



GRAVELLY®

**READ THIS MANUAL BEFORE ATTEMPTING
TO OPERATE THE EQUIPMENT**

**OPERATOR'S
MANUAL**

8000 Series

**Commercial
Grounds Maintenance
Tractors**



OPERATING INSTRUCTIONS FOR COMMERCIAL TRACTORS MODEL NUMBERS 8128, 8129, 8169, 8179, 8199. ARE INCLUDED IN THIS BOOK.

The Commercial Tractors have many different attachments for many operations.

The tractor must be given maintenance and operated according to this Operator's Manual.

All references to "left side", "right side", "front" and "back" are given from the operator's position.

It is important that you make a record of the Tractor Serial Number, Engine Model Number and Engine Specification Number for your future use. Write the numbers in the spaces below.

Tractor Serial Number 500961

Engine Model Number CCKA

Engine Specification Number MS/3612J

LEARN ABOUT YOUR TRACTOR

Read this book carefully and learn how to operate and do maintenance on your tractor before use.

Learning how to use your tractor is part of doing the job. Learn how to start, turn, change direction, change speeds and stop. Know what the tractor can do.

It is very important that the warnings for safe operation are read, learned and followed. Use Caution, SAFETY FIRST.

ABOUT THE WARRANTY

It is the purchaser's responsibility to make sure that the tractor is operated and the maintenance is done as shown in this book. A failure caused by bad maintenance or using the tractor in the wrong way stops the warranty.

Read the Limited Warranty. It is on the inside back cover.

Boardman's Gravelly Sales

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WABASH, IN 46992

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1.0 Warnings For Safe Operation

This section of this book gives warnings for safe operation of Gravelly tractors.

Using this equipment the wrong way can cause injury to persons and damage to the equipment. Persons using or doing maintenance on this equipment must read this Operator's Manual and follow the instructions.

It is important to understand that the warnings in this Operator's Manual and any other Gravelly instruction book do not list every possible danger. It is not possible for Gravelly to know and tell the operator or person doing service on the equipment of all the dangers in operating and doing maintenance on the equipment.

The purchaser must give these instructions to the persons operating and doing maintenance on this equipment. The purchaser must get the operator and person doing maintenance on this equipment to use eye and foot protection.

1.1 Instructions Before Operation

1. Read the tractor and attachments operator's manuals carefully before operating or doing maintenance.
2. Learn the location and function of all tractor and attachment controls.
3. Know how to use the controls to stop the tractor and attachment in a short time.
4. Never permit children to operate or ride on the tractor.
5. Use Caution with gasoline. Gasoline is very flammable. Keep gasoline in a clean and tight container. Keep gasoline away from flames or hot items. Never put gasoline in the fuel tank while the engine is running or hot. Clean any gasoline leakage before starting the engine.

1.2 Preparation For Operation

1. When using the tractor, keep all shields, guards and safety interlock switches in the correct position.
2. Wear strong shoes and clothing that is not loose when operating the tractor. Make sure your feet and eyes have protection.
3. Before starting the engine, put the Direction Control Lever in neutral and PTO Control in "OFF" position.
4. Do not use the tractor where the work area is too dark for the operator to see.
5. Keep the tractor in good operating condition. Do the maintenance as shown in this book.
6. Never operate the tractor or attachment when there is damage to any part or any part is not in the correct position. Replace all parts when damaged or missing before operating.

7. USE ONLY GRAVELLY ACCESSORIES AND ATTACHMENTS OR ATTACHMENTS shown by Gravelly to be correct for use with the tractor.

1.3 Operation

1. Do not change the setting of the engine governor.
2. Do not run the engine over 3600 revolutions per minute.
3. Keep away from moving parts.
4. Keep all persons and animals away from the area of operation.
5. Do not let persons other than the operator ride on the tractor.
6. When operating on slopes, use a low speed and engage the Direction Control Lever slowly.
7. Always look for and keep away from holes and hazards.
8. Use caution when pulling heavy loads. Keep load below 1000 lbs. (453 kg), go slowly and keep away from slopes.
9. Use more caution when moving backward. Look for persons and danger in the way.
10. After hitting an item, stop the tractor and engine and check for damage. If there is damage, make repairs before restarting.
11. Operate equipment only when in the tractor seat.
12. Travel up and down slopes, not across.
13. When moving the equipment on a transport, connect the tractor chassis and tractor rear hitch to the transport. Never connect from control levers, rods or like items, that could be damaged.

14. Before leaving the tractor, put the PTO Control in the "OFF" position, turn the Ignition Switch to the "OFF" position, lower any attachments, push on the brake pedal and engage the brake lock, and remove the Ignition key.
15. If there is a sudden change in the sound or vibration of the tractor or attachments, stop the tractor and check for damage. If there is damage, make repairs before operating.
16. Never start and run the engine inside a building except to move the equipment outside. Exhaust fumes are dangerous.
17. Go slow on surfaces where the tractor can slide.
18. Always follow traffic laws while going on or near a road.
19. Before leaving the tractor seat to make adjustments, or to do maintenance, put PTO control in "OFF" position, turn the ignition switch to "OFF" position and wait until the engine and moving parts stop.

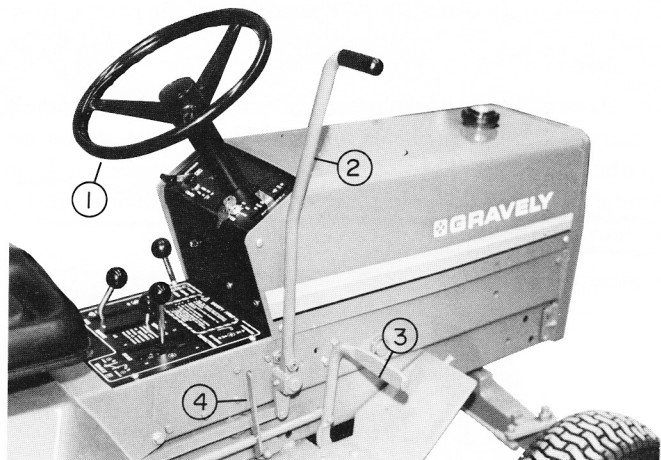
SECTION 2

2.0 Controls and Instruments

This section of this book gives a description of the Controls and Instruments and tells how to use the Controls and Instruments.

2.1 Steering Wheel

The Steering Wheel is used to control the direction of the tractor. Turn the Steering Wheel clockwise to turn the tractor to the right. Turn the Steering Wheel counter-clockwise to turn the tractor to the left. See figure 2.0-1.



- 1 — Steering Wheel
- 2 — Direction Control Lever
- 3 — Brake Pedal
- 4 — Brake Lock Lever

Figure 2.0-1

2.2 Direction Control Lever

The Direction Control Lever, shown in Figure 2.0-1, controls forward and reverse movement of the tractor. Push the lever forward, with your right hand, to go forward. Pull the lever back to go backwards. The tractor is in a neutral condition when the lever is in a vertical position.

2.3 Brake Pedal

The Brake Pedal is used to stop the tractor. To stop the tractor use your right foot, to push the Brake Pedal, all the way down, see figure 2.0-1. Pushing on the Brake Pedal will cause the Direction Control Lever to return to the neutral position.

2.4 Brake Lock for Parking

To engage the Brake Lock for parking, push the Brake Pedal and at the same time, pull the Brake Lock Lever back. See figure 2.0-1. To disengage the Brake Lock, push the Brake pedal and at the same time push the Brake Lock Lever forward.

2.5 Transmission Controls

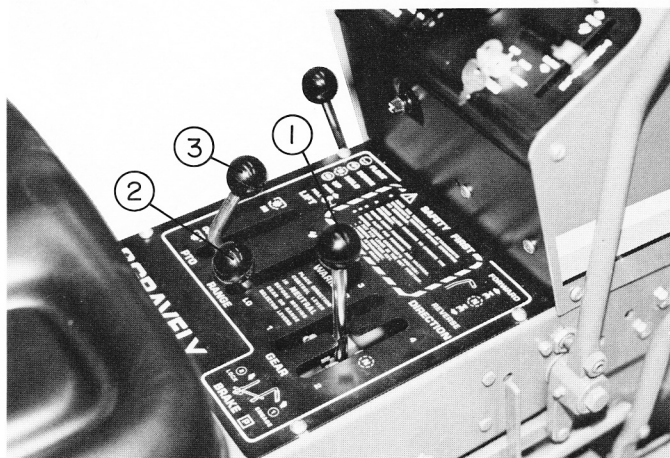
The Transmission Controls for changing speeds are shown in figure 2.0-2.

The Gear Selector is used to change the speed of the tractor. There are five positions for the Gear Selector. Positions numbered one, two, three and four are each for a different speed. When the Gear Selector is in Position One, the tractor will have a slow speed. When the Gear Selector is in Position Four, the tractor has the fastest speed. When the Gear Selector is in the neutral position (N), the transmission gears are disengaged.

The Range Selector is also used to change the speed of the tractor. There are two positions for the Range Selector. When the Range Selector is in the "LO" position, the tractor has a slower speed. When the Range Selector is in the "HI" position, the tractor has a faster speed. The Range Selector must be pushed all the way forward or pulled all the way backwards.

When the Gear Selector and Range Selector are used together, there are eight different speeds for forward movement.

The PTO Control is used to engage or disengage the Power Take Off (PTO) that gives power to the attachments. Push the Control Lever forward to engage the PTO, pull backwards to disengage the PTO.



- 1 — Gear Selector
- 2 — Range Selector
- 3 — PTO Control

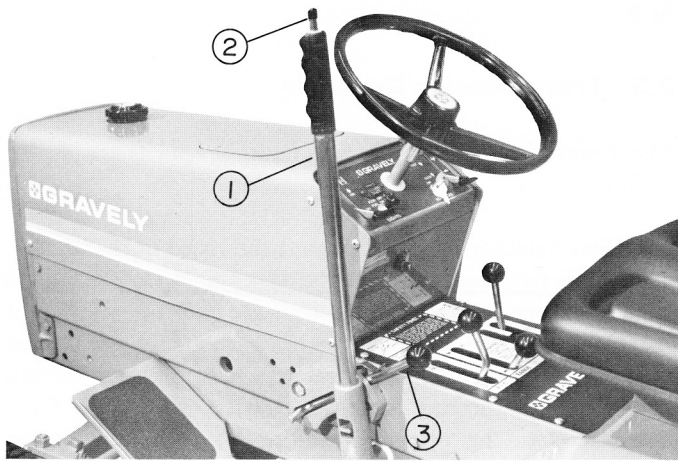
Figure 2.0-2

2.6 Attachment Lift Controls

There are two types of attachment lift systems. The tractor has a manual lift system or a hydraulic lift system.

The controls for the manual lift system are shown in figure 2.0-3.

ITEM NO. 4 in Fig. 2.0-1

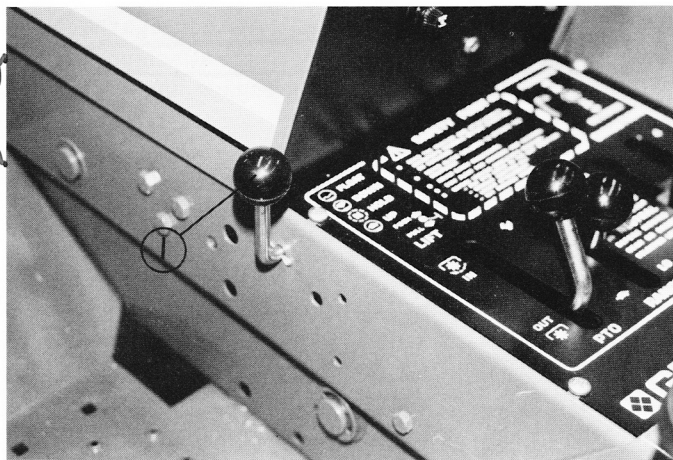


- 1 — Manual Lift Lever
- 2 — Release Button
- 3 — Lift Range Control

Figure 2.0-3

Push the Release Button all the way down to move the Manual Lift Lever. Pull the lever back to raise an attachment. Move the lever forward to lower an attachment. The Lift Range Control is used to control the distance between an attachment and the ground.

Figure 2.0-4 shows the Hydraulic Lift System Control.



- 1 — Hydraulic Lift Lever

Figure 2.0-4

The Hydraulic Lift Lever is used to raise or lower attachments. To raise an attachment, pull the Hydraulic Lift Lever backward. To lower an attachment, push the Hydraulic Lift Lever forward.

2.7 Engine Controls and Instruments

The Engine Controls and Instruments are shown in Figure 2.0-5. The Steering Wheel is removed in the illustration.

The Ignition Switch is used to start, run and stop the engine. The Ignition Switch has a key.

The Choke Lever is used to start a cold engine. Push the

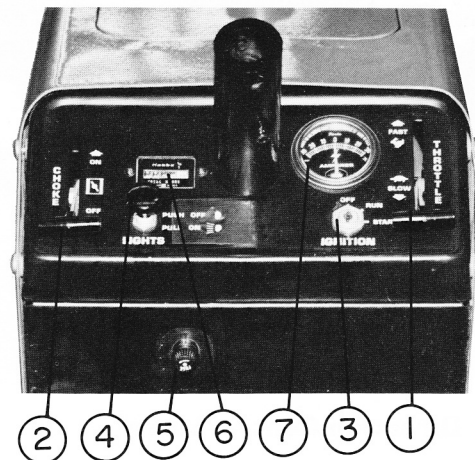
Choke Lever forward to the "ON" position for starting the engine. Pull the Choke Lever backwards after the engine starts and is running smoothly.

The Throttle Lever is used to change the engine revolutions per minute (RPM). Push the Throttle Lever forward to increase the engine RPM. Pull the Throttle Lever backwards to decrease the engine RPM.

The Light Switch is used to activate the tractor lights. Pull the knob up to the "ON" position to activate the lights. Push the knob down to the "OFF" position to deactivate the lights.

The Fuse Holder has a fuse that gives protection to the electrical system. A failure of the fuse stops the tractor from running.

The Hourmeter and Ammeter are not used on all Gravelly Tractors. If an Hourmeter is installed, the face shows the number of hours that the tractor has been operated. If an Ammeter is installed, the face shows if the electrical system is charging the battery.



- 1 — Throttle Lever
- 2 — Choke Lever
- 3 — Ignition Switch
- 4 — Light Switch
- 5 — Fuse Holder
- 6 — Hourmeter
- 7 — Ammeter

Figure 2.0-5

2.8 Fuel Tank Cap with Gauge

There is a Fuel Tank Cap with Gauge on the hood of the tractor. To add gasoline to the tractor, remove the cap by turning it counterclockwise until the threads are disengaged. Then, lift the cap vertically until the gauge mechanism is completely out of the fuel tank. To install the cap, lower the gauge mechanism into the tank, then engage the threads by turning the cap clockwise. Tighten the cap.

2.9 Rear Fender

When the Rear Fender is raised, as shown in figure 2.0-6, it is automatically held in the open position.



- 1 — Rear Fender
- 2 — Lock Bar

Figure 2.0-6

To close the Rear Fender, push the lock bar forward and hold the fender up, then lower the fender.

SECTION 3

3.0 Procedure for Operating the Tractor

This section of this book shows the procedures for operating the tractor. Read this Operator's Manual before operating the tractor. Read the Operator's Manual for any attachment that is to be used.

Get in the tractor seat and see the location of the tractor Controls and Instruments. (See Section 2). ALWAYS BE IN THE TRACTOR SEAT TO OPERATE THE TRACTOR.

3.1 Procedure to Follow Before Starting the Engine

Before starting the engine, do the daily maintenance procedures as shown in Section 4.0.

3.2 Procedure to Follow to Start and Stop the Engine

To start the engine, the Direction Control Lever must be in the "neutral" position and the PTO Control must be in the "OUT" position. To start the engine, follow this procedure.

1. Put the key in the Ignition Switch.
2. Move the Throttle Lever forward half-way.
3. If the engine is cold, move the choke lever all the way forward. If the engine is warm or hot, do not move the choke lever.
CHOKE
4. Turn the ignition key to the "START" position. When the engine starts and is running smoothly, pull the choke lever all the way backwards. If the engine does not start in five seconds, move the choke lever forward and try again. If the engine does not start after trying this procedure five times, see Section 6.0 for instructions.

CAUTION: Do not keep the starter engaged for over 15 seconds. Do not run the starter more than 15 seconds in one minute.

When stopping the engine, engage the Brake Lock and disengage the PTO. Pull the throttle backward to decrease the engine RPM. Turn the Ignition Switch to the "OFF" position. Always remove the key when leaving the tractor.

3.3 Procedure for Operating the Transmission

CAUTION: Engaging or disengaging the transmission gears while the tractor is moving will cause damage to the gears. Do not move the Gear Selector or Range Selector while the tractor is moving.

3.3.1 To Move the Tractor in a Forward or Reverse Direction

Follow this procedure: Use slow engine RPM and slow transmission speeds the first time the tractor is run and until the operator knows how to operate the tractor.

1. Start the engine and adjust the throttle lever to give the needed engine RPM. Put any attachment in a raised position.
2. Put the Range Selector in the position needed.
3. Put the Gear Selector in the position needed.
4. Move the Direction Control Lever forward to move forward, or backwards to move backward. When the tractor is moving fast, push the lever until it stops and holds in position. If the lever is not pushed all the way forward, damage can be caused to the clutches. USE CAUTION WHILE LEARNING TO OPERATE THE DIRECTION CONTROL LEVER.

3.3.2 Stopping the Tractor

Pushing the Brake Pedal down will stop the tractor and return the Direction Control Lever to the "neutral" position. Always use the Brake Pedal to stop the tractor.

3.3.3 Using the PTO Control

The PTO gives power to attachments from the engine. The PTO Clutch is inside the transmission. When the PTO Clutch is engaged, power goes to the attachment. To engage the PTO Clutch and activate an attachment, push the PTO Control forward to the "IN" position. To disengage the PTO Clutch and deactivate an attachment, pull the PTO Control backwards to the "OUT" position.

3.3.4 Correct Speeds for Tractor Operation

Warning: On rough and sloping ground, use slow speed. When operating the mower in high grass, the snowblower or the tiller, use slow speed. When mowing and trimming near buildings and trees use a slow speed.

3.4 Using the Attachment Lift Systems

The Manual Attachment Lift system and the Hydraulic Attachment Lift system are used to raise and lower attachments. Both systems can hold an attachment in a position above the ground or let an attachment follow the ground.

3.4.1 Using the Manual Lift System to Hold an Attachment in Position

Use the Lift Range Control on the Manual Lift System to hold an attachment in any position above the ground. Adjust the height above the ground of the attachment as follows:

1. Lift the attachment to the raised position.
2. Lift the Lift Range Control and at the same time, slide the Lift Range Control to the position needed.
3. Lower the attachment. The Manual Lift Lever will stop against the Lift Range Control. If the attachment is not in the position needed, repeat steps 1 and 2.

2. Engage the Brake Lock.
3. Start the Engine.
4. Put the Gear Selector in the "NEUTRAL" position.
5. Engage the PTO.
6. Use caution when leaving the tractor seat. Keep away from moving parts.

3.4.2 Using the Hydraulic Lift System to Hold an Attachment in Position

To hold an attachment in position with the Hydraulic Lift System, follow this procedure:

1. Lift the attachment to the raised position.
2. Lower the attachment to the necessary height above the ground by pushing the Hydraulic Lift Lever forward so that the attachment is lowered slowly.
3. When the attachment reaches the necessary height, release the Hydraulic Lift Lever.

Reynolds'
TRACTOR

3.4.3 Using the Manual Lift System To Let An Attachment Follow the Ground

Move the Lift Range Control to the lowest position to let an attachment follow the ground when using the Manual Lift System. Lower the attachment to the ground.

3.4.4 To Let An Attachment Follow the Ground with the Hydraulic Lift System

To let an attachment follow the ground with the Hydraulic Lift System, push the Hydraulic Lift Lever all the way forward to the "FLOAT" position. The lever will be in this position until you pull the lever backwards.

"FLOAT"

3.5 Using the Tractor for Stationary Operations

To operate attachments, such as the log splitter and compost shredder, that use PTO power when the tractor is stationary, follow this procedure:

1. Move the tractor to the location needed. Keep the tractor and attachment in an open area. Stay in the tractor seat until the attachment is activated.

SECTION 4


4.0 Procedures for Maintenance

This section gives a description of the procedures for maintenance at regular time intervals. Figure 4.0-1 shows the tractor maintenance schedule. The Maintenance Items are shown on the left. The correct time interval for each maintenance item is shown by the mark in the daily, 25 hour, 100 hour or 200 hour columns.

Follow the maintenance procedures shown in this section.

4.1 Filling the Fuel Tank with Gasoline

Gasoline is added as required. Use clean lead free or regular grade gasoline. To add gasoline, follow this procedure.

 Warning: Gasoline is very flammable, follow safety instructions shown in Section 1.0.

1. Put the tractor in an open area.
2. Stop the engine and engage the Brake Lock.
3. Clean the hood and fuel cap area.
4. Remove the Fuel Tank Cap with Gauge.
5. Fill the Fuel Tank with gasoline. Use caution, do not add too much.
6. Install the Fuel Tank Cap.
7. Tighten the Cap.

If gasoline flows onto the tractor, clean the tractor before starting the engine.

TRACTOR MAINTENANCE SCHEDULE

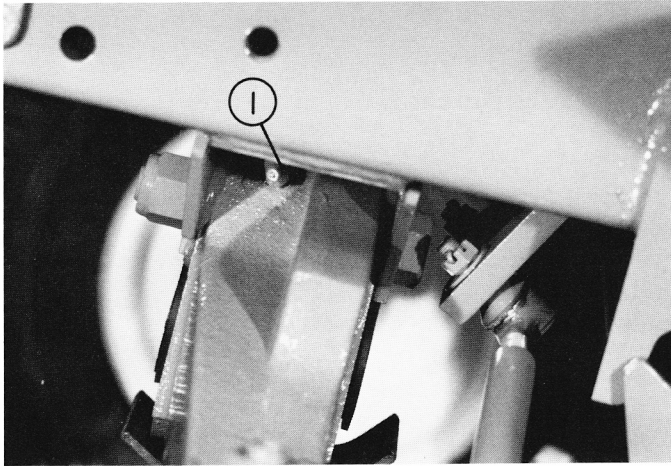
MAINTENANCE ITEMS	TIME INTERVALS FOR MAINTENANCE			
	DAILY	25 HOUR	100 HOUR	200 HOUR
Filling the Fuel Tank Sect. 4.1	X			
Applying Lubrication to the Chassis Sect. 4.2		X		
Checking the Engine Lubricant Sect. 4.3	X			
Changing the Engine Lubricant Sect. 4.4		X		
Changing the Engine Lubricant Filter Sect. 4.5		X		
Checking the Battery Fluid Level Sect. 4.6		X		
Cleaning the Battery Sect. 4.7		X		
Checking the Fasteners Sect. 4.8				X
Checking the Cooling System Sect. 4.9		X		
Checking the Air Filter Sect. 4.10	X			
Changing the Air Filter Sect. 4.11			X	
Checking the Transmission Lubricant Level Sect. 4.12			X	
Adjusting the Brake Sect. 4.13				
Adjusting the Clutches Sect. 4.14			X	
Adjusting the PTO Clutch Sect. 4.15				X
Adjusting the Steering Sect. 4.16			X	
Cleaning the Spark Plug Sect. 4.17			X	
Changing the Spark Plug Sect. 4.17				X
Checking the Hydraulic Fluid Level Sect. 4.18				X

Figure 4.0-1

4.2 Applying Lubricant to the Chassis

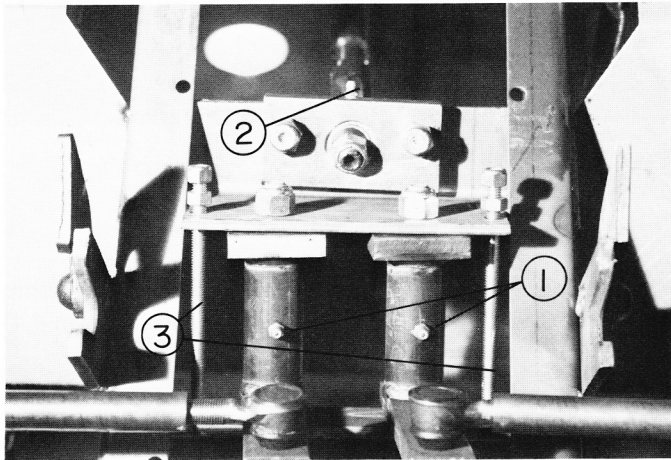
There are seven grease fittings on the tractor that need lubricant at 25 hour intervals. Clean the grease fittings before adding lubricant. Use a multi-purpose grease as the lubricant. Add lubricant until it shows at the ends of the bearings. Here are the locations of the seven grease fittings:

1. The bearing on the Direction Control Lever.
2. The front side of each front wheel king pin.
3. The front axle as shown in figure 4.0-2.



1 — Grease Fitting on the Front Axle
Figure 4.0-2

4. There are three grease fittings on the steering assembly. They are shown in figure 4.0-3



1 — Grease Fittings for the Steering Arms
2 — Grease Fittings on the Steering Column
3 — Adjusting Bolts

Figure 4.0-3

4.3 Checking the Engine Lubricant

Check the engine lubricant level each day. Never operate the engine without the correct lubricant level. Make sure

the level of the lubricant is between the high and low marks on the dipstick. If new lubricant is needed, use the following specification:

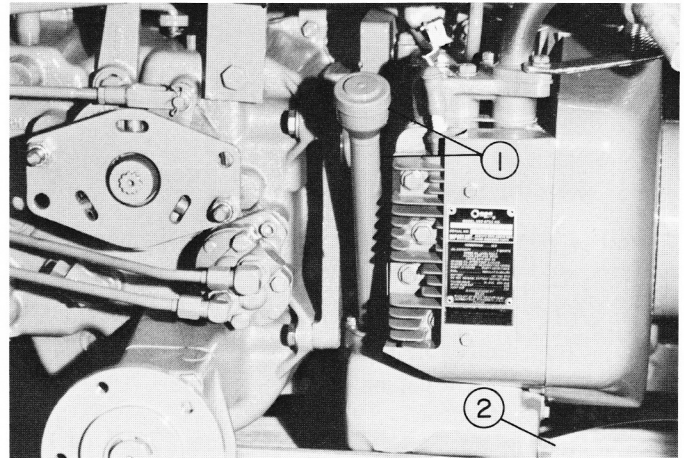
Engine Lubricant Specification
Grade — API Service SC, SD or SE
Viscosity — 10W-30 or 10W-40
Below 0°F (-18c) use 5W-20

To check the level of the lubricant, follow this procedure:

1. Clean the top of the tube and dipstick. Prevent dirt from falling into the tube.
2. Pull the Dipstick out of the tube and clean it.
3. Push the Dipstick all the way down into the tube.
4. Pull the Dipstick out of the tube and see level of the lubricant.
5. Add lubricant if needed.
6. Push the Dipstick all the way into the tube.

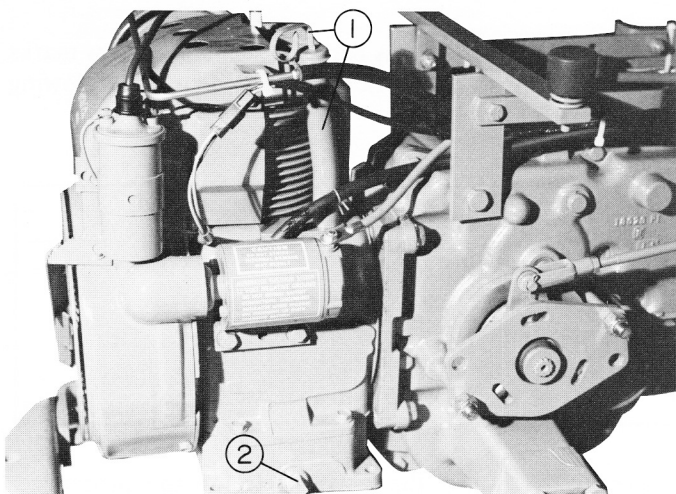
4.4 Changing the Engine Lubricant

The engine lubricant is changed after the first eight hours, then every 25 hours. When operating in a dirty condition, reduce the time interval. The correct lubricant is shown in Section 4.3. Figures 4.0-4 and 5 show two locations of the dipstick tube and engine drain plug.



1 — Dipstick & Tube
2 — Drain Plug

Figure 4.0-4



- 1 — Dipstick & Tube
- 2 — Drain Plug

Figure 4.0-5

To change the engine lubricant, follow this procedure:

1. Move the tractor to a flat open area. Engage the Brake Lock.
2. If the engine is not warm, let the engine run 5 minutes.
3. When the engine is warm, stop the engine and raise the Rear Fender.
 ⚠️ **WARNING:** Engine Muffler and other parts are hot.
4. Clean the areas near Dipstick, tube and drain plug.
5. Remove the Dipstick.
6. Put a container under the drain plug. Make sure the top is open and it can hold four quarts or four liters.
7. Remove the drain plug by turning it counter-clockwise.
8. Remove all the old lubricant.
9. Clean and install the drain plug.
10. Add new lubricant to raise the level of the oil to the "full" mark on the dipstick. See figure 4.0-6 for the lubricant capacity for the engine.
11. Replace the Dipstick. Lower the Rear Fender.
12. Start the engine and check for leakage at the drain plug. If there is leakage, tighten or replace the drain plug.

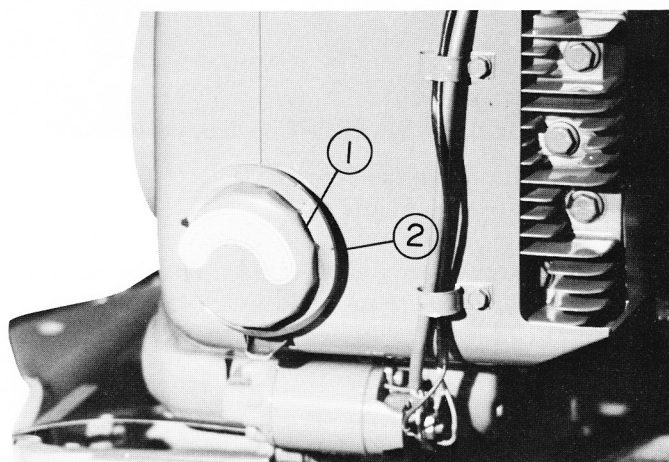
ENGINE LUBRICANT CAPACITY

Kohler, 10 H.P.	2 quarts (1.9 liters)
Kohler, 12 H.P.	2 quarts (1.9 liters)
Briggs & Stratton 16 H.P.	2 quarts (1.9 liters)
Onan, 16 H.P.	2 quarts (1.9 liters)
Onan CCKA, 16.5 H.P.	2 quarts (1.9 liters)
Onan, 18 H.P.	2 quarts (1.9 liters)
Onan, 19.9 H.P.	2 quarts (1.9 liters)

Figure 4.0-6

4.5 To change the Lubricant Filter in the Engine

When the tractor engine has a lubricant filter, the filter must be changed every 25 hours when the tractor is used in dirty conditions. If the tractor is used in clean conditions, change the filter every 50 hours. Figure 4.0-7 shows an engine with filter and air seal.



- 1 — Filter
- 2 — Air Seal

Figure 4.0-7

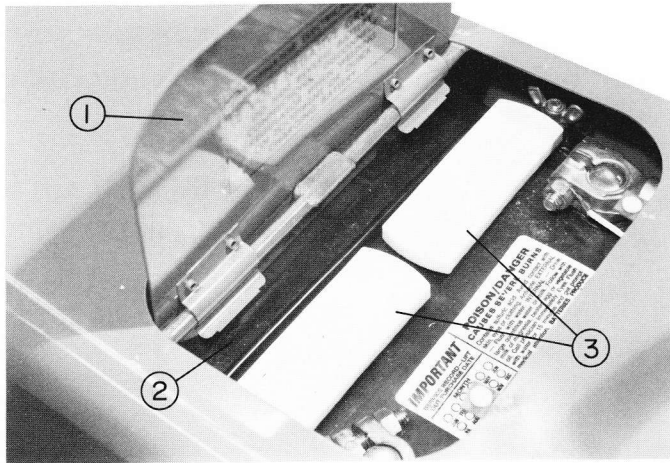
Always remove the old lubricant from the engine before changing the filter. To change the filter, (See Section 4.4) follow this procedure:

1. Remove the air seal.
2. Turn the old filter counterclockwise and remove it.
3. Put a small amount of clean lubricant on the new filter gasket.
4. Install the new filter by turning clockwise.
5. Use your hand to tighten the new filter.
6. Install the air seal.

7. Add the new lubricant as shown in Section 4.4.
8. Start the engine and check for lubricant leakage.

4.6 To Check the Battery Fluid

Check the battery fluid level every 25 hours. The battery is under the hood. Figure 4.0-8 shows the battery when the door in the hood is open.



- 1 — Door
- 2 — Battery
- 3 — Filler Caps on the battery

Figure 4.0-8

Use caution when checking the battery. Wear eye protection. Do not use a metal funnel to add water to the battery. To check the battery, follow this procedure:

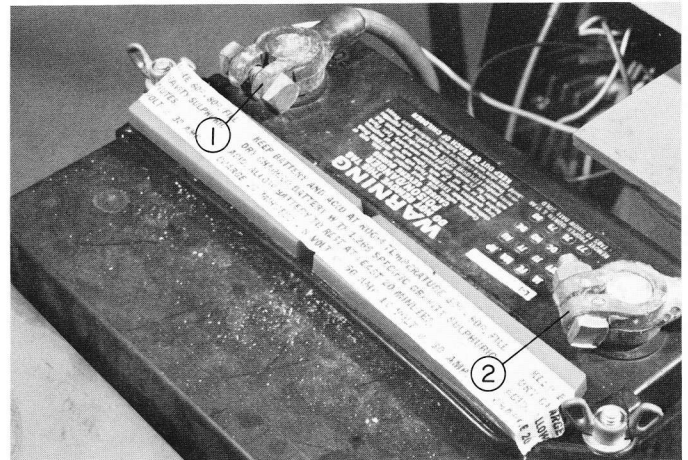
1. Clean the top of the battery.
2. Lift the battery filler caps away from the filler tubes.
3. If the fluid level is below the split ring in the filler tubes, add distilled water. Do not add water above the split ring.
4. Install the filler caps. Push the filler caps all the way down.

4.7 Battery Cleaning

Clean the battery every 200 hours or every year. Use caution when cleaning the battery. Wear eye protection. To clean the battery, follow this procedure. See figure 4.0-9.

1. Disconnect the tractor hood. Keep the hood away from the battery terminals.
2. Always disconnect the negative (-) battery cable first. Loosen the cable clamp bolt and separate the clamp ends with a thin flat tool. Lift the clamp away from the battery.

3. Disconnect the positive (+) battery cable clamp. Use the above procedure.
4. Clean the battery posts and cable clamps with a solution of one part baking soda to four parts water. Keep the cleaning solution away from the filler caps.
5. Reconnect the positive (+) battery cable first.
6. Reconnect the negative (-) battery cable. Push the cable clamps all the way down on the battery posts. Tighten the cable clamp bolts.
7. Install the tractor hood.



- 1 — Positive Terminal
- 2 — Negative Terminal

Figure 4.0-9

4.8 To Check The Fasteners

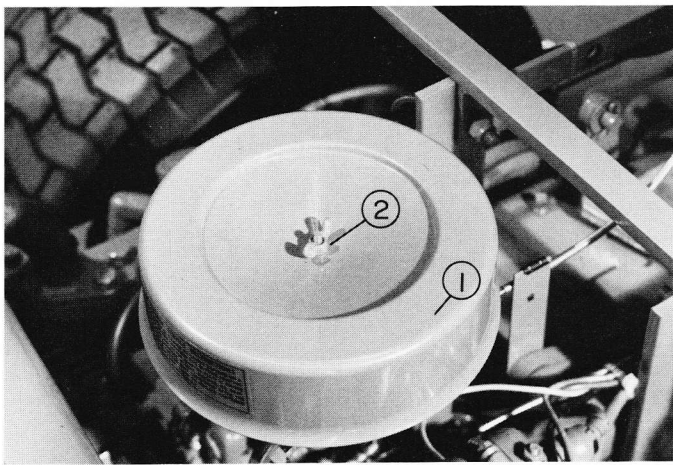
Check the fasteners every 25 hours. Tighten the bolts, nuts and screws that are loose. Make sure the cotter pins and fasteners are in the correct position, replace any fasteners that are missing.

4.9 To Check the Cooling System

Check the air intake screen each day for grass or other material entering the cooling system. The screen must be clean at all times. If material goes through the screen into the cooling system, remove the engine covers and clean the fins. Install the engine covers.

4.10 To Check the Air Filter

Check the air filter each day. There are two types of air filters used on Gravely tractors. (1) Paper cartridge filters. (2) Paper cartridge with foam precleaner. Both are found under a cover as shown in figure 4.0-10



- 1 — Cover
- 2 — Wing Nut

Figure 4.0-10

To check the paper cartridge air filter, raise the rear fender. Remove the air filter cover by turning the wing nut counterclockwise. Lift the cover. If needed, remove the second wing nut. If the paper cartridge, as shown in figure 4.0-11 is dirty, remove and hit it carefully on a smooth surface. See figure 4.0-12.



- 1 — Filter Cartridge

Figure 4.0-11

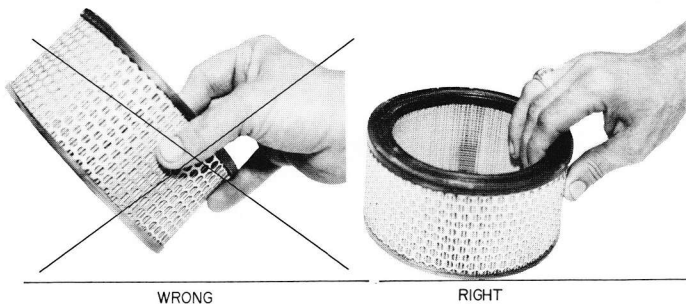
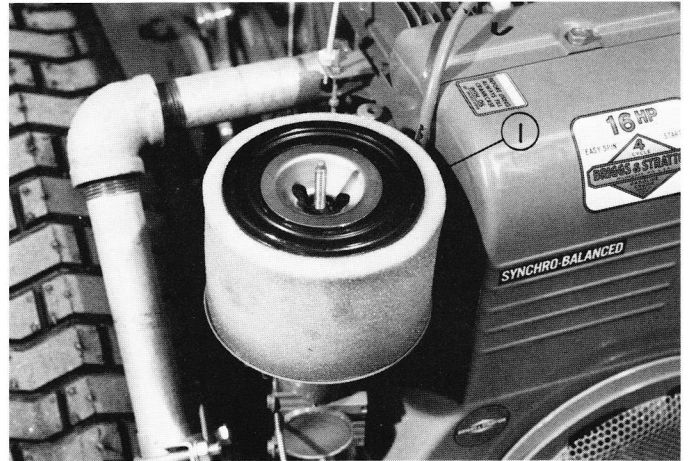


Figure 4.0-12

Repeat the above until all the dirt is removed. Prevent any dirt from entering the engine. Get a new filter cartridge if the old filter cartridge has damage. Install the filter cartridge carefully to prevent dirt from entering the engine. Clean the cover and put it in position on the paper cartridge. Engage and tighten the wing nut.

To check the air cleaner with paper cartridge and foam precleaner, remove the cover. Figure 4.0-13 shows a paper cartridge with foam precleaner after the cover is removed.



- 1 — Foam Precleaner

Figure 4.0-13

To remove the cover, turn the wing nut counterclockwise, then lift the cover. If needed, remove the second wing nut. If the foam precleaner is dirty, remove it carefully from the paper cartridge.

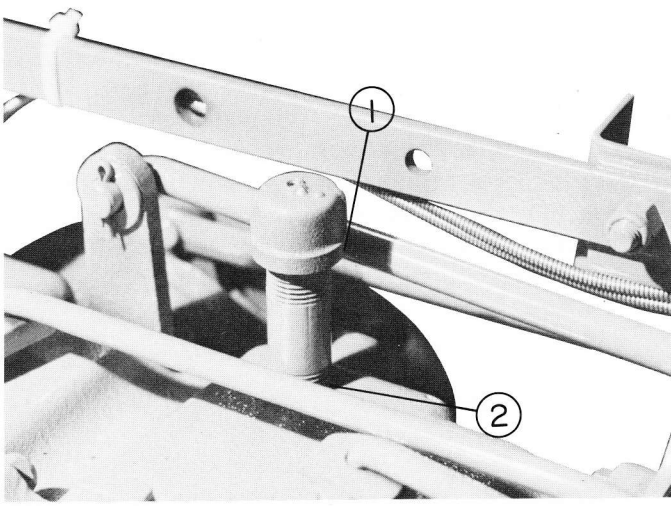
Use clean water and liquid detergent to clean the foam precleaner. Remove all the water from the foam precleaner. Put twenty drops of engine lubricant on all the surface of the foam precleaner. If the paper cartridge is dirty, remove, clean and install. CAUTION: Never operate engine without filter correctly installed. If the paper cartridge is clean, install the precleaner. Clean the cover and put it in position on the paper cartridge. Reconnect and tighten the wing nut.

4.11 To Change the Air Filter

The air filter is changed at 100 hour intervals. When operating in dirty conditions, check the filter every day or as needed. Clean or replace dirty filters. Use the procedures shown in section 4.10 to install a new filter cartridge and foam precleaner.

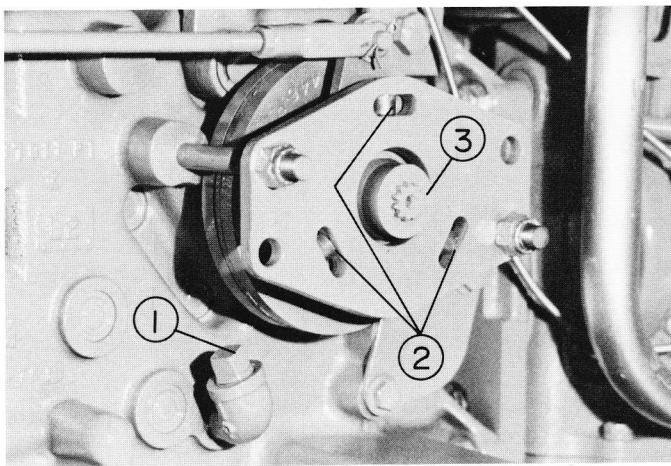
4.12 To Check the level of the Transmission Lubricant

The level of the transmission lubricant is checked every 100 hours. If there is leakage, check the level at decreased intervals. The transmission fill tube is under the rear fender as shown in figure 4.0-14. The Transmission Check Plug is shown in figure 4.0-15.



- 1 — Cap for Fill Tube
- 2 — Transmission Fill Tube

Figure 4.0-14



- 1 — Transmission Check Plug
- 2 — Clutch Cam Rollers
- 3 — Splined Clutch Shaft

Figure 4.0-15

To check the level of the transmission lubricant, follow this procedure:

1. Move the tractor to a flat open area. Stop the engine and engage the Brake Lock.
2. Raise the rear fender.
3. Turn the transmission check plug counterclockwise to remove it.
4. The level of the lubricant is correct when the level is at the top of the hole.
5. If the level is correct, clean and install the plug. Tighten the plug.

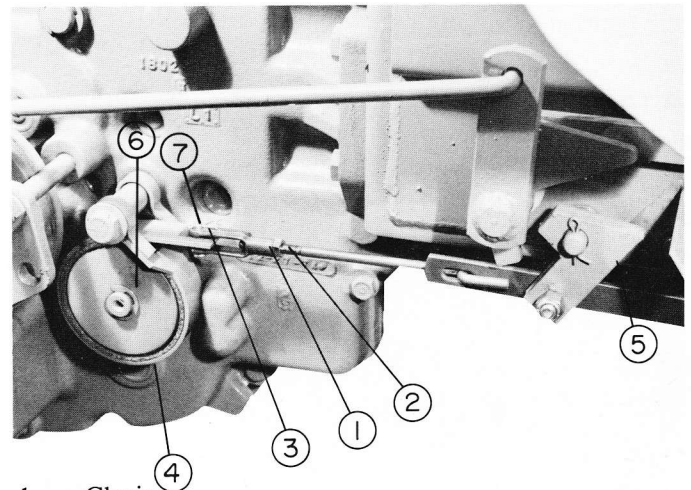
If the level is below the check plug, add lubricant. Use engine lubricant (see Section 4.3). To add lubricant, follow this procedure:

1. Turn the Fill Tube Cap counterclockwise to remove it.
2. Add lubricant until the level reaches the top of the hole.
3. Install and tighten both the Fill Tube Cap and Transmission Check Plug.
4. Lower the rear fender.

CAUTION: Keep the hole in the Fill Tube Cap clean. Always use the correct part.

4.13 Adjusting the Brake

The Brake is adjusted every 100 hours. If the Direction Control Lever does not return to the "neutral" position when the brake is used, check the brake adjustment. The brake is shown in figure 4.0-16.



- 1 — Clevis
- 2 — Jam Nut
- 3 — Clevis Pin
- 4 — Brake Band
- 5 — Cam
- 6 — Drum
- 7 — Cotter Pin

Figure 4.0-16

To adjust the brake, follow this procedure:

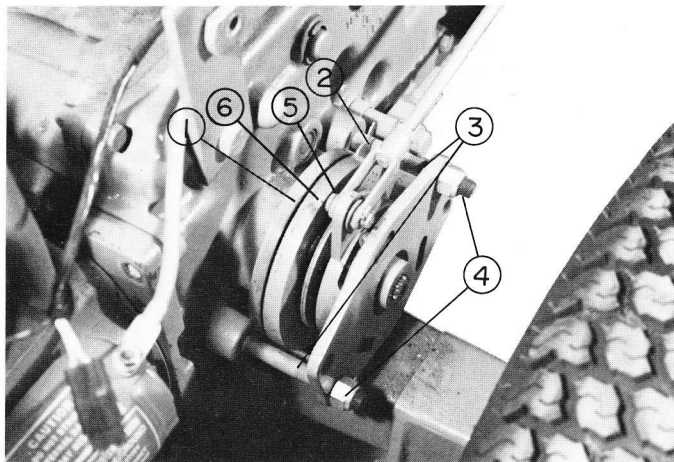
1. Stop the tractor on flat ground in an open area.
2. Stop the engine and put blocks under both rear wheels so the wheels can not roll.
3. To tighten the brake, loosen the Jam Nut and remove the Clevis Pin.
4. Turn the Clevis clockwise and adjust as needed.
5. To check the brake adjustment, reconnect the Clevis and Brake Band with the Clevis Pin.

6. Push the Direction Control Lever all the way forward.
7. Push the Brake Pedal by hand while looking at the motion of the Brake Band. The brake is correctly adjusted when the Brake Band is tight on the Drum after the Direction Control Lever moves to the neutral Position. If the Brake Band is tight before the Direction Control Lever moves to the neutral position, the brake is too tight. If the brake is too loose, remove the Clevis Pin and turn the Clevis in the opposite direction. Repeat steps 5, 6 and 7 until the brake adjustment is correct.
8. Install the Cotter Pin in the Clevis Pin and tighten the Jam Nut.
9. Check the operation of the brake while operating the tractor.

Replace the Brake Band when the brake lining is as thin as the Ignition key.

4.14 Adjusting the Clutches

The forward and reverse clutches must be checked every 100 hours and adjusted if needed. There is a clutch on each side of the transmission. Figure 4.0-17 shows a clutch.



- 1 — Check Clearance Here
- 2 — Ignition Key
- 3 — Studs for the clutch
- 4 — Nuts
- 5 — Clutch disc
- 6 — Clutch lining

Figure 4.0-17

Always check and adjust both clutches if needed. To check and adjust a clutch, follow this procedure:

1. Stop the engine and engage the Brake Lock.
2. Raise the rear fender.
3. Check the clearance in the slot. The correct clearance

is .070 inches (1.8 mm). Use the Ignition Key as a measurement. Adjust the clearance if needed.

4. To adjust the clearance, turn the nuts. If the clearance is too large, turn the nuts clockwise. If the clearance is too small, turn the nuts counterclockwise. The clutch is correctly adjusted when there is .070 inches (1.8 mm) clearance between the clutch plates.
5. Adjust the other clutch.

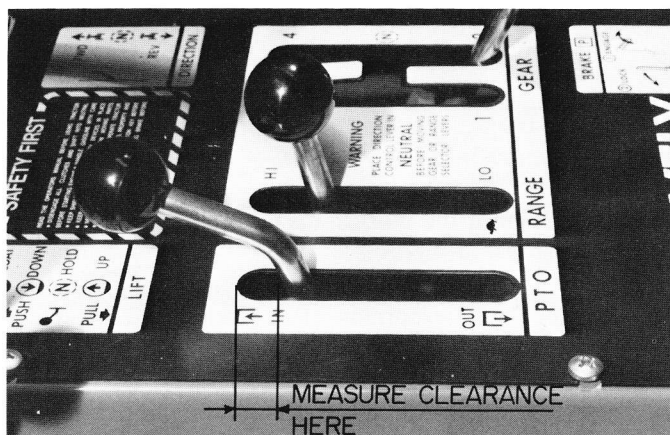
Replace the clutch disc when clutch lining is as thin as the Ignition Key.

The clutch needs lubricant where the hub slides on the splined shaft. To put lubricant on the shaft, follow this procedure. Use engine lubricant.

1. Stop the engine and block the rear wheels.
2. Raise the rear fender.
3. Move the Direction Control Lever all the way forward.
4. Apply lubricant to the end of the splined shaft on the forward clutch on the left side of tractor. Keep the lubricant away from the clutch friction material.
5. Pull the Direction Control Lever all the way back.
6. Apply lubricant to the reverse clutch on the right side of tractor. Keep the lubricant away from the clutch friction material.
7. Close the rear fender.

4.15 Adjusting the PTO Clutch Assembly

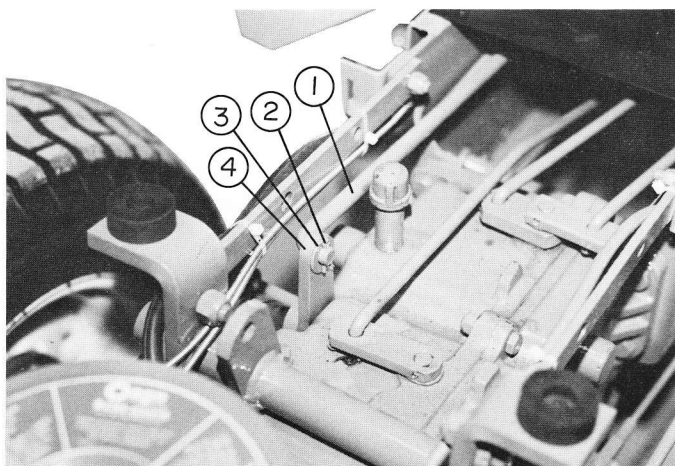
The PTO Clutch assembly is adjusted every 200 hours or when the clutch is engaged. The clearance from the front of the PTO Control Lever to the forward end of the slot is less than .5 inch (12.7 mm). The Clutch is correctly adjusted when clearance is between .5 inch (12.7 mm) and 1.0 inch (25.4 mm). See figure 4.0-18.



MEASURE CLEARANCE HERE

Figure 4.0-18

The PTO Control System is on top of the transmission and is shown in figure 4.0-19.



- 1 — PTO Control Rod
- 2 — Cotter Pin
- 3 — Washer
- 4 — Transmission Lever

Figure 4.0-19

To adjust the clearance between the PTO Control Lever and the end of the slot, follow this procedure:

1. Stop the engine and engage the Brake Lock.
2. Raise the rear fender.
3. Push the PTO Control Lever all the way forward.
4. Disconnect the PTO Control Rod from the Transmission Lever.
5. Turn the Control Rod to change the clearance. One full turn clockwise will increase the clearance by .25 inch (6.4 mm). One full turn counterclockwise will decrease the clearance .25 inch (6.4 mm).
6. Reconnect the control rod to the transmission lever and install the washer and cotter pin.
7. Check for the correct clearance in the slot.
8. Close the rear fender.

4.16 Adjusting the Steering

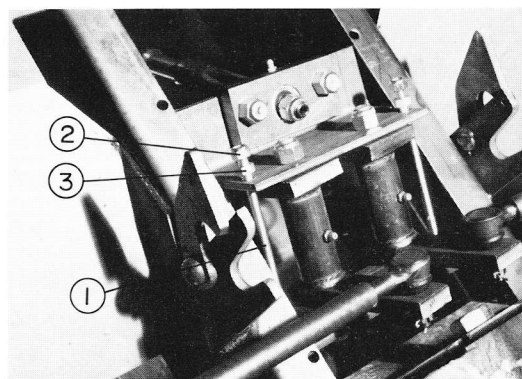
The Steering must be adjusted every 100 hours. The adjustment is needed to keep the correct clearance between the rack and pinion. The rack and pinion are in back of the front axle. Figure 4.0-20 shows the parts that need adjustment.

To adjust the rack and pinion clearance, follow this procedure:

1. Move the tractor to a flat area, stop the engine and

engage the Brake Lock.

2. Tighten all the fasteners that hold the tractor hood.
3. Loosen the lock nut on both adjusting bolts.
4. Turn the steering wheel all the way to the right.
5. Use your fingers to turn the adjusting nut, on the left side adjusting bolt, clockwise, until it is tight. Then, turn the nut one fourth turn counterclockwise to get the correct clearance.
6. Tighten the lock nut against the adjusting nut. Do not move the adjusting nut.
7. Turn the steering wheel all the way to the left.
8. Repeat steps 5 and 6 for the right side adjusting nut.



- 1 — Adjusting Bolt
- 2 — Lock Nut
- 3 — Adjusting Nut

Figure 4.0-20

4.17 Cleaning and Changing the Spark Plug

Clean the Spark Plug every 100 hours and change it every 200 hours. There is one spark plug on the top of one cylinder engine. There are two spark plugs on a two cylinder engine, one on each side of the engine. Figure 4.0-21 shows how many are needed and the correct gap in points for each tractor engine.

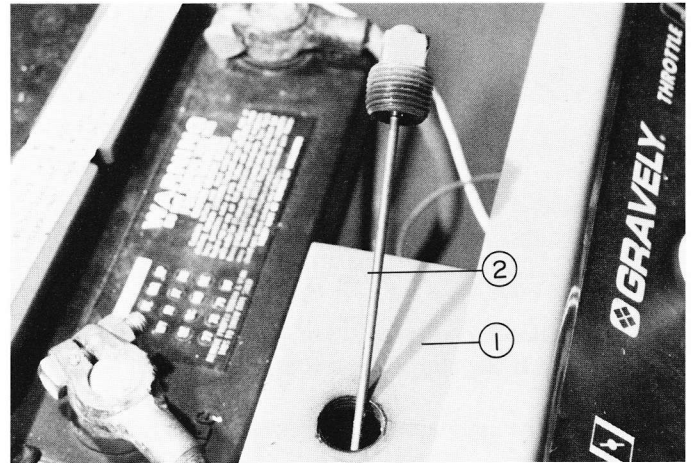
To clean or change a spark plug, follow this procedure:

1. Stop the tractor engine and engage the Brake Lock. Raise the rear fender.
 - ⚠ WARNING: Engine Muffler & other parts are hot.
2. Pull the ignition wire from the spark plug. Use caution, do not pull the wire from the spark plug connection.

3. Always use a spark plug socket wrench to remove the spark plug. Turn the spark plug clockwise to remove. CAUTION: Damage is easily caused to Spark Plugs.
 4. To clean a spark plug, remove the dirt from the body and use a sharp tool to remove the carbon from the base. Adjust the gap as needed. See figure 4.0-21.
 5. When changing a spark plug, check the gap on the new spark plug before installation.
 6. When installing a spark plug, use your fingers to engage the spark plug threads in the engine. Turn the spark plug clockwise until it stops, then get the spark plug wrench and tighten to a torque of 18 to 22 foot pounds (24-30 Nm).
 7. Reconnect the wire to the spark plug. Push the connector all the way onto the spark plug.
4. Remove the dipstick and check the level of the hydraulic fluid on the dipstick.
 5. If the level is low, add hydraulic fluid to raise the level to the full mark on the dipstick. CAUTION: Do not add too much fluid.

NOTE: Use hydraulic fluid that has the following specification; Automatic Transmission Fluid, type A, Suffix A.

6. Put the Plug with Dipstick in the tank and tighten it by turning it clockwise.



- 1 — Hydraulic Fluid Tank
2 — Plug With Dipstick

Figure 4.0-22

SPARK PLUG SPECIFICATION		
ENGINE	NEEDED	GAP
Kohler, 10 H.P.	1	.025 inch (.635mm)
Kohler, 12 H.P.	1	.025 inch (.635mm)
Briggs & Stratton, 16 H.P.	1	.030 inch (.762mm)
Onan, 16 H.P.	2	.025 inch (.635mm)
Onan CCKA, 16.5 H.P.	2	.025 inch (.635mm)
Onan, 18 H.P.	2	.025 inch (.635mm)
Onan, 19.9 H.P.	2	.025 inch (.635mm)

Figure 4.0-21

4.18 Checking the Hydraulic Fluid

If the tractor has a hydraulic lift system, the level of the hydraulic fluid must be checked at a 200 hour interval. Reduce the intervals if there has been hydraulic fluid leakage. The hydraulic fluid tank is under the hood by the battery. Figure 4.0-22 shows the Hydraulic Fluid Tank.


To check the level of the hydraulic fluid, follow this procedure:

1. Stop the tractor engine, engage the Brake Lock and remove the tractor hood.
2. Remove the Plug with Dipstick by turning it counter-clockwise.
3. Clean the dipstick and put it back in the hole in the tank. Do not engage the threads.


SECTION 5

5.0 To Put the Tractor in Storage

This section shows the procedure to put the tractor in storage. When the tractor will not be operated for three months or more, follow this procedure:

1. Do the daily and 25 hour maintenance, but do not add gasoline to the fuel tank.
 **WARNING:** Gasoline is highly flammable.
2. Close the fuel tank valve.
3. Disconnect the fuel line from the valve.
4. Get a five gallon (20.0 liter) container.
5. Open the valve and let the gasoline flow into the container.
6. Reconnect the fuel line to the valve.
7. Start the engine and let it run until all gasoline is used.
8. Remove the spark plug. If the tractor has a two cylinder engine, remove both plugs.
9. Put 20 drops of engine lubricant in each hole of the spark plug.
10. Install the spark plugs but **do not connect the spark plug wires.**
11. Operate the starter for 5 seconds.
12. Remove the ignition key.
13. Clean the battery.

To use the tractor again, follow this procedure:

1. Reconnect the spark plug wires.
2. Charge the battery if needed.
3. Put gasoline in the fuel tank.
 **WARNING:** Gasoline is highly flammable.
4. Check the level of engine lubricant.

SECTION 6

6.0 Correcting Tractor Problems

This section shows what to do when there are problems in starting or operating the tractor.

6.1 Starter will not turn the Engine

Follow this procedure:

1. Be sure the PTO Control Lever is in the "OUT" position and Direction Control Lever is in the neutral (N) position activating the Interlock Switch. See Section 3.2
2. Check the fuse. If there is damage, replace with BUSS AGC 30 fuse. See Section 2.7.
3. Check the battery. Clean and tighten the battery terminals on both ends. See Section 4.7. If battery is discharged, have it charged or replaced.

If these procedures do not correct the problem, see your Gravely dealer.

6.2 Engine is Difficult to Start or has a Loss of Power

Follow this procedure:

1. Check Fuel Tank for gasoline. Add gasoline if needed. See Section 4.1.
2. Check gasoline for water and dirt.
3. Check and clean air filter. See Section 4.10.
4. Check and clean spark plug. See Section 4.17.
5. Check for dirty cooling system. Clean if needed. See Section 4.17.
6. Check Fuel Cap with Gauge for dirt in the hole that the air goes through.
7. Check the book of instructions for the engine. Follow the procedures shown in it.

If these procedures do not correct the problem, see your Gravely dealer.

6.3 Clutch Engagement is Rough or Clutch Slips when Fully Engaged

Follow this procedure:

1. Check clutch clearance; adjust if needed. See Section 4.14.

2. Check clutch lining thickness. If too thin, replace it. See Section 4.14.
3. Check lubricant on clutch shaft. Add lubricant if needed. See Section 4.14.

If these procedures do not correct the problem, see your Gravely dealer.

6.4 Brake does Not Stop the Tractor

Follow this procedure:

1. Check brake adjustment. Adjust if needed. See Section 4.13.
2. Check thickness of brake lining. Replace if too thin. See Section 4.13.

If these procedures do not correct the problem, see your Gravely dealer.

6.5 More than One Inch (2.5 cm) Free Travel in Steering Wheel

Follow this procedure:

1. Check steering adjustment. Adjust if necessary. See Section 4.16.
2. Check for loose parts in steering and front axle. Replace or tighten if needed.

If these procedures do not correct the problem, see your Gravely dealer.

6.6 Attachment Will Not Run or Runs Slowly

Follow this procedure:

1. Check the PTO Clutch adjustment. Adjust if needed. See Section 4.15.

If this procedure does not correct the problem, see your Gravely dealer.

6.7 Gear Selector or Range Selector Levers Will Not Change Tractor Speed

Follow this procedure:

1. Check the control linkage for damage. Replace if needed.
2. Check for loose fasteners. Tighten if needed.

3. Check for loss of fasteners. Replace if needed.

If these procedures do not correct the problem, see your Gravely dealer.

6.8 Hydraulic Lift System Will Not Operate

Follow this procedure:

1. Check the level of the Hydraulic Fluid. Add Fluid if low. See Section 4.18.

If this procedure does not correct the problem, see your Gravely dealer.

6.9 Ammeter shows a Discharging Condition

Follow this procedure:

1. Stop the engine immediately.
2. Check the electrical system for loose or dirty connections. Clean and tighten the connections if needed.

If these procedures do not correct the problem, see your Gravely dealer.

TRACTOR SPECIFICATIONS

KIND	KOHLER		BRIGGS & STRATTON	ONAN	ONAN CCKA	ONAN	ONAN
Horsepower at 3600 RPM	10	12	16	16	16.5	18	19.9
Number of Cylinders	1	1	1	2	2	2	2
Spark Plug Gap	.025 inch .635mm	.025 inch .635mm	.030 inch .762mm	.025 inch .635mm	.025 inch .635mm	.025 inch .635mm	.025 inch .635mm
Engine Lubricant Amount	2 Quarts 1.9 liters	2 Quarts 1.9 liters	2 Quarts 1.9 liters	2 Quarts 1.9 liters	2 Quarts 1.9 liters	2 Quarts 1.9 liters	2 Quarts 1.9 liters
Tractor Weight	885	885	870	900	900	900	900

Engine Lubricant Recommendations — API Service SC-10W-40, 20W-30, 10W-30

Transmission Lubricant Recommendations — Use Engine Lubricant

Hydraulic Fluid Recommendations — Automatic Transmission Fluid Type A Suffix A

Fuel Recommendations — Regular or Lead-Free Gasoline

GENERAL ITEMS

Fuel Tank Capacity — 5.3 U.S. Gallons (20.14 Liters)

Tire Size Front — 16 x 6.50 — 8

Tire Size Rear — 23 x 8.50 — 12

Tire Pressure — 12 to 18 psi Front and Rear

Fuse Type — BUSS AGC 30

Battery — BCI group 22F, 12 Volt negative ground, 42 ampere hour.

GROUND SPEEDS

FORWARD		REVERSE
“LO” Range	“HI” Range	“HI” or “LO” Range
Gear	Gear	Gear
1 - .49 mph (.78 kmh)	1 - 2.5 mph (4.0 kmh)	1 - 1.1 mph (1.76 kmh)
2 - .76 mph (1.22 kmh)	2 - 3.7 mph (6.0 kmh)	2 - 1.66 mph (2.66 kmh)
3 - 1.1 mph (1.76 kmh)	3 - 5.6 mph (8.96 kmh)	3 - 2.5 mph (4.0 kmh)
4 - 1.66 mph (2.66 kmh)	4 - 8.54 mph (13.66 kmh)	4 - 3.75 mph (6.0 kmh)

**GRAVELY COMMERCIAL TRACTORS
LIMITED WARRANTY**

This Limited Warranty is issued by Clarke-Gravely Corporation, Gravely Division, and consists of the following terms:

1. Only the original purchaser of new Gravely equipment is covered by this Warranty.
2. This Warranty covers repair or replacement of parts manufactured by Gravely which are defective in material or workmanship. Gravely will pay for parts and labor only.
3. The Warranty starts the date of purchase and lasts TWELVE (12) MONTHS.
4. Some components of Gravely equipment are not covered by the Gravely Warranty. These components are covered by the original manufacturer's warranty, they are:
 - (a) Battery — Delco-Remy
 - (b) Tires — Goodyear
 - (c) Hydraulic Pump — Parker Hannifin Corp.
 - (d) Hydraulic Valve — Cessna Fluid Power
 - (e) Relief Valve — Parker Hannifin Corp.
5. To obtain warranty service on Gravely equipment including components not manufactured by Gravely, use this procedure:
 - (a) Notify the Gravely dealer from whom you purchased the equipment.
 - (b) Make arrangements to have the equipment delivered to the dealer (refer to paragraph 6 (a) below).
 - (c) If you have any questions concerning the Gravely Warranty, they should be referred to:

Gravely
Clarke-Gravely Corporation
A Studebaker-Worthington Company
One Gravely Lane
Clemmons, N.C. 27012
Attn: Manager of Customer Services
- (d) Warranty service on Gravely equipment must be performed by an authorized Gravely commercial dealer or Gravely factory branch.
6. This Warranty does not cover the following:
 - (a) Transportation between owner's home or place of business and the dealership. If the dealer provides the transportation of the equipment, he will charge the owner his usual rate for such service.
 - (b) Normal maintenance services and normal replacement of items such as spark plugs, belts, oil, oil filters, air filters and mower blades.
7. GRAVELY MAKES NO OTHER EXPRESS WARRANTIES. ANY IMPLIED WARRANTIES, INCLUDING WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE PERIOD SET OUT IN PARAGRAPH 3 ABOVE.
8. GRAVELY SHALL HAVE NO RESPONSIBILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE BREACH OF ANY WARRANTY, INCLUDING, BUT NOT LIMITED TO, INCONVENIENCE, RENTAL OR PURCHASE OF REPLACEMENT EQUIPMENT, LOSS OF PROFITS OR COMMERCIAL LOSS.
9. A Gravely equipment registration card is supplied with each Gravely tractor or major attachment. Please complete the card and return it to Gravely at the address listed on the card. The return registration card is not required in order to take advantage of this Warranty.
10. This Warranty is not subject to change or modification by anyone, including Gravely dealers and no Gravely dealer is authorized to make any representations or promises on Gravely's behalf.

