

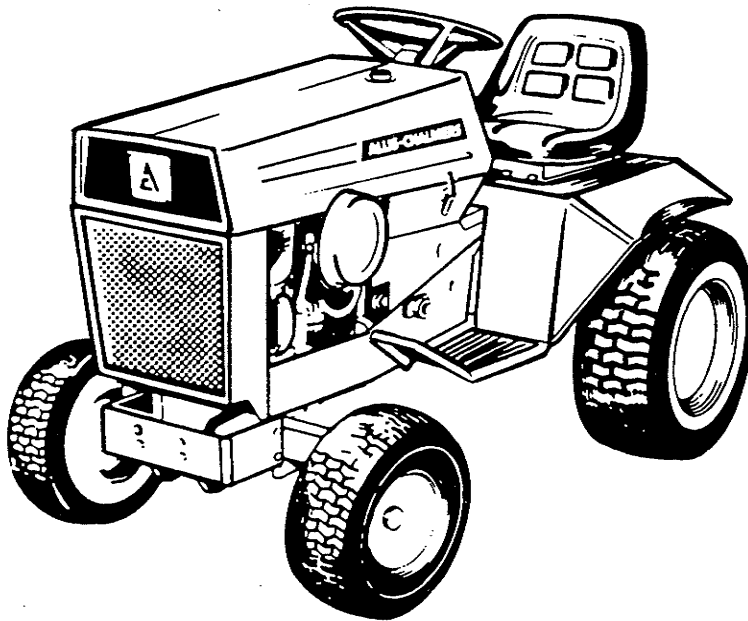


operator's manual

400 Series

Tractor

10, 14, and 16 H.P. Models



1600258, 1600259
1600260, 1600261
1600299
Litho in U.S.A.

TP - 1504



OUTDOOR & LEISURE PRODUCTS
Box 512 • Milwaukee, Wisconsin 53201

**DEALERS PRE-DELIVERY SERVICE
400 SERIES TRACTORS**

NAME _____ DATE DELIVERED _____
ADDRESS _____ SERIAL NUMBER _____
PHONE _____ ENGINE MODEL NUMBER _____
ENGINE SERIAL NUMBER _____

THE FOLLOWING PRE-DELIVERY SERVICE HAS BEEN COMPLETED:

ENGINE CRANKCASE FILLED WITH OIL DESIGNATED "SC" OR "SD" - BELOW
40°F. - SAE 5W-20 or SAE 10-W. ABOVE 40°, SAE 30
BATTERY FILLED TO CHECK RING AND FULLY CHARGED
BEVEL GEAR BOX AND TRANSMISSION FILLED TO CHECK PLUG WITH SAE 90
OIL
ON HYDROSTATIC MODELS HYDROSTATIC PUMP RESERVOIR FILLED TO
CHECK PLUG WITH DEXRON A.T.F.
GREASE FITTINGS LUBRICATED
SET FRONT TIRE PRESSURE TO 10 PSI
SET REAR TIRE PRESSURE TO 8 PSI
ENGINE SPEED SET TO 1700 RPM LOW IDLE AND 3600 RPM AT FULL THROTTLE
BRAKE AND CLUTCH ADJUSTMENT CHECKED
MOWER INSTALLED AND LEVELED
PTO CLUTCH ADJUSTED
OPERATION OF TRACTOR AND MOWER CHECKED
APPEARANCE TOUCHED UP AS NEEDED
OPERATORS MANUAL WITH TRACTOR

DEALERS SIGNATURE _____ DATE _____

YOUR TRACTOR HAS BEEN ADJUSTED AND SERVICED BY DEALER PRIOR TO ITS DELIVERY TO YOU.

DELIVERY RECORD FOR 400 SERIES TRACTOR

MODEL _____

THIS FORM MUST BE FILLED OUT BY THE DEALER AND SIGNED BY THE CUSTOMER AT THE TIME THE UNIT IS DELIVERED IN ORDER FOR THE WARRANTY TO BE VALID. DEALER SHOULD FILL IN ABOVE THE SPECIFIC MODEL NUMBER AND CHECK THE APPROPRIATE SQUARES BELOW FOR INSTRUCTIONS COVERED.

DELIVERED TO _____ DEALER _____
ADDRESS _____ TOWN _____
TOWN _____ TRACTOR SERIAL NO. _____
STATE _____ ENGINE MODEL & SPEC. NO. _____
PHONE _____ ENGINE SERIAL NO. _____
SERVICED BY _____

EXPLAIN CARE, SAFE OPERATION AND ADJUSTMENTS OF ITEMS LISTED BELOW:

CONTROLS:

- ☐ ALL MODELS
- ☐ MANUAL - 3 SPEED MODELS
- ☐ SHUTTLE CLUTCH MODELS
- ☐ HYDROSTATIC MODELS

OPERATION

- ☐ STARTING ENGINE
- ☐ STOPPING ENGINE
- ☐ STARTING TRACTOR
- ☐ STOPPING TRACTOR
- ☐ OPERATING WITH IMPLEMENTS

- ☐ OPERATORS SAFETY PRECAUTIONS

LUBRICATION AND SERVICE

- ☐ ENGINE OIL
- ☐ ENGINE FUEL
- ☐ BEVEL GEAR AND TRANSMISSION HOUSINGS
- ☐ GREASE FITTINGS
- ☐ FRONT WHEEL BEARINGS
- ☐ AIR CLEANER
- ☐ ENGINE COOLING FINS
- ☐ BATTERY CARE
- ☐ SHUTTLE CLUTCH DRIVE
- ☐ HYDROSTATIC PUMP FLUID LEVEL AND FILTER
- ☐ OFF SEASON STORAGE

ADJUSTMENTS

- ☐ SEAT
- ☐ FRONT PTO
- ☐ CLUTCH AND BRAKE
- ☐ MOWER
- ☐ OTHER ATTACHMENTS

THIS TRACTOR HAS BEEN DELIVERED TO ME IN GOOD CONDITION AND I HAVE BEEN INSTRUCTED IN THE FUNCTION, SAFE OPERATION AND ADJUSTMENTS OF THE ITEMS LISTED ABOVE.

OWNERS SIGNATURE _____ **(Delivery Date)** _____

I HAVE DELIVERED TRACTOR SERIAL NO. _____ TO THE ABOVE CUSTOMER AND HAVE INSTRUCTED HIM IN THE FUNCTION, SAFE OPERATION AND ADJUSTMENTS OF THE ABOVE ITEMS.

NAME OF DEALERSHIP _____

ADDRESS _____

SIGNATURE OF DEALER _____ **(Delivery Date)** _____
(Or Person Delivering Tractor)

BE A SAFE OPERATOR

BY THINKING — BEFORE ACTING

AND

BY READING YOUR OPERATORS MANUAL

AVOID ACCIDENTS

Most accidents, whether they occur in industry, on the farm, at home, or on the highway, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that can not be completely safe guarded against without interfering with reasonable accessibility and efficient operation.

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

THE COMPLETE OBSERVANCE OF ONE SIMPLE RULE WOULD PREVENT MANY THOUSAND SERIOUS INJURIES EACH YEAR. THAT RULE IS:

NEVER ATTEMPT TO CLEAN, OIL, OR ADJUST A MACHINE WHILE IT IS IN MOTION!



CAUTION

1. Keep all shields in place.
2. Before leaving operator's position:
 - Shift transmission to neutral.
 - Set parking brake.
 - Disengage attachment clutch.
 - Shut off engine.
 - Remove ignition key.
3. Wait for all movement to stop before servicing machine.
4. Keep people and pets a safe distance away from machine.

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STATE _____ ENGINE MODEL & SPEC. NO. _____
PHONE _____ ENGINE SERIAL NO. _____
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USER'S RESPONSIBILITY

It is the responsibility of the user to read the Operator's Manual and understand the safe and correct operating procedure as pertains to the operation of the product, and to lubricate and maintain the product according to the maintenance schedule in the Operator's Manual.

The user is responsible for inspecting his machine, and for having parts repaired or replaced when continued use of the product would cause damage or excessive wear to other parts. It is the user's responsibility to deliver his machine to the Allis-Chalmers dealer who sold him the product, for service or replacement of defective parts which are covered by the standard warranty.

The user should notify his Selling Dealer in advance so arrangements can be made to have his 100-hour or 30-day inspection performed. The user should not be charged for this inspection or adjustments, but is expected to pay for oil, filters, or any parts and labor which are not covered by the standard warranty. The user is responsible for bringing the product to the Selling Dealer's shop to have this inspection performed.

If the Dealer is requested by the Customer to travel to another location, or haul the machine to his shop for the purpose of performing a warranty obligation or free inspection, it would be for the Customer's convenience, and the cost for such trips is to be paid for by the Customer. Any arrangement whereby the Dealer agrees to absorb all or a part of the cost of these trips is to be made between the Dealer and the Customer and is to be considered a courtesy to the Customer.

Allis-Chalmers does not allow credit for the cost of travel time, mileage, or hauling as a warranty allowance.

NOTE

**THE ALLIS-CHALMERS BATTERY SERVICE
ADJUSTMENT POLICY AND WARRANTY
ARE SHOWN ON PAGE 32.**

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INTRODUCTION

Your Allis-Chalmers 400 Series tractor with its attachments is a big step to better lawn care. It is designed and built to give you fine performance and to help you have a more beautiful yard.

To help you have a more beautiful lawn, most grasses should be kept cut at approximately two (2) inches in height. Under dry conditions, one good watering (1-2 inches) is recommended every two weeks. A good watering well spaced is worth far more for root development than several 1/8-1/4 inch sprinklings. Never mow more than one-third (1/3) off the total height of the grass in one mowing except the initial mowing when grass is extremely tall (tall grass should be gradually mowed down to the desired height). Grass should always be cut when it is free of moisture for best appearance and ease of cutting. Change mowing patterns occasionally to give lawn smoother appearance.

Grass can be a pollution fighter and we should give more thoughts to the benefits of grass. Grass sod helps control soil erosion. Good growing sod or turf reduces water runoff and soil erosion losses. Soil erosion is one of the devastating losses to our environment and is a principle contributor to water pollution. A healthy grass sod cover helps stabilize the soil against erosion and tends to minimize or eliminate surface runoff.

Green plants purify the air of wastes produced by humans and produce the oxygen we need. Grass also reduces wind erosion and the amount of blowing dust. Healthy grass also enhances the beauty of the landscape and helps enhance enjoyment in recreation.

It has been said that healthy turf makes a tree "King" and a flower "Queen" in the settings where they are planted.

SAFETY PRECAUTIONS



**ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!**

This symbol is used to call your attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol - Heed Its Warning.

Many hours of lost time and much suffering is caused by the failure to practice simple safety rules.

IT IS TOO LATE TO REMEMBER WHAT SHOULD HAVE BEEN DONE AFTER THE ACCIDENT HAS HAPPENED.

OPERATION

- * **KNOW THE CONTROLS** and how to stop quickly - **READ THE OPERATOR'S MANUAL.**
- * **DO NOT** allow children to operate vehicle. **DO NOT** allow adults to operate it without proper instruction.
- * **DO NOT** carry passengers. **KEEP CHILDREN AND PETS A SAFE DISTANCE AWAY.**
- * **CLEAR** work area of objects which might be picked up and thrown.
- * **TAKE ALL** possible precautions when leaving vehicle unattended; such as disengaging power take off, lowering attachments, shifting into neutral, setting parking brake, stopping engine and removing key.
- * **DO NOT** stop or start suddenly when going uphill or downhill. Mow up and down the face of steep slopes; never across the face.
- * **REDUCE** speed on slopes and in sharp turns to prevent tipping or loss of control. Exercise extreme caution when changing direction on slopes.
- * **STAY ALERT** for holes in terrain and other hidden hazards.
- * **USE CARE** when pulling loads or using heavy equipment:
 - A. Use only approved drawbar hitch points.
 - B. Limit loads to those you can safely control.
 - C. Do not turn sharply. Use care when backing.
 - D. Use counterweight(s) or wheel weights when suggested in operator's manual.

* **WATCH** for traffic when crossing or near roadways.

* **KEEP** all nuts, bolts and screws tight to be sure equipment is in safe working condition.

* **DO NOT** change engine governor settings or over-speed engine.

* **DO NOT** operate equipment when barefoot or wearing open sandals. Always wear substantial footwear.

CAUTION: This tractor does not have warning devices for operation on public roads or highways.

FUEL AND FIRE HAZARDS

- * **HANDLE** gasoline with care - - it is highly flammable.
 - A. Use approved gasoline container.
 - B. Never remove cap or add gasoline to a running or hot engine or fill fuel tank indoors. Wipe up spilled gasoline.
 - C. Open doors if engine is run in garage - - exhaust fumes are dangerous. Do not run engine indoors.
- * **NEVER** store equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark.
- * **ALLOW** engine to cool before storing in any enclosure.
- * **TO REDUCE** fire hazard keep engine free of grass, leaves or excessive grease.



ATTACHMENTS

- * **DISENGAGE** all attachment clutches and shift into neutral before attempting to start engine.
- * **DISENGAGE** power to attachments and stop engine before leaving operator position.
- * **DISENGAGE** power to attachment(s) and stop engine before making any repairs or adjustments.
- * **DISENGAGE** power to attachments when transporting or not in use.
- * When using any attachments **NEVER** direct discharge of material toward bystanders or allow anyone near vehicle while in operation.
- * **KEEP** vehicle and attachments in good operating condition and keep safety devices in place. Use guards as instructed in operator's manual.
- * **VEHICLE** and attachments should be stopped and inspected for damage after striking a foreign object and the damage should be repaired before restarting and operating the equipment.



- * When using vehicle with **MOWER**:
 - A. Mow only in daylight or in good artificial light.
 - B. Never make a cutting height adjustment while engine is running if operator must dismount to do so.
 - C. Shut engine off when removing grass catcher and/or unclogging chutes.
 - D. Check blade mounting bolts for proper tightness at frequent intervals.
 - E. Check grass catcher bags frequently for wear or deterioration. Replace with new bags for safety protection.

- * **REMEMBER THAT SAFE OPERATION IS NO ACCIDENT.**

AVOID ACCIDENTS

BUILT IN SAFETY FEATURES CAN BE EFFECTIVE ONLY IF PROPERLY MAINTAINED AND UTILIZED.

GENERAL INFORMATION

The following models of 400 Series tractors are covered in this manual.

Model 410 with standard 3 speed transmission, Model 410-S, Model 414-S and Model 416-S each with shuttle clutch and 4 speed transmission. Model 416-H with hydrostatic transmission.

In each of the sections which follow, **CONTROLS, OPERATION, LUBRICATION AND SERVICE, AND ADJUSTMENTS**, those items which are common to all

models are listed first followed by subsections listing the additional items that are pertinent to each of the three types of transmissions listed. Each operator should study the first part of each section listed "Common to all Models", as well as the specific subsections listed for tractors with the specific transmission with which his tractor is equipped.

NOTE: Some of the photographs used in this manual were taken of prototype models. Actual production models may differ from photographs in minor detail.

https://truckmanualshub.com/
GENERAL SPECIFICATIONS
MODELS

ENGINE	410-3SP.	410S	414S	416S		416H
Horsepower	10	10	14	16		16
Kohler	x	x	x	x		x
Type	4 Cycle - Single Cylinder - Air Cooled					
Bore and Stroke	3.25 x 2.88 in.		3.50 x 3.25 in.	3.75 x 3.25 in.		3.75 x 3.25 in.
Displacement	23.9 Cu. In.		31.27 Cu. In.	35.89 Cu. In.		35.89 Cu. In.
R.P.M.	3600 RPM at rated Horsepower					
Starter	Gear Driven Electric Starter					
Governor	Precision, Oil Bathed, Flywheel Type with External Adjustment					
Electrical System	15 AMP Flywheel Alternator, Solid State Regulator - Rectifier					
Ignition System	Battery Ignition with Breaker Points					
Air Cleaner	Replaceable Dry Element Type					
ENGINE OIL	AIR TEMPERATURE Above 30° F. 30° F. to 0° F. Below 0° F.	OIL VISCOSITY (Weight) SAE 30 SAE 10W-30 SAE 5W-20		OIL TYPE API Service "SC" ("MS") Severe Duty API Service "SC" ("MS") Severe Duty API Service "SC" ("MS") Severe Duty		
BATTERY	Allis-Chalmers, 40 AMP Hour, 12 Volt					
DRIVE AND TRANSMISSION	Direct Drive to Spiral Bevel Gear Box					
	Belt to Sliding Gear Transmission 3FWD - 1R	Differential Shuttle Clutch Drive with Forward Reverse Control to Sliding Spur Gear 4 Speed Transmission			Hydrostatic Drive w/Piston Pump and Piston Motor	
DIFFERENTIAL	Planetary Gear with Controlled Traction					
SPEEDS - at 3600 RPM						
First	1.57 M.P.H.		.96 M.P.H.			Variable from
Second	3.59 M.P.H.		2.34 M.P.H.			0 to 8.1 M.P.H.
Third	5.90 M.P.H.		3.98 M.P.H.			forward and
Fourth	-----		5.53 M.P.H.			0 to 3.8 M.P.H.
Reverse	3.13 M.P.H.		(Same as above)			reverse
CAPACITIES						
Engine Crankcase	2 quarts					
Fuel Tank	3.5 gallons					
Transmission	1.5 quarts		SAE 90EP Gear Lubricant			
Bevel Gear Housing	1 pint		SAE 90EP Gear Lubricant			
Hydrostatic Unit						1.75 Qt. Dexron A.T.F.
DIMENSIONS						
Height @ Steering Wheel	43.0"					
Height @ Instrument Panel	39.0"					
Width Overall	34.5"		38.5"			
Length Overall	74.0"					
Wheel Tread	29.7" front; 26" rear		30.7" front; 28.0" rear			
Wheel Base	48.1"					
Clearance (Front Axle Mounting Bracket)	8.0"					
Clearance (Final Drive Gear Case)	6.0"					
Clearance (Drawbar)	7.5"					
TIRE SIZE						
Front	4.80/4.00 x 8 (10 PSI)		16-6.50 x 8 (10 PSI)			
Rear	23-8.50 x 12 (8 PSI)		23-10.50 x 12 (8 PSI)			
IMPLEMENT LIFT	Manual Lift Standard - Electric Lift Available for Field Installation					
POWER TAKE-OFF (Front)	Electric Clutch Standard					
LIGHTS AND LIGHTER	Field Installation Only					

The Allis-Chalmers Corporation reserves the right to make changes in the above specifications or to add improvements at any time without notice or obligation.

OPERATING CONTROLS

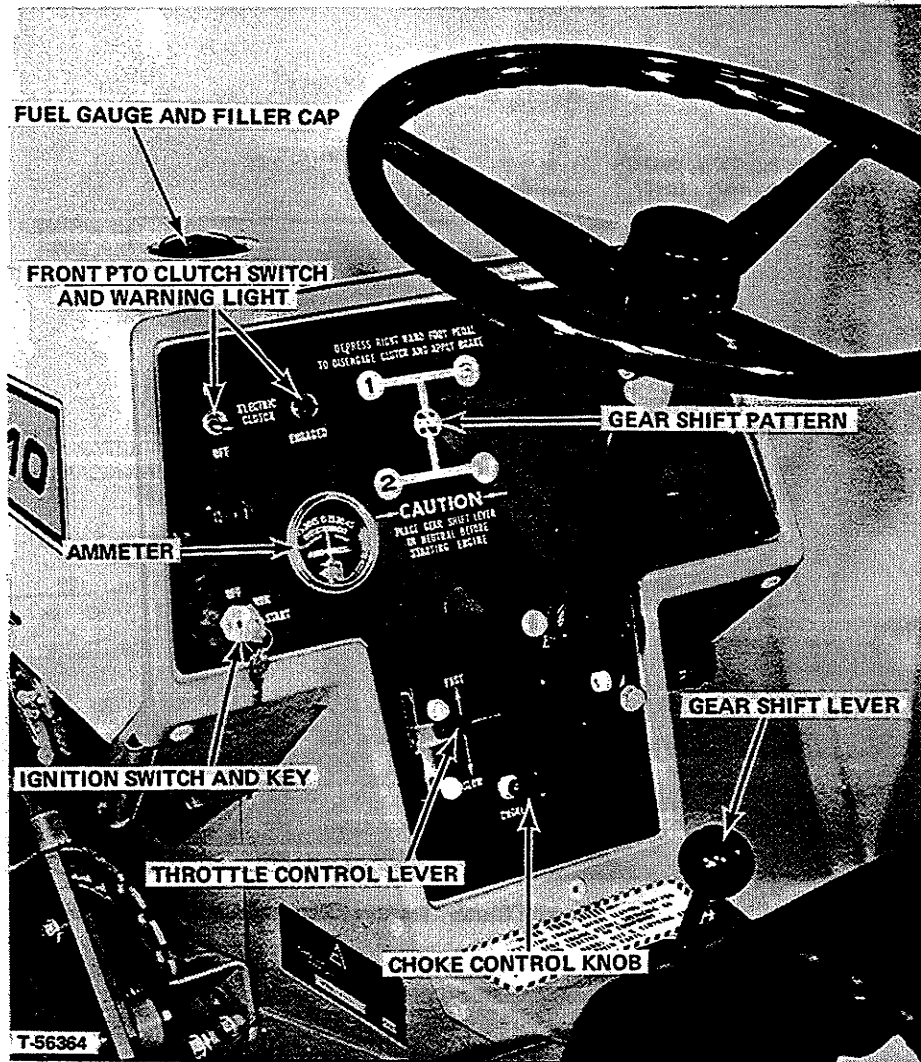


FIGURE 1 - Controls - Model 410 Standard 3 Speed Transmission

CONTROLS COMMON TO ALL MODELS

Before starting engine acquaint yourself with all the controls and their function.

1. IGNITION SWITCH AND KEY (Figure 1)

When key is turned clockwise to the first position the ignition is On. In the On position optional equipment like lights, hourmeter, etc. will operate. The key is turned farther clockwise to START position to actuate the starter. As soon as engine starts key should be released to return to the "Run" position.

NOTE: Gear shift lever must be in neutral and front PTO switch must be off before the starter will operate.



CAUTION: ALWAYS remove the ignition key when cleaning, adjusting, or servicing the tractor or any attachment and when leaving the tractor unattended.

2. CHOKE CONTROL KNOB (Figure 1)

When starting engine in cold weather pull the choke all the way out. After engine starts partially close choke for a few minutes warm up then push it all the way in. Little or no choke is required when air temperature is 70 degrees or more or when engine is warm from recent running. Never operate engine with choke out after it has warmed up.

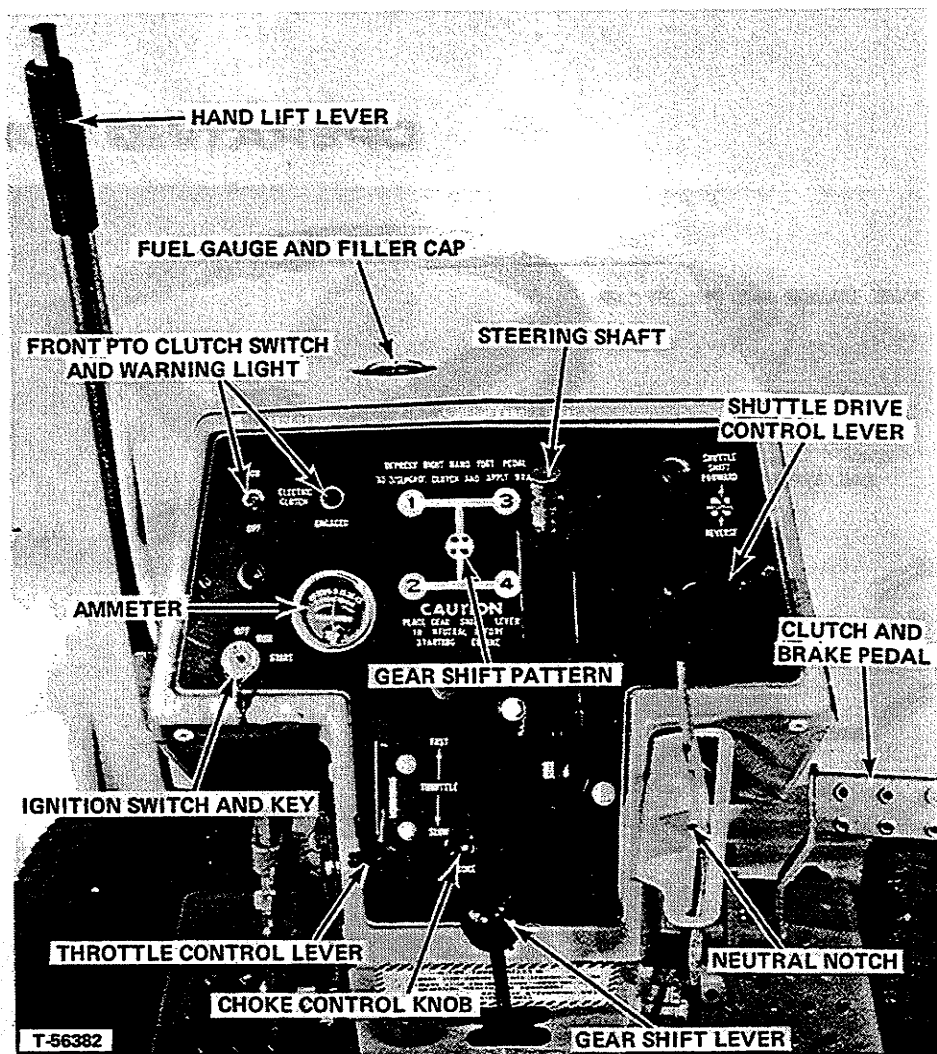


FIGURE 2 - Controls - Shuttle Clutch Tractors (Steering Wheel Removed)

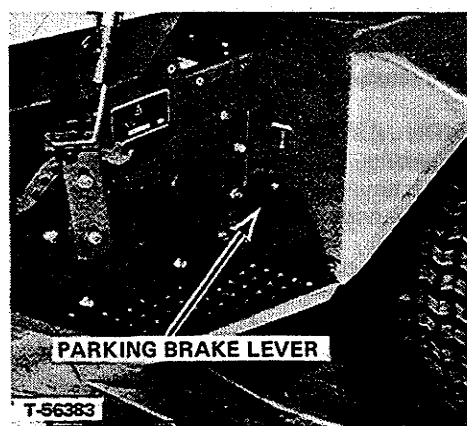


FIGURE 3

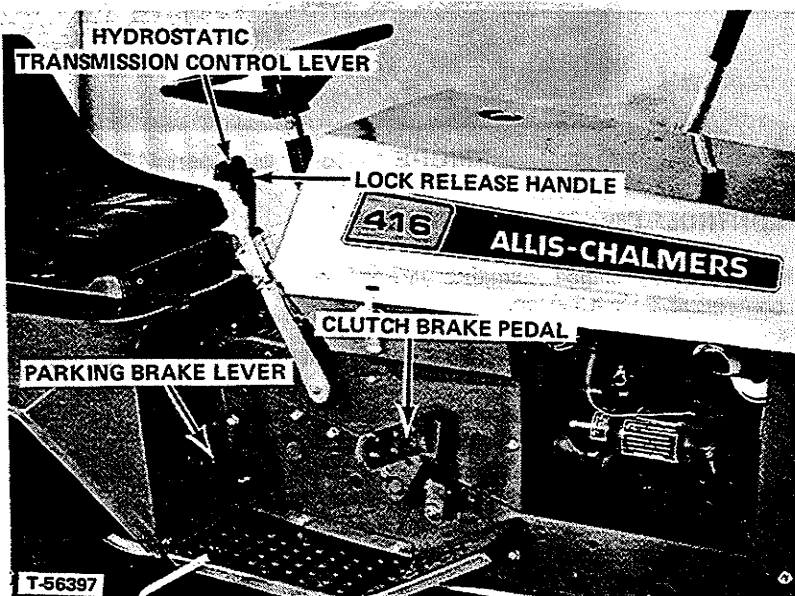


FIGURE 4

3. THROTTLE CONTROL LEVER (Figure 1)

Engine speed is set with the throttle control lever. Push lever forward to increase engine speed and pull it backward to reduce engine speed.

Specific information on suggested setting of engine speed is given in the operation section of manual.

4. FRONT PTO CLUTCH SWITCH AND WARNING LIGHT (Figure 1)

The front power take off clutch is engaged when clutch switch is pushed forward to "On" and is disengaged when switch is in rear, "Off" position. Red warning light near switch is on when clutch is engaged.

5. AMMETER (Figure 1)

The ammeter indicates the rate at which the battery is being charged or discharged. Normally it should show some charge when the engine is first started then gradually diminish toward the zero mark as battery charge is replenished. If the ammeter remains in the discharged position with engine at full speed, see your Allis-Chalmers dealer for alternator or regulator adjustment.

6. FUEL GAUGE AND FILLER CAP (Figure 1)

The fuel gauge is built into the filler cap and is located at the rear of the hood. Turn cap counter-clockwise to remove and lift straight up.



CAUTION: NEVER add fuel when engine is running or is hot. Do not smoke or have open flames near tractor when fuel is added.

7. CLUTCH AND BRAKE PEDAL (Figure 2)

Depressing clutch pedal first disengages the tractor drive clutch. As pedal is pushed farther forward the tractor brake is applied to stop the tractor.

NOTE: DO NOT use clutch pedal as a foot rest. To do so will cause excessive drive belt wear.

8. PARKING BRAKE LOCK (Figures 3 and 4)

To lock the parking brake pull the parking brake lever up into a vertical position opposite position shown in Figure 3. Lever can be more easily lifted and locked in position if foot brake is fully depressed first. Brake should be locked whenever operator leaves the tractor seat.

NOTE: Lock is located on right hand fender on hydrostatic transmission tractors, (Figure 4).

9. HAND LIFT LEVER (Figure 2)

The hand lift lever is used to raise and lower front

mounted, center mounted and rear mounted implements.

CONTROLS FOR STANDARD 3 SPEED TRANSMISSION TRACTORS

In addition to the 9 controls used on all model tractors, standard 3 speed transmission tractors also have the following:

GEAR SHIFT LEVER (Figure 1)

The gear shift lever is used to select which of the 3 forward or the reverse gears is selected. The approximate ground speeds at 3600 RPM full rated engine speed are:

First	1.57 M.P.H.
Second	3.59 M.P.H.
Third	5.90 M.P.H.
Reverse	3.13 M.P.H.

The gear shift pattern is shown on the tractor control panel (Figure 1). To shift transmission gears the tractor movement must be stopped and the clutch brake pedal must be fully depressed. The gear shift lever must be in the center of the neutral position for engine starter to operate.

CONTROLS FOR SHUTTLE CLUTCH TRANSMISSION TRACTORS

In addition to the 9 controls used on all model tractors, shuttle clutch tractors also have the following:

1. GEAR SHIFT LEVER (Figure 2)

The gear shift lever is used to select which of the four transmission speeds will be used. Using the shuttle drive unit the tractor will move forward or reverse in any of the gears. The approximate ground speed in miles per hour both forward and reverse are as follows with full engine speed of 3600 RPM.

Gear	Maximum Ground Speed
First	.96 M.P.H.
Second	2.3 M.P.H.
Third	3.7 M.P.H.
Fourth	5.1 M.P.H.

The gear shift pattern is shown on the tractor control panel. To shift transmission gears the tractor movement must be stopped and either the shuttle drive control lever must be in neutral or the clutch brake pedal must be fully depressed. The gear shift lever must be in the center of the neutral position for the engine starter to operate.

2. SHUTTLE DRIVE CONTROL LEVER (Figure 2)

This lever is used to cause the tractor to move forward, to move in reverse or to stop. With the transmission in gear and engine running, pushing

the shuttle drive control lever forward from the neutral notch causes tractor to move forward. Moving lever from forward position rearward to the neutral notch slows and stops the tractor. In similar manner pulling lever to rear causes tractor to move in reverse and pushing it forward again to neutral slows and stops tractor.

NOTE: All continuous operation should be done with the control lever fully forward and locked in the forward notch, or fully to the rear for reverse. Other than when starting or stopping or changing from forward to reverse or from reverse to forward the shuttle control should be in the fully engaged position. To operate it for more than a short time midway between neutral and fully engaged position will cause heating and excessive wear on clutches. Lever should be moved smoothly and steadily forward or rearward at a slow enough speed to prevent sudden starts or stops.

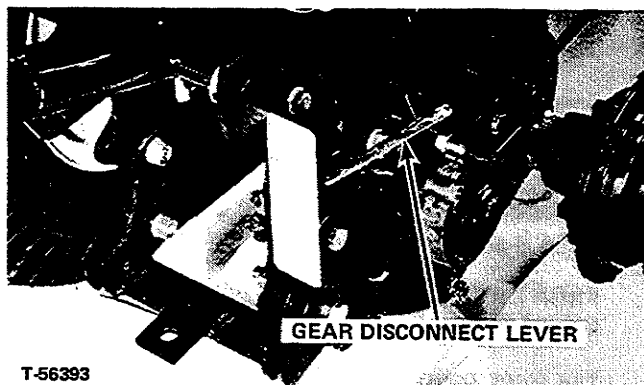


FIGURE 5

CONTROLS FOR HYDROSTATIC TRANSMISSION TRACTORS

In addition to the 9 controls listed for all 400 Series tractors in the first part of this section, tractors that are equipped with hydrostatic transmissions also have the following:

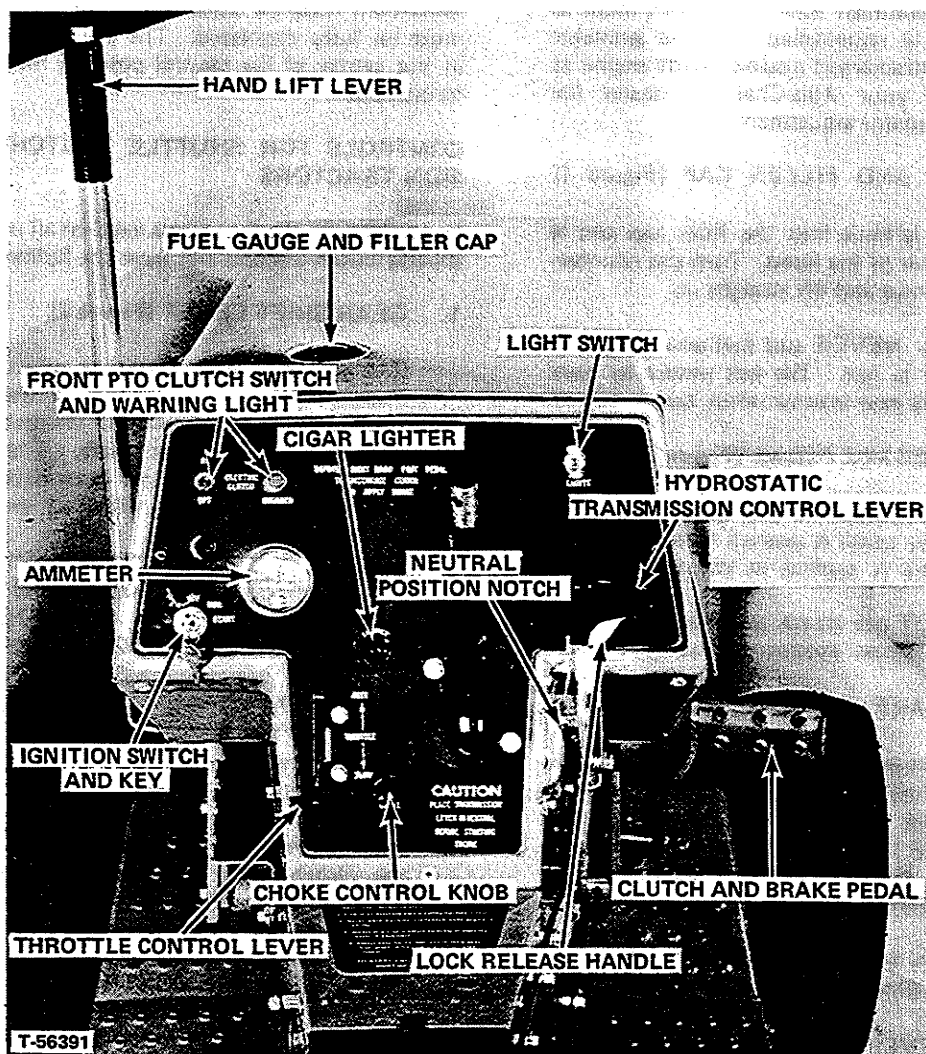


FIGURE 6 - Controls, Hydrostatic Transmission Tractors (Steering Wheel Removed)

1. GEAR DISCONNECT LEVER

If the tractor is to be moved by hand or is to be towed, the transmission gears must be disengaged to prevent damage to the hydraulic pump and motor.

The disconnect lever, at rear right hand corner of tractor (Figure 5), must be pulled up to a vertical position to disengage the gears. It must be pushed to the right as shown to engage the gears for tractor operation.



CAUTION: ALWAYS stop tractor engine, set brakes and dismount from operators seat before attempting to disconnect gears.

When engaging the disconnect lever it may be necessary to release the tractor brake and move tractor slightly by hand to align gear teeth and permit shifting gears.

2. HYDROSTATIC TRANSMISSION CONTROL LEVER (Figures 4 and 6)

The hydrostatic transmission is used to control both the direction of travel and the ground speed of the tractor. NEUTRAL position for the hydrostatic transmission control lever is as shown with the back of the control lever guide resting against the notched portion of the guide. The hydrostatic transmission control lever must be in this neutral position for the engine starter to operate.

To move the tractor FORWARD, grip the control lever squeezing the lock release handle toward the lever and move the control lever forward. The farther forward from neutral the control lever is pushed, the faster the tractor will move forward at a given engine speed. To slow or stop the tractor when it is moving forward, squeeze the lock release handle toward the lever and pull the control lever rearward slowly toward the neutral position. You can place the hydrostatic transmission in neutral from the forward position without watching it by slightly pushing to the right on the control lever as it is moved rearward. The control lever will stop against the notched portion of the guide when it reaches neutral.

To move the tractor in REVERSE, squeeze the lock release handle toward the lever, push the lever to the left and pull it back from the neutral position. The farther back the control lever is moved, the faster the tractor will travel in reverse. To stop the tractor while moving in reverse, squeeze the lock release handle toward the lever and move lever forward slowly to the neutral position. In emergency situations, you may use the foot clutch brake pedal to stop.

OPERATION

BEFORE STARTING ENGINE

1. Study this operators manual, especially the safety precautions in front of book and follow the recommendations.
2. Check that crankcase is filled to the "F" mark with a high quality detergent oil classified as "SC", "SD", or "MS". Use SAE 30 above 30 degrees F, SAE 10W-30 between 30 degrees F and 0 degrees F, and SAE 5W-20 below 0 degrees F. (Figure 7)
3. Fill the fuel tank with good grade regular gasoline. Do not use premium gasoline and DO NOT mix oil with gasoline.



CAUTION: GASOLINE IS HIGHLY FLAMMABLE. DO NOT fill the fuel tank while the engine is running, while engine is hot, while using a lantern, or while smoking. Avoid over filling and wipe up any spilled fuel.

4. Be sure that all tractor and any attachment to be used has been properly serviced.

STARTING ENGINE

1. Be seated properly in the tractor seat.
2. On 3 speed transmission tractors and shuttle clutch tractors: Place gear shift lever in neutral and front PTO clutch switch in "Off" position to activate the interlock safety switches (Figures 1 and 2).

On hydrostatic transmission tractors: Place the hydrostatic transmission control lever against the neutral position notch on quadrant and place front PTO clutch switch in "Off" position to activate the interlock safety switches (Figures 4 and 6).

3. Depress clutch brake pedal and apply braking pressure.
4. Pull choke out to choke position (unless engine is warm).
5. Place throttle control lever in mid-position.
6. Turn ignition key to "Start" position until engine starts then let go of key to return it to "Run" position. Note if engine does not start within 30 seconds allow starter motor to cool for a minute or two before making a second attempt.

NOTE: If the starter will not run check that the safety interlock switches referred to in step 2 are actually activated.

7. As engine warms up push choke fully in. Allow engine to warm up for a few minutes before applying a load.

STOPPING THE ENGINE

1. Move the throttle control lever to the "Slow" position.
2. If tractor has been operating under full load allow the engine to idle for a minute or two to reduce engine temperature. Stopping a hot engine suddenly can damage engine parts.
3. Turn ignition key to the "Off" position to stop engine.
4. Set parking brake.
5. Remove ignition key to prevent unauthorized use of the tractor.

STARTING TRACTOR TRAVEL - 3 SPEED TRANSMISSION TRACTOR

1. With engine running set throttle between 1/4 and 1/2 open.
2. Depress foot clutch fully and use gear shift lever to select desired transmission gear. It may be necessary to partially engage clutch carefully to rotate gears enough to line up gear teeth and permit shifting. DO NOT "clash" gears by trying to force gears in place while clutch is partially engaged.



CAUTION: WHEN OPERATING TRACTOR FOR FIRST TIME operator should select first gear until he becomes familiar with controls and operation of tractor.

3. Look carefully around to make sure there are no people, pets, or obstructions in direction you plan to drive, then raise clutch brake pedal slowly to engage clutch and start tractor in motion.
4. Adjust throttle control lever to obtain desired engine speed for job being performed.
5. To shift gears tractor motion must be completely stopped and the clutch brake pedal completely depressed.

STOPPING TRACTOR TRAVEL - 3 SPEED TRANSMISSION TRACTOR

To stop the standard 3 speed transmission tractor push the foot clutch brake pedal down smoothly and firmly to release the clutch and apply the brake. Place transmission gears in neutral.

STARTING TRACTOR TRAVEL

SHUTTLE CLUTCH TRACTORS

1. With engine running set throttle between 1/4 and 1/2 open.
2. With clutch and brake pedal engaged, (up) and shuttle drive control lever in neutral, place gear shift lever in desired position. It may be necessary to move shuttle drive control a little off neutral and then back to neutral again to rotate the gears enough to line up gear teeth to permit shifting.



CAUTION: When operating the tractor for first time operator should select first or second gear until he becomes familiar with the controls and operation of tractor.

3. Look carefully around to make sure there are no people, pets or obstructions in the direction you plan to drive then push shuttle drive control lever slowly but steadily in direction you want tractor to move. If forward, push lever entirely forward and lock it in quadrant notch. If travel is backward push lever fully to the rear of notch. **DO NOT** operate with lever midway between neutral and full range except when starting or stopping.
4. When shuttle drive control lever is fully forward (or backward) adjust throttle control lever to desired engine speed.
5. To shift gears tractor motion must be completely stopped either by depressing clutch and brake or by bringing shuttle drive control lever to neutral.

STOPPING TRACTOR TRAVEL

SHUTTLE CLUTCH TRACTORS

Tractor motion is normally stopped by moving the shuttle drive clutch lever smoothly from operating position to neutral position and then on thru neutral

partway into the opposite direction range till tractor stops. As soon as tractor stops move lever onto neutral notch.

Tractors may also be stopped by depressing the foot clutch brake lever until tractor stops.

STARTING TRACTOR TRAVEL

HYDROSTATIC TRANSMISSION TRACTORS

1. Be sure gear disconnect lever at transmission is engaged, (Figure 5). With engine running set throttle control lever between 1/4 and 1/2 open.
2. With foot clutch engaged (up) and hydrostatic transmission control lever against the neutral notch grasp the lever and squeeze the lock release handle toward it. Move lever slowly forward to move tractor forward. To move tractor backward push lever to left to clear the notch and pull lever to rear (Figure 6).
3. Set engine speed at desired level, move the hydrostatic control lever to position that gives desired ground speed and release lock release handle.



CAUTION: When operating the tractor for first time the operator should keep tractor ground speeds low until he becomes familiar with the controls and operation of tractor.

STOPPING TRACTOR TRAVEL

HYDROSTATIC TRANSMISSION TRACTORS

To stop tractor motion, grasp hydrostatic control lever and lock release handle and move lever smoothly to the neutral position notch.

In emergencies tractor can be stopped by depressing the foot clutch and brake. Do not start tractor motion or attempt to "inch" tractor with the foot clutch. Always have hydrostatic control lever in neutral when releasing foot clutch. Then use control lever to start.

OPERATING TRACTOR WITH IMPLEMENTS

For operating information with various implements refer to operators manual for the implement. For rotary mowers refer to mower section in rear of this manual.

LUBRICATION & SERVICE

LUBRICATION AND SERVICE - ALL MODELS



CAUTION: ALWAYS stop engine and remove ignition key before servicing inspecting, adjusting or repairing the tractor and any implements being used.

ENGINE OIL - Figure 7

1. Check the engine oil level before starting engine and after each 6 hours of operation.

To check level remove oil dipstick and wipe it clean. Replace in oil fill tube and push firmly all the way down. Remove and check the level. It should be between the "L" and "F" marks on dipstick. NEVER run engine with oil level below the "L" mark. Fill with oil to the "F" mark but DO NOT EXCEED THIS MARK.

2. Change the oil after the first 5 hours of operation and every 25 hours of operation after that. Tractor should be on a level surface when checking or changing oil.

To change oil, have engine hot, clean any dust or dirt from around oil fill tube and remove the dipstick. Then remove the oil drain plug and permit all oil to drain out. Replace drain plug and fill the crankcase up to the "F" mark on dipstick with a high quality detergent oil classified "SC", "SD" or "MS" service of proper viscosity for the prevailing temperature. DO NOT OVER FILL.

Air Temperature	Oil Viscosity
Above 30° F.	SAE 30W
30° to 0° F.	SAE 10W-30
Below 0° F.	SAE 5W-20

NOTE: Nothing should be added to the recommended engine oil.

ENGINE FUEL

1. Use clean, fresh, leaded or non-leaded "REGULAR" grade gasoline. Fill tank completely. DO NOT use premium gasoline and DO NOT mix oil with gasoline (Figures 1, 2 and 6).
2. Fuel filter should be replaced every 100 hours of operation or once a year (Figure 8).



CAUTION: NEVER add fuel, or open fuel line when engine is running or is hot. If gasoline is spilled on the engine wipe it up and permit all of it to evaporate before starting engine.

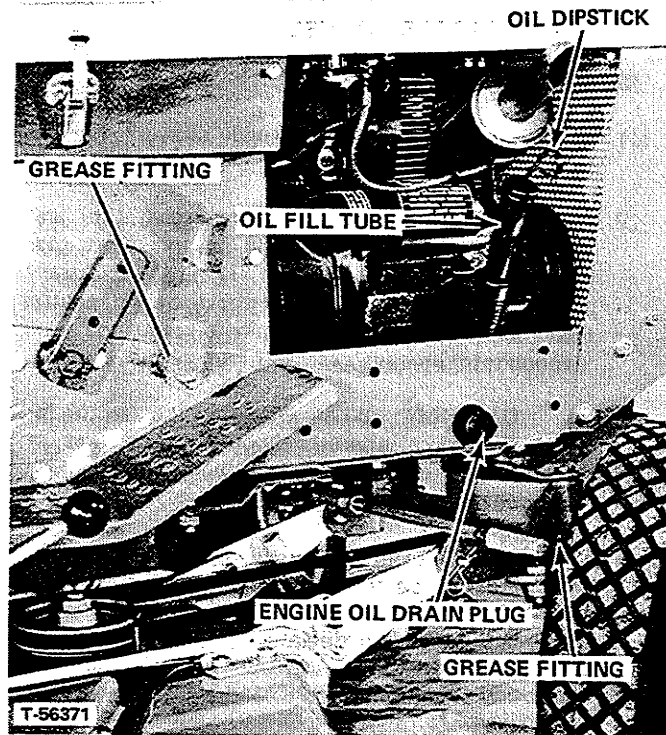


FIGURE 7



FIGURE 8

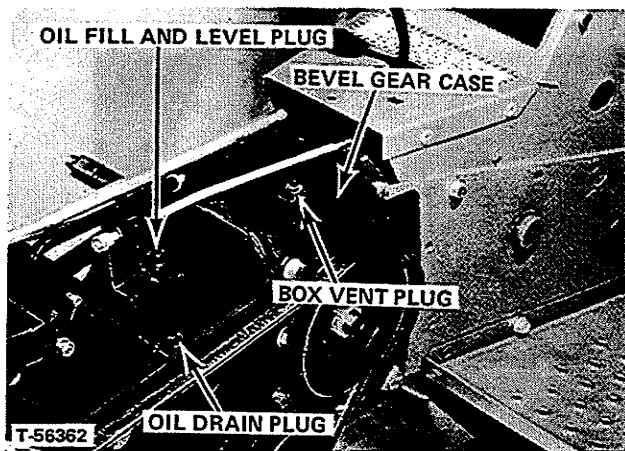


FIGURE 9 - Parts Removed For Clarity

BEVEL GEAR HOUSING (Figure 9)

The bevel gear housing has a capacity of 1 pint of SAE 90 transmission oil and is filled at the factory. Oil level should be checked every 25 hours operating time by removing oil fill and level plug. Oil level should be visible at the bottom of pipe elbow. Add oil if required but do not raise the level up into the upper part of elbow. If too much oil is put in it may be thrown out of vent plug in top of box. There is a drain plug on lower part of rear box cover plate from which excess oil can be drained.

GREASE FITTINGS

There are 5 grease fittings on all 400 Series tractors which should be lubricated every 25 hours of operating time. They are located as follows:

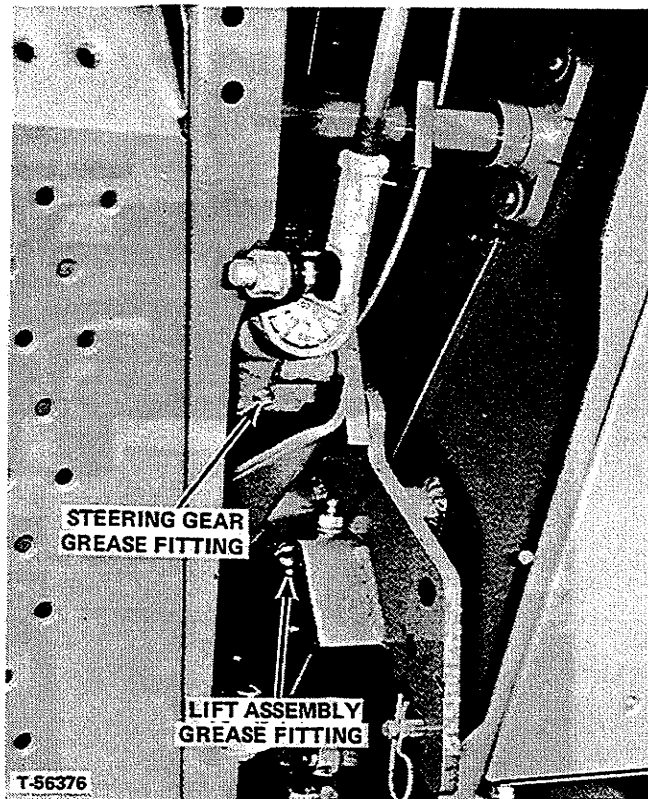


FIGURE 10 - View From Under Tractor

- 2 fittings on front axle (right hand shown) (Figure 7)
- 1 fitting on clutch brake pedal - (Figure 7)
- 1 fitting on steering gear under tractor - (Figure 10)
- 1 fitting on lift assembly under tractor - (Figure 10)

Wipe fittings clean before greasing. Use a standard grease gun with general purpose automotive grease.

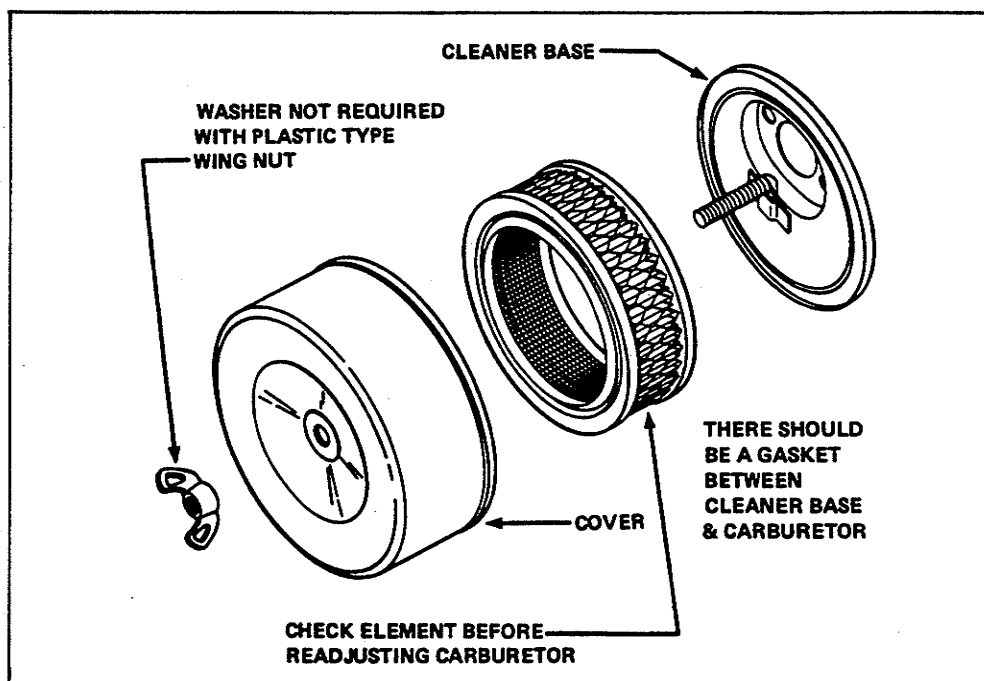


FIGURE 11

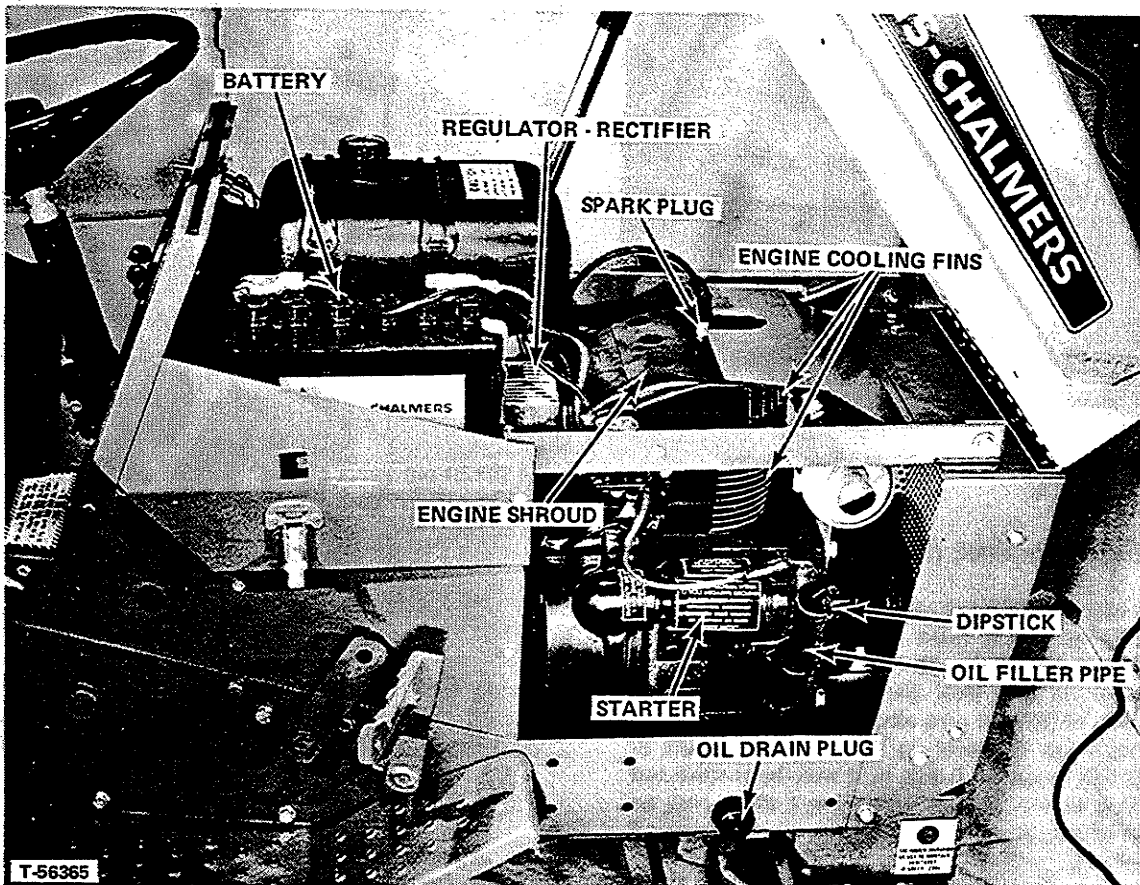


FIGURE 12

LUBRICATE PIVOT POINTS

A few drops of engine oil should be placed on the numerous pivot points on tractor and controls to provide smooth operation and reduce wear. Be careful to keep oil off of belts and pulleys to prevent belt damage.

AIR CLEANER (Figures 8 and 11)

NOTE: Be sure engine is stopped before removing air cleaner.

The Air Cleaner is removed by loosening the wing nut in the center of the Air Cleaner Cover. This is a "Dry Type" Air Cleaner element and should be removed and cleaned after every fifty (50) hours of operation - more often in dry, dusty conditions - and should be replaced after each 200 hours of operation.

A clean Air Cleaner element cannot be overemphasized as dirt induced into the engine air intake system will wear out an engine quicker than long periods of operation. A clogged air system causes a richer fuel mixture than is necessary in the fuel system which can

lead to harmful sludge deposits. Always cover the carburetor when the Air Cleaner is being serviced.

Remove the element and tap lightly on a flat surface to remove loose dirt particles.

NOTE: DO NOT wash the element in any fluid or attempt to blow it off with an air hose.

When replacing the Air Cleaner element, these points must be checked closely.

1. The cleaner base must be securely tightened to the carburetor. If the base is bent or cracked, it should be replaced.
2. There must be a gasket between cleaner base and carburetor.
3. Cover must fit snugly all the way around cleaner base.
4. Wing nut should be finger tight. If other than a plastic wing nut is used, a copper washer must be used between cover and wing nut.

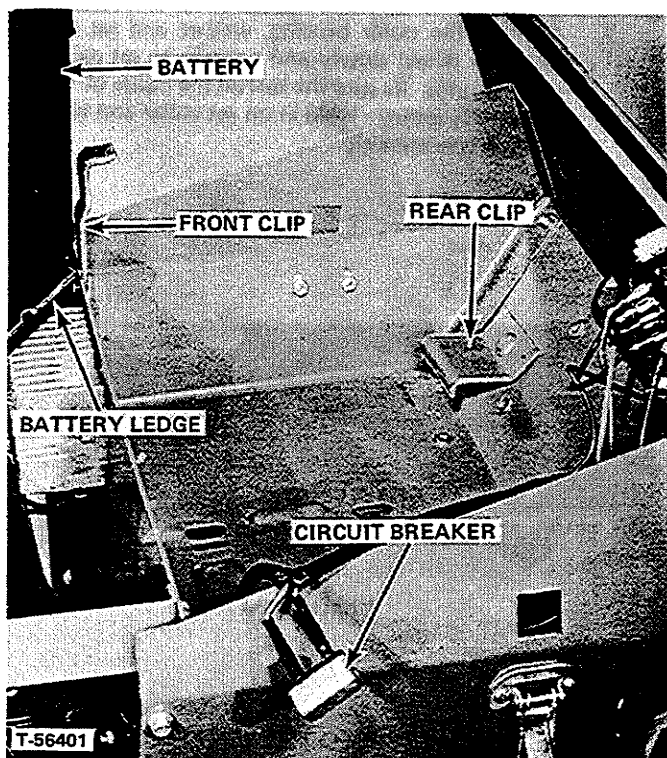


FIGURE 12A - Fuel Tank Removed

ENGINE COOLING SYSTEM (FINS) (Figure 12)

Any grass and other foreign matter build-up around the fins of cooling system will cause overheating of engine, thus shortening engine life.

The Cooling System fins should be cleaned after each day of operation. Special care should be taken to make sure that no build-up of this foreign matter has accumulated around the Oil Filler Pipe area.

Periodically remove engine shroud to thoroughly clean engine cooling fins in rear part of engine.

SPARK PLUG (Figure 12)

The plug should be removed, cleaned and regapped to .025 inch every 100 hours. Use a new plug if needed. Reinstall the plug and tighten.

BATTERY CARE (Figure 12)

NOTE: Always disconnect the negative (—) terminal first, then the positive (+) terminal before removing the battery or working on the electrical system.

A hydrometer test of the battery solution should be made monthly. If the specific gravity tests 1.225 or less, the battery should be removed and thoroughly recharged. At the same time the solution level should be examined and distilled water added when necessary to retain the level of 3/16 inch over the plates. When necessary to add distilled water it should always be done just prior to recharging to mix the added water thoroughly into the

solution. When recharging is necessary and user does not have his own charging equipment, he should request service station to slow charge the battery at a rate of 4 to 6 amperes.

Any collection of grease or any other substance should be kept removed from the top of the battery and the top kept dry and clean at all times. The battery should be kept snug in its cradle and not permitted to get loose.

If removed for charging, it should be fastened back in snugly enough to prevent any movement when in use. Vent caps should be kept tight and the small vent holes in top or side of cap be kept open at all times to permit escape of gases formed in the battery. Care should be exercised not to overfill the battery at any time and to always retain 3/16 inch of solution above the plates.

WINTER CARE

If battery will not be used during the winter months it should be removed and stored in a cool, dry place. Any collection of grease or other substance should be removed from the top of the battery. The battery must be recharged monthly or whenever the hydrometer reads less than 1.225. Before reinstalling the battery in the spring it should always be given a thorough recharge.

CAUTION: DO NOT charge the battery before first disconnecting the Regulator - Rectifier (Figure 12).

REGULATOR - RECTIFIER (Figure 12)

NOTE: When welding anywhere on the tractor be sure to disconnect the Regulator - Rectifier. Failure to do this may result in permanent damage to the Regulator - Rectifier.

The Regulator - Rectifier does exactly what it says it does. First, it regulates the amount of electrical power being produced by the alternator, and at the same time it transforms alternating current to direct current for use on the tractor.

When replacing battery in tractor make certain that ledge on rear of battery is under the rear clip. Rear clip is mounted in a slotted hole permitting it to be moved up and rearward for easy installation of battery. It should then be slid down and forward until front of clip is on top of battery ledge. Push front clip downward and tighten bolts to hold front end of battery in place (Figure 12A).

TIRE PRESSURE

Periodically check tire pressure and maintain 10 P.S.I. in front tires and 8 P.S.I. in rear tires.

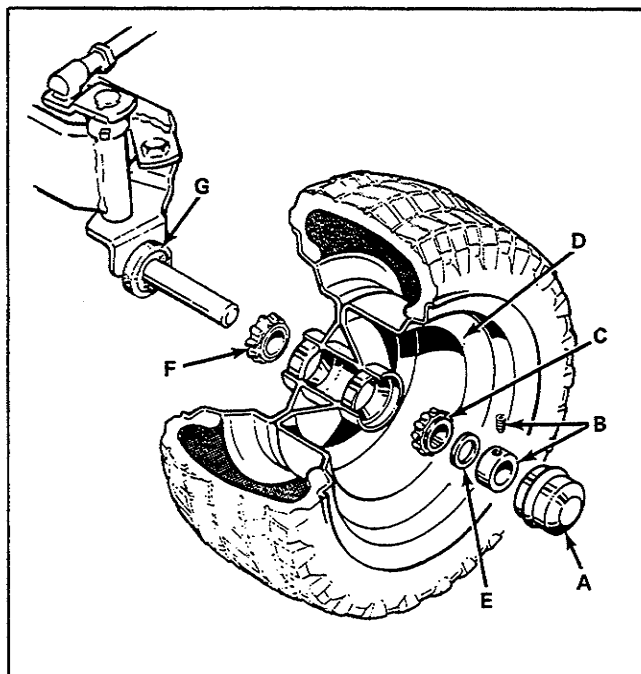


FIGURE 13

FRONT WHEEL BEARINGS (Figure 13)

Every 100 hours of operation or once a year the front wheel bearings should be removed and repacked with grease. Proceed as follows:

1. Block or jack up front of tractor so the wheels are off the ground.
2. Remove cap A by prying it off with screw driver.
3. Use an Allen wrench to loosen setscrew in collar B.
4. Remove the set collar B, washer E, outer bearing C, wheel D.

If seal G remains in hub instead of staying on the bearing shaft remove it and remove inner bearing. Wash the bearing shaft, bearings, wheel housing and seal with a suitable solvent, and wipe dry.

NOTE: IT IS EXTREMELY important that bearings, all other parts, and the grease to be packed with them be kept clean. Bearings should also be replaced in same position from which removed.

5. Using the palm of your hand force a good quality wheel bearing grease into the bearings. Place a coating of grease on seal where it turns in hub.
6. Replace the inner bearing, and seal in hub. Make sure the five washers that were back of seal "G" are placed on the bearing shaft and then slide the wheel on the shaft.

7. Replace the outer bearing, washer and set collar. Spin the wheel slowly and press in on set collar to seat bearings. Be sure the seal on the inside of wheel is properly seated. Hold in on set collar and tighten Allen screw securely.
8. Replace cap A.

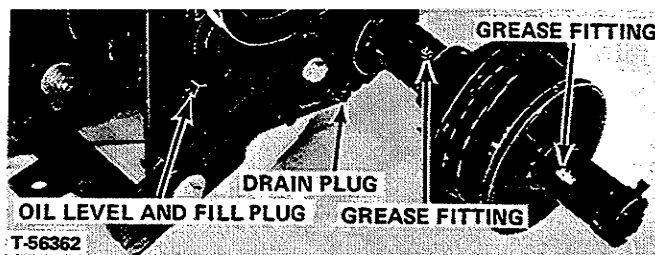


FIGURE 14

TRACTOR WITH 3 SPEED TRANSMISSION:

In addition to the above lubrication and service operations which apply to all 400 Series tractors, the tractors that are equipped with standard 3 speed transmissions must have the following attention:

1. Transmission oil shall be maintained up to the bottom of the oil level and fill plug (Figure 14). Fill with Allis-Chalmers Gear Lube 715 or good quality SAE 90 transmission oil.

If it should become necessary to drain transmission use the drain plug at lower side of housing, (Figure 14).

2. Every 25 hours lubricate two grease fittings on right hand rear axle (See Figure 14), with good grade automotive pressure gun grease.

TRACTORS WITH SHUTTLE CLUTCH

In addition to the above LUBRICATION AND SERVICE items, tractors that are equipped with shuttle clutch must have the following attention:

1. Transmission oil level shall be maintained up to the bottom of the oil level and fill plug (Figure 14). Fill with Allis-Chalmers gear lube 715 or good quality SAE 90 transmission oil.

If it should become necessary to drain transmission use the drain plug at lower side of housing.

2. Every 25 hours lubricate two grease fittings on right hand rear axle (See Figure 15), with good grade automotive type pressure gun grease.

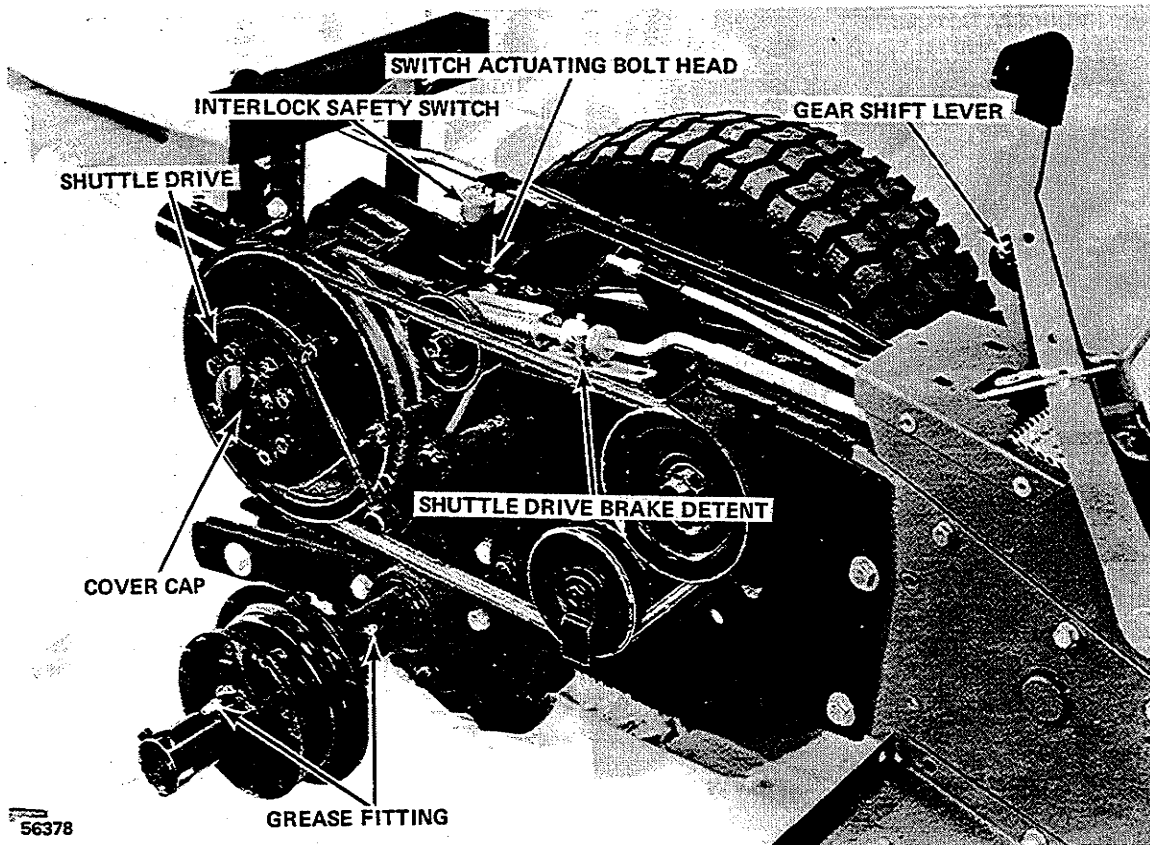


FIGURE 15

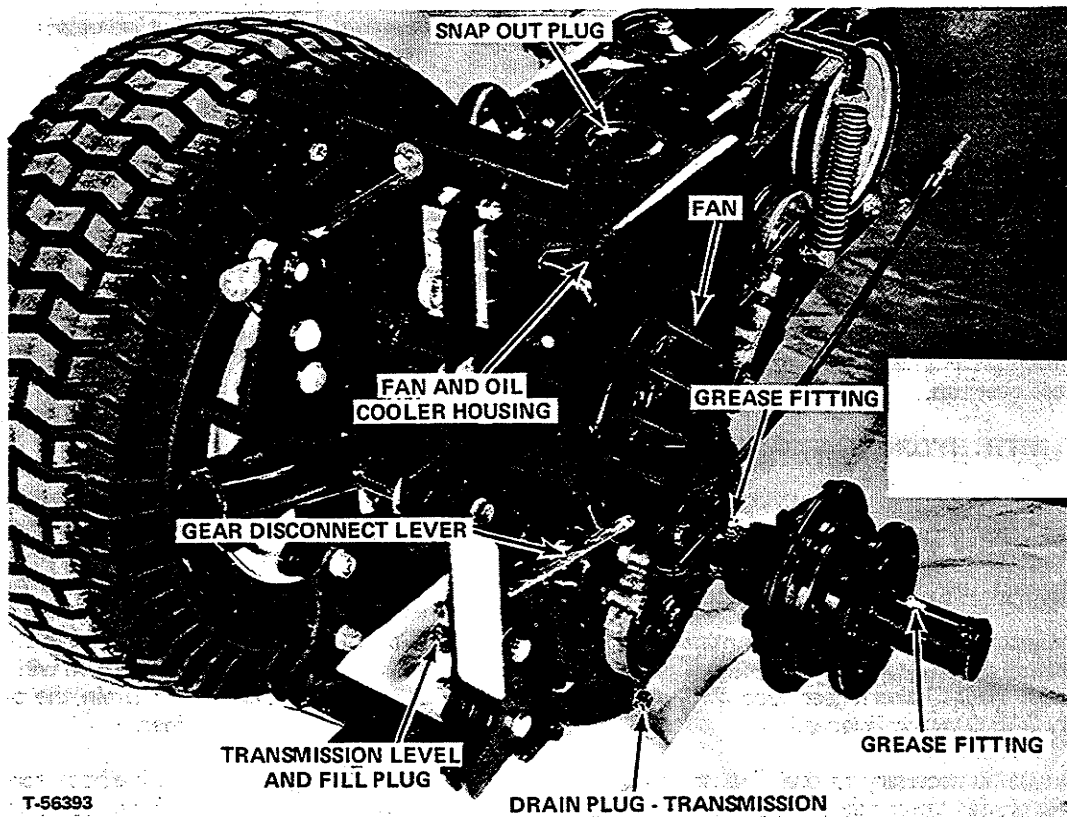


FIGURE 16

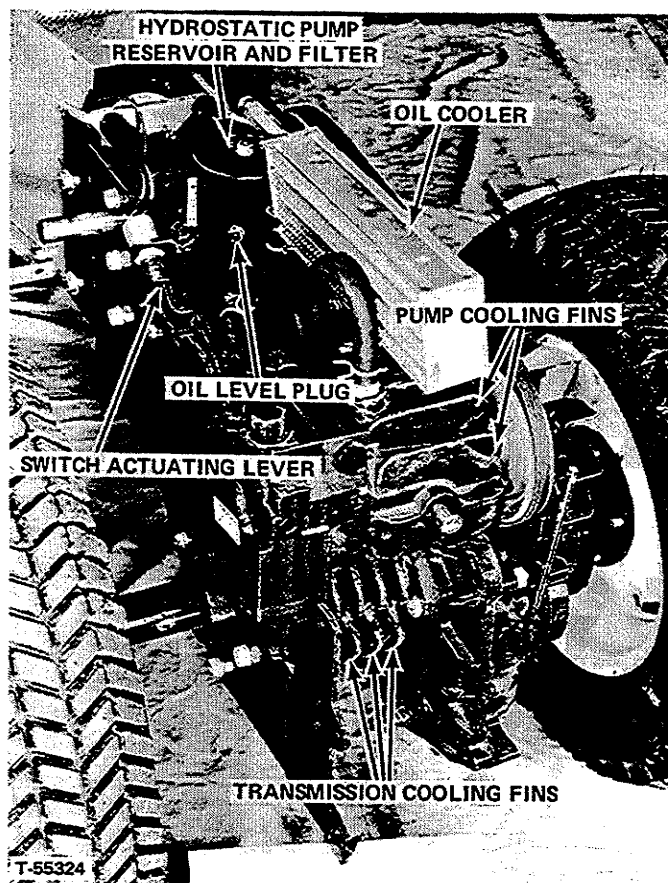


FIGURE 17 - Parts Removed For Clarity

3. At same time apply a small amount of grease to the pin and groove of the shuttle drive brake detent and to the head of the bolt that actuates the interlock safety switch when gear shift lever is in neutral (Figure 15).
4. Every 100 hours or once a year block up rear of tractor and remove right hand rear wheel. With a screw driver remove the cover cap from the shuttle drive (Figure 15). Force pressure gun grease into the space around the differential and pinion gears. Replace cover cap.

TRACTOR WITH HYDROSTATIC TRANSMISSION

In addition to the general LUBRICATION AND SERVICE items listed above for all models of 400 Series tractors, tractors that are equipped with hydrostatic transmission must have the following attention:

1. Transmission oil level shall be maintained up to the bottom of the oil level and fill plug (Figure 16). Fill with Allis-Chalmers gear lube 715 or good quality SAE 90 transmission oil.

If it should be necessary to drain transmission use the drain plug at lower side of housing (Figure 16).

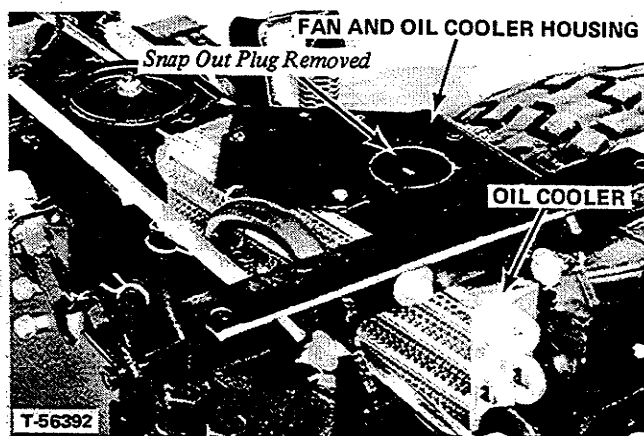


FIGURE 18

2. Every 25 hours lubricate two grease fittings on right hand rear axle (See Figure 16), with good grade of automotive type pressure gun grease.

At same time place a small quantity of pressure gun grease on the tip of switch actuating lever where it contacts trigger of the interlock safety switch (Figure 17).

3. Check the hydrostatic oil level (Figure 17). To be certain of satisfactory performance it is important that the hydrostatic oil is kept absolutely clean and that the level of oil in the oil reservoir be maintained. Before checking the hydrostatic oil level, be certain the outside of the hydrostatic oil reservoir is clean and that no debris can enter the reservoir.

Check the hydrostatic oil level by removing the oil level plug located on the side and near the top of the reservoir. If oil runs out, the reservoir is full and the plug should be replaced. If oil does not run out, replace the oil level plug, remove the nut and cover from top of the reservoir and add oil to the reservoir until it reaches the level of the oil level plug. Use only Dexron ATF (Automatic Transmission Fluid) which is available locally from several major oil companies.

Capacity of the system is 1-3/4 quarts.

4. Hydrostatic oil filter (Figure 17) - The hydrostatic oil filter in the bottom of the reservoir should be changed only when dirt gets into the hydrostatic system. To change the filter, remove the nut and cover from top of reservoir. Have a container ready to catch the oil and disconnect one of the hoses at the bottom of the oil reservoir. Raise the end of the hose and tie it up so oil will not run out of the pump assembly. Drain the oil from the reservoir into the container.

Use two pieces of wire with a hook formed on end to pull large washer and filter up out of reservoir.

Flush reservoir with kerosene and then follow up with 1/2 quart of new oil to flush any dirt from the bottom of the reservoir. Replace hose, install new filter and add Dexron Automatic Transmission Fluid up to the level of the oil level plug. Replace the cover and nut on the reservoir.

5. Keep the pump cooling fins on the hydrostatic pump, and the transmission cooling fins clean for more efficient operation (Figure 17).
6. After every five (5) hours of operation (more often in dusty conditions) remove the snap-out plug from the fan and oil cooler housing and clean fan and cooler with air or water under pressure. Replace the plug by pressing it into the hole in cooler housing (Figures 16 and 18).

OFF SEASON STORAGE - ALL 400 SERIES TRACTORS

When your tractor is to be stored without use for a period of 2 months or more perform the following operations:

1. Drain all gasoline from fuel tank by disconnecting fuel line at fuel filter. Reconnect fuel line, and put about 1/2 cup gasoline back in tank.



CAUTION: NEVER remove or add fuel when engine is hot. If any fuel is spilled wipe it up and allow remainder to evaporate before proceeding with next step.

2. When safe, start engine and allow it to run until all fuel is used up and engine stops.
3. Drain crankcase oil while engine is hot and refill with grade that will be required when tractor is again to be used. Place tag on engine stating grade of oil used.
4. Remove spark plug and pour two tablespoons of SAE 30 oil into cylinder through plug hole. Crank engine two or three times and reinstall spark plug.
5. Clean any dirt or grass from cylinder head cooling fins and engine housing and clean air cleaner element.

6. Cover exhaust outlet tightly with plastic or other water proof material to keep moisture, dirt and insects out of the engine.
7. Completely lubricate tractor as outlined in earlier part of this section.
8. Clean up tractor and apply paint or rust preventive to any areas where paint is chipped or damaged.
9. Be sure the battery is filled to the proper level with water and is fully charged. Battery life will be increased if it is removed and put in a cool, dry place and fully charged about once a month.
10. If the tractor is to be stored 6 months or longer block the tractor up off the wheels to relieve weight and keep the tires off a damp floor. Protect the tires from prolonged exposure to direct sunlight.
11. Store the tractor in a dry place indoors.

STARTING THE TRACTOR AFTER STORAGE

Before starting the tractor after it has been stored, do the following:

1. Remove the blocks from under the tractor.
2. Replace the battery.
3. Unplug the exhaust outlet.
4. Remove spark plug and wipe it dry. Crank the engine a few times to blow excess oil out of the plug hole. Reinstall plug.
5. Fill fuel tank with fresh regular grade gasoline.
6. Check crankcase oil level, and add proper oil if necessary.
7. Start the engine and let it run slowly. DO NOT run at high speed immediately after starting. Be sure to run engine only out of doors or in well ventilated area.
8. Inflate tires to proper operating pressure.

ADJUSTMENTS

ALL 400 SERIES TRACTORS

1. CARBURETOR ADJUSTMENTS (Illustration A)

Lack of power and black sooty exhaust smoke usually indicates that fuel mixture is too rich. An "overrich" mixture may also be caused by a clogged air cleaner - check this before readjusting carburetor. Fuel mixture may be too lean if engine "skips" or backfires at high speed.

Main Fuel Adjustment: For preliminary setting, turn MAIN FUEL screw in clockwise direction until it bottoms lightly (do not force) then back out two (2) turns. With engine thoroughly warmed up and running at full throttle and full load, turn MAIN FUEL screw in until engine slows down (lean setting) then turn screw out until engine regains speed and then starts to slow down (overrich setting). Turn screw back in until it is positioned halfway between lean and overrich settings - when properly adjusted engine will accelerate smoothly and operate with steady governor action.

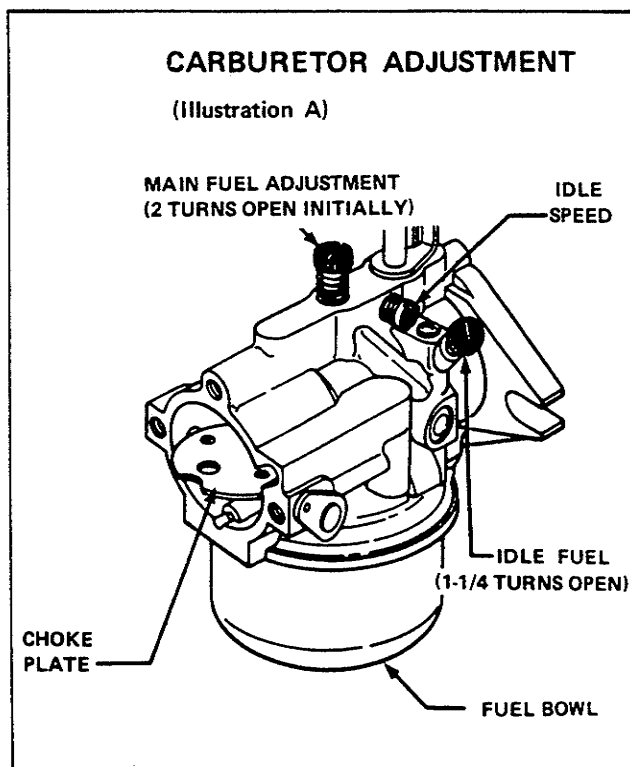
Idle Adjustment: Rough idle is usually caused by the idle speed being set too low. Turn IDLE SPEED screw in (clockwise direction) to increase speed. If engine still idles poorly after speed is increased, stop engine and turn IDLE FUEL screw all the way in (clockwise) until it bottoms lightly (do not force screw), then back out 1-1/4 turns. Restart engine and check idle - turn needle in or out (1/4 turn at a time) until smoothest idle is achieved.

Idle speed should be 1600 to 1800 RPM.

2. GOVERNOR ADJUSTMENT (Illustration B)

The governor functions to maintain engine speed under changing load conditions and also acts as a speed limiting device. Governors are set in the factory and further adjustments should not be required unless linkage works loose or becomes disconnected. Readjustment should be made if engine surges with changing load or if speed drops considerably when a normal load is applied.

Initial Adjustment: With engine stopped, loosen (do not remove) arm retaining nut securing governor arm to governor cross shaft. Grasp end of cross shaft with pliers and turn shaft as far as possible in



counter-clockwise direction - tab on shaft will stop internally against governor gear mechanism. Hold shaft in this position, pull governor arm all the way away from carburetor then retighten arm retaining nut to complete initial adjustment.

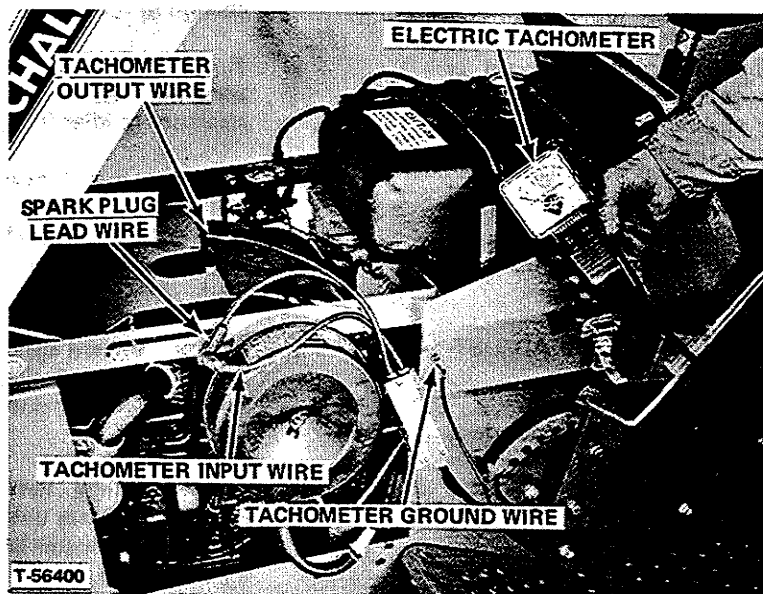
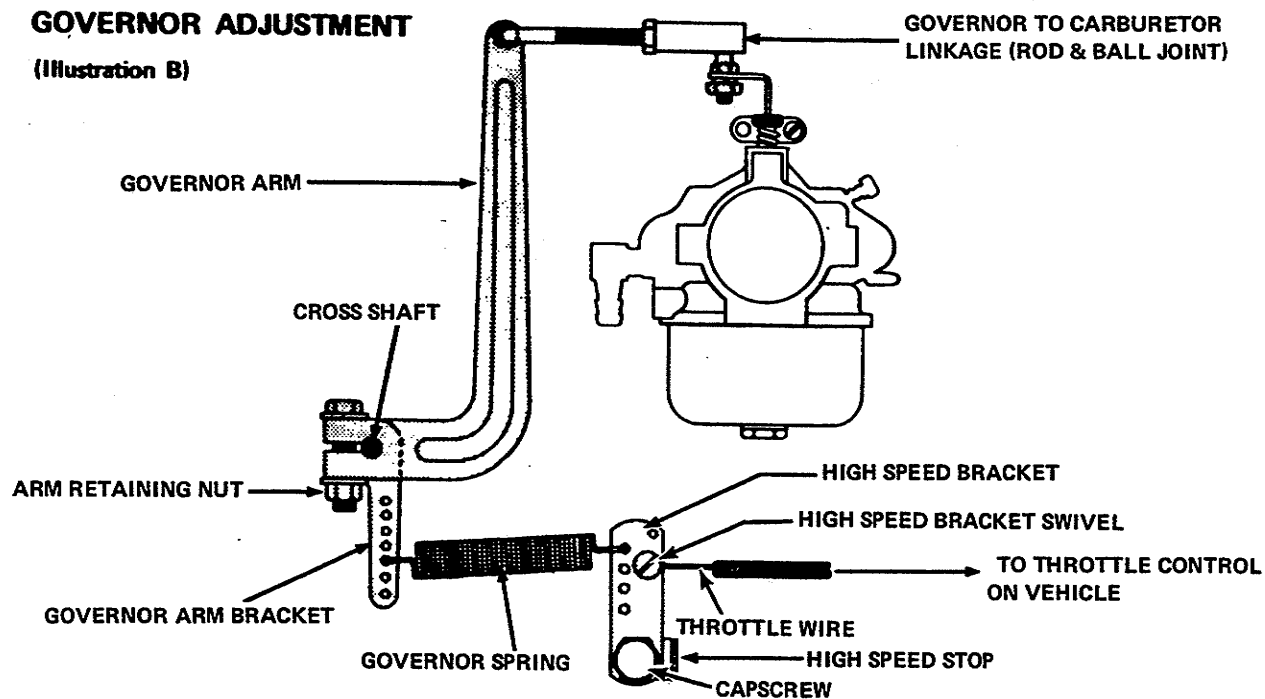
Throttle Wire Installation: If throttle wire has been disconnected, move throttle control handle to full throttle position. Insert throttle wire into hole in high speed bracket swivel. With high speed bracket against high speed stop, tighten swivel screw on throttle wire.

Speed Adjustment: Maximum allowable speed for these engines is 3600 RPM. This speed must not be exceeded. If overspeed condition is suspected, check RPM's with hand tachometer and readjust as follows:

With variable speed type arrangement as shown in illustration, loosen capscrew and move high speed stop bracket until correct maximum speed is attained - retighten capscrew to lock bracket in new position.

GOVERNOR ADJUSTMENT

(Illustration B)

**FIGURE 19**

NOTE: Because of inaccessibility of end of crankshaft in this installation the use of an electronic tachometer attached between spark plug and spark plug lead wire is recommended (See Figure 19). Attach spark plug lead wire to tachometer input wire, attach tachometer output wire to spark plug, and ground wire to tractor frame. Follow instructions with tachometer for use on 4 cycle engines.

Sensitivity Adjustment: If speed drops considerably when a normal load is applied, governor should be set for greater sensitivity. If set too sensitive, speed surging will occur with changing load. Governor sensitivity is adjusted by repositioning governor spring in holes provided in governor arm bracket and high speed bracket. Increase tension on spring (and sensitivity) by moving spring hooks into holes spaced further apart - conversely, decrease sensitivity by reducing tension on spring.

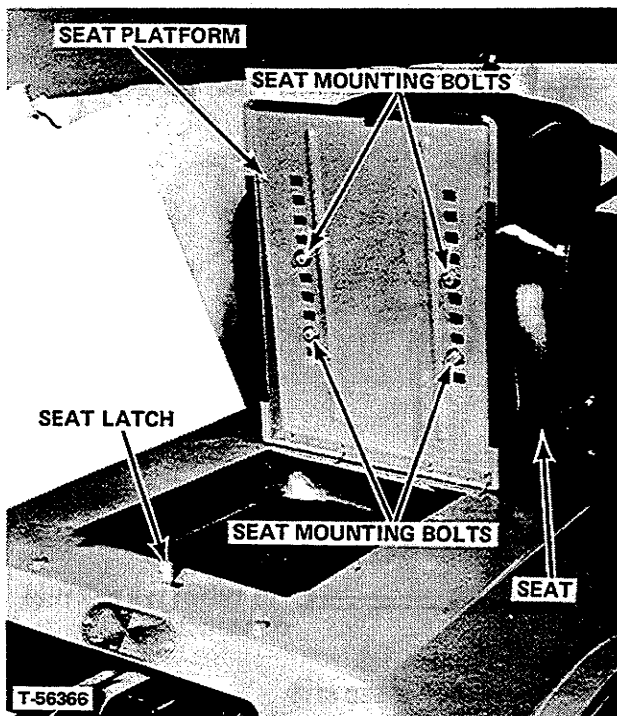


FIGURE 20

3. SEAT ADJUSTMENT

The operators seat may be moved forward or backward to accommodate leg length. To adjust, unlatch seat latch by pushing it to right and lift seat and seat platform, (Figure 20). Remove 4 seat mounting bolts and reposition seat forward or backward until operators right foot is in position for comfortable, effective operation of clutch brake pedal. Bolt seat to seat platform using set of holes nearest the desired seat location.

4. FRONT POWER TAKE OFF IDLER ADJUSTMENT

When using implements driven by the front power take off, the idler pulleys mounted in the idler frame must be adjusted as belts wear and stretch, or when new belts are installed.

Refer to Figure 21. The right hand pulley is spring loaded. As belt stretches the lever and indicator, which are part of the right hand idler pulley mounting, will move forward in relation to the idler frame when indicator gets to the forward edge of the green zone, belt is too loose for proper operation and idler must be readjusted as follows:

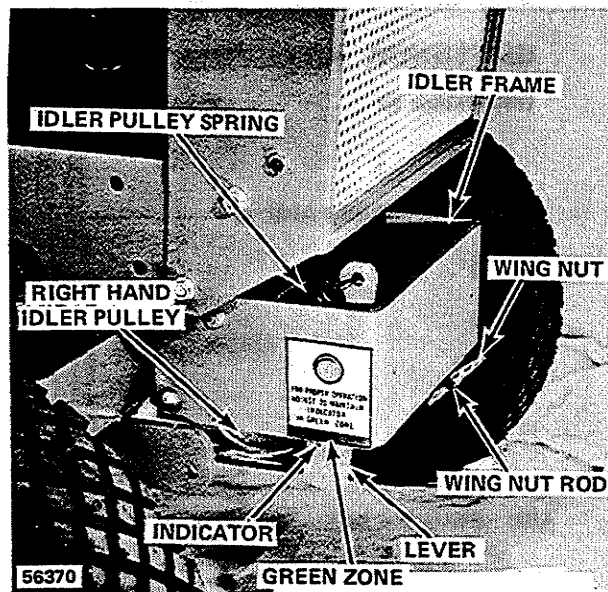


FIGURE 21

1. Turn wing nut counter-clockwise several turns until nut and lockwasher, which are on the wing nut rod back of the idler frame, are loose enough to turn by hand.
2. Turn nut clockwise to move nut rearward on wing nut rod until it has about a half inch clearance to idler frame.
3. Turn wing nut clockwise to pull wing nut rod forward. This moves left hand idler forward and right hand idler rearward. Turn wing nut until indicator is near the rear edge of the green mark.
4. Turn nut forward against lockwasher and idler frame until finger tight, then turn wing nut clockwise until lockwasher is locked against idler frame.
5. When installing new belt turn wing nut counter-clockwise until it is almost at end of wing nut rod. Install belt and adjust as in steps 3 and 4 above.

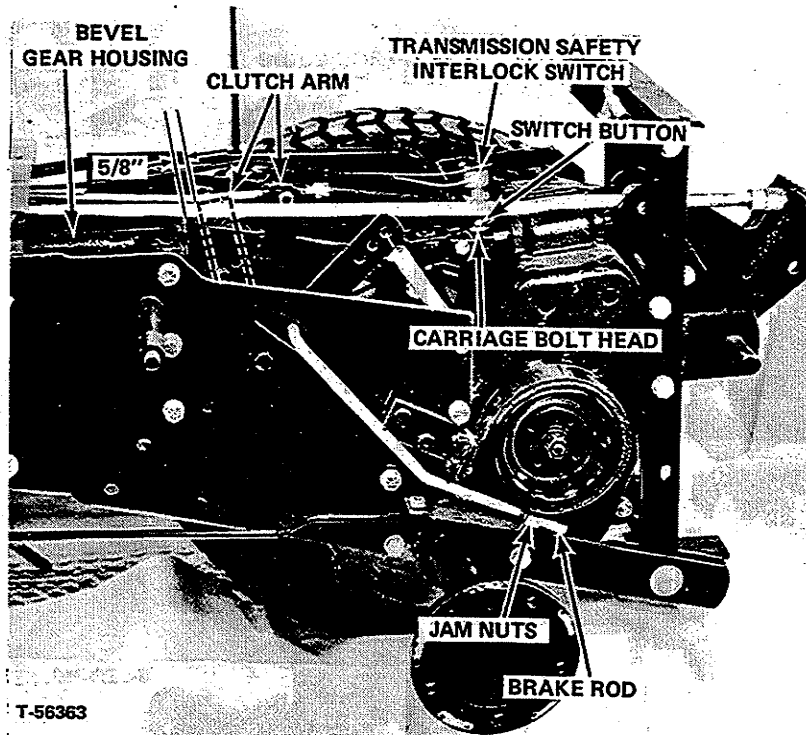


FIGURE 22

TRACTORS WITH 3 SPEED TRANSMISSION

In addition to the 4 adjustments just given that are common to all Series 400 tractors, the tractors that are equipped with standard 3 speed transmission have the following additional adjustments:

1. Adjust jam nuts on rear end of brake rod so that when foot clutch brake pedal is pushed firmly forward clutch arm will stop with its forward edge 5/8 inch to rear of rear corner of bevel gear box (See Figure 22).
2. Loosen jam nut on parking brake rod and turn lever and rod end on parking brake rod so that brake is tight when parking brake lever is pulled up vertically as shown in Figure 23. Tighten jam nut against rod end.

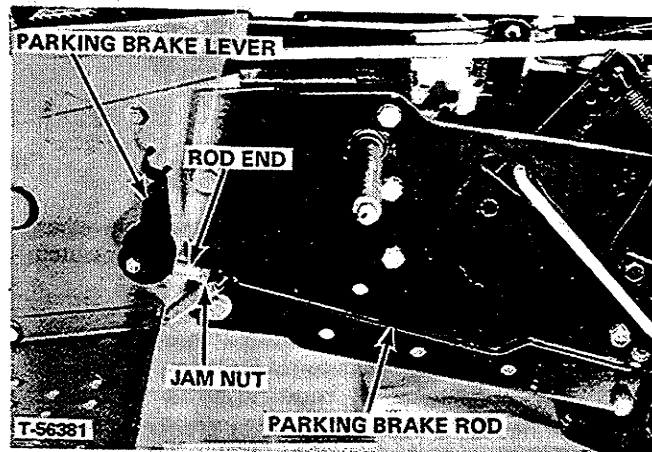


FIGURE 23

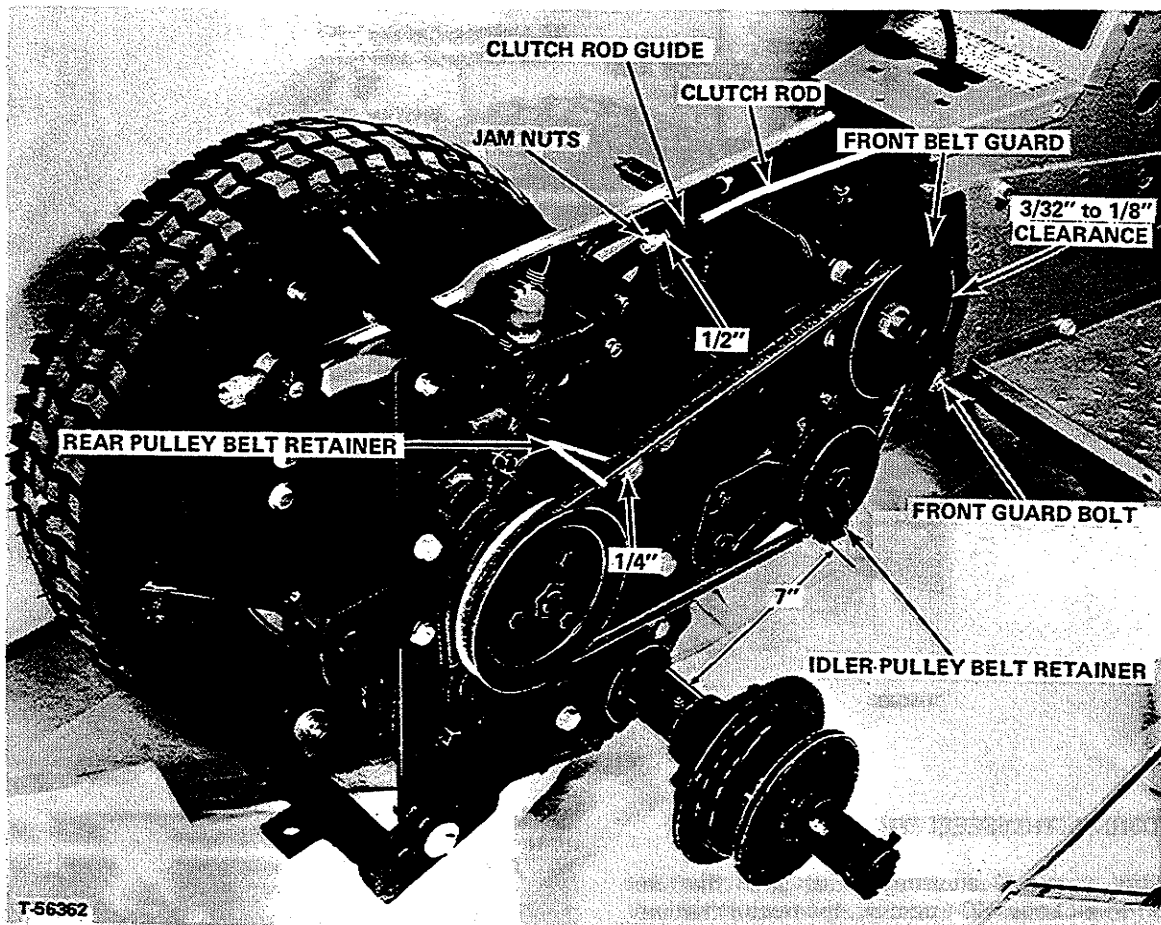


FIGURE 24

3. With clutch pedal up in engaged position adjust jam nuts on clutch rod $\frac{1}{2}$ inch away from clutch rod guide (Figure 24).
4. Rotate front belt guard around front guard bolt until guard has clearance of $\frac{3}{32}$ to $\frac{1}{8}$ inch to outside diameter of front pulley at the closest point. Be sure guard stays in proper location as front guard bolt is tightened (Figure 24).
5. Rotate the idler pulley belt retainer around pulley until rear edge of retainer is 7 inches from front side of axle shaft as shown in Figure 24. Securely tighten bolt through pulley hub.
6. Adjust rear pulley belt retainer to have $\frac{1}{4}$ inch clearance to top of belt (Figure 24).
7. See Figure 22. The transmission safety interlock switch may be adjusted up or down by repositioning the large flat nuts that hold it in its mounting bracket. It should be just low enough that when switch button is resting centered on carriage bolt head as shown the switch is closed permitting the starter to operate. The switch must not be closed when the gear shift lever is engaged in any of the four gear positions.

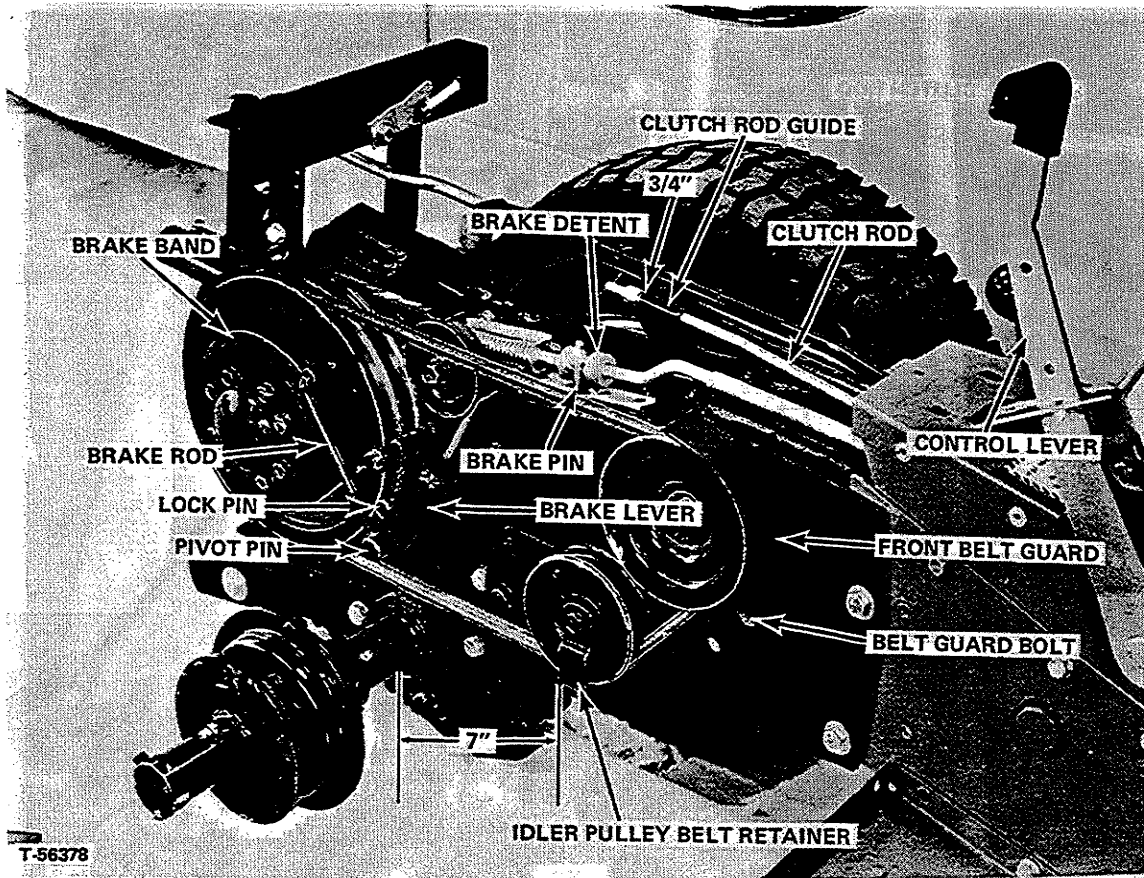


FIGURE 25

TRACTORS WITH SHUTTLE CLUTCH

In addition to the 4 adjustments common to all 400 Series tractors, the tractors that are equipped with shuttle clutch have the following additional adjustments:

1. See Figure 22. Adjust jam nuts on rear end of brake rod so that when foot clutch brake pedal is pushed firmly forward clutch arm will stop with its forward edge $5/8$ inch to rear of rear corner of bevel gear box.
2. Loosen jam nut on parking brake rod and turn lever and rod end so that brake is tight when parking brake lever is pulled up vertically as shown (Figure 23). Tighten jam nut against rod end.
3. With clutch pedal up in engaged position adjust jam nuts on clutch rod $3/4$ inch away from clutch rod guide (Figure 25).
4. Rotate front belt guard around belt guard bolt until guard has clearance of $3/32$ to $1/8$ inch to

outside diameter of front pulley at the closest point. Be sure guard stays in proper location as belt guard bolt is tightened (Figure 25).

5. Rotate the idler pulley belt retainer around pulley until rear edge of retainer is 7 inches from front side of axle shaft as shown in Figure 25. Securely tighten bolt through pulley hub.
6. See Figure 22. The transmission safety interlock switch may be adjusted up or down by repositioning the large flat nuts that hold it in its mounting bracket. It should be just low enough that when switch button is resting centered on carriage bolt head as shown the switch is closed permitting the starter to operate. The switch must not be closed when the gear shift lever is engaged in any of the 4 gear positions.
7. (Figure 25), with control lever in neutral position make sure center of notch in brake detent is centered on brake pin. If necessary loosen setscrew in detent, move it, and retighten setscrew.

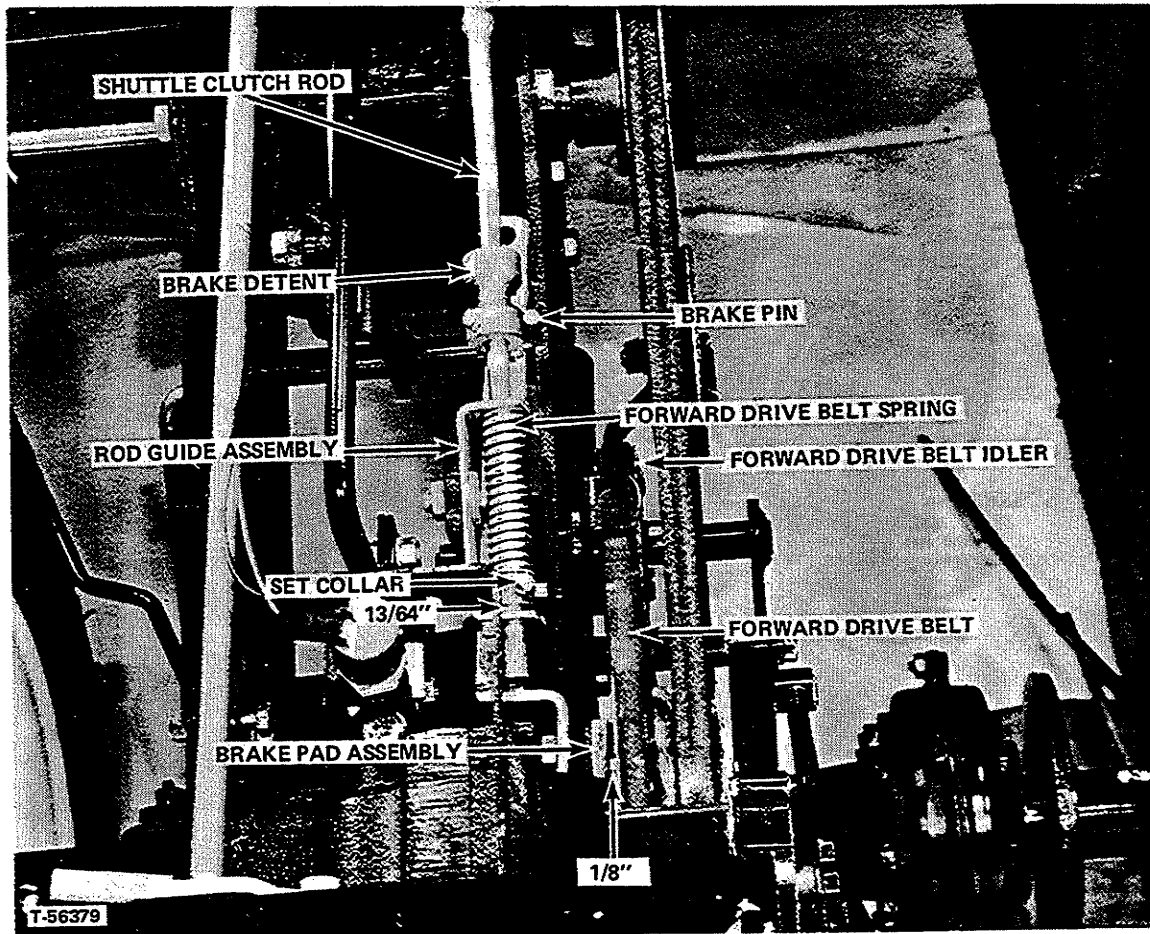


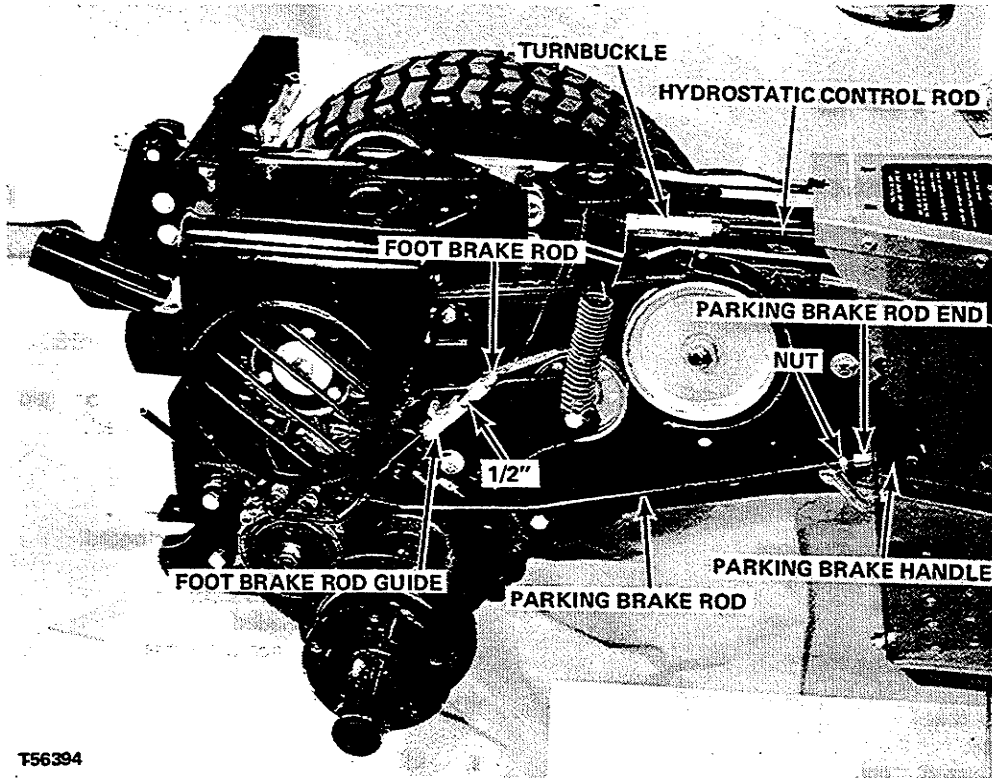
FIGURE 26

8. With control lever in full reverse position adjust brake pad assembly, (Figure 26), to have 1/8 inch clearance between pad and surface of pulley.
9. With control lever in neutral position loosen set-screw in set collar behind forward drive belt spring (Figure 26). Move rod guide assembly and spring forward until slack is taken out of forward drive belt. Tighten setscrew. Move control lever to the full forward position. There should now be 13/64 inch clearance between rear surface of set collar and rear leg of rod guide assembly (Figure 26). If necessary reset set collar to obtain the 13/64 inch dimension when control lever is fully forward.
10. See Figure 25. With control lever in neutral position rotate pivot pin on threads on brake rod so that when pin is reinstalled in hole in brake lever all of the slack will be taken out of brake band. Fasten pivot pin in place in brake lever with lock pin.

TRACTORS WITH HYDROSTATIC TRANSMISSIONS

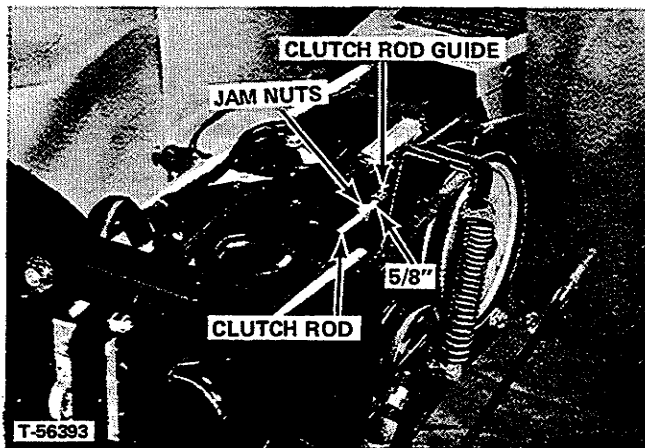
In addition to the 4 adjustments listed at beginning of this section for all 400 Series tractors, those tractors with hydrostatic transmissions have the following adjustments:

1. (Figure 27), loosen nut from rod end at front of parking brake rod. Turn parking brake handle and



T56394

FIGURE 27

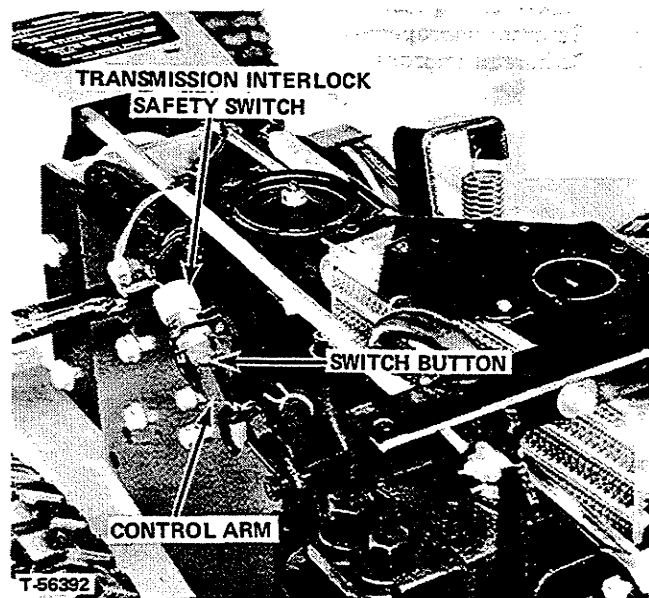


T-56393

FIGURE 28

rod end until parking brake is fully tight when parking brake handle is pulled up against fender as shown.

2. With parking brake tight adjust jam nuts on end of foot brake rod to provide 1/2 inch clearance to rod guide (Figure 27).
3. Adjust jam nuts on clutch rod to have 5/8 inch clearance from clutch rod guide as seen in Figure 28.
4. With the hydrostatic control lever against the neutral position notch, the turnbuckle on the hydrostatic control rod can be turned to adjust the



T-56392

FIGURE 29

control so that the actual neutral condition does occur when control lever is on neutral notch (Figure 27).

5. Check that transmission interlock safety switch is properly located that the switch button is depressed far enough to make contact only when the hydrostatic control is in neutral. Switch can be moved in its mounting bracket to align tip of control arm and switch button (Figure 29).

SERVICE TIPS

HARD STARTING OR LOSS OF POWER

- a. **Faulty ignition.**
 - 1. Leads grounded or loose.
 - 2. Spark plug faulty or improperly gapped.
 - 3. Coil, points or condenser defective.
- b. **Faulty carburetion.**
 - 1. Fuel line or filler clogged (dirt-gum).
 - 2. Fuel pump faulty.
 - 3. Carburetor dirty or improperly adjusted.
- c. **Poor compression.**
 - 1. Head loose or gasket leaking.
 - 2. Valves sticking or leaking.
 - 3. Piston rings worn.

OPERATING ERRATICALLY

- a. Clogged fuel line.
- b. Water in fuel.
- c. Vent in gas cap plugged.
- d. Faulty fuel pump.
- e. Gasket leaking (carb.-manifold).
- f. Governor improperly set.
- g. Carburetor improperly adjusted.

KNOCKING

- a. Fuel octane too low.
- b. Carbon build-up in combustion chamber.
- c. Engine overheated.

OCCASIONAL "SKIP" AT HIGH SPEED

- a. Spark plug fouled, faulty or gap too wide.
- b. Carburetor improperly adjusted.

OVERHEATING

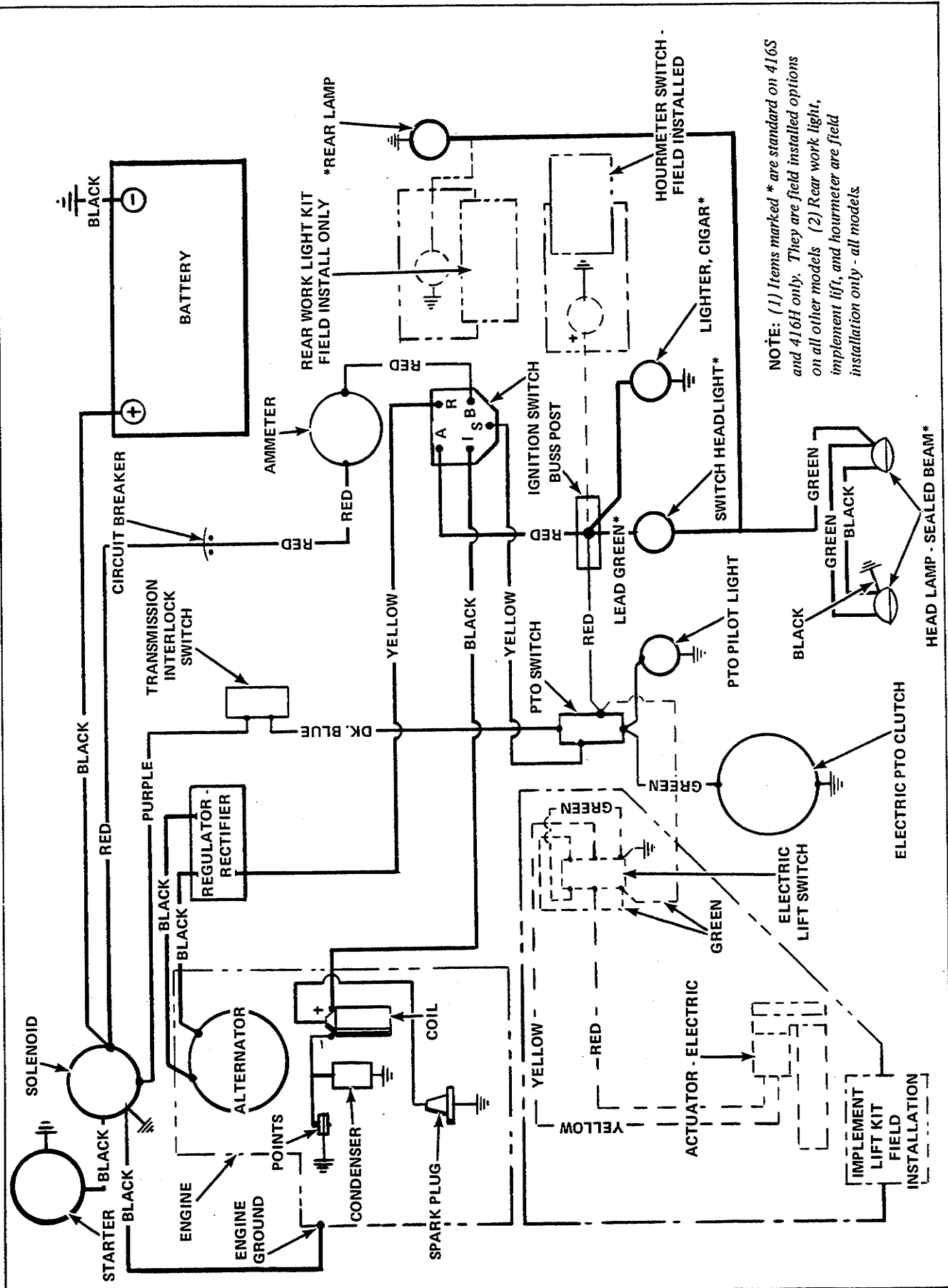
- a. Air intake screen or fins clogged.
- b. Oil level too high (or low).
- c. Fuel mixture too lean.
- d. Engine overloaded.
- e. Tappet clearance too close.

IDLES POORLY

- a. Idle speed too low.
- b. Idle Fuel improperly adjusted.
- c. Gasket leaking (carburetor to manifold).
- d. Spark plug gap too close.

BACKFIRING

- a. Carburetor set too lean (Main Fuel).
- b. Valve sticking.



WARRANTY

ALLIS-CHALMERS CORPORATION (the Company) warrants new products sold by it to be free of defects in workmanship and material at the time of shipment from the Company's factory. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THOSE SPECIFIED HEREIN.

No warranty of any kind, statutory, implied or otherwise, is made or shall be imposed upon the Company with respect to (1) second-hand products, (2) new products which, after shipment from the Company's factory, have been subject to operation in excess of recommended capacities, misuse, negligence, or accident, or have been altered or repaired in any manner not authorized by the Company, or (3) tires and engines except that the Company agrees to make available to the first user whatever warranty benefits may be made available to the Company by the manufacturer of any such tires or engines, (4) batteries which are guaranteed under the Company's separate Battery Service Adjustment Policy.

The Company will repair or replace, without charge, any part which under normal use and service fails to conform to this warranty, provided that such part shall be returned to the Company's factory or to the Company's authorized Dealer, transportation charges prepaid, as follows:

A. Within first twelve months (Parts and Labor).

B. Within second twelve months (Parts at 1/2 the suggested list price at time of replacement).

The Company will replace any part purchased as a repair part from an authorized Dealer, which under normal use fails within 90 days after purchase and which is returned to the Company's factory or to the Company's Dealer from whom the part was purchased, transportation charges prepaid.

The Company's liability whether in contract or in tort arising out of warranties, representations, instructions, or defects from any cause shall be limited exclusively to repair or replacing parts under the conditions as aforesaid.

No representative of the Company has authority to change this warranty and no attempt to repair or promise to repair or improve the product by any representative of the Company shall change or extend this warranty.

THE ALLIS-CHALMERS BATTERY SERVICE ADJUSTMENT POLICY

1. If within a period of 90 DAYS after day of sale to the original user, either as a new equipment battery or as a replacement battery, an Allis-Chalmers battery becomes unserviceable (not merely discharged) in normal use, due to defective material or workmanship, the Allis-Chalmers Manufacturing Company will replace it with an equivalent new Allis-Chalmers battery, without charge, to the original user.
2. If after the expiration of such 90 DAYS but before the expiration of 24 months from date of sale to the original user (each such month being designated herein as a unit of service) an Allis-Chalmers battery becomes unserviceable (not merely discharged) in normal use, due to defective material or workmanship, it will be replaced for the original user, in exchange for the unserviceable battery, with an equivalent new Allis-Chalmers battery at an adjusted price. This adjusted price shall be determined by applying to the then current retail price of the new battery, the percentage of the maximum (24) units of service which was received from the unserviceable battery.

LIMITATIONS

No-charge replacements or adjustments under this policy may be made by any authorized Allis-Chalmers Lawn and Garden Equipment dealer.

This policy does not cover the following:

1. Unserviceability due to abuse or neglect, failure to maintain recommended electrolyte level, fire, wreckage, explosion, freezing, the addition to the battery of any chemical or solution other than approved water or battery grade sulfuric acid of proper gravity, the use of a group size smaller than the group size of the original equipment battery, or continued operation of the battery in an undercharged condition (below half charge — 1.190 sp. gr.).
2. Breakage of containers, covers or posts.
3. The cost of transportation, service calls, recharges or the use of rental batteries.

Proof of date of purchase is required for all claims. This policy is void if the date coding on the battery is removed or destroyed.

ROTARY MOWER

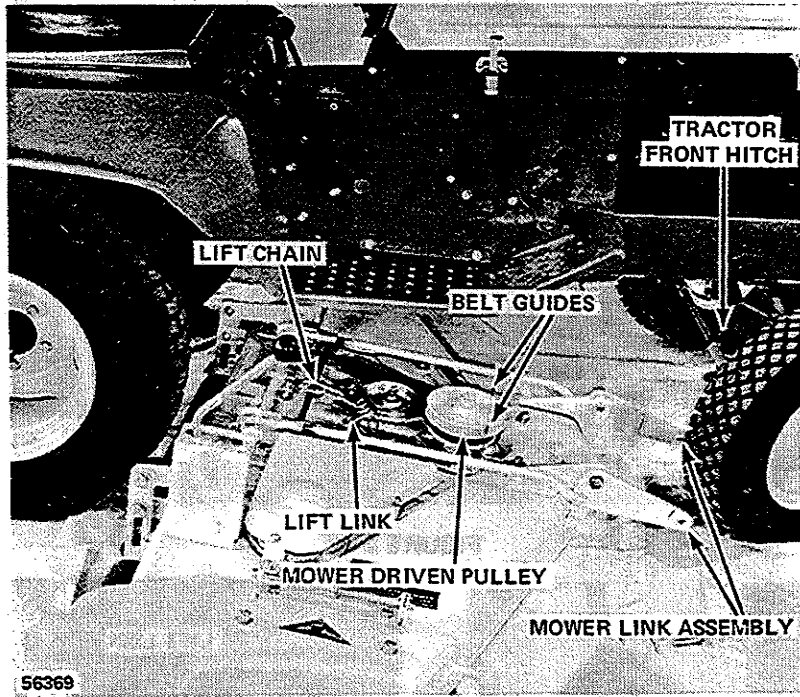


FIGURE 1

42" AND 48" ROTARY MOWERS

ATTACHING THE MOWER

1. Park the tractor on level ground and place the mower at right side of tractor. Turn tractor wheels hard to the left and place mower height adjusting lever in the lowest position. Slide mower into place under tractor (Figure 1).
2. Lift front of mower and align holes in mower link assembly with holes in tractor front hitch and install round head pins and lock pins as shown in Figure 2.
3. With mower in low cutting position, loosen wing nut and back it off almost to end of wing nut rod (Figure 3). Place belt over electric clutch pulley, (Figure 2), over the right hand and left hand idler pulleys, and over the mower driven pulley.
4. Tighten wing nut at front of tractor to tighten drive belt. Continue turning wing nut until the indicator (Figure 3) moves into the rear half of "green" zone on decal on right side of idler frame. Turn nut and lockwasher on wing nut rod down against inside of idler frame and tighten wing nut tight.
5. Adjust belt guides to 1/16 to 1/8 inch clearance with mower belt (Figure 2).
6. Assemble the lift link, (Figure 1) to the fifth link of lift chain and attach lift link to the lift arm under tractor with a pin and lock pin (Figure 4).

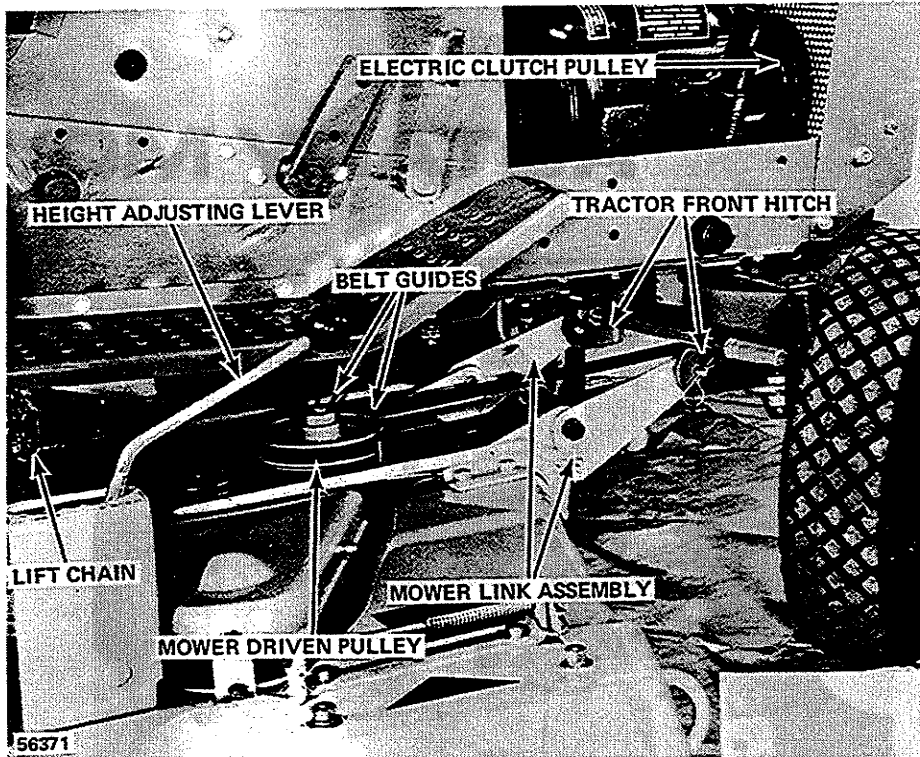


FIGURE 2

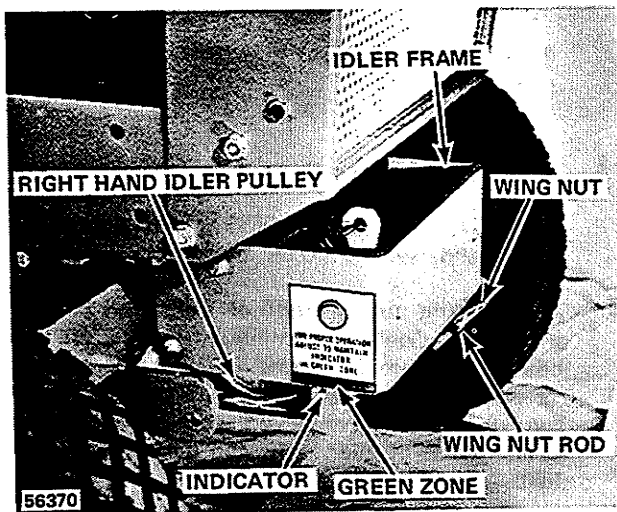


FIGURE 3

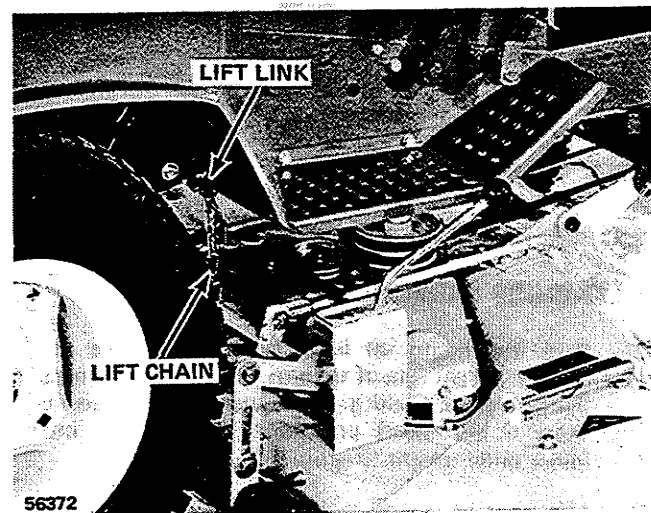


FIGURE 4

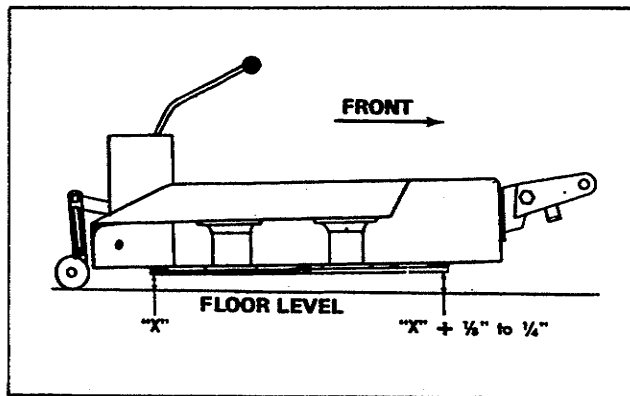
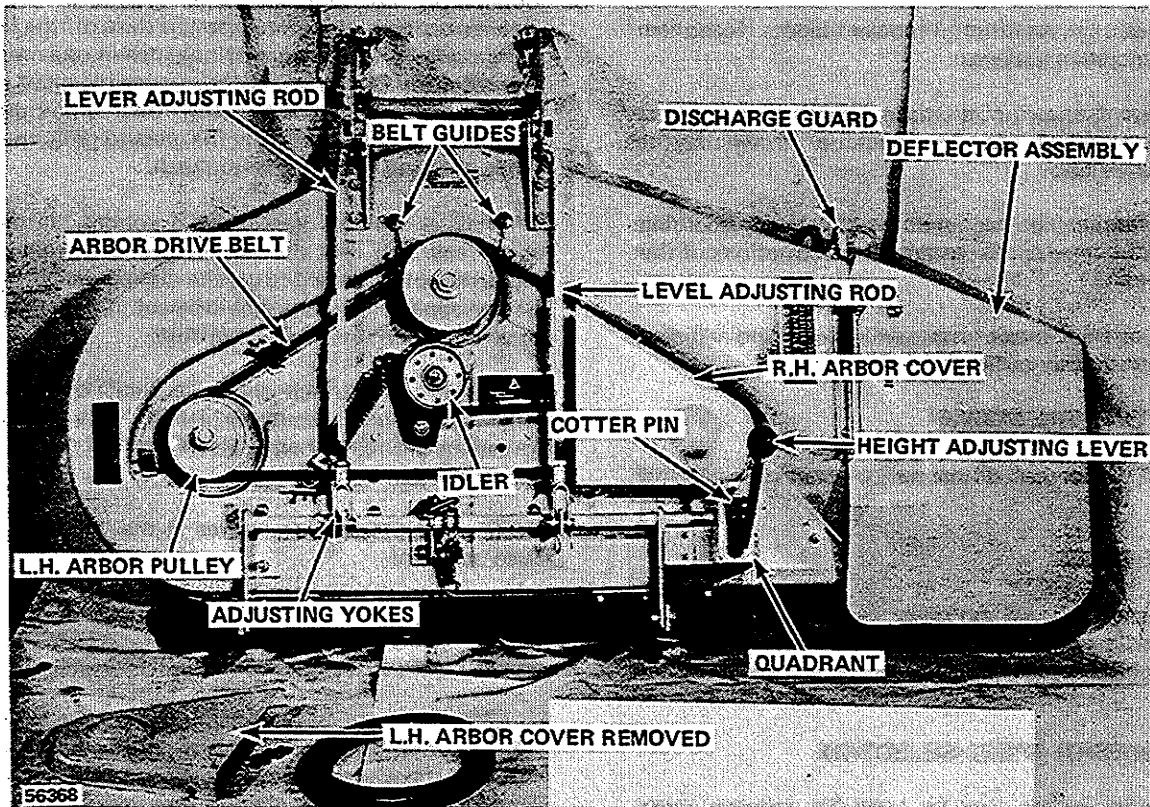
REMOVING MOWER FROM TRACTOR

Referring to Figures 1 through 4:

1. Park tractor and mower on level ground with sufficient space to right side of tractor for the mower.
2. Lower tractor lift and disconnect lift link from lift arm. Move the mower height adjusting lever fully forward to put mower in lowest position.
3. Loosen belt tightening wing nut on front of tractor and remove drive belt from idler pulleys and electric clutch pulley on engine.
4. Remove pins and lock pins holding mower link assembly to tractor front hitch and lower front of mower to ground.
5. Turn tractor wheels fully to left and slide mower out to right side of tractor.

OUT OF SERVICE PROTECTION (STORAGE)

1. Remove the mower from the tractor. See above.
2. Use water under pressure to thoroughly clean the mower to remove any buildup of grass clippings and dirt under the mower deck.
3. Cover any area where paint has been worn or chipped away with paint or a light coat of oil.
4. Store the mower in a dry place.

**FIGURE 5****FIGURE 6****LEVELING THE MOWER (Figures 5 and 6)**

With the tractor and mower on a level surface rotate the three blades so that the blade tips are pointed toward the front of the mower. Measure the distance from the front tip of the center blade to the ground. Then measure the height of the rear tips of side blades. The front tip of center blade should be 1/8 to 1/4 inch higher than rear tip of side blades. The rear tips of right hand and left hand side blades should be the same distance above ground.

To adjust, turn the adjusting yokes on the rear end of level adjusting rods. Turn the yoke on both rods to obtain the 1/8 to 1/4 inch difference in height from front tip to back tip. Turn only one yoke to obtain same height of the side blades for side ways leveling.

CUTTING HEIGHT

Cutting height from 1-1/4 inches to 3-3/4 inches can be selected by adjusting the height control lever up or down. To adjust, move lever sideways to release from notch and move lever to desired height.

A cutting height of approximately 2 inches is average and normal. The lower settings should be used only for smooth lawns where short grass is desired. The higher settings are for rougher areas or for very high grass.

BEFORE OPERATING MOWER

1. Read this manual and the manual covering the tractor very carefully. Be sure you are familiar with the safety precautions, controls and operating instructions.
2. Check the mower carefully to be sure it is properly installed.



CAUTION: NEVER operate the mower unless the deflector assembly and discharge guard are both fastened securely in place, (See Figure 6), or unless the vacuum collector adaptor is in place.

3. Check the condition of mower blades. Keep them sharp and in balance.
4. Clear the lawn of all sticks, stones, wire and other debris which may be caught or thrown by the mower blade.
5. Determine the best method of mowing according to the dimensions, terrain and obstructions of the lawn.
6. Be sure that mower is properly leveled and adjusted as previously outlined.

OPERATING THE MOWER

Refer to tractor part of manual for starting engine and tractor.

ENGINE SPEED

Engine speed should normally be operated at 2/3 to full throttle when mowing. When grass is wet or over 3 inches high engine should be run at full speed for best results.

TRANSMISSION SPEED SELECTION

All forward speeds may be used for mowing under some conditions. The higher speeds should only be used in smooth level lawns with moderate to light grass crop. Always select a forward speed that is slow enough to assure that you can properly and safely control the tractor over the ground conditions encountered.



CAUTION: When operating the mower for first time put the transmission in low speed until you become acquainted with the controls and operation of the tractor and mower.

MOWING PATTERN

The size and type of area to be mowed determines the best mowing pattern to use. Obstructions such as trees, fences, and buildings must also be considered. In most cases, making one or two passes in a clockwise direction around the outside of the area to be mowed is

advisable to keep cut grass off of fences, walks, etc. The remainder of the mowing should normally be done in a counter-clockwise direction so the clippings are dispersed on the cut area.

On moderate size, frequently mowed lawns where the grass is light, it is practical to mow in a clockwise direction so the grass clippings are thrown toward the center of the lawn and concentrated for easy pickup and removal.

MOWING TIPS

Most lawns should be mowed to keep the grass approximately two to three inches high. Best results are obtained by cutting often and not too short. To keep a green lawn, never mow more than one third off the height of the grass or a maximum of one inch in one mowing. For extremely tall grass, set the cutting height at maximum for the first mowing, then reset to the desired height and mow again. Allow the grass to grow to three inches, then cut off only the top inch.

On thick or springy grass or soft ground, the mower rollers may sink into the ground giving too low a cut. Adjust the cutting height to get the desired height of cut. For best appearance, grass should be cut in the afternoon or evening when it is free of moisture.

To transport the mower, disengage the PTO control to stop the rotation of the mower blades. Raise the mower to a safe height to clear any objects that the tractor may pass over while in transit.

NOTE: Do not operate mower in the "transport" or raised position.



CAUTION: DO NOT WORK around mower housing area until you are certain that the mower blades have stopped rotating.



Heed the CAUTION SIGN and the SAFETY FIRST SIGN located on the mower housing. Make certain the discharge guard and deflector assembly are always in place before operating mower.



CAUTION: ALWAYS disconnect the power take off drive and stop engine before leaving the tractor seat. If leaving the tractor and mower unattended remove the ignition key.

BELTS

The mower drive belt and the arbor drive belt are specially constructed to insure proper operation and long life from the mower. The arbor drive belt is spring tensioned and requires no adjustment. Replace belts only with genuine replacement belts ordered from your dealer.

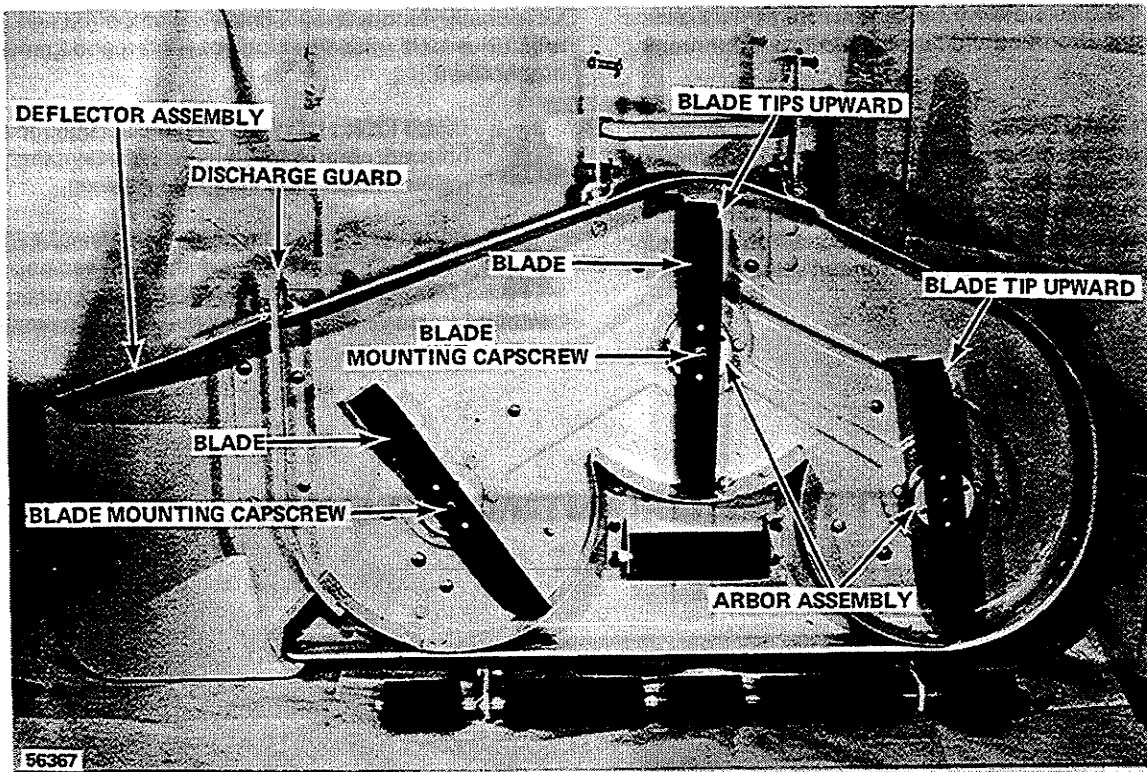


FIGURE 7

BELT REPLACEMENT

The mower drive belt can be replaced by the steps as outlined in the section headed Attaching The Mower.

The arbor drive belt can be replaced by loosening the hex nuts on the left and right hand arbor covers (3 on each cover) and lifting the covers off (Figure 6). Spring the idler pulley over with a wrench and remove the old belt. Put the new belt around the pulleys as shown and spring the idler pulley into place. Slip the arbor covers back over the capscrows, making sure that the flat washers and lockwashers are on the outside and tighten the hex nuts down to secure the covers into place.

BLADE REPLACEMENT

DO NOT attempt to remove the blades unless you have the correct size box or socket wrench to fit the blade mounting capscrow.

To remove the blades, first remove mower from tractor and turn it upside down as shown in Figure 7.

Then securely wedge a block of wood between the blade and the housing in such position that it will hold the blade safely while loosening or tightening the blade mounting capscrow.

DO NOT attempt to remove the arbor assemblies. Take out blade mounting capscrows only.

Be sure to note the exact location of the large spring washers, the shouldered spacer and the lockwasher under head of capscrow and replace in exact same arrangement when reinstalling blades.



CAUTION: ALWAYS handle the blade with care to avoid injury.

To sharpen blades yourself clamp blade securely in a vise and use a large mill file along the original bevel. File to a sharp edge.

To balance blade, place a small rod through center hole to see if blade rests with both ends balancing evenly. File heavy side of blade until it balances out even.

NOTE: Your Allis-Chalmers Dealer is equipped to sharpen and balance your mower blades. For expert service and quality parts, see your authorized Allis-Chalmers Dealer.

BEFORE the blades are reassembled, the arbor assembly faces **MUST** be scraped clean of all accumulations of dirt, grass or other foreign matter. This will insure a positive "fit" of the blades to the arbor assembly faces when the capscrows are tightened. The capscrows should be tightened to 60 foot pounds of torque, or if a torque wrench is not available, tighten securely with a hand wrench.

NOTE: The blades must be mounted so that the angled blade tips are on top or face the underside of the mower housing.

Rotate the blades slowly by hand to see that they clear the housing all around and that the blade tips are running true.



CAUTION: ALWAYS check mower for broken parts immediately after striking any solid object. If a mower blade is bent, it should be replaced rather than straightened and reused. Any broken parts should be replaced. Replacement blades should be ordered only from your Allis-Chalmers Dealer.



CAUTION: DO NOT WORK around mower housing area until you are certain that the mower blades have stopped rotating.



Heed the CAUTION SIGN and the SAFETY FIRST SIGN located on the mower housing. Make certain the discharge guard and deflector assembly is always in place before operating mower.

SETTING UP INSTRUCTIONS

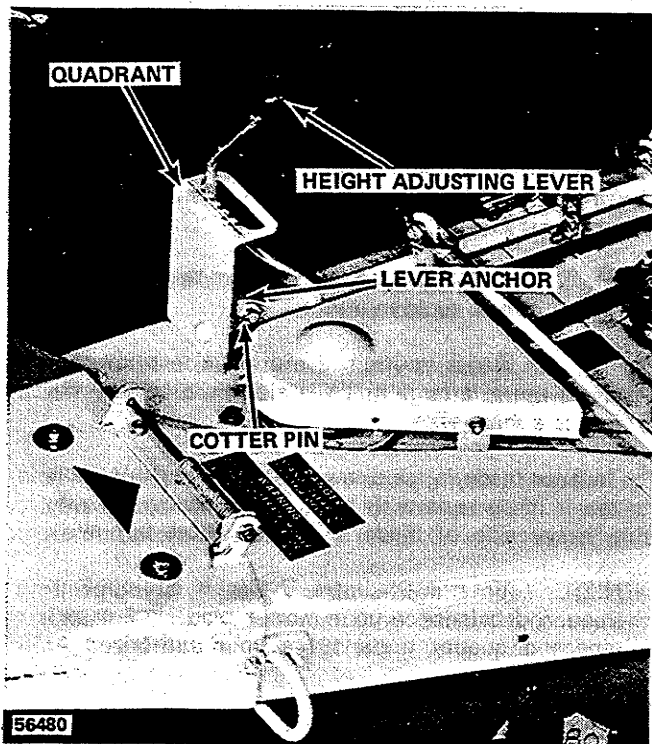


FIGURE 8

After unpacking mower perform the following operations.

1. Place end of height adjusting lever through slot in quadrant and insert end in lever anchor. Install cotter pin in end of lever (Figures 6 and 8).
2. Bolt the deflector assembly to mower outlet as shown in Figure 9, using two bolts, lockwashers

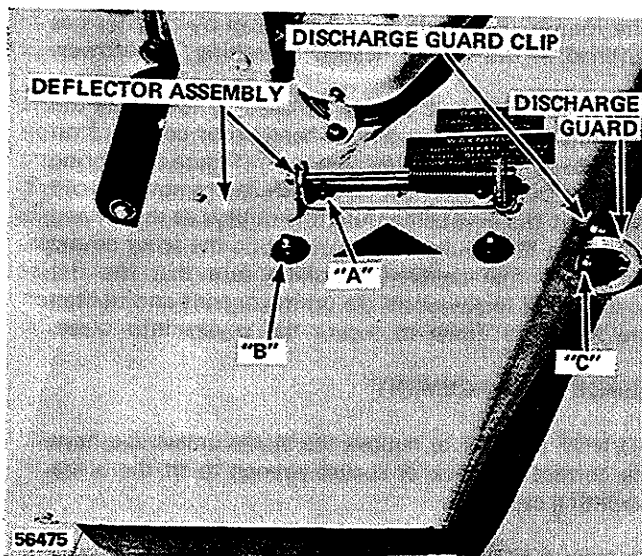


FIGURE 9

and nuts at "A" and two bolts, large flat washers, lockwashers and nuts at "B". Install bolt in front of housing at "C" as follows: Bolt head on inside of housing, bolt thru right hand end of discharge guard clip, front side of deflector on outside of clip with slot over bolt, large flat washer against slot in deflector, lockwasher and nut. Tighten bolts securely.

ATTACHMENTS

Your Allis-Chalmers tractor is designed to accept numerous front, center and rear mounted attachments to perform the jobs that you have for it to do. See your Allis-Chalmers dealer for assistance in selecting which of the following you need:

48 inch Rotary Mower

42 inch Rotary Mower

42 inch Grader Blade

Spring Tooth Harrow

38 inch Revitalizer

P.T.O. Vacuum Collector

Dump Cart

Cart Cover

Roving Nozzle

Sickle Bar Mower

Lawn Roller

46 inch Angle Dozer

36 inch Rotary Tiller

32 inch Snow Thrower

36 inch Snow Thrower

42 inch Snow Thrower

Garden Cultivator

10 inch Moldboard Plow

42 inch Front Blade

Tine Extension Set

Some of these attachments will require some of the special tractor accessories listed below. See your Allis-Chalmers dealer.

Because many of these tractors will be used with a center mounted rotary mower, the operators manual for the 42 inch and 48 inch rotary mower is reprinted in the rear of this manual for your convenience.



ACCESSORIES

Your Allis-Chalmers 400 Series tractors have been designed to do very many different jobs under widely varying conditions. To make your tractor most effective for your particular requirements you may need some of the following accessories. See your Allis-Chalmers dealer for help in selecting the ones most useful to you.

Rear Wheel Weights

Tire Chains

Hub Caps

Front Wheel Weights

Rear Work Light

One Point Hitch

Electric Lights

540 RPM Rear Power Take Off

Electric Lift

Hourmeter

