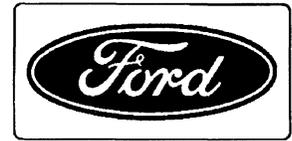


FORD



Service Manual

Tractor Series

2000, 3000, 4000, 5000, 7000
3400, 3500, 3550, 4400, 4500,
5500, and 5550

Part 1 – Engine Systems
Part 2 – Fuel Systems
Part 3 – Electrical System

1965 – 1975

Vol. 1

Product: 1965-1975 New Holland Ford 2000/3000/4000/5000/7000/3400/3500/3550/4400/4500/5500/5550 Tractor Service Rep
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FOREWORD

This three-volume manual provides information for the proper servicing of the Ford 2000, 3000, 4000, 5000, and 7000 agricultural tractors. Keep this manual readily available for reference at all times.

The manual is grouped into 17 parts. Each part contains chapter divisions. The chapters contain such information as general operating principles, detailed inspection and repair procedures, and full specifics regarding troubleshooting, specifications, and special tools. Whenever possible, the special tools are illustrated performing their specific operations.

The page and figure numbers are consecutively numbered throughout each part of the manual and each page bears the date of issue. Specifications listed on some pages may differ from those in the text. In these cases, the specifications listed on the pages bearing the latest issue date should be used. Any reference made in the manual to right, left, front, rear, top, or bottom, is as viewed facing the direction of forward travel from the driver's seat.

The tractor and engine serial numbers, and the production code numbers for the transmission, hydraulic pump, rear axle and hydraulic power lift, are located on the individual components. An explanation covering the usage and location of these numbers is detailed on the following page. The serial numbers and production codes should be used on all correspondence relative to these Ford tractors.

The material contained in this manual was correct at the time the manual was approved for printing. Ford policy is one of continuous improvement and the Ford Motor Company reserves the right to discontinue models at any time or change specifications or design without notice and without incurring obligation.

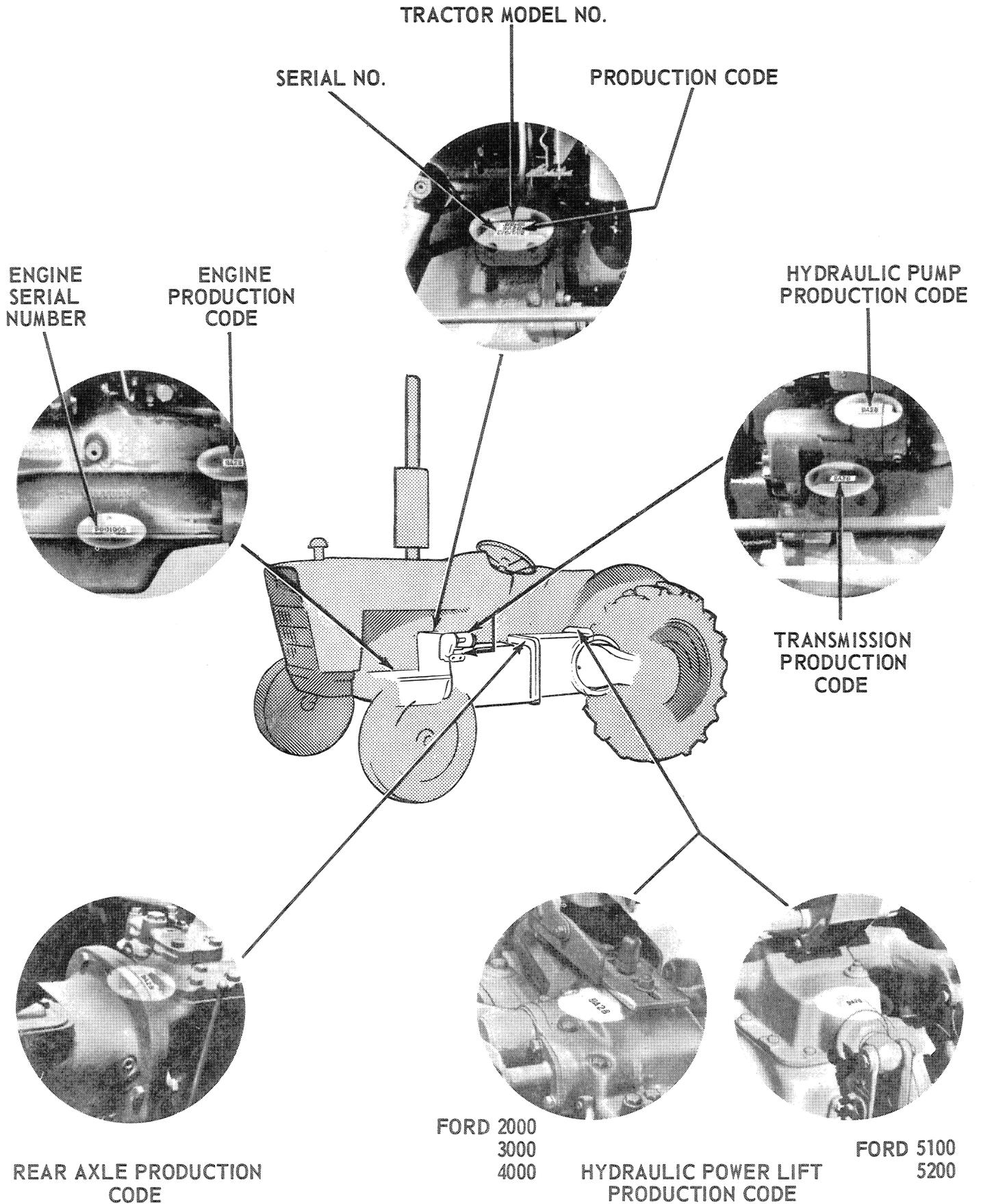


SAFETY PRECAUTIONS

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

There are numerous variations in procedures, techniques, tools, and parts for servicing tractors, 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 instructions provided in this manual must first establish that he compromises neither his personal safety nor the machine integrity by his choice of methods, tools, or parts.

PRODUCTION CODES AND SERIAL NUMBERS



PRODUCTION CODES

<u>Year</u>	<u>Month</u>	<u>Day</u>	<u>Shift</u>
1965 - 5	Jan - A	Numerical	Midnight - A
1966 - 6	Feb - B	Date	Day - B
1967 - 7	Mar - C	1 through 31	Afternoon - C
1968 - 8	Apr - D		
1969 - 9	May - E		
1970 - 0	June - F		
1971 - 1	July - G		
1972 - 2	Aug - H		
1973 - 3	Sept - J		
1974 - 4	Oct - K		
	Nov - L		
	Dec - M		

Example of Production Code: 5A2B

5 _ _ _ Year - 1965

A _ _ Month - Jan

2 _ Day - 2nd

B Shift - Day

SERIAL NUMBERS

<u>Manufacturing Codes</u>	<u>Tractor</u>	<u>Fuel Type</u>
A	L - 2000	D - Diesel
B	N - 3000	G - Gasoline
C	P - 4000	P - Liquid Petroleum
	R - 5000	

Example of Engine Serial Number and Production Code: LG001005A5

L _ _ _ _ _	Ford 2000
G _ _ _ _ _	Gasoline Engine
001005 _ _ _ _ _	Serial Number
A5 _ _	Production Code - Built January, 1965

Example of Tractor Serial Number and Production Code: C1010025A2

C _ _ _ _ _	Manufacturing Code
101002 _ _ _ _ _	Serial Number
5A2 _ _	Production Code - Built 1965 January 2nd

NEW MODELS

FOREWORD

This Supplement covers the major differences between new and previous type Ford 2000, 3000, 4000 and 5000 Agricultural tractors. The mechanical changes detailed also apply to Ford 3400, 3500, 4400, 4500 and 5500 Industrial models. Changes to styling have little effect on service procedures, therefore where changes are merely ones of appearance, reference to the Parts Catalog should be made when replacing such items as radiator grilles, hoods and exhaust mufflers.

SERIAL NUMBERING AND DATE CODING

The following Serial Numbering and Coding information should be noted:

Model Code

The model code is stamped on the right-hand implement mounting pad of the transmission and is also shown on the identification decal located under the right-hand hood panel.

The first numerical digit which identified previous models has been changed to a letter for the new models. The chart below details the new code.

Model Identification		Chassis Type	Fuel Type	P.T.O. Type	Trans Type	
<i>Previous Model</i>	<i>New Model</i>					
2 — 2000 —	B	10—Agricultural All Purpose	1—Diesel 2—Gas 3—L.P.	1—No P.T.O. 2—Trans 540 3—Live 540 4—Independent 540 5—Independent 540-1000 6—Independent 540/1000 GD	A—4-Speed	
3 — 3000 —	C				11—L.C.G.	C—8-Speed
4 — 4000 —	D				12—Highway	E—Select-O-Speed
5 — 5000 —	E				13—Rice	F—4/4 T-C Power Reversing
					20—Row Crop 30—Vineyard 31—Narrow 40—Utility 50—Industrial	K—6/4 Manual Reversing

Example E 10 1 4 C

Thus a model E1014C indicates a new model Ford 5000 All Purpose Tractor equipped with a diesel engine, Independent (540 r.p.m.) P.T.O. and an 8-speed transmission.

Tractor Serial Numbers

These will carry on in the same sequence as with previous models. The following chart shows the approximate Serial Number of each new model.

Assembly Plant	Ford 2000	Ford 3000	Ford 4000	Ford 5000
Highland Park	C204631	C204849	C204998	C204852

NOTE: For an interim period previous model and new model tractors were being produced simultaneously; however, there were no previous model tractors produced with a date code after 8G19B.

Engine Serial Numbers

With the new models, Engine Serial Numbers begin again at 000001, while the "power class" prefixes have been changed as indicated below.

NOTE: A few of the first production new model Ford 2000 and 3000 engines were stamped with the previous Engine Number sequence.

Model	Engine Serial Number Prefix	
	Previous	New Model
Ford 2000	L	B
Ford 3000	N	C
Ford 4000	P	D
Ford 5000	R	E

Part 1

ENGINE SYSTEMS**FORD 4000 DIESEL ENGINE**

To provide increased power, a new cylinder head with modified porting has been introduced together with a new high lift camshaft, fuel injection pump and injectors, and a new air cleaner.

Cylinder Head

The inlet ports of the new cylinder head are larger than those of the previous cylinder head to provide improved breathing. All valve seats are located 0.020 in. (0.52 mm) deeper.

This head may be used in service on previous Ford 4000 tractors.

When milling a new type head for service, the distance between the top of the valve seat and the head to cylinder block jointing face must not be less than 0.137 in. (3.48 mm) after milling.

Cylinder Head Gasket

An improved cylinder head gasket with wider beading on the underside of the gasket is used on the new models. This gasket may be used on previous Ford 4000 diesel engines. See Figure 1.

Camshaft

A new camshaft with higher cam lift and wider timing is used with the new model diesel engine.

Connecting Rod

Heavier I-section connecting rods are used on all new model Ford 4000 and 5000 engines. While these may be installed when servicing a previous type engine, they must not be mixed with the previous type connecting rods.

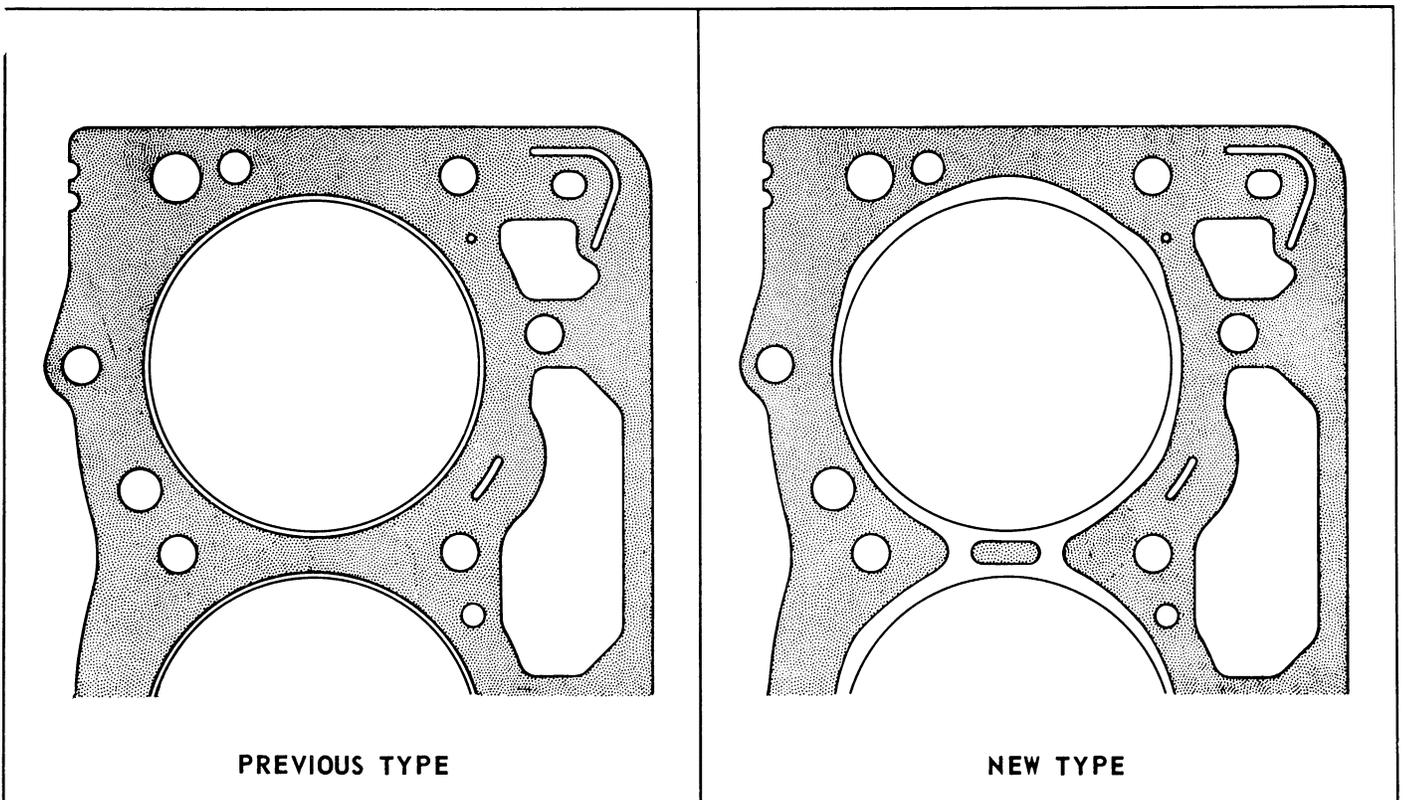


Figure 1
Cylinder Head Gasket

FORD 4000 GAS ENGINE

Increased power has been obtained by increasing the stroke from 4.2 in. (106.68 mm) to 4.4 in. (111.76 mm).

Cylinder Head and Gasket

A new cylinder head has been introduced which differs from that used on previous Ford 4000 gas engines in that the valve seats are located 0.020 in. (0.52 mm) deeper. There is no change to the cylinder head gasket.

Crankshaft

The crankshaft used in the new model Ford 4000 gas engine is common with the Ford 4000 diesel crankshaft and provides a stroke of 4.4 in. (111.76 mm).

Pistons

New pistons are used which have a piston pin-to-piston crown height of 2.523/2.525 in. (64.08/64.14 mm). Previous Ford 4000 gas pistons had a piston pin to crown height of 2.741/2.743 in. (69.62/69.67 mm). See Figure 2.

Connecting Rods

New model Ford 4000 gas engines have the same heavier I-section connecting rods as are used on the new model Ford 4000 diesel and 5000 gas and diesel engines.

FORD 5000 DIESEL ENGINE

Increased power for the new model Ford 5000 diesel engine has been achieved by increasing the cylinder bore diameter, introducing a new cylinder head with modified porting, a new camshaft and pistons, and a new injection pump and injectors.

Cylinder Block

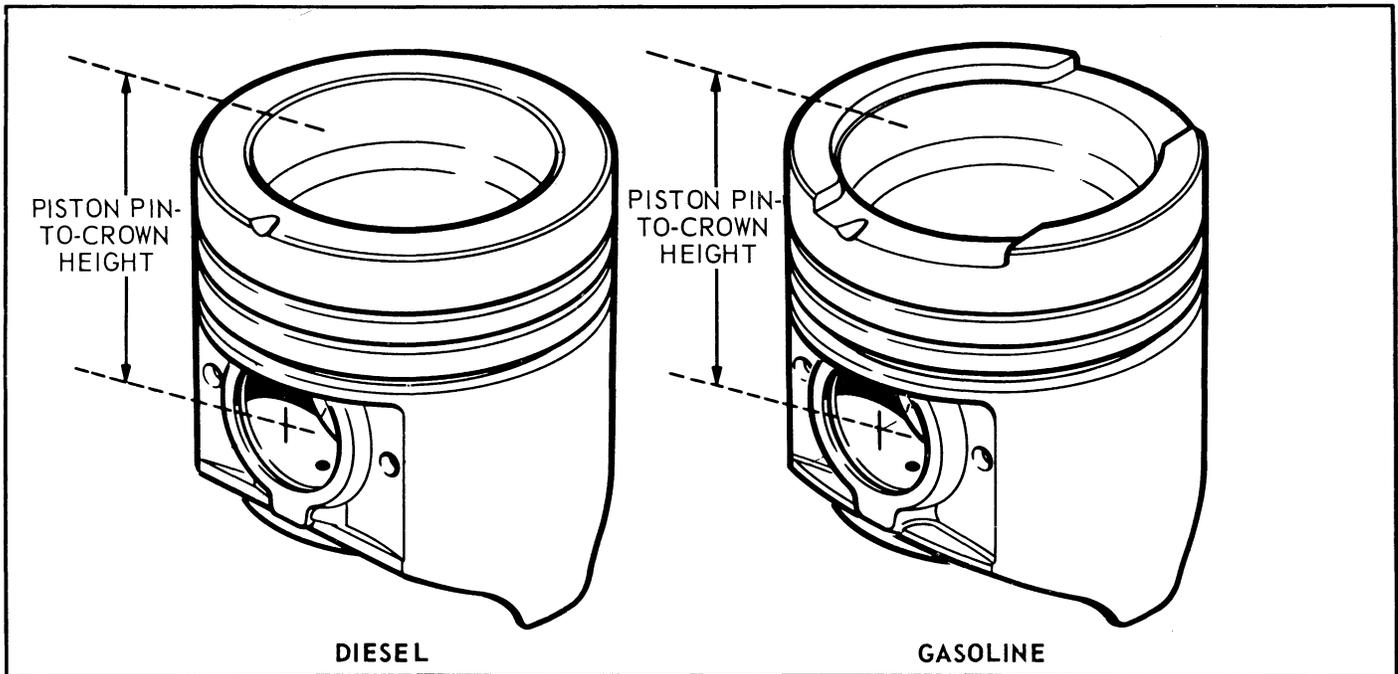
The new model Ford 5000 cylinder block has piston bores which are 4.4 in. (111.76 mm) diameter, whereas the previous Ford 5000 bores were 4.2 in. (106.88 mm) diameter.

Pistons

While the pistons have been increased to the same diameter as those of the Ford 4000, they are not identical with the Ford 4000 pistons in that the Ford 5000 piston pin-to-piston crown height is greater. See Figure 2.

Piston Pin to Crown Height – Diesel	
Ford 4000	Ford 5000
2.661/2.663 in. (67.59/67.64 mm)	2.761/2.763 in. (70.13/70.18 mm)

Specified piston-to-bore clearance with these new Ford 5000 pistons is 0.0080/0.0090 in. (0.2032/0.2286 mm).



**Figure 2
Piston Pin-to-Crown Height**

Connecting Rods

Heavier I-section connecting rods, identical with those used on the new model Ford 5000 gas and Ford 4000 diesel and gas engines, are used on the new model Ford 5000 diesel engine.

Cylinder Head

A new cylinder head with increased diameter inlet ports to provide improved breathing, and valve seats located 0.020 in. (0.52 mm) deeper, is used on the new model Ford 5000 diesel engine.

The new head may be used on previous Ford 5000 engines but, as with the new model Ford 4000 diesel engine cylinder head, if it ever requires milling, the distance between the valve seat and the head face must not be less than 0.137 in. (3.48 mm) after milling.

Cylinder Head Gasket

New type with wide beading interconnecting the bores on the underside of the gasket. Because of the larger bores in the new model Ford 5000 diesel engine, this gasket is not suitable for use on any previous engine.

Camshaft

New type with higher cam lift.

Oil Pan

A new oil pan has been introduced on new model Ford 5000 engines and the specified oil capacity of the engine, including filter, has been increased to 10 U.S. qts. (16.75 Imp. pints) (9.5 litres).

FORD 5000 GAS ENGINE

Increased power for the new model Ford 5000 gas engine has been achieved by increasing the cylinder bore diameter, introducing new pistons to suit, a new cylinder head with deeper valve seats, and a new air cleaner with increased oil capacity.

Cylinder Block

Piston bore diameter increased from 4.2 in. (106.68 mm) to 4.4 in. (111.76 mm).

Pistons

New type pistons are used on new model Ford 5000 gas engines. Although these are of the same diameter as the Ford 4000 gas engine piston, the new model Ford 5000 piston has a greater piston pin-to-piston crown height than the new Ford 4000 gas piston, and a lesser piston pin-to-crown height than the previous 4000 gas piston.

Piston Pin-to-Crown Height - Gas		
Previous Ford 4000	New Model Ford 4000	New Model Ford 5000
2.741/2.743 in. (69.62/69.67 mm)	2.523/2.525 in. (64.08/64.14 mm)	2.662/2.664 in. (67.62/67.67 mm)

Specified piston-to-bore clearance is 0.0032/0.0042 in. (0.8128/0.8627 mm) with these new pistons.

Cylinder Head and Gasket

The cylinder head is new in that the valve seats are located 0.020 in. (0.52 mm) deeper than on the previous Ford 5000 gas engine.

A new cylinder head gasket has been introduced to suit the larger bore size of the new model Ford 5000 gas engine.

Connecting Rods

Heavier I-section connecting rods, identical with those used on new model Ford 5000 diesel and Ford 4000 gas and diesel engines, are used on the new model Ford 5000 gas engine.

Oil Pan and Dipstick

The new oil pan described under Ford 5000 Diesel Engine is also used on the Ford 5000 Gas engine, and the oil capacity of the engine has been increased to 10 U.S. qts. (16.75 Imp. pints) (9.5 litres).

FORD 2000 AND 3000 GAS AND DIESEL ENGINES

The changes in new model Ford 2000 and 3000 engines are minor and are mainly introduced to take maximum advantage of machining and manufacturing techniques which have been changed to accommodate the new model Ford 4000 and 5000 engines.

Cylinder Head and Gasket

Although new cylinder head part numbers have been allocated, the only difference between the cylinder heads used previously and those used with the new model engines is that the latter have the valve seats located 0.020 in. (0.52 mm) deeper.

A new cylinder head gasket with wide leading inter-connecting the bores on the underside of the gasket is used on new model Ford 2000 and 3000 diesel engines. This gasket may be used for service on previous Ford 2000 and 3000 diesel engines.

Camshaft – Diesel Engines only

A new camshaft with higher cam lift is used in new model Ford 2000 and 3000 diesel engines. This change

is merely to commonize with the camshaft of the new model 4000 diesel engine.

The camshaft of the Ford 2000 gas engines, and also that of the Ford 3000 gas engines, are unchanged.

Crankshaft – Ford 3000 Diesel

Apart from a difference in material, the crankshaft in the Ford 3000 diesel engine is virtually identical with that of the previous type Ford 4000 gas engine. The current Ford 3000 diesel crankshaft will be discontinued when existing stock is exhausted. The crankshaft used in the previous Ford 4000 gas engine will then be used for production and service of all Ford 3000 diesel engines, as well as for service of the previous Ford 4000 gas engine.

COOLING SYSTEM

New radiators have been introduced with some of the new model Ford 4000 and 5000 Agricultural tractors and the 5200 Row Crop tractor. The difference is in the num-

ber of cooling fins per inch. There are no changes to the radiators in Ford 2000 and 3000 tractors.

Model	Engine	Trans.	Cooling Option	No. of Radiator Fins/inch	
				Previous	New Model
4000	Gas	8-Speed and Select-O-Speed	Standard	5	7
4000	Gas	Select-O-Speed	Tropical	7	9
4000	Diesel	8-Speed	Standard	5	7
4000	Diesel	8-Speed	Tropical	5	7
4000	Diesel	Select-O-Speed	Standard	No change	
5000	Gas	8-Speed and Select-O-Speed	Standard	7	9
5000	Diesel	8-Speed	Standard	5	9
5000	Diesel	Select-O-Speed	Standard	7	9
5000	Diesel	8-Speed and Select-O-Speed	Tropical	7	9
5200	Row Crop	All Models		7	9

Part 2

FUEL SYSTEMS-DIESEL

FORD 2000 and 3000

The fuel injection pumps and injectors of new model Ford 2000 and 3000 tractors are identical to those used on the previous model Ford 2000 and 3000 tractors.

FUEL INJECTORS

The fuel injectors used in new model Ford 4000 and 5000 engines differ from those used in previous Ford 4000 and 5000 engines. The outward appearance of the new injector is the same as those used on the previous tractors. The difference between current and previous injectors is in the size and angle of the nozzle holes which, without accurate gauges, cannot be readily recognized.

For this reason, when re-conditioning injectors in service, special attention should be given to the identification code numbers which are etched on the body of the nozzle. This number in conjunction with the following chart will enable each nozzle to be identified with the tractor it was designed for.

Previous New Range Tractors	Nozzle Identification	Current New Model Tractors	Nozzle Identification
Ford 2000	BDLL150S6443	Ford 2000	BDLL150S6443
Ford 3000	NL 413	Ford 3000	NL 413
Ford 4000	BDLL150S6476	Ford 4000	BDLL140S6422
Ford 5000	NL 413	Ford 5000	BDLL140S6422

FORD 4000 DIESEL - AIR CLEANER

The air cleaner specified for use with the new Ford 4000 diesel engine is the same as that used on the previous and current Ford 5000 tractor. The diameter of this cleaner is 7 in. (178 mm) as compared to the 6.5 in. (165 mm) diameter cleaner previously used on the Ford 4000. The inlet and outlet ports are 2.25 in. (57.15 mm) diameter as compared to the 2 in. (50.8 mm) diameter ports in the previous cleaner. The air cleaner hoses have been changed accordingly.

Part 2

FUEL SYSTEMS-GAS

FORD 5000 (GAS) - AIR CLEANER

A new air cleaner is used with the new model Ford 5000 gas engine. This cleaner has a diameter of 7 in. (178 mm) compared to the 6.5 in. (165 mm) diameter cleaner used on the previous Ford 5000 gas tractor. It has an inlet port diameter of 2.25 in. (57.15 mm) as compared to the 2.0 in. (50.8 mm) diameter inlet port in the previous cleaner used on Ford 5000 gas tractors.

ALL GAS ENGINES - NO LOAD AND IDLE SPEEDS

The following no load and idle speeds are specified for new model gasoline engines.

Model	No Load Speed	Idle Speed
Ford 2000	2065-2165	600-700
Ford 3000	2285-2385	600-700
Ford 4000	2395-2495	600-700
Ford 5000	2285-2385	600-700

Part 3

ELECTRICAL SYSTEM

**ALL MODELS –
GENERATORS AND REGULATORS**

All new model Ford 3000, 4000 and 5000 tractors have 22 amp. generators and regulators as standard equipment.

For a short period the 11 amp. generator and regulator may be installed on Ford 2000 tractors but eventually this model will also have the 22 amp. parts.

NOTE: *It is not permissible to mix a 22 amp. generator with an 11 amp. regulator or vice versa. It is important, therefore, that care is taken to check which type is installed on a Ford 2000 before installing a service replacement.*

**ALL TRACTORS WITH SELECT-O-SPEED –
OIL PRESSURE WARNING LIGHT**

It is no longer considered necessary to have an oil pressure warning light on Select-O-Speed transmissions

and this item is, therefore, not incorporated on new model tractors.

Existing stocks of Select-O-Speed transmissions which incorporate a distributor plate assembly with a threaded hole for the warning light switch will continue to be used. As an interim measure, the switch will still be installed in the distributor plate assembly but its function will be merely that of a blanking plug to maintain pressure in the system.

Similarly, existing wiring harnesses will continue to be used but the wire connecting the warning light switch to the light (white/light green) is cut at a point 5 in. (12.7 cm) outside the rubber grommet in the cover, and at the wire clip inside the cover.

When existing stocks of wiring harnesses are exhausted, new wiring harnesses with only two wires will be introduced, and the warning light switch will be superseded by a pipe plug.

Part 4

CLUTCHES

FORD 5000 – 13" CLUTCH DISC

In December, 1967, the standard 12 in. (30.5 cm) diameter clutch disc was changed to the type which has a torsion spring damped hub and woven linings. A similar 13 in. (33 cm) disc has been introduced with the new model Ford 5000 for use in heavy duty applications where requested, Figure 3.

It should be noted that the spacers used between the new 13 in. clutch pressure plate cover and the flywheel have a different thickness from those used with the previous 13 in. clutch. It is important that the correct spacers are used in accordance with the disc being installed.

Previous type
spacer thickness 0.184/0.200 in. (4.67/5.08 mm)

New type
spacer thickness 0.090/0.100 in. (2.29/2.54 mm)

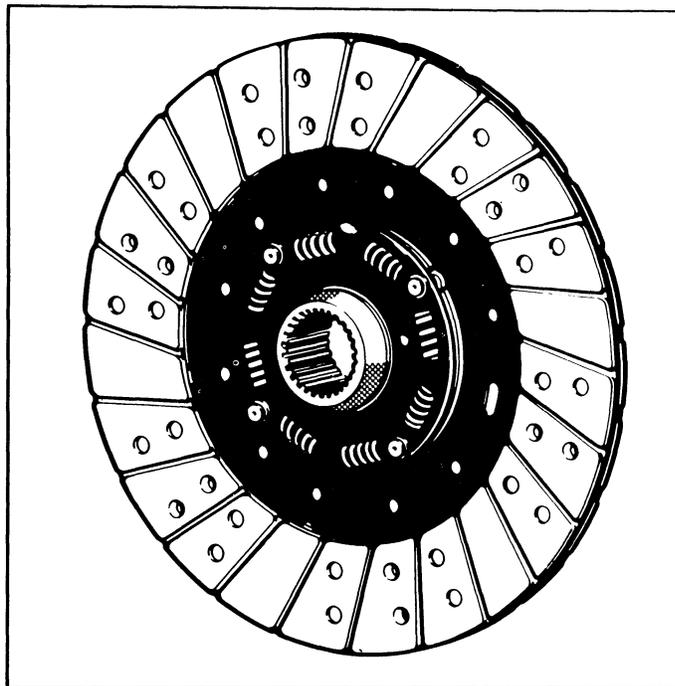


Figure 3
Ford 5000 – 13" Clutch Disc for Special Applications

**FORD 2000/3000 WITH LIVE P.T.O. –
DOUBLE CLUTCH ASSEMBLY**

A new double clutch assembly has been released for use with the new model Ford 2000 and 3000 tractors with Live P.T.O.

The principal difference between the new assembly and that used previously is that the new assembly has a larger gap adjustment between the socket head (Allen) screws on the top of the P.T.O. pressure plate connecting links and the release lever struts, see Part 4, Chapter 2, of the Tractor Repair Manual.

This gap should be adjusted on new model double clutches to 0.070–0.074 in. (1.78–1.88 mm). The shank of a No. 50 drill may be used as a gauge when adjusting this gap, Figure 4.

The new double clutch assembly may be used in a previous tractor, but before installation, the gap mentioned above should be adjusted to the previous specification of 0.050–0.054 in. (1.27–1.37 mm) using the shank of a No. 54 drill as a gauge.

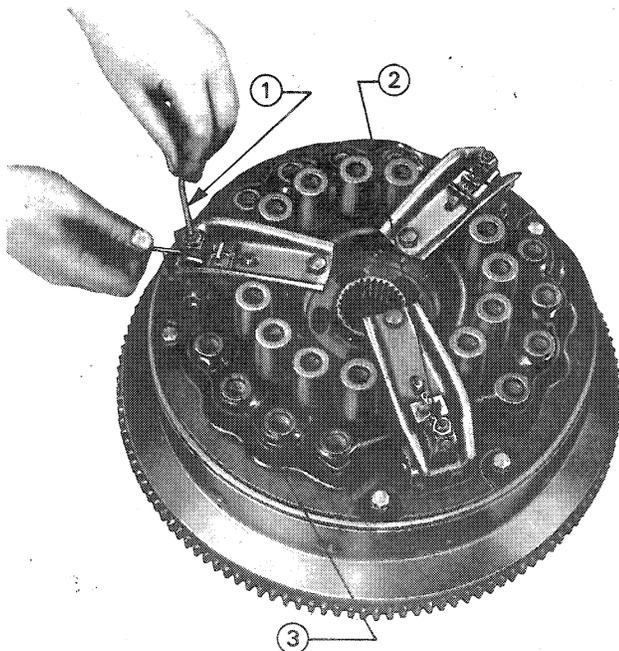


Figure 4
Setting P.T.O. Clutch Gap

- (1) Socket Key
- (2) Socket Head Adjusting Screw
- (3) Drill Shank as Gauge

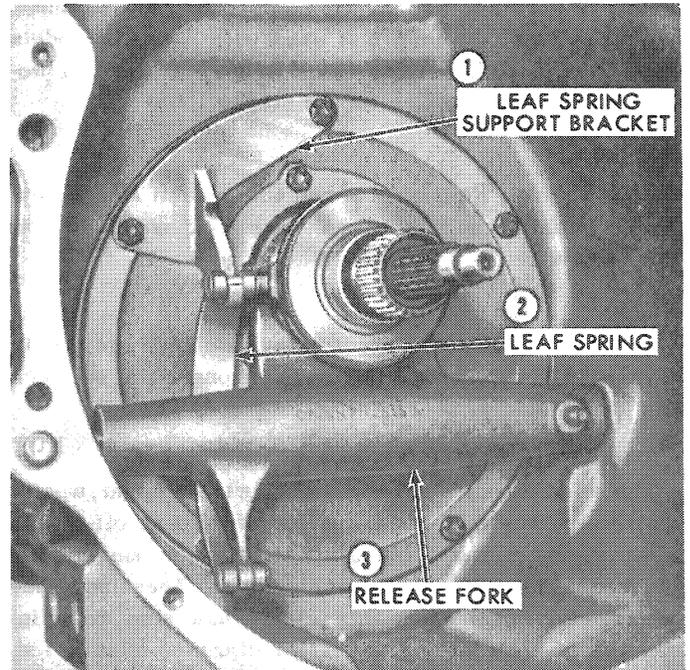


Figure 5
Clutch Release Bearing Spring and Fork

**FORD 2000/3000 DOUBLE AND FORD 4000
SINGLE CLUTCH – RELEASE LINKAGE**

Release Bearing Return Spring – A new leaf type clutch release bearing return spring has been introduced on Ford 2000 and 3000 tractors with a double clutch and on the Ford 4000 with a single clutch. See Figure 5.

Clutch Release Fork – New forks which extend fully across the transmission housing and completely enclose the cross-shaft are used in conjunction with the above-mentioned leaf spring. See Figure 5. The material from which the fork is manufactured has been changed, and the fork pads, which contact the release bearing hub, are specially hardened to reduce wear and provide minimal friction losses.

Release Bearing Hub – New release bearing hubs with specially hardened faces at the points of contact with the release fork have been introduced on these new models.

Release Bearing Hub Support Plate and Bracket – A bracket for each model has been introduced which acts as a fulcrum point for the new leaf spring. This bracket is secured by two longer bolts which pass through the release bearing hub support plate. See Figure 5.

The release bearing hub support plate used on these new models differs from that used with previous models in that the plate casting is filled in and machined to provide a supporting surface for the bracket.

Clutch Pedal, Release Rod and Cross-shaft Arm – New design pedals and release rods are used on these new type models.

The new model pedals vary from those used previously in that the portion below the pivot is longer and set back at a greater angle.

The release rods for the new models are straight, whereas the previous rods had a portion which was off-set. In addition, the release rod used on the new model Ford 2000 and 3000 with a double clutch has been increased in diameter. The adjustable clevis has also been increased in size to suit the larger diameter release rod.

The cross-shaft arm of new model Ford 2000 and 3000 Live P.T.O. tractors is longer between centers than that used on previous models, and it has a different off-set to suit the new type release rod.

Together, these changes enable the clutches to be released with less effort than was required on previous models.

FORD 2000/3000/5000 SINGLE CLUTCH – RELEASE LINKAGE

Clutch Release Forks – New release forks have been introduced that differ only in the material. The fork contacts pads are specially hardened.

Release Bearing Hubs – New release bearing hubs with specially hardened faces at the points of contact with the release fork have been introduced.

Release Bearing Hub Support Plate – This has been changed for new model Ford 2000 and 3000 tractors with a single clutch to commonize with the support plate used on new model Ford 2000 and 3000 tractors with a double clutch. As the leaf spring type of release mechanism is not used on these models, there is no necessity for a spring fulcrum bracket; hence the change to the hub support plate is of no significance in service.

There is no change to the hub support plate on the Ford 5000.

Clutch Pedals, Release Rods and Cross-shaft Arms – New design pedals, release rods and cross-shaft arms are used on the new model Ford 2000 and 3000 tractors with a single clutch and on the new model Ford 5000.

Each of the new pedals is longer below the pivot point and the lower end is set back at a greater angle.

On the new model Ford 2000 and 3000 tractors with a single clutch, the clutch release rod is straight compared to the off-set design of the previous rod. It is also longer than the previous rod, as is the new release rod used on the Ford 5000.

The cross-shaft arm of the Ford 5000 is unchanged, but on the new model Ford 2000 and 3000 tractors with a single clutch, a new arm is used which has a different off-set to the previous arm.

CLUTCH PEDAL ADJUSTMENT

Regular checks on clutch pedal free play is very important. Recommendations are that this check be made at intervals of 50 hours of operation.

NOTE: *This 50 hour check is now recommended for previous 2000, 3000, 4000 and 5000 tractors as well as on the new model tractors.*

Because of linkage changes, the free play specified for new models, see following table, differs from that specified for previous models.

Clutch Pedal Free Play – New Model Tractors

Ford 2000/3000 with Transmission P.T.O.	1.12–1.38 in. (28–35 mm)
Ford 2000/3000 with Live P.T.O.	1.38–1.63 in. (35–41 mm)
Ford 4000 with Transmission P.T.O.	1.25–1.50 in. (32–38 mm)
Ford 4000 with Independent P.T.O.	1.62–1.88 in. (41–48 mm)
Ford 5000	1.25–1.50 in. (32–38 mm)

The lighter spring is also used in the High/Low shift rail position. In addition, the pin between the spring and the top cover has been shortened.

Gear Shift Selector Arm Spring

A lighter selector stop plunger spring has been intro-

duced for the 4th/8th selector fork of the 7-speed and 8-speed transmissions of the new model Ford 5000.

This spring is also used on the 4th/8th selector arm of the 7-speed and 8-speed transmissions of the new model Ford 2000, 3000 and 4000 tractors.

Part 9

POWER TAKE-OFF

FORD 5000 INDEPENDENT P.T.O.

Independent P.T.O. Clutch Valve Operating Pressure

The increase in power of the new model Ford 5000 engine gives a corresponding increase in power available at the P.T.O. Because of the increased P.T.O. power, the operating pressure of the drive clutch regulating valve has been increased by introducing a new pressure regulating valve spring.

When checking the pressure of the P.T.O. system at the hydraulic pump of a new model Ford 5000, a reading of 150/225 psi (10.5/15.8 kg/cm²) should be obtained when the oil is at operating temperature.

P.T.O. Clutch Dowel Locating Pin

To improve the efficiency of the independent P.T.O. clutch brake, new model Ford 5000 tractors have an adjustable pin locating the P.T.O. clutch valve assembly in the rear axle center housing. This new pin allows for better contact between the brake arm pad and the P.T.O. clutch housing than was possible with the previous non-adjustable locating pin.

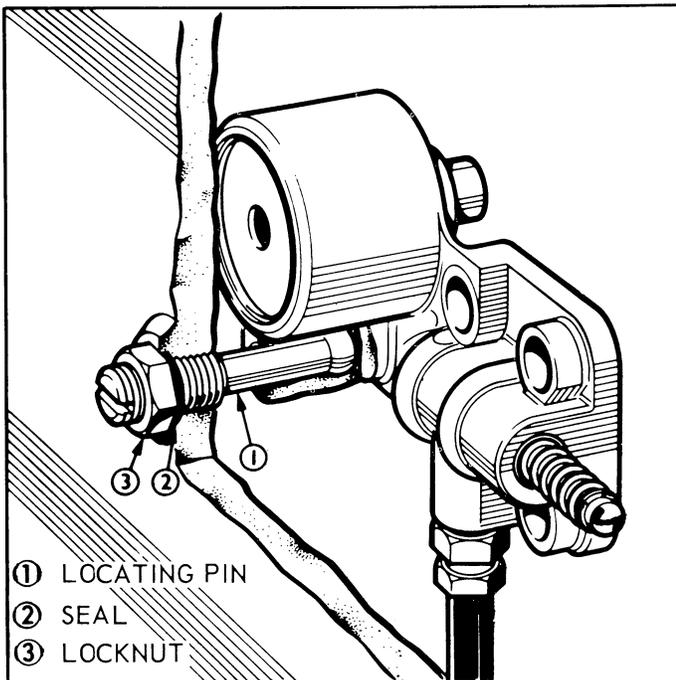


Figure 15
P.T.O. Valve Locating Pin

The new locating pin, Figure 15, incorporates an O-ring seal to prevent oil leakage. A nut is used to retain the pin.

The following adjustment procedure applies to the new type pin.

1. Loosen the locating pin nut, then back off the locating pin.
2. Screw in the locating pin until the P.T.O. brake piston spring just starts to compress.
3. Hold the locating pin with a screwdriver and tighten the nut to a torque of 15–20 lbs. ft. (2.07–2.77 kgm).

Where cases of inadequate P.T.O. braking are encountered on previous Ford 5000 tractors, and the evidence shows uneven contact between the brake arm pad and the clutch housing, the new type parts may be installed to overcome the condition.

P.T.O. Drive Clutch Operating Handle

A new operating handle has been introduced which extends rearward at a greater angle to provide better clearance for the operator's legs, Figure 16.

FORD 4000 P.T.O.

P.T.O. Rear Cover and Rear Axle Center Housing

On new model Ford 4000 Tractors, the P.T.O. rear plate and P.T.O. cover have been superseded by an integral cover and plate component.

The rear axle center housing has been modified and now has two additional tapped holes at the rear cover location, i.e., it now has 4 large and 4 small tapped holes at this location.

The new rear cover is secured by four bolts at the smaller tapped holes. The four large holes are used for retaining two new anchor brackets which have been introduced for attachment of hydraulic linkage check chains.

NOTE: When installing a belt pulley on a new model Ford 4000 with internal check chains, the check chain anchor brackets should be located between the pulley and the

rear axle center housing. Four longer bolts are supplied with the belt pulley kit to retain the pulley and the brackets to the center housing. If the tractor has external check chains, four spacers, which are supplied with the belt pulley kit, should be installed between the pulley and the rear axle center housing.

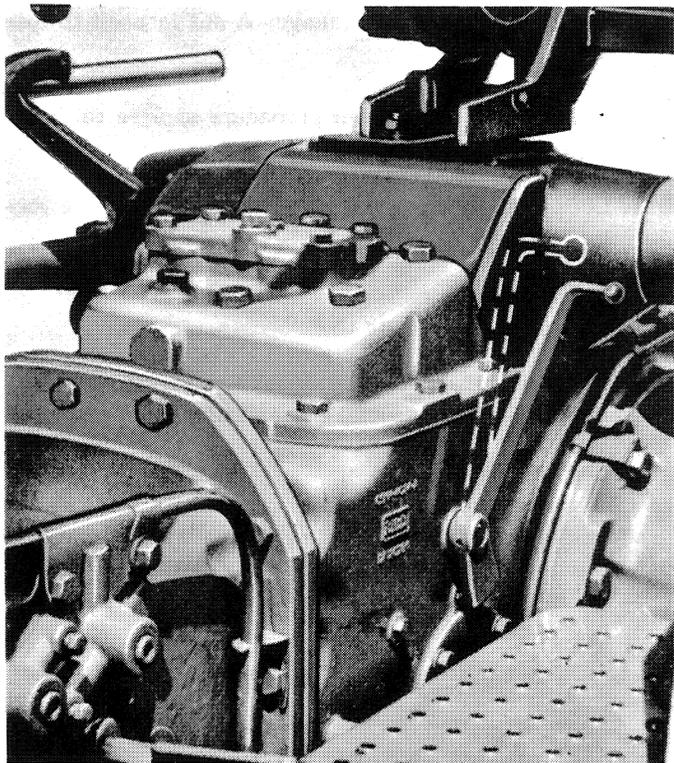


Figure 16
P.T.O. Operating Handle

P.T.O. Clutch Plates

The P.T.O. clutch plates and the P.T.O. clutch housing of the new model Ford 4000 tractor differ from those used on previous models.

Six externally splined steel plates and six internally splined phosphor bronze plates are now used instead of six internally splined steel plates and seven externally splined phosphor bronze plates.

The externally splined steel plates are identical with those already in use at various locations in Select-O-Speed transmissions. The internally splined phosphor bronze plates are also dimensionally the same as those used in P.T.O. clutches of Select-O-Speed transmissions but they have radial grooves on both sides and are, therefore, not interchangeable with the Select-O-Speed parts.

An externally splined steel plate is installed adjacent to the P.T.O. drive clutch piston in the new type P.T.O. clutch pack, thereafter the phosphor bronze and steel plates alternate so that the sixth phosphor bronze plate is adjacent to the P.T.O. clutch pressure plate.

The new steel plates are flat, whereas in previous type tractors they were dished. This, together with the reduced total number of plates in the pack, means that the pressure plate takes up a different position in the P.T.O. clutch housing. This in turn necessitates relocation of the groove in the housing for the pressure plate snap ring, making the new housing non-interchangeable with the previous type housing.

Part 10

REAR AXLE AND BRAKES

BRAKE PEDALS

New brake pedals have been introduced on all models except the Ford 4000 and 5000 Row Crop and the Ford 5500. The new pedals have parallel width throughout their length, whereas the previous pedals tapered in towards the pad end.

One of the new pedals cannot be used on a previous type tractor without also changing the other pedal to the latest type. This is because the pedal interflock pin holes in the new pedals are in a different position to those in the previous type pedals.

Part 11

HYDRAULIC SYSTEMS

ALL MODELS – HYDRAULIC PRESSURE RELIEF VALVE

A new type of pressure relief valve assembly, Figure 17, has been introduced in the hydraulic pumps of new model Ford 4000 and 5000 tractors with Independent P.T.O. This valve will also be introduced shortly as a running change in the rear axle center housing of all models with the engine mounted hydraulic pump. It may also be installed when servicing previous type tractors if so desired.

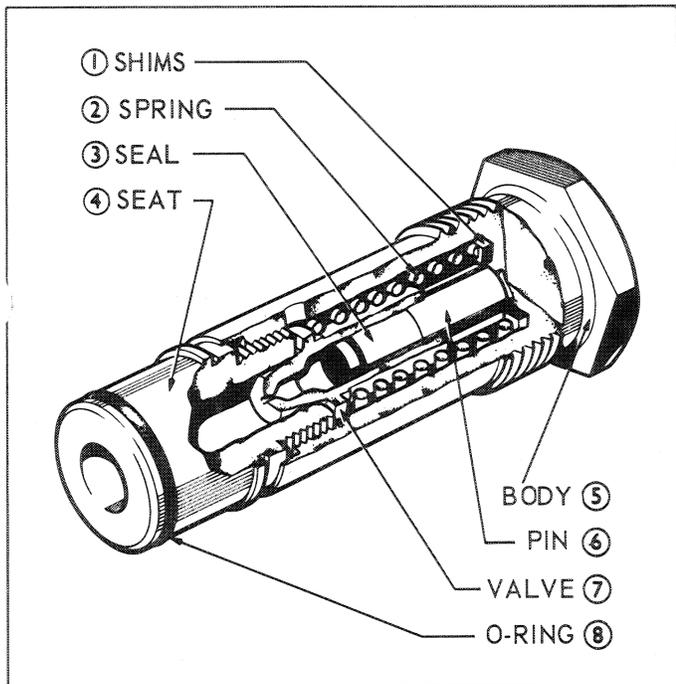


Figure 17
Hydraulic Pressure Relief Valve

With the previous type valve assembly, a sudden heavy lifting load, in excess of the designed lifting capacity of the hydraulics, caused the valve to open. It was then necessary for the pressure in the system to be reduced considerably by relieving the load before the valve would reseat and allow lifting to be resumed.

The new valve re-seats at a higher pressure, enabling maximum lifting power to be sustained in the hydraulic system.

The following is a comparison of the operating pressure characteristics of the previous and new valve assemblies.

Pressure	Previous Type	New Type
Initial Opening (Minimum Crack-Off)	2100 psi (147.5 kg/cm ²)	2150–2450 psi (151–172 kg/cm ²)
Full Opening (Maximum By-Pass)	2550–2650 psi (179–186 kg/cm ²)	2400–2600 psi (169–183 kg/cm ²)
Re-seat (Minimum)	1600 psi (112.5 kg/cm ²)	1950 psi (137 kg/cm ²)

Relief Valve Adjustment

If, on checking the pressure of the hydraulic system, the maximum pressure is found to be above or below that specified, 2400–2600 psi (169–183 kg/cm²), no attempt should be made to adjust the valve without first establishing that it is in fact the valve which is at fault.

The easiest way to check this is to install another valve assembly known to have the correct setting. If this corrects the fault then the original valve should be dismantled for examination. Where necessary, the valve may be adjusted by adding or subtracting shims (1), Figure 17, from behind the spring.

To gain access to the shims, grip the assembly lightly in a soft jaw vice, unscrew the body and remove the valve and spring.

Two thicknesses of shims are available. One has a thickness of 0.010 in. (0.25 mm) and provides a pressure difference of 63–70 psi (4.4–4.9 kg/cm²). The other has a thickness of 0.015 in. (0.38 mm) and provides a pressure difference of 95–106 psi (6.8–7.4 kg/cm²).

Part 12

STEERING SYSTEMS

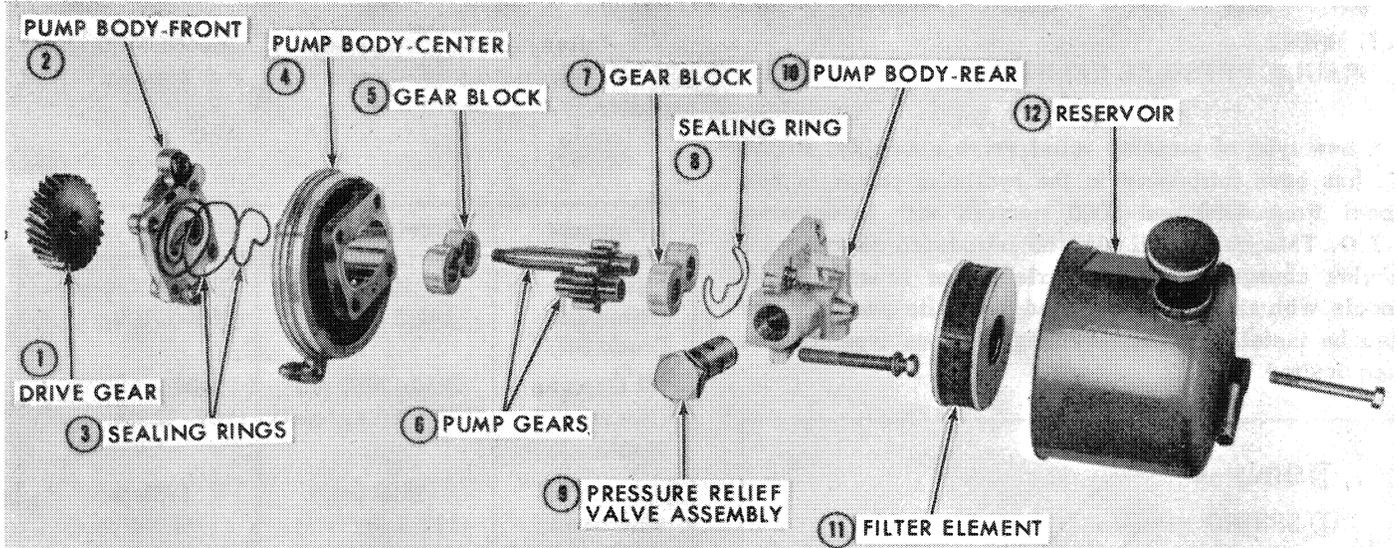


Figure 18
Power Assisted Steering Pump Components

POWER ASSISTED STEERING – ALL MODELS (where fitted)

While there will be no significant change in the steering systems of early production new model tractors, a change is being made to agricultural tractors with power assisted steering. Three new pump assemblies, each with integral reservoir and filter will be introduced. These three pumps will be identical except for the pressure relief valve setting.

Figure 18 shows the pump and reservoir components. The new reservoir will completely enclose the rear of the pump. See Figures 18 and 19. The following should be noted when servicing the unit.

1. Every 300 operating hours the oil level in the reservoir should be checked with the oil at operating temperature and the wheels in the straight ahead position. If necessary, add fresh oil of the correct grade to bring the level up to the bottom of the filler neck. Then, with the engine running, turn the steering from lock-to-lock to purge air from the system. Add oil as necessary to maintain the level.
2. Oil must be Ford Oil Part No. M2C41.
3. While it will be necessary to remove the complete pump and reservoir assembly in order to gain access

to the filter, the period between filter element changes with this design is every 1200 hours as compared to every 600 hours with the previous design.

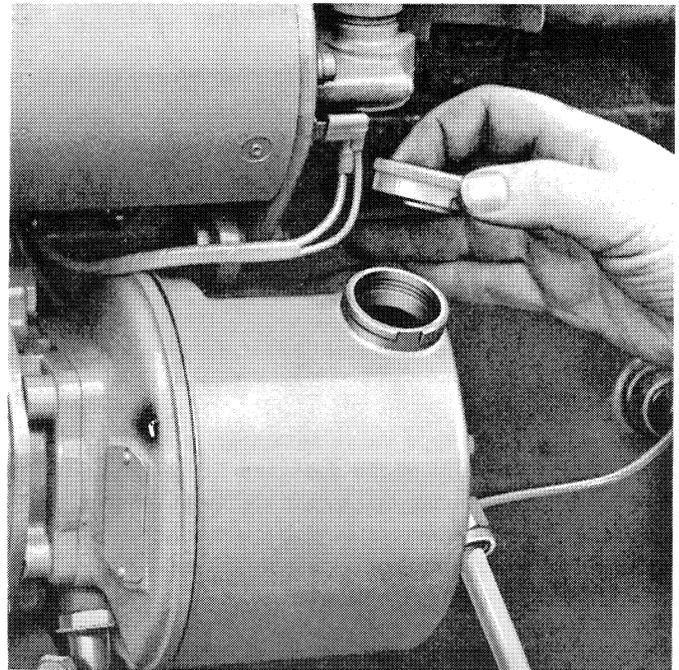


Figure 19
Power Assisted Steering Reservoir Filler Cap

To remove the filter element, disconnect the oil tubes from the pump, remove the pump and reservoir assembly (two bolts) from the engine, drain the oil from the reservoir then remove the reservoir and filter element from the pump.

Clean the inside of the reservoir, install a new filter element and re-install the reservoir. The flat detent in the reservoir should be placed between the two locators on the pump (2), Figure 20.

Re-install the pump and reservoir assembly on the engine. Connect the oil tubes and refill the reservoir with clean oil of the correct grade. Purge the system of air by running the engine and turning the steering wheel from lock to lock several times. Add oil as necessary to maintain the level at the bottom of the filler neck.

Power Steering Pump Pressure Relief Valve

While the new type pump is similar in principle to that used previously, detail changes have been made to the components, including the introduction of a new type pressure relief valve. The new valve, which is incorporated in the rear body of the pump, is similar in design to the pressure relief valve used in the hydraulics of the new models, see Hydraulic Section of this Supplement, but it has a different spring, a lower pressure setting and a thinner head. It has a larger capacity than the previous

type relief valve, therefore the flow control spool valve, which was used in previous pumps, has been discontinued for use in the new pump.

Pressure Testing and Adjustment

The relief valve operating pressure and the procedure for pressure testing the system will be the same for the new pumps as with the previous types.

If pressure testing the system shows that the operating pressure of the new type pump pressure relief valve needs to be adjusted, the following procedure applies:

1. Disconnect the two tubes from the pump and remove the two bolts retaining the pump assembly to the engine.
2. Remove the pump assembly from the engine. Drain the oil from the reservoir.
3. Remove the reservoir and filter element from the pump.
4. Remove the pressure relief valve from the rear body of the pump, grip it lightly in a soft jawed vice and unscrew the head from the body. Extract the valve and spring.
5. The pressure adjusting shims are now accessible. Shims are available in thicknesses of 0.010 in., 0.015 in. and 0.060 in. (0.25 mm, 0.38 mm and 1.52 mm). The addition or subtraction of one of these shims will vary the opening pressure of the relief valve by the following amount.

0.010 in. (0.25 mm)	– 66–74 psi (4.6–5.2 kg/cm ²)
0.015 in. (0.38 mm)	– 99–110 psi (7.0–7.7 kg/cm ²)
0.060 in. (1.52 mm)	– 396–440 psi (27.8–30.9 kg/cm ²)

6. On re-assembly, care should be taken to be sure the head of the valve is not overtightened. The specified tightening torque is 6–10 lbs. ft. (0.83–1.38 kgm).
7. Install the valve assembly in the pump, re-assemble the filter element and reservoir, and install the unit on the tractor.
8. Refill the reservoir with fresh oil of the correct grade. Run the engine and turn the steering from lock-to-lock to expel air from the system. Add oil as necessary to maintain the level.

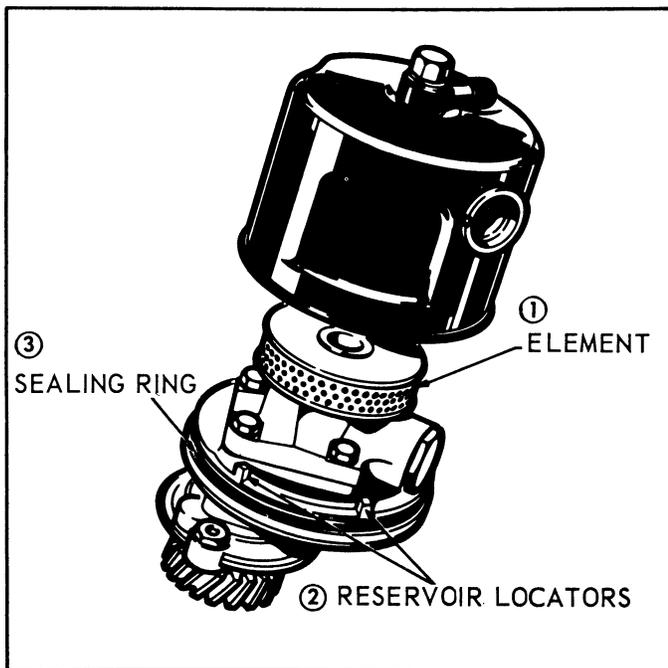


Figure 20
Power Assisted Steering Pump, Filter, and Reservoir

7000 SUPPLEMENT

FOREWORD

This supplement provides information for the proper servicing of the Ford 7000 Tractor. Where service information for the Ford 5000 Tractor also applies to the Ford 7000, this supplement refers to the appropriate section of your Ford Tractor Repair Manual, SE 9205, for that information. This supplement can be kept in its entirety at the front of your repair manual, or it can be separated into its various parts and inserted behind the appropriate dividers of the repair manual.

The material contained in this supplement was correct at the time the supplement was approved for printing. Ford policy is one of continuous improvement and the Ford Motor Company reserves the right to discontinue models at any time or change specifications or design without notice and without incurring obligation.

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