

TL10
CRAWLER LOADER

OPERATORS MANUAL

TAKEUCHI MFG. CO., LTD.

OPERATORS MANUAL

TL10
CRAWLER LOADER

Serial No. 10031L and after

TAKEUCHI MFG. CO., LTD.

OPERATOR'S MANUAL



TL10 CRAWLER LOADER

Model No. TL10-1

Copyright © 1998

Preface

Thank you for purchasing the **TL10** Crawler Loader.

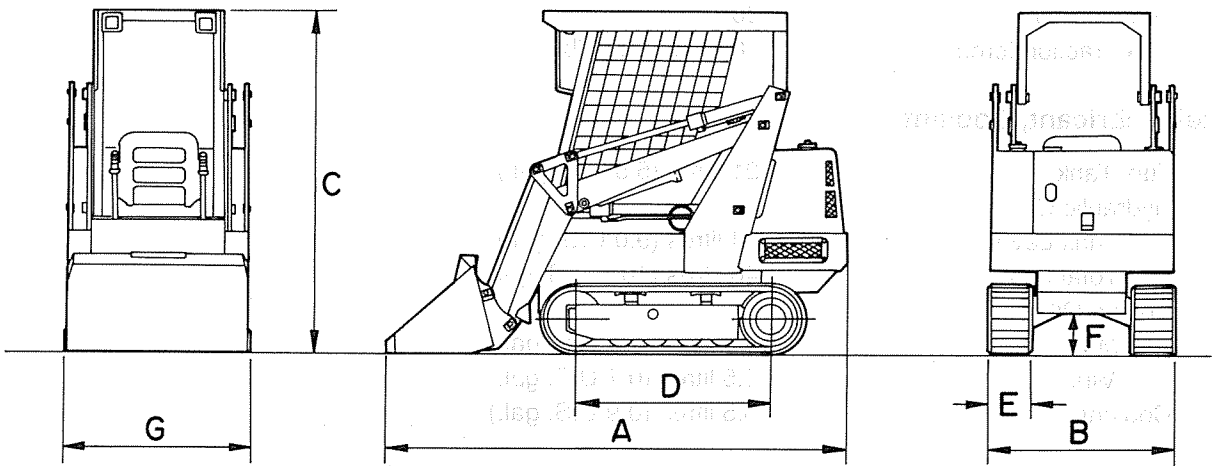
This manual has been prepared to inform you of the best methods for driving, operation, maintenance and repairs so that you can realize the maximum efficiency and economy as you use the **TL10** Crawler Loader. Please read this manual carefully to understand the correct procedures for operation, maintenance and service.

Contents

Specifications	3	Lights: Replacing the Bulbs	26
		Other Inspection and Maintenance	26
Names · Functions		Replacing the Bucket	28
Names of Components	5	Handling in Cold Weather	29
Controls and Instruments	5	Long-term Storage	29
Seat	7		
Seat Belt	8	Lubricants Chart	30
Safety Bar	8	Tightening Torques	31
Operation		Service Schedule	32
Before Starting the Engine	9	Troubleshooting	33
Starting the Engine	10	Hydraulic System Diagram	34
Stopping the Engine	11	Electrical System Diagram	35
Levers and Pedals Operation	12	Safety Instructions	36
Steering Levers and Acceleration Pedal	13		
Operational Pedals	14	Options	40
Operation Outline	16	Parts · Service	
Cautions During Operaiton	19	When ordering	41
Transporting the Loader	22	Consumable Items	41
Inspection · Maintenance		Standard Accessories	42
Greasing	23	Parts List	43
Adjusting the Crawler Belt Tension	23		
Replacing the Gear Oil	24		
Replacing the Hydraulic Oil	24		
Remove the hood	25		
Servicing the Fuel System	25		
Replacing the Engine Oil Filter	25		
Cleaning and Replacing the			
Air Cleaner Element	26		

SPECIFICATIONS

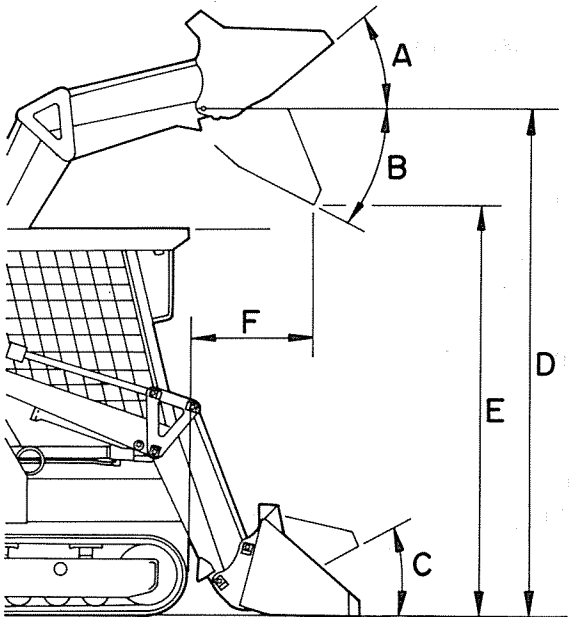
Dimensions



TO-201

	A	B	C	D	E	F	G
mm	2545	990	1873	1046	230	214	1000
in	100	39	73.7	41.2	9.1	8.4	39.4

Working ranges



A	B	C
35°	50°	35°

	D	E	F
mm	2370	1735	1335
in	93.3	68.3	52.2

TO-202

SPECIFICATIONS

Performance

Travel Speed	
Low Speed	0 ~ 2.6 km/hr (0~1.61 mph)
High Speed	0 ~ 5.1 km/hr (0~3.17 mph)
Gradeability	30°
Max. traction force	1010 kg (2227 lb.)

Fuel, Lubricant, Coolant

Fuel Tank	21 litres (5.5 U.S. gal.)
Hydraulic Oil	
Tank Level	34 litres (9.0 U.S. gal.)
Total System	40 litres (10.6 U.S. gal.)
Engine Oil	
Max.	4.0 litres (1.1 U.S. gal.)
Min.	2.5 litres (0.7 U.S. gal.)
Coolant	3.5 litres (0.9 U.S. gal.)

Engine

Make	Isuzu
Model	3KC1
Cooling	Liquid
Fuel	Diesel
Rated Output	17.5 ps (17.3 hp) @2,200 rpm
Rated Torque	6.0 kg·m (43 ft.-lb) @2,000 rpm
Number of Cylinders	3
Bore & Stroke	75 mm × 76 mm (2.95 in. × 2.99 in.)
Total Displacement	980 cm ³ (59.8 cu.in.)

Electrical

System Voltage	12V
Battery	52A 300 cold crank amps. @-15°C
Alternator	20A

Power Train

2 Speed, open circuit

Weight

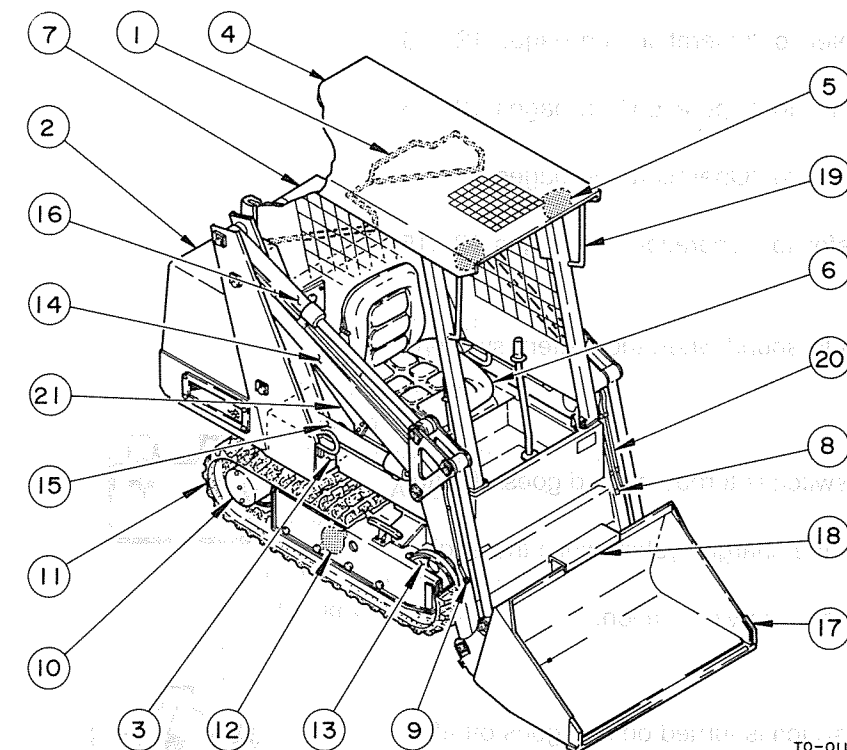
Operating Weight	1,390 kg (3,065 lb.)
Ground Pressure (JIS)	0.26 kg/cm ² (3.7 psi)

Standard Bucket

Width	1,000 mm (39.4 in.)
SAE Rated Capacity	0.16 m ³ (0.21 cu.yd.)
Weight	77 kg (170 lb.)

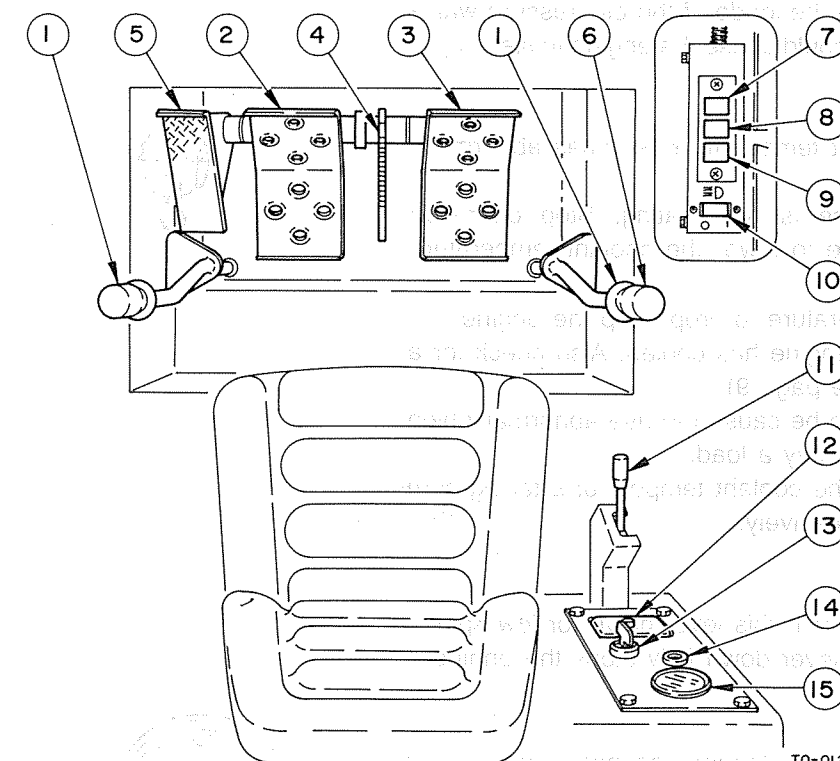
NAMES · FUNCTIONS

Names of Components



1. Safety Bar
2. Bonnet
3. Hydraulic Oil Tank
4. Canopy
5. Headlights
6. Seat
7. Fuel Tank
8. Hydraulic Return Line
9. Right Auxiliary Hydraulic Line
10. Travel Motor
11. Crawler Belt
12. Track Roller
13. Front Idler
14. Lift Arm
15. Lift Cylinder
16. Bucket Cylinder
17. Bucket
18. Safety Step
19. Safety Grip
20. Left Auxiliary Hydraulic Line
21. Lift Arm Stopper

Controls and Instruments



1. Steering Levers
2. Arm Pedal
3. Bucket Pedal
4. Auxiliary Pedal
5. Acceleration Pedal
6. Horn Button
7. Water Temp. Warning Lamp
8. Oil Press. Warning Lamp
9. Charge Warning Lamp
10. Light Switch
11. Throttle Lever
12. Fuses
13. Starter Switch
14. Glow Signal
15. Hourmeter

NAMES · FUNCTIONS

Steering Levers Refer to “Operation” on pages 12~15

Arm Pedal Refer to “Operation” on pages 12~15

Bucket Pedal Refer to “Operation” on pages 12~15

Auxiliary Pedal Refer to “Operation” on pages 12~15

Acceleration Pedal Refer to “Operation” on pages 12~15

Horn Button
Pressing this button causes the horn to sound when the battery switch is on.

Charge Warning Lamp
This lamp lights up when the starter switch is turned on and goes off after the engine starts.
It lights up if there is a malfunction in the charge system while the engine is running.

- Have the charge system checked at a service station.

Oil Press. Warning Lamp
This lamp lights up when the starter switch is turned on and goes off after the engine starts.
It lights up if there is trouble in the lubrication system while the engine is running.

- Stop the engine and check the engine oil level (see page 9).
- If there is some other cause, have it checked at the service station.

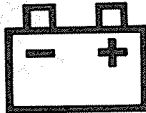
CAUTION: Do not continue driving the loader if the oil pressure warning lamp lights up as it could cause the engine to seize up.

Water Temp. Warning Lamp
This lamp lights up when the coolant temperature becomes abnormally high.

- This lamp signals that the engine is overheating. Stop operation immediately and let the engine idle to lower the coolant temperature (See page 10).
- After waiting for the coolant temperature to drop, stop the engine.
- Check the coolant level after the engine has cooled. Also check for a broken or loose fan belt, etc.. (See page 9)
- The coolant temperature could also be caused to rise abnormally high by running the engine under too heavy a load.
Resume operation after lowering the coolant temperature, taking care not to let the temperature rise excessively.

Throttle Lever
This lever controls the engine rpm. Push this lever down for low speed, pull up for high speed. Pushing this lever down fully stops the engine.

Hourmeter
This meter indicates the time which the loader has been operated. It operates only while the engine is running.



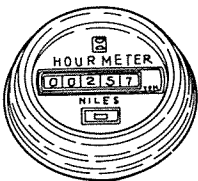
T2-016



F2-104



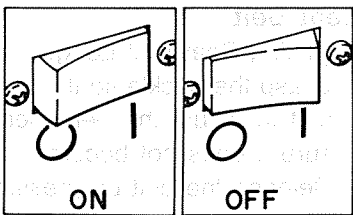
F2-103



B3-222

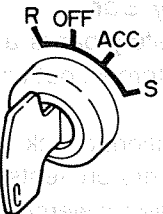
NAMES · FUNCTIONS

Light Switch
This switch turns on the head lights.



T0-023

Starter Switch (see pages 10 and 11)
R Heats the glow plugs to facilitate engine starting.
OFF Cuts off the accessory and power supply circuits (engine stop position).
ACC Connects the accessory and power supply circuits (engine run position).
S Turns the starter motor to start the engine. (The key returns to the ACC position automatically when the key is released.)



T0-019

NOTE: The following two types of key are supplied in the key holder.

- 1. Engine start key 2 keys
- Fuel filler cap key..... 2 keys
- 2. Bonnet key..... 2 keys

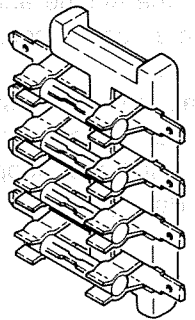
Glow Signal
This signal indicates when the glow plugs has been preheated (See page 10).



K0-017

Fuses
The fuses are arranged in order from the top as shown below.

Capacity	Circuit
15A	Horn
5A	IC Regulator (Alternator)
5A	Warning lamps, Feed pump
15A	Headlights

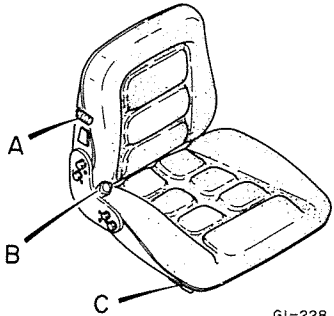


F1-098

Seat
Cushion Adjustment
Moving lever “A” up and down permits the operator to select the cushion firmness which best suits his body weight.
Top position..... Light person
Middle position..... Medium person
Bottom position..... Heavy person

Seat Back Angle Adjustment
Turning handle “B” permits the seat back to be reclined backward between 5° and 20°.

Forward-Backward Adjustment
Pressing lever “C” to the right permits the seat to be adjusted backward or forward a total of 150mm (5.9 in.) in 15mm (0.6 in.) increments.



G1-228

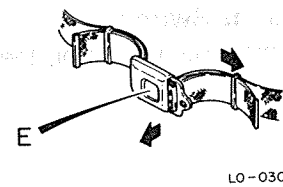
NAMES · FUNCTIONS

Seat Belt

Adjusting Seat Belt Length

- Grasp the buckle so that it is at right angles to the belt, then pull on the belt to adjust the belt's length. Fasten the seat belt securely, making sure it does not become unbuckled.

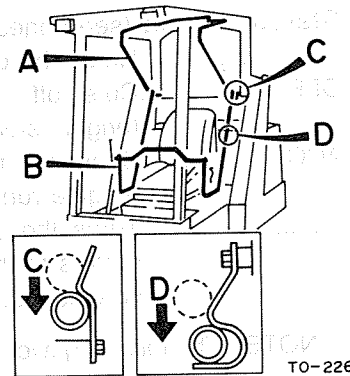
Release the belt by pressing on portion "E" in the buckle.



Safety Bar

The safety bar is a safety device designed to prevent the operator from being thrown out toward the front in the event that the loader is tipped forward.

In addition, a lock mechanism connected to each control pedal and steering levers prevents the pedals or levers from being operated until the bar has been lowered.



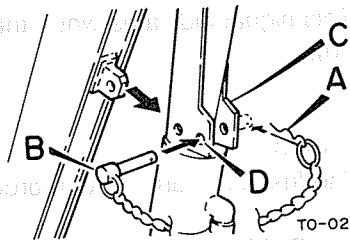
- A..... With the safety bar not set (Steering lever and control pedal lock position)
- B..... With the safety bar set (Steering lever and control pedal release position)

NOTE: Push the safety bar down to the "C" and "D" positions.

Lift Arm Stopper

If the lift arms must be maintained in a raised position during repair or other operations, use this stopper to prevent the lift arms from dropping.

- One person must stay in the operator's seat, with the seat belt fastened and the safety bar lowered, while another person installs the lift arm stopper.
- Start the engine and raise the lift arms all the way up.
- Have a second person install the lift arm stopper over the rod of one lift cylinder.
- Install the lift arm stopper by the following procedure.
 - Pull out snap pin "A" and pin "B" in the order of "A", then "B".
 - Install the stopper "C" over the rod.
 - Pass pin "B" through hole "D", then fasten it with snap pin "A".



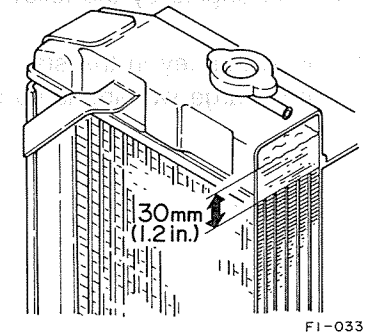
OPERATION

Before Starting the Engine

Checking the Coolant

At a time when the engine is cool, remove the radiator cap and check the level of the coolant. The coolant level should be 30mm (1.2 in.) above the top of the radiator core to be normal. If there is insufficient coolant, fill the radiator back to the proper level with soft water.

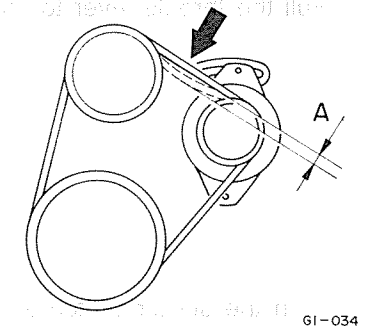
WARNING: Do not remove the radiator cap when the engine is hot.



Checking the Fan Belt

Adjust the fan belt so that the deflection "A" is approximately 12mm (0.5 in.) while pressing down on the center of the fan belt (with approximately 10 kg/22 lb. of pressure).

For details see the engine operation manual.



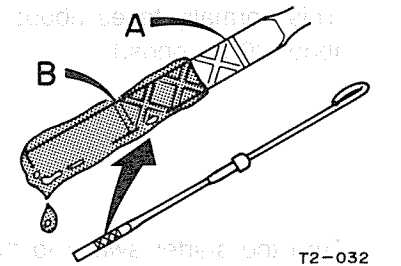
Checking the Engine Oil

Check the oil level with the oil level gauge.

"A" is the upper limit.

"B" is the lower limit.

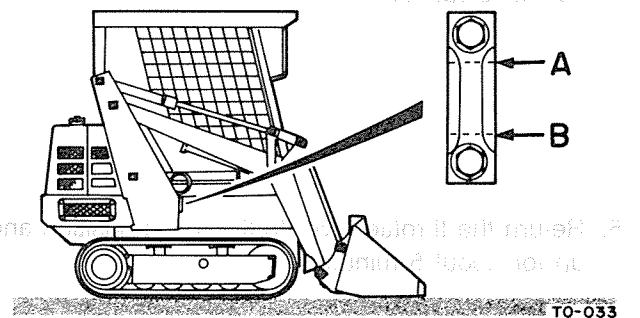
For details see the engine operation manual.



Checking the Hydraulic Oil

Set the loader in the posture shown in the figure. Check the oil level, using the following points as criteria since the oil level varies according to the oil temperature.

- Between the upper limit "A" and lower limit "B" when the oil is at normal temperature (about 20°C/68°F).
- Near the upper limit "A" when the oil temperature is the normal operating temperature (about 60°C/140°F).
- The oil level in the tank varies approximately 1mm (0.04 in.) for every 10°C (18°F) change in the oil temperature.



Miscellaneous

Check all piping for oil leakage, etc., and check to make sure no bolts, nuts, split pins or other parts are damaged or missing.

After the above check, make all necessary adjustments, referring to the items on "Inspection · Maintenance".

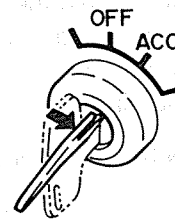
The operator should be sure to adjust the seat to the proper position and fasten the seat belt during operation (See page 8).

OPERATION

Starting the Engine

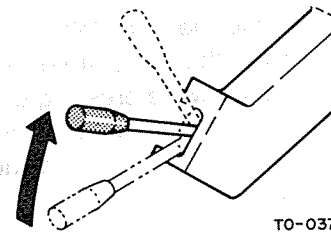
Start the engine by the following procedure.

1. Insert the key in the starter switch and turn it to the "ACC" position. The charge warning lamp and oil pressure lamp will light up.



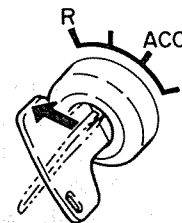
TO-036

2. Pull the throttle lever to the center position.



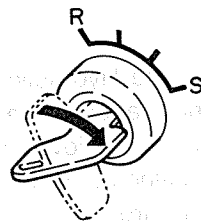
TO-037

3. Turn the starter switch to the "R" position and hold it there until the glow signal indicates that the glow plugs are red hot. (This normally takes about 15 seconds, but in cold weather it takes about 30 seconds.)



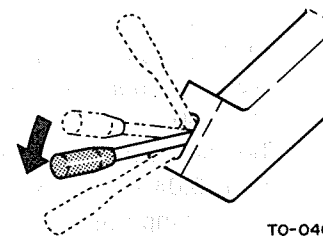
TO-038

4. Turn the starter switch to the "S" position and start the engine. The starter switch will return automatically to the "ACC" position when the key is released.



TO-039

5. Return the throttle lever to the Idling position and let the engine warm up for about 5 minutes.



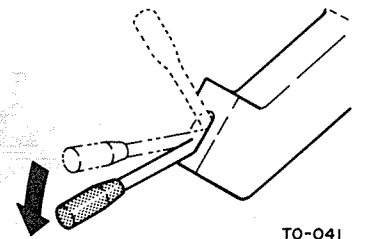
TO-040

OPERATION

Stopping the Engine

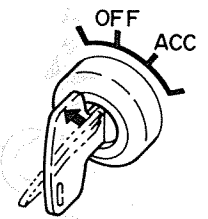
Before stopping the engine, let it idle for 5 minutes to cool, then stop it by the following procedure.

1. Push the throttle lever down fully. This will stop the engine.



TO-041

2. Turn the starter switch to the "OFF" position.



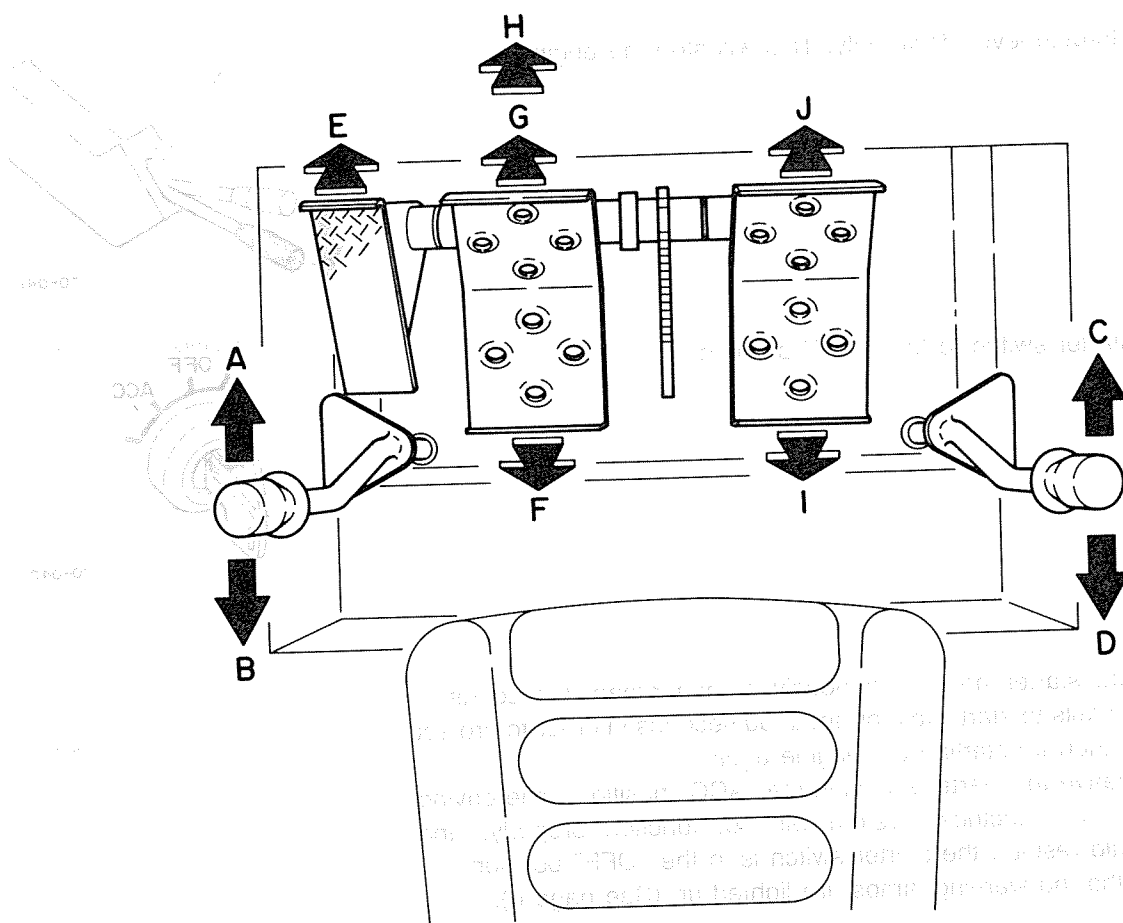
TO-042

CAUTION:

1. Do not run the starter motor continuously for longer than 10 seconds.
2. If the engine fails to start, wait for about 30 seconds in order to protect the battery, then try starting the engine again.
3. Be sure to leave the starter switch in the "ACC" position while driving the loader. The electrical system will not function properly, and damage could result if the starter switch is in the "OFF" position.
4. Make sure that no warning lamps are lighted up (See page 6).

OPERATION

Levers and Pedals Operation



TO-045

A	Left Crawler Forward	F	Lift Arm Raise
B	Left Crawler Reverse	G	Lift Arm lower
C	Right Crawler Forward	H	lift Arm Float
D	Right Crawler Reverse	I	Bucket Rollback
E	Travel, Acceleration	J	Bucket Dump

OPERATION

Steering Levers and Acceleration Pedal

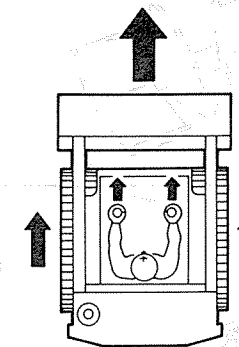
The steering levers control forward and reverse travel and turning of the loader.

- **Forward travel**
Push both levers forward.
- **Reverse travel**
Pull both levers backward.
- **Normal turning**
Move one of the levers more than the other lever.
- **Spin turn**
Push one lever forward and pull the other lever backward.
- **Changing travel speed**
Depressing the acceleration pedal while traveling at low speed causes the loader to speed up. Letting up on the pedal causes it to slow down again.
- **Stopping**
Return both levers slowly to the neutral position. The parking brake engages automatically when the loader is stopped.

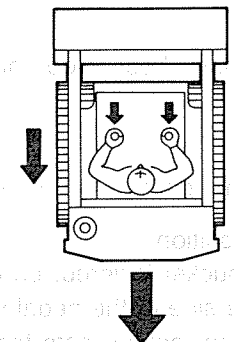
CAUTION:

Fasten the seat belt snugly and lower the safety bar when driving the loader.

Forward

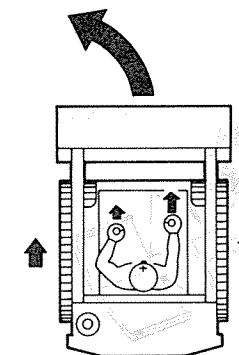


Reverse

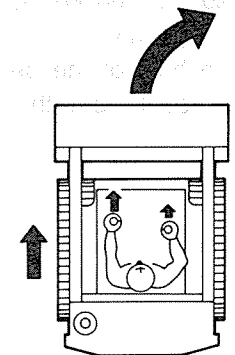


TO-046

Left Turn

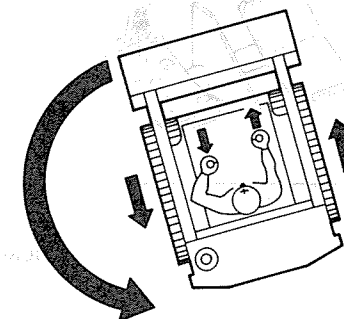


Right Turn

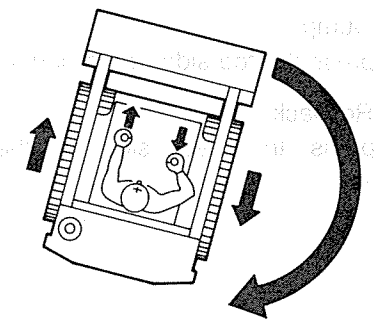


TO-047

Left Spin Turn



Right Spin Turn



TO-048

OPERATION

Operational Pedals

Arm Pedal

The arm pedal controls the lift arm.

■ Raise

Depress the heel side of the pedal.

■ Lower

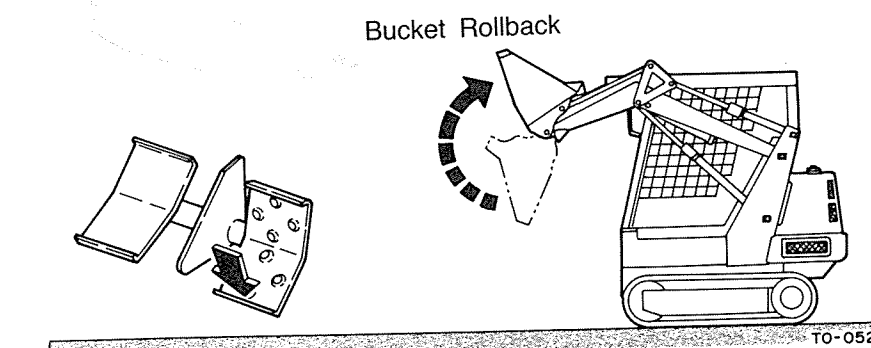
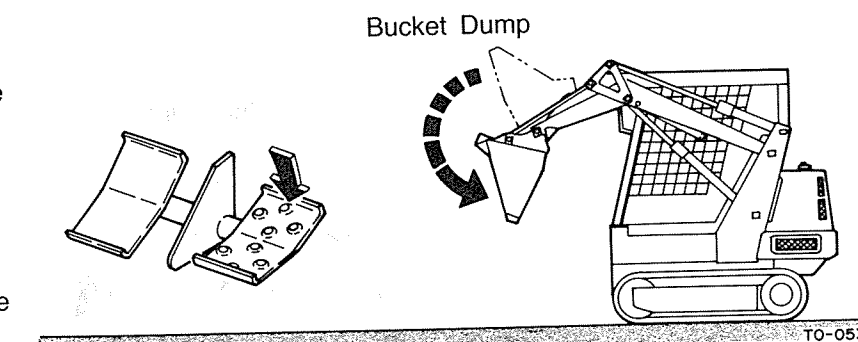
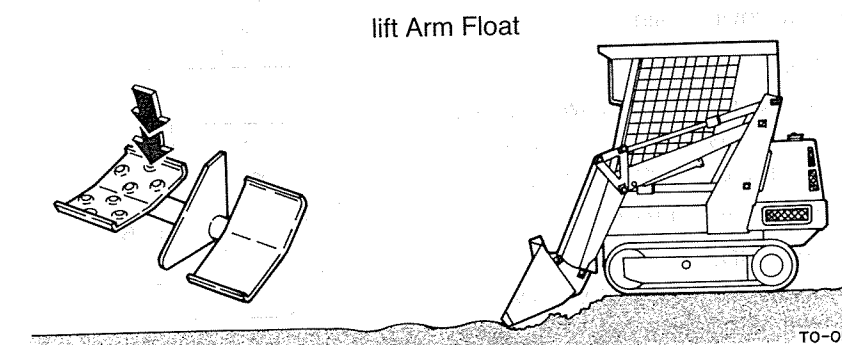
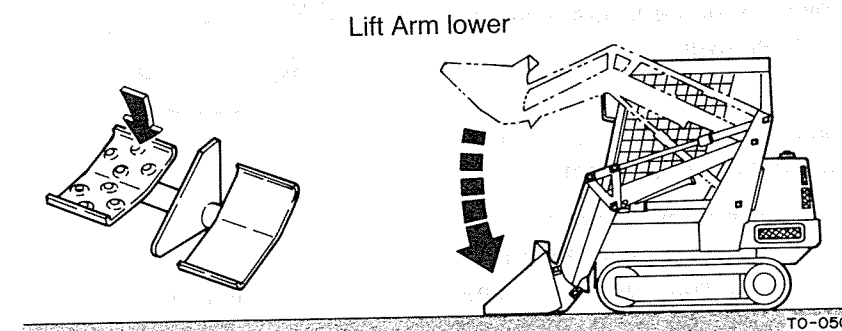
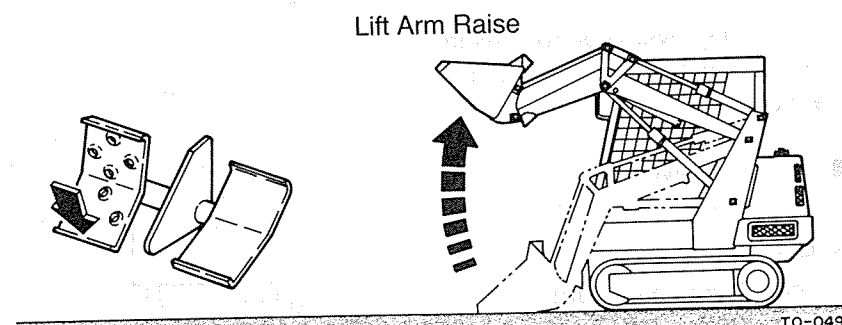
Depress the toe side of the pedal.

■ Float position

With the bucket lowered, depressing the toe side of the pedal to the lock position (detent) sets the arm in the Float position.

Use the Float position of the lift arms to level loose material while driving backwards. In this position, there is no hydraulic force on the lift arms so the bucket is held down only by gravity.

Push on the heel of the pedal to unlock the pedal from the Float position.



Bucket Pedal

The bucket pedal controls the bucket tilting function.

■ Dump

Depress the toe side of the pedal.

■ Rollback

Depress the heel side of the pedal.

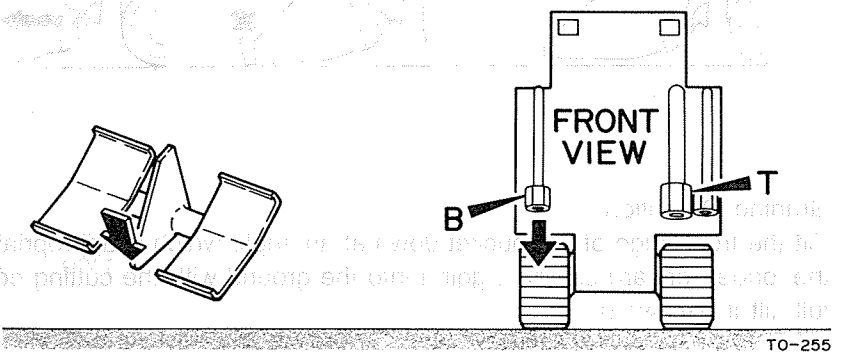
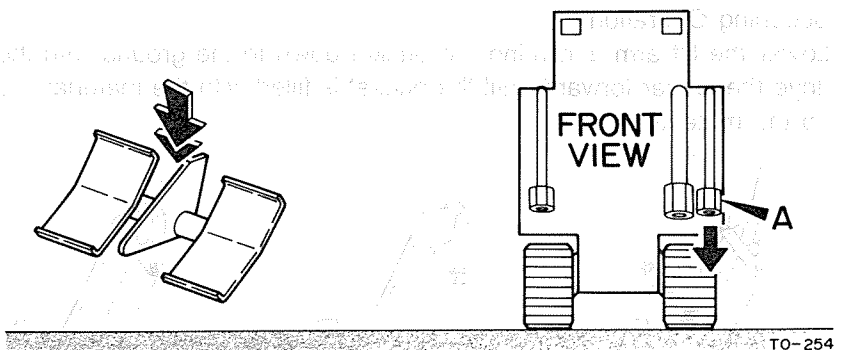
OPERATION

Auxiliary Pedal

The auxiliary pedal controls the flow of hydraulic fluid in the left and right auxiliary lines.

■ Depressing the toe end of the auxiliary pedal causes high pressure hydraulic oil to flow from port "A". Depressing the still further moves the control valve to the detent position, allowing the constant flow of hydraulic oil. Pushing the heel end of the pedal releases the control valve from the detent position.

■ Depressing the heel end of the auxiliary pedal causes high pressure hydraulic oil to flow from port "B".



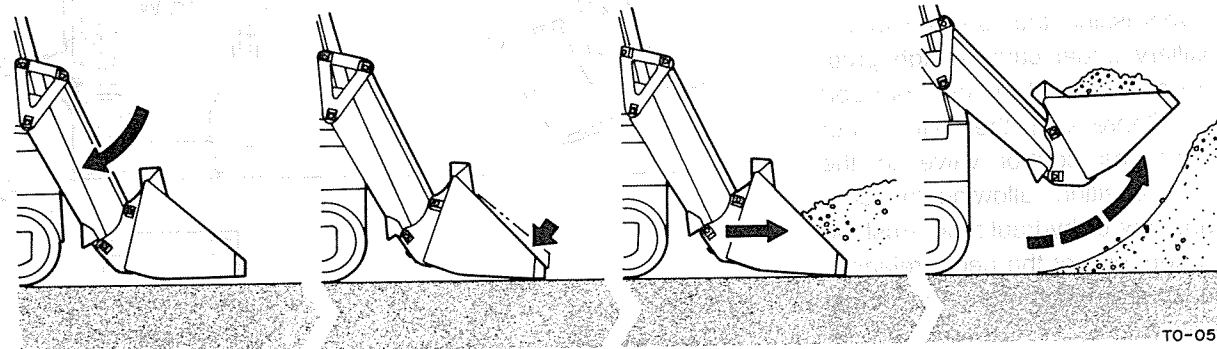
NOTE: Hydraulic oil passing through port "T" returns directly to the hydraulic tank. It is used return oil to the tank when the breaker is used.

OPERATION

Operation Outline

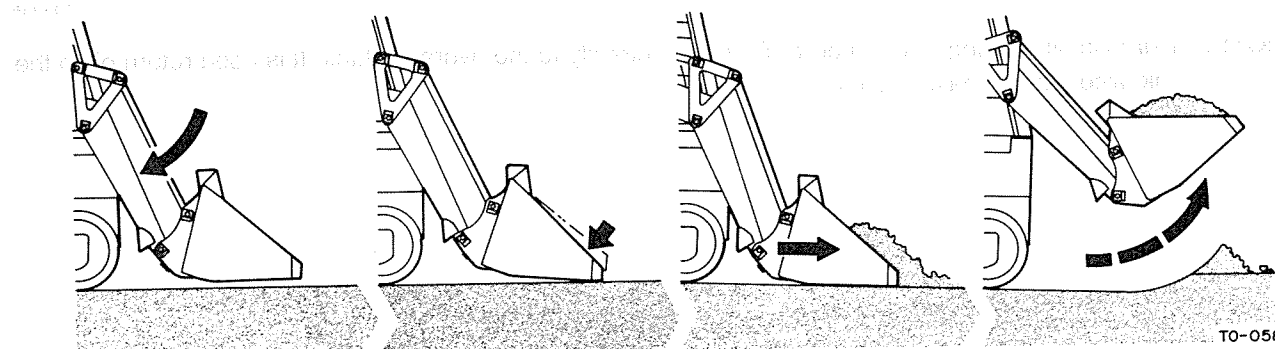
Scooping Operation

Lower the lift arm and bring the bucket down to the ground with the front end tilted slightly forward, then drive the loader forward until the bucket is filled with the material. Next tilt the bucket backward and scoop up the material.



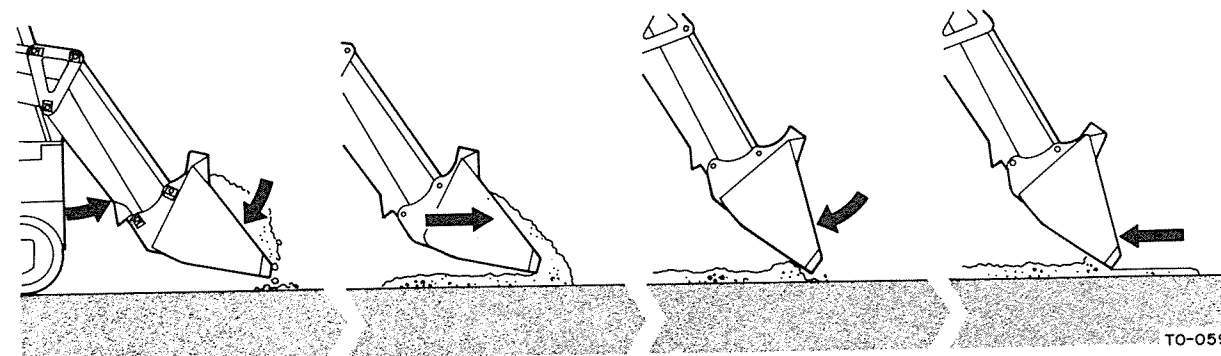
Grading Operation

Tilt the front edge of the bucket down at an angle which is appropriate for the ground hardness, then drive the loader forward slowly, digging into the ground with the cutting edge of the bucket. When the bucket is full, tilt it backward.



Leveling Operation

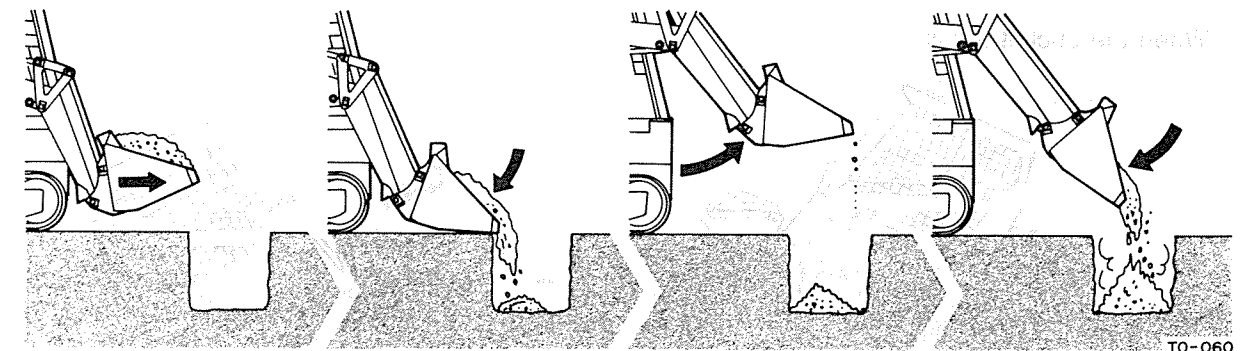
Raise the lift arm and tilt the bucket forward, then release it as the loader is driven forward. Next tilt the bucket forward and lower the front edge until it is slightly above the ground surface, then back the loader over the load which was just released.



OPERATION

Backfilling Operation

With the bucket lowered, drive near the hole and tilt the front edge of the bucket downward as soon as it passes over the near side of the hole. Raise the bucket and empty the load only when necessary.

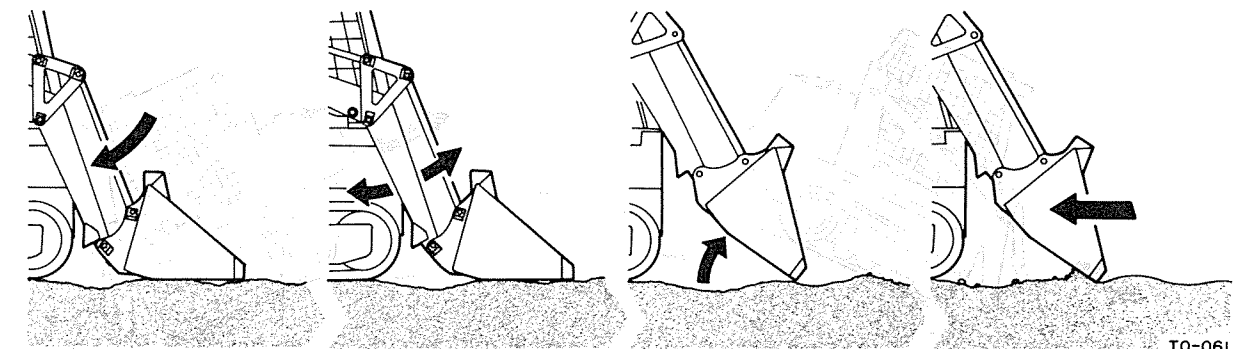


Leveling Operation using the Float position.

Lower the bucket onto the ground, then put the lift arms in a Float position. Tilt the bucket forward to stand it on its cutting edge, then level the loose material while driving backward.

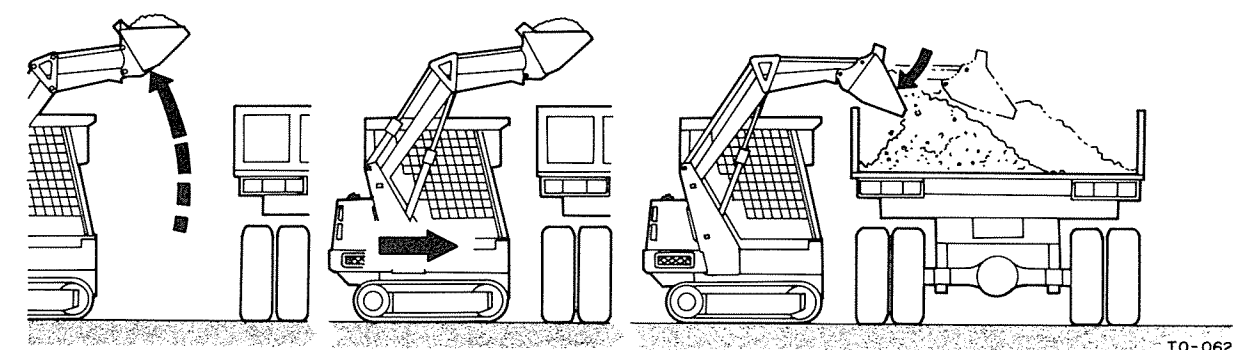
CAUTION: • Do not use the Float position to lower a full bucket.

• Do not drive the loader forward with the lift arms in Float position.



Loading Operation

Approach the truck and stop, then raise the bucket until its lower edge clears the truck bed. Drive the loader slowly forward, stop at the position where the bucket is to be tilted forward, then tilt the bucket forward, releasing the material in the bucket into the truck bed. When the truck is half loaded, use the bucket to spread the load evenly.

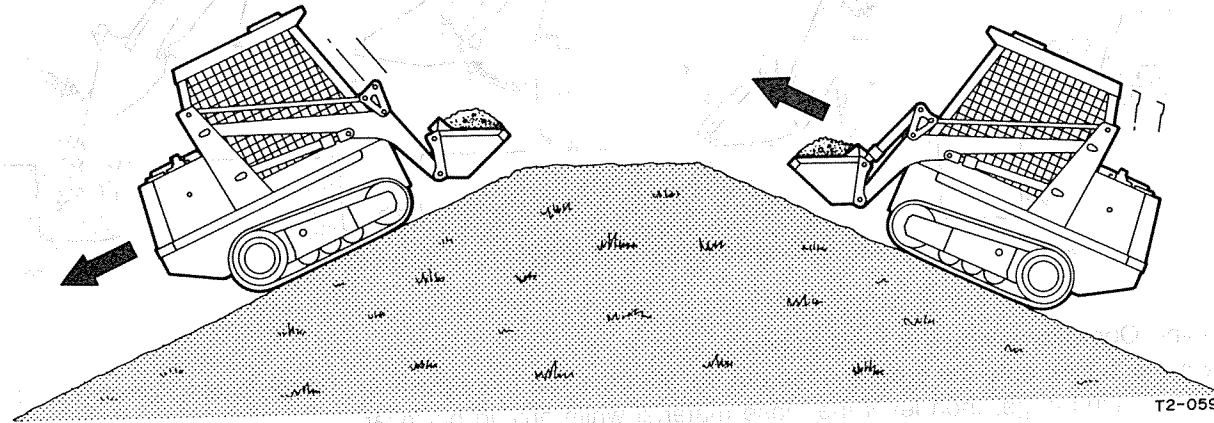


OPERATION

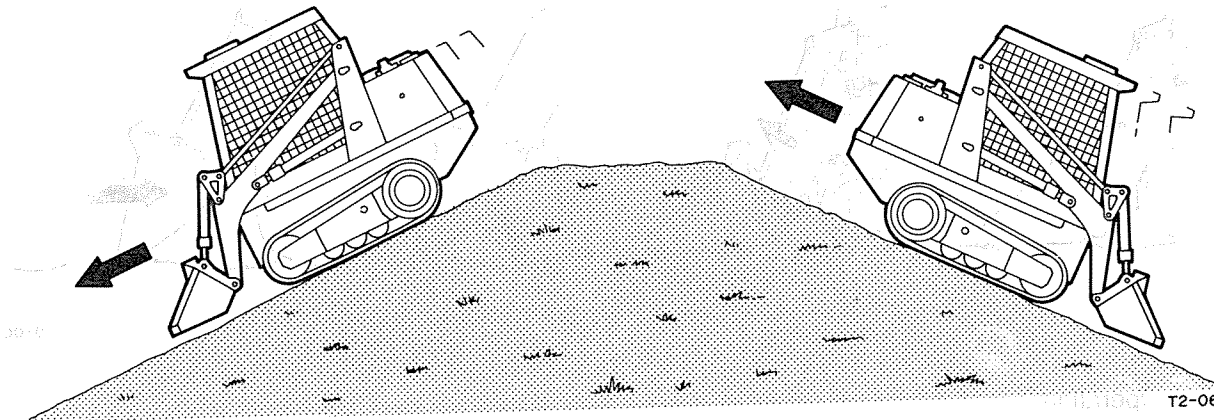
Travel on a Slope

Travel up and down slopes or hillsides with the heavier end of the loader facing toward the top of the hill. Travel straight up and down the grade. Do not travel sideways or tilted.

- When the bucket is full



- When the bucket is empty



OPERATION

Cautions During Operation

Carry out operations on level ground. Use maximum caution when traveling on slopes or hillsides.

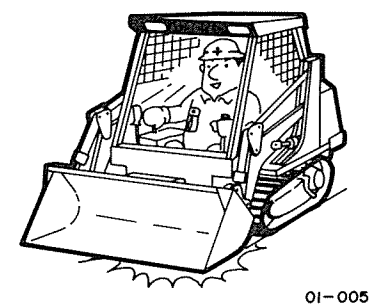
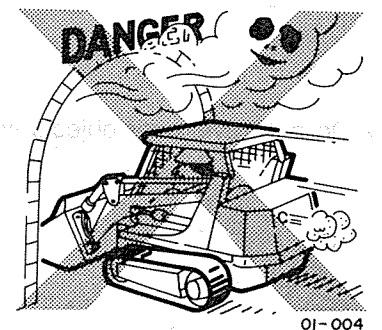
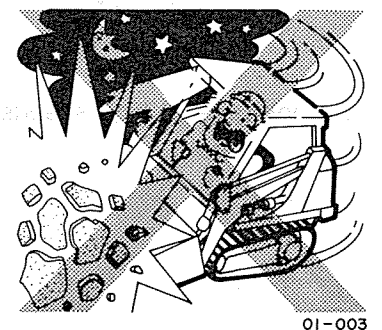
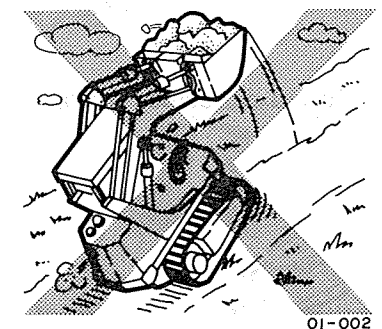
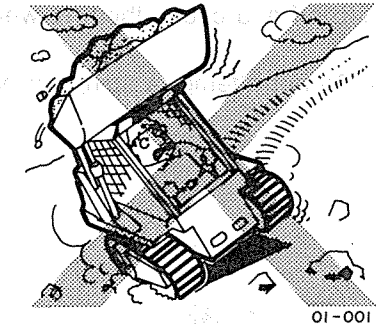
Keep the bucket as low as possible during travel. Do not travel or attempt to change directions with the bucket raised.

Travel at a speed which is appropriate for the conditions. Travel at low speed when the field of view is obstructed and take extra precautions with hazardous materials.

Do not use this loader in areas where there is danger of explosion from volatile gases. Also avoid using the loader where the exhaust gases could come in contact with flammable items.

Lower the lift arm fully and let the bucket rest on the ground before finishing operation or leaving the loader for short periods of time. Engage the parking brake and switch off the engine. Be careful in dismantling the loader.

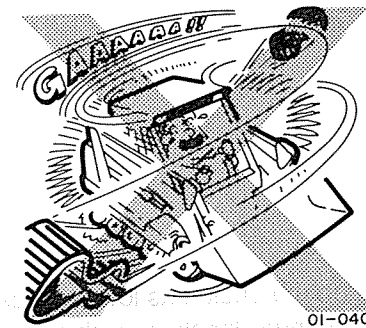
When parking the loader on a hillside, be sure to place wheel blocks in front of and behind the track belt. In addition, drive the loader forward when moving it a long distance. Moving it long distances in reverse accelerates wear of the track belts (link bushings).



OPERATION

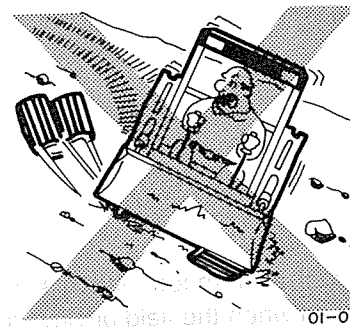
Failure to observe the following cautions could cause the crawler belts to slip off and cause them to wear out rapidly.

- Do not attempt a spin turn or pivot turn at high speeds.



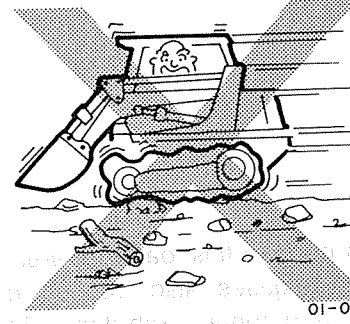
01-040

- Do not cut across a slope.



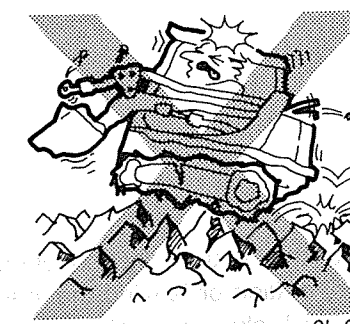
01-041

- Do not travel at high speeds over rough terrain or over cobblestones.



01-042

- Do not travel over objects with sharp edges such as crushed rock.

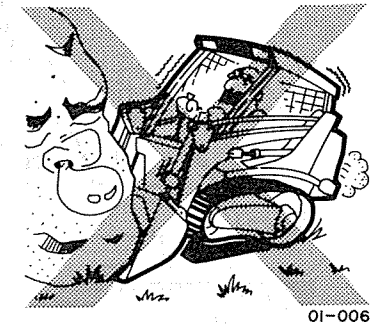


01-043

OPERATION

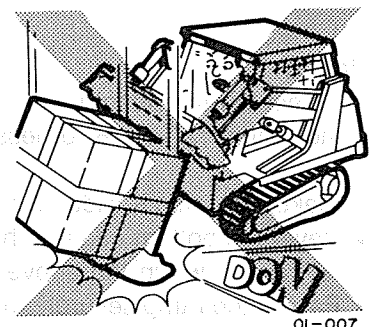
The following operation methods should not be used since they bring excessive loads to bear on the loader and cause breakdowns.

- Do not exceed the loader's rated operation capacity.



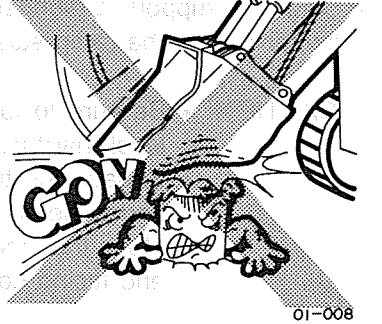
01-006

- Do not use buckets or attachments which exceed the loader's operation capacity.



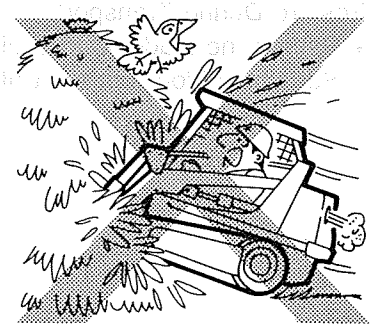
01-007

- Do not use the downward force of the loader to drive piles.



01-008

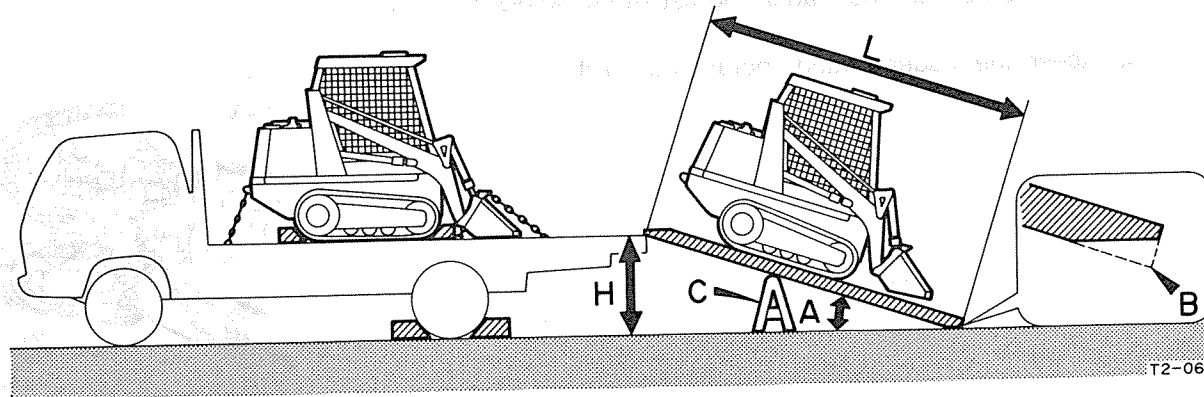
- Do not rush the loader into a pile of material.



01-009

OPERATION

Transporting the Loader



Ramps

- Select a ramp length which will yield an angle of inclination "A" of 18° or less (Refer to the chart at right).
- Make the ramp's width 1.2 times the shoe width.
- Bevel the bottom edge of the ramp so that it is like "B" as shown in the above figure.
- Fasten the ramp securely with stays, etc. to prevent it from separating from the truck.
- Setting a support "C" underneath the ramp in the center makes the ramp safer.

Relationship between "H" and "L"

H mm (ft. in.)	L mm (ft. in.)
1,300 (4-3).....	4,300 (14-1) or greater
1,110 (3-8).....	3,700 (12-2) or greater
930 (3-1).....	3,100 (10-2) or greater
750 (2-6).....	2,500 (8-2) or greater

- CAUTION:**
- Be sure to load and unload the loader in an area with level, hard packed ground.
 - Engage the truck's parking brake and set wheel blocks under the wheels.
 - Move the loader up and down the ramp with the bucket end facing downward. (See the above figure.)

Posture During Transport

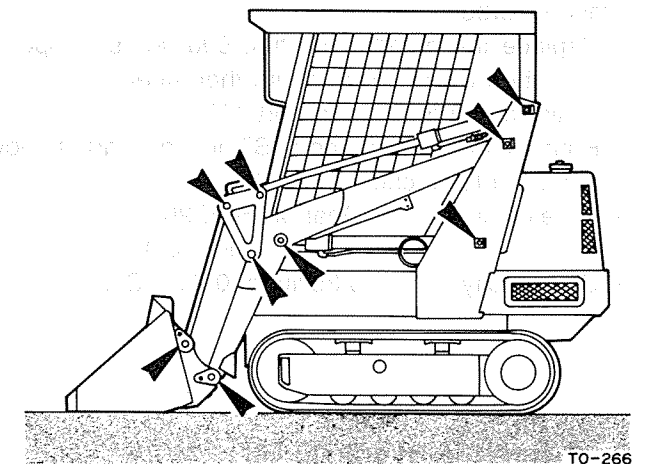
- Secure the loader with chains or wire ropes, etc.
- Set wheel blocks in front of and behind the crawler belts.

INSPECTION · MAINTENANCE

Greasing

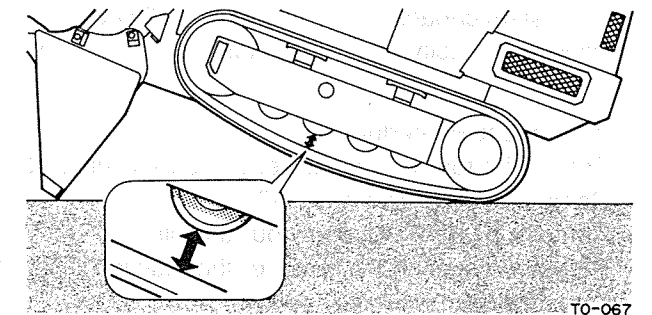
Apply grease to the portions marked with "▲" every day or after every 10 hours of operation. Apply grease a little more frequently depending on the severity of operating conditions.

Type of grease: Multipurpose lithium soap based grease No. 2



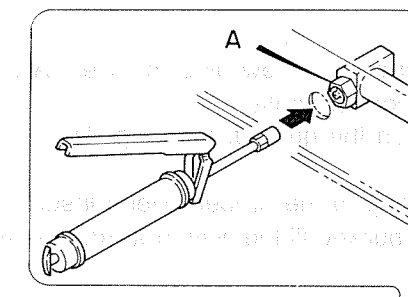
Adjusting the Crawler Belt Tension

- Check the tension of the crawler belts daily or after every 10 hours of operation.
- Lower the lift arms and tilt the bucket to raise the front of the loader fully off the ground.
- Measure the clearance between the center track roller and the surface of the crawler belt where it makes contact with the roller.
- Standard values
 - Rubber crawler 20~25mm (0.8~1.0 in.)
 - Steel crawler 20~40mm (0.8~1.6 in.)



Tightening the Belt

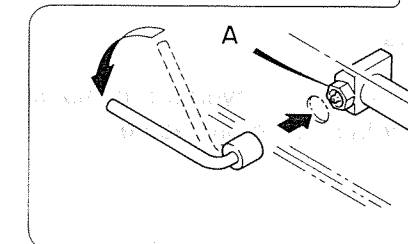
Apply grease to check valve "A" until the tension of the crawler belt is correct.



Loosening the Belt

Loosen check valve "A" to drain some of the grease out. Be sure to loosen the check valve gradually.

CAUTION: The grease nipple should not be loosened.



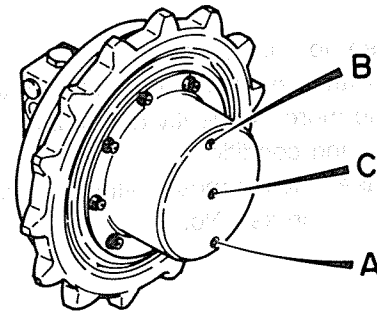
CAUTION: Applying too much tension to the crawler belt will cause it to break. Loosening the crawler belt too much will cause it to slip off.

INSPECTION · MAINTENANCE

Replacing the Gear Oil

Track Gearbox

- Replace the oil after the first 500 hours of operation, then every 1,000 hours thereafter.
- Drain the oil from drain port "A".
- Pour oil into oil filling port "B" until oil starts to flow out of oil level check pot "C".
- Type of oil : Gear oil SAE 90
API GL-4
- Oil capacity : 0.35 liters (0.74 U.S. pt.)



TO-070

Replacing the Hydraulic Oil

Replace the oil every 1,000 hours of operation.

Type of oil : Antiwear hydraulic oil
ISO VG 32 or VG 46

Total system capacity : 40 liters (10.6 U.S. gal.)

Tank level capacity : 34 liters (9.0 U.S. gal.)

Replacement Procedure

- Set the bottom of the bucket flat on the ground.
- Remove the oil filler cap "A".
- Remove plug "B" to drain out the oil.
- Remove cover "D", remove the suction filter "E" and clean it in kerosene.
- Replace the return filter (refer to "Replacing the Return Filter").
- Remove the other parts and clean the inside of the tank.

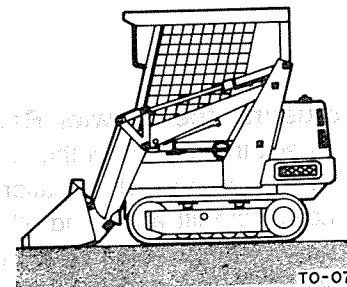
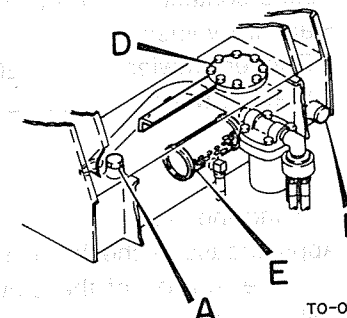
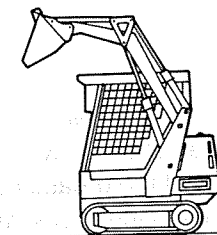


Fig. 1

TO-072
Fig. 2

Supplying Hydraulic Oil

- After assembling each component pour in new oil at oil filler "A".
- Start the engine and operate the loader lightly.
- Set the bottom of the bucket flat on the ground. (see Fig. 1)
 - Level Check Posture
- Check the hydraulic oil level, refilling to the proper level if insufficient.
- Raise the lift arms fully and tilt the bucket all the way forward. (see Fig. 3)
 - Tank Pressurization Posture.
- Install the oil filler cap "A".
 - Tank Pressurization Complete.

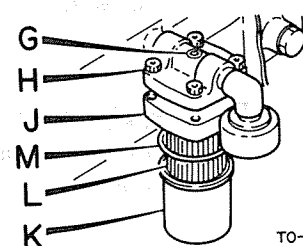
TO-073
Fig. 3

CAUTION: If the tank is not pressurized, the hydraulic pump will be damaged. Always follow the above procedure.

Replacing the Return Filter

First time after 50 hours
Thereafter every 500 hours

- Loosen the oil filler cap "A" on the tank and bleed out the air.
- Loosen plug "G" and bleed out the air.
- Remove the 4 bolts "H", then remove the flange "J".
- Remove the case "K", then remove the element "L" and replace it.
- Replace the packing with a new packing if it is scratched or deformed.



TO-077

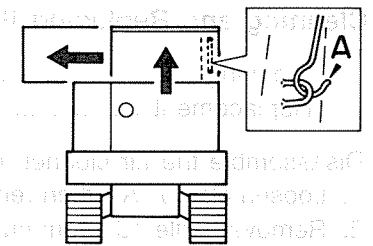
INSPECTION · MAINTENANCE

Remove the hood

Removing the hood makes maintenance within the engine room easier.

1. Open the hood fully.
2. Slide the hood to the left.

- When checking the engine without removing the hood, fasten the hood in place with hook "A".

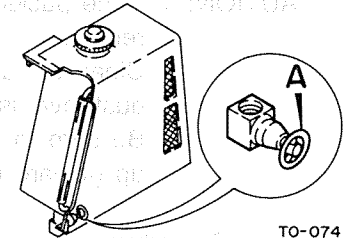


TO-218

Servicing the Fuel System

Draining the Fuel Tank

- Drain out the water, dirt and other debris which has accumulated in the bottom of the tank through drain cock "A".
- Repeat this procedure after every 50 hours of operation.

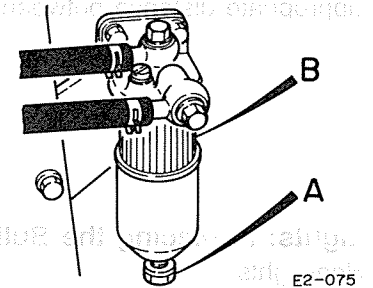


TO-074

Replacing the Fuel Filter Element

Draining every 100 hours
Replacement every 500 hours

Loosen the center bolt "A" and drain out the fuel, then remove the center bolt "A" and take out the element "B". Be sure to replace the O-ring and packing.

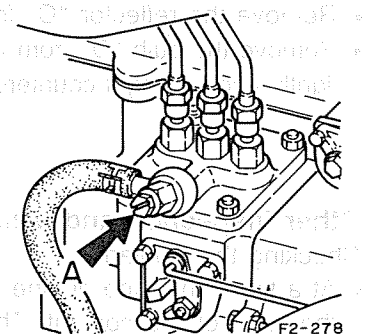


E2-075

Bleeding Air out of the Fuel System

After draining or replacement of the fuel filter element, or when cutting of the fuel supply, bleed the air out by the following procedure.

1. Loosen the air bleeder screw plug "A" on the fuel injection pump.
2. Turn the starter switch ON.
3. Tighten the screw plug "A" after air bubbles disappear from the fuel.

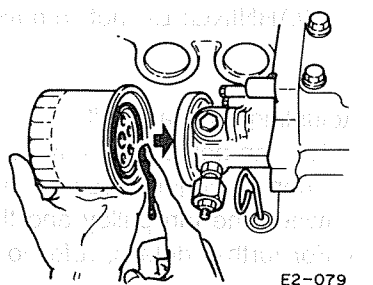


F2-278

Replacing the Engine Oil Filter

First time after 50 hours
Subsequent times every 250 hours

1. The oil filter is a cartridge type oil filter, so remove the filter case and replace it with a new one.
2. Apply a small amount of oil to the fuel filter O-ring when installing the filter.
3. Tighten the filter by hand, turning it 2/3 turn beyond the point where the O-ring and fuel filter bracket come in contact with each other.



E2-079

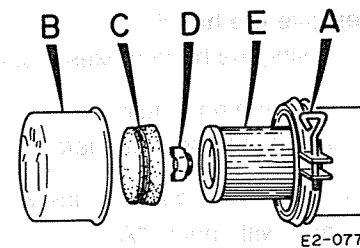
INSPECTION and MAINTENANCE

Cleaning and Replacing the Air Cleaner Element

Cleaning every 250 hours
Replacement every 1,000 hours

Disassemble the air cleaner in the following sequence.

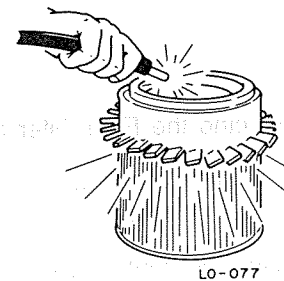
1. Loosen clamp "A", then remove dust cup "B".
2. Remove baffle "C" from dust cup "B", then clean them both.
3. Remove wing nut "D" and remove element "E". Clean the air cleaner unit.



- CAUTION:**
- If the packing in the element is deformed or scratched, replace it.
 - Clean the dust cup each day. Clean it more often if the dust level is extremely bad.
 - Be sure to install the dust cup with the arrows pointing up (toward the top).

Cleaning Procedure

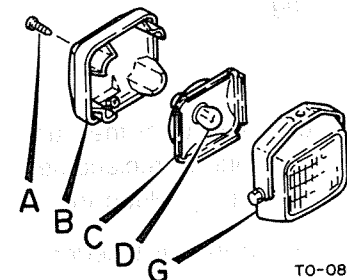
Blow out the filter with clean, dry compressed air (at 7 kg/cm² (99 psi) or less), moving the nozzle along the folds from top to bottom. Maintain an appropriate distance between the nozzle and the element.



Lights: Replacing the Bulbs

Headlights

- Remove the 4 screws "A", then remove the housing "B".
- Remove the reflector "C" from the rim "G".
- Remove the bulb "D" from the reflector "C" by pushing in the bulb "D" lightly and turning it counterclockwise.



Other Inspection and Maintenance

Checking the Coolant

- At a time when the engine is cool, remove the radiator cap and check the level of the coolant. The coolant level should be 30mm (1.2 in.) above the top of the radiator core to be normal. If there is insufficient coolant, fill the radiator back to the proper level with soft water.

WARNING: Do not remove the radiator cap when the engine is hot.

Adjusting the Fan Belt

- The fan belt should have a deflection of approximately 12mm (0.47 in.) when a finger pressure (approximately 10 kg/22 lb.) is applied between the fan pulley and the generator pulley.
- For further details, refer to the engine operation manual.

Replacing the Engine Oil

First time after 50 hours
Thereafter every 250 hours

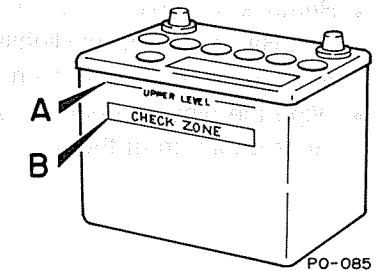
INSPECTION : MAINTENANCE

Battery Fluid Check

- The battery fluid level should be between the Upper Level "A" and the upper limit of the Check Zone B. Replenish the battery fluid with distilled water if the fluid level drops to the Check Zone.

Precautions when handling the battery

- Fire or explosion could occur, so take the following precautions.
 1. Be careful to prevent shorts and sparks, and keep all fires, such as cigarettes, away from the battery.
 2. Work in a well ventilated area.
- If battery fluid gets in the eyes or on one's skin, rinse immediately with large quantities of water. Particularly in the case of eyes, have a physician examine them after they have been rinsed well with water.



Refer to the engine operation manual, supplied with the engine, for checks and servicing of the engine.

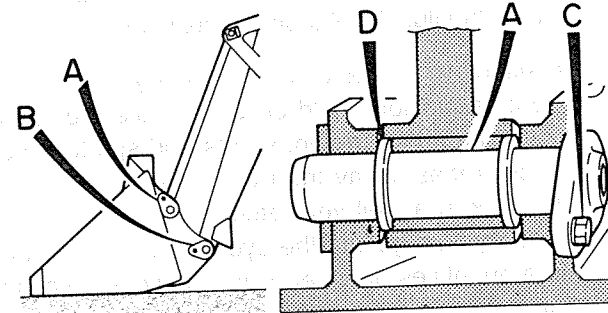
INSPECTION · MAINTENANCE

Replacing the Bucket

Carry out replacement on level ground.

Removing the Bucket

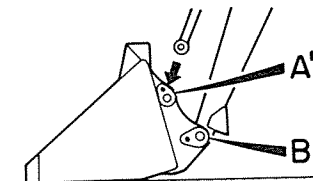
- Clean around the bucket pins.
- Set the bucket on the ground as shown in the figure at right.
- Remove the bolt "C", then drive out the bucket pin "A". Raise the bucket slightly to give it a little play in order to make the operation a little easier.
- Wipe the pins and pin holes clean to keep soil and other debris from them.



TO-285

Installing the Bucket

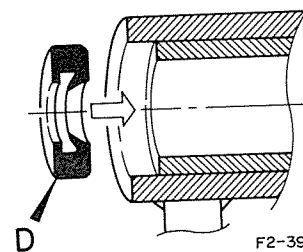
- Fasten pin hole "B" first.
- Move the bucket cylinder to align it with pin hole "A", then fasten it.



TO-286

CAUTION:

- The pin seal "D" will be damaged if the pin holes are not correctly aligned before the pin is driven in.
- Replace the pin seal if it is deformed or torn.
- Replacing the Pin Seal
Set the new pin seal in the direction shown in the figure at right, then pressure insert the seal a little at a time using a wooden mallet or similar tool. Be careful not to deform or tear the seal.



F2-397

INSPECTION · MAINTENANCE

Handling in Cold Weather

Battery

- Check the amount of battery fluid and its specific gravity, and charge it quickly.

CAUTION: To prevent the distilled water from freezing, fill the battery first thing in the morning, not after operations in the afternoon. also, have qualified service personnel check and charge the battery.

Coolant

- Add antifreeze to the radiator when the temperature drops below 0°C (32°F).
- Water and Antifreeze Fluid Mixing Chart.

Minimum Temp.	°C (°F)	-5 (+23)	-10 (+15)	-15 (+5)	-20 (-4)	-25 (-13)	-30 (-22)	-35 (-31)	-40 (-40)
Antifreeze	lit. (U.S.qt.)	0.53 (0.56)	0.88 (0.93)	1.05 (1.11)	1.23 (1.30)	1.40 (1.48)	1.58 (1.67)	1.75 (1.85)	1.93 (2.04)
Water	lit. (U.S.qt.)	2.97 (3.14)	2.62 (2.77)	2.45 (2.59)	2.27 (2.40)	2.10 (2.22)	1.92 (2.03)	1.75 (1.85)	1.57 (1.66)

NOTE: Be sure to add antifreeze in the proper amount to achieve the proper mixing ratio as specified by the antifreeze maker.

Precautions after Operations

Clean off any mud or water adhering to the loader body, park the loader on a concrete surface or on dry ground, or lay timbers down to park it on, then cover it with a sheet or similar covering. Wipe off any water drops on the hydraulic cylinder piston rod completely. Frozen water droplets mixed with mud, etc. could get into the seal and damage it.

Long-term Storage

Take the following measures when storing the loader for extended periods of time.

- Store the loader indoors in a dry place after cleaning and drying it thoroughly. Do not store it outdoors. If the loader must be kept outdoors, select a level area and place it on top of a row of timbers. Cover the seat securely to protect it.
- Add oil, apply grease and change the oil regularly.
- Apply an adequate amount of grease to the piston rod of the hydraulic cylinder.
- Disconnect the cable from the ground terminal of the battery or remove it from the loader and store it indoors.
- Add antifreeze to the coolant or drain all the coolant from the engine if the temperature drops below 0°C (32°F).

Following long term storage of the loader, carry out the following measures before use.

- Wipe the grease off the hydraulic cylinder piston rod.
- Start the engine, drive and operate it under no load, letting the oil circulate completely.

NOTE: If the loader is not operated for 1 month or longer, carry out the above procedure once a month.

LUBRICANTS CHART

Lubricated Part	Hydraulic oil	Pump spline section	Track gearbox	Grease fittings
Capacities	Total system 40 lit. (10.6 U.S.gal.) Tank level 34 lit. (9.0 U.S.gal.)	As required	0.35 lit. (0.74 U.S.pt.)	As required
Interval	Every 1,000 hours		first 500 hours. each succeeding 1,000 hours.	Everyday or every 10 hours
Application				
Takeuchi specification	Antiwear hydraulic oil	Grease with molybde- num disulphide added	API, GL-4 or GL-5 SAE 90	EP-2 Lithium soap based grease
ESSO	Nuto H46		Gear oil GP 90	Beacon EP 2
MOBIL	DTE 25		Mobilube GX 90	Mobiluxe EP 2
GULF	Harmony 46 AW			Gulfcrown No.2 EP
TEXACO	Regal RO 46		Thuban Universal 90	Multifak EP 2
SHELL	Tellus oil 46	Retinax AM	Spirax EP 90	Alvania EP 2

TIGHTENING TORQUES

Reference figure	Principle parts needing retightening	Tightening torque
1	Travel motor installation bolts	5.6 kg·m (40.5 ft. -lb.)
2	Drive sprocket installation bolts	5.6 kg·m (40.5 ft. -lb.)
3	Track roller installaiton bolts	9.9 kg·m (71.6 ft. -lb.)
4	Shoe slide installation bolts	5.6 kg·m (40.5 ft. -lb.)

Retighten these parts after the first 50 hours of operation, and thereafter retighten them after every 500 hours of operation.

CAUTION: Do not attempt to retighten the engine installation bolts since they are tightened with screw lock.

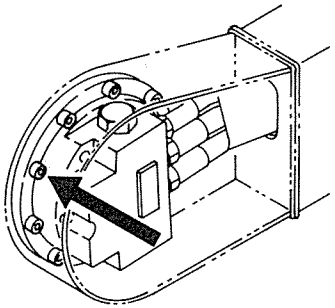


Figure 1

TO-090

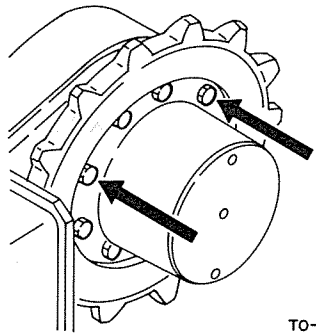


Figure 2

TO-091

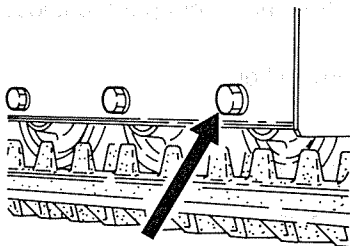


Figure 3

TO-092

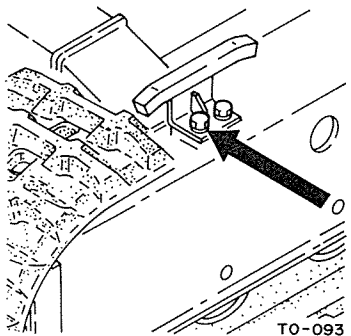


Figure 4

TO-093

SERVICE SCHEDULE

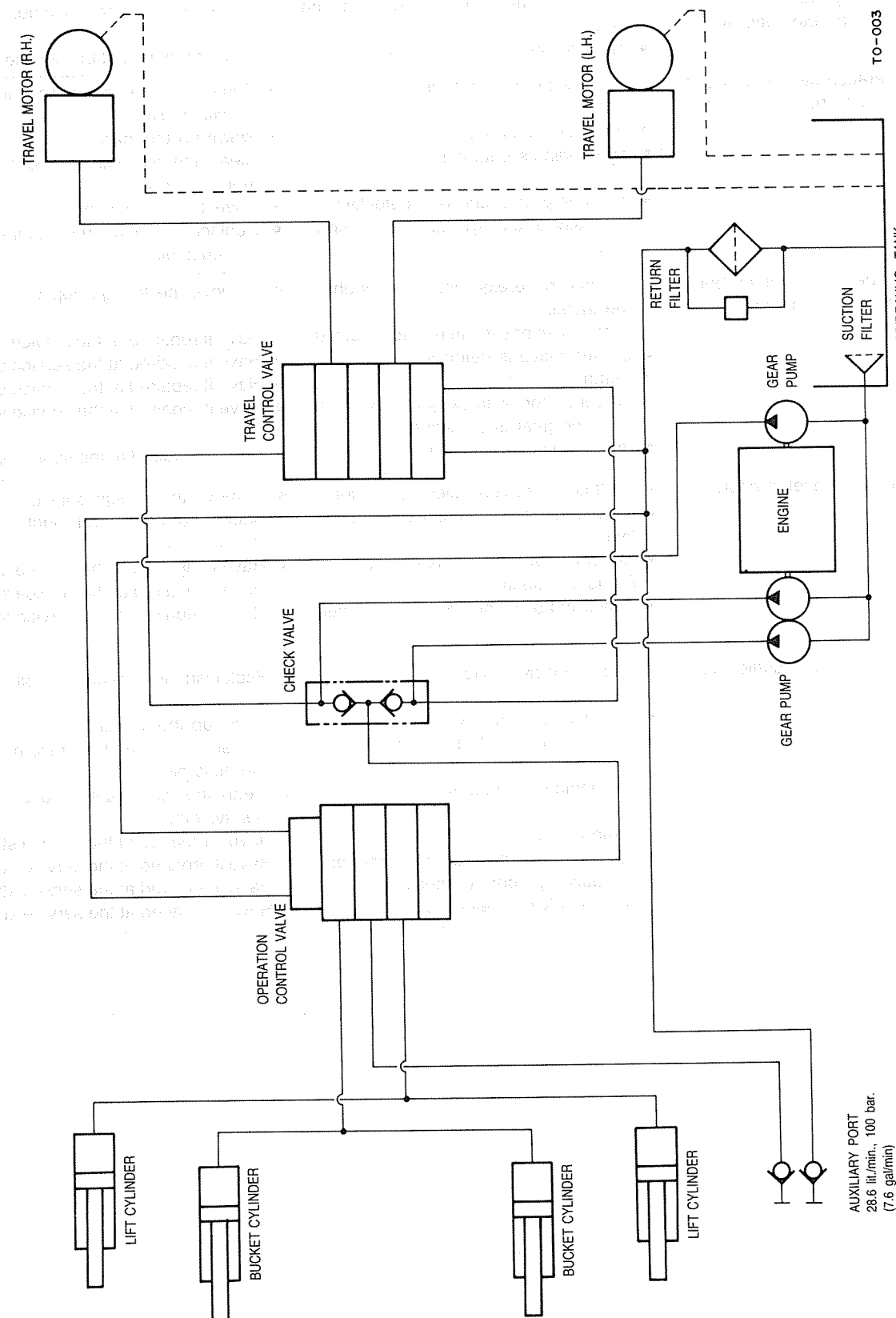
Check or service item	Daily	Every 50 hrs.	Every 100 hrs.	Every 250 hrs.	Every 500 hrs.	Every 1000 hrs.
Grease application	△					
Crawler belt tension	○					
Track gearbox oil					X 1st	X
Hydraulic oil	○				X	X
Return filter		X 1st			X	
Suction filter		X 1st			□	
Operation pedal operation, looseness	○					
Steering lever operation, looseness	○					
Fuel filter			□		X	
Oil filter		X 1st		X		
Air cleaner				□		X
Coolant	○					
Radiator fins				□		
Fan belt	○					
Engine oil	○	X 1st		X		
Draining fuel tank of water		□				
Head Lights, Operation Light, Horn	○					
Hourmeter operation	○					
Warning lamps	○					
Battery Fluid					○ (Sp. Gravity)	
Retightening of Bolts		○ 1st			○	

○: Check △: Replenish □: Clean X: Replace

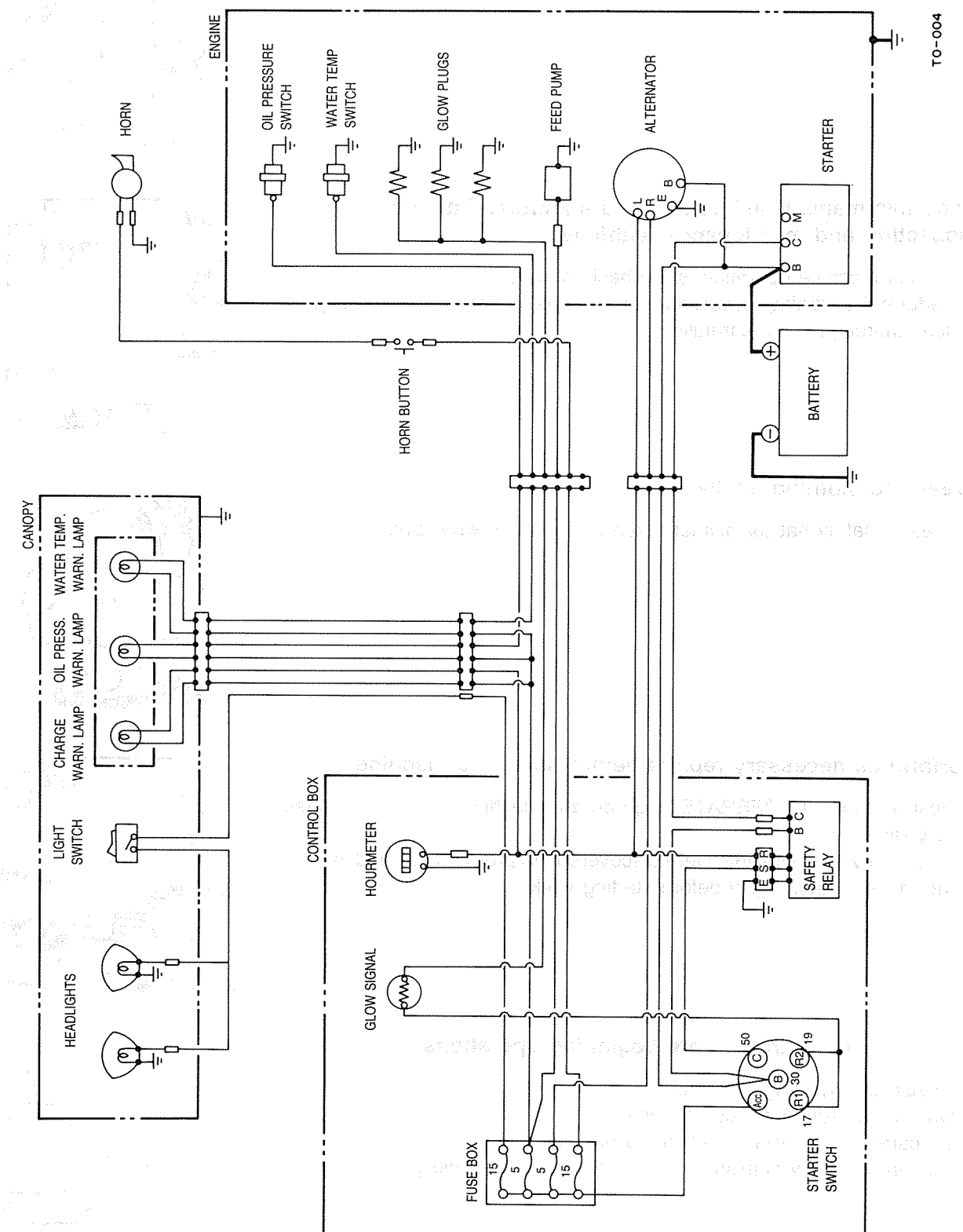
TROUBLESHOOTING

Trouble	Main causes	Countermeasure
Operation pedals are stiff or don't return automatically.	- Stones or mud are lodged under the pedals. - The control valve is defective.	- Remove the stones or mud. - Have it repaired at the service station.
No operation can be done, or there is no operating power.	- Insufficient hydraulic oil. - Hydraulic oil is not warm. - The engine's output is low. - The pump or coupling is defective. - Viscosity of the hydraulic oil is improper.	- Replenish the hydraulic oil to the specified level. - Warm up the loader. - Clean the air cleaner and check the fuel system. - Have it repaired at the service station. - Replace it with the recommended hydraulic oil.
Either the left, right or both crawlers do not move.	- A stone or foreign object is caught in the tracks. - Steering lever system is disconnected. - Control valve is defective. - Pump is defective. - Travel motor or track gear box speed reducing gear is defective. - Brake valve is defective.	- Remove the foreign object. - Have it repaired at the service station. - Have it repaired at the service station. - Have it repaired at the service station. - Have it repaired at the service station. - Have it repaired at the service station.
Straight line travel is poor.	- A stone or foreign object is caught. - Crawler tension adjustment is defective. - Steering lever system is damaged. - Pump is defective. - Travel motor or brake valve is defective.	- Remove the foreign object. - Adjust both left and right standard dimensions. - Have it repaired at the service station. - Have it repaired at the service station. - Have it repaired at the service station.
Digging power is insufficient.	- Insufficient hydraulic oil - Hydraulic oil is not warm. - Hydraulic oil is not appropriate. - The engine's output is low. - Pump is defective. - Relief valve set pressure has dropped. - Hydraulic cylinder is defective. - Control valve is defective.	- Replenish the hydraulic oil to the specified level. - Warm up the loader. - Replace it with the recommended hydraulic oil. - Clean the air cleaner and check the fuel system. - Have it repaired at the service station. - Have it repaired at the service station. - Have it repaired at the service station. - Have it repaired at the service station.

HYDRAULIC SYSTEM DIAGRAM



ELECTRICAL SYSTEM DIAGRAM



SAFETY INSTRUCTIONS

Know the machine well.

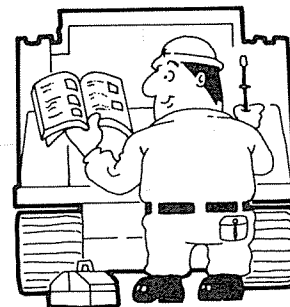
- Know the machine's capabilities, capacity, size and weight well.



01-020

Read this manual well so that you understand it, and carry out inspection and maintenance faithfully.

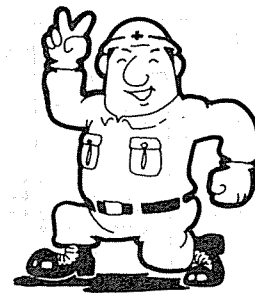
- Correct machine operation is the basis of safety.
- Perform the starting inspection and the daily and other periodic inspections thoroughly and carefully.



01-021

Wear your clothing neatly.

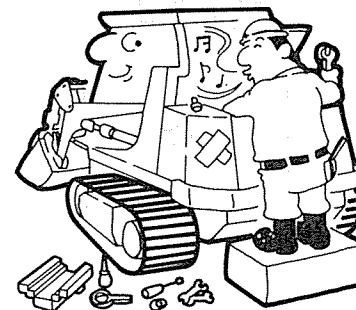
- Wear a safety hat (or helmet), safety shoes and work clothes.



01-022

Perform all necessary repairs before using the machine.

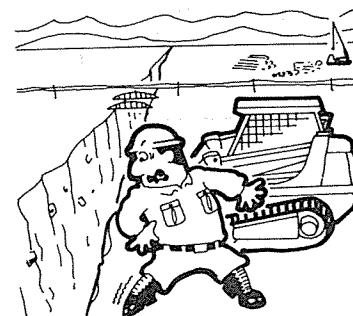
- Post a "DO NOT OPERATE" sign on any machine that has not been fully repaired.
- Repair any problems that were discovered the previous day and inspect the machine thoroughly before starting work.



01-023

Check the work area before beginning operations.

- Check for any danger areas.
- Check the ground or floor surface.
- Be careful of objects buried in the ground.
- Be careful of low objects which could cause head injury.

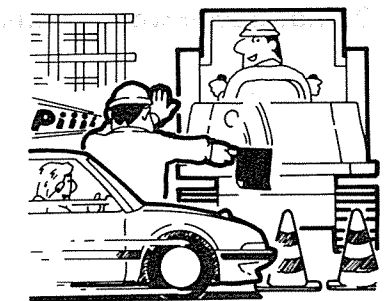


01-024

SAFETY INSTRUCTIONS

Post an assistant wherever the visibility is poor or there is danger.

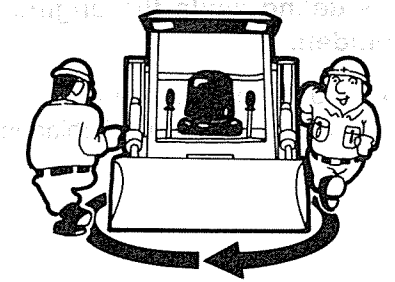
- Decide on hand or other signals ahead of time.



01-025

Watch out for others! (Keep a close watch on persons who are nearby.)

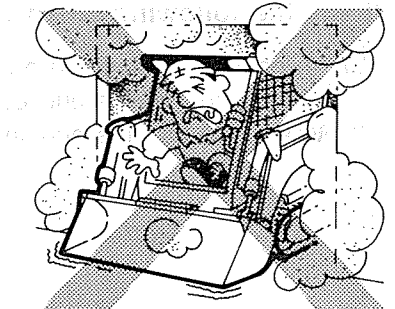
- Make sure there are no other persons in the way when starting the engine and moving the machine.
- Do not let persons come within the work area during operations.



01-026

Always make sure there is adequate ventilation.

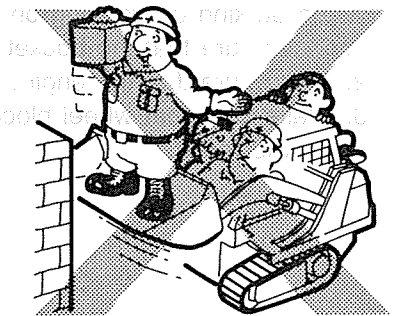
- Exhaust fumes from diesel engines are extremely toxic.
- Always provide adequate ventilation when running the engine in an enclosed area.



01-027

No Riders!

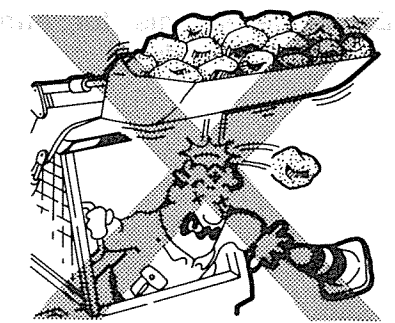
- Do not let any person other than the operator ride on the machine in any place.



01-028

The operator must not let any part of his body hang out of the operator's compartment during operations.

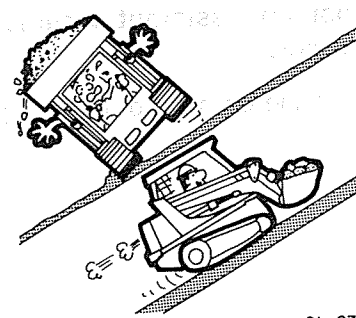
- Do not work with hands or feet sticking out of the operator's compartment.



01-029

SAFETY INSTRUCTIONS

Do not travel, work or change direction on sloping ground.



01-030

Refueling while the engine is running or when it is hot is forbidden.

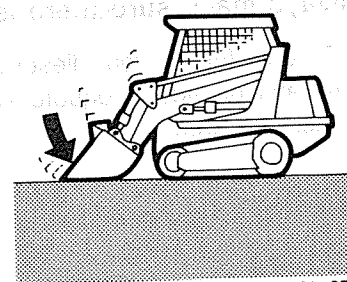
- Stop the engine and let it cool before adding fuel.
- Fire and sparks are forbidden.



01-031

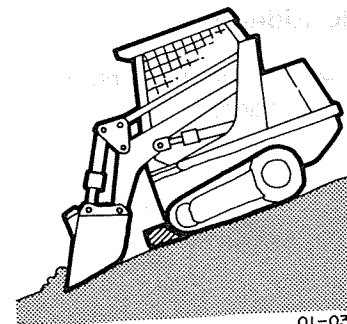
Check the following when parking.

- When parking or stopping on level ground.
 1. Make sure that the bucket is resting on the ground.
 2. Make sure that the engine is stopped.



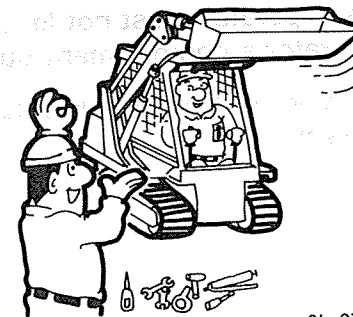
01-032

- When parking or stopping on sloping ground.
 1. Make sure that the bucket is dug into the ground.
 2. Make sure that the engine is stopped.
 3. Make sure that wheel blocks are placed in front of and behind the crawler belts.



01-033

Exchange signals for effective communication, and check everything carefully!

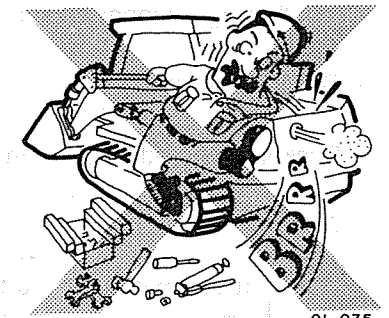


01-034

SAFETY INSTRUCTIONS

Maintenance work during machine operation is prohibited!

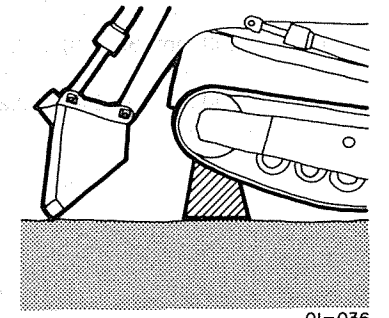
- Never service or adjust machine with engine running unless instructed to do so.



01-035

Place safety blocks under the machine!

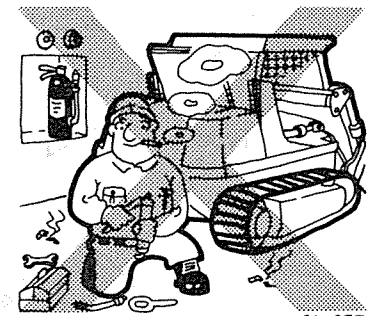
- When performing inspection and maintenance work underneath the machine, always lay safety blocks under it to prevent it from falling.



01-036

Fire is prohibited!

- Just in case, make sure that you know where a fire extinguisher is located and how to operate it.
- Performing inspection and maintenance work while smoking can cause a fire, so don't do it.



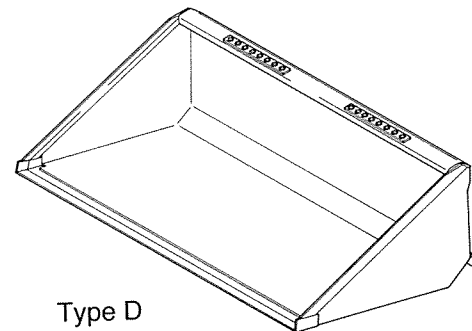
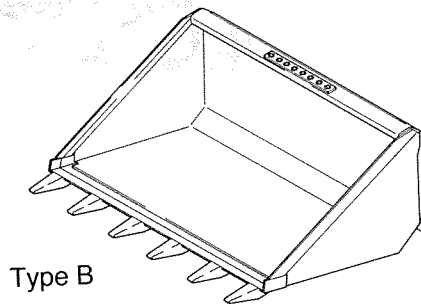
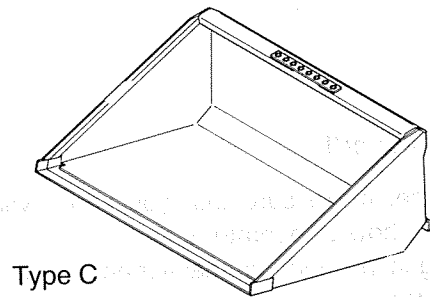
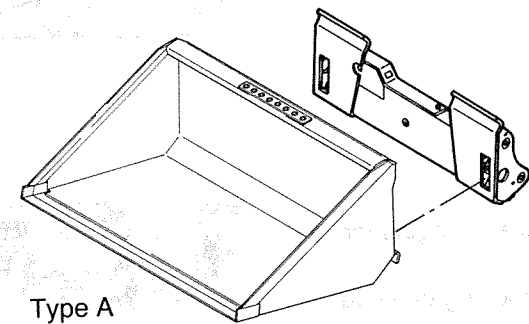
01-037

OPTIONS

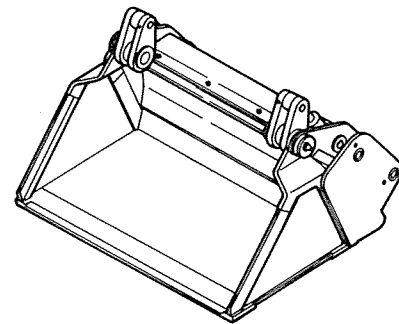
The following optional equipments are available for use when circumstances demand.

- Quick Attachment
- Buckets to be attached to the Quick Attachment.

Type	Width	SAE Rated Capacity	Weight	Dumping Reach	Dumping Clearance
A	1000 mm (39.4 in.)	0.16 m ³ (0.21 cu.yd.)	79 kg (174 lb.)	335 mm (13.2 in.)	1735 mm (68.3 in.)
B	1000 mm (39.4 in.)	0.16 m ³ (0.21 cu.yd.)	87 kg (192 lb.)	335 mm (13.2 in.)	1735 mm (68.3 in.)
C	1000 mm (39.4 in.)	0.18 m ³ (0.24 cu.yd.)	83 kg (183 lb.)	375 mm (14.8 in.)	1685 mm (66.3 in.)
D	1300 mm (51.2 in.)	0.23 m ³ (0.30 cu.yd.)	102 kg (225 lb.)	375 mm (14.8 in.)	1685 mm (66.3 in.)



- 4-in-1 Bucket
Width 1000 mm (39.4 in.)



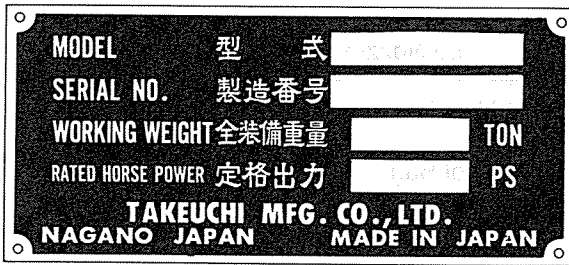
- Steel Crawler (Factory Option)

PARTS · SERVICE

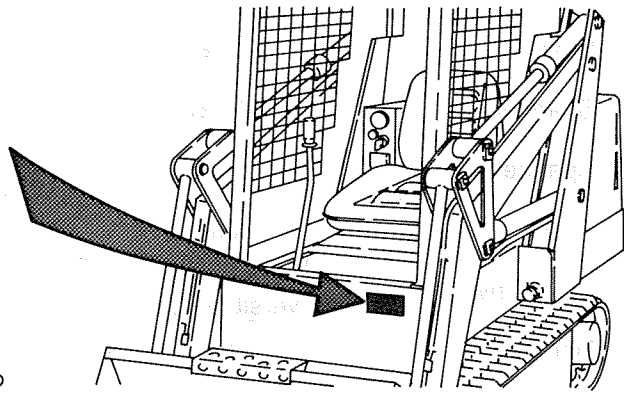
When ordering

When ordering parts or sending notification of trouble, always include the machine model and machine serial number stamped on the machine identification plate also include information on the number of hours the machine has been in use.

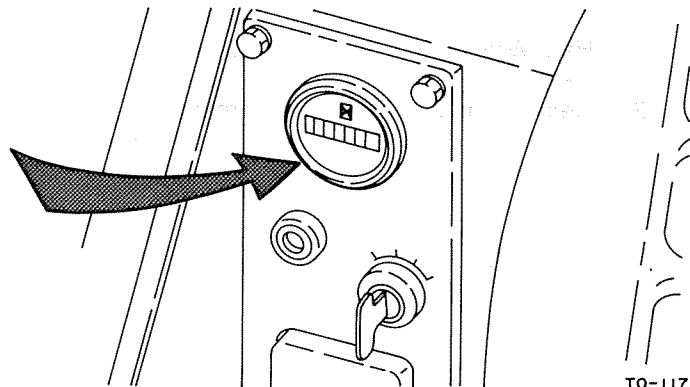
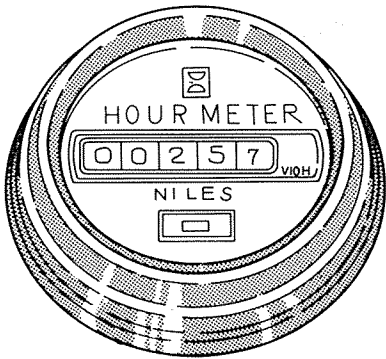
- Identification Plate



T2-110



- Hourmeter



Consumable Items

Check and replace consumable items such as filter elements periodically. Periodic replacement of consumable items will prevent many troubles from occurring.

- Major Consumable Items (Items to be periodically replaced)

Part Name	Q'ty.	Replacement Interval
Hydraulic Oil Tank Return Filter	1	Every 500 hrs. of operation
Fuel Filter Element	1	Every 500 hrs. of operation
Engine Oil Filter	1	Every 250 hrs. of operation
Air Cleaner Element	1	Every 1,000 hrs. of operation

STANDARD ACCESSORIES

No.	Part Name	Specification	Q'ty
1	Monkey Wrench	250mm	1
2	Spanner	10×12	1
3	Spanner	14×17	1
4	Spanner	19×22	1
5	Spanner	24×27	1
6	Spanner	13	1
7	Pliers	200mm	1
8	Screwdriver	+ and -re-versible type	1
9	Hammer	3/4	1
10	L-type Wrench	26	1
11	Pipe	20×330	1
12	Hex. Wrench	4mm	1
13	Hex. Wrench	5mm	1

No.	Part Name	Specification	Q'ty
14	Hex. Wrench	6mm	1
15	Hex. Wrench	8mm	1
16	Hex. Wrench	10mm	1
17	Grease Gun	600cc	1
18	Hose Nozzle		1
19	Nozzle		1
20	Tool Bag		1
21	Split Pin	ø6×55	3
22	Key Holder		1
23	Operators Manual		1
24	Engine Operation Manual		1
25	Engine Parts Catalog		1

PARTS LIST

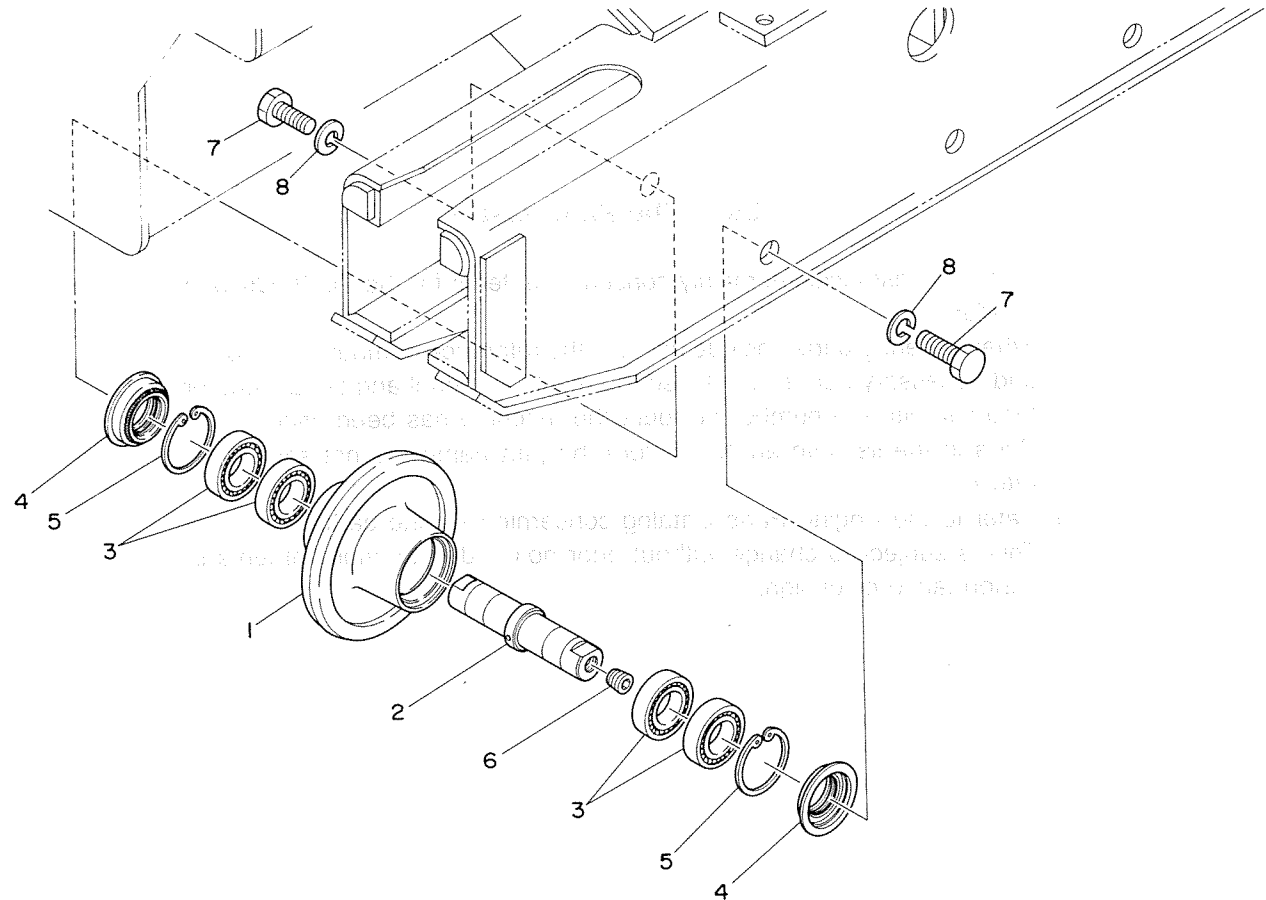
Using the Parts List

- This parts list includes mainly consumable items for the TL 10 Crawler Loader.
- When ordering parts, include not only the reference number, description and necessary quantity, but also the machine model and serial number together with the number of hours the machine has been used.
- Parts in the list with an “×” before the part name are not sold separately.
- Refer to the Engine Parts Catalog concerning engine parts.
- This is subject to change without prior notice due to improvements in performance or design.

CONTENTS

TRACK ROLLER	44
FRONT IDLER	45
TRACK SPRING	46
TRAVEL DEVICE	47
ATTACHMENT	48
PIPING; ATTACHMENT	49

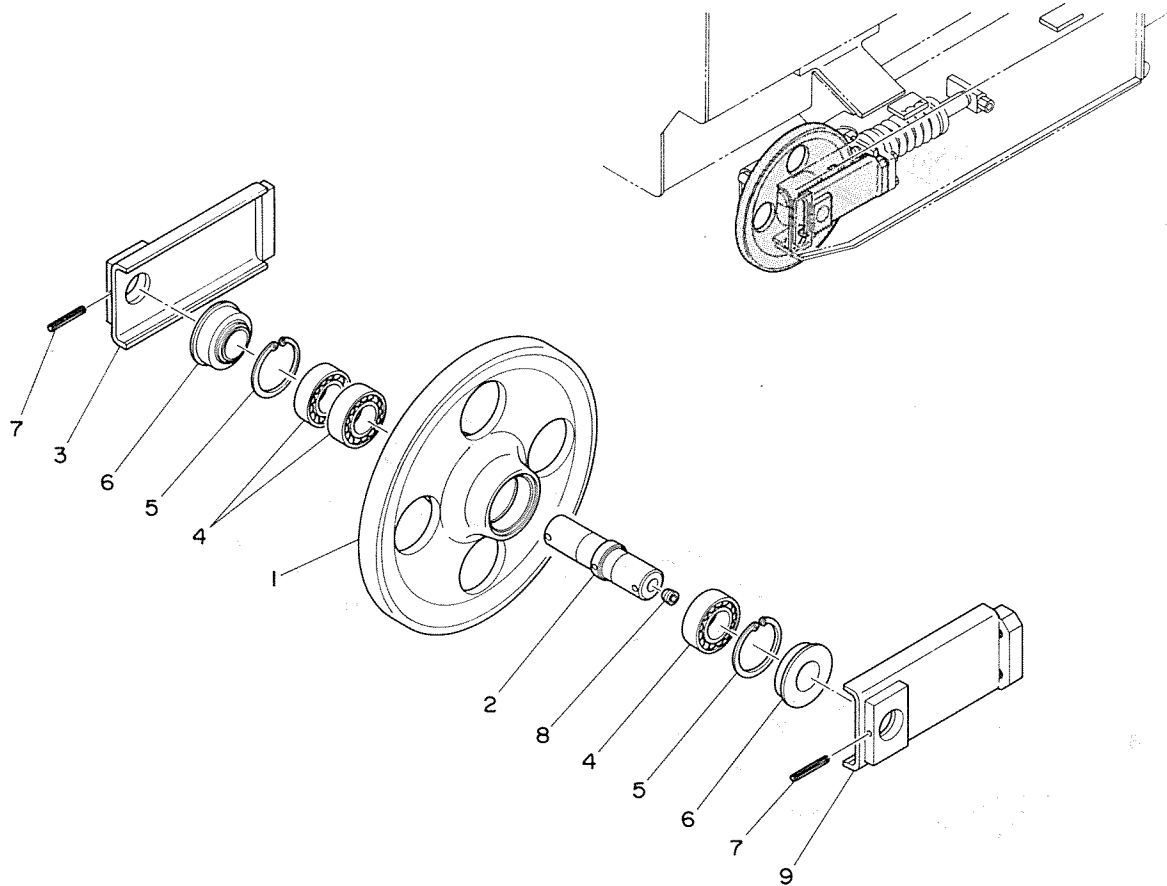
TRACK ROLLER



T0-04a-0-D

Ref.	Description	Q'ty	Remarks
0-1	ROLLER ASSY, track	8	
1	☆ROLLER	1	
2	☆SHAFT	1	
3	☆BEARING	4	
4	☆SEAL, oil	2	
5	☆RING, snap	2	
6	☆PLUG	1	
7	BOLT	16	
8	WASHER, spring	16	

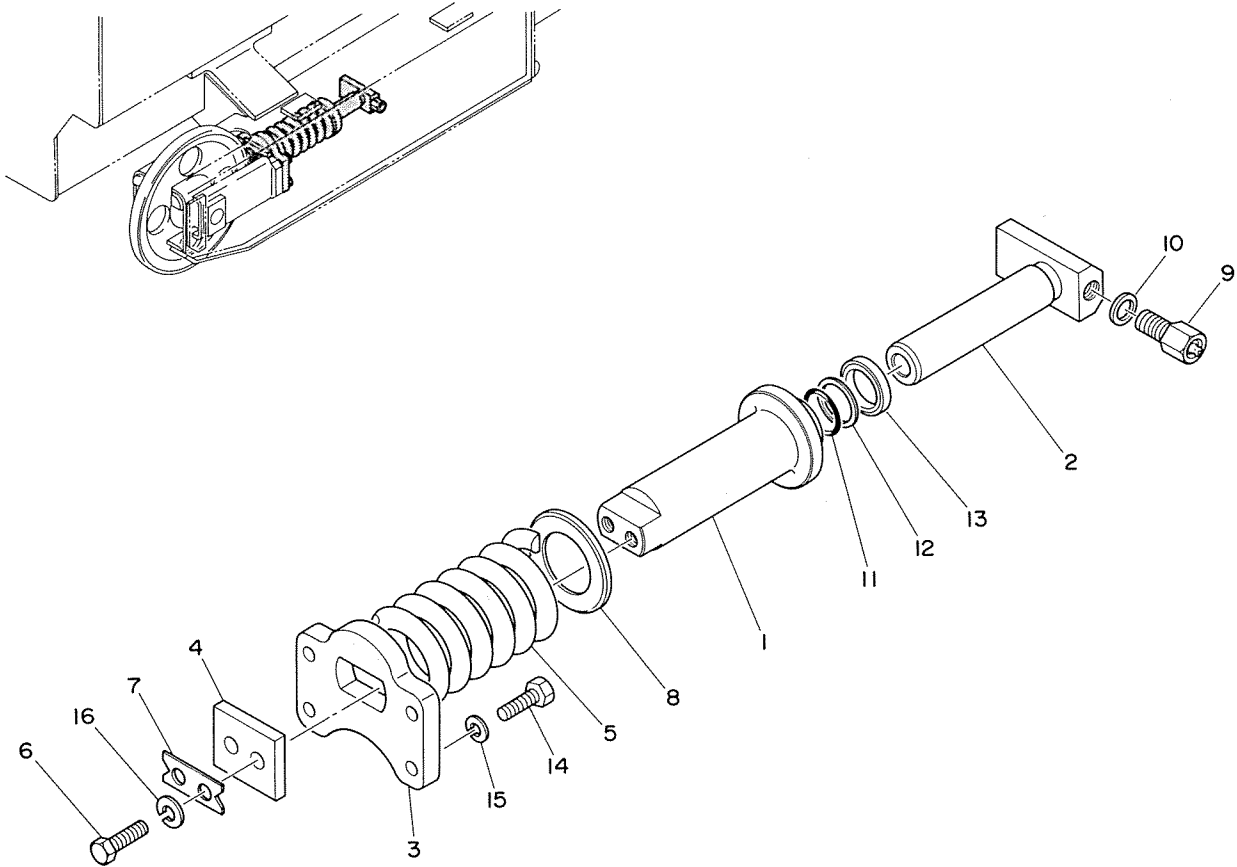
FRONT IDLER



T0-05a-1-D

Ref.	Description	Q'ty	Remarks
0-1	IDLER ASSY, front	2	
1	☆IDLER, front	1	
2	☆SHAFT	1	
3	☆YOKE (R. H.)	1	
4	☆BEARING	3	
5	☆RING, snap	2	
6	☆SEAL, oil	2	
7	☆PIN, spring	2	
8	☆PLUG	1	
9	☆YOKE (L. H.)	1	

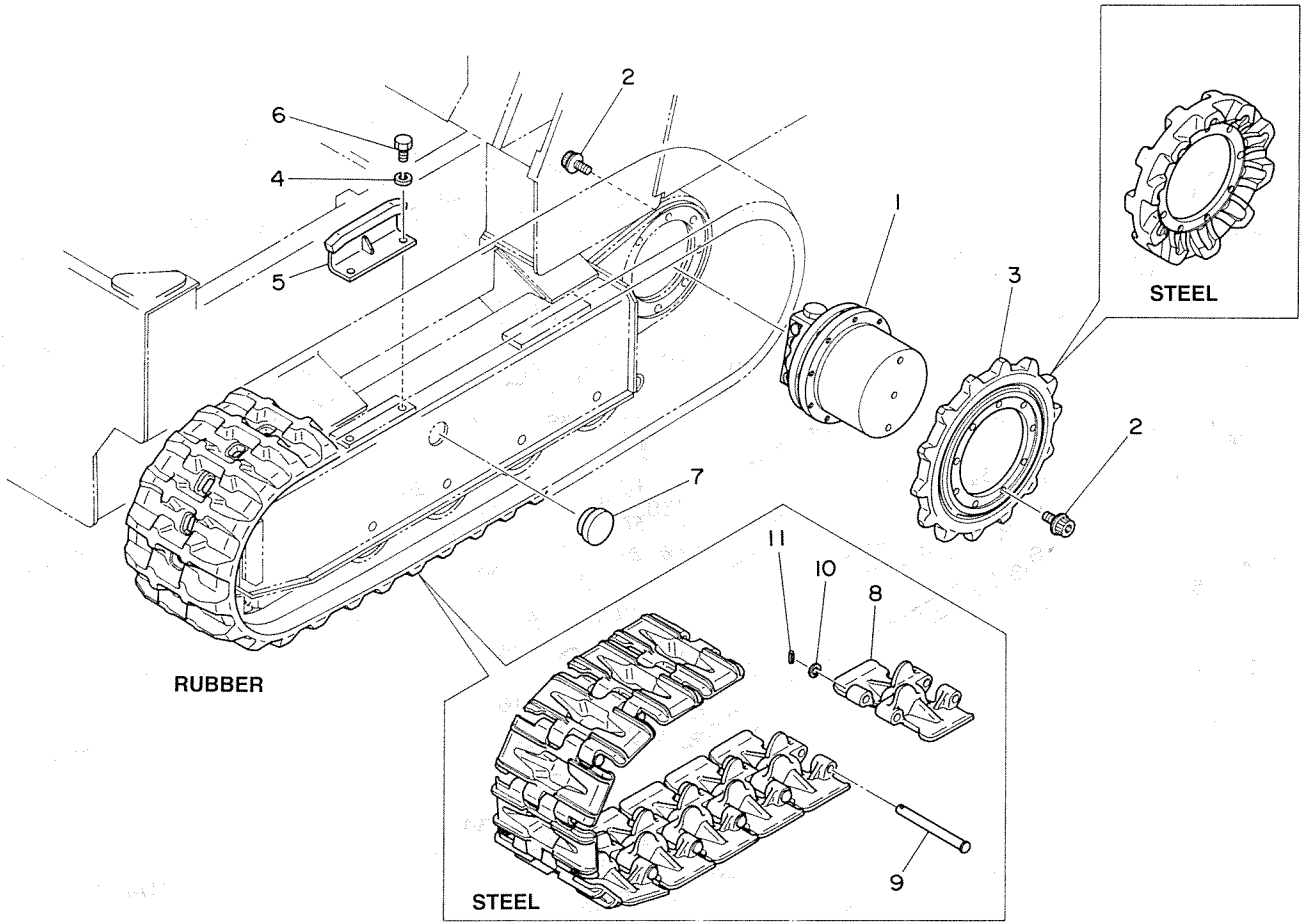
TRACK SPRING



T0-06a-0-D

Ref.	Description	Q'ty	Remarks
1	CYLINDER, grease	2	
2	PISTON	2	
3	PLATE	2	
4	PLATE	2	
5	SPRING	2	
6	BOLT	4	
7	STOPPER	2	
8	WASHER	2	
9	VALVE ASSY, check	2	
10	PACKING	2	
11	O-RING	2	
12	RING, back-up	2	
13	SEAL, oil	2	
14	BOLT	8	
15	WASHER, spring	8	
16	WASHER, spring	4	

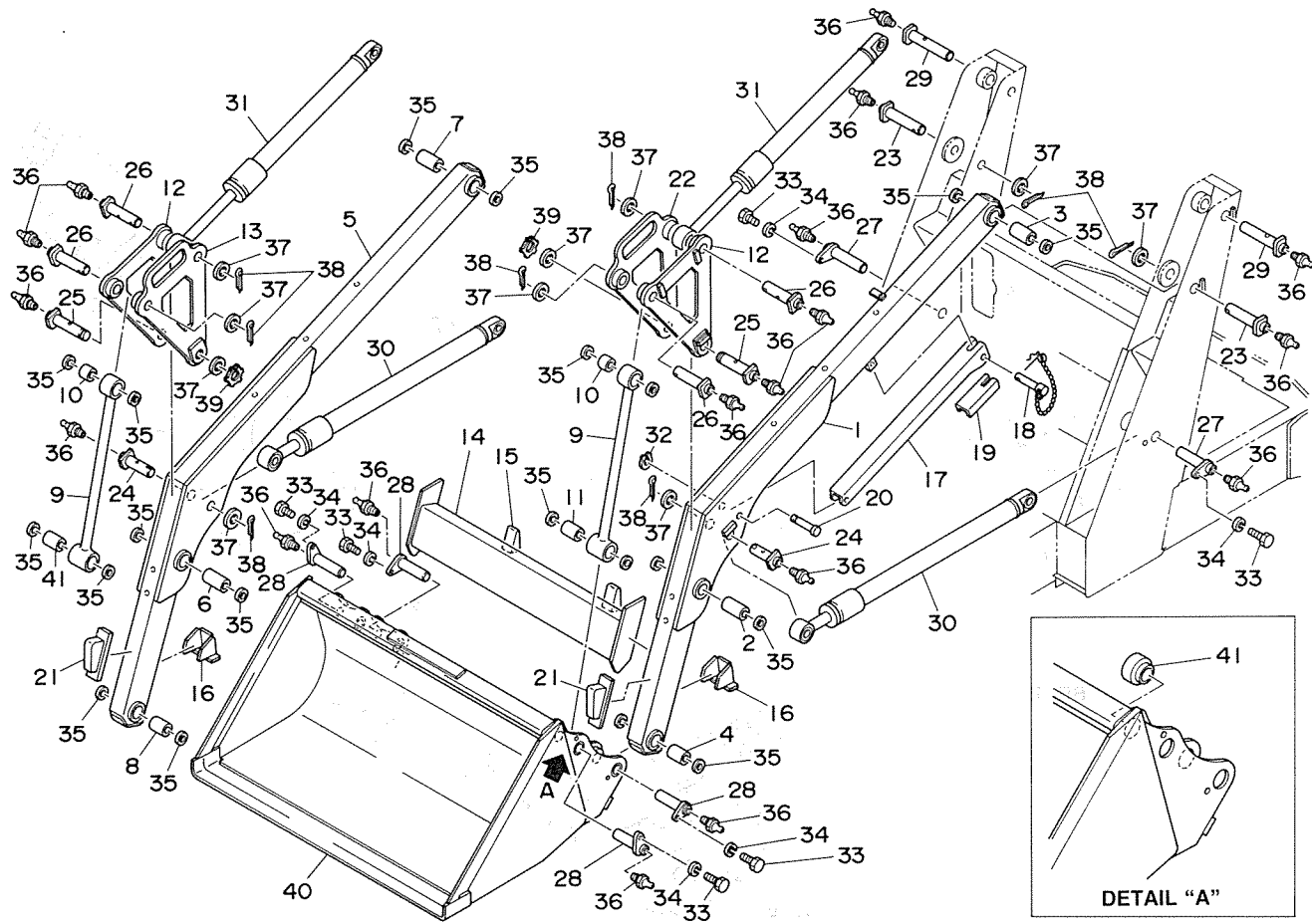
TRAVEL DEVICE



T0-07a-1-D

Ref.	Description	Q'ty	Remarks
1	MOTOR, travel	2	
2	BOLT	34	
3	SPROCKET, drive	2	rubber
	SPROCKET, drive	2	steel
4	WASHER, spring	8	
5	SLIDE	4	
6	BOLT	8	
7	GROMMET	2	
0-1	BELT, crawler	2	rubber
0-2	BELT, crawler	2	steel
8	☆SHOE	30	steel
9	☆PIN, track	30	steel
10	☆WASHER	30	steel
11	☆PIN, spring	30	steel

ATTACHMENT

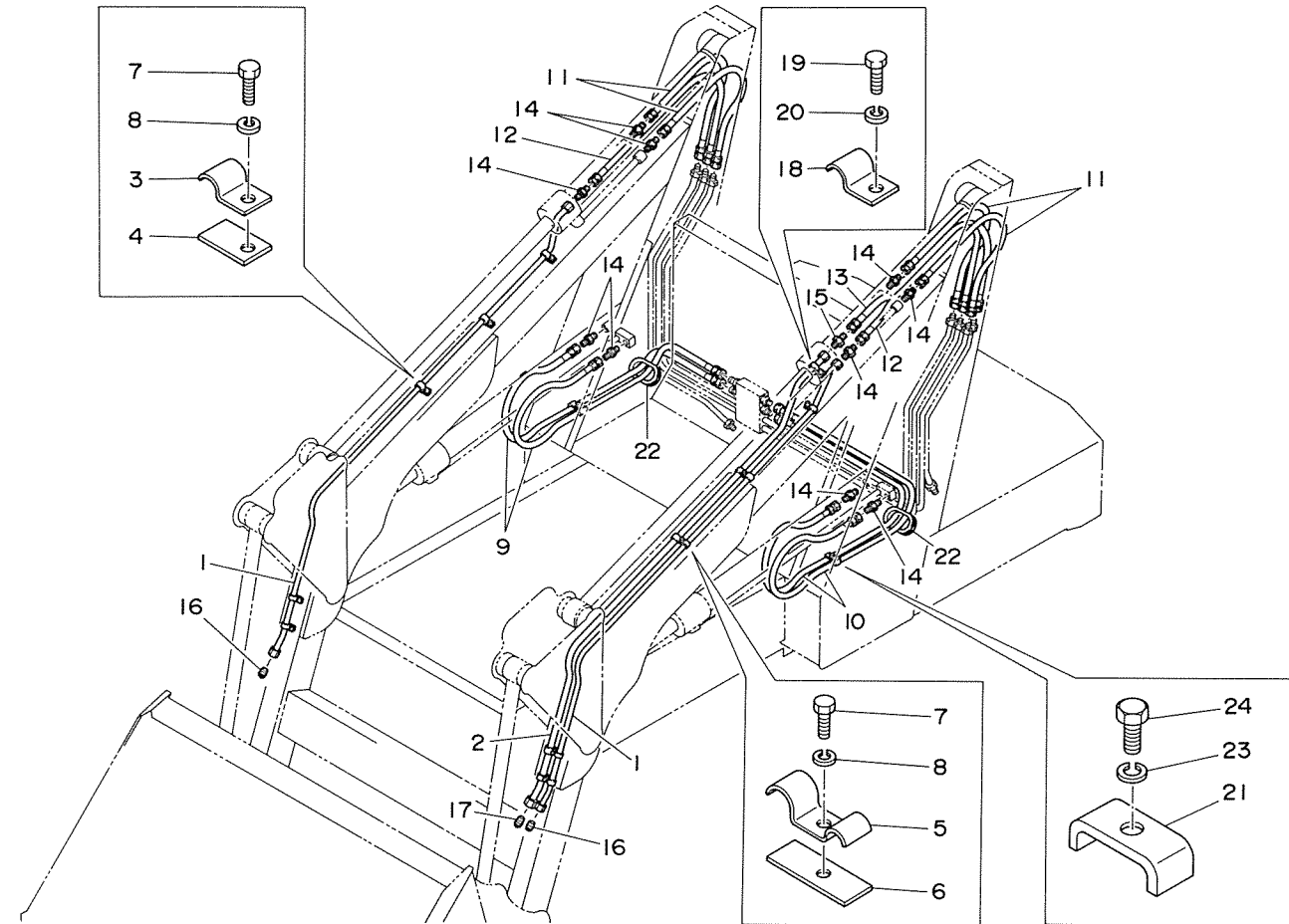


T0-39b-0-D

Ref.	Description	Q'ty	Remarks	Ref.	Description	Q'ty	Remarks
0-1	ARM ASSY, lift (L. H.)	1		28	PIN	4	
1	×☆ARM, lift (L. H.)	1		29	PIN	2	
2	☆BUSHING	1		30	CYLINDER, lift	2	
3	☆BUSHING	1		31	CYLINDER, bucket	2	
4	☆BUSHING	1		32	RING, snap	1	
0-2	ARM ASSY, lift (R. H.)	1		33	BOLT	6	
5	×☆ARM, lift (R. H.)	1		34	WASHER, spring	6	
6	☆BUSHING	1		35	SEAL, dust	20	
7	☆BUSHING	1		36	NIPPLE, grease	18	
8	☆BUSHING	1		37	WASHER	10	
0-3	ROD ASSY, reach	2		38	PIN, split	8	
9	×☆ROD, reach	1		39	RING, seeger	2	
10	☆BUSHING	1		40	BUCKET ASSY	1	
11	☆BUSHING	1		41	☆BUSHING	8	
12	PLATE, rocker	2					
13	PLATE, rocker (R. H.)	1					
14	BAR, main	1					
15	STOPPER	2					
16	STOPPER	2					
17	LOCK, arm	1					
18	PIN ASSY	1					
19	RUBBER	1					
20	PIN	1					
21	STOPPER	2					
22	PLATE, rocker	1					
23	PIN	2					
24	PIN	2					
25	PIN	2					
26	PIN	4					
27	PIN	2					

T0-39b-0-L

PIPING; ATTACHMENT



T0-41b-0-D

Ref.	Description	Q'ty	Remarks
1	TUBE ASSY	2	
2	TUBE ASSY	1	
3	CLAMP	6	
4	HOLDER	6	
5	CLAMP	4	
6	HOLDER	4	
7	BOLT	10	
8	WASHER, spring	10	
9	HOSE ASSY	2	
10	HOSE ASSY	2	
11	HOSE ASSY	4	
12	HOSE ASSY	2	
13	HOSE ASSY	1	
14	ADAPTOR	10	
15	ADAPTOR	1	
16	PLUG	2	
17	PLUG	1	
18	HOLDER	1	
19	BOLT	1	
20	WASHER, spring	1	
21	CLAMP	2	
22	RUBBER	2	
23	WASHER, spring	2	
24	BOLT	2	

T0-41b-0-L



First Published July 1987
Second Published April 1988

OPERATORS MANUAL

TL 10 Crawler Loader

Edited and issued by TAKEUCHI MFG, CO., LTD.