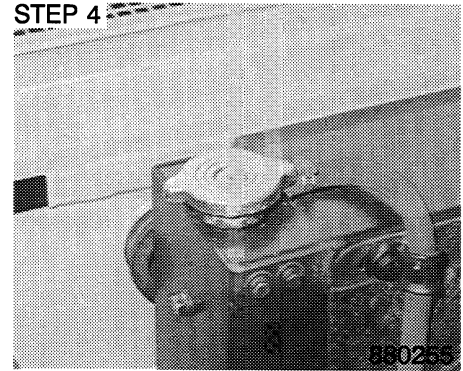
Raise heater control knob.

STEP 3



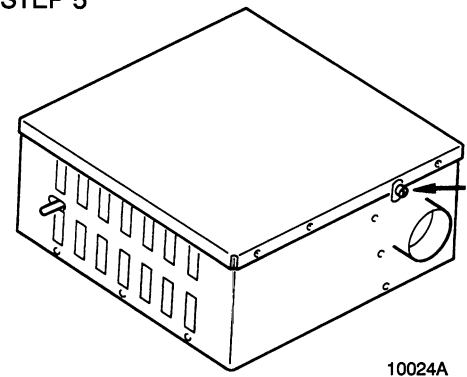
Loosen the bleeder on the heater feed line.

STEP 4



Fill radiator until coolant overflows from the filling hole.

STEP 5



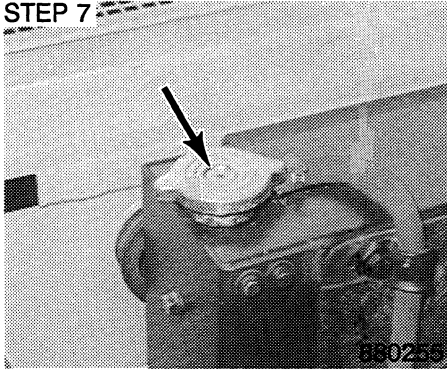
Loosen the cabin heater bleeder.

STEP 6

Release the air from the heater feed line and the cabin heater and wait until the coolant flows freely.

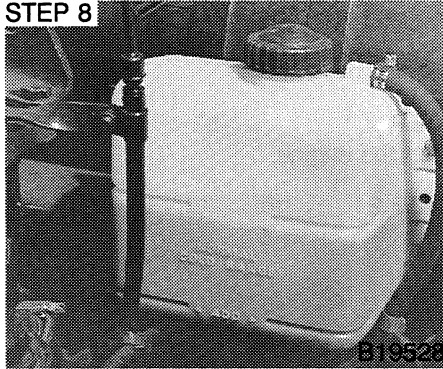
LUBRICATION/FILTERS/FLUIDS

STEP 7



Top up until coolant overflows from filling hole.

STEP 8



Fill the reservoir up the "Maxi" mark.

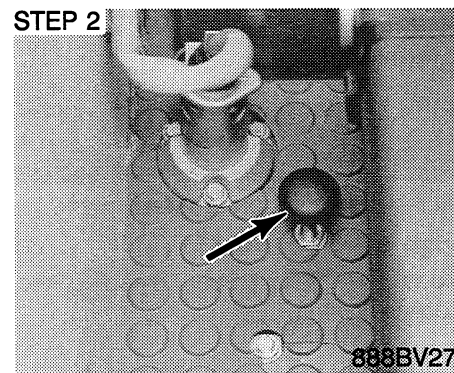
STEP 9

Bleed the circuit. See "Bleeding the Cooling System".

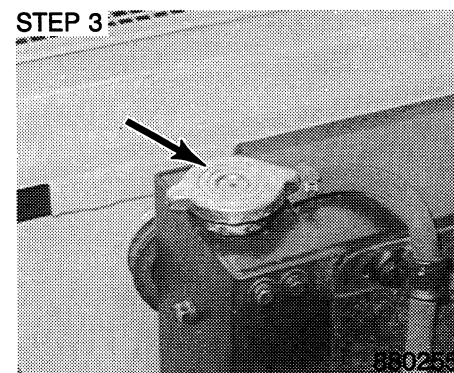
LUBRICATION/FILTERS/FLUIDS

Bleeding the Cooling System

STEP 1
Start the engine.

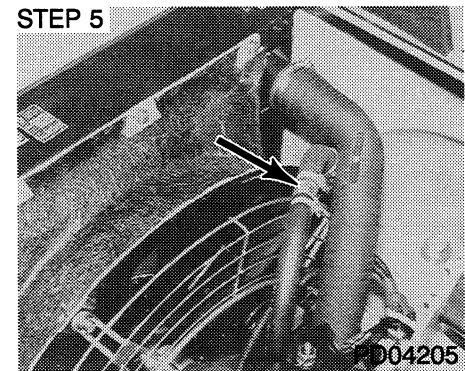


Raise heater control knob.

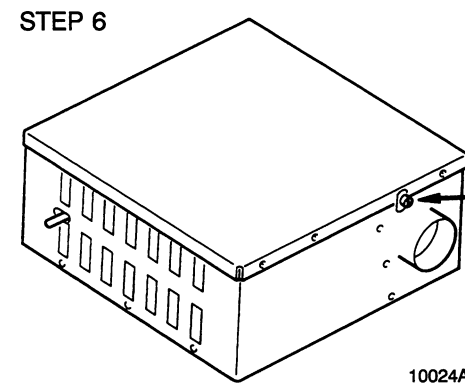


Remove radiator cap and run engine at idle speed for 2-3 minutes.

STEP 4
Stop the engine.



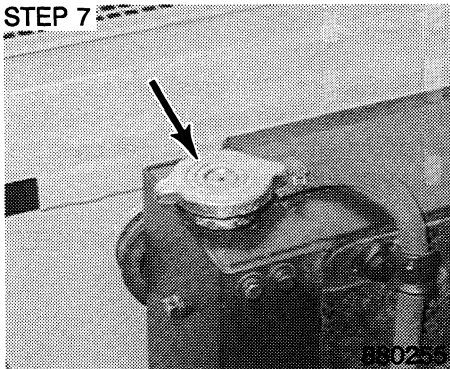
Loosen the heater feed line bleeder until coolant flows out freely without air bubbles.



Loosen cabin heater bleeder until coolant flows out freely without air bubbles.

LUBRICATION/FILTERS/FLUIDS

STEP 7



Fill radiator to overflowing point, then replace the radiator cap.

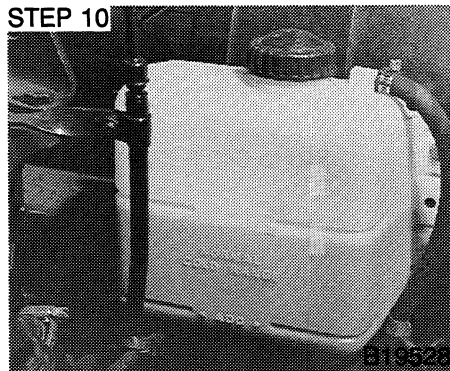
STEP 8

Start the engine.

STEP 9

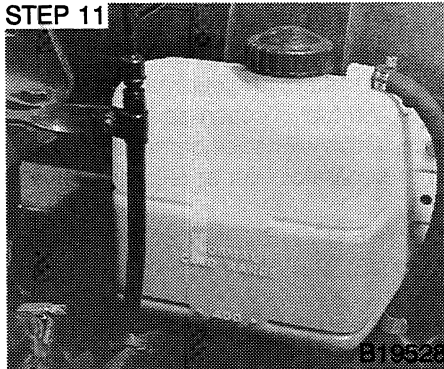
Accelerate slowly to raise engine temperature to the point where the radiator thermostat opens.

STEP 10



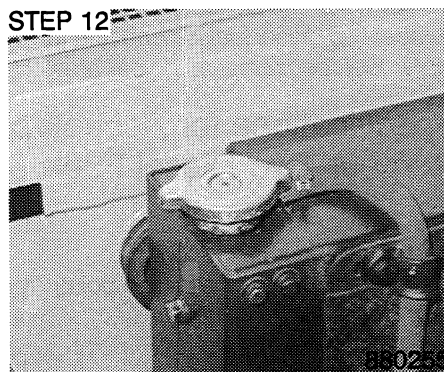
After half an hour, check that the level in the recovery reservoir is about 0.4 inch (1 cm) above the "Maxi" mark.

STEP 11



When the engine is cold, check that the recovery level has returned to the "Maxi" mark.

STEP 12



Remove the radiator cap. The level should be just to the bottom of the filling hole. If not, top up the radiator and bleed the cooling system once more.

LUBRICATION/FILTERS/FLUIDS

FUEL SYSTEM

The fuel system on your machine has an 65 U.S. Gallons (247 litres) fuel tank, fuel filters and fuel injection parts. To prevent dirt and water from reaching the injection parts, which will cause damage and decrease performance, use clean fuel, drain the water separator filter at regular intervals and service the fuel filters.

FOR THE PROTECTION OF YOUR FUEL SYSTEM - GET CLEAN FUEL AND KEEP THE FUEL CLEAN.

Diesel Fuel Specifications

Use a good grade of number two diesel fuel in your engine. Do not use other types or grades of fuel. The use of other fuels will result in loss of engine power and high fuel consumption.

NOTE: *When the temperature is very cold, the use of a mixture of number one and number two diesel fuel is permitted for a short period of time. See your fuel dealer for winter fuel requirements in your area.*

Specifications for Acceptable Number Two Diesel Fuel

A.P.I. gravity (min)	34
Flash point, (min)	140°F (60°C)
Cloud point (wax appearance point) (max)	-5°F (-2°C)
Pour point (max)	-15°F (-26°C)
Distillation temperature, 90% point	540 to 640°F (282 to 338°C)
Viscosity, at 100°F (38°C)	
Centistokes	2.0 to 4.3
Saybolt seconds universal	32 to 40
Cetane number (min)	43 (45 to 55 for winter or high altitudes)
Water and sediment by volume (max)	0.05 of 1%
Sulfur, by weight (max)	0.50 of 1%
Copper strip corrosion (max)	No. 2
Ash, by weight (max)	0.01 of 1%

Fuel Conditioner

Diesel fuel conditioner is available from your dealer. Instructions for the use of the fuel conditioner is on the container.

The use of diesel fuel conditioner will:

1. Clean fuel injectors, valves and manifolds for increased service life.
2. Disperse insoluble gummy deposits that can form in the fuel system.
3. Separate moisture from the fuel.
4. Stabilize fuel in storage.

LUBRICATION/FILTERS/FLUIDS

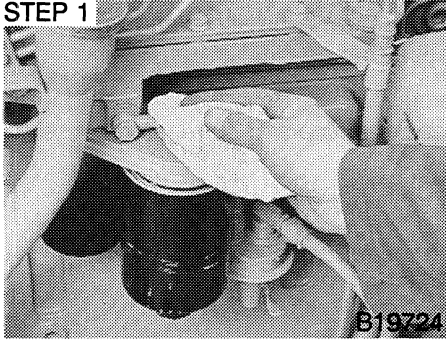
FUEL CIRCUIT

Fuel System Service Intervals

Water separator filter.....	Drain water every 10 hours Replace when a loss of horsepower occurs
Filters.....	Replace every 500 hours or when loss of horsepower occurs
Fuel tank.....	Drain water every 10 hours or each day
Inline filter	Replace every 500 hours
Fuel tank capacity.....	87 U.S. Gallons (330 litres)

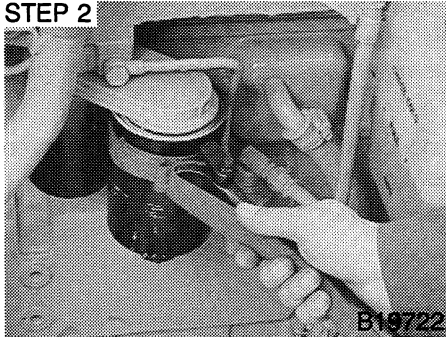
Fuel Filter Replacement

STEP 1



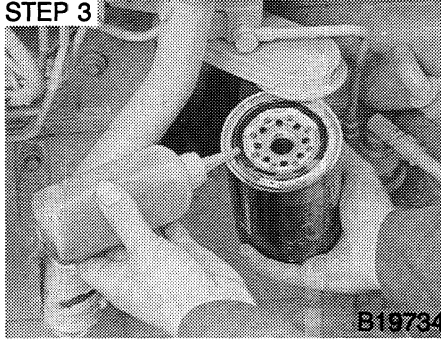
Clean the filter head, filters and engine area next to the filters.

STEP 2



Turn each filter counterclockwise to remove. Use a strap wrench if required.

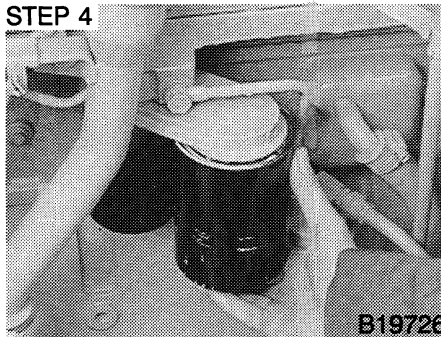
STEP 3



Apply clean oil or grease to the gasket on the new filters.

NOTE : Do not fill the new filters with fuel before installation.

STEP 4



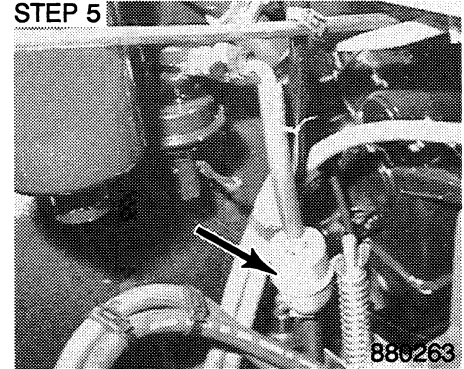
Install the filters. Turn the filters until the gasket is in contact with the filter heads. Tighten the filter an additional half turn by hand.

LUBRICATION/FILTERS/FLUIDS

IMPORTANT : Do not use a strap wrench to install the filters. If the filters are too tight, the gaskets and filters can be damaged.

IMPORTANT : To ensure oil tightness, loosen the filters and tighten by half to three quarters of turn after the gasket comes in contact with the filter head.

STEP 5



Loosen the clamps and remove the hoses.

Install new inline filters and tighten the hose clamps.

NOTE : If the engine does not have power after you have done the filter service and removed the air from the system, see your dealer to find and correct the cause.

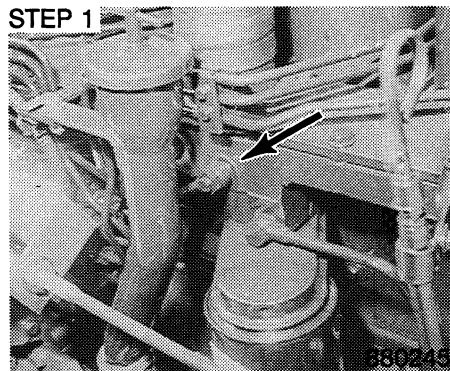
Bleeding and Priming Fuel Circuit

Air must be removed from the fuel system in the following cases :

1. The fuel tank is empty of fuel.
2. Fuel system parts are removed for service or repairs.
3. The machine is in storage for a long period of time.

NOTE : If the machine has no fuel, it is possible to put fuel in the tank and start the engine without doing the air removal procedure. However, a small amount of air can be in the filters and injection pump. Air in the system will cause loss of power and engine stall when a load is applied.

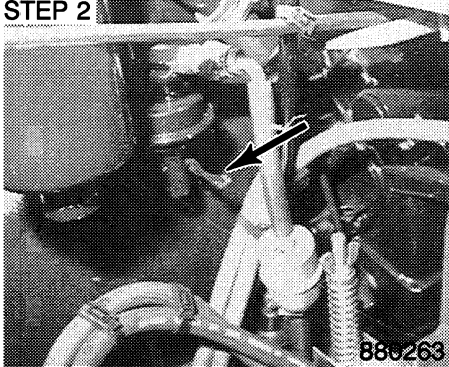
STEP 1



Loosen the bleed screw by two or three revolutions.

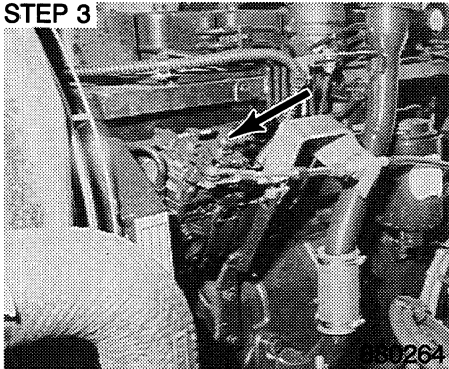
LUBRICATION/FILTERS/FLUIDS

STEP 2



Actuate the priming pump lever until the fuel flows without air bubbles. Then tighten the bleed screw.

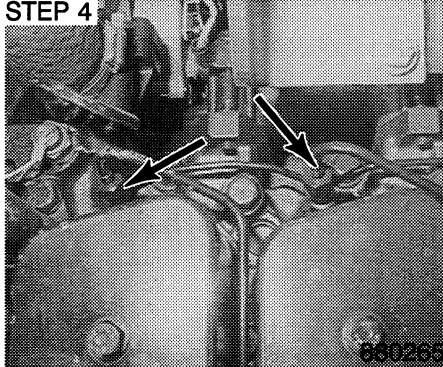
STEP 3



Loosen the pipe screw on the injection pump lines and actuate the priming pump lever until the fuel flows without air bubbles, then tighten the pipe fitting on the injection pump.

If the high pressure pipes have been removed do the following :

STEP 4



Loosen the lines at the injectors and actuate the starter motor to remove the air, continue until the fuel flows free of air.

NOTE : *Never operate the starter motor more than 30 seconds, then wait 2 minutes before trying again.*

Tighten the lines.

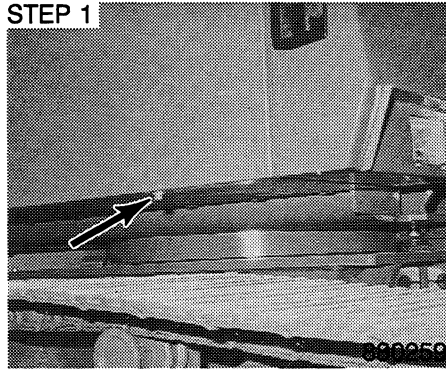
The engine must run without misfire, if not, repeat the procedure. If the problem continues, air is still entering the system, check that all fittings are tight.

LUBRICATION/FILTERS/FLUIDS

Water and Sediment Removal

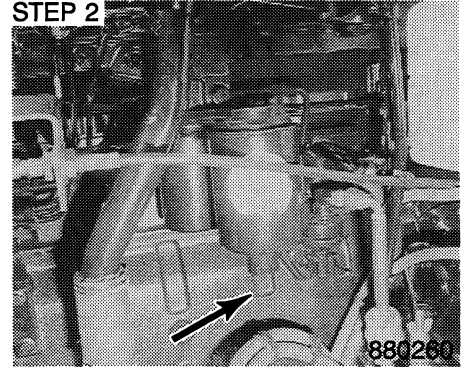
Every 10 hours or every day.

STEP 1



Before starting the engine, loosen the drain plug under the fuel tank by one or two revolutions to let any dirty fuel or water drain out.

STEP 2

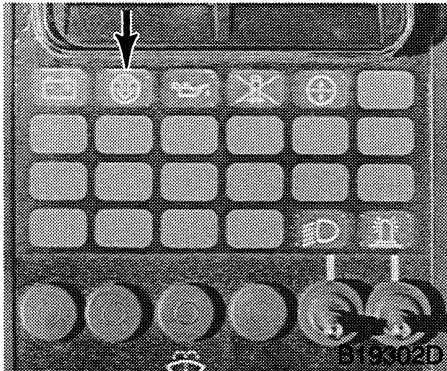


Loosen the drain plug under the sediment filter by one or two revolutions to let any dirty fuel or water drain out.

LUBRICATION/FILTERS/FLUIDS

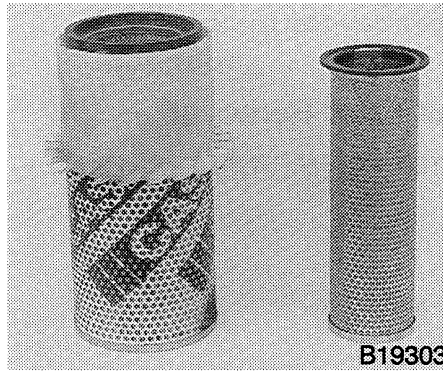
AIR FILTER SYSTEM

Restriction Warning Lamp



If the restriction warning lamp illuminates while the engine is running, this shows that it is necessary to clean the air filter.

Air Filter



Your machine is equipped with a two-stage air filter system consisting of a primary (outer) filter and a secondary (inner) filter. The primary filter is a high capacity filter designed to provide optimum protection to the engine. The primary filter can be cleaned or washed as required between filter changes. See air filter service for more information.

The secondary (inner) filter gives extra protection to the engine if there is damage to the primary filter. The secondary filter cannot be cleaned or washed. Replace the filter if the filter is damaged or is dirty.

Inspection

Frequent checks are needed for air filter, intake manifold gaskets, intake manifold screw tightening, hoses and hose clamp tightening.

The hoses must be replaced before they become damaged.

Frequently check operation of restriction warning lamp, on the control panel.

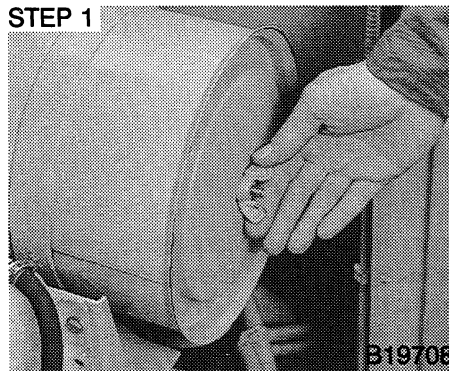
LUBRICATION/FILTERS/FLUIDS

AIR FILTER

Filter service interval.....Clean when warning lamp illuminates
Primary filter replacement interval.....Once a year or after six (6) cleanings
Secondary filter change intervalOnce a year or after
Third (3) cleaning of primary filter

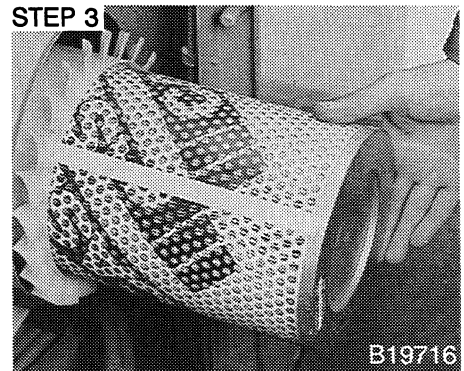
Air Filter Removal

STEP 1



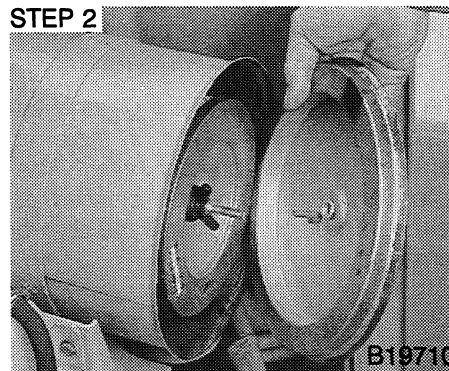
Remove the wing nut.

STEP 3



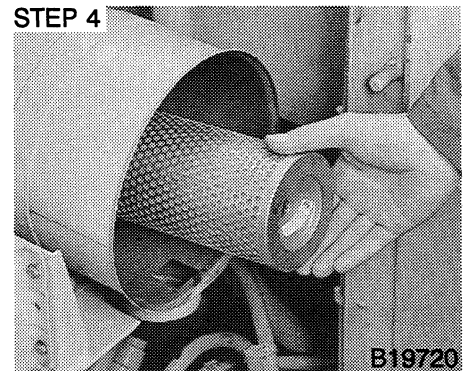
Remove the primary filter.

STEP 2



Remove the cover.

STEP 4



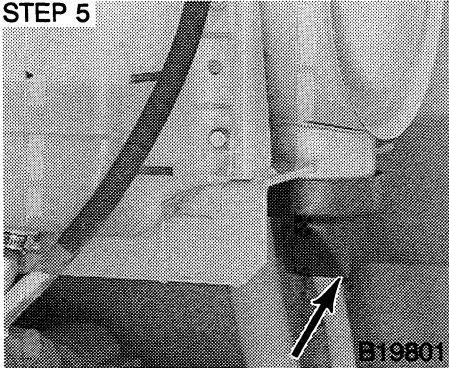
Remove the nut and take out the secondary filter if necessary.

NOTE : *The secondary (inner) element must not be cleaned.*

LUBRICATION/FILTERS/FLUIDS

Dust Ejector

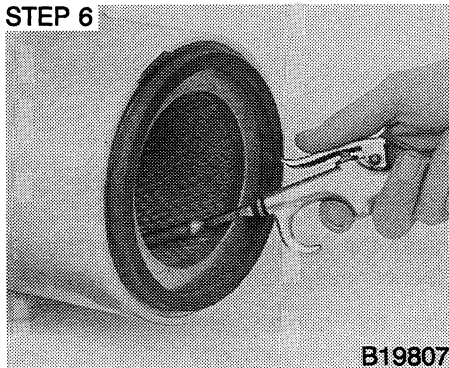
STEP 5



Make sure that the dust ejector operates properly.

Cleaning Primary Air Filter

STEP 6



If most of the dirt is dry, clean the element with compressed air put into the inside of the element to the outside. Keep the air nozzle about 5 inch (12 cm) from the element. Cleaning is over when no more dust is given off by the element.

IMPORTANT : *The nozzle pressure must not be more than 101 psi (7 bar).*

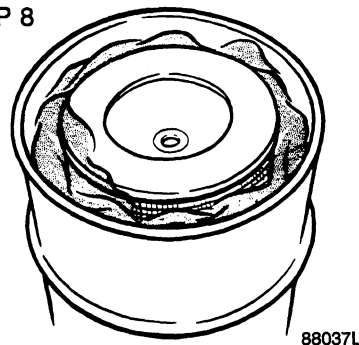
NOTE : *Do not use the compressed air method of cleaning if the dirt has oil or soot.*

STEP 7



If the dirt is wet or heavy, put the element in a solution of Case IH filter element cleaner, part number A40910 and water. Mix two ounces (56.7 grams) of cleaner to one gallon (3.8 litres) of water at a temperature of approximately 100°F (38°C).

STEP 8



If the cartridge is greasy, clean it with water and a suitable detergent (see your dealer). Instructions for use of the detergent are printed on the packing. Shake the cartridge in the solution for 15 minutes.

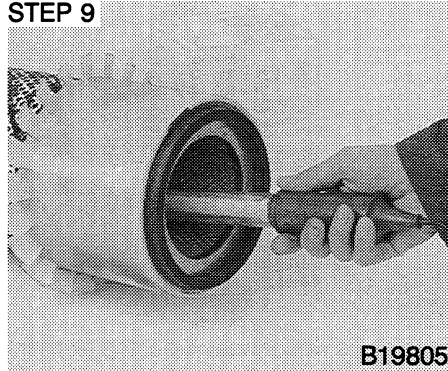
IMPORTANT : *Let the element dry completely before installation. It is best to have a second filter to install in the machine while the cleaned filter is drying.*

NOTE : *Replace the primary element after the element has been cleaned 6 times.*

LUBRICATION/FILTERS/FLUIDS

Primary Air Filter Inspection

STEP 9

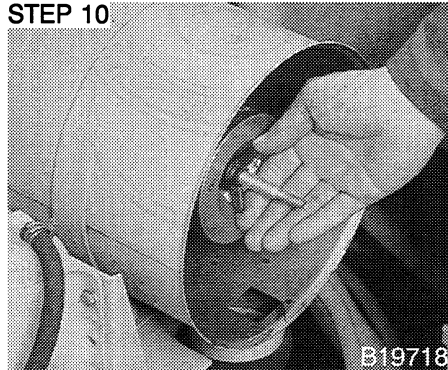


To check the clean element for damage or holes, put a lamp inside the element and turn the lamp.

Replace the filter element if a hole allows a ray of light to pass, regardless of how small it is.

Air Filter Installation

STEP 10

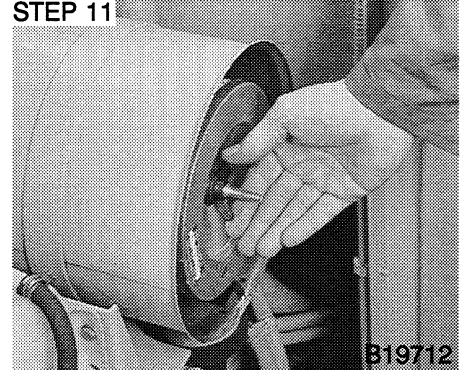


The secondary filter element must be replaced after one year of service or after the primary filter has been cleaned three times.

Do not clean the secondary filter element.

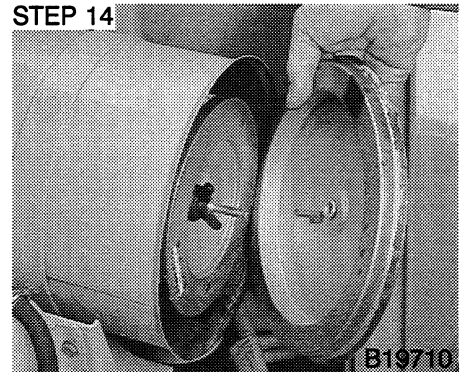
Install the secondary filter element and tighten the wing nut.

STEP 11



Install the air cleaner primary filter element, and tighten the wing nut.

STEP 14



Install the air cleaner cover on the air cleaner housing and tighten the wing nut.

After the primary element has been replaced or properly cleaned and installed, operate the engine at idle speed. Make sure that the warning lamp on the control panel is not illuminating.

LUBRICATION/FILTERS/FLUIDS

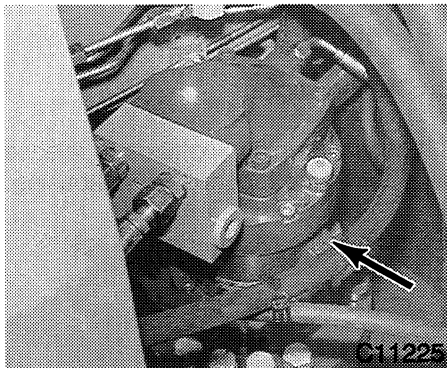
TRAVEL AND SWING REDUCTION GEAR

Service Specifications

Oil level check interval for swing reduction gear	100 hours
Oil level check interval for travel reduction gear	250 hours
Oil change interval for travel and swing reduction gear	2000 hours
Oil capacity for travel reduction gear (each)	2.1 U.S.Quarts (2 litres)
Oil capacity for swing reduction gear	3.7 U.S. Quarts (3.5 litres)
Oil type	CASE IH GEAR LUBE (85 W-140)

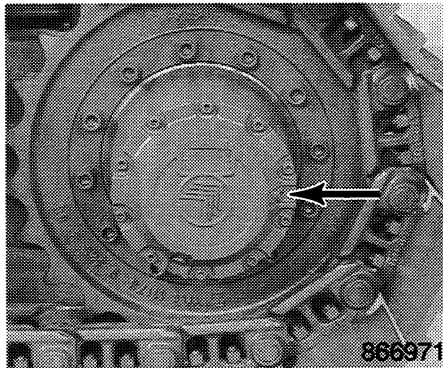
Oil Level

To check the reduction gear fluid level, put the machine on level ground. The housings must be cold.



SWING REDUCTION GEAR

1. Remove the dipstick. The level must be between the maximum and minimum marks on the dipstick. If not add the correct amount of oil.



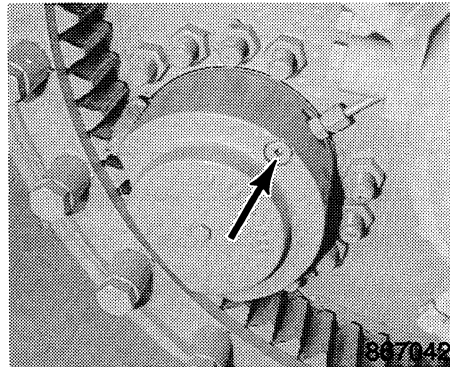
TRAVEL REDUCTION GEAR

1. Stop the machine when the plug is at the horizontal position.
2. Stop the engine.
3. Loosen the plug two turns to release pressure in the reduction gear housing.
4. Remove the plug and check the oil level. The oil level must be flush with the bottom edge of the hole. If not add the correct amount of oil.
5. Repeat steps 1 through 4, for the second travel reduction gear.

LUBRICATION/FILTERS/FLUIDS

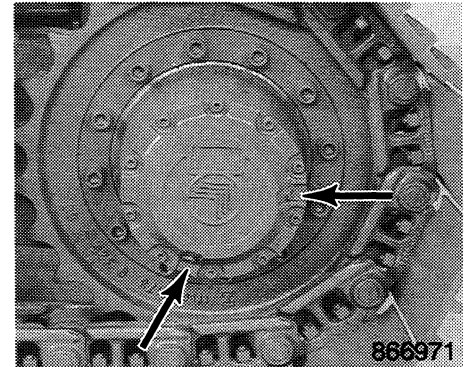
Oil Change

To change the oil, put the machine on level ground.



SWING REDUCTION GEAR

1. Remove the dipstick and the drain plug.
2. Let the oil drain.
3. Install the drain plug.
4. Fill with oil of the correct grade through fill level hole to the correct level.



TRAVEL REDUCTION GEAR

1. Stop the machine so that the plug is at the lowest position.
2. Stop the engine.
3. Loosen the plug two turns to release pressure in the reduction gear housing.
4. Remove the fill and drain plugs.
5. Let the oil drain.
6. Install the drain plug.
7. Fill with oil of the correct grade through fill level hole to the bottom edge of the hole.
8. Repeat 1 to 7 for the second travel reduction gear.

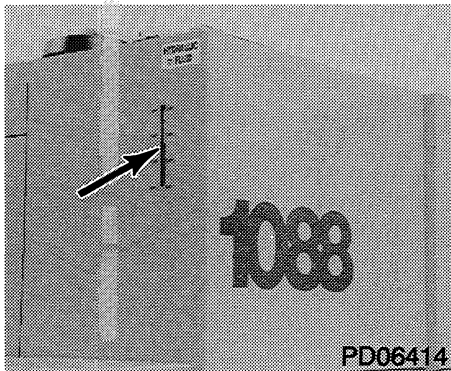
LUBRICATION/FILTERS/FLUIDS

HYDRAULIC SYSTEM

Service Specifications

Replace reservoir filters.....	When the warning lamp is illuminated on the control panel
Oil level check interval (in tank)	Every 10 hours or daily
Replace anti surge valve filter.....	Every 500 hours
Replace tank breather plug	Every 2000 hours
Circuit oil change	Every 2000 hours
Tank capacity	34.3 U.S. Gallons (130 litres)
Complete system capacity	55.4 U.S. Gallons (210 litres)
Oil type	MS 1230 Hydraulic fluid

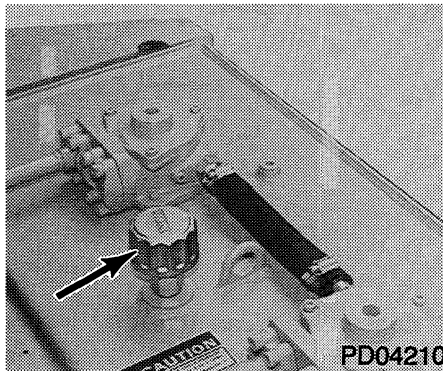
Hydraulic Oil Level



1. Park the excavator on level ground.
2. Fully retract the bucket and dipper cylinder rods.
3. Bring the attachment to the ground.
4. Stop the engine.

The fluid must be in between the mark (4) and the "max" mark (5) on the indicator, if not add fluid.

Tank Breather Plug

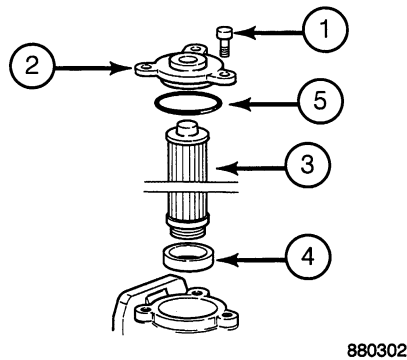
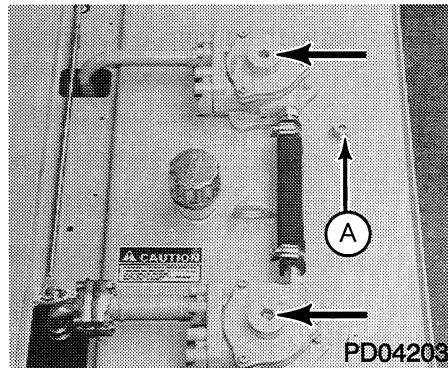


1. Remove the breather cap from the reservoir.
2. Fit a new reservoir breather cap.

NOTE: In order to prevent any loss of the inner screw of the breather plug, a strainer is placed between the plug and the reservoir.

LUBRICATION/FILTERS/FLUIDS

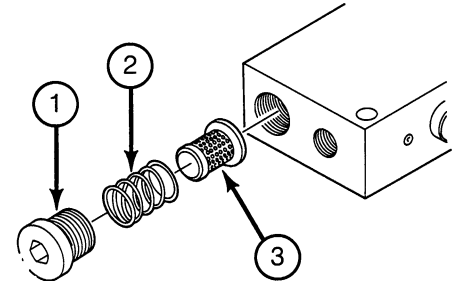
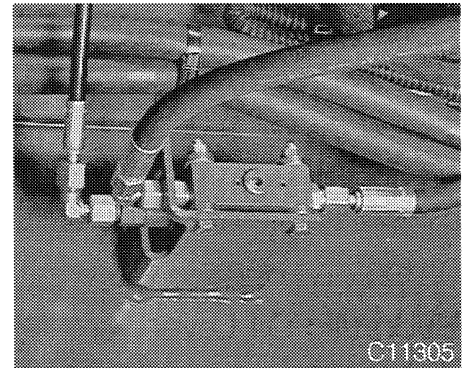
Reservoir Filters Replacement



1. Loosen the bleed screw (A) two or three turns to release pressure from the reservoir.
 2. Remove screws (1).
 3. Remove cover (2).
 4. Remove filter (3).
 5. Remove and clean bowl (4).
 6. Install bowl (4) on the new filter.
 7. Install the new filter.
 8. Check seal (5), replace seal if necessary.
 9. Install cover (2) and screws (1).
 10. Repeat 1 to 9 for the second filter.
- NOTE:** Operate the machine, then check for leaks.

Replacing the Filter on the Anti Surge Valve

1. Release pressure in the hydraulic circuit, see section "Maintenance/Adjustments".



2. Remove plug (1), spring (2), then remove filter (3).
3. Install a new filter.
4. Install spring (2), then plug (1).

NOTE: Operate the machine, then check for leaks.

LUBRICATION/FILTERS/FLUIDS

Hydraulic Oil Change

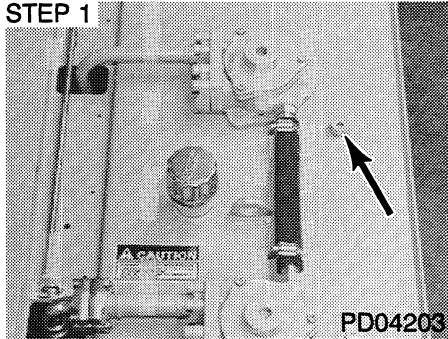
Change of hydraulic oil consists of systematically draining the oil from the main components (tank, pumps, cylinders, valve bank, hydraulic motors, cooler).

We recommend you have your dealer do this maintenance.

Oil Change

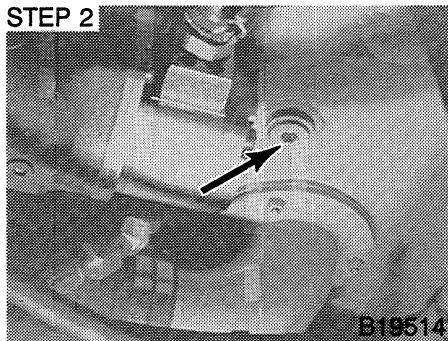
To change the circuit oil, put the machine on level ground and stop the engine.

STEP 1



Loosen the bleed screw two or three turns to release pressure from the reservoir.

STEP 2



Remove the drain plug and drain the oil from the reservoir.

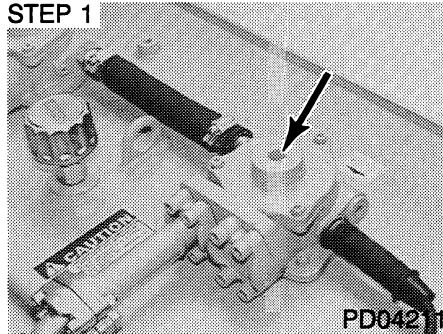
STEP 3

Remove the feed and return fittings so as to drain the other components (see your dealer).

NOTE: See *hydraulic filters* section if the filters are to be changed.

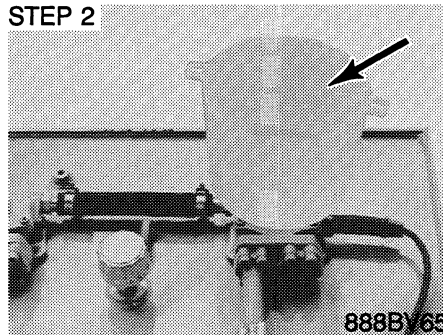
Filling

STEP 1



Clean all round the plug before removing it from the hydraulic reservoir.

STEP 2



Install and tighten the drain plugs. Install a funnel. Fill the hydraulic reservoir with the hydraulic oil specified in this manual. See specifications.

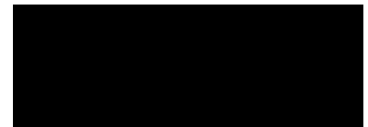
The oil must reach the second mark (4) on the indicator.

Remove the funnel and install the filter plug. Tighten the bleed plug. Start up the engine and operate the attachments, swing and travel. Then fully retract the dipper and cylinder rods, lay the attachment on the ground and stop the engine. Check the oil level and add oil if necessary.

MAINTENANCE/ADJUSTMENTS_____

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Checking engine fan drive belt.....	125
Coolant radiator	124
Fire-extinguisher	128
Hydraulic cylinder leakage check.....	128
Hydraulic reservoir shutoff valve.....	122
Releasing pressure in the hydraulic circuit.....	123
Starting fluid container	126
Turntable leveler cylinders	127



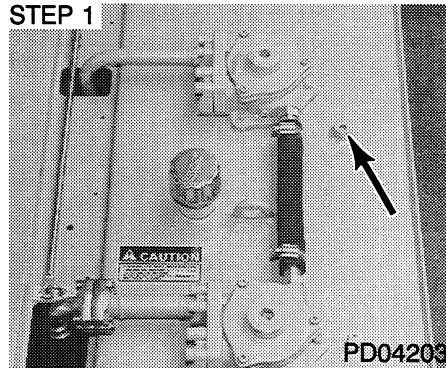
MAINTENANCE/ADJUSTMENTS

HYDRAULIC RESERVOIR SHUTOFF VALVE

The hydraulic oil reservoir is equipped with a manually controlled shutoff valve.

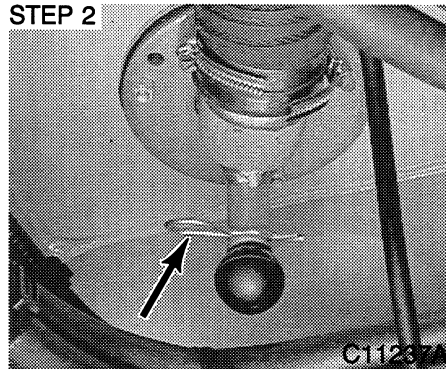
This valve must be closed when servicing the hydraulic system.

STEP 1



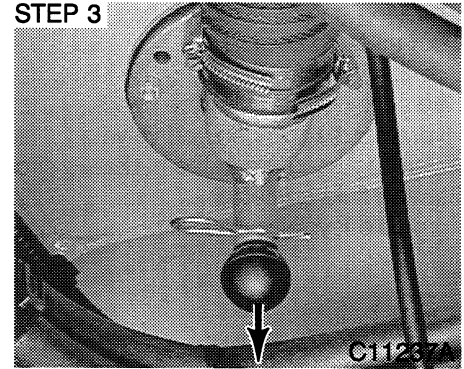
Loosen the bleed screw two or three turns to release pressure from the hydraulic reservoir.

STEP 2



Remove the keeper pin from the valve.

STEP 3



Pull the shutoff valve control down and install the keeper pin.

To open the shutoff valve, remove the keeper pin.

Push the shutoff valve fully up and install the keeper pin.

Tighten up the bleed screw on the hydraulic reservoir.

NOTE: If the shutoff valve has been closed to do a servicing, make sure the shutoff valve is open before starting the engine.

MAINTENANCE/ADJUSTMENTS_____

RELEASING PRESSURE IN THE HYDRAULIC CIRCUIT

Before doing any servicing on the hydraulic circuit it is necessary to completely release the pressure in all the circuits.

1. Stop the engine.
2. Operate the emergency pump while operating the control lever of the component which has to be serviced.

Disconnect the pressure lines in two stages :

3. Loosen the mounting plates and free the hoses by pulling them. The hydraulic fluid must flow out.
4. Disconnect the pressure lines.

MAINTENANCE/ADJUSTMENTS

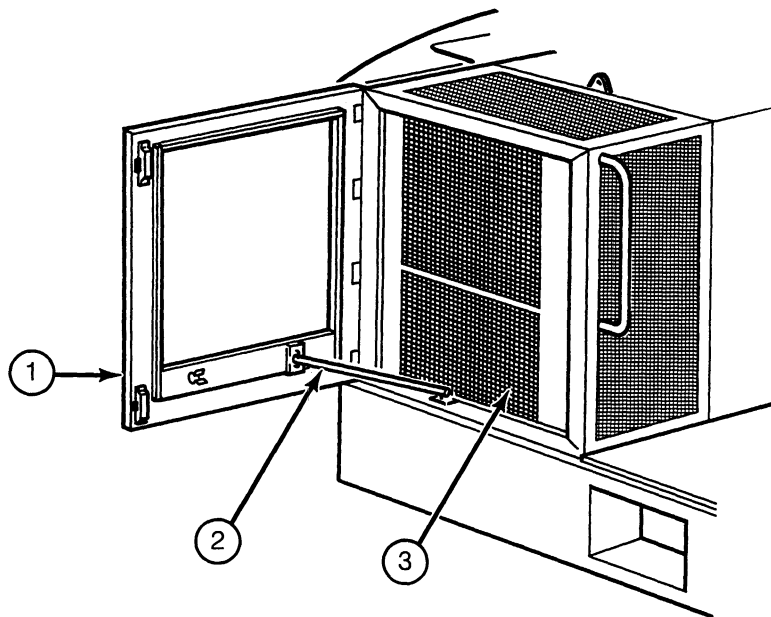
COOLANT RADIATOR

Every 10 hours or every day.

Check the cooling system for leaks and to make sure that the radiator fins are clean.

Every 250 hours.

IMPORTANT: Before cleaning with water or another suitable product, take the necessary steps to protect the batteries and the electric circuit.
Never use trichlorethylene as this can damage the cooler.



888BV69

1. Use the square Key to open the screen housing door (1).
2. Put the strut (2) in place.
3. Clean the screen (3) with compressed air and if necessary clean the radiator with water.
4. Put the strut in storage position.

IMPORTANT: Never leave tools inside the screen housing.

5. Lock the door (1) with the square Key.

IMPORTANT: Before moving away, make sure the screen housing door is properly locked.

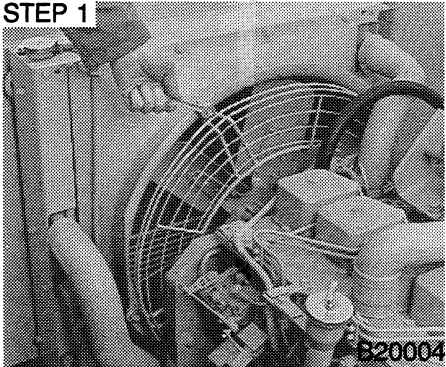
MAINTENANCE/ADJUSTMENTS

CHECKING ENGINE FAN DRIVE BELT

Every 10 hours or every day.
Check visually the condition of the belt.

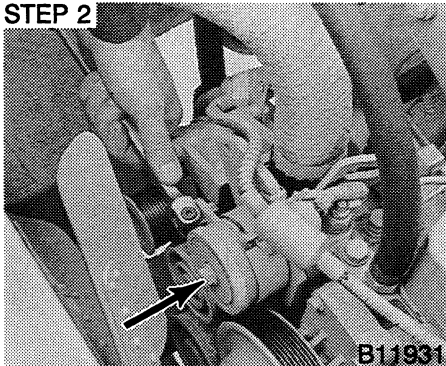
Every 1000 hours.

STEP 1



Remove the guard from the radiator.

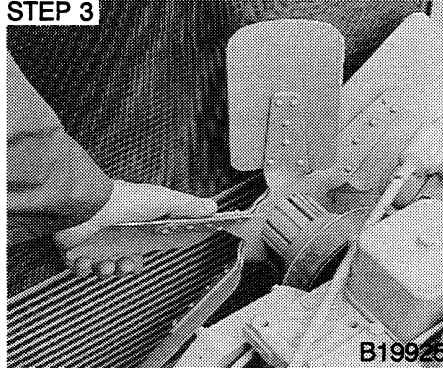
STEP 2



Push the tension roller and remove the belt.

Make sure that the tension roller and pulley operate properly (the pulley must turn freely).

STEP 3



Make sure that the fan operates correctly (the fan hub must turn freely without excessive axial play).

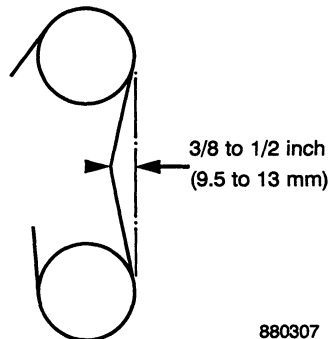
STEP 4

Check condition of the drive belt and change it if worn or damaged.

STEP 5

Install the belt.

STEP 6



Measure the deflection of the belt on its longest linear section.

Maximum deflection : 3/8 to 1/2 inch
(9.5 to 13 mm)

STEP 7

Install and tighten the guard into the radiator.

MAINTENANCE/ADJUSTMENTS

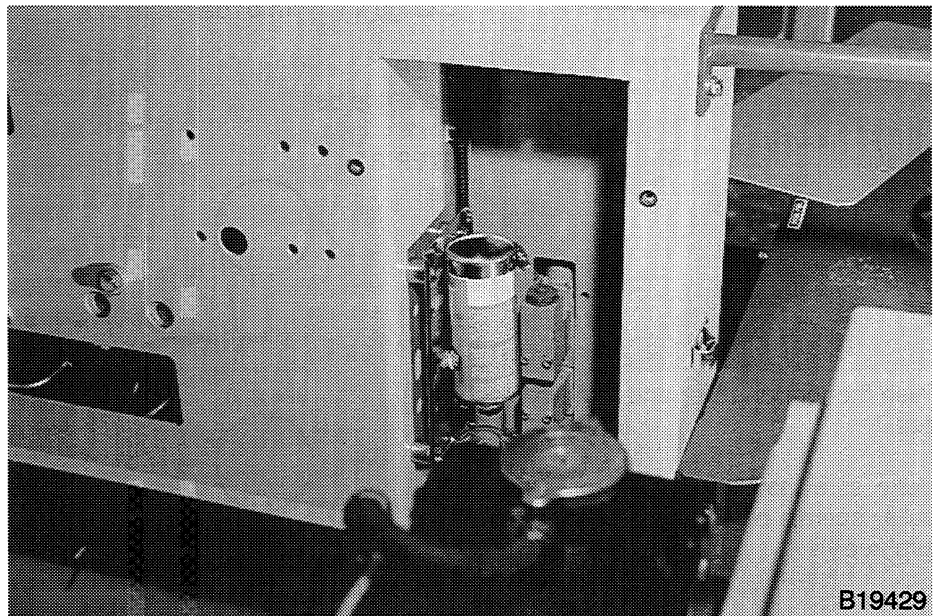
STARTING FLUID CONTAINER

Install a new container of starting fluid as follows:

1. Remove the cover plate.
2. Loosen the retaining clamp.
3. Turn the container counterclockwise to remove.
4. Remove the safety cap and plastic nozzle from the new container.
5. Install the container, and turn until firmly in contact with gasket.
6. Tighten the clamp.
7. Install cover plate.



Ether cans are explosive. Observe the precautions printed on the container. Ether must be in twelve ounce containers meeting ICC 2Q specifications. Remove ether can from the machine in hot weather.



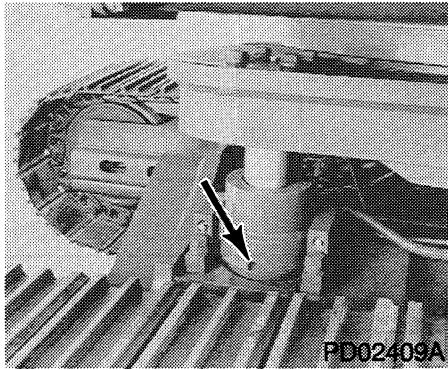
MAINTENANCE/ADJUSTMENTS

TURNTABLE LEVELER CYLINDER (If Equipped)

Bleed the turntable leveler cylinders:

- a) When carrying out the starting up procedure.
- b) After servicing the cylinders.

Bleed Screw



1. Start and run the engine at maximum.
2. Loosen the bleed screw one to two turns.
3. Tighten the bleed screw as soon as oil begins to flow freely without air bubbles.

MAINTENANCE/ADJUSTMENTS

HYDRAULIC CYLINDER LEAKAGE CHECK

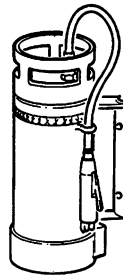
The piston rod of any cylinder must be slightly greasy. The hydraulic circuit must be at normal operating temperature before doing the oil leakage check.

1. Clean the rod and cylinder gland of the cylinder to be checked.
2. Operate the cylinder normally for 5 to 10 minutes.
3. Extend the cylinder rod.
4. Do the oil leakage check.

See table below

ROD CONDITIONS	TEST	CONCLUSION
Dry	Slight traces of oil when passing paper over the rod.	Normal
Slightly oily	The paper remains stuck when passed over the rod.	Normal
Oily	The paper remains stuck when touching the rod.	Normal
Very oily or seepage	After each rod extension, an oil ring is visible on the rod.	See your dealer
Leakage	At each rod retraction, oil leaks at the gland bore.	See your dealer

FIRE-EXTINGUISHER (Optional)



880340A

Every 2000 hours or once a year, have the fire-extinguisher checked by an expert.

ELECTRICAL SYSTEM

SECTIONAL INDEX

Adjusting upperstructure headlamps.....	138
Alternator	134
Batteries	132
Battery shutoff	134
Electrical specifications.....	130
Electrolyte level check.....	132
Fuses.....	130 - 131
Lamps	130
Replacing a battery.....	133
Replacing a bulb.....	136 - 138
Starter	135
Temperature sender unit.....	135

ELECTRICAL SYSTEM

ELECTRICAL SPECIFICATIONS

System voltage.....	24 volt negative ground
Batteries	two 12 volt low maintenance
Alternator	Robert Bosch, 45 amps
Starter	Robert Bosch

IMPORTANT : *Before doing any servicing, disconnect the electric circuit, using the battery master switch.*

Lamps

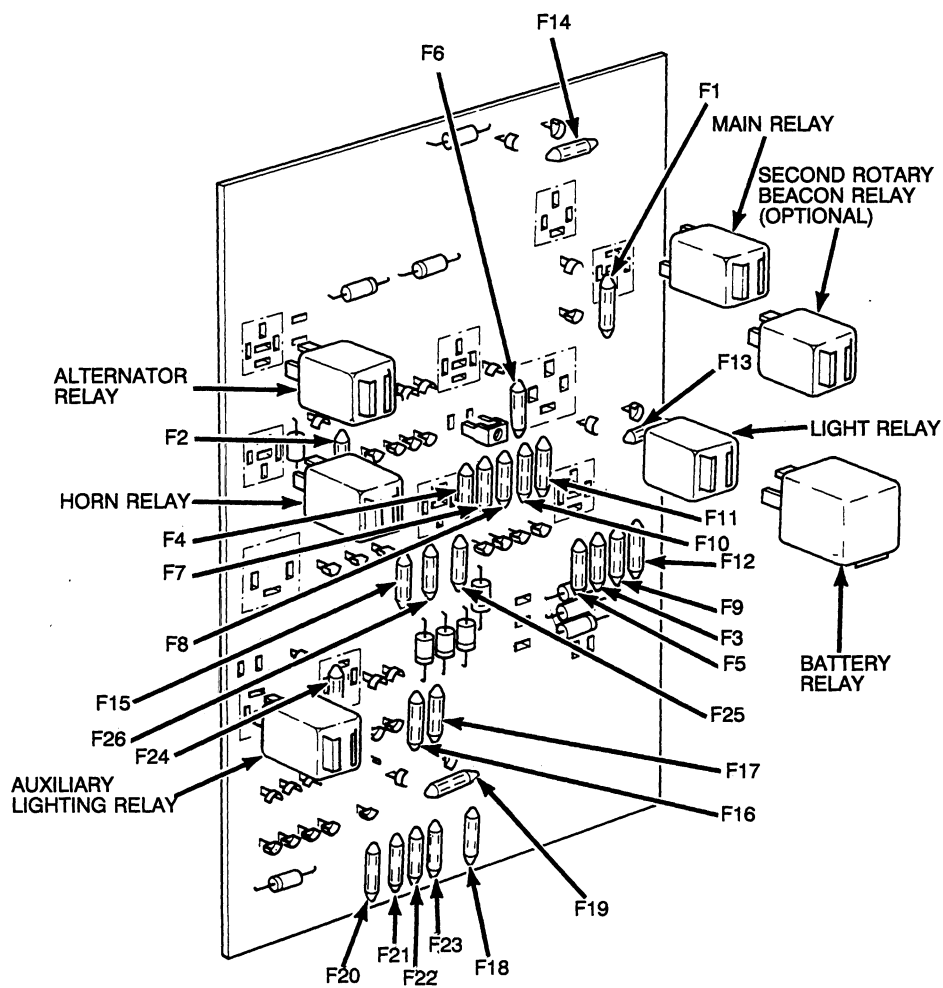
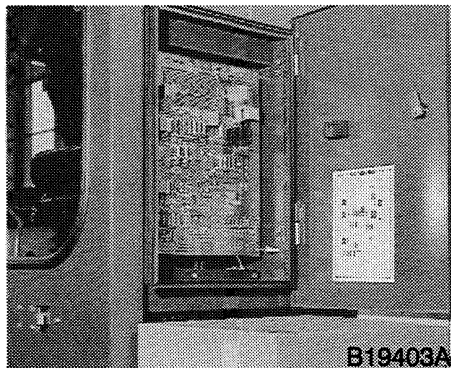
	Bulb part number
Control Panel Lamp (1.2W)	D40506
Cab lamp (5W).....	P40565
Turntable head lamp (70/75W)	P140555
Attachment working lamp (70W)	P340501

Fuses

IMPORTANT : *Before replacing the fuses in this machine, turn the battery master switch to the OFF position.*

F1 Starter, ether starting.....	30 amps
F2 Starting device	5 amps
F3 Charging warning lamp, air filter restriction, hydraulic oil filter restriction, pilot pressure, engine temperature, fuel level, engine oil pressure, hourmeter, warning lamp check	5 amps
F4 Dome lamp, horn	5 amps
F5 Working lamp control and indicator lamp, control panel lamps	8 amps
F6 Turntable lamps, attachment lamps	16 amps
F7 Horn.....	10 amps
F8 Turntable power line connection.....	16 amps
F9 Windshield washer, windshield wiper	5 amps
F10 Heater.....	10 amps
F11 Cigarette lighter.....	8 amps
F12 Engine shutdown, left hand lever safety.....	8 amps
F13 Not used.....	5 amps
F14 Radio	5 amps
F15 Not used.....	16 amps
F16-F25 Not used.....	5 amps
F26 Not used.....	8 amps

ELECTRICAL SYSTEM



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ELECTRICAL SYSTEM

BATTERIES

IMPORTANT : Before servicing components of the electrical system always turn the master switch to the OFF position.

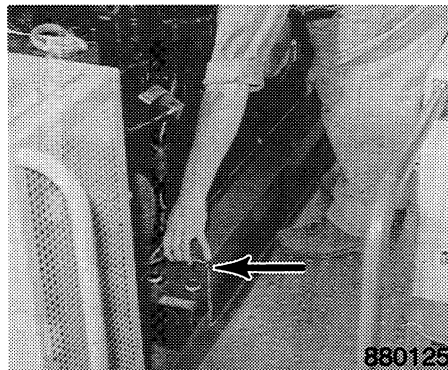
IMPORTANT : Before doing any welding operation on the excavator or repair to the electrical circuit, disconnect wires B+ and D+ from the alternator.

When connecting, check marking of wires.

IMPORTANT : Do not use a steam cleaner or cleaning solvent to clean the alternator.

Electrolyte Level Check

At least once a year.



1. Remove the cover from over the batteries.

2. Check the level in each battery cell. The level must be 1/2 inch (13 mm) above the plates. If required, top up with distilled water.

3. Make sure that the cables and terminals are clean, tight and covered with vaseline.



Sparks or flame can cause hydrogen gas in a battery to explode. To prevent an explosion do the following :

- 1. When you disconnect the battery cables, always disconnect the negative (–) battery cable first.**
- 2. When you connect the battery cables, always connect the negative (–) battery cable last.**
- 3. Do not short circuit the battery posts with metal items.**
- 4. Do not weld, grind or smoke near a battery.**

ELECTRICAL SYSTEM



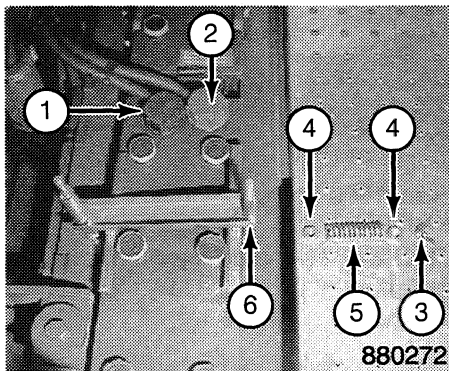
BATTERY ACID CAUSES SEVERE BURNS.

Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote : EXTERNAL - flush with water. INTERNAL - Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately.

EYES -Flush with water for 15 minutes and get prompt medical attention.

BATTERIES PRODUCE EXPLOSIVE GASES. Keep sparks, flames and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries. KEEP OUT OF REACH OF CHILDREN.

Replacing a Battery



Removal

1. Disconnect the electrical circuit, using the battery shutoff switch.
2. Remove the battery cover.
3. Remove the terminal covers.
4. Disconnect cables (1) and (2).
5. Remove anti-sulphate discs.
6. Loosen wing nut (3).
7. Remove washers (4) and spring (5).
8. Remove fastening bracket (6).
9. Remove old battery.

Installing

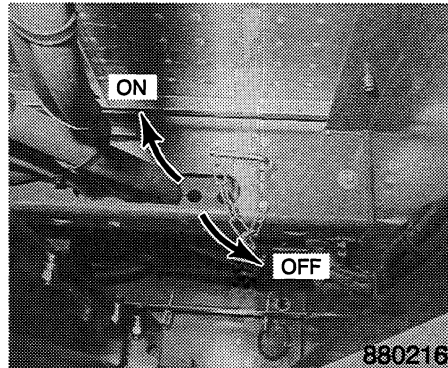
1. Install the new battery.
2. Install fastening bracket.
3. Install washers (4) and spring (5).
4. Install and tighten the wing nut.
5. Clean the cables and connecting terminals and coat with vaseline.
6. Install new anti-sulphate discs.
7. Connect the cables, positive first, and install the covers.

NOTE : *Make sure that the positive (+) cables are connected to the positive (+) battery terminals, and the negative (-) cables are connected to the negative (-) battery terminals.*

8. Install the battery cover.

ELECTRICAL SYSTEM

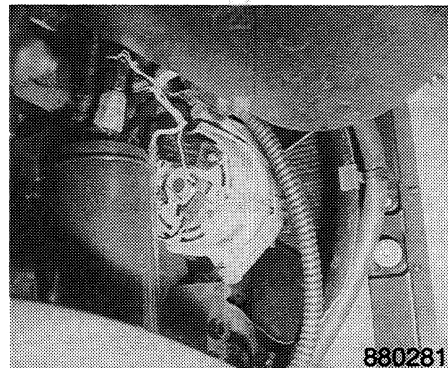
BATTERY



The battery master switch is located under the walkway, on the left hand side, and must be used :

- After the day's work.
- When doing maintenance operations.
- To service the electrical circuit.
- To disconnect the electrical circuit.
- To connect the electrical circuit.

ALTERNATOR

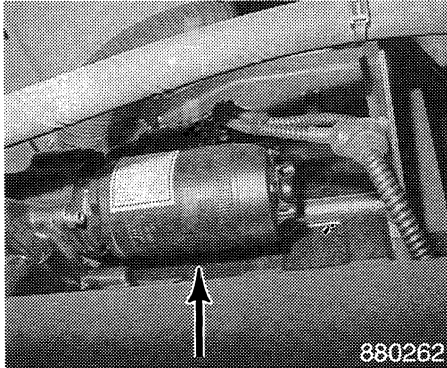


Every 1000 hours.

Have the alternator checked by your dealer.

ELECTRICAL SYSTEM

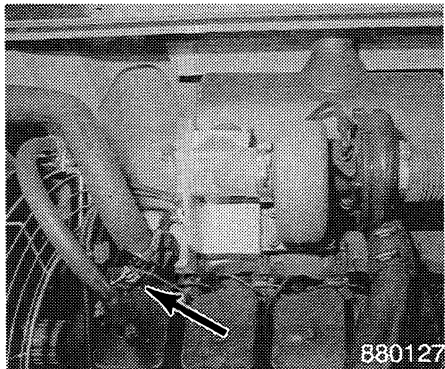
STARTER



Every 1000 hours

Have the starter motor checked by your dealer.

TEMPERATURE SENDER UNIT



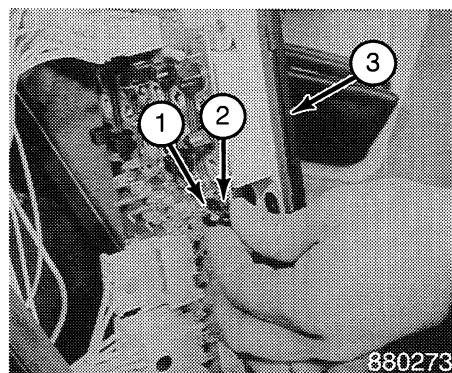
Every 1000 hours

Have the temperature sender unit checked by your dealer.

ELECTRICAL SYSTEM

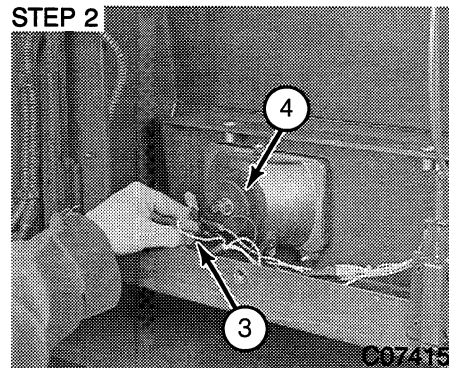
REPLACING A BULB

Control Panel



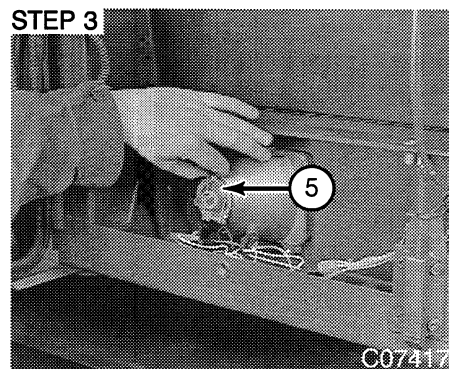
1. Remove the top plate (3).
2. Slightly press bulb support (1) rotate it a quarter turn and remove bulb (2).
3. Install a bulb of the same voltage and wattage (1.2 W).

STEP 2



Disconnect socket (3) from the lamp base, and remove rubber protector (4).

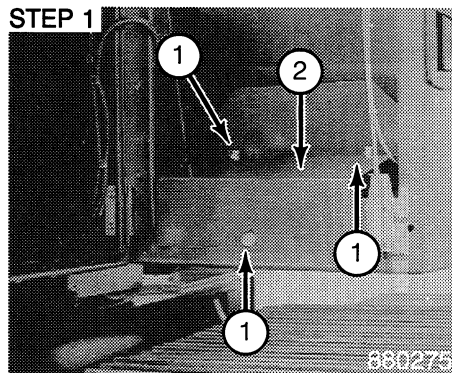
STEP 3



Tilt both clips (5) outwards.

Right Hand Headlamp

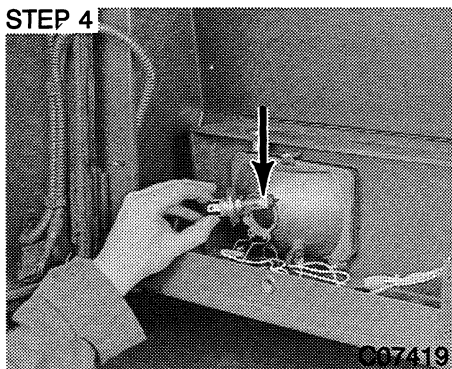
STEP 1



Open the tool compartment and remove the three mounting bolts (1) and the protective cover (2).

ELECTRICAL SYSTEM

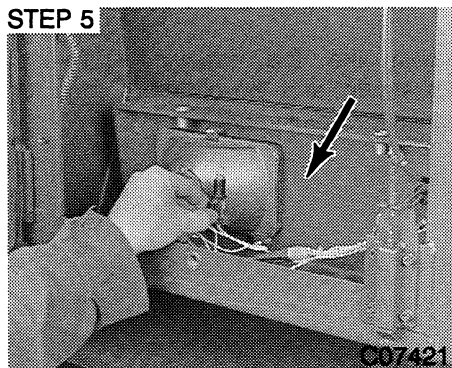
STEP 4



Remove bulb and install a bulb of same wattage (70/75 W).

NOTE: *Never put your fingers on a quartz-iodine bulb.*

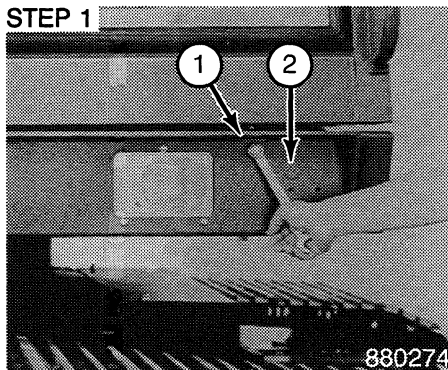
STEP 5



Remove bulb and install a bulb of same wattage (4 W).

Left Hand Headlamp

STEP 1

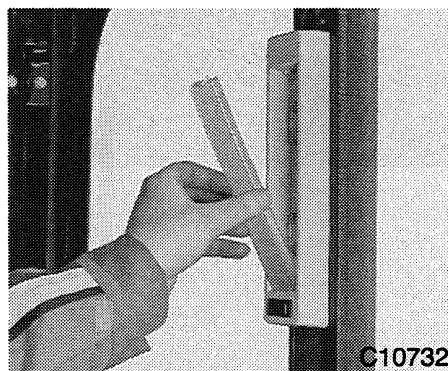


Remove mounting screw (1) headlamp support (2).

STEP 2

Carry out steps 2 to 5 for the right-hand headlamp.

Cab Lamp

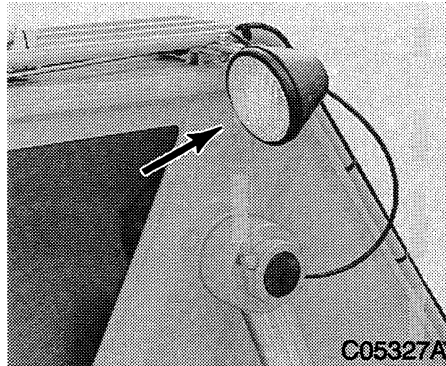


1. Remove lens.

2. Replace the bulbs with bulbs of the same voltage and wattage (5W).

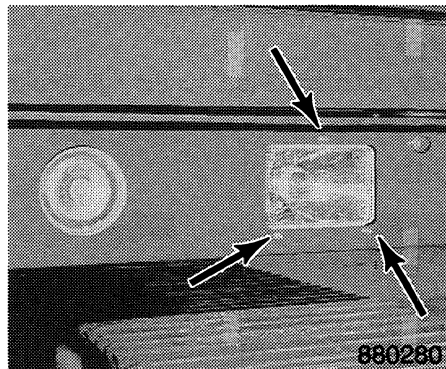
ELECTRICAL SYSTEM

Attachment Working Lamp



1. Remove the lamp base.
2. Replace the bulb with a bulb of the same voltage and wattage (70W).

ADJUSTING UPPERSTRUCTURE HEADLAMPS



To adjust the headlamps use the three screws indicated.

Adjust the top screw for vertical adjustment and the bottom screws for horizontal adjustment.

STORAGE

SECTIONAL INDEX

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Preparation prior to storage.....	140
Regular checks	141
Starting after storage	141



STORAGE

MACHINE STORAGE

The following procedure applies to storage of the machine for one month and over.

Preparation Prior to Storage

1. Park the machine on horizontal, flat and clean ground.
2. Do a complete lubrication of the machine.
3. Fully retract the hydraulic cylinder rods (bucket and dipper cylinders).
4. Lubricate the part of the cylinder rods which remains out.
5. Release the pressure in the hydraulic circuit.
6. Clean the outer components of the engine with clean fuel.
7. With the engine hot, drain the oil from the crankcase.
8. Fill the engine with anti corrosive oil up to the MAXI mark on the gauge.
9. Drain the fuel tank.
10. Fill with a mixture of 90% fuel and 10% anti corrosive oil.
11. Run the engine at low idle for five minutes to allow the anti corrosive oil to reach the pipes, filters, pump, turbocharger, and injectors.
12. Remove the rocker arm covers.
13. Spray a mixture of 90% fuel and 10% anti corrosive oil in the rocker arm chamber.
14. Install the rocker arm covers and side covers.
15. Seal off the air filter intake port and exhaust pipe.
16. Remove the batteries.

STORAGE

Regular Checks

Every month check the following :

1. Battery charging.
2. Lubrication of the cylinder rods.
3. Level of fuel in tank and anti corrosive oil in the engine. Add fuel or oil as necessary.
4. Check condition of pipes, clamps and unions for corrosion. Lubricate if required.
5. Check condition of paint. Apply a fresh coat of anti rust product if necessary.

Starting After Storage

1. Do a complete lubrication of the machine.
2. Install the components previously removed.
3. Remove plug from intake and exhaust ports.
4. Drain the storage oil.
5. Replace oil and fuel filters.
6. Fill the engine crankcase with oil.
7. Drain the fuel tank and fill with clean fuel.
8. Clean the cylinder rods.
9. Start the machine.



Check the machine for leaks or any parts that are broken, not working correctly or not there at all. Before you start the machine, tighten all caps, dipsticks, battery covers, etc.



Before starting the engine, be sure all operating controls are in neutral. This will eliminate accidental movement of the machine or start up of power driven equipment.



Never operate the engine in a closed building. Proper ventilation is required under all circumstances.

NOTE : The CASE CORPORATION reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

