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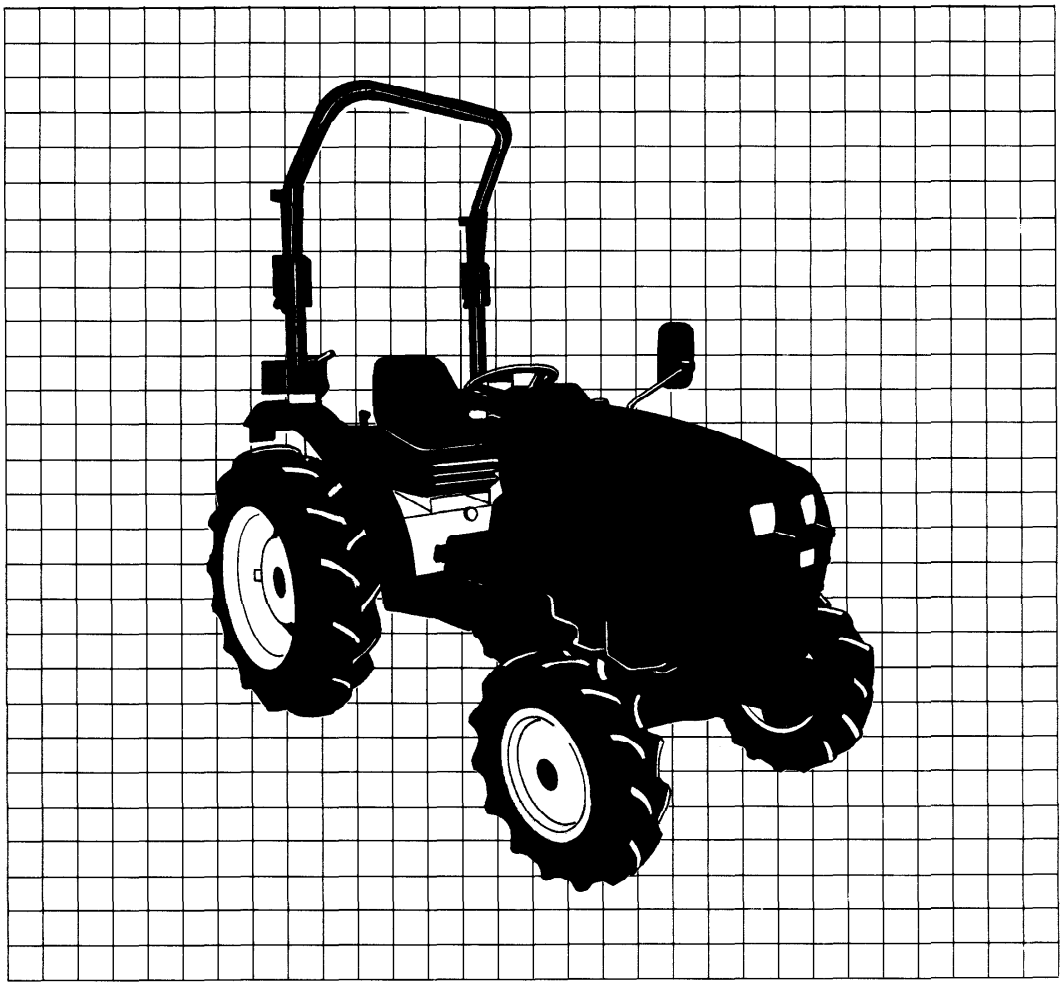
SHIBAURA

TRACTOR OPERATOR'S MANUAL

MODEL
ST329/ST333



ISHIKAWAJIMA-SHIBAURA MACHINERY CO., LTD.

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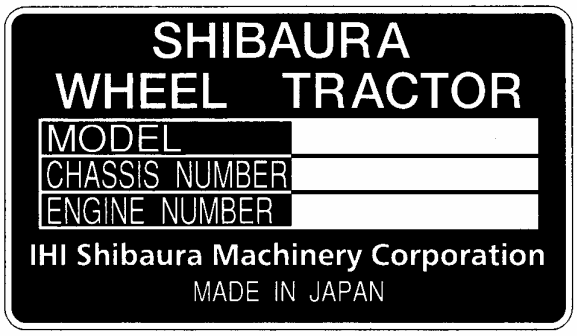
GENERAL INFORMATION

PLEASE READ CAREFULLY:

For a complete list of the pre-delivery service checks performed by your dealer, refer to the PRE-DELIVERY SERVICE check list found at the back of this manual. Keep one copy as your record of the service performed. The other should be removed from the manual and kept by your dealer. MAKE SURE THAT BOTH COPIES ARE COMPLETED AND THAT YOU AND THE DEALER SIGN BOTH COPIES.

After you have operated your tractor for fifty hours, take this manual and your tractor to your dealer. He will then perform the factory recommended 50-HOUR SERVICE as listed on the lower portions at the back of this manual — without charge — except for lubricant, oil, or filters replaced as part of normal maintenance. MAKE SURE THAT YOU AND THE DEALER SIGN BOTH COPIES.

A PRODUCT IDENTIFICATION PLATE is located on the right-hand side of the front frame. The numbers on the plate are important should your tractor require future service. For your convenience, have your dealer record the numbers in the appropriate spaces below.



SHIBAURA policy is one of continuous improvement, and the right to change prices, specification or equipment at any time without notice is reserved.

All data given in this manual is subject to production variations. Dimensions and weights are approximate only and the illustrations do not necessarily show tractors in standard condition. For exact information about any particular tractor please consult your SHIBAURA Tractor Dealer.

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INTERNATIONAL SYMBOLS

As a guide to the operation of your tractor, various international symbols have been utilized on the instruments and controls. The symbols are shown below with an indication of their meaning.

Engine Speed

Hours Recorded

Engine Water Temperature

Air Filter

Engine Oil Pressure

Hazard Warning

Axle Connect

Axle Disconnect

Continuously Variable

Increase

Decrease

Fuel Level

Creeper Range

High Range

Middle Range

Low Range

N
Neutral

Diesel Fuel

Glow

Engine Stop

Engine Oil

Engine Start

Parking Brake

Lights (Upper Beam)

Lights (Lower Beam)

Lock

Release Lock

Up

Down

Differential Lock

Raise ROPS

Read Operator's Manual

Battery

Power Take-off (ON)

Power Take-off (OFF)

"Tortoise"-Slow or Minimum Setting

"Hare,"-Fast or Maximum Setting

Warning

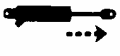
Control Lever Operating Direction

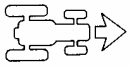
Rock Shaft (Raised)

Rock Shaft (Lowered)

Remote Cylinder (Float)

Remote Cylinder (Retracted)


Remote Cylinder (Extended)


Forward

Horn

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SAFETY PRECAUTIONS

The following precautions are suggested to help prevent accident

PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements (“CAUTION”, ”WARNNG”, and “DANGER”) followed by specific instructions. These specifications are intended for the personal safety of you and those working with you. Please take the time to read them.

The word “CAUTION” is used where a safe behavioral practice according to operating and maintenance instructions and common safety practices will protect the operator and others from accident involvement.

The word “WARNING” denotes a potential or hidden hazard, which has a potential for serious injury. It is used to warn operators and others to exercise every appropriate means to avoid a surprise involvement with machinery.

The word “DANGER” denotes a forbidden practice in connection with a serious hazard.

Failure to follow the “CAUTION”, “WARNING”, and “DANGER” instructions may result in bodily injury or death.

MACHINE SAFETY

Additional precautionary statements (“ATTENTION”, and “IMPORTANT”) are followed by specific instructions. These statements are intended for machine safety.

ATTENTION: The word “ATTENTION” is use to warn the operator of potential machine damage if a certain procedure is not follows.

IMPORTANT: The word “IMPORTANT” is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not follows.

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. Read and take the following precautions before operating this tractor to help prevent accidents. Equipment should be operated only by those who are responsible and instructed to do so.

SAFETY AND THE TRACTOR

1. Read the Operator’s Manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.
2. Use an approved Roll bar and Seat Belt for safe operation. Overturning a tractor without a roll bar can result in death or injury. If your tractor is not equipped with a rollbar and seat belt, see your SHIBAURA Tractor Dealer.
3. Use the handholds and step plates when getting on and off the tractor to prevent falls. Keep steps and platform cleared of mud and debris.
4. Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra riders.
5. Keep all safety decals clean of dirt and grime, and replace all missing, illegible, or damaged safety decals. See the list of decals in the Decal section of this manual.

SERVICING THE TRACTOR

1. The cooling system operates under pressure, which is controlled by the radiator cap. It is dangerous to remove the cap while system is hot. Always turn cap slowly to the first stop and allow the pressure to escape before removing the cap entirely.
2. Do not smoke while refueling the tractor. Keep any type of open flame away. Wait for engine to cool before refueling.

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SAFETY PRECAUTIONS

The following precautions are suggested to help prevent accident

3. Keep the tractor and equipment, particularly brakes and the steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.

4. Keep open flame away from battery or cold weather starting aids to prevent fires or explosions. Use jumper cables according to instructions to prevent sparks, which could cause explosion.

5. Stop the engine before performing any service on the tractor.

6. Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury. If fluid is injected into the skin, obtain medical attention immediately or gangrene may result.

* **DO NOT** use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.

* Stop **engine** and relieve pressure before connecting or disconnecting lines.

* Tighten all connections before starting engine or pressurizing lines.

7. Do not modify or alter or permit anyone else to modify or alter this tractor or any of its components or any tractor function without first consulting SHIBAURA Tractor Dealer.

8. The fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle or any other part of the fuel injection system. Failure to follow these instructions can result in serious injury.

9. Continuous long term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil. Wash skin promptly with soap and water.

10. Some components on your tractor, such as gaskets and friction surfaces (brake linings, clutch linings etc.), may contain asbestos. Breathing asbestos dust is dangerous to your health. You are therefore advised to have any maintenance of repair operations on such components carried out by an authorized SHIBAURA Tractor Dealer. If however, service operations are to be undertaken on parts that contain asbestos, the essential precautions listed below must be observed:

* Work out of doors or in a well-ventilated area.

* Dust found on the tractor or produced during work on the tractor should be removed by extraction not by blowing.

* Dust waste should be dampened, placed in a sealed container and marked to ensure safe disposal.

* If any cutting, drilling, etc., is attempted on materials containing asbestos, the item should be dampened and only hand tools or low speed power tools used.

OPERATING THE TRACTOR

1. Apply the parking brake, place the PTO lever in the “OFF” position, the lift control lever in the down position, the remote control valve levers in the neutral position, and the transmission in neutral before starting the tractor.

2. Do not start the engine or operate controls while standing beside the tractor. Always sit in the tractor seat when starting the engine or operating controls.

3. Do not bypass the neutral start switches. Consult your SHIBAURA Tractor Dealer if your neutral start controls malfunction. Use jumper cables only in the recommended manner. Improper use can result in tractor runaway.

4. Avoid accidental contact with the gear shift levers while the engine is running. Unex-

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SAFETY PRECAUTIONS

The following precautions are suggested to help prevent accident

pected tractor movement can result from such contact.

5. Disengage PTO, shut off the engine and apply the parking brake before getting off the tractor.

6. Do not park the tractor on a steep incline.

7. Do not operate the tractor engine in an enclosed building without adequate ventilation. Exhaust fumes can cause death.

8. If power steering or engine ceases operating, stop the tractor immediately.

9. Pull only from the drawbar or the lower link drawbar in the down position. Use only a drawbar pin that locks in place. Pulling from the tractor rear axle or any point above the axle may cause the tractor to upset.

10. If the front end of the tractor tends to rise when heavy implements are attached to the three-point hitch, install front end or front wheel weights. Do not operate the tractor with a light front end.

11. Always set the hydraulic selector lever in position control when attaching equipment and when transporting equipment. Be sure hydraulic couplers are properly mounted and will disconnect safety in case of accidental detachment of implement.

12. Do not leave equipment in the raised position.

13. Use the Flasher/Turn Signal Lights and SMV signs when traveling on public roads both day and night unless prohibited by law.

14. Be sure tractor lights are adjusted to prevent blinding an oncoming vehicle operator.

DRIVING THE TRACTOR

1. Watch where you are going especially at row ends, on roads, around trees and low hanging obstacles.

2. To avoid upsets drive the tractor with care and at speeds compatible with safety, especially when operating over rough ground, when crossing ditches or slopes, and when turning corners.

3. Lock tractor brake pedals together when transporting on roads to provide two wheel braking.

4. Keep the tractor in the same gear when going downhill as used when going uphill. Do not coast or free wheel down hills.

5. Any towed vehicle whose total weight exceeds that of the towing tractor must be equipped with brakes for safe opera ion.

6. When the tractor is stuck or tires are frozen to the ground, back up the tractor to prevent upset.

7. Always check overhead clearance, especially when transporting the tractor.

8. When operating at night, adjust lights to prevent blinding an oncoming driver.

OPERATING THE PTO

9. When operating PTO driven equipment, shut off the engine and wait until the PTO stops before getting off the tractor and disconnecting the equipment.

10. Do not wear loose clothing when operating the power take off, or when near rotating equipment.

11. When operating stationary PTO driven equipment, always place both gear shift levers in neutral, apply the tractor parking brake and block the rear wheels front and back.

12. To avoid injury, do not clean, adjust, unclog or service PTO driven equipment when the tractor engine is running.

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SAFETY PRECAUTIONS

The following precautions are suggested to help prevent accident

13. Make sure the PTO master shield is installed at all times and always replace the PTO shield cap when the PTO is not in use.

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SAFETY PRECAUTIONS

The following precautions are suggested to help prevent accident

DIESEL FUEL

1. Under no circumstances should gasoline, alcohol or blended fuels be added to diesel fuel. These combinations can create an increased fire or explosive hazard. Such blends are more explosive than pure gasoline in a closed container such as a fuel tank. Do not use these blends.

2. Never remove the fuel cap or refuel with the engine running or hot.

3. Do not smoke while refueling or when standing near fuel.

4. Maintain control of the fuel filler pipe nozzle when filling the tank.

5. Do not fill the fuel tank to capacity. Allow room for expansion.

6. Wipe up spilled fuel immediately.

7. Always tighten the fuel tank cap securely.

8. If the original fuel tank cap is lost, replace it with a SHIBAURA approved cap. A non-approved, proprietary cap may not be safe.

9. Keep equipment clean and properly maintained

10. Do not drive equipment near open fires.

11. Never use fuel for cleaning purposes.

12. Arrange fuel purchases so that summer grade fuels are not held over and used in the winter.

SAFETY FRAME (ROPS)

If your SHIBAURA Tractor is equipped with a safety frame it must be maintained in a serviceable condition. Be careful when driving through doorways or working in confined spaces with low headroom.

Under no circumstances:

1. ····modify, drill or alter the safety frame in any way as doing so could render you liable to legal prosecution.

2. ····attempt to straighten or weld any part of the main frame or retaining brackets which have suffered damage. By doing so you may weaken the structure and endanger your safety.

3. ····secure any parts on the main frame or attach your safety frame with other than the special high tensile bolts and nuts specified.

4. ····attach chains or ropes to the main frame for pulling purposes.

5. ····take unnecessary risks even though your safety frame affords you the maximum protection possible.

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CONTROLS, INSTRUMENTS AND OPERATIONS

SEAT, ROPS AND MIRROR

Seat Adjustment

Your SHIBAURA Tractor is equipped with an adjustable suspension seat as shown in Figure **1**.

To adjust the seat fore and aft, move the release lever ①, towards the fender, slide the seat to the desired position, releasing the lever to lock.

The seat height is controlled variably by the knob ②. While sitting in the seat, turn it clockwise to increase the height, or turn it counterclockwise to reduce the height.

To adjust the seat suspension for individual operators ; with moving the Lever ③ straight up, turn it clockwise to be for more （＋） and turn it counter-clockwise to be for less （－）.

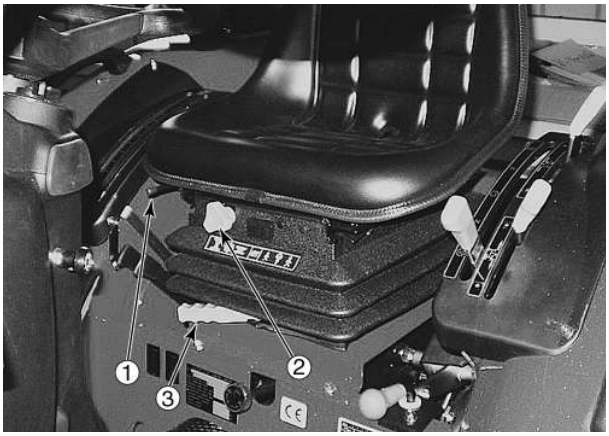

Figure 1 - Tractor Seat Adjustment
①Fore/aft Lever ②Hight knob
③Flotation Adjuster Lever

Mirror Adjustment

Your tractor equipped with a mirror.
The mirror can be moved fore/aft or outside/inside as desired, in Figure **2**.

To adjust the mirror, move the arm fore/aft or loosen the screw tightened clamp for repositioning the mirror.

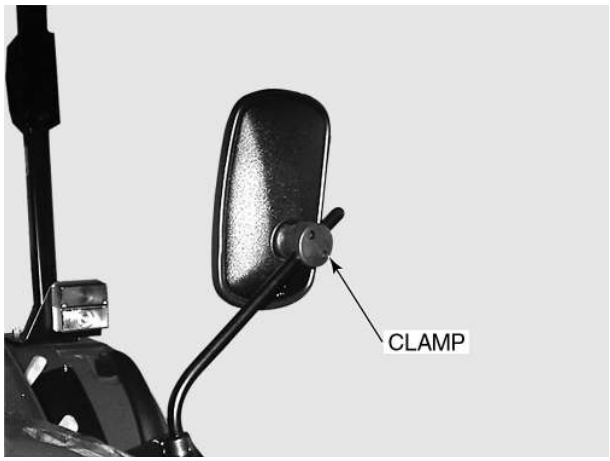

Figure 2 - Mirror Adjustment

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ROLLOVER PROTECTIVE STRUCTURE(ROPS)

Your tractor is equipped with a folding Roll Over Protective Structure(ROPS). If, for some reason, the ROPS was deleted by the original purchaser or has been removed, it is recommended that you equip your tractor with a ROPS.

ROPS are effective in reducing injuries during tractor overturn accidents. Overturning tractor without a ROPS can result in serious injury or death.

Roll Over Protective Structure (ROPS), is available from your SHIBAURA Tractor Dealer.

WARNING : When improperly operated, a tractor can roll over.
For low clearance use only, the ROPS may be lowered.
No protection is provided when the tractor is operated with the ROPS in the lowered position.
Always raise the ROPS and lock it immediately after low clearance work.

Figure 3 - Rollover Protective Structure (ROPS)

Folding the ROPS

A foldable ROPS is factory installed on your tractor. Operate with ROPS in the raised position whenever possible. Use the ROPS in the folded position only when absolutely necessary.

To fold the ROPS remove two locking pins, Figure **4**, Lower the upper section of the ROPS rearward.

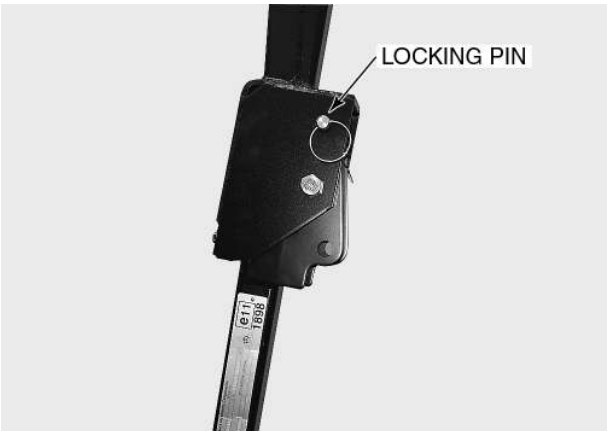

Figure 4 - ROPS, Raised Position

Install two locking pins to anchor the ROPS firmly once in position. To raise the ROPS reverse the above procedure.

Figure 5 - ROPS, Folded Position

WARNING : Do not operate the tractor with the ROPS folded as a standard operating mode. A folded ROPS does not provide rollover protection.

Always pull from the tractor the drawbar. Do not attach chains or ropes to the ROPS for pulling purposes, as the tractor can tip backwards.

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CONTROLS, INSTRUMENTS AND OPERATIONS

LIGHTING

HAZARD FLASHER WARNING LIGHTS AND COMBINATION SWITCH

Your SHIBAURA tractor is equipped with hazard light, Figure **6**. The light switch must be turned to the “ON” position before the hazard light will operate.

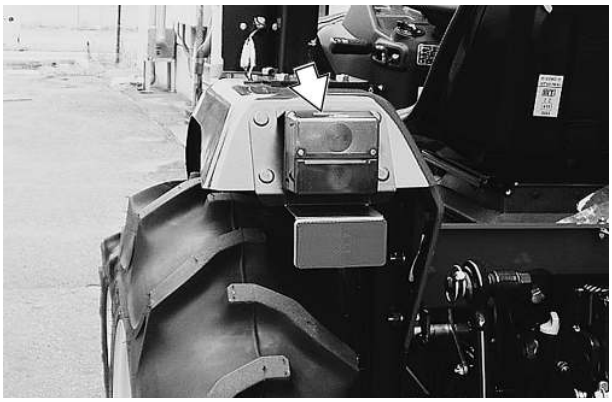

Figure 6 - Hazard Flasher and Turn Signal Lights

Lighting Switches

Your tractor is equipped with a combination switch ①,operating turn signals, hazard lights and the horn. The main lighting switch ②, is mounted on the left side of the instrument console.

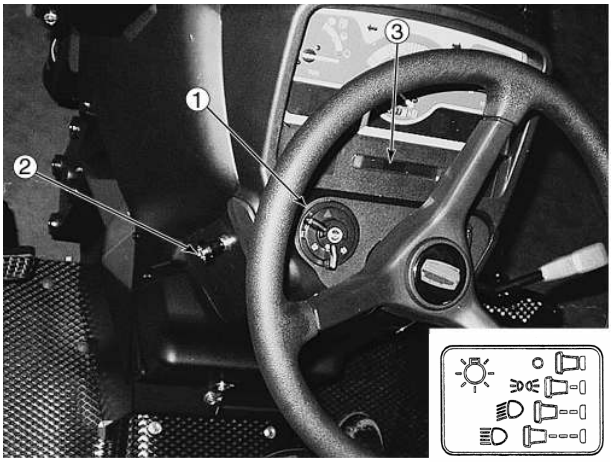

Figure 7 - 1.Combination Switch, 2.Main Lighting Switch
3.Trailer Turn Indicator Light

Combination Switch

The turn signal lights are activated by moving the switch to the left or right as required. The turn signal switch is not self-canceling. To operate the hazard function, move the hazard flasher switch, clockwise to activate all four indicator lights.
Depressing the center button will sound the horn.

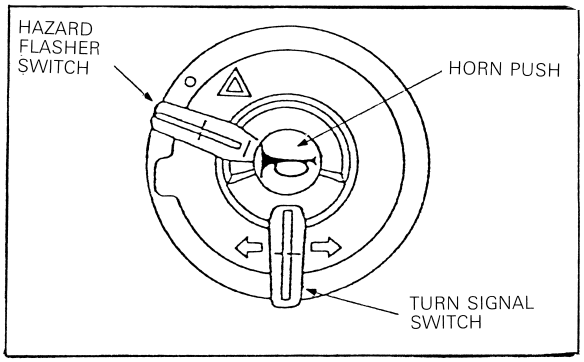

Figure 8 - Combination Switch

MAIN LIGHTING SWITCH

The main lighting switch, shown in Figure **7**, is a pull-push type switch. Its positions are :

1st position·····Lights “OFF”
2nd position·····Side and Tail Lights “ON”
3rd position·····Side, Tail and Headlights “ON” (Low Beam)
4th position·····Side, Tail and Headlights “ON” (High Beam)

Trailer Turn Indicator Light

The warning light ③, Figure **7**, will flash in union with tractor/trailer turn signals if trailer is attached.

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CONTROLS, INSTRUMENTS AND OPERATIONS

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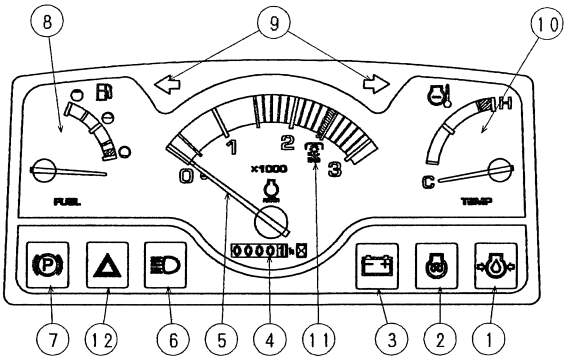
CONTROLS, INSTRUMENTS AND OPERATIONS

INSTRUMENT PANEL



Instrument Panel

① **Engine Oil Pressure Warning Light -** Illuminates with the key switch in the "ON" or "HEAT" positions and remains lit for a short period of time after the engine is started. The light indicates oil pressure only and goes out when sufficient oil pressure is present at the oil sender. If the bulb becomes lit during operation, stop the tractor engine immediately and investigate the cause.

② **Cold Starting Indicator Light -** Illuminates when the key switch is turned to the "HEAT" position. It remains lit for approximately 5 seconds when the key is held in position, during which time the glow plugs are heating the pre-combustion chambers.

③ **Battery Charge Warning Light -** Illuminates when the key switch is in the "ON" or "HEAT" positions and goes out when engine is started. If this bulb becomes lit during operation, it indicates the charging system is not operating normally. As the battery can become fully discharged under these conditions, the problem should be investigated as soon as possible.

④ **Proof Meter -** Records the hours and portions of hours that your tractor has been operated based on an average engine speed of 1883 RPM. Use the proof meter as a guide to determine hourly service maintenance intervals.

⑤ **Tachometer-** Registers engine RPM (Revolutions Per Minute). The gauge is marked in increments of 100 and will return to zero when the engine is not running.

⑥ **High Beam Indicator -** Illuminates when the head-lights are switched to main beam.

⑦ **Parking Brake Light -** Illuminates if the parking brake is engaged when the key switch is turned from "OFF" position.

⑧ **Fuel Gauge -** Indicates the amount of diesel fuel when the key switch is in the "ON" or "HEAT" positions. It will register empty with the key switch in the "STOP" position.

⑨ **Turn Indicator Warning Lights -** Flash in union with the turn signal warning light when the lever is moved to the right-hand or left-hand.

⑩ **Temperature gauge -** Indicates coolant temperature. It is activated when the key switch is turned to the "ON" or "HEAT" positions. The gauge will register cold with the key switch in the "STOP" position. If the needle registers in the green range, this indicates a normal operating temperature. If the needle moves to the red portion of the gauge, this indicates an overheated condition. Stop the tractor engine immediately and investigate the cause.

⑪ **Rear PTO Speed -** Determined by the portion of the needle on the tachometer. The tachometer is marked to indicate 540 PTO RPM. Engine RPM should remain close to this mark while using the rear PTO; running the engine faster than this results in a dangerous over speed condition.

⑫ **Hazard Indicator Warning Lights -** Flash in union with the hazard warning light when the lever is moved clockwise.

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KEY SWITCH

The key switch is shown in Figure **9.**
Turning the key to the right to the “ON” position will activate the indicator lights and instruments.
Turning the key further right to the “HEAT” position will active the cold-start aid.
Turning the key to the fully clockwise to the “START” position will start the engine. Upon release, the key will spring return to the “ON” position.
To stop the engine, turn the key to the “OFF” position.

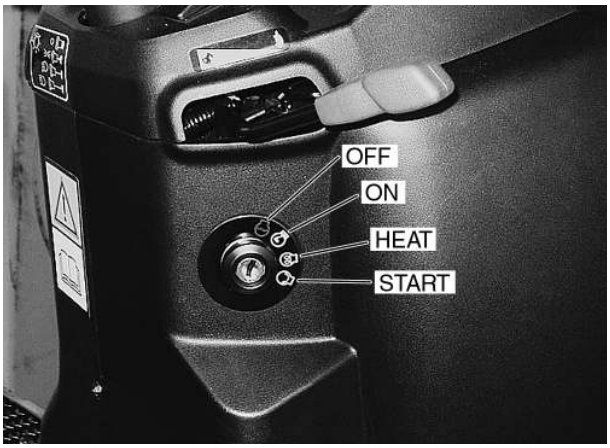

Figure 9 - Key Switch

IMPORTANT : The key switch must remain in the ON position while operating the engine. The warning lights and battery charging system will not function with the switch in the OFF position.

PRE-HEATING THE ENGINE

Your tractor has a diesel engine. Before starting a cold engine, the pre-combustion chambers must be heated.
To preheat the engine, turn the key switch to the “HEAT” position, Figure **9** and hold the key in this position for approximately 5 seconds. The glow plugs heat the combustion chambers during this time, and the engine will now be ready to start.

NOTE: When ambient temperature are colder, a longer preheat time may be necessary. Even after the cold start indicator light has gone out, the glow plugs will continue to heat if the key is held in the “HEAT position.

WARNING : Do not use ether with the thermostat starting aid.

STARTING THE ENGINE

The safety key switch allows activation of the starting motor only when:

1. The rear PTO is in the “OFF” position.

2. The mid PTO is in the “OFF” position, if equipped.

3. The range lever is in the “NEUTRAL” position.

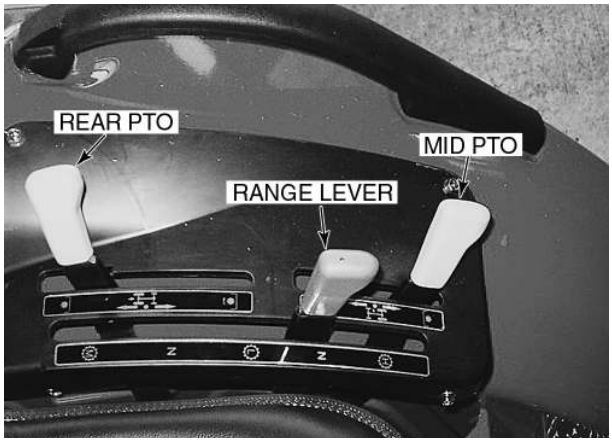

Figure 10 - Rear PTO, Mid PTO and Range lever

Always use safety practices when starting your tractor.Position the hand throttle rearward so that it is one-fourth to one-third open when starting the tractor. After starting return the throttle to the idle position and allow the engine to idle for 1 minute before operating the tractor.

IMPORTANT : Do not engage the starting motor continuously for more than 30 seconds ; doing so may cause starting motor failure.

NOTE : A coolant immersion heater which provides for easier starting in temperatures below 0° F (－17.7℃) by warming the engine oil and coolant,

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is available as a dealer installed option.

STARTING THE TRACTOR WITH JUMPER CABLES

WARNING : Start engine only from the operator's seat.

If it is necessary to use jumper cables to start the tractor, follow the instructions below.

1. Shield eyes.

2. Connect one end of the jumper cable to the tractor battery positive (+) terminal and the other to the auxiliary battery positive (+) terminal. Connect one end of the other cable first to the auxiliary battery negative (−) terminal, and the other end to the tractor starter ground terminal. Follow the starting procedures indicated previously above.

Idle the engine and turn on all electrical equipment (lights, etc.), then disconnect the cables in reverse order of the connecting procedure above. This will help protect the alternator from damage due to extreme load changes.

WARNING : Batteries contain sulfuric acid and produce explosive gases. Follow the instructions below to prevent personal injury.

- Wear eye and skin protection.
- Keep sparks and flame away.
- Always have adequate ventilation while charging or using the battery.
- Follow the battery manufacturer's instructions shown on the battery.

STOPPING THE ENGINE

Push the hand throttle fully forward and turn the key switch, Figure **9**, to the "OFF" position to stop the engine.

IMPORTANT : Failure to turn the key switch to the "OFF" position after the engine has stopped will allow the warning lights to remain on, causing the battery to discharge.

BREAK-IN PROCEDURES

Your SHIBAURA Tractor will provide long and dependable service if given proper care during the 50 hour break-in period. During the first 50 hours of operation :

1. Avoid "lugging" the engine. Operating in too high a gear under heavy load may cause engine "lugging", which is indicated when the engine will not respond to a throttle increase.

2. Use the lower gear ratios when pulling heavy loads and avoid continuous operation at constant engine speeds. You will save fuel and minimize engine wear by selecting the correct gear ratio for a particular operation. Operating the tractor in low gear with a light load and high engine speed will waste fuel.

3. Avoid prolonged operation at either high or low engine speeds without a load on the engine.

4. Check the instruments frequently and keep the radiator and oil reservoirs filled to their recommended levels. Daily checks include :

   - Engine oil level
   - Radiator coolant
   - Air cleaner

5. After the first 50 hours of use, be sure to perform the maintenance chart ,on Page **32**.

WARNING : Never attempt to start the engine while standing beside the tractor—always sit in the seat when starting the engine.

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ELECTRICAL SOCKET for Trailer

A standard seven pin socket, Figure **12**, is provided mounted on the left side of the tractor at the rear. With reference to the picture inset, the socket connections (as viewed from the rear of the tractor) are as follows;

Pin No.	Wire Colour	Circuit
①	Green/Red	L.H. Turn Signal
②		Not Used
③	Black	Earth(Ground)
④	Green/White	R.H. Turn Signal
⑤	Red	R.H. Parking Light
⑥	Green/Purple	Stop Lights
⑦	Red/Black	L.H. Parking Light

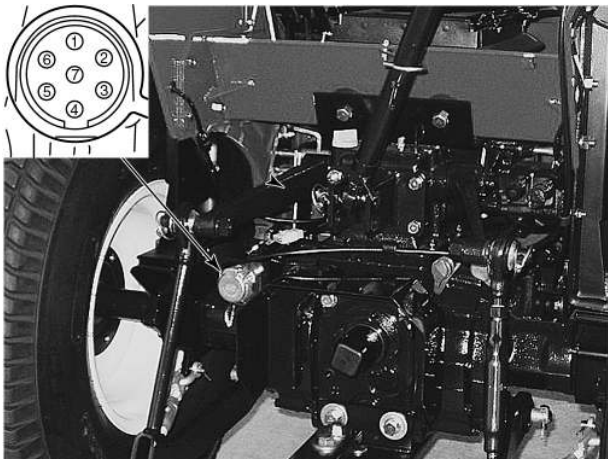

Figure 12- Seven Pin Electrical Socket

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CONTROLS, INSTRUMENTS AND OPERATIONS

THROTTLE CONTROLS

HAND THROTTLE AND ENGINE STOP CONTROL

The hand throttle is shown in Figure **13**. Pull the throttle rearward to increase engine rpm. Push the throttle forward to decrease engine rpm.

Figure 13 - Hand throttle

FOOT THROTTLE

(Only mechanical transmission, 9x3)

The foot throttle, shown in Figure **14**, can be used separately, or in conjunction with the hand throttle. With the hand throttle control lever set at a selected engine rpm, the foot throttle can be used to increase engine rpm to its maximum speed.

Upon release of the foot throttle, the engine speed will return to the rpm at which the hand throttle has been set, or idle if the hand throttle is not at a pre-set position.

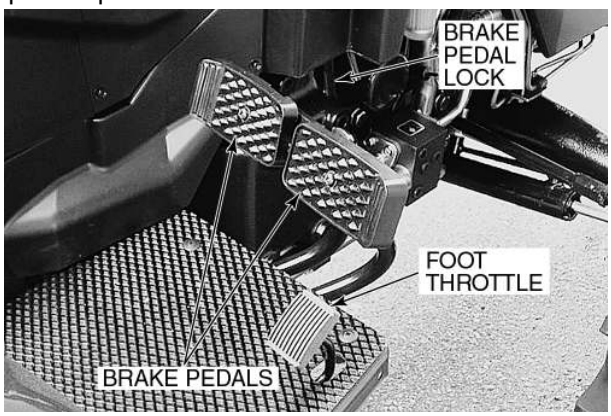

Figure 14 - Foot throttle and Brake Controls

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BRAKE CONTROLS

BRAKE PEDALS

The brake pedals are shown in Figure **15**. The right brake pedal is used to brake the right rear wheel. The left pedal is used to brake the left rear wheel. Depress both pedals simultaneously to stop the tractor.

To assist in making sharp turns at slow speed, depress the right or left brake pedals as required.

WARNING : When operating the tractor at high speeds, never attempt to make sharp turns by using the brakes.

BRAKE PEDAL LOCK

The brake pedal lock, shown in Figure **15**, is used to secure the brake pedals together.
Lock the pedals together whenever the tractor is operated at high speeds and at any time the tractor is used on the highway.

Figure 15 - Brake Pedal Locking

PARKING BRAKE CONTROL

The parking brake, shown in Figure **16**, is used for locking the brake pedals in the applied position.
The parking brake should be applied whenever the tractor is parked.

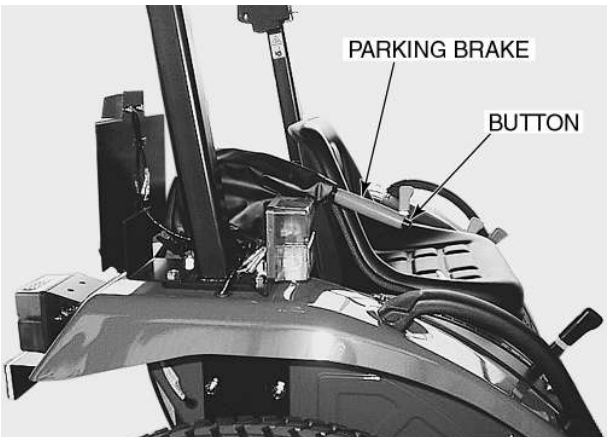

Figure 16 - Parking Brake Control

FUEL SHUTOFF VALVE

The fuel shutoff valve is shown in Figure **17**.
To open the fuel shutoff valve, move the handle so that it points straight up and down.
To close the fuel shutoff valve, move the handle to the horizontal position. Always shut off the valve when servicing any portion of the fuel system.

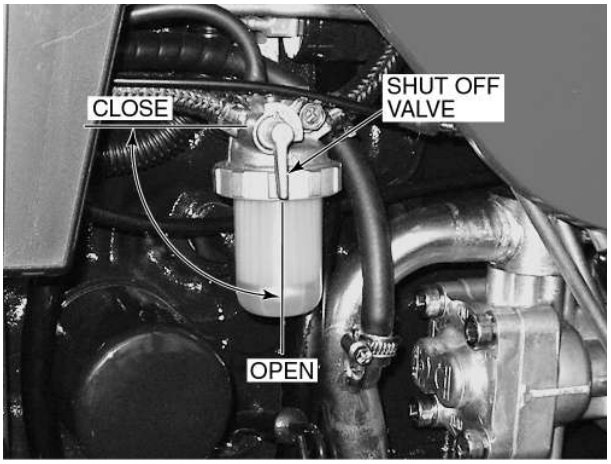

Figure 17 - Fuel Shutoff Valve

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CONTROLS, INSTRUMENTS AND OPERATIONS

TRANSMISSION, FOUR-WHEEL DRIVE AND P.T.O

FOUR-WHEEL DRIVE

The shift lever for the four-wheel drive is located on the left-hand of the seat, Figure **18**.
Full upward, the lever engages the four-wheel drive(ON). Full downward, it disengages the four-wheel drive(OFF).

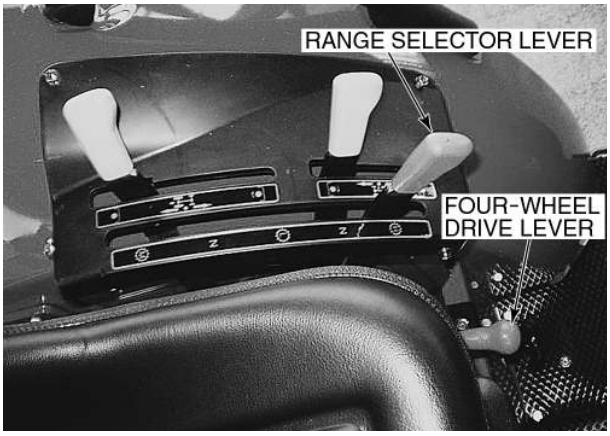

Figure 18 - Four - Wheel Drive Lever

To engage the four-wheel drive, depress the clutch pedal fully and move the four-wheel drive lever full upward. To disengage, move the lever full down ward.

IMPORTANT : The front wheel drive should be used when additional traction is required while operating in loose soil, wet, slippery conditions or on slopes.
For normal operation on firm soil, level hard surfaces and roading the unit at high speeds, front wheel drive should be disengaged to maximize tire and driveline life and fuel economy.

MECHANICAL TRANSMISSION (9×3)

TRANSMISSION GEARSHIFT LEVERS

The transmission main shift lever and range selector lever, are shown in Figure **18** or **19**.
A diagram showing the shift pattern is on the bezel around the gearshift lever.
Three forward and one reverse speeds are provided for each of the three ranges. This provides a total of 9 forward and 3 reverse speeds.

Ground speeds for the various gear ratios can be found on page **56**.

IMPORTANT : Do not attempt change gears while the tractor is moving. The mechanical transmission is not synchronized. The clutch pedal must be depressed and tractor motion stopped to change gear ratios with the main shift lever or the range shift lever.

Figure 19 - 9×3 - Main shift Lever

SPEED	RANGE	MAIN
1	L	1
2		2
3		3
4	M	1
5		2
6		3
7	H	1
8		2
9		3
R^1	L	R
R^2	M	R
R^3	H	R

Figure 21 - Speed Range Combinations - 9×3

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HYDROSTATIC TRANSMISSION-H.S.T. (Optional)

H.S.T. FOOT PEDAL

The ground speed of tractors equipped with the hydrostatic transmission is continuously variable, from zero to full rated speed in each range.
Speed is controlled by the H.S.T. rocker pedal on the right side of the transmission, Figure **22**.
Depress the forward pad on the pedal for forward travel, to the position that provides the desired ground speed.
For reverse travel, depress the rear pad on the pedal.
Releasing the pedal returns the transmission to Neutral, and stops the tractor, unless the H.S.T speed control switch is in the "**LOCK**" position.

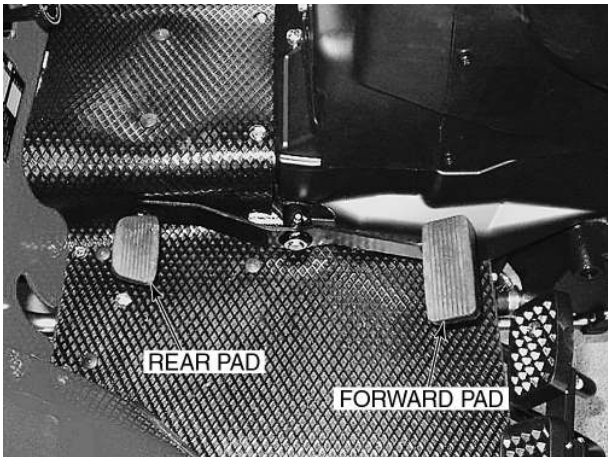

Figure 22 - H.S.T. Foot Pedal

H.S.T. Range Selector Lever

The range selector lever is located oh the left-hand of the seat, Figure **23**. It has three speed ranges and two neutral position.

NOTE: The range selector lever must be in one of the neutral positions to activate the safety start system and allow the engine to start.

To select the desired operating range, depress the clutch pedal fully.

IMPORTANT : Never attempt to engage or disengage the range lever when the tractor is in motion.

Figure 23 - H.S.T. Range Selector Lever

H.S.T. Cruise Control

The H.S.T. Cruise Control switch is located on the right-hand side of the Hydraulic Lift Cover and is used to remain a constant forward speed, Figure **24**.

NOTE: Cruise control will not function in the reverse direction.

When the desired travel speed is reached, depress the top half of the control switch to lock the hydrostatic rocker pedal. A green light will illuminate inside the switch indicating the cruise control is engaged. To disengage cruise control, depress the bottom half of the switch or depress the brake pedal. The green light will extinguish, indicating cruise control is off and the hydrostatic rocker pedal will return to neutral.

WARNING : To avoid personal injury and maintain optimum control of the tractor, do not use the cruise control at high speeds or when roading the tractor.

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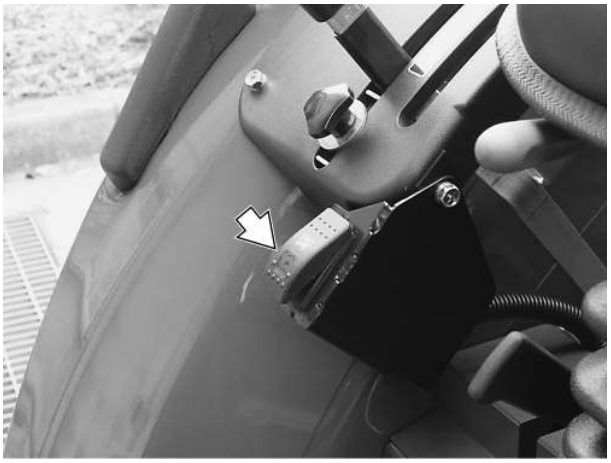

Figure 24 - H.S.T. Cruise Control

CLUTCH PEDAL

The foot-operated clutch pedal, Figure **25**, must be completely depressed to stop forward travel and PTO shaft rotation.
Always fully depress the pedal when changing gear ratios or engaging four-wheel drive.

IMPORTANT : Avoid using the clutch pedal as a "footrest"(riding the clutch). Prolonged operation in this manner can cause damage to the clutch components.

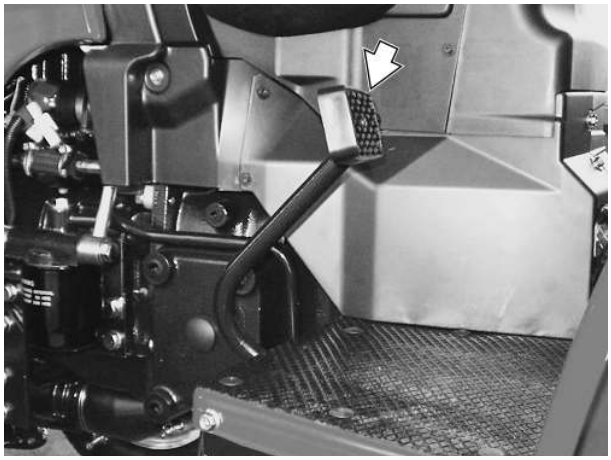

Figure 25 - Clutch Control

DIFFERENTIAL CONTROL

DIFFERENTIAL LOCK PEDAL

The differential lock pedal is located on the right-hand foot platform on 9 × 3 model and left-hand foot platform on HST model. The differential lock is used to obtain additional traction in wet or loose soil.

When the differential lock pedal is depressed, both final drive pinion gear shafts are locked together, preventing one wheel from rotating independently of the other. Whenever one wheel begins to slip in wet or loose soil. use the lock to obtain additional traction from the opposite wheel.

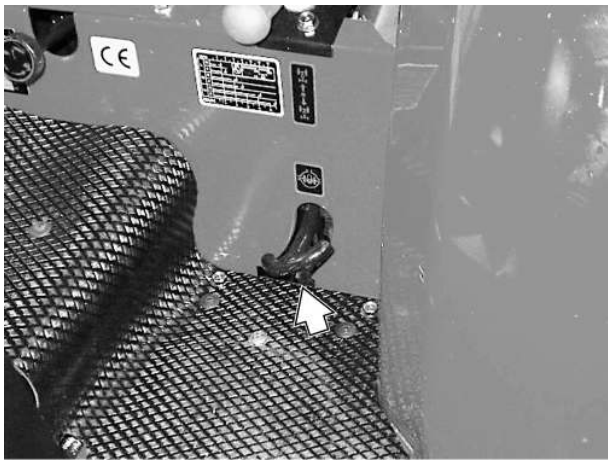

Figure 26 - Differential Lock Pedal—HST

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WARNING : Tractor is very difficult to steer with differential locked.

Do not engage the differential lock when driving the tractor on the highway or when ground speed is above 8 km/h.

To operate the differential lock, depress and hold the pedal down until the lock is positively engaged. It is best to engaged the differential lock while the wheels are turning slowly to minimize shock loads to the drive line. If a wheel spins at high speed, as on ice, reduce engine speed to idle before engaging the lock, or damage may occur. The differential lock is released by releasing the pedal.

NOTE: In some instances the lock may remain engaged after the pedal is released. This may occur if one rear wheel tends to turn at a faster speed than the other. Should this happen, the lock may be disengaged by either of two ways:

- Decrease the drawbar pull by raising or disengaging the implement so that neither wheel tends to slip.

——OR——

- Rapidly apply and release a light braking load to the slipping rear wheel.

PTO CONTROLES AND OPERATION

TRANSMISSION PTO CONTROL LEVER

The power take-off (PTO) on your tractor transfers engine power directly to mounted or trailed equipment. The transmission/PTO options are three types, as fellows:-

Type	Transmission	PTO Type
A	Manual- 9 fwd. x 3 rev.	Single – speed Transmission with mid-PTO optional
B	Manual- 9 fwd. x 3 rev.	2 – speed Transmission
C	Hydrostatic - 3 ranges	Single – speed live with mid-PTO standard

All models operate through the standard 1 3/8 in. (34.9 mm) diameter, 6-spline output shaft rotating at 540 rpm , the speed at which most PTO driven equipment is designed to operate.

If your tractor is equipped with 2-speed PTO then the symbol on the proof-meter relates to 540 rev./min. PTO speed when the lower PTO speed range is selected.

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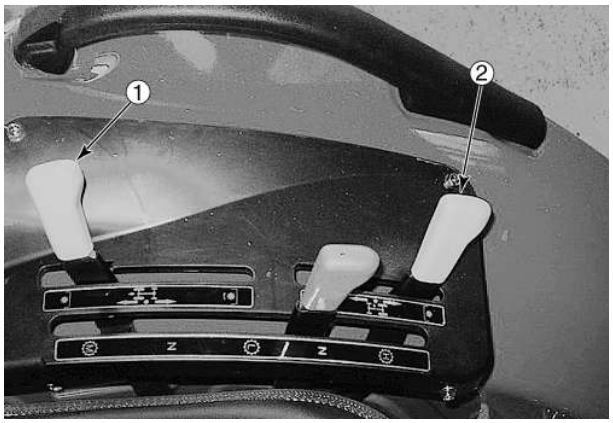

Figure 27 - PTO Control Lever
1. Rear PTO Lever (single/2-speed)
2. Mid PTO Lever (where fitted)

The PTO is engaged and disengaged by means of a lever in conjunction with the clutch pedal. The lever(s) is shown in Figure **27**. The engaged positions (single-speed PTO), speed range (2-speed PTO) and neutral position(s) are clearly identified by the decal adjacent to the PTO lever(s).

PTO SHIELD AND CAP

The PTO shield, shown in Figure **28**, is standard equipment. The shield is to be used with all PTO equipment. The PTO cap should always be installed when the PTO is not in use.

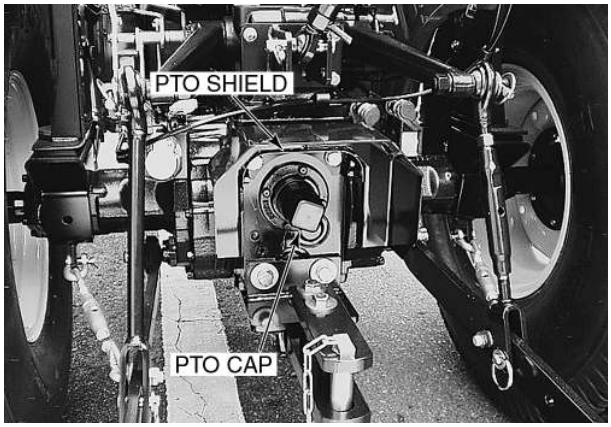

Figure 28 - PTO Shield and Cap

POWER TAKE-OFF OPERATION

WARNING : To reduce the possibility of personal injury comply with the following before attaching or detaching PTO equipment, and before working on, or clearing, PTO equipment.

1. Attaching the PTO
   - Stop the engine.
   - Depress the clutch pedal completely and move the transmission gearshift lever to the neutral position.
   - Depress the clutch pedal completely and move the transmission gearshift lever to the neutral position.
   - Set parking brake.
   - Disengage the PTO. with the PTO control lever, Figure **27**.
   - Remove the PTO cap for rear.
   - Wait until the PTO shaft stops turning.
   - Attach the mounted or drawn equipment.
2. Make sure the equipment-driven shaft is properly aligned and locked to the tractor PTO drive shaft and that the PTO shield is down in the guarded position. With the PTO disengaged, start the engine, raise and lower the equipment to make sure proper clearances exist.
3. With the transmission in neutral, depress the clutch pedal completely, then engage the PTO by moving the PTO control lever.
   NOTE : Failure to move the PTO lever through its full range may result in damage to the PTO.
4. Check the PTO driven equipment for proper operation by gradually releasing the clutch pedal and increasing engine rpm.
5. After determining that the equipment is operating properly, depress the clutch pedal and shift to the desired operating gear. Release the pedal gradually to start the PTO and tractor in motion.
6. Control the PTO speed with the throttle, never exceeding the PTO limit on the Proof-Meter. If the tractor movement is too fast for the PTO load, stop the tractor and shift transmission to a lower gear.

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PTO speeds relative to engine speeds are shown in the following tables:

PTO Type	Ratio	PTO Speed (rpm)	Engine Speed (rpm)
Single-speed			
(Manual trans.)	-	540	2455
(HST trans)	-	540	2500
2-speed	1	540	2485
(Manual trans.)	2	750	2350
Mid-mounted			
(Manual trans.)	-	2000	2377
(HST trans)	-	2000	2420

WARNING : Rear PTO speeds in excess of 630 PTO rpm may damage equipment that is designed for 540 rpm operation and could result in personal injury to the operator or bystanders.

7. Disengage the PTO with the PTO control lever with mounted equipment in the fully raised position.
8. Disconnect the P.T.O.-driven shaft at the tractor PTO shaft before traveling on highways or for any great distance.
9. Reinstall the PTO shaft cap when the PTO-driven equipment is disconnected from the tractor or when the PTO is not being used.

WARNING : To avoid inadvertent movement of PTO implement, disengage PTO after each use.

TOWING THE TRACTOR

To tow your tractor, place the transmission gear-shift levers in neutral. Do not exceed 13 km/h. Do not tow your tractor to start it.
If the tractor is to be moved any great distance, use a solid tow bar and pull the tractor at a speed not to exceed 13 km/h.

WARNING : For safety reasons, towing the tractor on the highway is not recommended. Also, for safety reasons, never attempt to start the engine by towing.

EXTENSION / CLEVIS DRAWBAR

Your tractor is equipped with a extension/clevis type drawbar, shown in Figure **29** for towing equipment behind the tractor.
This drawbar may be extended for sliding it rearward, 145 mm.

IMPORTANT : When transporting equipment on highways, a safety chain with tensile strength equal to the gross weight of the implement should be installed between the tractor and implement hitch.

WARNING : Pull only from the drawbar, always use the drawbar or lower links in the lowered position when performing pull-type work..

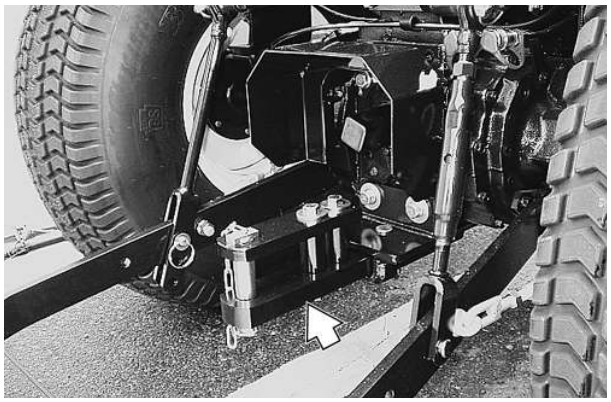

Figure 29 - Extension / Clevis Drawbar

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HOOD LATCH

1. To raise the hood, move the latch lever ①, to the right, or the hood may be raised up sligtly. And then move the safety catch ② to the left-hand / upward with inserting your hand below the hood. Figure **30**. Lift the hood to its fully raised position. A support link, Figure **31**, will automatically hold the hood in the fully raised position.
2. To lower the hood, lift up on the hood slightly and pull the support link towards you, so that the support pin is no longer in the catch position. Lower the hood until it is retained by the latch mechanism.

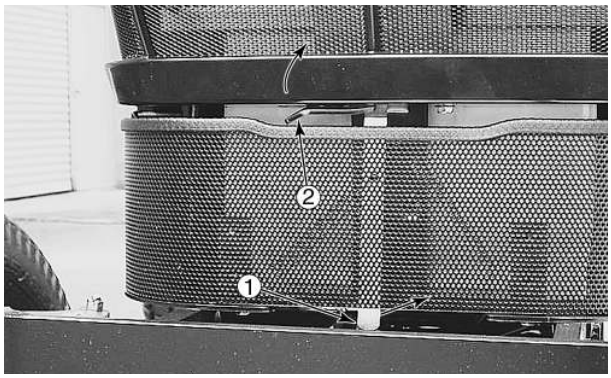

Figure 30 - Hood Latch

Figure 31 - Support Link, Hood

IMPORTANT : Do not attempt to lower the hood without moving the support link. Attempting to force the hood down can result in bending or breaking of the hood and support linkage.

NOTE : Keep the latch mechanism free of the dirt and the debris so that the latch assembly will operate properly.

THREE POINT LINKAGE

The tractor's standard three-point linkage is used to attach mounted equipment to the rear of the tractor. This can be ground driven, PTO operated or trailed. The three "points" of the linkage are the Category 1 ball ends on the two lower lift arms and the top link.

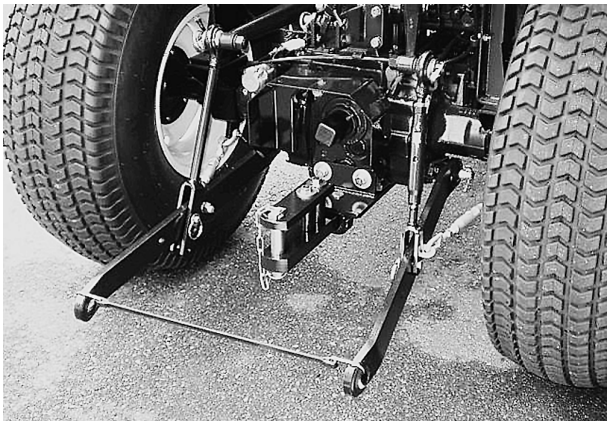

Figure 32 - Three-Point Linkage

Linkage Adjustment

The three-point linkage has adjustable stabilizers to control lateral movement of the lift arm. Loosen the lock nut and turn the adjuster②, to shorten or lengthen the stabilizer. Re-tighten the lock nut.

The height of the right-hand lift arm can be adjusted by loosening the lock nut and turning the threaded adjuster ① on the lift rod.

To adjust the height of the left-hand lift arm re-position the attaching bolt ③, in one of the alternative holes in the lift rod.

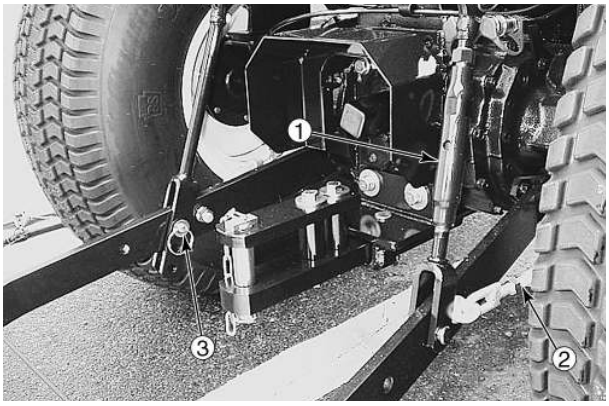

Figure 33 - Linkage Adjustment, Three-Point

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HYDRAULIC LIFT SYSTEM

SINGLE LEVER HYDRAULIC LIFT SYSTEM (Standard)

The hydraulic lift system provides accurate, smooth, and instant hydraulic power for raising a variety of compatible equipment whenever the engine is running. The position control feature of the system maintains the selected height or depth of three point linkage equipment in relation to the tractor. When the hydraulic lift control lever is moved to a higher or lower setting in the quadrant, the system repositions the equipment to a higher or lower position and maintains the selected position, Figure **34**.

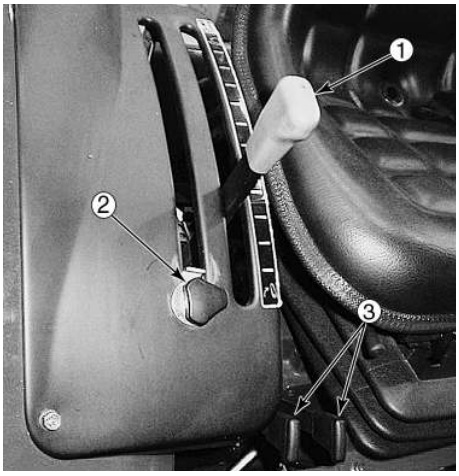

Figure 34 - Hydraulic Lift System Control
①Position Control Lever
②Adjustable Stop
③Remote Control Levers

TWO LEVER HYDRAULIC LIFT SYSTEM WITH DRAFT AND POSITION CONTROL (Optional)

If you tractor is equipped with the optional Two Lever Control System shown in Figure **35**, there are two modes of Hydraulic Lift System operation — Position Control or Draft Control — that can be selected to satisfy operating conditions for the implement being used.

WARNING : Make sure area is clear of people before lowering equipment.

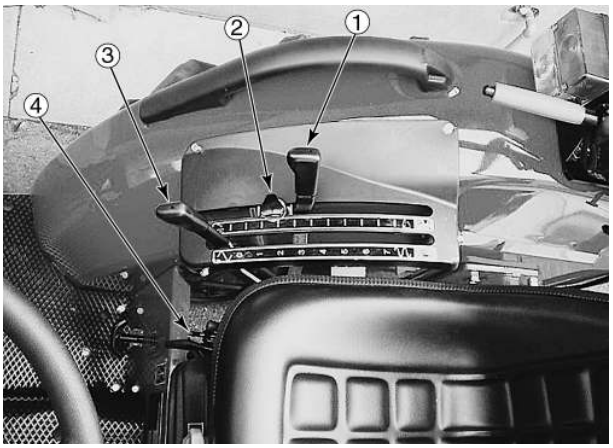

Figure 35 - Two Lever Hydraulic Lift System Control (Draft and Position)
①Position Control Lever
②Adjustable Stop
③Draft Control Lever
④Remote Control Lever

POSITION CONTROL

When operating in position control, there is a definite relationship between the position of the control lever in the quadrant and the position of the equipment. The lever must be moved to change the position of the equipment relative to the tractor. The system will automatically maintain the equipment in the selected position.

Position control provides easy, accurate control of three-point linkage equipment that operates above the ground ; such as sprayers, rakes, mowers, etc. It also provides a uniform depth when using a blade or similar equipment on level ground.

The position control lever (Front) is used to raise and lower the equipment.

DRAFT CONTROL

When operating in draft control, the draft control lever is used to adjust sensitivity to draft loads. Once the lever is positioned, the hydraulic lift system will automatically adjust the depth of the equipment to maintain an even load on the tractor as soil conditions vary. The hydraulic system senses draft-changes through changes in upper link compression. The operation of the upper link draft sensing system is described in the following

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paragraph.

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Upper Link Compression Loads : As the equipment is pulled through the soil. the draft caused by soil resistance tends to rotate the equipment upward around the lower link hitch points. This draft creates a pushing or compressive force on the upper link. When changes in soil resistance cause the draft to increase, the compression force on the upper link will also increase. These changes in upper link compression, signal the hydraulic system through internal linkage, to raise the equipment slightly to maintain uniform draft.

WARNING : Always lower the hydraulic lift and all other hydraulic equipment before stopping the tractor.

SHIBAURA tractors having the Hydraulic Draft Control option are equipped with two lever hydraulic lift control systems. The operation of each system is described below :

TWO LEVER CONTROLS

POSITION CONTROL OPERATION

The two lever control system is shown in Figure **35**. Position control is obtained by placing the draft control lever all the way forward and then moving the position control lever to position the equipment as desired. The front (position) lever is used to set the desired working height or depth.

DRAFT CONTROL OPERATION

Draft control is obtained by placing the position control lever in the forward position. Use the draft control to adjust the draft setting (the lift system will automatically maintain the selected draft as described above).

OPERATING IN BOTH POSITION AND DRAFT CONTROL

The position control may be used together with the draft control as follows :

1. Set the position control lever at the maximum desired implement depth. The hydraulic system will not lower the implement below the preselected depth. (This will also prevent “diving” which may be encountered with light equipment, such as a rear blade, when grading or backfilling.)

2. Adjust the draft control lever for the maximum draft load (pull) desired.

The hydraulic lift system will now provide normal draft response within the range set by the position control. This adjustment provides more uniform depth while maintaining an even pull in widely varying soil conditions.

WARNING : Make sure the area is clear of people before lowering equipment.

HYDRAULIC LIFT ROCKER

The hydraulic lift rocker, Figure **36**, has two holes for attaching the upper link, Attach the link in the lower hole for light draft loads (cultivating) and in the top hole for heavier draft loads (plowing) shouwn.

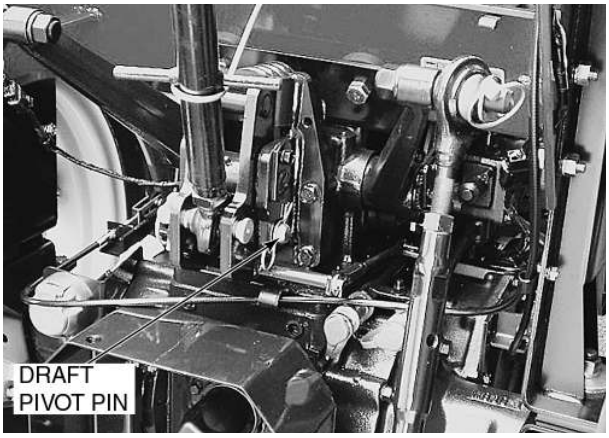

Figure 36 - Hydraulic Lift Rocker

NOTE : Fix the draft-arm with pin, Figure **36**, when operating equipment without draft control.

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FLOW CONTROL VALVE

The flow control valve, Figure **37**, provides an adjustment to regulate the flow of oil from the lift cylinder, thus slowing or increasing the rate of drop of the lower links.
To adjust rate of flow, either turn the flow control valve clockwise to decrease the rate of drop or counterclockwise to increase the rate of drop. The flow control valve must be opened before hydraulic lift control will function.

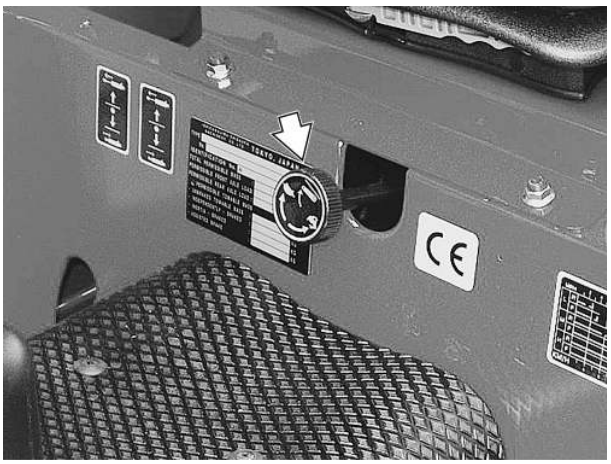

Figure 37 - Flow Control Valve

HYDRAULIC MANIFOLD BLOCK/DIVERTER

The hydraulic Manifold Block is provided to supply hydraulic oil to equipment such as a front loader, dozer blade, etc. Location of the Block is shown in Figure **38**.
To operate auxiliary equipment, remove the plugs from the manifold block and connect the feed hose to the outlet port, Figure **38** and the return hose to the inlet port.

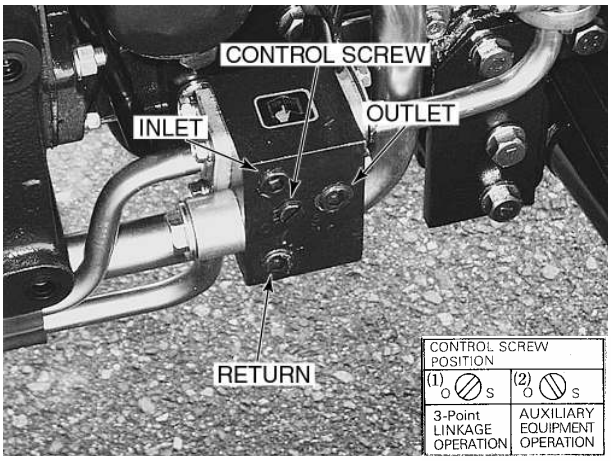

Figure 38 - Hydraulic Manifold Block

IMPORTANT : In order to operate auxiliary equipment, the control screw must be turned to the position shown at (2). With a front remote valve installed, it is **not** required to turn the control screw to the position shown at (1) to operate the three point linkage. When it is required to operate the three point linkage **only**, the screw must be turned to the position shown at (1).

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REAR REMOTE CONTROL VALVES (Optional)

HST - REAR remote control valve

Your tractor can be equipped with one remote control valve. The remote control lever is located on the right-hand control quadrant, and inside, shown in Figure **39**.

To operate the remote valve, pull the inside remote control lever rearward to extend the cylinder. Push the remote control lever forward to retract the cylinder. Release the control lever to stop the cylinder in any position.

The rear remote are standard with 3/8” quick couplers, in Figure **40**.

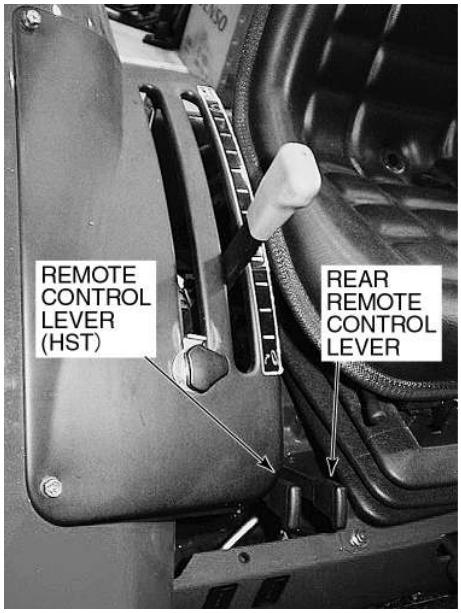

Figure 39 - Rear remote Control Valve (Optional)

HST - Single acting remote control valve

To operate the remote control valve (with detent), pull the outside remote control lever rearward to extend the cylinder.

Push the outer remote control lever forward to retract the cylinder. The Release the control lever to stop the cylinder in any position before it is fully extended, the lever automatically returns to the Neutral and the position of cylinder is held (detent).

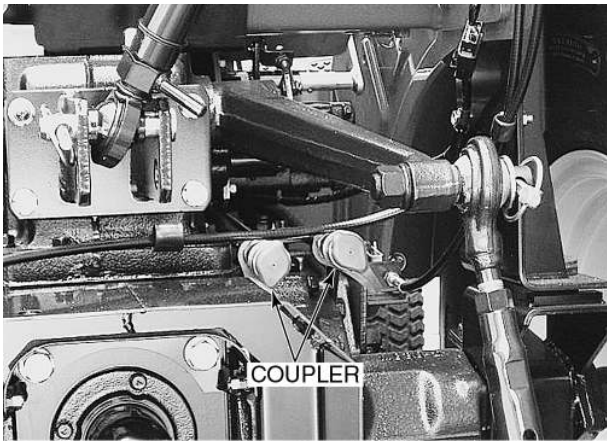

Figure 40 - Hydraulic Couplings

9×3 - Rear remote control valve

Your tractor can be equipped with single/
double acting remote control valve.

The remote valve may be changed with control screw turning on the valve.

The remote control lever is located on the right-hand quadrant,shown in Figure **39**.

To operate the remote valve, pull the remote control lever rearward to extend the cylinder.

Push the remote control lever forward to retract the cylinder. Release the control lever to stop the cylinder in any position.

In the case of single acting remote valve, release the control lever to stop the cylinder in any position, before it is fully extended, the lever automatically returns to the Neutral.

The rear remote are standard with 3/8” quick couplers, in Figure **40**.

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TWO-SPOOL CONTROL VALVE (OPTIONAL)

The optional two-spool control valve is mounted on the right side of the clutch housing beside the engine hood. This valve is used mainly for front end loader operation, but may also be used to operate other front-mounted implements.

With loader fitted, pull the control lever rearwards to the loader arms and push forwards to lower them. Moving the lever to the right will “dump” the bucket to the dig position.

NOTE : When the control lever is pushed right to the second position, a regenerative feature is activated and the exhaust oil from one end of the cylinder is transferred to the other end of the cylinder. When this feature is used, the cylinder will operate at a faster rate. This regenerative feature cannot be used with single-acting cylinders.

Push the control lever forward or pull it sideways to the left to retract the cylinder. Release the control lever to stop the cylinder in any position before it is fully extended. The lever automatically returns to Neutral. Fully forward past the detent position is a “FLOAT” position which allows a cylinder to extend or retract freely. The simultaneous operation of two services may achieved by moving the lever diagonally.

WARNING : Before disconnecting cylinders or equipment, make certain that the implement or equipment is supported securely.

WARNING : Remote couplers must be properly mounted and securely fastened to tractor mounting bracket for proper function of safety disconnect feature.

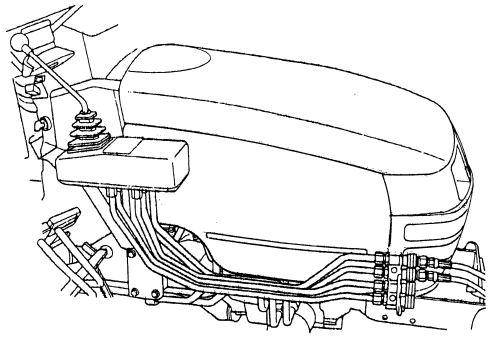
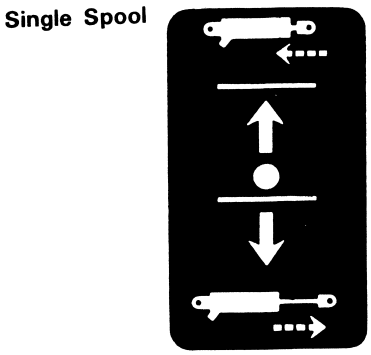


Figure 41 - Two- spool Control Valve (Optional)



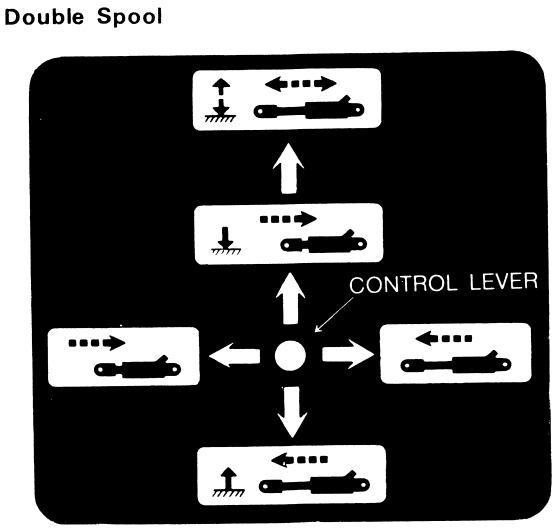


Figure 42 - Operating Two-spool Control Valve

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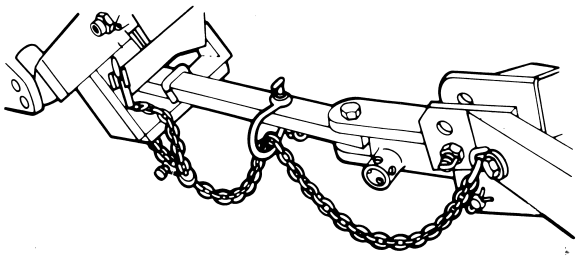
DRIVING THE TRACTOR

WARNING : Observe the following precautions when driving the tractor.

- Watch where you are going—especially at row ends, on roads, and around trees.
- Keep the tractor in gear when going down hill. Use a low gear to maintain control with minimum braking.
- If the tractor is stuck, back out to prevent upsetting the unit.
- Always use the drawbar for pull-type work. Do not pull from any other part of the tractor, especially ROPS since it may tip backward.
- Keep the lights adjusted so they do not blind the operator of an oncoming vehicle.
- Engage the clutch slowly when driving out of a ditch, gully, or up a steep hillside. Disengage the clutch promptly should the front wheels rise off the ground.
- Reduce speed before turning quickly or applying brakes. Lock the brake pedals together when traveling at high speeds. Brake both wheels simultaneously when making an emergency stop.
- Never apply the differential lock when turning.
- Use extreme caution and avoid hard applications of the tractor brakes when pulling heavy towed loads at road speeds.
- Always sit in the driver's seat while starting or driving the tractor.
- Any towed vehicle whose total weight exceeds that of the towing tractor must be equipped with brakes for safe operation.
- Always check overhead clearance, especially when transporting the tractor.

IMPORTANT : When transporting on the highway, it is recommended that a safety chain with tensile strength equal to the gross weight of the implement be connected between the tractor and the towed implement. This will control the implement in the event the hitch pin is lost.



NOTE : Attaching hardware will need to be procured locally. Check implement assembly or operators manual for attaching hardware specifications, such as bolt size and grade, chain strength, washers, lock-washer, nuts, etc.

After attaching the safety chain, make a trial run by driving the tractor to the right and to the left for a short distance to check the safety chain adjustment.
If necessary, readjust to eliminate tight or loose chain. Safety chains and suitable hardware are available from your SHIBAURA Tractor Dealer

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WHEEL TREAD SETTINGS

NOTE : Tread settings are measured from center of tire to center of tire.

NOTE: Torque front wheel bolts;M12 to 92-116 N-m

Front Wheel Settings

Front Tire Type	Tread Setting	Note
Agricultural 7-14	1100 mm	Not Adjustable
Agricultural 6-14	1100 mm	Not Adjustable
Turf 25x8.50-14	1150 mm	Not Adjustable

IMPORTANT : Never attempt to widen the tread setting by reversing front wheels on a four-wheel drive system.

Rear Wheel Settings

Rear Tire Type	Tread Setting	Note
Agricultural 11.2-24	1070 mm	Adjustable by switching Disc in or disc out
Agricultural 9.5-24	1070 mm	Adjustable by switching Disc in or disc out
Turf 13.6-16	1120 mm	Not Adjustable

NOTE: Torque rear wheel bolts;M16 to 206-255 N-m

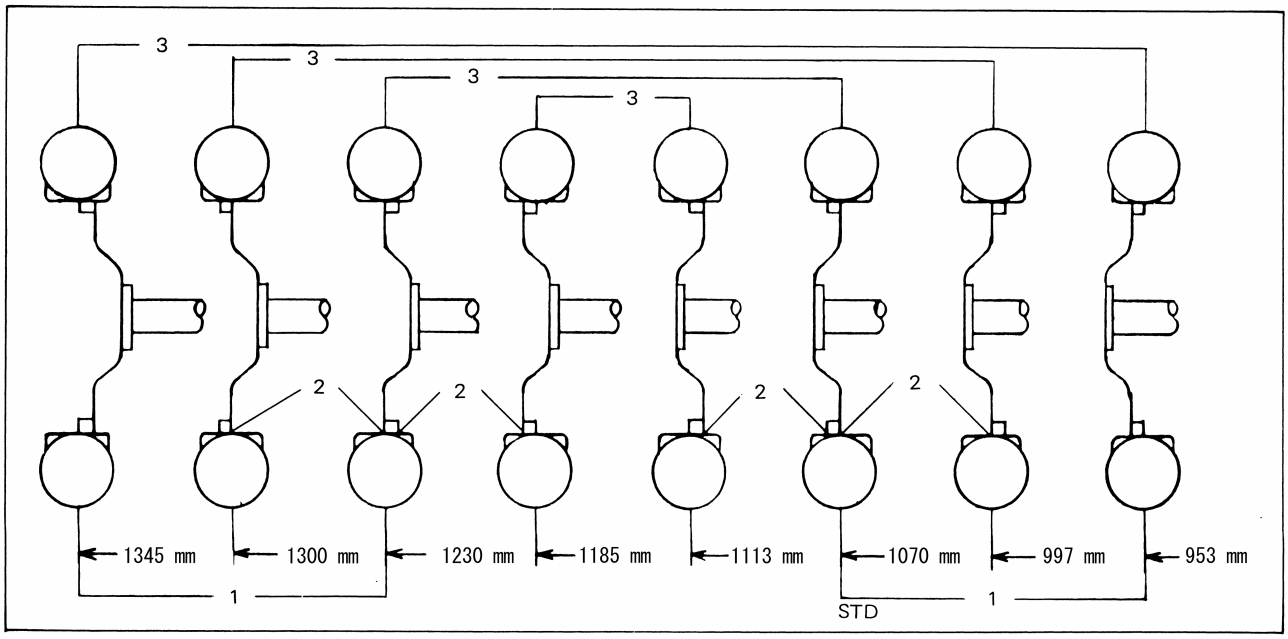

Figure 43 – Rear Wheel Tread Settings (Tire;AG11.2-24 or 9.5-24)

1. Reposition Rim On Disc
2. Rim Repositioned On Opposite Disc
3. Inter-Changing Rear Wheel Assemblies Give These Combinations

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TRACTOR WEIGHTING

To obtain sufficient traction for maximum performance in heavy draft operations and to counter-balance rear-mounted equipment, weight should be added to the tractor in the form of liquid ballast, cast iron weights, as shown in Figure **44** and **45**, or combination of both. Only enough weight should be added to provide good traction and stability.
Adding more weight than is needed results in unnecessary soil compaction and increased rolling resistance and thus higher fuel consumption.

NOTE : When adding weight to the tractor, tire pressure may needed to be increased. Refer to the Tire Inflation Pressure data found on the next page.

WEIGHTING FOR STABILITY

Front end ballast may be required for stability and steering control when weight is transferred from the front wheels to the rear wheels as the implement is raised by the tractor 3-point hitch.

As a general guide :

Ballast the tractor(less implement) so that approximately 1/3 of the tractor weight is on the front wheels. For optimum traction, tractor equipped with FWD should be ballasted so 40-45% of machine weight is on front wheels.

When a mounted implement is raised to the transport position, the front wheel reaction should be at least 20% of tractor weight.

Add additional front end ballast as required for stability during operation and transport. Tractor front end ballast may not always maintain satisfactory stability if the tractor is operated at high speed on rough terrain. Reduce tractor speed and exercise caution under these conditions.

When using front mounted equipment, add weight to the rear axle to maintain good traction and stability.
Front-mounted equipment varies in weight. Refer to equipment manual for ballsting.

WARNING : If proper stability cannot be obtained within the weighting limitations below, reduce the load on the tractor until stability is obtained.

WEIGHTING LIMITATIONS

The weighting limitations that follow are limitations only ; they do not imply that the tractor should be weighted to obtain the weights shown. Use only enough weight to obtain good performance, and do not exceed the tire load capacities.

CAST IRON WEIGHTS(OPTIONAL)

Cast iron weights are a factory installed option or are available as accessories from your SHIBAURA Tractor Dealer. Weights can be mounted on the front end of the tractor, and on the rear wheels with AG tire only as shown in Figure **44** and **45**.

Front End Weights

Location	Weight(s)
Front End	Maximum of 3 Weights per tractor @ 30 kg each 90 kg total

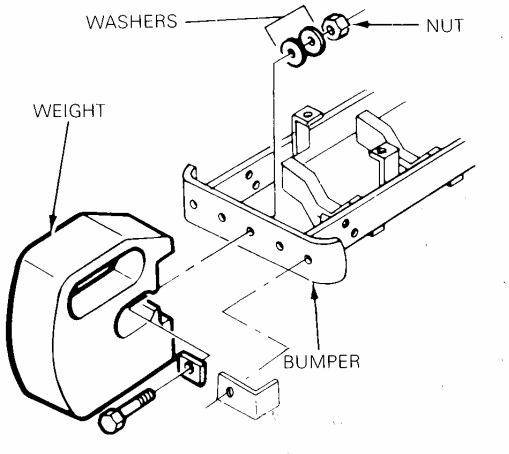

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Figure 44 - Front End Weights

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FRONT TIRE INFLATION PRESSURES		
Tire Type	**Tire Size**	**Inflation Pressure**
Agricultural	7-14, 4PR, R1 or 6-14, 4PR, R1	60-140 kPa
Turf	25x8.50-14, 4PR, R3	60-140 kPa
REAR TIRE INFLATION PRESSURES		
Agricultural	11.2-24, 4PR, R1 or 9.5-24, 4PR, R1	80-120 kPa
Turf	13.6-16, 4PR, R3	80-120 kPa

NOTE : Do not under-inflate or over-inflate tires. Do not exceed maximum inflation pressure listed.

Rear Wheel Weights

Location	Weight(s)
Rear wheel with AG tire only	Maximum of 4 weights per tractor @ 30 kg each 120 kg total

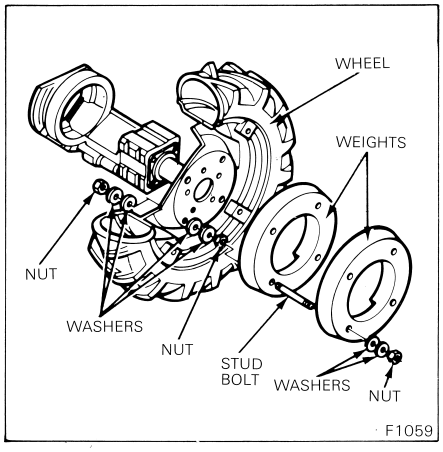

Figure 45 - Rear wheel weights

TIRE PRESSURE

Tire pressure must be considered when adding weights, implements or attachments to the tractor or damage to the tractor may occur.

The chart below outlines type inflation pressures.

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LIQUID BALLAST(OPTIONAL)

It is a common practice to add weight to the tractor by filling the rear tires with liquid. A calcium chloride ($CaCl_2$) and water solution is recommended due to its low freezing point and greater density (weight per gallon) than water.

Never exceed the total recommended weight for the tractor. Because special equipment is required to fill the tires, we recommend that you consult your SHIBAURA Tractor Dealer.

Tires should never be filled beyond 75% (tire filled to the valve stem when valve stem is at its highest point at the top of the wheel.)

NOTE : Rear wheel weights can be used with liquid ballast for only agricultural Tire.

NOTE : Hardware to mount weights should be obtained locally. Use standard “1/2” cap screw instead of the stud bolts.

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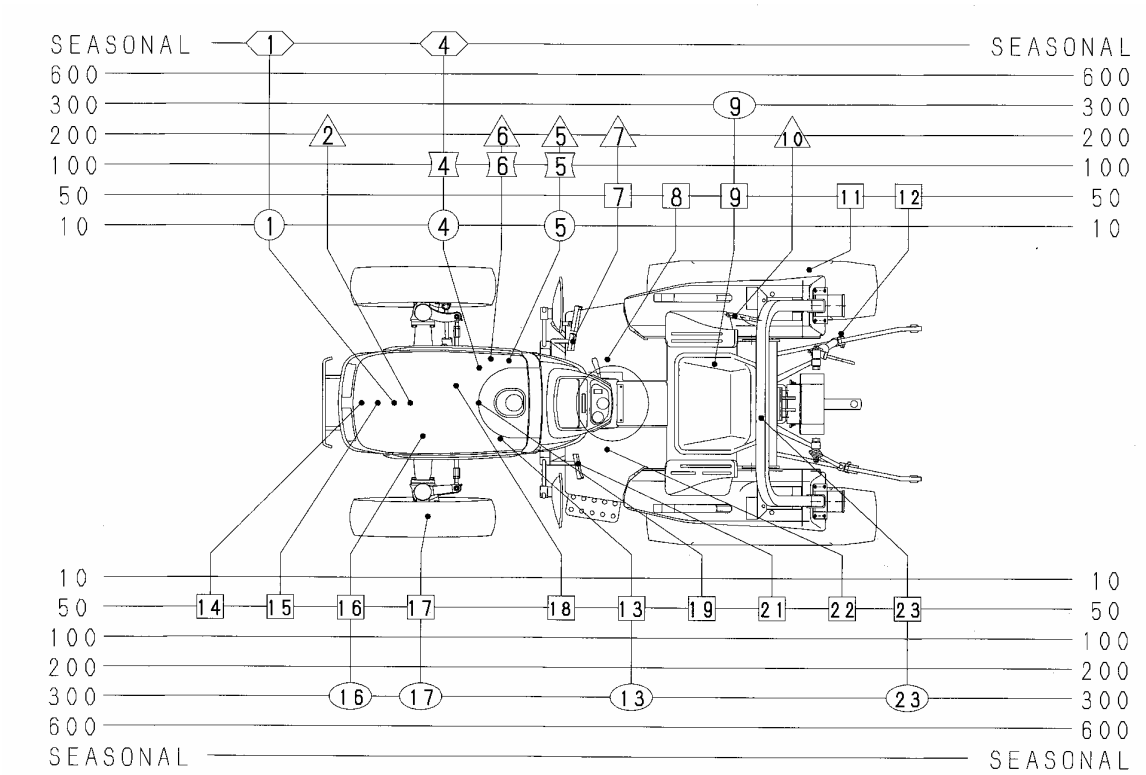
LUBRICATION AND MAINTENANCE CHART — SHIBAURA ST333 • ST329 FOUR-WHEEL DRIVE



NO.	LUBRICATION AND MAINTENANCE ITEMS	CHECK	CLEAN	LUBE	CHANGE	ADJUST	SERVICE INTERVALS
1	Radiator Coolant	x					Every 10 Hours or Daily
4	Air Cleaner	x					
5	Engine Oil Level	x					
14	Battery	x					
9	Hydraulic Filter				x		First 50 Houres
13	H.S.T Cartridge Filter				x		
11	Tires/Wheel Bolt Torque	x					
16	Front Axle Oil Level	x					Every 50 Hours
17	Final Reduction Gear Cases Oil Level	x					
23	Transmission Oil Level	x					
	Lubrication Fittings						
7	Brake Pedal			x			
8	H.S.T Foot Pedal Shaft			x			
12	3-Point Linkage			x			
15	Pivot Shaft			x			
18	Power Steering Cylinder			x			
19	Drive Shaft Cover			x			
21	Clutch Pedal			x		x	
22	Pedal Shaft			x			

NO.	LUBRICATION AND MAINTENANCE ITEMS	CHECK	CLEAN	LUBE	CHANGE	ADJUST	SERVICE INTERVALS
5	Engine Oil				x		Every 100 Hours
4	Air Cleaner Element		x				
6	Fuel Filter		x				
2	Fan Belt	x				x	Every 200 Hours
5	Engine Oil Filter				x		
6	Fuel Filter Element				x		
7	Brakes					x	
10	Handbrake					x	
11	Wheel Bolt Torque					x	
9	Hydraulic Filter				x		Every 300 Hours
13	H.S.T Cartridge Filter				x		
23	Transmission and Rear Axle Oil				x		
16	Front Axle Oil				x		
17	Final Reduction Gear Cases Oil				x		
1	Radiator Coolant				x		Seasonal
4	Air Cleaner Element				x		

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FUEL AND LUBRICANTS

DIESEL FUEL

Type of fuel to use :

When operating in temperatures above －6.7℃ (20° F), use diesel fuel oil No. 2 - D with a minimum cetane rating of 40.
When operating in temperatures below －6.7℃ (20° F), use diesel fuel oil No. 1 - D with a minimum cetane rating of 40.
Low ambient temperatures as well as engine operation at high altitudes may require use of fuels with higher cetane ratings.
Fuel represents a major portion of your tractor operating costs ; therefore, it is important to use it efficiently. Do not let low price tempt you to use inferior diesel fuel. The initial savings is a false economy when you consider the damage poor fuel can do to your tractor fuel system.

FUEL USAGE SAFETY

Fuel is becoming very expensive and scarce. As a result, many of our customers are trying new fuels or blends to reduce costs and conserve energy.

Today's new fuels or blends are frequently more volatile and there is a need to handle them carefully. Furthermore, some of the blends are dangerous and should not be used at all.

- **Under no circumstances** should gasoline, alcohol or gasohol be added to diesel fuel. These combinations can create an increased fire hazard.
- Never remove the Fuel Cap or refuel the tractor when the engine is running or is hot.
- Don't smoke while refueling or while anywhere near fuel.
- When filling the tank, maintain control of the nozzle.
- Don't fill the fuel tank to capacity...allow room for expansion.
- Wipe up spills immediately
- Always tighten the fuel tank cap securely.
- If the original equipment fuel tank cap is lost, always replace it with a SHIBAURA approved cap. A will-fit cap may not be safe.
- Keep equipment properly maintained.
- Keep equipment clean － free of trash and oil.
- Don't drive equipment near open fires.
- Never use gasoline for cleaning parts.

NOTE : Use only fuel designated for diesel engines. Some heating fuels contain harmful chemicals that, if used, can seriously affect tractor efficiency and performance.
Refer to the "Engine Oil Recommendations" on Page **35, 36** for additional fuel information.

WARNING : Fuel oil in the injection system is under high pressure and can penetrate the skin.
Unqualified persons should not remove or attempt to adjust a pump injector, nozzle or any part of the fuel injection system.
DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
If any fluid is injected into the skin, obtain medical attention immediately or gangrene may result.
Failure to follow these instructions can result in serious injury.

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REFUELING THE TRACTOR

The fuel filler cap is located at the rear of the tractor hood. Before removing the cap, wipe all dust and dirt from around the cap to prevent debris from falling into the tank while filling.

Use an approved fuel container and check the inside of the container periodically for cleanliness. Fuel tank capacity is 30 liters.

NOTE : The fuel cap is a vented-type. Use only an approved SHIBAURA replacement cap to prevent fuel system-related problem.

If there is no filter on the outlet of the storage tank, filter the fuel through a 100-mesh screen or finer when filling the tractor fuel tank. Keep the tractor tank as full as possible to minimize condensation.

NOTE : It is a good practice to fill the tractor fuel tank with fuel at the end of each day, as this will reduce overnight condensation. Also, any fuel which may have been spilled should be cleaned up.

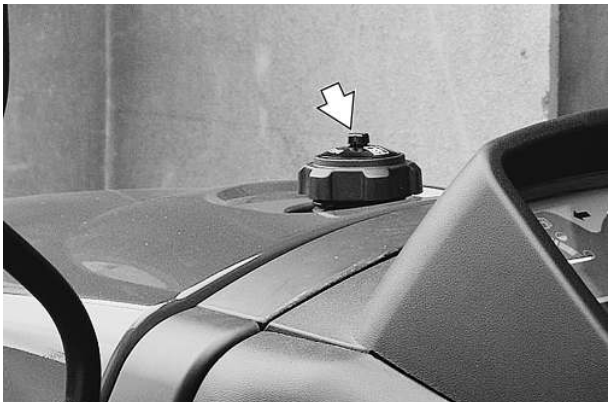

Figure 46 - Filler Cap, fuel

HOOD LATCH

As viewed from the front of the tractor.

1. To raise the hood, move the latch lever ①, to the right, or the hood may be raised up slightly. And then move the safety catch ② upward with inserting your hand below the hood. Figure **46**. Lift the hood to the raised position fully.
   A support link, Figure **48**, will automatically hold the hood in the fully raised position.
2. To lower the hood, lift up on the hood slightly and pull the support link towards you, so that the support pin is no longer in the catch position. Lower the hood until it is retained by the latch mechanism.

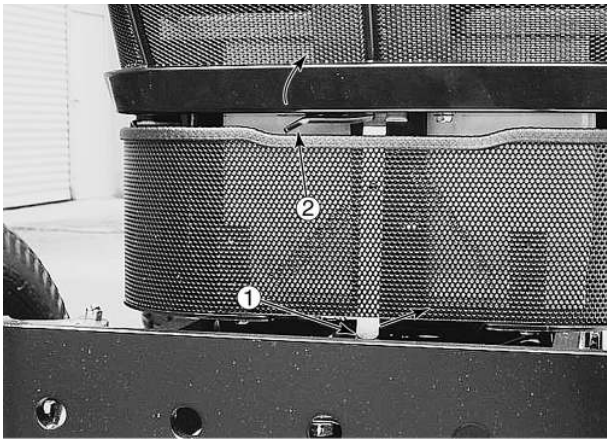

Figure 47 - Hood Latch

Figure 48 - Support Link, Hood

IMPORTANT : Do not attempt to lower the hood without moving the support link. Attempting to force the hood down can result in bending or breaking of the hood and support linkage.

NOTE : Keep the latch mechanism free of the dirt and the debris so that the latch assembly will op-

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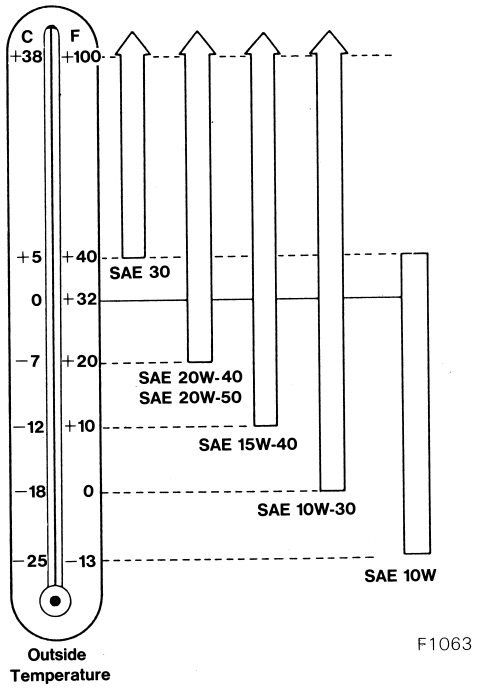
erate properly.

LUBRICANTS

Type of lubricant to use,
Transmission, Rear Axle, Final
Reduction, and Hydraulic System ·····SAE 80
Hydraulic Transmission Oil ·····ISO VG 46
Front Axle, Final Reduction Oil·····SAE 80
Engine Crankcase ·····Service Grade CD
SAE 10W30, for year around use
or
SAE 20W for use -5℃－25℃
SAE 30 for use 10℃－35℃

All Lubrication Fittings ·····NLG 1 GRADE 2 EP
GREASE WITH LTIUM
SOAP

NOTE : Use the following chart to determine which SAE Grade engine oil to use :
In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable, such as the use of SAE 5W (CC) in extremely cold temperatures or the use of SAE 40 (CD) or SAE 50 (CD) in extremely high temperatures.



IMPORTANT : Engine crankcase oil drain intervals should be adjusted downward when diesel fuel sulfur content is over 0.5%.
Consult your dealer for details of Engine Crank case Oil usage.

FUEL AND LUBRICANT SERVICE PROCEDURES

ENGINE

Checking Oil Level : Check the engine oil level daily or every 10 hours.

1. With the tractor standing level, and after the engine has been stopped for a period of time, check the oil level with the dipstick, Figure **49**.

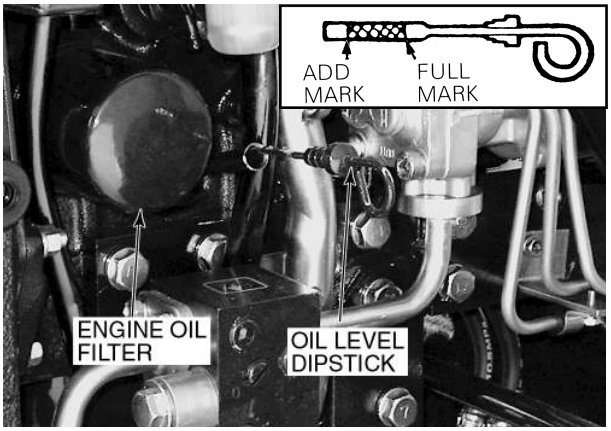


Figure 49 - Engine Oil Level Dipstick and Oil Filter

2. If the oil level is low, remove the filler cap, Figure **50**, and add oil to the engine through the filler hole to bring the oil level between the marks on the dipstick. Be careful not to overfill.

3. Install the oil filler cap.

Changing Oil and Filter : Change the engine oil every 100 hours and the engine oil filter every 200 hours.

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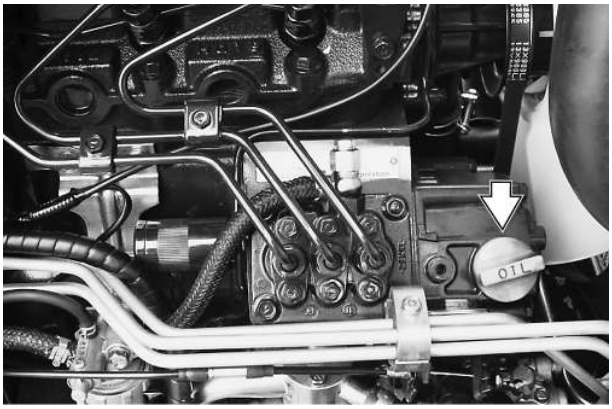

Figure 50 - Engine Oil Filler Cap

NOTE : Oil intervals should be adjusted according to sulfur-content of diesel fuel. The use of fuel with a sulfur content over 1.3% is not recommended.

Sulfur Content, %	Oil Change Interval
Below 0.5	Normal
0.5 – 1.0	1/2 Normal
Over 1.0	1/4 Normal

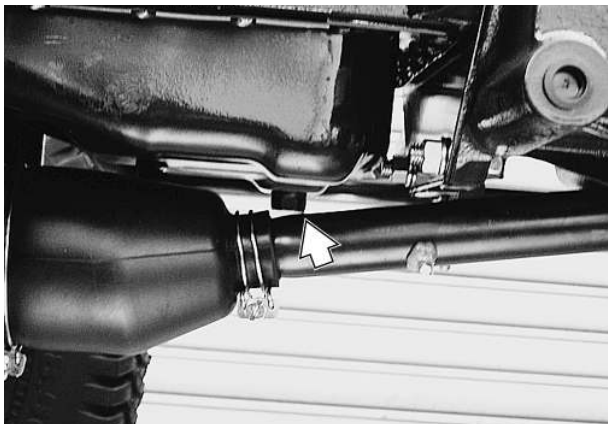

Figure 51 - Engine Oil Drain Plug

NOTE : More frequent engine oil and filter changes are recommended if the tractor is operated for extended periods of time at maximum rated power and speed. Under such conditions, or other types of continued severe operating conditions, the engine oil and the engine oil filter should be changed at 70 hours intervals.

1. With the engine off, but at normal operating temperature, drain and discard the engine oil by removing the drain plug, Figure **51**. Reinstall the plug after the oil has drained and discard the oil.

2. Unscrew the oil filter, Figure **49**, catching the used oil in a suitable container placed below the filter. Discard the filter.

3. Coat the gasket on the new filter with a film of oil. Screw the filter into place until the gasket contacts its mating surface, then turn the filter approximately 3/4 of a turn by hand. Do not over-tighten.

4. Add new oil of the type specified, page **35**. Start the engine and check the filter for leaks after adding the oil. Be sure the oil is at the proper level.

FUEL FILTER

Draining the Filter : Drain the diesel fuel filter when water is visible in the sediment bowl.

Cleaning the Fuel Filter : Clean the fuel filter every 100 hours by rinsing in a container of clean diesel fuel.

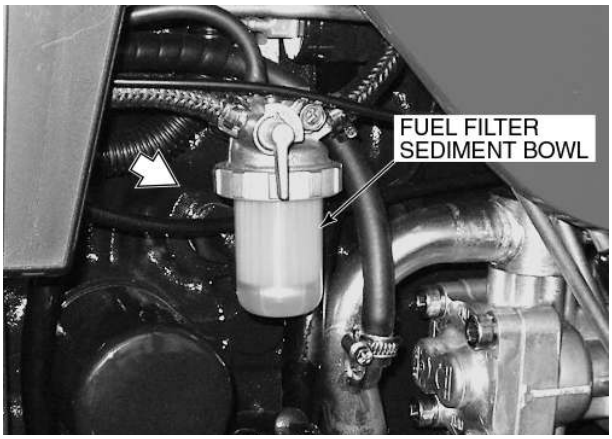

Figure 52 - Fuel Filter

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1. Be sure there is adequate fuel in the fuel tank, close the fuel shut-off valve, then remove the fuel sediment bowl, Figure **52**.

2. Open the fuel shut-off valve until all water has been removed and only fuel flows from the filter.

3. Install the fuel sediment bowl and bleed the system as outlined under “Bleeding the Fuel System.”

Changing the Fuel Filter : Change the diesel fuel filter every 200 hours.

1. Close the shut-off valve, Figure **52**.

2. Remove the sediment bowl, Figure **52**.

3. Open the fuel shut-off valve to drain any remaining water from the tank.

4. Discard the old element and install a new element.

5. Install and securely tighten the sediment bowl.

6. Open the fuel shut-off valve so fuel will flow to the filter.

7. Bleed the fuel filter and injection pump as covered under “Bleeding the Fuel System.”

BLEEDING THE FUEL SYSTEM

Bleed the fuel system after it has been drained :

- If a new filter element has been installed,
- If the tractor has run out of fuel,
- If the lines leading to or from the filter have been disconnected,
- If the injection pump has been removed and reinstalled.

WARNING : Fuel oil in the injection system is under high pressure and can penetrate the skin.
Unqualified persons should not remove or attempt to adjust a pump injector, nozzle or any part of the fuel injection system.
DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks. If any fluid is injected into the skin, obtain medical attention immediately or gangrene may result.
Failure to follow these instructions can result in serious injury.

Bleed the fuel system as follow :

1. Be sure there is adequate fuel in the fuel tank.

2. Open the fuel shut-off valve.

3. Open the bleed screw, Figure **53** and let the air bubbles escape from the strainer, then close the bleed screw.

4. Push the hand throttle to the high speed position. Turn the engine over for a few seconds to bleed the high pressure fuel tube.

Figure 53 - Fuel System Bleed Screw

Injector Lines : Bleed the injector lines if the tractor has run out of fuel, if new injectors have been installed, or if the injection pump has been removed for service repairs.

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5. Loosen the injector line fittings at the injectors.

6. Move the hand throttle control lever to its wide open position.

7. Crank the engine until air-free fuel flows from each connection, then tighten the fittings to 24 -29 Nm.

IMPORTANT : Do not crank the engine continuously for more than 30 seconds. Doing so may cause starting motor failure. If air is not purged from the system, repeat the procedure.

AIR CLEANER

Checking element : Check the air cleaner primary element for cleanliness, daily or every 10 hours, Figure **54**.

Clean the air cleaner primary (outer) element every 100 hours of service.
The air cleaner contains two elements: an outer primary element and an inner safety element. To remove the primary element, push in on the end cap and rotate counterclockwise. Remove the end cap from the air cleaner body to expose the primary element, Figure **54**.

1. Pull the primary element, Figure **54** , from the canister. Clean any loose dirt from the canister and inspect the end of the canister for dirt which may prevent the new element from sealing properly.

2. Clean the primary element using low air pressure (200 kPa or less). Blow dust from the inside to the outside of the element (opposite to normal air flow through element).

   IMPORTANT : Be careful not to rupture the filter element. Maintain a reasonable distance between the air nozzle and the filter element when directing air up and down the clean air side of the element pleats.

3. after cleaning the element, check the inner diameter seals for damage. If damage is present, replace the primary element.

4. Re-install the primary element by inserting it into the canister and pushing on the end of the element until it is seated against the canister.

   NOTE: Place a light inside the element to check for paper leaks or for bonding of the paper to the end plate. If any leaks are found, replace the element.

5. Place the end cap onto the canister body, push in on end cap, and rotate clockwise. Make sure the end cap is locked in place and not loose.

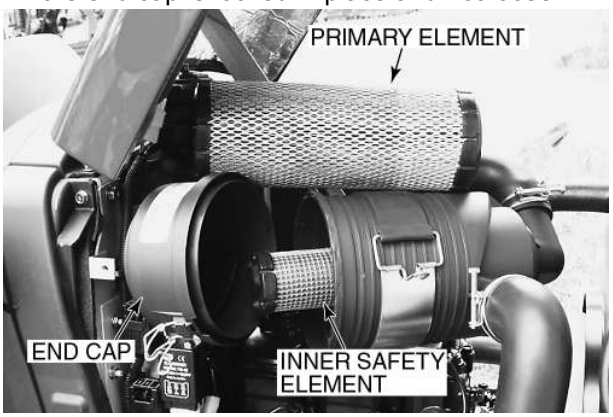

Figure 54 - Air Cleaner—Disassembled

IMPORTANT : Never tap the element with hard objects or against a hand surface. This may dent or break the element end cap seals.

IMPORTANT : Failure to obtain a good seal between elements and the container may cause major engine damage.

Change the element:
At the start of the each season, change the air cleaner primary (outer) element.

NOTE: For maximum engine protection and air cleaner service life, install a new inner safety element, Figure **54**, every third primary element change or after every 1000 hours of operation, whichever comes first.

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TRANSMISSION, REAR AXLE AND HYDRAULIC SYSTEM

Checking Oil Level : Check the oil level every 50 hours.

1. With the tractor standing level and the engine off, check the oil level with the dipstick, Figure **55**.

2. The oil is at the correct level when the oil level is between the mark and the lower end of the dipstick. If low, add new oil of the type specified, page **35**.
   The filler plug is shown in Figure **55**.
   Do not fill beyond the mark on the stick, as the transmission will be overfilled.

3. Install the filler plug and dipstick.

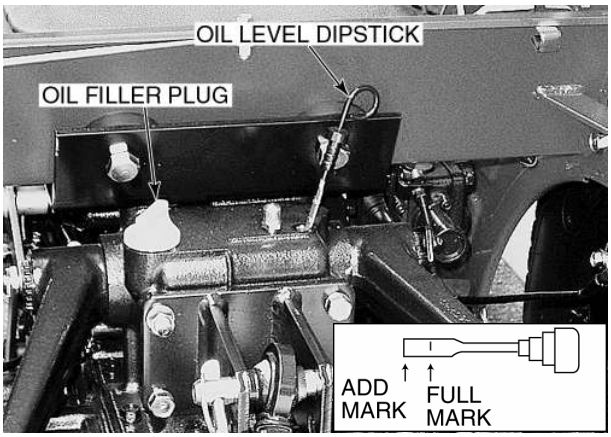

Figure 55 - Transmission,Rear Axle and Hydraulic System Oil Level Dipstick/Filler Plug

Changing Oil : Change the oil every 300 hours.

1. With the oil at normal operating temperature, drain and discard the oil by removing the transmission, rear axle center housing drain plugs, Figure **56.** Reinstall the plugs after the oil has drained. Discard the oil.

2. Check and if necessary clean or replace the hydraulic oil filter.

3. Remove the filler plug and dipstick, Figure **55**, and fill with new oil of the type specified, page **35**.

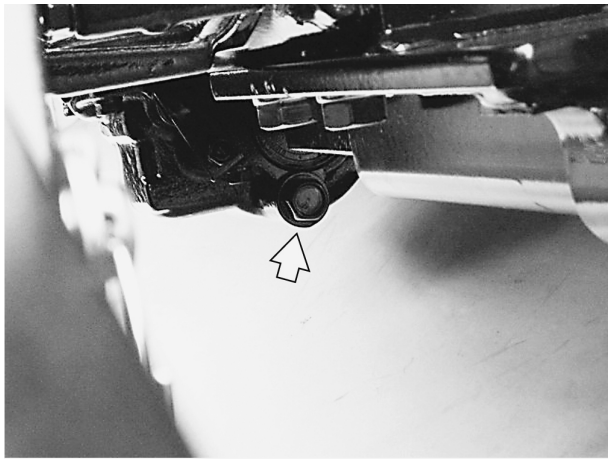

Figure 56 - Transmission,Rear Axle Center Housing - Oil Drain Plugs

4. The oil reservoir is filled to the correct level when the oil level is between the mark and the lower end off the dipstick. Do not fill beyond the mark on the stick, as the oil reservoir will be overfilled.

5. Install the dipstick and filler plug.

IMPORTANT : Because there is a common sump for the transmission, rear axle and hydraulic system, special attention is necessary in keeping the oil clean.

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HYDRAULIC SYSTEM OIL FILTER

The hydraulic system is equipped with a spin-on type oil filter, Figure **57**. Replace the filter after the first 50 hours of operation and every 300 hours thereafter following the procedure below.

Figure 57 - Hydraulic Oil Filter

1. Unscrew the oil filter and discard.

2. Coat the gasket on the new filter with a film of oil. Screw the filter into place until the gasket contacts the sealing surface, then tighten the filter approximate 3/4 of a turn by hand. Do not over tighten

3. Start the engine and check the hydraulic oil filter for leaks.

4. Stop the engine and check the hydraulic oil level. Replenish if necessary.

H.S.T. SYSTEM OIL FILTER

The H.S.T. system is provided with an additional cartridge oil filter, Figure **58.** Change the cartridge oil filter after the first 50 hours of operation and every 300 hours thereafter.

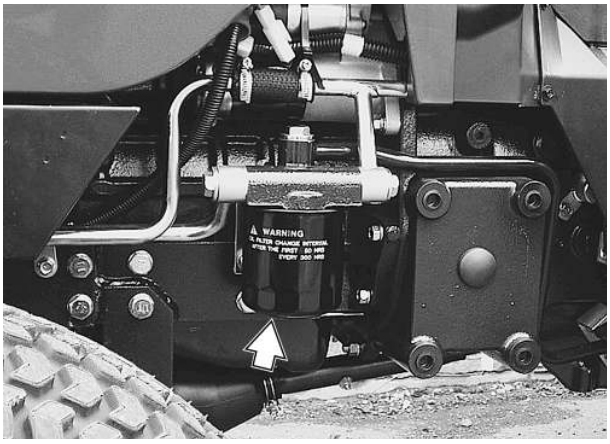

Figure 58 - Hydraulic Oil Filter - H.S.T

LUBRICATION FITTINGS

The following lubrication points(refer to the Lubrication Chart, page **32**) require the application of a good quality grease every 50 hours. In extremely dirty conditions, lubrication should be more often. Refer to page **35** for the type of grease that should be used.

- Steering Linkage
- Front Axle Pivot
- Pedal shaft, Clutch and Brake Pedals
- 3-point linkage
- Front-wheel drive shaft
- H.S.T. foot pedal shaft(if equipped)
- Power Steering Cylinder

1. Wipe away all old grease and dirt from the lubrication fittings to prevent dirt or foreign material from entering the fittings when new grease is applied.

2. Use a high pressure grease gun to force in the new grease until clean grease oozes from the assembly being lubricated.

3. Wipe away any excess grease.

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GENERAL MAINTENANCE

COOLING SYSTEM

The cooling system in your SHIBAURA Tractor has been filled with one year lift antifreeze.

To obtain maximum efficiency and service life from the engine, it must operate at the correct temperature. This is dependent on the cooling system. The system should be kept filled with a 50/50 solution of permanent antifreeze and clear water.

Checking Coolant Level : Check the coolant level between the Low and the Full marks on the coolant reservoir, Figure **59**, daily or every 10 hours. This check should be made when the engine is stopped.

It is not necessary to open the radiator cap when checking the coolant level. But when changing the coolant, follow the next WARNING to open the radiator cap.

WARNING : The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always cover the cap with a thick cloth and turn the cap slowly counterclockwise to the first stop. Allow all pressure to escape before removing the cap completely.

Figure 59 - Radiator Coolant Reservoir

If the cooling system already contains antifreeze, add only antifreeze solution of the correct water / antifreeze mixture.
Plain water will dilute the solution and weaken its protection.

IMPORTANT : The radiator is filled with non-amino type antifreeze. Alcohol-type antifreeze is not recommended. Do not mix alcohol-type solution with permanent antifreeze.

Keep the radiator fins clear of chaff or dirt to allow free passage of air, Figure **61**.

Draining and Flushing the Cooling System :
Drain and flush the radiator and engine block every 12 months. Refill with a 50/50 mixture of long life antifreeze, or equivalent, and clear water.

To Drain the System :

1. Remove the radiator cap, Figure **61** on next page and open the drain valve on both the radiator and the engine block. The radiator drain valve is located on the bottom right side of the radiator. The engine block drain valve is located on the right side of the engine. See Figure **60**.

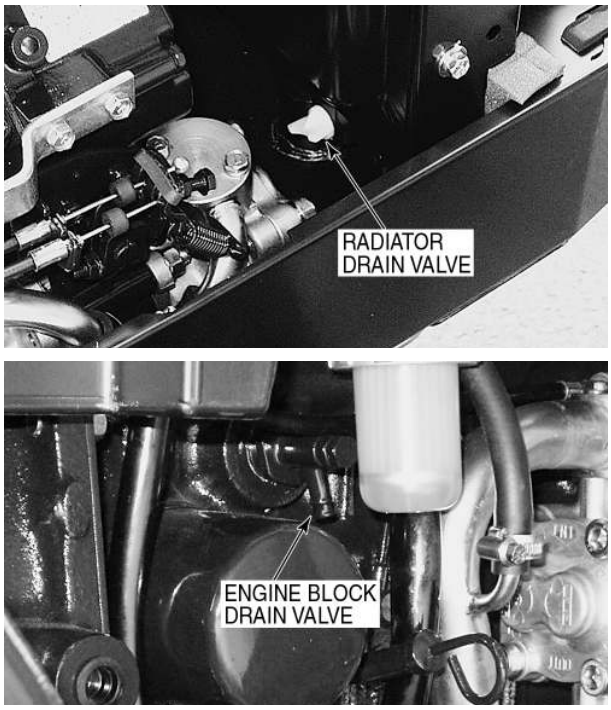

Figure 60 - Engine Block and Radiator Drain Valves

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2. After the coolant has drained, place a water hose in the radiator filler neck and run water through the system with the engine running.
   Make sure water is flowing from the drain valve before starting the engine. When the water flowing from the drain valve is free of discoloration and sediment, stop the engine and remove the hose. Allow all water to drain from the system through drain valves.

3. Close the drain valve and slowly refill the system with a 50/50 solution of permanent antifreeze and clear water. Fill until the coolant level is approximately 40 to 50 mm below the bottom of the filler neck. Do not fill beyond this level.

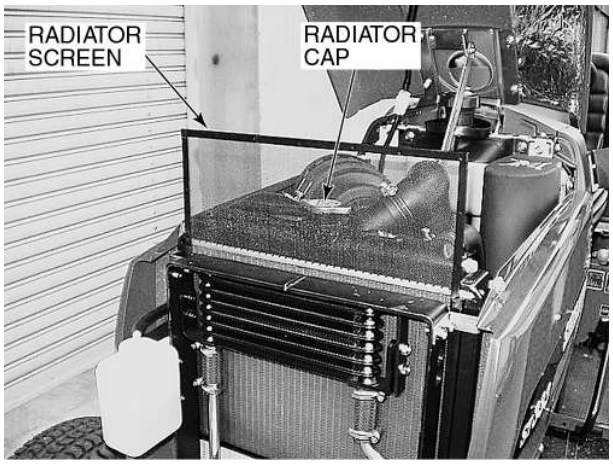

Figure 61 - Radiator Screen and Radiator cap

4. Clean the radiator cap and cap seal. Install the cap.

5. Clean the radiator front screen, Figure **61**.

6. Run the engine until normal operating temperature is reached, then stop the engine and recheck the coolant level. Add coolant as required.

IMPORTANT : Never run the engine when the cooling system is empty, and do not add cold water or cold antifreeze solution if the engine is hot.

Thermostat : The thermostat is located in the coolant outlet connection in the front of the cylinder head, Figure **62**.

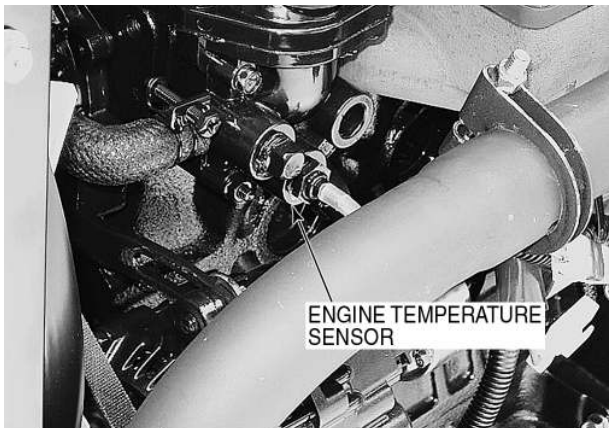

Figure 62 - Engine Temperature sensor

When the engine is cold, the thermostat, which is a head sensitive valve, shuts off the flow of coolant to the radiator, thus allowing rapid engine warm up.
A recirculating bypass allows the coolant to circulate within the engine whenever the thermostat shuts off flow to the radiator.

IMPORTANT : Do not remove the thermostat in an attempt to improve the cooling. This will cause the engine to run below normal working temperatures, resulting in excessive engine wear.

If it ever becomes necessary to install a new thermostat, it should be positioned in the recess of the water outlet connection so that the heat element(spring end)will be in the cylinder head of the engine.

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Fan Belt : A belt-driven fan at the front of the engine draws air through the fins of the radiator to cool the coolant in the radiator. A slipping fan belt will lower the efficiency of the fan, resulting in the engine running too hot. If the belt is too tight, it will shorten the alternator bearing life. A correctly tightened belt will deflect 5 to 10 mm when 5 kg thumb pressure is applied midway between the belt pulleys. Check the condition and tension of the fan belt every 200 hours. If the belt shows signs of cracking or fraying, install a new belt.

To Adjust Belt Tension :

1. Loosen the alternator mounting bolts, Figure **63**.

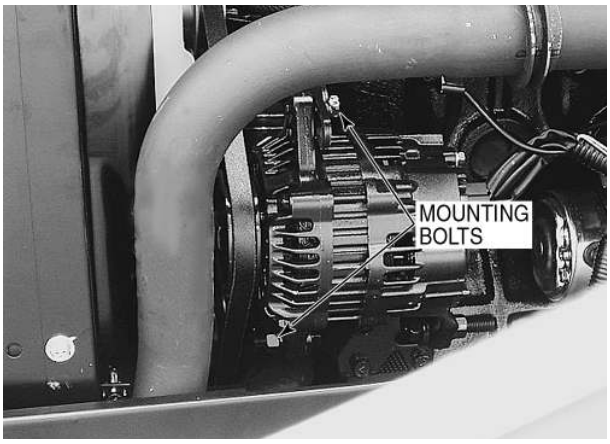

Figure 63 - Alternator Mounting Bolts

WARNING : Never attempt to loosen or tighten the bolts when the engine is running.

2. Pry the alternator away from the engine and tighten the mounting bolts.

3. Recheck belt deflection.

ENGINE SPEED ADJUSTMENT

The adjustments for idle and maximum no-load speed settings should be adjusted according to the following procedures :

Idle Speed

1. Pull the throttle lever rearward to the lowest engine speed, this makes foot throttle free.

2. Adjust to the designated idling engine speed by adjusting idling stop bolt and lock it.

Maximum Speed

1. Push the hand throttle lever forward to the maximum engine speed.

2. To adjust maximum engine speed to 2950 - 3000 rpm, elongate outer cable gradually by tightening the adjusting screw of throttle wire, and lock the adjusting screw.

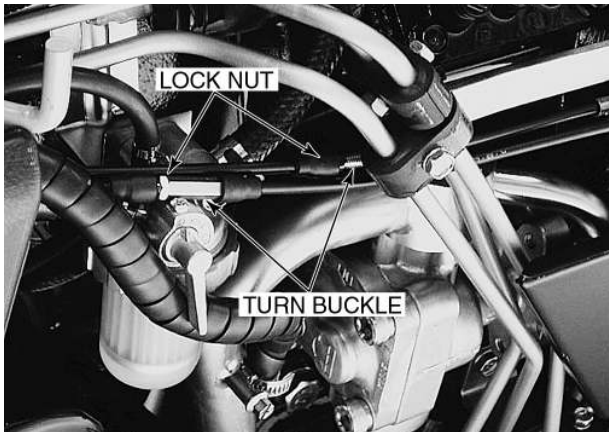

Figure 64 - Throttle Adjustment

3. To shorten outer cable release the adjusting screw of throttle wire.

4. Use the same procedure for adjusting maximum speed on the foot throttle pedal stroke.

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CHECK WHEEL BOLT TORQUE

NOTE: Check wheel bolt torque after the first 50 hours operation and every 200 hours thereafter. Additionally, tighten the wheel bolts to the specified torque any time the wheel assembly is removed from the tractor or the bolts are loosened.

Front Wheel Bolt Torque	Rear Wheel Bolt Torque
75 – 95 Nm	157 – 192 Nm

Check wheel bolt torque daily until stabilizes.

Figure 65 - Wheel Hub-Bolts

MAINTENANCE AND INSPECTION OF THE ROPS

NOTE: Inspect the ROPS after the first 20 hours of operation. Following the initial inspection, the ROPS should be checked after every 500 hours of operation or every six months, whichever comes first.

1. Check the torque of the ROPS mounting bolt 佳, Figure **66**. Tighten both nut and bolt (M12) to the correct torque of 74.5 Nm if necessary.

2. Also check the torque of the ROPS to fender mounting bolt 加, Figure **66**. Tighten the bolts (M12) to the correct torque of 74.5 Nm, if necessary.

POSSIBLE DAMAGE TO THE ROPS

If the machine has rolled over or the ROPS has been in some other type of accident (such as hitting an overhead object during transport) you must replace the ROPS to get the original protection.

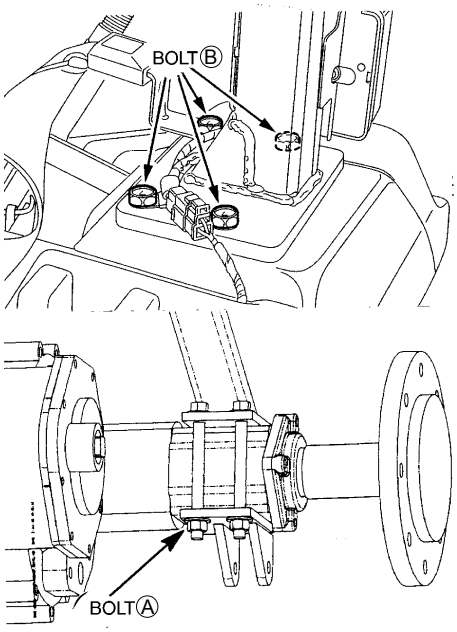

Figure 66 - ROPS Mounting Bolts/ Nuts

After an accident, check for damage to (1) the ROPS, (2) the operator's seat. Before you operate the machine, replace all damaged parts.

IMPORTANT : Do not try to weld or straighten the ROPS.

WARNING : Always pull from the tractor drawbar. Never attach chains, ropes, or cables to the rops or cab for pulling purposes or the tractor will tip backwards.

WARNING : If the rops or cab is removed or replaced, make sure that the proper hardware is used and the recommended torque values are applied to the attaching bolts.

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LUBRICATION AND MAINTENANCE

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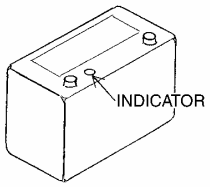
BATTERY

Keep the battery connections tight and free of corrosion. An ammonia or baking soda-water solution is good for washing the outside surface and terminals of the battery. After cleaning, wash the battery with clean water. Apply a small amount of petroleum jelly to the terminals to protect them from corrosion.

In freezing temperatures, the battery must be maintained in a good state of charge. When a battery is discharged or run down, the electrolyte is weak and may freeze, causing damage to the case.
The battery on model ST330 or ST333 is free of maintenance.
There is not vent plug, but an indicator (Hydrometer) on this battery. It is necessary daily to check the indicator as the following.
Indicator (hydrometer) shows,



Green ; Good condition·····the level and gravity of electrolyte are good
Dark (black) ; Necessary to charge
·····electrolyte is weak
White ; Change the battery·····discharged or run down

- Never over charge the battery, it could cause an explosion and the battery may be discharged or run down.

- Charge the battery within 10% of the rated 5.5 amps.

Determine the battery charge with checking the indicator of battery.

WARNING : When the alternator is charging, an explosive gas is produced inside the battery. Therefore, always check the indicator with the engine stopped. Do not use an exposed flame and do not smoke when checking the battery indicator.

ALTERNATOR

The alternator, Figure **70**, is belt-driven from the engine crankshaft pulley. It is important that belt slippage does not occur, otherwise, the charging rate will be affected. Details of belt adjustment are given on page **43**.

Other than belt adjustment, the only maintenance required on the alternator is to periodically inspect the terminals and keep them clean and tight. The alternator cooling fan should also be cleaned periodically.
When working on or checking the alternator, comply with the following precautions to prevent alternator damage.

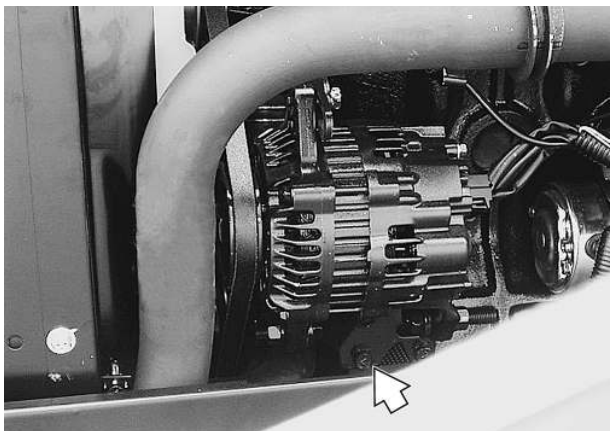


Figure 70 - Alternator

- DO NOT, under any circumstances, short the FIELD terminal of the alternator to ground.

- DO NOT disconnect the alternator output lead or battery cables while the alternator is operating.

- DO NOT remove the alternator from the tractor without first disconnecting the negative (−) battery cable. If the battery is to be removed, disconnect the negative cable first.

- If a battery is being installed, MAKE CERTAIN

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that the positive (+) cable is connected first and that the negative terminal is connected to ground. Reverse polarity will destroy the rectifier diodes in the alternator.

If the charge indicator warning light indicates that the alternator is not charging the battery, check the fan belt and the wiring connections. If these are satisfactory and the warning light continues to indicate no charge, consult your SHIBAURA Tractor Dealer.

FUSES

Fuse Blocks

The two main fuse blocks, Figure **71**, are located on the right-hand side of the engine compartment fire wall adjacent to the air cleaner. Two additional fuse blocks, Figure **72,** are attached to the headlight support bracket inside the engine hood.

When viewed from front to rear, the upper and lower fuse blocks contain the following fuses:

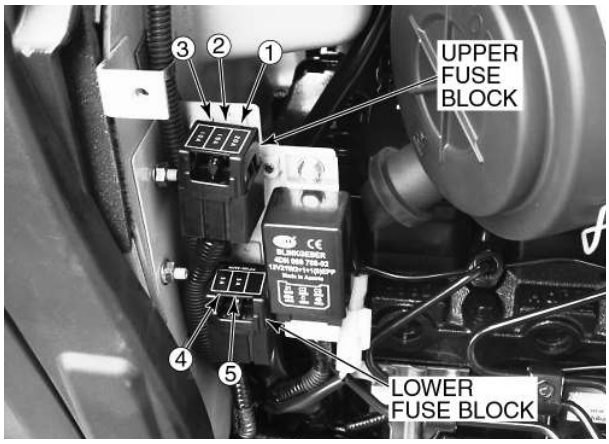

Figure 71 - Main Fuse Blocks

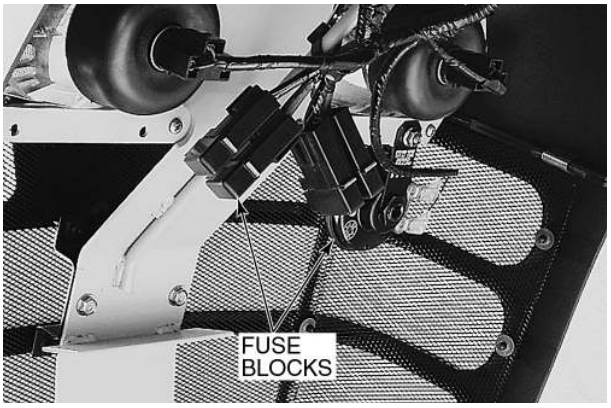

Figure 72 - Headlight Fuse Blocks

Upper Fuse Block - Figure **71**		
	Fuse Size	Circuit Protected
①	20 amp.	Headlights, Parking lights Instrument panel lights
②	15 amp.	Indicators, Hazard lights
③	10 amp.	Brake lights, Horn

Lower Fuse Block - Figure **71**		
	Fuse Size	Circuit Protected
④	5 amp.	Warning lights, Gauges, H.S.T. speed control
⑤	5 amp.	Engine fuel solenoid

Headlight Fuse Block - Figure **72**		
	Fuse Size	Circuit Protected
①	7.5 amp.	Headlight - Low Beam
②	7.5 amp.	Headlight - High Beam

NOTE : Before replacing a fuse ensure all electrical circuits are switched off. Always replace blown fuses with the size specified for that circuit.

Fusible Link

A fusible link wire, Figure **73**, is used to protect the tractor's entire electrical system. If too much amperage passes through this wire it will melt down so that it will no longer allow circuit to pass (similar to the way a fuse works). The fusible link wire is a red wire that goes from the starter terminal to a connector that links into the main wiring harness.

To replace the fusible link wire:

1. Disconnect the negative battery cable from the battery.
2. Unplug the connector linking the wire to the main wiring harness.
3. Remove the old fusible link wire from the starter terminal.
4. Replace the old fusible link wire with a new one, first attaching to starter terminal, and then con-

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necting into the main wire harness.

IMPORTANT: Always replace the fusible link wire with the appropriate fusible link wire for this tractor.

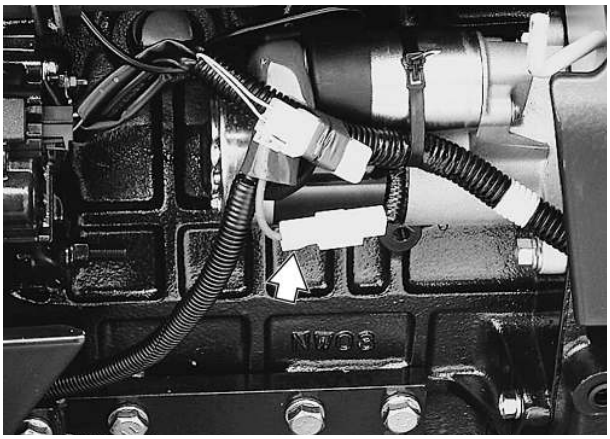

Figure 73 - Fusible Link Wire

HEADLIGHT

Should a headlight failure occur, the bulb must be replaced. To change the bulb :

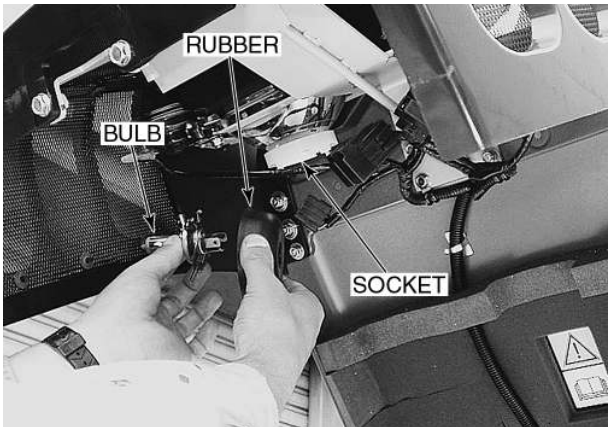

Figure 74 - Headlight Socket

1. Pull up the connector and socket from the housing, Figure **74**.
2. Take off the spring.
3. Remove the bulb.
4. Install a new bulb and install the spring, socket and connector.

TAIL LAMP AND FLASHER WARNING LIGHTS

To replace a tail lamp bulb or flasher warning light bulb :

1. Remove the lens, then remove the bulb.
2. Install a new bulb and reinstall the lens and/or rim assembly.

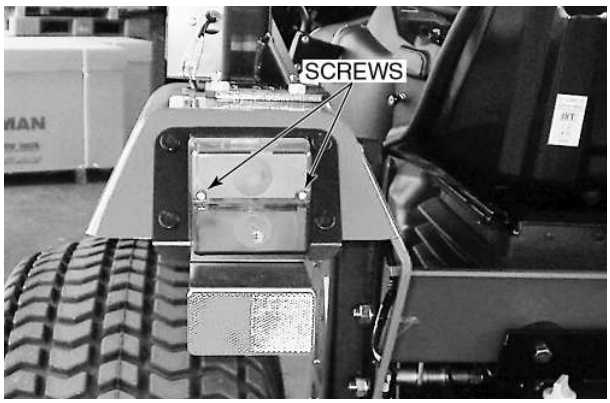

Figure 75 - Tail Light and Flasher Warning Lights

INSTRUMENT LIGHT

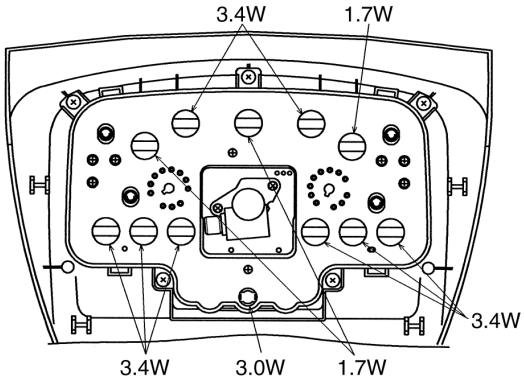

Figure 76 - Instrument Panel Warning Lights

To change an instrument bulb :

1. Remove the instrument panel.
2. Pull out lens-cover by removing the stay.
3. Replace bulb.
4. Install the lens-cover and fix the instrument

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panel.

TIRES

Inflation and Service

- Upon receiving your tractor, check the air pressure in the tires as indicated in the tables.
- Check tire pressure every 50 hours, or weekly.
- Tire inflation pressure affects the amount of weight which a tire may carry.
  Do not over-or under inflate the tires.
- Do not re-inflate a tire that has been run flat or seriously under-inflated until the tire has been inspected for damage by a qualified person.

WARNING : Inflating or servicing tires can be dangerous. Trained personnel should be called to service and/or mount tires when possible. In any event to avoid possible serious or fatal injury, follow the safety precautions below :

- When checking tire pressure, inspect the tire for damaged side walls and tread cuts. Neglected damage will lead to early tire failure.
- Be sure the rim is clean and free of rust.
- Lubricate both tire beads and rim flanges with soap solution. Do not use oil or grease.
- Use a clip-on tire chuck with a remote hose and gauge which allows the operator to stand clear of the tire while inflating it.
- NEVER INFLATE TO OVER 240 kPa TO SEAT BEADS. If beads have not seated by time
  pressure reaches 35 psi, deflate the assembly, reposition tire on rim, relubricate both tire beads and rim flanges and re-inflate. Inflation beyond 240 kPa with-unseated beads may break the bead or rim with explosive force sufficient to cause serious injury.
- After seating the beads, adjust inflation pressure to recommended operating pressure.
- Do not inflate a tire unless the rim is mounted on the tractor or is secured so that it will not move if the tire or rim should suddenly fail.
- Do not weld, braze, otherwise repair, or use a damaged rim.
- Never attempt tire repairs on a public road or highway.
- Use jack stands or other suitable blocking to support the tractor while repairing tires.
- Insure jack has adequate capacity to lift your tractor.
- Insure jack is placed on a firm level surface.
- Do not put any of your body under the tractor or start the engine while the tractor is on the jack.
- Torque lug nuts to specification after reinstalling wheel. Check lug nut torque daily until torque stabilizes.
- Refer to tractor weighting section before adding ballast to the tires.

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FRONT WHEEL TOE-IN

Front wheel toe-in adjustments on your tractor were made at the factory. Normally, the wheels maintain their toe-in ; however, an occasional check should be made.

Checking Toe-In

1. With the front wheels in the straight-ahead position, mark the front of the wheels (not the tires) at wheel hub height, Figure **77**.
2. Measure and record the distance between the front of the wheels at the marks, then push the tractor forward or backward until marks are at wheel hub height on the rear of the wheel.
3. Measure and record the distance between the marks at the rear of the wheels.
4. The difference between the dimensions recorded in Step 2 and 3 should give zero to 0-5 mm toe-in. The distance between the marks on the wheels should be zero to 0-5 mm greater when the marks are at the rear than at the front.
5. If the toe-in is not correct, adjust as outlined in the following procedure.

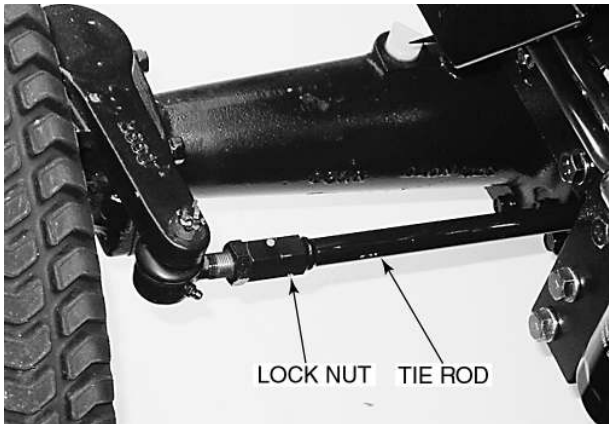

Figure 77 - Checking Toe-In

Adjusting Toe-In

1. Loosen the tie rod lock nuts.
2. Adjust the tie rod tube assembly as required to give zero to 0-5 mm toe-in.
3. After the correct toe-in is obtained, tighten the tie rod lock nuts.

FOOT-BRAKE ADJUSTMENT

Whenever the brake pedal travel becomes excessive, or if the travel of one pedal is unequal to that of the other, adjustment of each pedal should be made in the following manner :

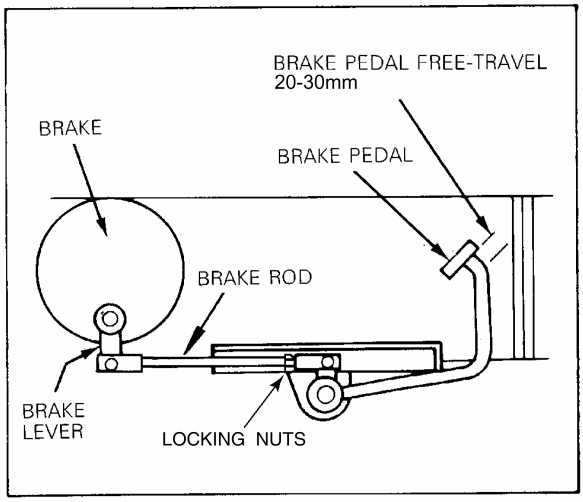

Figure 78 - Brake Pedal Adjustment

1. Loosen the lock-nut, Figure **78**, and rotate the brake rod as necessary until there is 20-30mm of pedal free play. Lengthening the rod increases free play while shortening the rod decreases free play.

2. Test drive the tractor to make sure the braking action of both rear wheels is equal. Readjust as necessary.

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HANDBRAKE ADJUSTMENT

Adjustment of the handbrake should be carried out after the foot brakes have been adjusted.

Broke the front wheels, jack up the rear of the tractor and support the rear wheels just clear of the ground. Unlatch the brake pedals.

Remove the cover of the handbrake mechanism as shown in Figure **79**, to gain access to the cable adjusters. Apply the handbrake so that the 4th..notch of the sector is engaged. Tighten the self locking nuts, on the operating cables until both wheels start to lock. Release the handbrake and ensure that both wheels are free to rotate. Apply the hand brake to ensure that the system operates freely. Refit the waterproof cover over the handbrake mechanism.

Figure 79 - Handbrake Adjustment

Road test, using the handbrake to stop the tractor. The tractor should stop in a straight line if the cables have been correctly adjusted.

CLUTCH PEDAL ADJUSTMENT

To obtain maximum clutch life, it is essential that the clutch pedal free travel be checked every 50 hours so as to maintain free travel at 20-30 mm, Figure **80**.

1. Remove the cotter pin and clevis pin.

2. Turn the clevis to increase or decrease pedal travel as required.

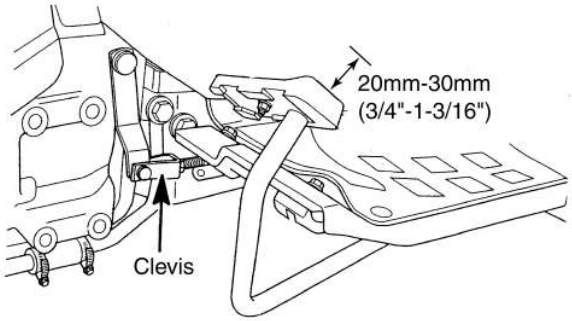

Figure 80 - Clutch Pedal Free Travel Adjustment

FOUR-WHEEL DRIVE FRONT AXLE DIFFERENTIAL CASE AND FINAL REDUCTION GEAR CASES

Checking Oil Level : Check the oil level every 50 hours.

1. With the tractor standing level and the engine off, check the oil level with the dipstick, Figure **81**.

2. The oil is at the correct level when the oil level is between the mark and lower end of the dipstick. If low, add new oil of the type specified, page **35**, through the combined dipstick/ filler plug. Do not fill beyond the mark on the stick, as the front axle case will be overfilled.

3. Install the dipstick/filler plug.

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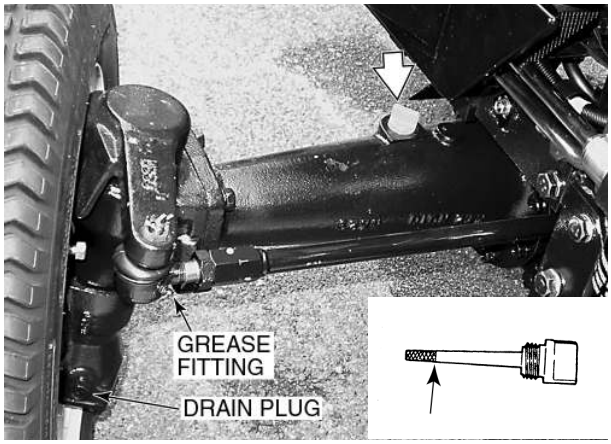

Figure 81 - Front Axle Oil Level Dipstick/Filler Plug

Changing Oil : Change the oil every 300 hours.

1. With the oil at normal operating temperature, drain the oil by removing the front axle differential, Figure **82**, and final reduction gear case drain plugs, Figure **83**. Reinstall the plugs after the oil has drained. Discard the oil.

   NOTE: Remove the front wheel before drain or refill oil of the final reduction gear case.

2. Remove the filler plugs at each final reduction gear case, Figure **83**, and fill with new oil as specified on page **35**, and install the filler plug.

3. Remove the dipstick/filler plug on the top, right side of axle housing, Figure **81**, and fill with new oil of the type specified, page **35**.

4. The front axle is filled to correct level when the oil level is between the mark and lower end of the stick. Do not fill beyond the full mark on the stick, as the front axle will be overfilled.

5. Install the dipstick/filler plug.

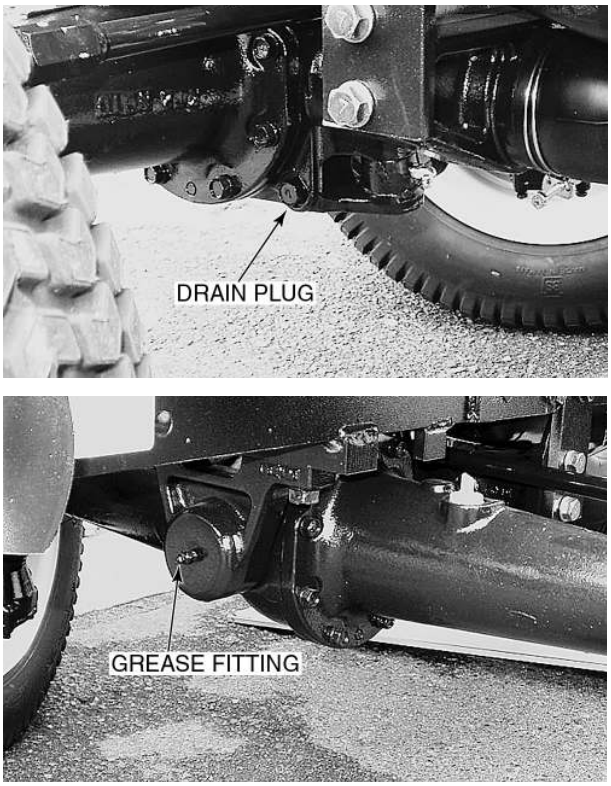

Figure 82 - Front Axle Differential Drain Plug and Grease Fitting

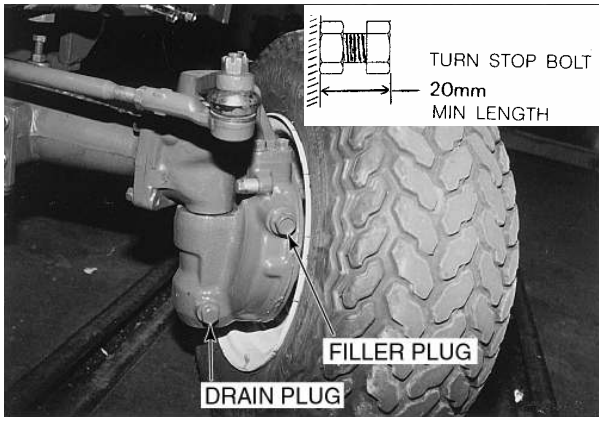

Figure 83 - Final Reduction Gear Case Filler and Drain Plugs. And Turn Stop Bolt

NOTE: To ensure correct steering operation the stop bolt, Figure **83**, should protrude a minimum of 20mm from the casing.

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TRACTOR STORAGE

Tractors that are to be stored for an extended period should be protected during storage. The following is a suggested list of operations to be carried out.

1. Thoroughly clean the tractor. Use touch-up paint where necessary to prevent rust.

2. Check the tractor for worn or damaged parts. Install new parts as required.

3. Raise the lift arms hydraulically to their fully raised position so the lift piston is in a fully extended position. This fills the cylinder with oil and will protect the cylinder wall surfaces from corrosion.

4. Lubricate the tractor. Drain and refill the transmission, hydraulic system and rear axle with new oil. Drain the engine oil and refill with new lubricating oil. Also clean the air cleaner.

   IMPORTANT : Do not use No.2 diesel fuel for winter storage because of wax separation and setting at low temperature.

5. Open the drain valve of radiator and engine block. Flush the system, close the drain valve, and fill with a 50/50 solution of permanent antifreeze and clear water.

6. Remove the battery and clean it thoroughly. Be sure that it is fully charged. Place it in storage in a cool, dry place above freezing temperature. The battery should be charged periodically during storage.

7. Place blocking under the tractor axles to remove the weight from the tires.

8. Cover the exhaust pipe opening.

9. Place pedal spacer between clutch pedal and step plate to separate clutch disc from flywheel, Figure **84**.

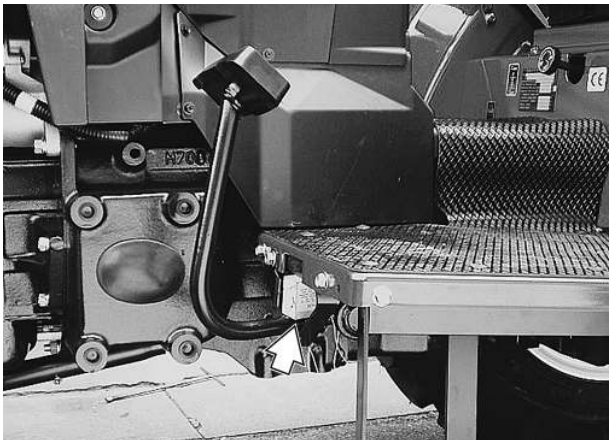

Figure 84 - Installing Pedal Spacer

Tractor that have been placed in storage should be completely serviced in the following manner before using :

1. Inflate the tires to the recommended pressures, and remove the blocking.

2. Check the oil level in the engine crankcase, the common sump (for the hydraulic lift, transmission, rear axle and optional power steering), and optional front wheel drive axle.

3. Install a fully-charged battery and remove the exhaust cover, if other than a rain cap.

4. Check the cooling system for proper level of 50/50 solution of antifreeze and clear water.

5. Remove pedal spacer from between clutch pedal and step plate.

6. Start the engine and allow it to idle a few minutes. Be sure the engine is receiving lubrication and that each control is functioning correctly.

7. Drive the tractor without a load and check to be sure it is operating satisfactorily.

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GENERAL METRIC BOLT TORQUE SPECIFICATION TABLE

USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

NOTE : These values apply to fasteners as received from supplier, dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly disulphide greases or other extreme pressure lubricants are used.

		Coarse Thread		Fine Thread	
Bolt Size	Grade No.	Pitch (mm)	Newton-Meters	Pitch (mm)	Newton-Meters
M6	4T	1.0	4.9 – 6.9	–	–
	7T		8.3 – 11.3		
	10T		11.8 – 15.7		
M8	4T	1.25	12.7 – 16.7	1.0	15.2 – 20.1
	7T		22.6 – 28.4		26.5 – 34.3
	10T		28.4 – 36.3		30.4 – 40.2
M10	4T	1.5	25.5 – 33.3	1.25	28.4 – 36.3
	7T		44.1 – 55.9		49.0 – 62.8
	10T		53.9 – 69.6		57.9 – 73.5
M12	4T	1.75	37.3 – 47.1	1.25	43.1 – 54.9
	7T		65.7 – 83.4		74.5 – 94.1
	10T		92.2 – 116		99.0 – 127
M14	4T	2.0	62.8 – 80.4	1.5	69.6 – 87.3
	7T		104 – 131		117 – 148
	11T		139 – 175		147 – 186
M16	4T	2.0	86.3 – 110	1.5	91.2 – 115
	7T		149 – 184		157 – 192
	11T		206 – 255		221 – 270
M18	4T	2.0	114 – 141	1.5	131 – 163
	7T		196 – 235		230 – 279
	11T		275 – 333		299 – 368
M20	4T	2.5	144 – 179	1.5	172 – 211
	7T		240 – 289		275 – 333
	11T		363 – 441		397 – 485

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SPECFICATIONS

ENGINE

Type ····· Diesel
Number of Cylinders ····· 3

Tractor Model	ST330 9x3 ST330 HST	ST333 9x3 ST333 HST
Engine Model	N843	N843
Bore	84 mm	84 mm
Stroke	90 mm	90 mm
Displace-ment	1496 cc	1496 cc
Compres-sion Ratio	22	22

Firing Order ····· 1 - 2 - 3
Low Idle Speed ····· 1000 – 1100 rpm
Maximum Speed :
High Idle ····· 2950 -3000 rpm
Rated ····· 2800 rpm
Valve Clearance(Cold Engine) :
Intake ····· 0.20 mm
Exhaust ····· 0.20 mm

CAPACITIES

Fuel Tank ····· 30 Liters
Cooling System
With Filter ····· 5.0 Liters
Engine Crankcase :
Less Filter ····· 3.0 Liters
With Filter Change ····· 4.0 Liters
Rear Axle and Transmission ····· 32.5 Liters
(Includes Hydraulics)
Front Axle Final Reduction ····· 0.8 Liters
Per side
Front Differential Gear Case ····· 1.5 Liters

COOLING SYSTEM

Type ····· Pressurized Liquid with Re-circulating Bypass

COOLING SYSTEM—Cont'd.

Water Pump :
Type ····· Centrifugal
Drive ····· V-Belt
Water Pump Belt
Deflection ····· 10-15 mm when 5 kg Thumb Force is Applied Midway Between Pulleys.
Fan Diameter ····· 34.0 cm
Thermostat :
Start to Open ····· 71℃(160° F)
Fully Open ····· 85℃(185° F)
Radiator Cap ····· 90 kPa

ELECTRICAL SYSTEM

Alternator ····· 12-volt, Heavy Duty, 40 amps
Battery ····· 12-volt, 55 amp. 5-Hour Rating with Negative Ground
Starting Motor ····· 1.7 kw Solenoid, Pre-Engaged Reduction

FUEL SYSTEM

Type of Fuel to Use	Temperature	Type
Diesel	Above—6.7℃ (20° F)	No.2D Cetane Rating min. 40
	Below—6.7℃ (20° F)	No.1D Cetane Rating min. 40

Injection Pump :
Type ····· In-Line
Timing ····· 21° BTDC

CLUTCH

Type ····· 184 mm Dry Disc., Organic Face
Pedal Free-Travel ····· 20-30 mm

BRAKES

Type ····· Multi-disc, wet
Disc ····· 155/123 mm Diameter(Outer/Inner)

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STEERING

Type · Power
Turns Lock-to-Lock · 3.2/2.5
Front Wheel Toe-In · 0-5 mm

Turning Radius
(Without Brake) · 2760 mm

POWER TAKE-OFF

Type · Transmission
Shaft · 35 mm
6 Spline SAE STD
Engine Speed for 540 rpm
PTO Operation

9x3	HST
2455 rpm/ 540 rpm	2500 rpm/ 540 rpm

Horsepower PTO Observed (kw)

ST330 9x3	ST330 HST	ST333 9x3	ST333 HST
17.7	17.2	19.4	19.0

MID PTO Shaft · 25.4 mm (1 in.)
Engine Speed for 2000 rpm
MID PTO Operation

9x3	HST
2377 rpm/ 2000 rpm	2420 rpm/ 2000 rpm

HYDRAULIC LIFT SYSTEM

Type · Category 1
3-point Linkage
Pump Type · · · · · · · · · · · · · · · · · · ·

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SPECFICATIONS

GENERAL DIMENSIONS

Transmission	9x3		HST	
Tire Size Front	7-14		25x8.50-14	
Rear	11.2-24		13.6-16	
Overall Length (With 3-point Hitch)	2825 mm		2825 mm	
Overall Width	1345 mm		1470 mm	
Overall Height (With ROPS)	2490 mm		2425 mm	
Wheel base	1600 mm		1600 mm	
Minimum ground clearance	285 mm		240 mm	
Tread Setting : Front	1100 mm		1150 mm	
Tread Setting : Rear	1070 mm		1120 mm	
Weight(With ROPS)	ST330 1115 kg	ST333 1115 kg	ST330 1090 kg	ST333 1090 kg

GROUND SPEEDS

at the Engine Rated Speed (2800 RPM)

Forward **Transmission—9x3**

Tire	AG 11.2-24	Turf 13.6-16
	km/h	km/h
1st	1.30	1.17
2nd	1.94	1.73
3rd	2.78	2.49
4th	4.14	3.70
5th	6.11	5.46
6th	8.78	7.84
7th	10.58	9.47
8th	15.65	14.00
9th	22.44	20.61

Rearward

Tire	AG 11.2-24	Turf 13.6-16
	km/h	km/h
1st	1.94	1.73
2nd	6.11	5.46
3rd	15.65	14.00

Forward **HST**

Tire	AG 11.2-24	Turf 13.6-16
	km/h	km/h
L	0~ 6.30	0~ 5.63
M	0~13.07	0~11.69
H	0~26.66	0~23.84

Rearward

Tire	AG 11.2-24	Turf 13.6-16
	km/h	km/h
L	0~ 4.41	0~ 3.94
M	0~ 9.15	0~ 8.18
H	0~18.66	0~16.69

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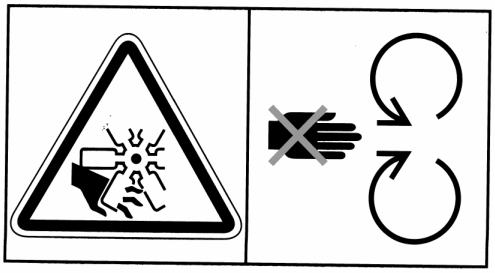
In the event that decals become damaged or illegible, they should be replaced with new decals at their original position. Replacement decals are available from your SHIBAURA Tractor Dealer.

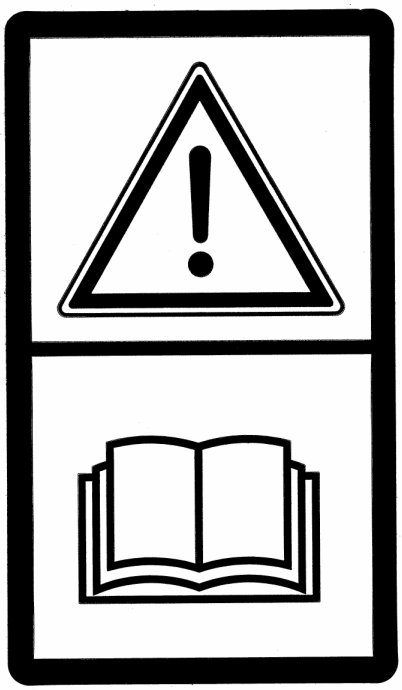
WARNING - BATTERY
PART NO. - 490992480
LOCATION - Top of battery

- Batteries produce explosive gas. Keep sparks and flames away.
- Battery contains sulfuric acid. Wear protective clothing and use eye protection.



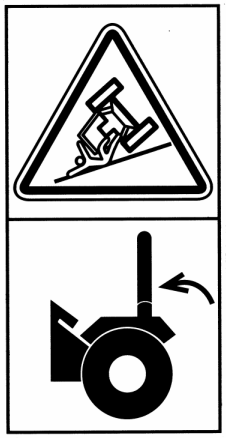
WARNING - Keep Hands and Clothing away from Rotation Fan.
PART NO. - 390198020
LOCATION - Rear of radiator

- Never touch rotating parts when engine is running.



DANGER !
PART NO. - 390197900
LOCATION –Inside of hood

- See operator's manual.



DANGER !
PART NO. - 390198010
LOCATION - Left-and and inside of ROPS

- Always raise the ROPS immediately after low clearance operation.

WARNING - Radiator Cap
PART NO. - 490992490
LOCATION - On radiator cap

- Do not open while hot
- Contents under pressure

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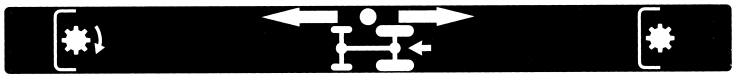
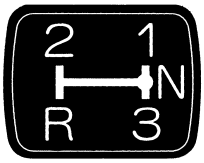
INSTRUCTION DECALS



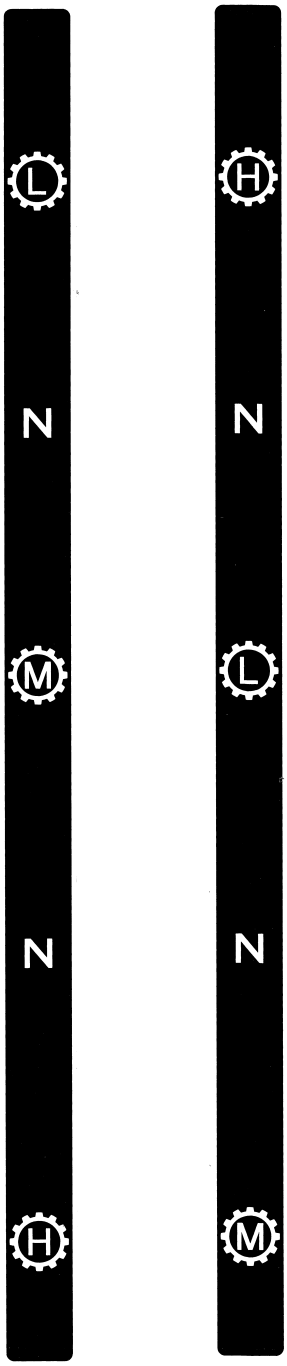
PTO Control Lever-single-speed
PART NO.- 390173980
LOCATION - Top of L.H.fender

PTO Control Lever-2-speed
PART NO.- 390174070
LOCATION - Top of L.H.fender

MID PTO Control
PART NO.- 390173990
LOCATION - Top of L.H. fender

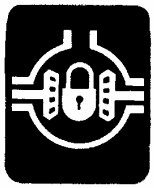


Main Shift Lever - 9×3
PART NO.- 390193950
LOCATION – On the main shift Lever



Range Selector Lever - HST
PART NO.- 390173961
LOCATION - Top of L.H. fender

Range Selector Lever
PART NO.- 390173971
LOCATION - Top of L.H. fender



Differential Lock
PART NO.- 390191690
LOCATION - Above pedal below seat

Hand Throttle Control
PART NO.- 390430251
LOCATION - Right side of instrument panel

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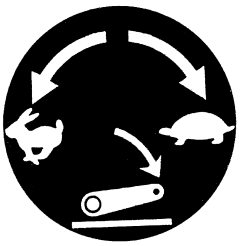
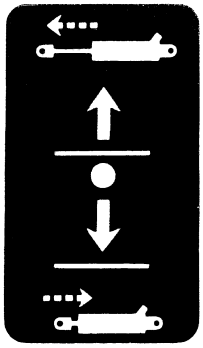
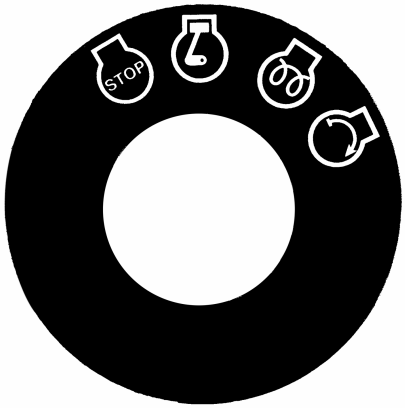


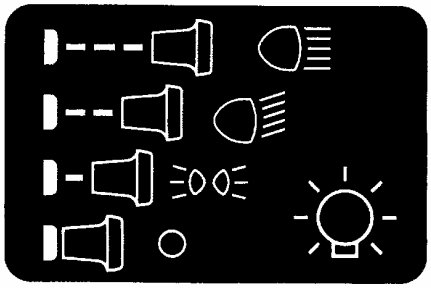
Flow Control Knob
PART NO. - 390370290
LOCATION - Top of flow control knob



Rear Remote Control
PART NO. - 390370300
LOCATION - Right & below seat



Starter Switch
PART NO.- 390197280
LOCATION - Right side of instrument panel



Main Lighting Switch
PART NO. - 390380590
LOCATION - Left side of instrument panel

Position Control Lever
PART NO. - 390372510
LOCATION - Top of R.H. fender

Draft Control Lever
PART NO. - 390372520
LOCATION - Top of R.H. fender

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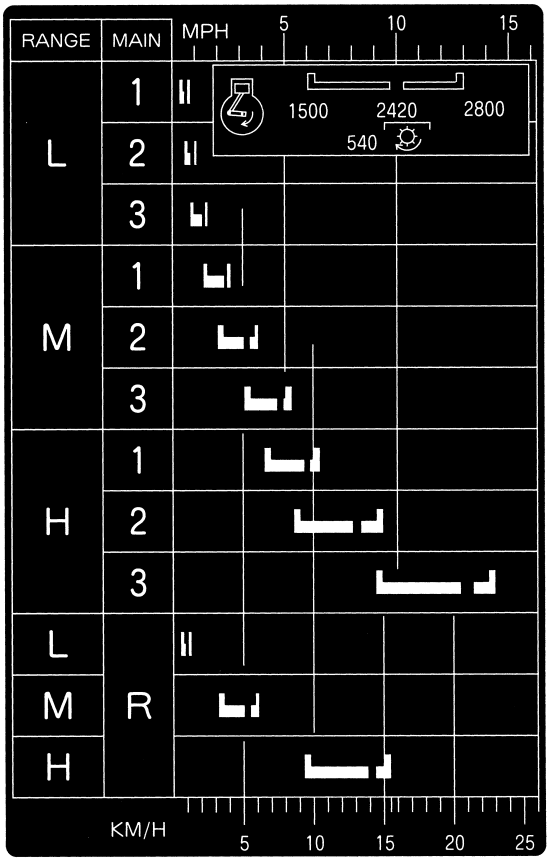
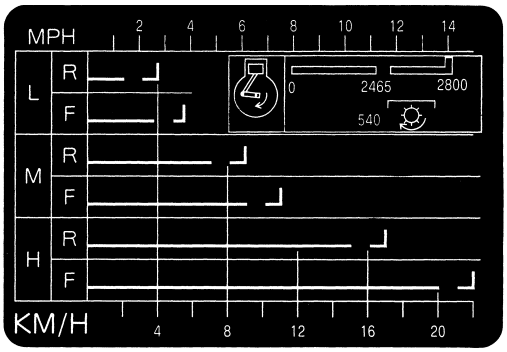
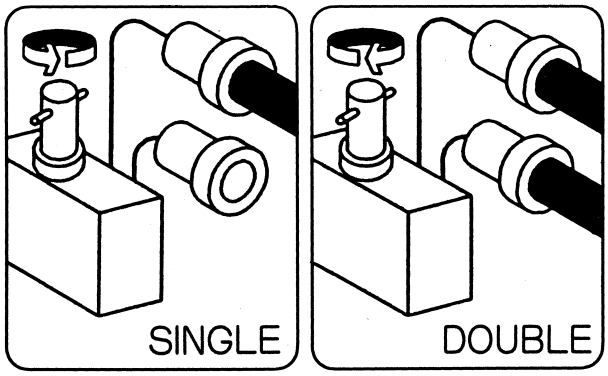
INSTRUCTION DECALS



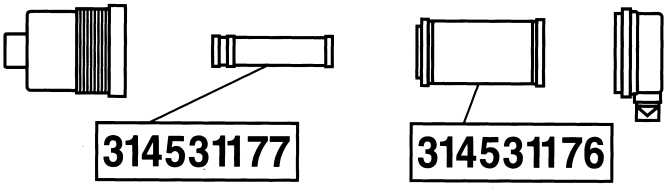
Ground Speeds - 9×3
PART NO. - 390174020
LOCATION - Left & below seat



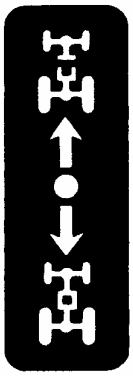
Ground Speeds - HST
PART NO. - 390174050
LOCATION - Left & below seat



Single/Double Acting Control
PART NO. - 390372090
LOCATION - Back of tractor,
near seat



Air cleaner - Disassembled
PART NO. - 390198440
LOCATION - On the air cleaner



Four-Wheel Drive Control Lever
PART NO. - 390170630
LOCATION - Left & below seat,
near the lever

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PRE-DELIVERY SERVICE
CHECK AND ADJUST AS REQUIRED

INOPERATIVE SERVICE CHECKS

1. Tire pressure ☐
2. Air cleaner element and hose connections ☐
3. Radiator coolant level ☐
4. Fan belt tension ☐
5. Battery cleanliness, vent openings, electrolyte level, and charge ☐
6. Engine oil level ☐
7. Power steering reservoir oil level ☐
8. Transmission and rear axle ☐
9. Front axle and front differential oil level（4WD） ☐
10. Hydraulic Lift control adjustment ☐
11. Upper link, and hitch ☐
12. Brake adjustment and pedal equalization ☐
13. Rear wheel disc and hub bolts for tightness ☐
14. Front wheel hub bolts for tightness（4WD） ☐
15. Front wheel toe-in ☐
16. Fuel level ☐
17. Sheet metal and paint condition ☐
18. Check lift rod for proper operation ☐
19. Drain diesel fuel filter ☐

SAFETY ITEMS CHECKS

1. ROPS installed ☐
2. Seat belts installed ☐
3. Bolt torque check of ROPS and seat belt ☐
4. PTO master shield installed ☐
5. SMV emblem installed ☐
6. Safety decals installed ☐
7. Neutral start switches operation ☐
8. Parking brake & latch operation ☐
9. Flashing lights/tail lights operation ☐
10. Operator's Manual ☐

OPERATIVE SERVICE CHECKS

All operating checks are to be performed with the tractor at normal operating temperature

1. Lights and instruments for proper operation, and fuel shut down with key switch OFF ☐
2. Fluid and oil leaks ☐
3. Maximum no-load speed and idle speed adjustments ☐
4. P.T.O. engagement and disengagement ☐
   ●Clutch pedal and P.T.O. lever ☐
5. Hydraulic System:
   ●Selector level for position control ☐
   ●Flow control operation ☐
6. 4-wheel drive lever operation ☐
7. Low speed（creeper）lever ☐
8. Operation of H.S.T ☐

TRACTOR MODEL NO._____ **INSPECTION PERFORMED WARRANTY EXPLAINED** **TRACTOR SERIAL NO.** _____

OWNER'S SIGNATURE **DATE** **DEALER'S SIGNATURE** **DATE**

50-HOUR SERVICE
CHECK AND ADJUST AS REQUIRED

INOPERATIVE SERVICE CHECKS

1. Tire pressure ☐
2. Check air cleaner hose connection ☐
3. Replace diesel fuel filter(s) ☐
4. Tighten in-line pump delivery valve holders ☐
5. Radiator coolant level ☐
6. Fan belt tension ☐
7. Battery cleanliness and vent openings, electrolyte level and charge ☐
8. All electrical cables, terminals and wires ☐
9. Drain and refill engine oil ☐
10. Replace engine oil filter ☐
11. Power steering reservoir oil level ☐
12. Transmission and rear axle oil level ☐
13. Front differential and front axle oil level（4WD） ☐
14. Injection pump timing ☐
15. Cylinder head bolt torque ☐
16. Replace hydraulic system oil filter ☐
17. Replace H.S.T. cartridge oil filter ☐
18. Bolt torque check of ROPS and seat belt ☐

OPERATIVE SERVICE CHECKS

1. Lights and instruments for proper operation, and fuel shut down with key switch OFF ☐
2. Fluid and oil leaks ☐
3. Maximum no-load speed and idle speed adjustments ☐
4. Starting and starter safety switches
5. Valve lash,engine ☐
6. Hydraulic system:
   ●Selector lever for position control operation ☐
   ●Flow control operation ☐
   （Note: Flow control only on H.P.L. lowering rate speed can be adjusted）

PERFORMANCE SERVICE CHECKS

1. Engine operation including throttle and governor operation ☐
2. Transmission including clutch ☐
3. Steering control ☐
4. Differential lock engagement and disengagement ☐
5. Brake action ☐
6. All optional equipment and accessories ☐
7. Hydrostatic Transmission ☐

TRACTOR MODEL NO._____ **INSPECTION PERFORMED** **TRACTOR SERIAL NO.** _____

OWNER'S SIGNATURE **DATE** **DEALER'S SIGNATURE** **DATE**

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PRE-DELIVERY SERVICE
CHECK AND ADJUST AS REQUIRED

INOPERATIVE SERVICE CHECKS

1. Tire pressure ☐
2. Air cleaner element and hose connections ☐
3. Radiator coolant level ☐
4. Fan belt tension ☐
5. Battery cleanliness, vent openings, electrolyte level, and charge ☐
6. Engine oil level ☐
7. Power steering reservoir oil level ☐
8. Transmission and rear axle ☐
9. Front axle and front differential oil level（4WD） ☐
10. Hydraulic Lift control adjustment ☐
11. Upper link, and hitch ☐
12. Brake adjustment and pedal equalization ☐
13. Rear wheel disc and hub bolts for tightness ☐
14. Front wheel hub bolts for tightness（4WD） ☐
15. Front wheel toe-in ☐
16. Fuel level ☐
17. Sheet metal and paint condition ☐
18. Check lift rod for proper operation ☐
19. Drain diesel fuel filter ☐

SAFETY ITEMS CHECKS

1. ROPS installed ☐
2. Seat belts installed ☐
3. Bolt torque check of ROPS and seat belt ☐
4. PTO master shield installed ☐
5. SMV emblem installed ☐
6. Safety decals installed ☐
7. Neutral start switches operation ☐
8. Parking brake & latch operation ☐
9. Flashing lights/tail lights operation ☐
10. Operator's Manual ☐

OPERATIVE SERVICE CHECKS

All operating checks are to be performed with the tractor at normal operating temperature

1. Lights and instruments for proper operation, and fuel shut down with key switch OFF ☐
2. Fluid and oil leaks ☐
3. Maximum no-load speed and idle speed adjustments ☐
4. P.T.O. engagement and disengagement ☐
   ●Clutch pedal and P.T.O. lever ☐
5. Hydraulic System:
   ●Selector level for position control ☐
   ●Flow control operation ☐
6. 4-wheel drive lever operation ☐
7. Low speed（creeper）lever ☐
8. Operation of H.S.T ☐

TRACTOR MODEL NO._____ **INSPECTION PERFORMED WARRANTY EXPLAINED** **TRACTOR SERIAL NO.** _____

OWNER'S SIGNATURE **DATE** **DEALER'S SIGNATURE** **DATE**

50-HOUR SERVICE
CHECK AND ADJUST AS REQUIRED

INOPERATIVE SERVICE CHECKS

1. Tire pressure ☐
2. Check air cleaner hose connection ☐
3. Replace diesel fuel filter(s) ☐
4. Tighten in-line pump delivery valve holders ☐
5. Radiator coolant level ☐
6. Fan belt tension ☐
7. Battery cleanliness and vent openings, electrolyte level and charge ☐
8. All electrical cables, terminals and wires ☐
9. Drain and refill engine oil ☐
10. Replace engine oil filter ☐
11. Power steering reservoir oil level ☐
12. Transmission and rear axle oil level ☐
13. Front differential and front axle oil level（4WD） ☐
14. Injection pump timing ☐
15. Cylinder head bolt torque ☐
16. Replace hydraulic system oil filter ☐
17. Replace H.S.T. cartridge oil filter ☐
18. Bolt torque check of ROPS and seat belt ☐

OPERATIVE SERVICE CHECKS

1. Lights and instruments for proper operation, and fuel shut down with key switch OFF ☐
2. Fluid and oil leaks ☐
3. Maximum no-load speed and idle speed adjustments ☐
4. Starting and starter safety switches
5. Valve lash,engine ☐
6. Hydraulic system:
   ●Selector lever for position control operation ☐
   ●Flow control operation ☐
   (Note: Flow control only on H.P.L. lowering rate speed can be adjusted)

PERFORMANCE SERVICE CHECKS

1. Engine operation including throttle and governor operation ☐
2. Transmission including clutch ☐
3. Steering control ☐
4. Differential lock engagement and disengagement ☐
5. Brake action ☐
6. All optional equipment and accessories ☐
7. Hydrostatic Transmission ☐

TRACTOR MODEL NO._____ **INSPECTION PERFORMED** **TRACTOR SERIAL NO.** _____

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