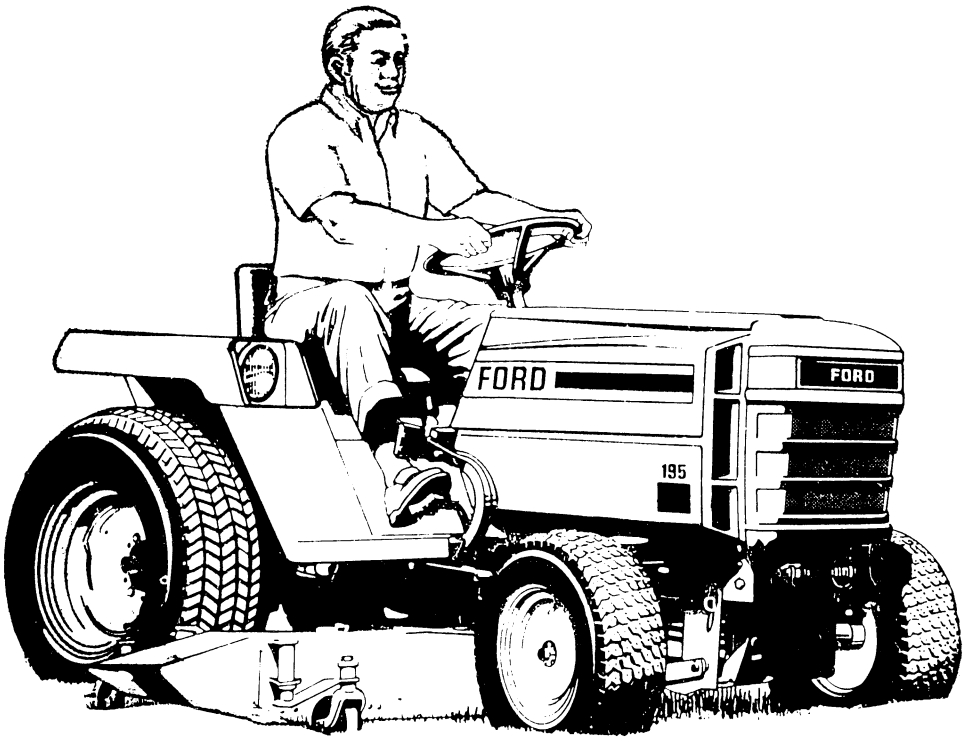
FORD

NEW HOLLAND

Service Manual

Lawn and Garden Tractors
100, 120, 125, 145, 165, 195



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Reprinted

SAFETY PRECAUTION

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all tractors and equipment as well as the personal safety of the individual doing the work. This Shop Manual provides general directions for accomplishing service and repair work with tested, effective techniques. Following them will help assure reliability.

There are numerous variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. This Manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instruction provided in this Manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or parts.

SECTION INDEX

Section 1

INTRODUCTION

SECTION I
INTRODUCTION

GENERAL

This manual contains service and maintenance for the Ford 10, 12, 14, 16 and 19.5 H.P. tractors.

MODELS INCLUDED

1. LGT 100 TRACTOR 10 H.P. Gear
2. LGT 120 TRACTOR 12 H.P. Gear
3. LGT 125 TRACTOR 12 H.P. Hydro
4. LGT 145 TRACTOR 14 H.P. Hydro
5. LGT 165 TRACTOR 16 H.P. Hydro
6. LGT 195 TRACTOR 19.5 H.P. Hydro

This manual is divided into sections. Some sections are divided into subsections. The subsections pertain to a certain component or operating system relative to the section title.

All sections of this manual should be carefully studied by the serviceman prior to beginning work on the tractor. In addition to this manual, the operator's manual should also be studied to insure familiarity with all operating procedures and controls.

SAFETY

This notation, followed by the word **WARNING,** signifies important precautionary measures which, if not properly followed, could result in personal injury or death.

Read these safety rules and follow them closely. Failure to obey these rules could result in loss of control of machine, severe personal injury or death to yourself or bystanders.

WARNING

Always store gasoline or flammable solvents used for cleaning in a proper container. Always dispose of used flammable solvent in a proper manner. NEVER discard flammable solvents in a barrel or bin used for ordinary scrap material.

WARNING

Do not start or run the engine in an enclosed area. Exhaust fumes can kill.

WARNING

Be certain that engine and exhaust assemblies are not hot before cleaning ANY part of the tractor using a flammable solvent.

WARNING

Never let shop rags, used for cleaning, lay around to become fire hazards.

WARNING

Always keep work area clean and free of oil, grease, and water. Some of these may be spilled on the floor during normal disassembly procedures. Clean this up as soon as possible to prevent accidents.

WARNING

Always disconnect spark plug wire before servicing to prevent accidental starting.

WARNING

Always wear safety glasses when working in the shop area. Do not confuse ordinary prescription glasses (even with tempered lenses) or sunglasses with shop safety glasses.

WARNING

Be certain that any part being removed is properly supported or held to prevent injury or damage.

WARNING

Be certain that the work bench or support being used is strong enough. The weight of the part plus the force applied to it during assembly or disassembly may put a great strain on the bench or support.

WARNING

If test running is required, read the operator's manual carefully. Be thoroughly familiar with the controls and proper use of the equipment. Know how to stop the unit.

WARNING

Use jack stands or blocks to hold up the unit in any potentially dangerous positions required for access. Do not rely only on a jack for support.

WARNING

Be sure all tools and cleaning materials are removed before starting unit.

WARNING

Be sure all parts are securely fastened before starting the machine.

WARNING

Never operate without guards, plates, or other safety protective devices in place.

WARNING

If the unit should start to vibrate abnormally, stop the engine and check immediately for the cause.

WARNING

Stop engine and disengage PTO whenever you leave the operating platform to make any repairs, adjustments, or inspections.

WARNING

Take all possible precautions when leaving the vehicle unattended. Shift into neutral; set parking brake and stop the engine.

WARNING

When cleaning, repairing, or inspecting, make certain tractor and all moving parts have stopped.

WARNING

Never operate machine at high transport speeds on slippery surfaces. Use care when backing.

WARNING

Disengage PTO when transporting or not in use.

WARNING

Never operate without good visibility or light.

WARNING

Do not put hands or feet near rotating parts.

WARNING

Never store machine with fuel in the fuel tank inside a building where open flame or sparks are present. Allow engine to cool before storing in any enclosure.

CAUTION

This symbol identifies procedures or practices that if not followed, could result in mechanical damage leading to personal injury.

CAUTION

Always refer to operator's manual for important details if tractor is to be stored for an extended period.

Always be certain that internal components are kept clean and free of chemicals and contaminants.

Always use the proper tool for the work being done. Where a specific tool is specified in the manual, always use THAT tool.

Do not overload machine capacity.

Use only attachments and accessories approved by manufacturers.

NOTE

Metric equivalents are included throughout the manual. They are found adjacent to the English measure, eg. 7 gallons (26.5L).

Throughout this manual, reference will be made to, "right hand of tractor, left hand of tractor, etc." This is determined by sitting in the operator's seat facing forward.

TRACTOR IDENTIFICATION

TRACTOR SERIAL NUMBER. The tractor serial number is located on the tractor frame, *figure 1*, 10, 12, 14, 16 H.P., *figure 2*, 19.5 H.P.

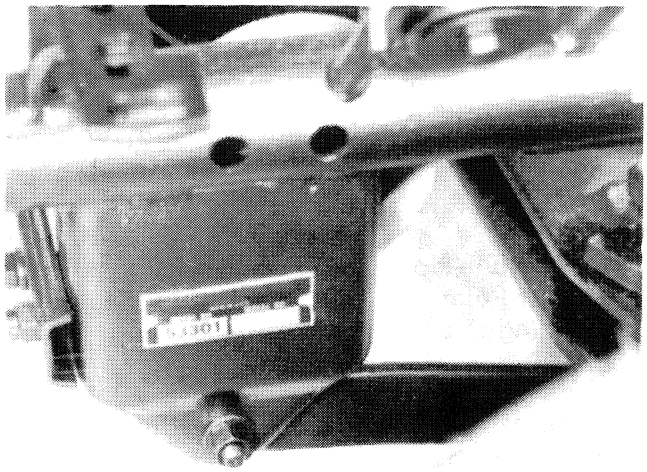


Figure 1 (10, 12, 14 & 16 H.P.)
Location of Tractor Serial Number

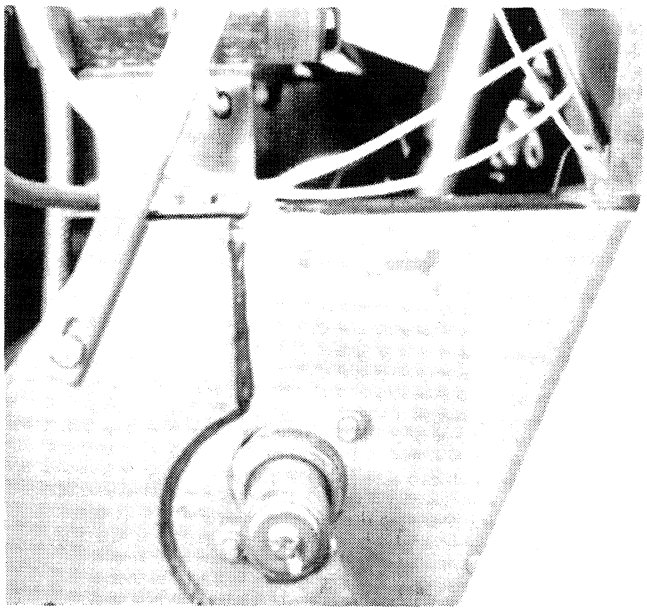


Figure 2 (19.5 H.P.)
Location of Tractor Serial Number

ENGINE SERIAL NUMBER. The engine serial number is located on the engine shroud, *figure 3*, 10, 12, 14, 16 H.P. *figure 4*, 19.5 H.P.

ENGINE SERIAL NUMBER. The engine serial number is located on the engine shroud, *figure 2.*

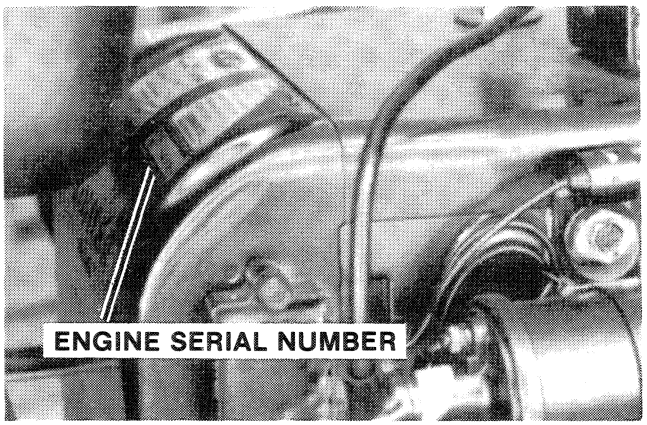


Figure 3 (10, 12, 14 & 16 H.P.)
Location of Engine Serial Number

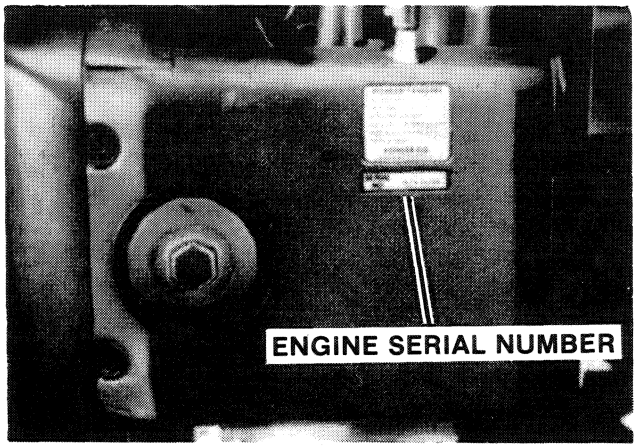


Figure 4 (19.5 H.P. Tractor)
Location of Engine Serial Number

TRANSMISSION SERIAL NUMBER. The transmission serial number is located on the transmission cover, *figure 5.*

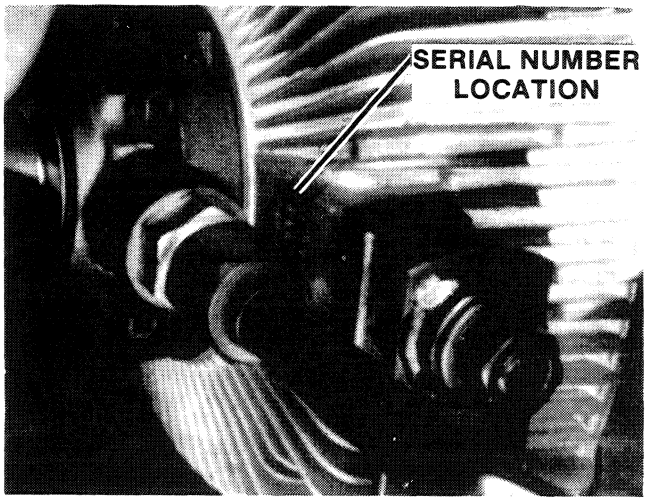


Figure 5 (Typical)
Location of Transmission Serial Number

TRACTOR SPECIFICATIONS

10 H.P. TRACTOR (Gear)

Engine

Manufacturer	Kohler
Model Number	K241AQS Spec no. 4674O-D
Cylinder	1
Type	4-cycle — air cooled
Bore	3 1/4" (82.5 mm)
Stroke	2 7/8" (73.0 mm)
Displacement	23.9 cu. in. (390 cc)
Horsepower (at 3600 rpm)	10.6 (7.8 kw)

Power Train

Transaxle	Peerless model 2306A
Brakes	Rear wheel — drum & band

Electrical System

Battery	12 volt (22 amp) (BC1)
Ignition	Battery coil
Spark Plug	Champion H-10 Champion RH-10 (resistor)
Spark Plug Gap	.025" (0.635mm)
Breaker Point Gap	0.20" (0.508mm)
Charging Capacity	15 amps.

Capacities

Fuel Tank	3 gal. (11.36 l)
Crankcase	1 1/2 qts. (1.42 l)
Transaxle	2 qts. (1.9 l)

Ground Speeds (at 3200 engine rpm with standard tires)

1st	0.83 mph
2nd	2.47 mph
3rd	4.42 mph
4th	6.51 mph
Reverse	2.91 mph

Tires

Standard

Front	16x6.50x8
Rear	23x8.50x12

Optional

Rear Bar Type	23x8.50x12

Tire Pressure

Front	8 psi (0.562 kg/sq. cm)
Rear	8 psi (0.562 kg/sq. cm)

PTO

Front std.	Engine speed
Front opt.	540 rpm
Rear opt.	3300 rpm

Hitch, Rear

Std. — Fixed Drawbar Uses 3/4" Hitch Pin
Opt. — Sleeve

12 H.P. TRACTOR (Gear)

Engine

Manufacturer	Kohler
Model Number	K301AQS Spec. no. 47606-D
Cylinder	1
Type	4 cycle — air cooled
Bore	3 3/8" (85.7 mm)
Stroke	3 1/4" (82.5 mm)
Displacement	29.07 cu. in. (475 cc)
Horsepower (at 3600 rpm)	12 (8.9 kw)

Power Train

Transaxle	Peerless model 2306A
Brakes	Rear wheel — drum & band

Electrical System

Battery	12 volt (22 amp) (BC 1)
Ignition	Battery coil
Spark Plug	Champion H-10 Champion RH-10 (resistor)
Spark Plug Gap	.025" (0.635 mm)
Breaker Point Gap	.020" (0.508 mm)
Charging Capacity	15 amps

Capacities

Fuel Tank	3 gal. (11.36 l)
Crankcase	1 1/2 qts. (1.42 l)
Transaxle	2 qts. (1.9 l)

Ground Speeds (at 3200 engine rpm with standard tires)

1st	0.83 mph
2nd	2.47 mph
3rd	4.42 mph
4th	6.51 mph
Reverse	2.91 mph

Tires

Standard

Front	16x6.50x8
Rear	23x8.50x12

Optional

Rear Bar Type	23x8.50x12

Tire Pressure

Front	8 psi (0.562 kg/sq. cm)
Rear	8 psi (0.562 kg/sq. cm)

PTO

Front std.	Engine speed
Front opt.	540 rpm
Rear opt.	3300 rpm

Hitch, Rear

Std. — Fixed Drawbar Uses 3/4" Hitch Pin
Opt. — Sleeve

TRACTOR SPECIFICATIONS (CON'T)

12 H.P. TRACTOR (Hydro)

Engine

Manufacturer ..... Kohler
Model Number .... K301AQS Spec. no. 47606-D
Cylinder 1
Type ..... 4-cycle — air cooled
Bore ..... 3 3/8" (85.7mm)
Stroke ..... 3 1/4" (82.5mm)
Displacement ..... 29.07 cu. in. (475 cc)
Horsepower (at 3600 rpm) ..... 12.0 (8.9 kw)

Power Train

Transaxle ..... 2500 Peerless
Hydrostatic Unit ..... Model 11 Eaton
Brakes ..... Rear wheel — drum & band

Electrical System

Battery ..... 12 volt (22 amp) (BC1)
Ignition ..... Battery coil
Spark Plug ..... Champion H-10
Champion RH-10 (resistor)
Spark Plug Gap ..... .025" (0.635 mm)
Breaker Point Gap ..... .020" (0.508 mm)
Charging Capacity ..... 15 amps

Capacities

Fuel Tank ..... 3 gal. (11.36 l)
Crankcase ..... 1 1/2 qts. (1.42 l)
Hydrostatic Transmission —
Transaxle (Common Sump) ..... 4 qts. (3.8 l)

Ground Speeds (at 3200 engine rpm with standard tires)

Low Range ..... 0-4.5 mph
High Range ..... 0-6.5 mph
Reverse ..... 0-3.2 mph

Tires

Standard

Front 16x6.50x8
Rear 23x8.50x12

Optional

Rear Bar Type 23x8.50x12

Tire Pressure

Front ..... 8 psi (0.562 kg/sq. cm)
Rear ..... 8 psi (0.562 kg/sq. cm)

PTO

Front std. ..... Engine speed
Front opt. ..... 540 rpm
Rear opt. ..... Engine speed

Hitch, Rear

Std. — Fixed Drawbar — Uses 3/4" Hitch Pin
Opt. — Sleeve
Opt. — Category: "O" 3 pt. Hitch

14 H.P. TRACTOR (Hydro)

Engine

Manufacturer ..... Kohler
Model Number .... K321AQS Spec. no. 60244-D
Cylinder 1
Type ..... 4-cycle — air cooled
Bore ..... 3 1/2" (88.9 mm)
Stroke ..... 3 1/4" (82.5 mm)
Displacement ..... 31.27 cu. in. (512 cc)
Horsepower (at 3600 rpm) ..... 14.0 (10.4 kw)

Power Train

Transaxle ..... 2500 Peerless
Hydrostatic Unit ..... Model 11 Eaton
Brakes ..... Rear wheel — drum & band

Electrical System

Battery ..... 12 volt (22 amp) (BC1)
Ignition ..... Battery coil
Spark Plug ..... Champion H-10
Champion RH-10 (resistor)
Spark Plug Gap ..... .025" (0.635 mm)
Breaker Point Gap ..... .020" (0.508 mm)
Charging Capacity ..... 15 amps

Capacities

Fuel Tank ..... 3 gal. (11.36 l)
Crankcase ..... 1 1/2 qts. (1.42 l)
Hydrostatic Transmission —
Transaxle (Common Sump) ..... 4 qts. (3.8 l)

Ground Speeds (at 3200 engine rpm with standard tires)

Low Range ..... 0-4.4 mph
High Range ..... 0-6.5 mph
Reverse ..... 0-3.2 mph

Tires

Standard

Front 16x6.50x8
Rear 23x10.50x12

Optional

Rear Bar Type 23x8.50x12

Tire Pressure

Front ..... 8 psi (0.562 kg/sq. cm)
Rear ..... 8 psi (0.562 kg/sq. cm)

PTO

Front std. ..... Engine speed
Front opt. ..... 540 rpm
Rear opt. ..... Engine speed

Hitch, Rear

Std. — Fixed Drawbar, Use 3/4" Hitch Pin
Opt. — Sleeve
Opt. — Category "O" 3 pt. Hitch

16 H.P. TRACTOR (Hydro)

Engine

Manufacturer	Kohler
Model Number	K341AQS
Cylinder	1
Type	4-cycle — air cooled
Bore	3 3/4" (95.3mm)
Stroke	3 1/4" (82.5mm)
Displacement	35.89 cu. in. (588 cc)
Horsepower (at 3600 rpm)	16 (11.9 kw)

Power Train

Transaxle	2500 Peerless
Hydrostatic Unit	Model 11 Eaton
Brakes	Rear wheel — drum & band

Electrical System

Battery	12 volt (22 amp) (BC1)
Ignition	Battery coil
Spark Plug	Champion H-10 Champion RH-10 (resistor)
Spark Plug Gap	.025" (0.635 mm)
Breaker Point Gap	.020" (0.508 mm)
Charging Capacity	15 amps

Capacities

Fuel Tank	5 gal. (18.9 l)
Crankcase	1 1/2 qts. (1.42 l)
Hydrostatic Unit — Transaxle (Common Sump)	4 qts. (3.8 l)

Ground Speeds (at 3200 engine rpm with standard tires)

Low Range	0-4.4 mph
High Range	0-6.5 mph
Reverse	0-3.2 mph

Tires

Standard

Front	16x6.50x8
Rear	23x10.50x12

Optional

Rear Bar Type	23x8.50x12

Tire Pressure

Front	8 psi (0.562 kg/sq. cm)
Rear	8 psi (0.562 kg/sq. cm)

PTO

Front std	Engine speed
Front opt.	540 rpm
Rear opt	Engine speed

Hitch, Rear

Std. — Fixed Drawbar — Uses 3/4" Hitch Pin
Opt. — Sleeve
Opt. — Category "O" 3 Pt. Hitch

19.5 H.P. TRACTOR (Hydro)

Engine

Manufacturer	Kohler
Model Number	K5325
Cylinder	2
Type	4-cycle — air cooled
Bore	3 3/4" (8.57 cm)
Stroke	.3" (7.62 cm)
Displacement	53.7 cu. in. (880.14 cc)
Horsepower (at 3600 rpm)	19 1/2 (14.726 kw)

Power Train

Transaxle	2500 Peerless
Hydrostatic Unit	Model 11 Eaton
Brakes	Rear wheel — drum & band

Electrical System

Battery	12 volt (45 amp) (BCI)
Ignition	Battery coil
Spark Plug	Champion H-10 Champion RH-10 (resistor)
Spark Plug Gap	.035" (0.889 mm)
Breaker Point Gap	.020" (0.508 mm)
Charging Capacity	15 amps

Capacities

Fuel Tank	7 gal. (26.51.)
Crankcase	3 qts. (2, 8L.)
Hydrostatic Unit — Transaxle (Common Sump)	6 qts. (5.7 l)

Ground Speeds (at 3200 engine rpm with standard tires)

Low Range	0-5.2 mph
High Range	0-9.6 mph
Reverse	0-4.8 mph

Tires

Standard

Front	20x8.0x10
Rear	29x12.0x15

Optional

Front	10-12 p.s.i.
Rear	8-10 p.s.i.

PTO

Front std.	Engine speed
Rear opt.	2000 rpm
Rear opt.	540 rpm

Hitch, Rear

Std. — Fixed Drawbar — Uses 3/4" Hitch Pin
Opt. — Category "O" 3 Pt. Hitch

TORQUE CHART
Tolerance ± 10%

SIZE	SAE GRADE #2	SAE GRADE #5	SAE GRADE #8
8-32	19 In./Lbs.	30 In./Lbs.	41 In./Lbs.
8-36	20 In./Lbs.	31 In./Lbs.	43 In./Lbs.
10-24	27 In./Lbs.	43 In./Lbs.	60 In./Lbs.
10-32	31 In./Lbs.	49 In./Lbs.	68 In./Lbs.
1/4-20	66 In./Lbs.	8 Ft./Lbs.	12 Ft./Lbs.
1/4-28	76 In./Lbs.	10 Ft./Lbs.	14 Ft./Lbs.
5/16-18	11 Ft./Lbs.	17 Ft./Lbs.	25 Ft./Lbs.
5/16-24	12 Ft./Lbs.	19 Ft./Lbs.	25 Ft./Lbs.
3/8-16	20 Ft./Lbs.	30 Ft./Lbs.	45 Ft./Lbs.
3/8-24	23 Ft./Lbs.	35 Ft./Lbs.	50 Ft./Lbs.
7/16-14	30 Ft./Lbs.	50 Ft./Lbs.	70 Ft./Lbs.
7/16-20	35 Ft./Lbs.	55 Ft./Lbs.	80 Ft./Lbs.
1/2-13	50 Ft./Lbs.	75 Ft./Lbs.	110 Ft./Lbs.
1/2-20	55 Ft./Lbs.	90 Ft./Lbs.	120 Ft./Lbs.
9/16-18	65 Ft./Lbs.	110 Ft./Lbs.	150 Ft./Lbs.
9/16-20	75 Ft./Lbs.	120 Ft./Lbs.	170 Ft./Lbs.
5/8-11	90 Ft./Lbs.	150 Ft./Lbs.	220 Ft./Lbs.
5/8-18	100 Ft./Lbs.	180 Ft./Lbs.	240 Ft./Lbs.
3/4-10	160 Ft./Lbs.	260 Ft./Lbs.	386 Ft./Lbs.
3/4-16	180 Ft./Lbs.	300 Ft./Lbs.	420 Ft./Lbs.
7/8-9	140 Ft./Lbs.	400 Ft./Lbs.	600 Ft./Lbs.
7/8-14	155 Ft./Lbs.	440 Ft./Lbs.	660 Ft./Lbs.
1-8	220 Ft./Lbs.	580 Ft./Lbs.	900 Ft./Lbs.
1-12	240 Ft./Lbs.	640 Ft./Lbs.	1,000 Ft./Lbs.

NOTES:
1. These torque values are to be for all tractor hardware excluding: locknuts, self-tapping screws, thread forming screws, and sheet metal screws.
2. Unless otherwise noted, all torque values must meet this specification.

BOLT HEAD MARKING

S.A.E. GRADE:

Standard Tires

20 x 8.00-10 front tires

6 psi (0.422 kg/sq cm)	400 lbs. (181.4 kg)
8 psi (0.562 kg/sq cm)	470 lbs. (213.2 kg)
10 psi (0.703 kg/sq cm)	535 lbs. (242.7 kg)
12 psi (0.843 kg/sq cm)	595 lbs. (270.0 kg)

29 x 12.00-15 rear tires

5 psi (0.351 kg/sq cm)	790 lbs. (358.3 kg)
10 psi (0.703 kg/sq cm)	1185 lbs. (537.5 kg)
15 psi (1.054 kg/sq cm)	1505 lbs. (682.6 kg)

Optional Tires

18 x 8.50 - 8 front tires

6 psi (0.422 kg/sq cm)	380 lbs. (172.4 kg)
8 psi (0.562 kg/sq cm)	450 lbs. (204.1 kg)
10 psi (0.703 kg/sq cm)	515 lbs. (233.6 kg)
12 psi (0.843 kg/sq cm)	570 lbs. (258.5 kg)

26 x 12.00 - 12 rear tires

6 psi (0.422 kg/sq cm)	880 lbs. (399.1 kg)
8 psi (0.562 kg/sq cm)	1040 lbs. (471.7 kg)
10 psi (0.703 kg/sq cm)	1185 lbs. (537.5 kg)
12 psi (0.843 kg/sq cm)	1320 lbs. (598.7 kg)

Maximum load includes weight of tractor, operator, attachments, wheel weights, tire fluid, etc.

Notes:

Section 2

LUBRICATION AND MAINTENANCE

SECTION 2
LUBRICATION AND MAINTENANCE

FUEL AND LUBRICANT

FUEL. The engines perform best when the following recommendations are followed:

CAUTION

Handle gasoline with care - it is highly flammable. Do not fill fuel tank with engine running or if engine is hot. Do not smoke while filling fuel tank.

Prior to filling fuel tank wipe dirt from around filler neck and fuel tank cap. Dirt allowed to enter the tank may cause hard starting and poor performance. Fill the fuel tank with fresh clean 85 octane (minimum) regular grade gasoline. Leaded or unleaded may be used.

CAUTION

DO NOT MIX OIL WITH GASOLINE.

LUBRICANTS. Proper use of approved lubricants is the best way of ensuring proper service from the tractor. Use only lubricants specified in this manual and within the intervals specified.

ENGINE LUBRICATING OIL. Oils meeting the requirements of the American Petroleum Institute's (API) Service Classification SC, CC, SD, or SE are to be used. Oil viscosity (weight) is selected according to the anticipated ambient temperature. The temperature (viscosity) recommendations are:

Temperature	Oil Viscosity
40° F (44. C) & up	SAE 30
0° F (-17, 8 C) to 40° F (4.4 C)	SAE 10W - 30
0° F (-17, 8 C) & below	*SAE 5W - 20

*Increased oil consumption may be experienced when SAE 5W - 20 oil is used. Check oil more frequently.

TRANSAXLE - Non-hydro gear model, SAE 90 oil

HYDROSTATIC TRANSMISSION AND TRANSAXLE. The following fluids are approved by the manufacturer and are used as factory fills.

1. Texaco Transhydral #2209
2. Ford Motor Co. #M-2C41-A

The following fluids in descending order of preference, are also acceptable.

1. International Harvester Hy Tran
2. Automotive Automatic Transmission fluid type "B".
3. 10W detergent engine oil, no service grade is specified.
4. 20W detergent engine oil, no service grade is specified.

CAUTION

Do not mix fluids. Do not use Type "A" Automatic Transmission Fluid. The use of Type "A" and/or intermixing of fluids may cause severe damage to the hydrostatic unit and WILL void the warranty.

LUBE FITTINGS. Use a good quality chassis grease.

ENGINE LUBRICATION

Crankcase (oil change) 10, 12, 14, 16 HP Tractors

Break-in	5 hrs.
Normal Conditions	*30 hrs.

Crankcase (oil change) 19.5 HP Tractor

Break-in	5 hrs.
Normal Conditions	*50 hrs.

Engine Oil Filter 19.5 HP Tractor

Break-in	5 hrs.
Normal Conditions	*100 hrs. (every other oil change)

*Extreme dusty and dirty conditions require more frequent changes.

CHECKING ENGINE OIL

Check the oil level using the dipstick located at the side of the engine. For accurate readings, the oil level should be checked approximately 15 minutes after the engine is shut off. Maintain the oil level as near the FULL mark as possible at all times.

To check the oil level of the engine, proceed as follows:

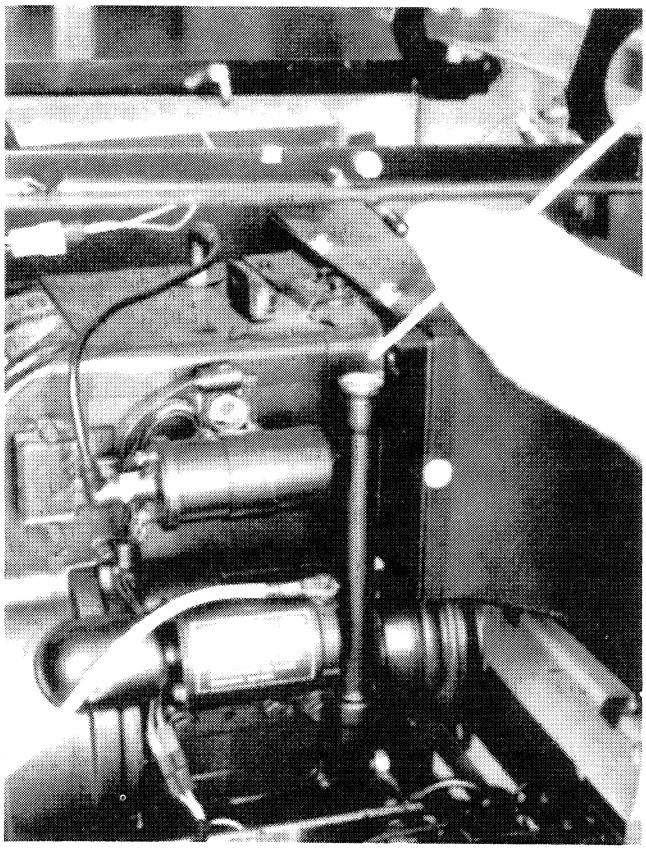


Figure 1 (10, 12, 14 & 16 H.P.)
Checking Engine Oil Level

Figure 2 (19.5 H.P.)
Checking Engine Oil Level

1. Park tractor on a level surface, set parking brake, stop engine and raise hood.

   Install dipstick fully prior to taking reading. An inaccurate reading may lead to overfilling and possible engine seal damage.
2. Wipe dust and dirt from around dipstick. Oil must be between marks on dipstick.

CHANGING ENGINE OIL

Engine should be at operating temperature (after engine has run 5 minutes or more) when oil is drained. When hot, the oil will drain faster removing dirt and other foreign material held in suspension.

To change engine oil, proceed as follows:

1. Park tractor on a level surface, set parking brake, stop engine and raise hood.
2. Remove dipstick, *figure 1* 10, 12, 14 & 16 H.P., *figure 2* 19.5 H.P..
3. Remove side panel.
4. Remove drain plug located at front of engine, *figure 3* 10, 12, 14 & 16 H.P., *figure 4* 19.5 H.P.
5. Drain oil into a suitable container. Replace plug after all oil is drained out.

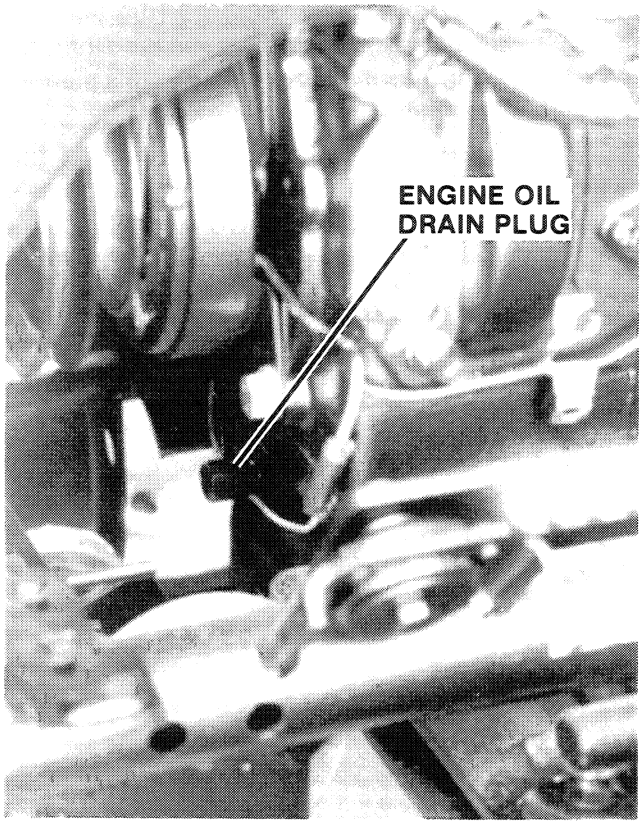


Figure 3 (10, 12, 14 & 16 H.P.)
Engine Oil Drain Plug Location

6. Fill crankcase through dipstick opening with oil of the correct viscosity and grade. Fill until oil level is within safe range on dipstick (see Engine Crankcase Capacity Chart below).

ENGINE CRANKCASE CAPACITY

Engine Horse Power	Without Filter	With Filter
10	1½ qts. (1.42 l.)	NA
12	1½ qts. (1.42 l.)	NA
14	1½ qts. (1.42 l.)	NA
16	1½ qts. (1.42 l.)	NA
19.5	3 qts. (2.8 l.)	3½ qts. (3.3 l.)

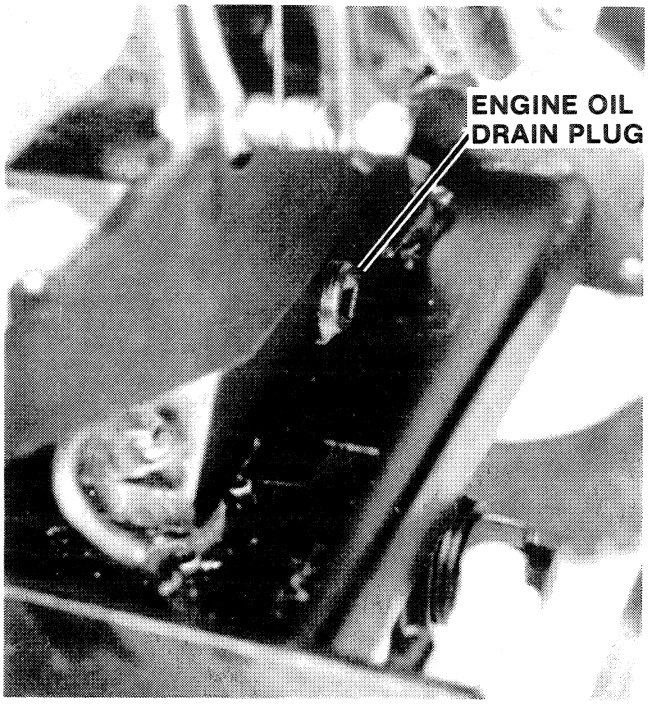


Figure 4 (19.5 H.P.)
Engine Oil Drain Plug Location

CHANGING ENGINE OIL FILTER (19.5 H.P. Tractor Only)

The engine oil filter change interval should be every 100 hours or every other engine oil change at 50 hour intervals.

To change the oil filter, proceed as follows:

1. Drain engine crankcase oil (see Changing Engine Oil, page 14).
2. Remove R.H. side panel, *figure 5.*
3. Remove filter by turning it counterclockwise. Discard old filter.

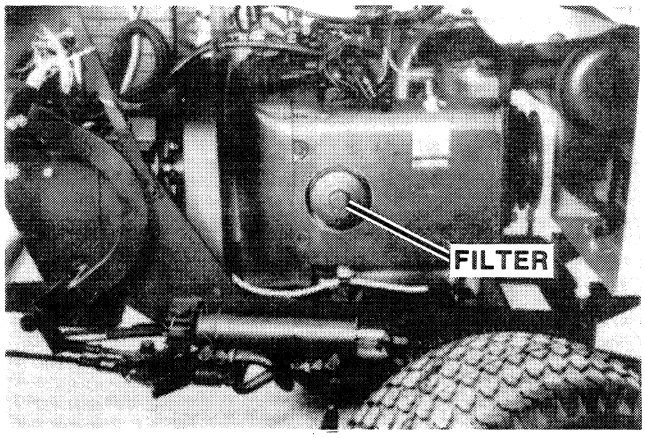


Figure 5 (19.5 H.P.)
Engine Oil Filter Location

4. Clean filter adapter and wipe up any oil spilled on crankcase.
5. Lightly grease seal of new filter. Install new filter.

NOTE

Do not over tighten, seal may be damaged and future removal extremely difficult.

6. Replace drain plug and fill crankcase with oil (see Changing Engine Oil, page 14).

CHECKING TRANSAXLE FLUID

The fluid level of the transmission should be checked only when the fluid is **COLD.** It should be checked prior to initial start and maintained with checks at eight hour intervals. With the tractor level, check the transaxle fluid as follows:

HYDROSTATIC MODELS

1. Check oil level by removing plug A, *figure 6.*

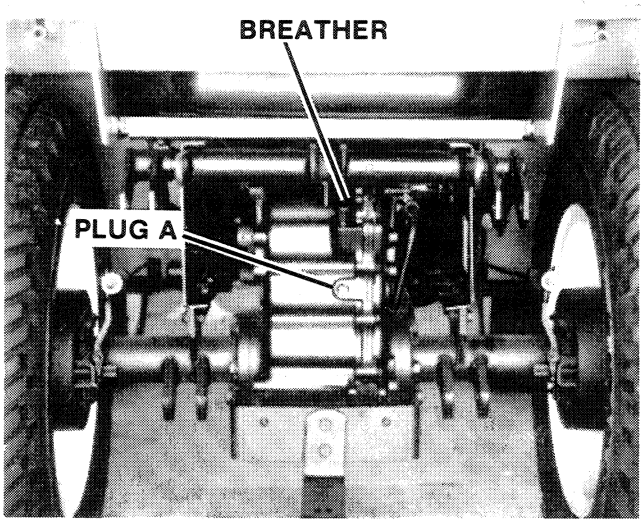


Figure 6 (Hydrostatic Models)
Checking Fluid Level In Transaxle

When fluid is at the proper level it will begin to dribble out. If fluid is required, remove breather, *figure 6,* and plug *A*. Add fluid through breather hole until fluid begins to dribble out through hole from plug *A*. Use Texaco Transhydral #2209 or Ford Motor Co. #M-2C41-A.

NOTE

Do not overfill.

2. Replace plug *A* and breather.

GEAR MODELS

1. Check oil level by removing plug *A*. When oil is at proper level it will be even with bottom edge of this hole. If oil is required, add SAE-90 oil until proper level is met. Use a pump or funnel with a flexible spout to add oil.
2. Replace plug *A*.

CHANGING HYDRAULIC OIL FILTER (Hydrostatic Models Only)

The hydraulic oil filter change interval should be every 100 hours. The filter is located on the hydrostatic transmission beneath the tractor.

To change hydraulic oil filter, proceed as follows:

1. Park tractor on a level surface, set parking brake and stop engine.
2. Remove and discard old filter.
3. Fill new filter with fresh fluid prior to installation.
4. Install new filter.
5. Check transmission fluid level (Refer to Checking Transmission Fluid Level, page 15) and add fluid as required.

CHANGING TRANSMISSION FLUID

1. Park tractor on a level surface; set parking brake and stop engine.

HYDROSTATIC MODELS

2. Remove breather, *figure 6.*
3. Remove drain plug, *figure 7.*
4. Drain fluid into a container.
5. Replace drain plug.
6. Remove plug *A, figure 6.*
7. Fill with 4 quarts (3.8 l), (6 quarts for 19.5 H.P.) of Texaco Transhydral #2209 or Ford Motor Co. #M-2C41-A.
8. Replace plug *A* and breather, start engine.

NOTE

Keep tractor in neutral and operate hydraulic lift (if tractor is so equipped) several times. This insures that the entire system is filled. Run engine approximately 1 minute.

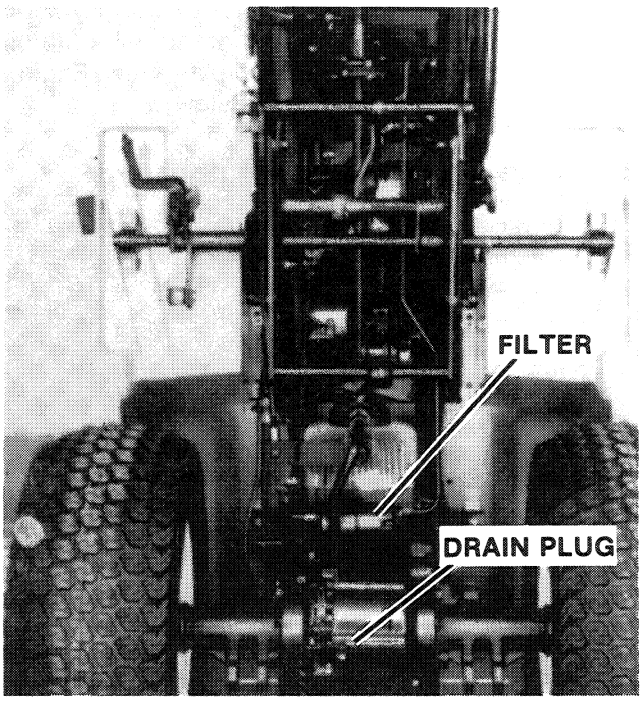


Figure 7 Underside View (10, 12, 14 & 16 H.P.)

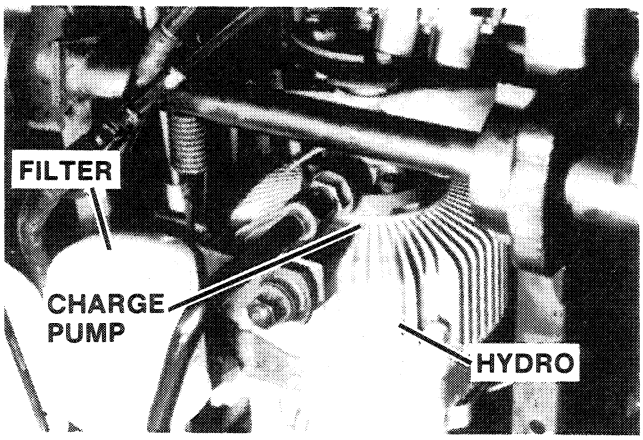


Figure 8 Underside View (19.5 H.P.)

9. Stop engine and recheck fluid level. Add fluid as required to bring up to proper level. Refer to Checking Transmission Fluid Level, page 15.

GEAR MODELS

1. Remove plug *A*.
2. Remove drain plug.
3. Drain oil into a container.
4. Replace drain plug.
5. Fill with 2 quarts (1.9 l) SAE 90 oil. Refer to Checking Transmission Fluid Level, page 15.
6. Replace plug *A*.

LUBRICATION CHART
10 & 12 H.P. GEAR TRACTOR

REF.	PART NAME	LUBRICANT	LUBRICATION INTERVAL		REMARKS
			30 HOURS	60 HOURS	
1	Grease Fittings (2) Front Wheels	Chassis Grease	●		Fill slowly with grease gun until grease begins to seep out
2	Grease Fittings (2) Each End of Front Axle	Chassis Grease	●		Fill slowly with grease gun until grease begins to seep out
3	Grease Fitting (1) Steering Gear	SAE 90 Oil	●		Fill slowly with grease gun until grease begins to seep out
4	Front Power Take-Off	Chassis Grease	●		Apply around tension springs
5	Grease Fitting (1) Right Angle Gear Box	Chassis Grease	●		Fill slowly with grease gun until grease begins to seep out
6	Brake Adjusting Spring	Chassis Grease	●		Apply around spring
7	Lift Quadrant	Chassis Grease	●		Apply generously
8	Implement Lift Handle	SAE 30 Oil	●		Spring and rod inside handle
9	Implement Lift Linkage	SAE 30 Oil		●	All sliding surfaces, slotted holes and pivot points
10	Idler and Spring Tension Arms and Pivot Rod	SAE 30 Oil		●	All connection points
11	Brake Links and Pins	SAE 30 Oil		●	Caution - do not get oil between brake drum and brake band
12	Brake Rod Pivot	SAE 30 Oil		●	Linkage pivot points
13	Steering Linkage	SAE 30 Oil		●	Outboard bearing and linkage pivot points
14	Parking Brake Lock	SAE 30 Oil		●	Linkage pivot points
15	Clutch and Brake Pivot Shaft	SAE 30 Oil		●	Linkage pivot points
16	4-Speed Transaxle	SAE 90 Oil	●		Fill to required level
17	Engine Air Filter Dry Type			●	Remove element after 60 hours and tap lightly on flat surface to remove loose dirt. Replace after 120 hours (more frequently under extremely dirty or dusty conditions).
18	Engine Crankcase Oil Change	Per Mfg. Rec.	●		See operators manual

Lubricate your tractor on a definite schedule. The rear axle bearings are prepacked and sealed at the factory and need no further lubrication. Apply a few drops of SAE 30 Oil as required to other moving parts not listed above.

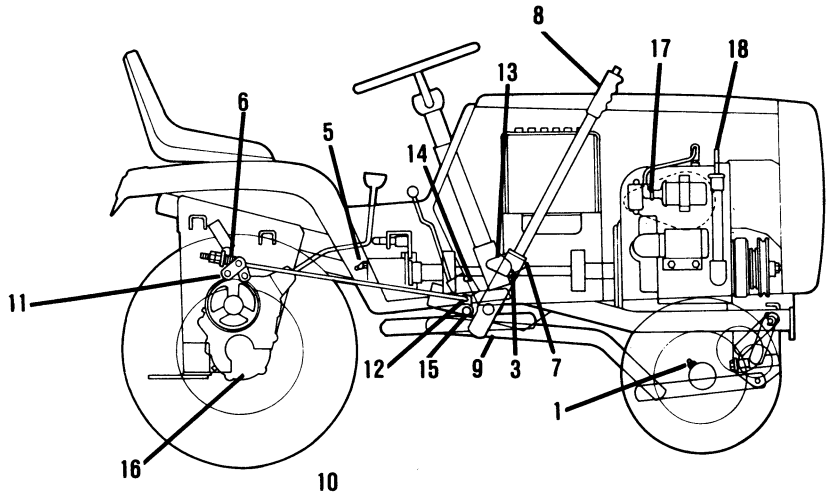
Lubricant:
SAE 30 Oil

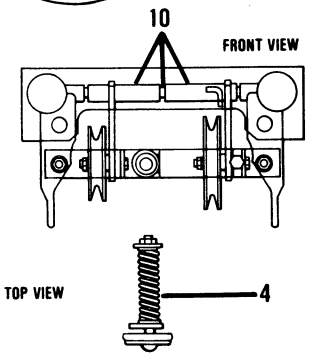
Sources: Sunray DX; Mobil Oil

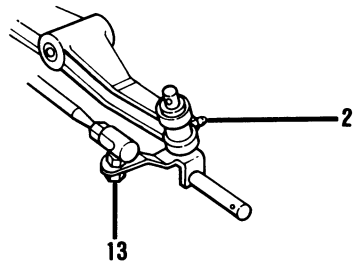
Chassis Grease - Pressure Gun Grease
Sources: Sunray DX #671; Gulf Supreme #0

SAE 90 Oil
Sources: Elco Gear Safety; Exxon Gear Oil "LC"; Mobil Mobilube "46"; Texaco Gear Lube "HD-90".

R.H. SIDE VIEW







LUBRICATION CHART
12, 14 & 16 H.P. HYDRO TRACTOR

REF.	PART NAME	LUBRICANT	LUBRICATION INTERVAL		REMARKS
			30 HOURS	60 HOURS	
1	Grease Fittings (2) Front Wheels	Chassis Grease	●		Fill slowly with grease gun until grease begins to seep out
2	Grease Fittings (2) Each end of front axle	Chassis Grease	●		Fill slowly with grease gun until grease begins to seep out
3	Grease Fitting (1) Steering Gear	SAE 90 Oil	●		Fill slowly with grease gun until grease begins to seep out
4	Front Power Take-Off	Chassis Grease	●		Apply around tension springs
5	Depth Control	Chassis Grease	●		Apply full length of threads
6	Brake Adjusting Spring and Pivot Points	Chassis Grease	●		
7	Implement Lift Linkage	SAE 30 Oil		●	All sliding surfaces, slotted holes and pivot points
8	Idler and Spring Tension Arms	SAE 30 Oil		●	All connection points
9	Brake Links and Pins	SAE 30 Oil		●	Caution - Do not get oil between brake drum and brake band
10	Brake Rod Pivot	SAE 30 Oil		●	Linkage pivot points
11	Steering Linkage	SAE 30 Oil		●	Outboard bearing and linkage pivot points
12	Parking Brake Lock	SAE 30 Oil		●	Linkage pivot points
13	Hydraulic Lift Lever	SAE 30 Oil		●	Linkage pivot points
14	Hydrostatic Transmission	Hydraulic Oil	●		Check Daily
15	Oil Filter (Hydrostatic Transmission)				Change after first 10 hours of operation. No further changes necessary unless system becomes contaminated through oil level checks, refill, or teardown.
16	Engine Air Filter Dry Type			●	Remove element after 60 hours and tap lightly on flat surface to remove loose dirt. Replace after 120 hours (more frequently under extremely dirty or dusty conditions).
17	Engine Crankcase Oil Change	Per Mfg. Rec.	●		See operators manual
18	Speed Range Lever	SAE 30 Oil	●		Linkage pivot points
19	Implement Lift Handle (12 H.P. Model Only)	SAE 30 Oil	●		Spring and rod inside handle
20	Quadrant (12 H.P. Model Only)	Chassis Grease	●		Apply generously

Lubricate your tractor on a definite schedule. The rear axle bearings are prepacked and sealed at the factory and need no further lubrication. Apply a few drops of SAE 30 Oil as required to other moving parts not listed above.

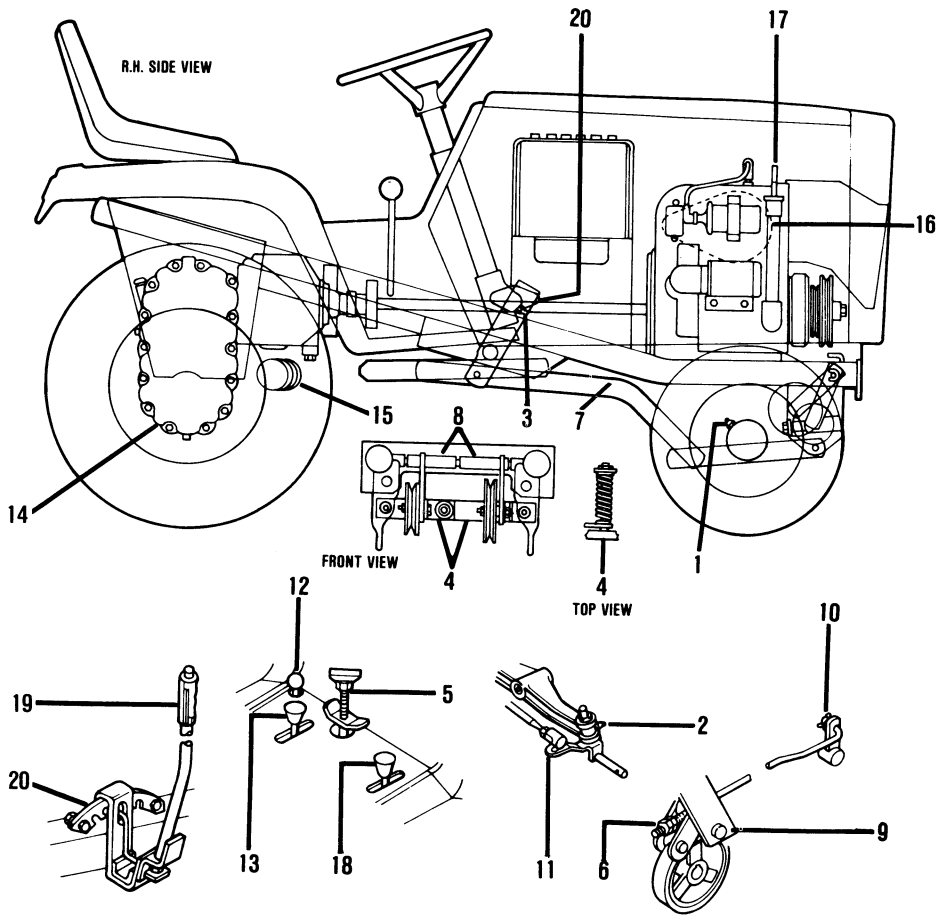
Lubricant:
SAE 30 Oil.

Sources: Sunray DX; Mobil Oil

Chassis Grease - Pressure Gun Grease
Sources: Sunray DX #671; Gulf Supreme #0

Hydraulic Oil, **Sources:** Texaco Transhydral #2209, Ford Motor Co. #M-2041-A, Texaco Torque Fluid C3 1821 Formulation No. TL-9039.

SAE 90, **Sources:** Elco Gear Safety; Exxon Gear Oil "LC"; Mobil Mobilube "46"; Texaco Gear Lube "HD-90".



LUBRICATION CHART
19.5 H.P. TRACTOR

REF.	PART NAME	LUBRICANT	LUBRICATION INTERVAL		REMARKS
			30 HOURS	60 HOURS	
1	Hydrostatic Transmission	Hydraulic Oil			Check Daily
2	Engine - Oil Check				Check Daily
	Oil Change	Per Mfg. Rec.			*50 hrs. See operators manual
3	Steering Gear-Grease Fitting (1)	SAE 90	●		Fill slowly until grease seeps out.
4	Front Axle - Grease Fitting (3)	Chassis Grease	●		Fill slowly until grease seeps out.
5	Front Wheels - Grease Fitting (2)	Chassis Grease	●		Fill slowly until grease seeps out.
6	Rear Pivot Shaft - Grease Fitting (1)	Chassis Grease	●		Fill slowly until grease seeps out.
7	Depth Control Rod	Chassis Grease	●		Apply full length of threads
8	Speed Range Selector	SAE 30 Oil	●		Apply to all moving parts
9	Speed Control Linkage	SAE 30 Oil	●		Apply to all moving parts
10	Parking Brake	SAE 30 Oil	●		Apply to all moving parts
11	Brake Pivots	SAE 30 Oil	●		Apply to pins on frame
12	Steering Shaft Outboard Bearing	SAE 30 Oil	●		
13	Valve Actuator	SAE 30 Oil		●	Apply to all moving parts
14	Hydro Control Linkage	SAE 30 Oil		●	Apply to all moving parts
15	Throttle, Choke & Governor Linkages	SAE 30 Oil		●	Apply to all moving parts
16	Cylinder Pivots (4)	SAE 30 Oil		●	Apply to anchor pivots.
17	Ball Joints (5)	SAE 30 Oil		●	
18	Lift Linkage	SAE 30 Oil	●		Apply to all moving parts and pivot points.
19	Brake Springs	Chassis Grease		●	
20	All Other Moving Parts	SAE 30 Oil	●		For easy operation

( ) - Number of Locations

Lubrication coupled with cleanliness is the most inexpensive preventive maintenance tool. Therefore, lubricate the tractor at regular intervals as instructed above and always clean the area around grease fittings and oil fills before lubricating and wipe up excessive grease or oil after lubricating.

Lubricant:

Hydraulic Oil, **Sources**: Texaco Transhydral #2209; Ford Motor Co. #M-2041-A, Texaco Torque Fluid C3 1821 Formulation No. TL-9039.

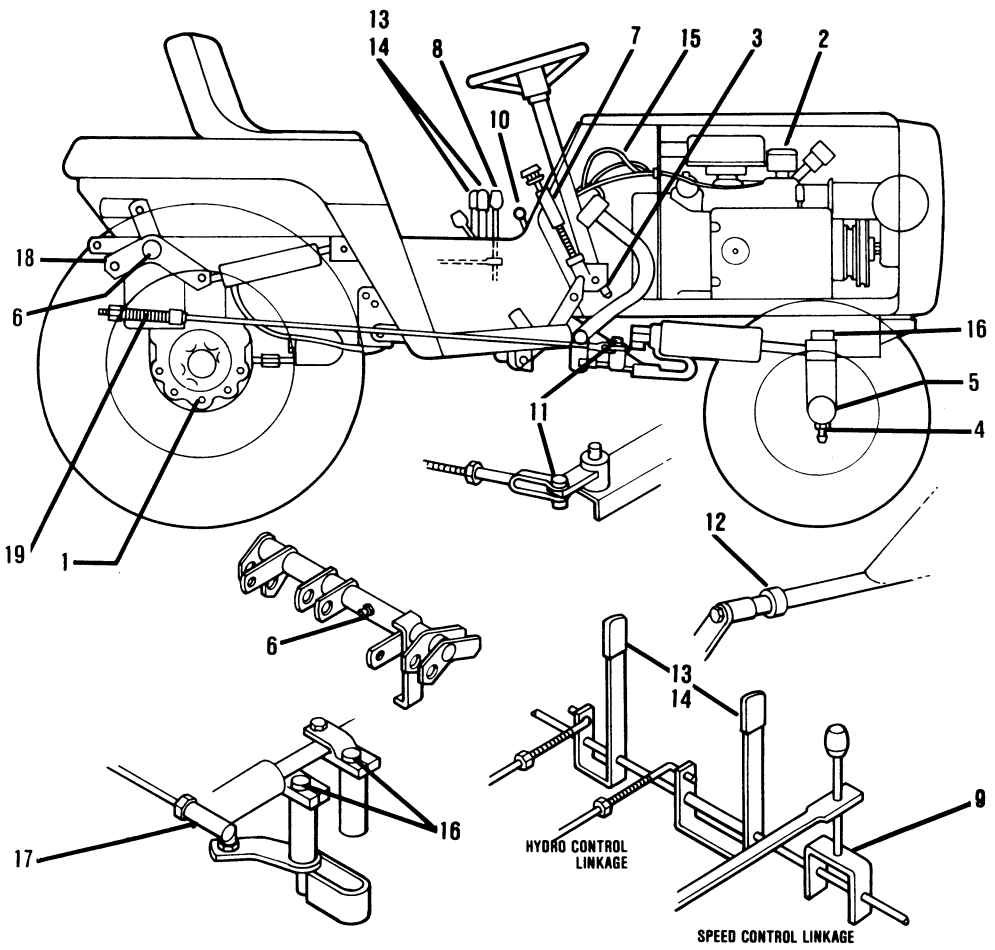
SAE 90 Oil, **Sources:** Elco Gear Safety; Exxon Gear Oil "LC"; Mobil Mobilube "46"; Texaco Gear Lube "HD-90".

Chassis Grease — Pressure Gun Grease, **Sources:** Sunray DX #671; Gulf Supreme #0.

SAE 30 Oil, **Sources**: Sunray DX; Mobil Oil.

*Change oil after first 5 hours of new equipment operation. then every 50 hours thereafter. If dirty conditions exist, change every 20 hours.

R.H. SIDE VIEW



Section 3

HYDRAULIC SYSTEM AND COMPONENTS

HYDRAULIC SYSTEM 3A

HYDRAULIC CONTROL VALVES 3B

HYDRAULIC CYLINDERS 3C

SUBSECTION 3A
HYDRAULIC SYSTEM

GENERAL

The hydraulic system includes all the hydraulic components. The components included in the system are the charge pump, lift valve, lift cylinders and (19.5 H.P. only) power steering valve and cylinder. Hydraulic flow charts used to describe the principle of operation along with a description of each component are provided in this section.

PRINCIPLE OF OPERATION (12, 14, 16 H.P.)

Hydraulic pressure for the lift curcuit is provided by the charge pump located on the front of the hydrostatic unit. Hydraulic fluid, under pressure, flows to the one (1) spool lift valve which, when actuated, directs fluid to the lift cylinder.

A full flow replacable filter is located in the return circuit, *figure 1.*

PRINCIPLE OF OPERATION (19.5 H.P.)

Hydraulic pressure for lift and steering circuits is provided by a charge pump located on the front of the hydrostatic unit. Hydraulic fluid, under pressure, flows to the two (2) spool lift valve. A full flow filter is located in the return circuit. Constant fluid flow is maintained to the steering circuit (avoiding steering lock-up) through a priority system. Normal flow is through the lift valve then to the steering valve. When fluid flow stops due to a cylinder reaching the end of its stroke or overloading of an implement, a pressure relief valve in the lift valve opens allowing fluid to by pass the center of the lift valve and flow to the steering control valve, *figure 2.* The lift valve has two (2) spools which control the lift cylinder and front mounted accessory hydraulics.

The power steering control valve is mounted on the drag link connecting the steering arm on top of the left spindle to the steering arm assembly which is driven by the manual steering gear. Turning the steering wheel moves the spool in the valve directing fluid to the power steering cylinder.

The power steering cylinder is mounted on the right hand side of the frame and is connected to the right-hand steering arm.

FLUSHING THE HYDRAULIC SYSTEM

If any evidence of hydraulic system contamination, such as dirt, sludge, and/or metallic particles are discovered, flush and clean the system as follows:

NOTE

If the cause of the contamination is due to a faulty component, the component must be repaired or replaced before the hydraulic system is flushed.

1. Start engine and bring hydraulic system to normal operating temperature.
2. Drain transmission fluid. (See Changing Transmission Fluid, steps 1 thru 4 page 18.)
3. Install drain plug and fill transmission with a 50-50 mixture of kerosene and clean transmission fluid (Texaco Transhydral #2209 or Ford Motor Co. #M-2C41-A).
4. Raise and lower the lift cylinder and (19.5 H.P. only) turn steering wheel left and right several times to circulate the flushing oil throughout hydraulic system.

NOTE

End procedure with cylinders in retracted position.

5. Remove drain plug and drain flushing oil from the transmission. Replace filter and refill with clean transmission oil.
6. Disconnect hose attached to the rod end of each cylinder and extend cylinders. This will force the flushing oil from the cylinders.
7. Reconnect hoses to cylinders. Retract lift cylinder and (19.5 H.P. only) center steering wheel.
8. Add clean fluid to the transmission as required to bring to full capacity.

HYDRAULIC SYSTEM PRESSURE

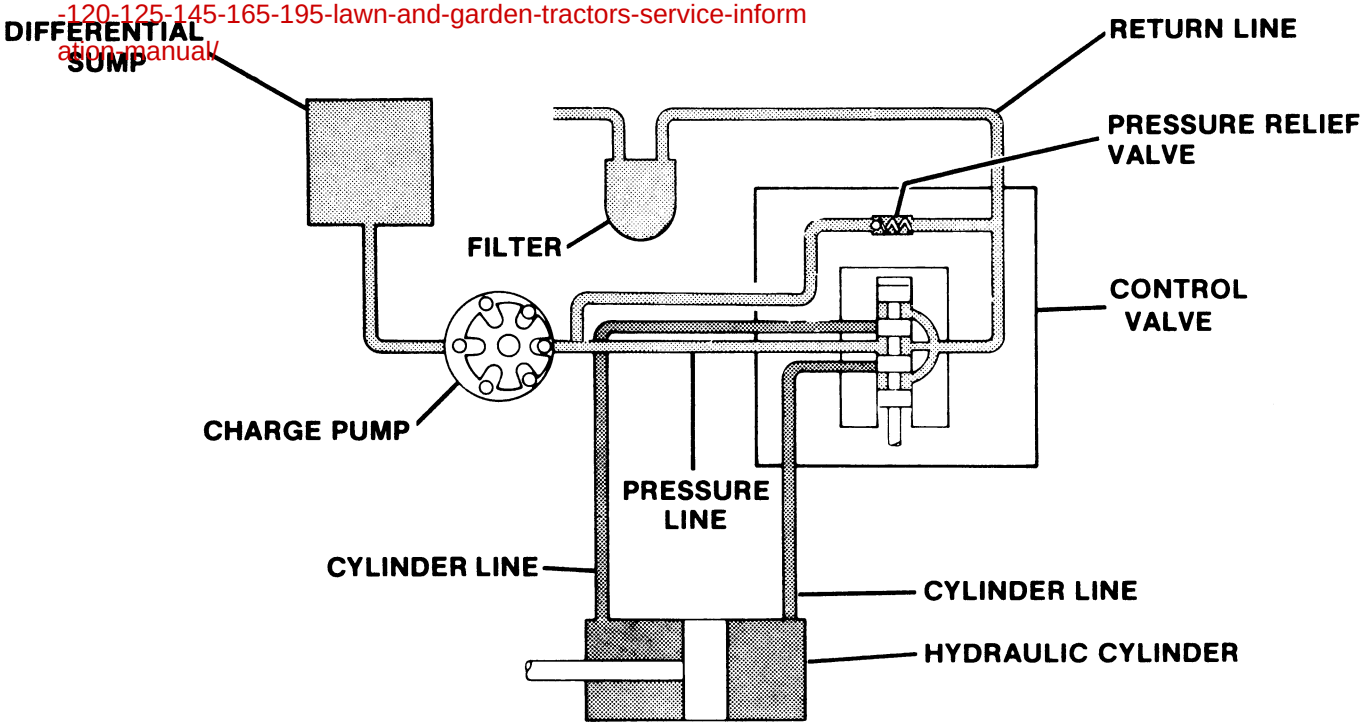
GENERAL. System pressure has been preset by the manufacturer and should retain its setting over prolonged periods of time under normal operating conditions. However, relief valve springs will eventually weaken with tractor use, therefore periodic checking of system pressure is recommended.

If the relief valve is disassembled for cleaning, inspection, or other reasons, readjustment will be necessary following reassembly.

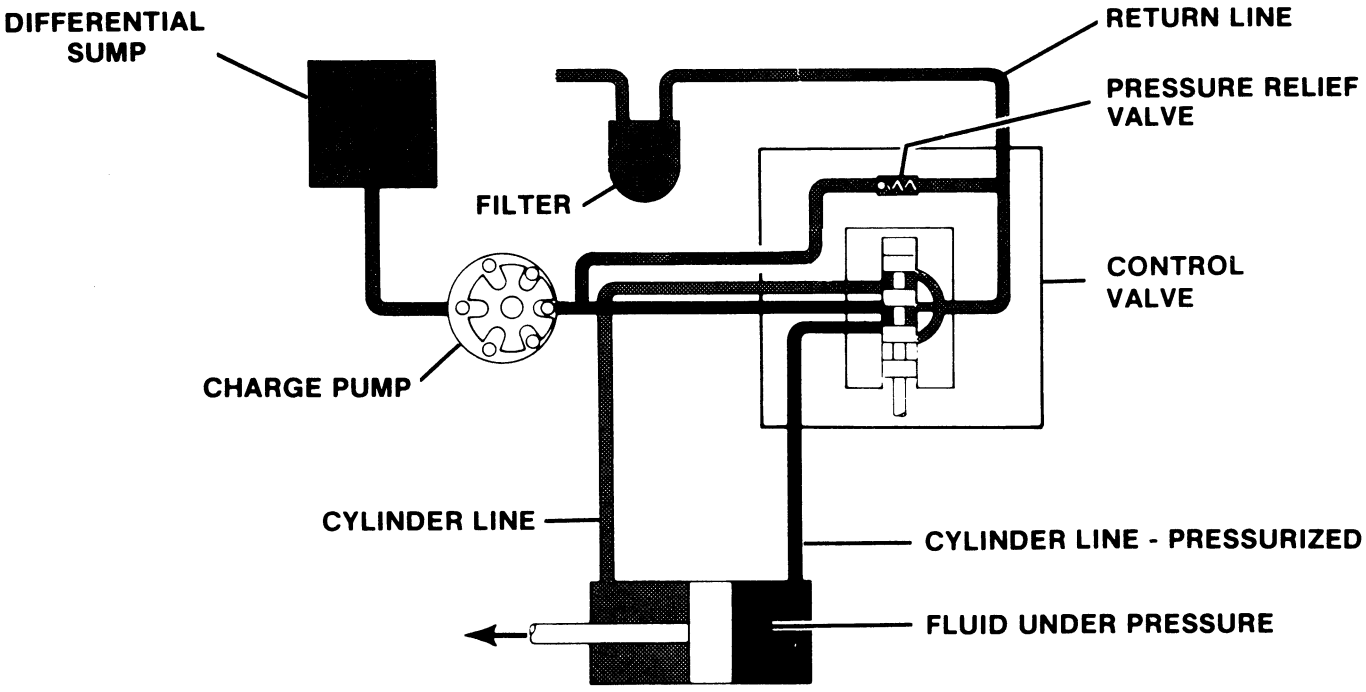
TESTING AND ADJUSTMENT (12, 14, 16 H.P.)

PREPARATION FOR TEST. The following preparations must be made before testing:

1. Check, and adjust if necessary, engine high rpm (3200 rpm). This speed must meet the engine manufacturer's recommendations.



CONTROL VALVE IN NEUTRAL



CONTROL VALVE IN LIFT MODE

Figure 1 (12, 14, & 16 H.P.)
Diagram of Hydraulic System