

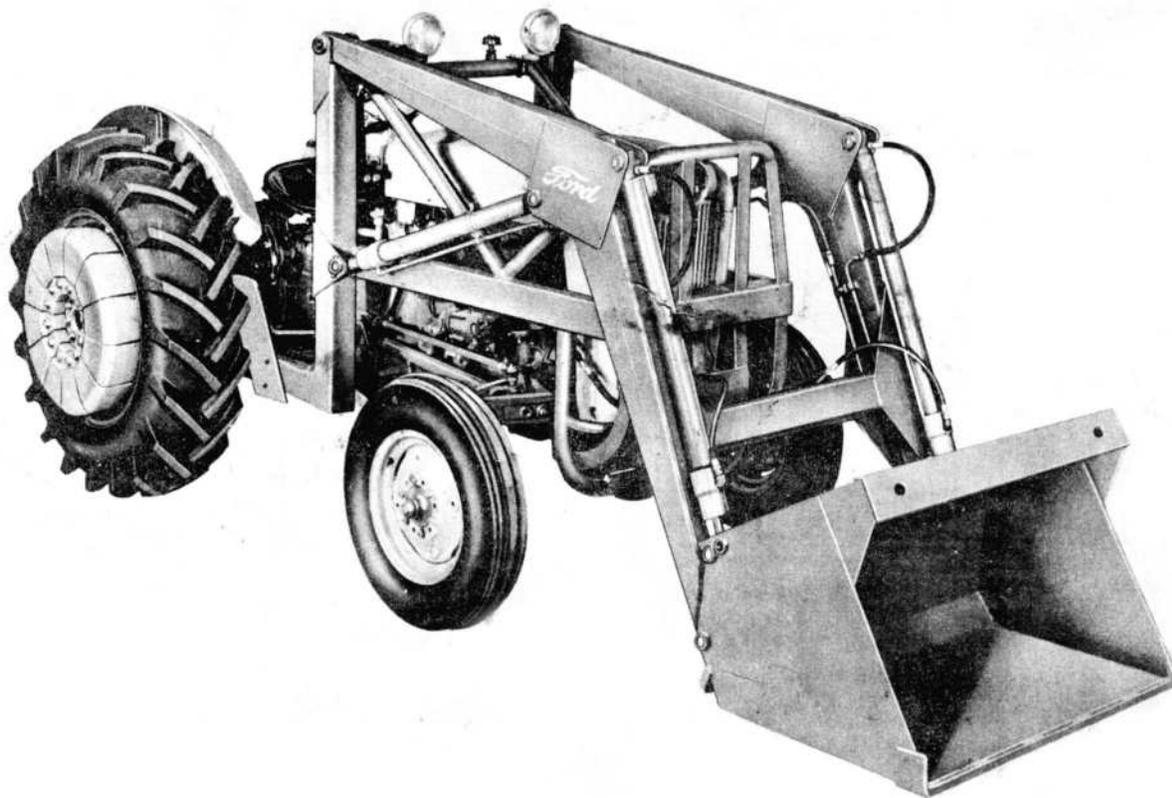
FORD

INDUSTRIAL LOADER

MODELS 19-97 and 19-105



OPERATING AND ASSEMBLY INSTRUCTIONS



The Ford Industrial Loader was designed to give top loading performance and rugged low-cost service, together with maximum convenience and ease of control. Top performance is provided by its high lift and high capacity, longer bucket over-hang and close-coupled design. Rugged, low-cost service because of welded box channel construction; two cylinder bucket control, full circulating hydraulic system resulting in lower oil temperatures and an independent, tractor mounted pump for a positive, dependable hydraulic drive even under most adverse conditions, are also features of this loader.

Maximum comfort and ease of operation is provided because of full vision, convenient controls, step-on mounting, and ample elbow room, all combined with the easy maneuverability of the Ford Tractor.

NOTE: Power steering is now available as optional equipment on all new Ford Tractors. Power Steering Conversion Kits, Part No. 309524, are available for

installation on Series 600 and 800 and Model NAA Tractors now in the field.

For additional performance and versatility, other Ford or Dearborn Implements can be used on your Ford Tractor without removing your loader. Implements such as blades, scoops or subsoilers are easily operated by your effective Ford Tractor Hydraulic System.

The Ford Industrial Loader is available in two models. The model 19-97, is equipped with double acting lift cylinders, and the model 19-105, has single acting lift cylinders.

These loaders are designed for use on the model 8N, NAA and series 600 and 800 Ford tractors. This manual contains instructions for the installation and operation of the loader on all of the above tractors. Attaching kits are available for installation on Ferguson TO-30 and 35, and Oliver 55 tractors. Instructions for installation on these tractors are provided with the kits and supplement those contained in this manual.

Prepared by _____

TRACTOR AND IMPLEMENT DIVISION

Ford Motor Company

BIRMINGHAM, MICHIGAN

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SPECIFICATIONS*

Ford Industrial Loaders

MODEL 19-97, Double Acting Lift Cylinders. Model 19-105, Single Acting Lift Cylinders.

PERFORMANCE

BREAKAWAY LIFT CAPACITY.....2500 lbs.	SPEED OF LIFT (No Load, 1700 r.p.m.).....4.5 Secs.
RATED LOAD AT FULL LIFT.....1000 lbs.	SPEED OF DROP.....2.5 Secs.
MAXIMUM LOAD AT FULL LIFT.....1200 lbs.	

BUCKET OPERATION

BUCKET DUMP.....2.5 Secs.	BUCKET PITCH UP AT GROUND LEVEL.....0 to 3 1/4"
BUCKET RETURN.....1.5 Secs.	HEIGHT OF LIFT.....See Figure 1
BUCKET DUMP ANGLE AT FULL LIFT.....46°	

HYDRAULIC SYSTEM

RELIEF PRESSURE.....	1800 p.s.i.
OPERATING PRESSURE (at rated load).....	1800 p.s.i.
OIL CAPACITY.....	6 gals.

Main frame is reservoir with filler boss and breather on top of cross tube. Hydraulic lines are made of pipe, bolted and clamped to the frame and lift arms. Hydraulic hoses are single-ply wire braid.

RESERVOIR:

Type.....	Main frame structure
Location.....	Front horizontal members and front mounting leg
Capacity.....	6 gals.
Oil Specification..	Ford spec. M-4864-D, hydraulic fluid

PUMP:

Type....	Vane type with balanced pressure, no starting load, constant delivery rate and high volumetric efficiency.
Capacity.....	11.5 g.p.m. at 1700 r.p.m.
HP Required.....	15
Mounting....	Direct to front mounting bracket; not on loader frame.
Drive....	Heat treated, rubber mounted splined hub is bolted to tractor crankshaft pulley; 3/4" shaft with 1" heat treated spline fits into the hub and is connected to pump shaft by a 3 1/2" flexible coupling.

CONTROL VALVE (Model 19-97):

Type....	Double spool, open center, with 4-way piston to control lift cylinders and 4-way piston to control bucket cylinders. Spring loaded spools for self-centering in neutral position.
Flow Capacity.....	20 g.p.m.

CONTROL VALVE (Model 19-105):

Type.....	Same as Model 19-97 except with 3-way piston for control single acting lift cylinders.
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LIFT CYLINDERS:

Type (Model 19-97)....	Piston type with ground and polished cylinder rod, chromium plated. Cylinder of seamless tubing. Cast iron head has fabricated V-ring packing and a neoprene wiper ring.
Type (Model 19-105)..	Rod displacement type with ground and polished cylinder rod, chromium plated. Cylinder tube is standard seamless pipe. Cast iron cylinder head has fabricated V-ring packing and a neoprene wiper ring.
Number (Model 19-97).....	2 Double Acting
Number (Model 19-105).....	2 Single Acting
Extended Length.....	70 1/8"
Retracted Length.....	40 3/8"
Stroke.....	29 3/4"
Piston Diameter.....	2"
Rod Diameter (Model 19-97).....	1 3/8"
Rod Diameter (Model 19-105).....	2"

BUCKET CYLINDERS:

Type.....	Double acting hydraulic with chromium plated cylinder rods, turned, ground and polished. Leather piston cups.
Extended Length.....	59 1/2"
Retracted Length.....	39 1/2"
Stroke.....	20"
Piston Diameter.....	2"
Rod Diameter.....	1 1/4"

FORD INDUSTRIAL LOADER ATTACHING KEYS. (sold separately)

	Model Number
Ford Series 600-800 and Model NAA.....	19-116
Ford Model 8N.....	19-115
Ferguson Model TO-30.....	19-127
Ferguson Model TO-35.....	19-128
Oliver 55.....	19-126

* The specifications contained in this manual were in effect at the time it was approved for printing. Ford Motor Company reserves the right, however, to discontinue models or change specifications for design at any time without notice and without incurring any obligation.

OPERATION

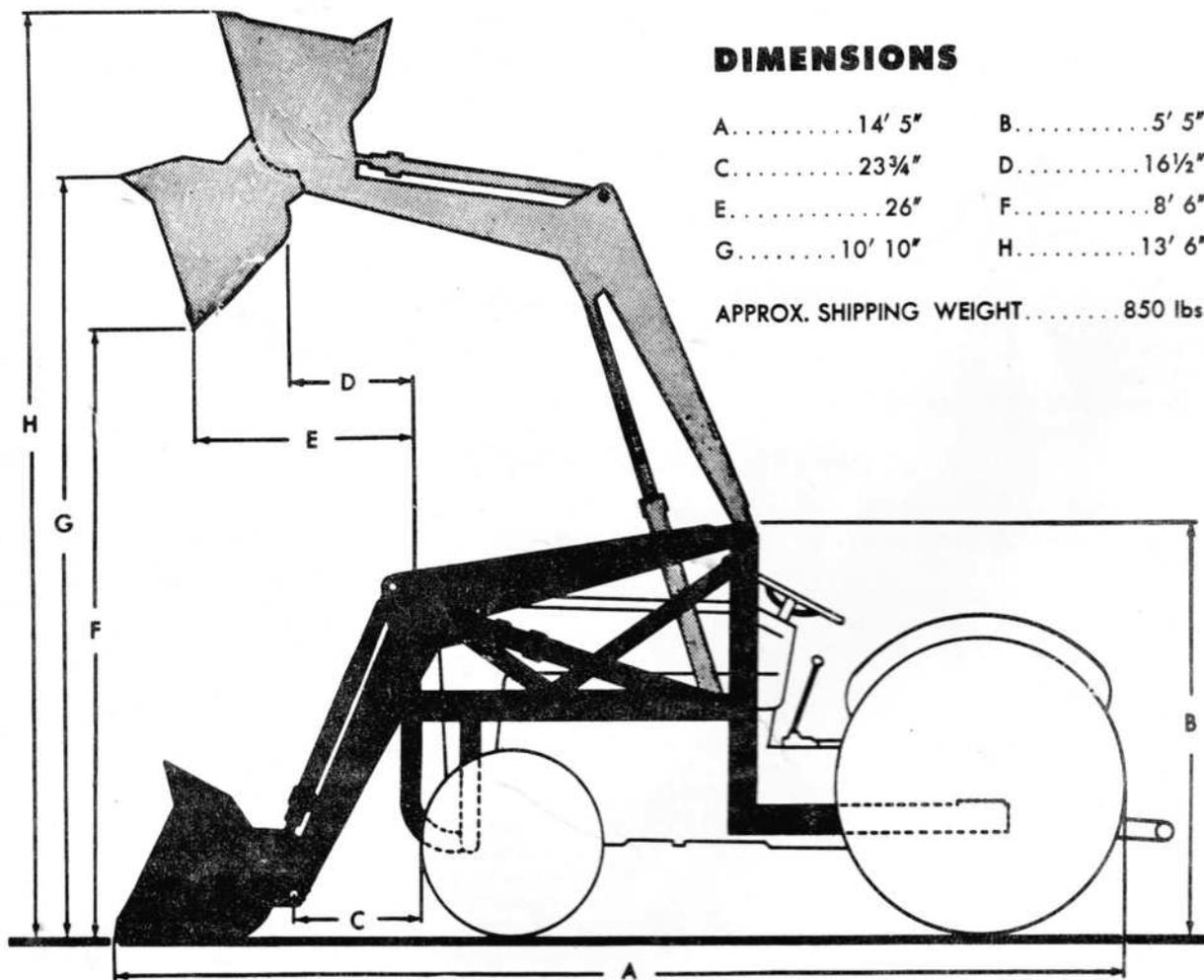


Figure 1
Ford Industrial Loader Performance Chart

OPERATION

The Ford Industrial Loader should be operated at moderate tractor speeds to avoid bucket spillage and loss of control. Excessive speeds are dangerous and may cause unnecessary strain. The tractor engine speed should be 1200 to 1500 r.p.m. and the tractor operated in third gear on five speed transmission tractors, and second gear on four speed transmission tractors.

The loader lift arms are raised by pulling the left valve lever to the rear, and lowered by pushing the lever forward. To dump the bucket, push the right valve lever forward. To return the bucket to its operating position, pull back on the right lever. The loader operation is sufficiently fast for complete action during a normal amount of tractor maneuvering.

NOTE: Your Ford Tractor and Implement Dealer can reverse the valve lever action, if so desired.

Drive straight into the pile, gradually raising the

lift arms when crowding a load into the bucket. Do not overtax the loader and tractor by trying to fill the bucket while turning. When loading from a pile of material, keep the surrounding area clean to maintain better traction and more efficient operation. The best procedure is to load from a wall of material so that it will break away and fall into the bucket for maximum fill on each load. **DO NOT** under any circumstances, use the top edge of the material bucket as a dozer blade.

The industrial loader does not utilize the Ford tractor hydraulic system and it, therefore, is free to be used for other implements such as the Ford Adjustable Rear Blade, Ford Economy Blade, Ford Economy Post Hole Digger, etc.

When transporting the loader with the bucket loaded or empty, the lift arms should be raised to a height where the bucket is just below the level of the tractor hood. Good stability and visibility are obtained when the lift arms are in this position.

OPERATION

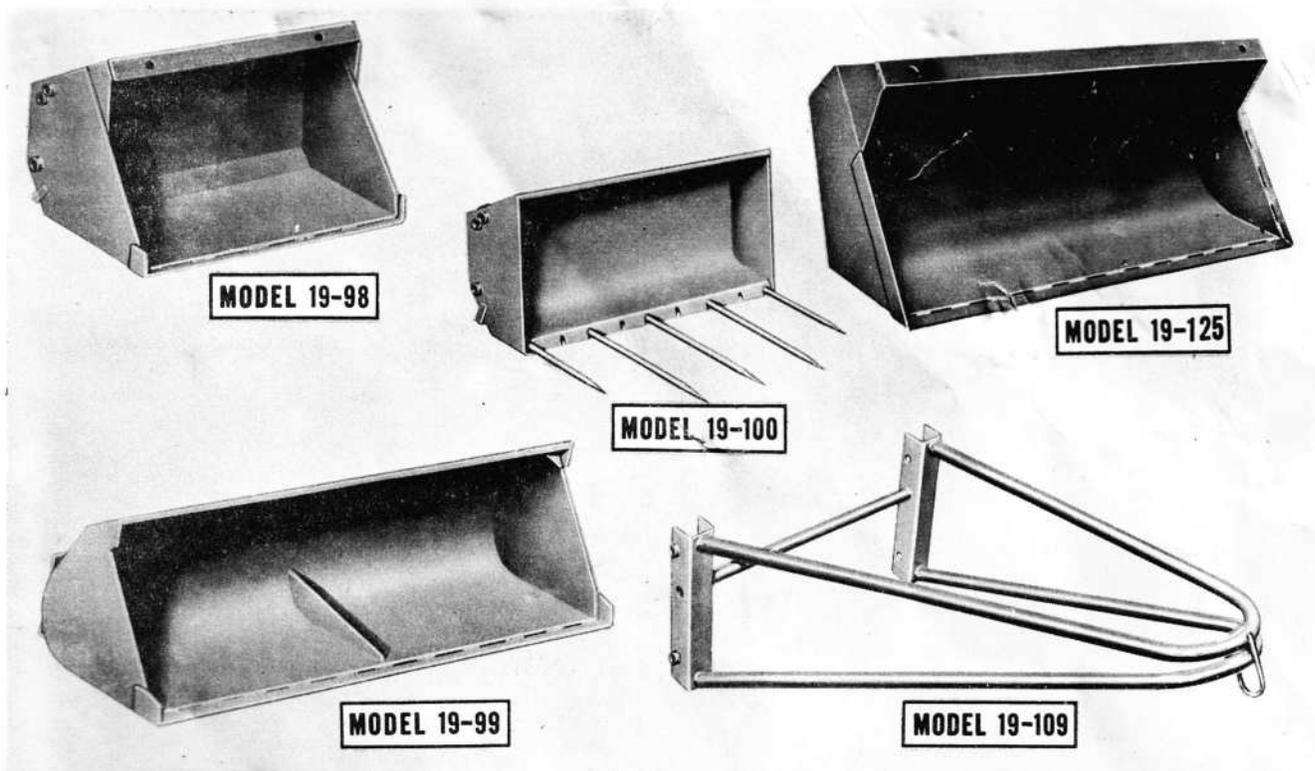


Figure 2
Ford Industrial Loader Attachments

ADJUSTMENTS

Bucket Pitch: A two hole bucket mounting position has been provided on the bucket ears for adjusting the pitch of the bucket lip or fork tines. The lower holes (1), Figure 21, maintain a level bucket or fork line. The upper holes (4) and (5) provide an up pitch of approximately 3" on the bucket lip and 2" on the fork tine.

Universal Blade: Blade pitch adjustment can be easily varied by the loader bucket cylinders.

ATTACHMENTS

A variety of attachments specially designed for industrial and agricultural application, are available for use on the Ford Industrial Loader. These attachments sold separately by your Ford Tractor and Implement Dealer are shown in Figures 2 and 3.

BUCKETS

Model 19-98 Material Bucket: Bucket weight approximately 256 lbs. Capacity is $\frac{1}{3}$ cubic yard for material with density up to 130 lbs. per cubic foot. Top of bucket has two 1" holes for clevis and chain installation to facilitate use of bucket for miscellaneous lifting.

Model 19-99 Light Material Bucket: Bucket weight approximately 365 lbs. Capacity is 16 cubic feet of material with density up to 65 lbs. per cubic foot, specially designed for handling light materials such as snow and coal.

Model 19-125 Tread Width Bucket: Bucket weight approximately 360 lbs. Capacity is $\frac{1}{3}$ cubic yard of material with density up to 130 lbs. per cubic foot. Specially designed for clean-up jobs and cutting close to fences, walls and sidewalks. Top of bucket has two 1" holes for clevis and chain installation to facilitate miscellaneous lifting.

NOTE: For quick reference to material being handled, see the conversion table and densities chart, Figure 4.

OPERATION

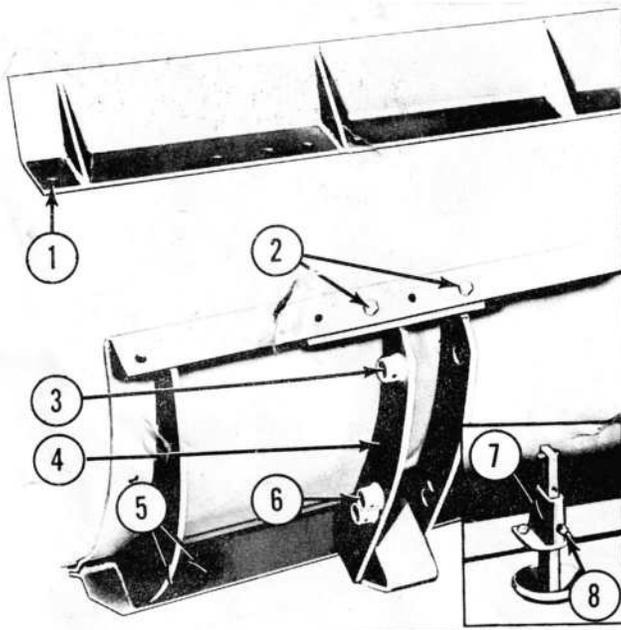


Figure 3
Universal Dozer Blade and Accessories

OTHER ATTACHMENTS

19-100 Manure Fork: Can be used with five to nine replaceable tines depending on consistency of material being handled. Weight of fork approximately 208 lbs. with 5 tines, 254 lbs. with 9 tines.

19-109 Industrial Crane: The crane attachment weighs approximately 110 lbs. lifts 1000 lbs. to height of 16½ feet.

19-113 Universal Dozer Blade: Blade weight is approximately 250 lbs. and can be equipped with Dozer Blade Extension and Mushroom Skid Shoes.

Dozer Blade Extension, Part No. 195872: (See Figure 3) Attach the blade extension to the top of the blade, using the bracket bolts (2), Figure 3, and two ½" x 1 1/8" hex head bolts, lockwashers and hex nuts provided.

Mushroom Skid Shoes, Part No. 190033: (See insert, Figure 3) Attach the skid shoe brackets (7), Figure 3, to the blade at (5), using two ½" x 1 1/2" hex head bolts, lockwashers and hex nuts for each bracket. Adjust the skid shoes for height by means of the set screws (8), and secure with jam nuts.

CONVERSION TABLE*

CU. YD.	CU. FT.
1/8	3 3/8
1/4	6 3/4
1/3	9
3/8	10 1/8
1/2	13 1/2
5/8	16 7/8
3/4	20 1/4
7/8	23 5/8
1	27

*1 cubic foot equals .037 cubic yard

AVERAGE DENSITIES OF MATERIALS

MATERIAL	LBS. CU. FT.
Ashes, Cinders	40-45
Cement, Portland, loose	94
Chalk	80
Clay, dry	63
Clay, wet	110
Coal, anthracite	47-58
Coal, bituminous	40-54
Coke	23-32
Concrete, wet	160
Gravel	100
Earth, dry, loose	76
Earth, mud, packed	115
Lime, loose	64
Limestone, crushed	100
Salt	48-60
Sand, dry	105
Sand, wet	126
Snow, wet	40

Figure 4
Conversion Table and Densities Chart

OPERATION

TROUBLE SHOOTING

The following material on trouble shooting is presented to aid the operator in quickly recognizing operational problems, and serve as a guide for the dealer in diagnosing their general cause and corrective action.

LOADER

<i>Problem</i>	<i>Possible Cause</i>	<i>Correction</i>
Pump and/or valve noisy.	<ol style="list-style-type: none"> 1. Cavitation caused by low fluid level. 2. Cavitation caused by foaming fluid. 3. Pump shaft seal leaks. 4. Intake hose leaks. 5. Intake hose or fittings loose. 6. Broken rotor. 7. Worn rotor housing. 8. Relief valve pressure too high. 9. Breather very dirty. 10. Fluid too heavy. 	<ol style="list-style-type: none"> 1. Correct leaks in system and maintain full reservoir. 2. Use proper type of hydraulic fluid. 3. Replace seals. 4. Replace hose. 5. Tighten clamps and fittings. 6. Replace rotor. Examine adjacent parts for damage. 7. Replace housing. 8. Check and adjust using pressure gauge. 9. Remove and rinse clean. 10. Use proper type fluid or thin for low temperature operation.
Slow or erratic rate of lift.	<ol style="list-style-type: none"> 1. Low pump efficiency. 2. Valve spools not properly centered. 3. Relief pressure too low. 4. Low fluid level. 5. Foaming fluid. 6. Air in hydraulic system. 	<ol style="list-style-type: none"> 1. Replace worn or damaged parts. 2. Adjust valve spools. 3. Check and adjust with pressure gauge. 4. Correct leaks in system and maintain full reservoir. 5. Use proper type of hydraulic fluid. 6. Bleed air from system.
Bucket drops under load.	<ol style="list-style-type: none"> 1. Piston cups cut, worn or loose. 2. Cylinder bore not smooth. 3. Fluid bypassing at control valve. 4. Bucket cylinder shaft "O" ring damage. 5. Piston cups or chevrons improperly installed. 	<ol style="list-style-type: none"> 1. Replace and install properly. 2. Replace cylinder. 3. Replace valve. 4. Disassemble piston assembly and replace "O" ring on shaft. Check "O" ring groove and spacer for burrs. 5. Install correctly.
Lift arms drop under load.	<ol style="list-style-type: none"> 1. Check valve worn or not seating properly. 2. Piston cups cut, worn or loose. 3. Bucket cylinder shaft "O" ring damage. 4. Pump worn and overheats. 5. Fluid bypassing at spools. 6. Cylinder bore not smooth. 	<ol style="list-style-type: none"> 1. Inspect parts, replace defective parts. 2. Replace and install properly. 3. Disassemble piston assembly and replace "O" ring on shaft. Check "O" ring groove and spacer for burrs. 4. Repair pump. 5. Replace control valve. 6. Replace cylinder.
Low lift capacity.	<ol style="list-style-type: none"> 1. Low pump efficiency. 2. Relief pressure too low. 3. Piston cups cut, worn or loose. 	<ol style="list-style-type: none"> 1. Replace worn or damaged parts. 2. Check and adjust with pressure gauge. 3. Replace and install properly.
Drive shaft failure.	<ol style="list-style-type: none"> 1. Partial spline engagement. 2. Tractor front axle support failure. 3. Misalignment. 	<ol style="list-style-type: none"> 1. Adjust for full spline engagement in hub. 2. Repair or replace. 3. Check installation of hub and pump mounting bracket.
HYDRAULIC OIL LEAKAGE		
Cylinder "O" rings.	<ol style="list-style-type: none"> 1. Cut in installation. 2. Rough or burred cylinder O.D. 3. Extrusion from excessive clearance. 	<ol style="list-style-type: none"> 1. Replace "O" rings. 2. Remove sharp edges with crocus cloth and replace ring. 3. Replace tube or stuffing box.

OPERATION

<i>Problem</i>	<i>Possible Cause</i>	<i>Correction</i>
Pump "O" rings.	<ol style="list-style-type: none"> 1. Cut in assembly. 2. Pump cover not tight causing extrusion. 	<ol style="list-style-type: none"> 1. Replace rings. 2. Torque to 70 foot lbs.
Cylinder packings.	<ol style="list-style-type: none"> 1. Worn packing lip. 2. Damaged in assembly. 3. Cut by a burr or scored rod. 4. "V" chevrons assembled backwards. 	<ol style="list-style-type: none"> 1. Replace packing. 2. Replace packing. 3. Remove burr or replace rod. 4. Install correctly.*
Pump seals.	<ol style="list-style-type: none"> 1. Shaft burred or scored. 2. Worn seals. 3. Abrasives in system. 	<ol style="list-style-type: none"> 1. Replace shaft and seal. 2. Replace seal. 3. Flush system as recommended.
Valve seals.	<ol style="list-style-type: none"> 1. Paint ring on spindle. 2. Score or rough finish on spindle. 3. "O" ring leaking between valve and mounting plate. 	<ol style="list-style-type: none"> 1. Remove paint and replace seals. 2. If feasible, smooth with crocus cloth, or replace valve. 3. Replace "O" ring and tighten nuts evenly.
PUMP		
Rotor embedded with metal particle-body galled.	<ol style="list-style-type: none"> 1. Insufficient lubrication. 	<ol style="list-style-type: none"> 1. Use proper type hydraulic fluid.
Rotor, body and/or pressure plate scored or scratched.	<ol style="list-style-type: none"> 1. Abrasives or dirt in system. 	<ol style="list-style-type: none"> 1. Flush as recommended.
Pump cover plate broken.	<ol style="list-style-type: none"> 1. Cap screws loose. 	<ol style="list-style-type: none"> 1. Replace and torque to 70 ft. lbs. Check "O" ring for extrusion.
Pump burst.	<ol style="list-style-type: none"> 1. High pressure. 2. Obstruction in line. 	<ol style="list-style-type: none"> 1. Check relief valve with pressure gauge and adjust. 2. Check hose and line for obstruction.
Rotor housing (ring) ridged.	<ol style="list-style-type: none"> 1. Cavitation. 2. Excessive pressure. 	<ol style="list-style-type: none"> 1. Check fluid level—type of hydraulic fluid. Check for leaks at pump intake. 2. Check valve and adjust with pressure gauge.
Rotor segment broken.	<ol style="list-style-type: none"> 1. Vanes too loose in slots. 	<ol style="list-style-type: none"> 1. Replace rotor.
Vanes worn prematurely to taper.	<ol style="list-style-type: none"> 1. Cavitation—low fluid level. 2. Insufficient lubrication. 	<ol style="list-style-type: none"> 1. Check fluid level—type of fluid. 2. Replace vanes—inspect ring.
Vanes scored.	<ol style="list-style-type: none"> 1. Abrasives in system. 	<ol style="list-style-type: none"> 1. Flush system as recommended. Inspect all pump parts.
Pump shaft seal leaks.	<ol style="list-style-type: none"> 1. See pump seal leakages. 	
"O" rings extruded.	<ol style="list-style-type: none"> 1. See pump "O" ring leakages. 	
Pump will not deliver pressure when appears O.K.	<ol style="list-style-type: none"> 1. Rotor housing ring assembled incorrectly. Pressure plate spring omitted. 	<ol style="list-style-type: none"> 1. Assemble properly with arrow pointing in direction of crankshaft rotation.
Premature bearing failure.	<ol style="list-style-type: none"> 1. Drive shaft misalignment. 2. Flexible coupling worn. 	<ol style="list-style-type: none"> 1. Replace bearing. Align shaft. 2. Replace coupling.
VALVE		
Levers stick.	<ol style="list-style-type: none"> 1. Valve spool binds due to bent spool or centering spring. 2. Linkage binding. 	<ol style="list-style-type: none"> 1. Disassemble and inspect for dirt or scoring. Check spool and centering spring. 2. Inspect linkage.
Bypass fluid in neutral.	<ol style="list-style-type: none"> 1. Spools pitted by corrosion 2. Spools scored. 3. Bores damaged. 	<ol style="list-style-type: none"> 1. Replace valve. 2. Replace valve. 3. Replace valve.
Relief valve does not hold pressure.	<ol style="list-style-type: none"> 1. Relief valve "O" ring not sealing. 2. Foreign object holds valve open. 3. Pressure setting too low. 4. Burred or scored relief valve ball, seat or seal. 5. Broken relief spring. 	<ol style="list-style-type: none"> 1. Replace "O" rings. 2. Disassemble valve and clean. 3. Check pressure with gauge and adjust with shims. 4. Replace assembly. 5. Replace spring.

*NOTE: Chevron packing correctly installed has point of chevron pointing opposite pressure.

MAINTENANCE

LUBRICATION

There are ten lubrication fittings on the Ford Industrial Loader; one each on the lift arm pivot pin, one on both ends of each lift arm cylinder, one on the upper end of each bucket cylinder and one on each bucket cylinder rod bushing. Lubricate the loader with a good grade of grease immediately after assembly and every eight hours of operation thereafter.

OPERATIONAL MAINTENANCE

1. Check the level of fluid in the loader hydraulic system daily and maintain the proper level as directed in the section "FILLING THE LOADER RESERVOIR," on page 17.
2. Have hydraulic fluid leaks serviced promptly to avoid loss of fluid and damage to the system.
3. Lubricate the loader as directed in the section "LUBRICATION," on this page.
4. Remove the breather cap from the loader and rinse in kerosene after fifty hours of operation, or more frequently if operating under extremely dusty conditions. After rinsing, dip the breather in hydraulic fluid and reinstall.
5. Use Sprayon Touch-Up enamel as necessary to prevent rust and to maintain the appearance of the loader.
6. Your Ford Tractor and Implement Dealer stocks genuine Ford Tractor and Implement repair parts. For high quality and accurate fit, always insist on genuine Ford Tractor and Implement repair parts.

STORAGE

Always store the loader in a clean dry place when possible. Coat the exposed parts of the control valve spools and cylinder rods with a rust preventive.

Dismounting the Loader for Storage: The loader is removed from the tractor as follows:

1. Support the weight of the loader with a chain fall or other suitable hoist.

2. Remove the two 1" x 4 $\frac{1}{4}$ " round head pins attaching the frame to the rear mounting brackets.
3. Remove the two 1" x 4 $\frac{1}{4}$ " hex head bolts attaching the loader to the front mounting bracket.
4. Remove the two hex head bolts securing the pump to the mounting bracket. Remove the pump and drive shaft, and wire them to the frame.
5. Detach the headlight wires.
6. Raise the loader frame to provide sufficient clearance between the tractor axle and the frame. Back the tractor away and lower the loader.

NOTE: The front and rear mounting brackets will not interfere with most tractor applications, but can be removed if necessary.

SAFETY PRECAUTIONS

Accidents involving operators of farm and industrial equipment are generally caused by the failure of individuals to observe fundamental safety precautions. Most accidents can be avoided by following these simple safety precautions:

1. Do not permit anyone but the operator to ride the tractor at any time.
2. Do not allow anyone to ride on the loader.
3. Do not make mechanical adjustments when the tractor or loader is in motion.
4. Exercise extreme caution in operating the tractor with a raised, loaded bucket or fork.
5. Do not leave the tractor when it is in motion.
6. Always shut off the tractor engine when leaving the tractor.
7. Do not attempt to repair or tighten hoses with the tractor engine running, or the lift arms raised.
8. Make sure the brake pawls are set when parking the tractor.
9. Do not leave the tractor with the lift arms raised.
10. Keep the tractor keys where they are not available to children.

SHIPPING

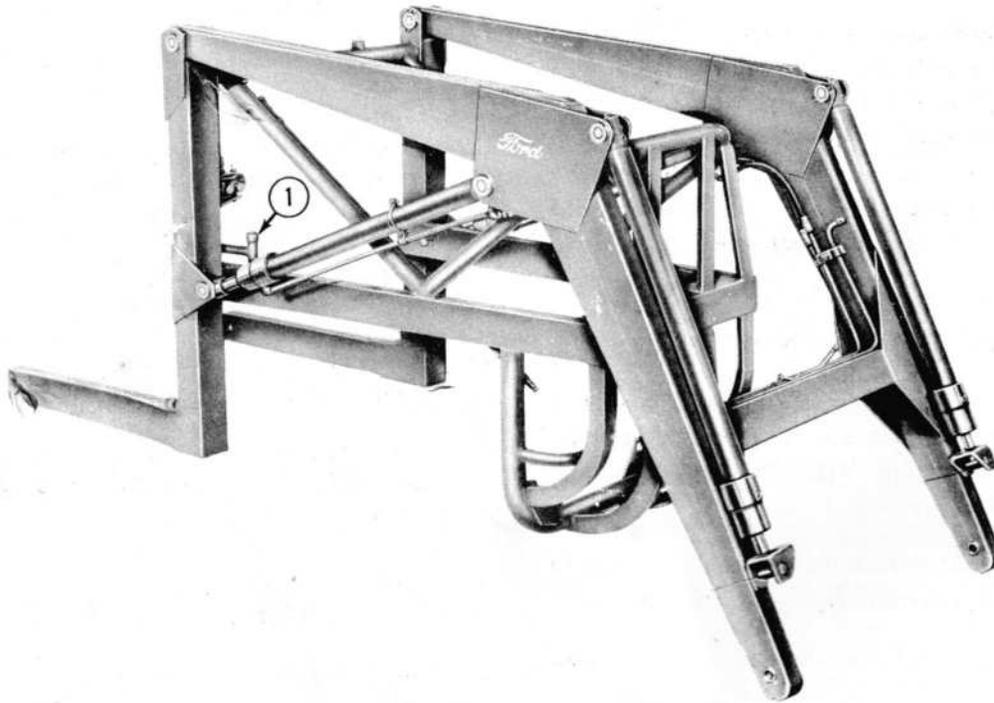


Figure 5
Loader Frame and Lift Arms Bundled for Shipment

SHIPPING INFORMATION

The Ford Industrial Loaders are shipped in two bundles. Bundle No. 195467 consists of one Frame and Lift Arm assembly for Model 19-97, and bundle No. 195660 consists of one Frame and Lift Arm assembly for Model 19-105, as shown in Figure 5.

Bundle No. 196147 consists of one wirebound box of parts for Model 19-97, and bundle No. 196148 consists of one wirebound box of parts for model No. 19-105, as shown in Figure 6. Check the contents of the wirebound box of parts against this list to make certain all parts are received.

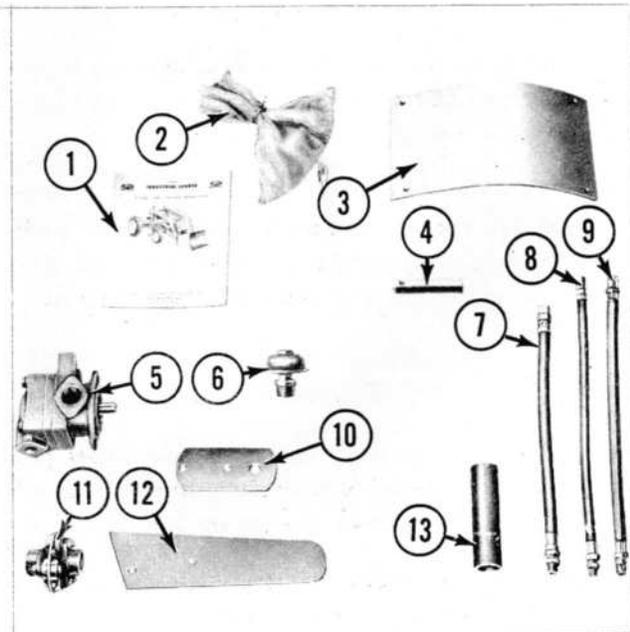


Figure 6
Contents of Wirebound Box

Item No.	Description	No. Required	
		19-97	19-105
1	Operating and Assembly Manual	1	1
2	Bag of Miscellaneous Hardware	1	1
3	Bumper Plate	1	1
4	Bucket Attaching Pin	4	4
5	Hydraulic Pump	1	1
6	Breather Cap	1	1
7	Hose 1/2" x 16" (pump to valve)	2	2
8	Hose 3/8" x 25" (cylinder supply)	4	4
9	Hose 1/2" x 25" (valve to cyl. tubes)	4	3
10	Headlight Mounting Plate	2	2
11	Flexible Coupling Assembly	1	1
12	Foot Guard Plate	2	2
13	Hose 1 1/4" x 6 1/2" Pump Inlet	1	1

ASSEMBLY

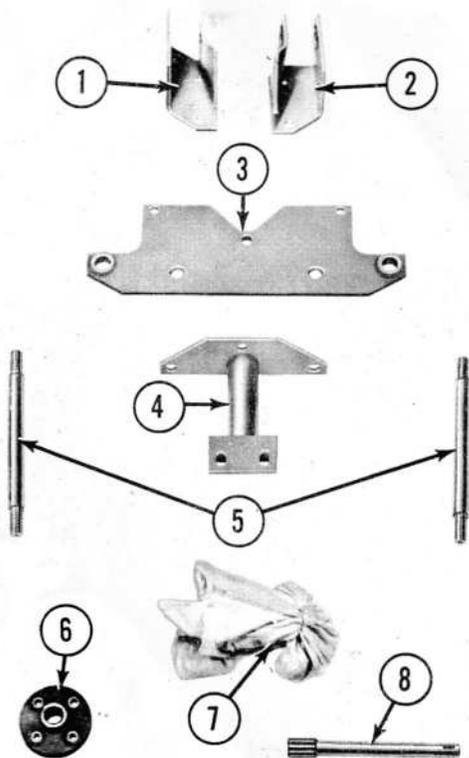


Figure 7
Model No. 19-116 Attaching Kit

The Attaching Kit, Model 19-116 for attaching the 19-97 and 19-105 Industrial Loaders to Series 600-800 or Model NAA tractors is shipped as Bundle No. 19-116 and is shown in Figure 7. The contents are listed below:

Item No.	Description	No. Required
1	Rear Mounting Bracket, R.H.	1
2	Rear Mounting Bracket, L.H.	1
3	Front Support Plate	1
4	Pump Mounting Assembly	1
5	Rod-Front Support	2
6	Hub-Splined Drive	1
7	Bag of Hardware	1
8	Shaft-Pump Drive	1

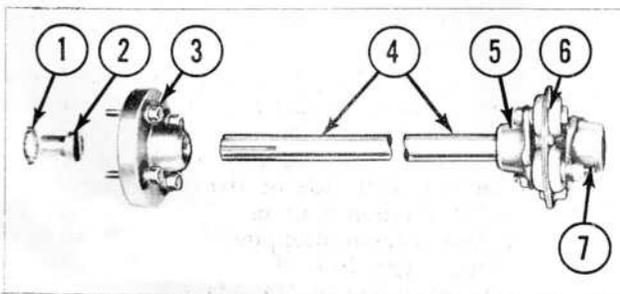


Figure 8
Coupler, Drive Shaft and Morflex Coupling

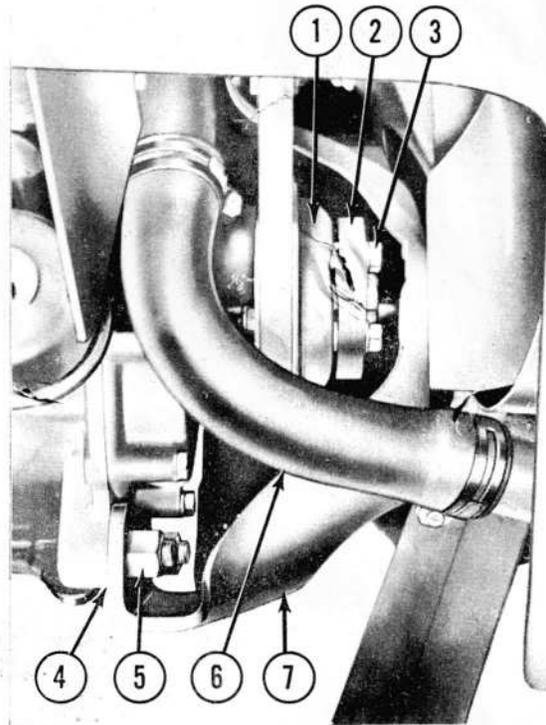


Figure 9
Pump Drive Hub Installed

ASSEMBLY PROCEDURE

NOTE: The loader can easily be installed on the tractor by two men using a chain fall or other suitable hoist. However, certain work must be done on the tractor itself before the loader is mounted in place.

Add weight to the tractor rear tires as outlined in the Tractor Owner's Manual. The additional draw bar weight recommended is up to 1000 pounds.

NOTE: To facilitate mounting the Ford Industrial Loader on tractors having 12:00 x 28 rear tires, the wheel spacing should be 56 inches. Refer to the Tractor Owner's Manual for wheel spacing procedure.

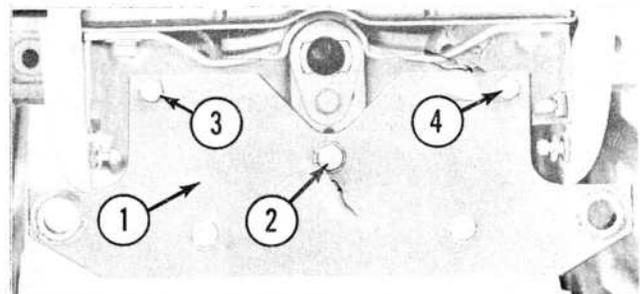


Figure 10
Front Mounting Plate Installed on Tractor

ASSEMBLY

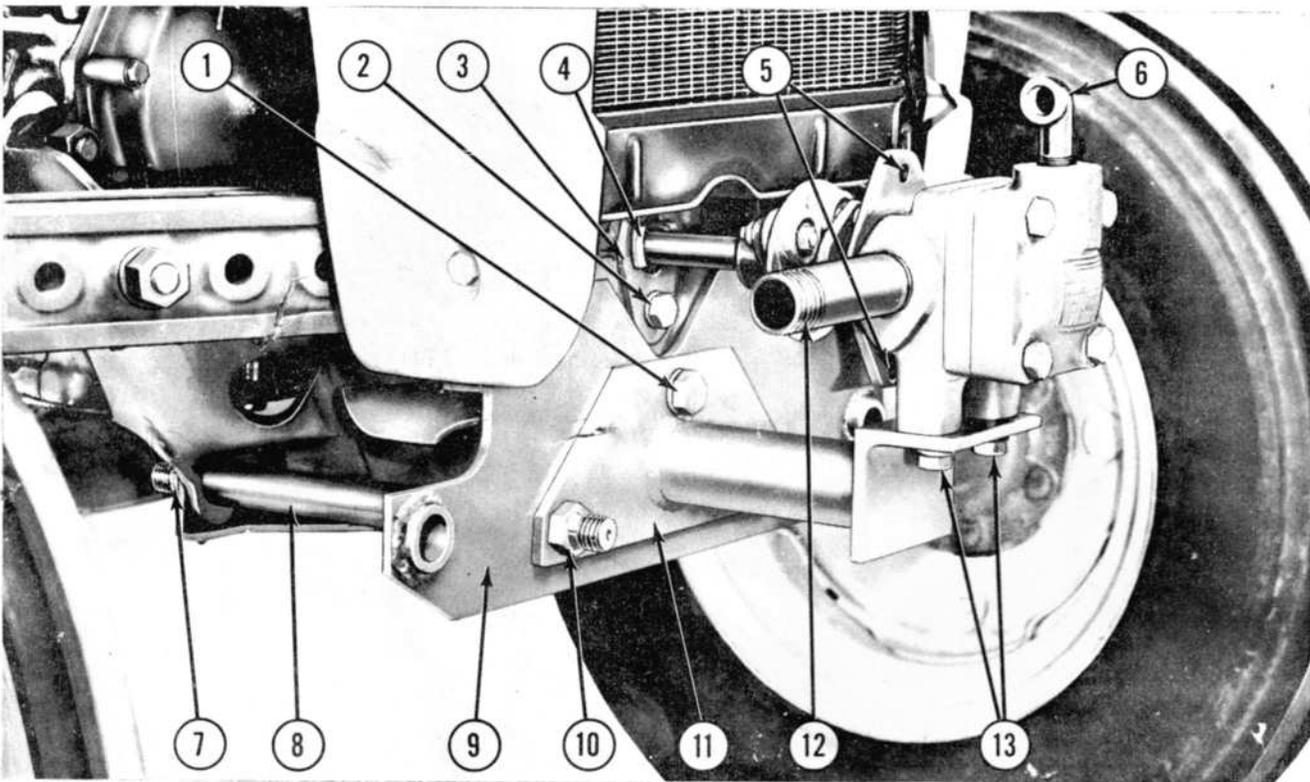


Figure 11
Mounting Bracket and Pump Installed

PREPARING THE TRACTOR

The following procedure outlines the installation of the Ford Industrial Loader on the Series 600-800 or Model NAA Ford Tractors with the Industrial Loader Attaching Kit, Model 19-116.

1. Open the wire bound box, lay out the parts, remove all of the wires and tape from the basic loader bundle, and remove the plugs from all of the openings.
2. Remove the following parts from the tractor:
 - a. Remove the radiator grille.
 - b. Remove the headlights.
 - c. Remove the crankshaft ratchet nut and four hex head bolts and lockwashers from the pulley hub. The crankshaft ratchet nut has a right hand thread. (Later model tractors have a large hex head bolt and plain washer in place of a ratchet nut.) Be careful not to move the crankshaft pulley after removing the hex head bolts, so as to maintain hole alignment.
3. Fit the flat washer (1), Figure 8, on the special $\frac{5}{8}$ " x $1\frac{3}{16}$ " round head slotted screw (2), and install the screw in place of the crankshaft ratchet nut which was removed. To prevent loosening, tighten this round head slotted screw with a square shank screw driver and wrench.

Important: To install the splined hub assembly (2),

Figure 9, on tractors equipped with power steering, it is necessary to gain additional clearance between the power steering belt pulley and the axle pin. Sufficient clearance can be obtained as follows:

- a. Place a jack under the tractor center housing and raise the front wheels off the floor.
 - b. Loosen the four $\frac{5}{8}$ "-18 hex nuts securing the front axle support to the engine block, see (5) Figure 9.
 - c. Install a suitable wedge between the engine block and the axle support just below the upper $\frac{5}{8}$ " x $2\frac{1}{16}$ " stud on each side of the tractor, see (4), Figure 9.
 - d. Install the hub as outlined in step 4, then tighten the four nuts (5) securely, and remove the jack.
4. Place four $\frac{7}{16}$ " x $1\frac{3}{8}$ " hex head bolts and lockwashers in the drive hub (2), Figure 9, and position the assembly on the front of the crankshaft pulley (1), by working it through the opening (4) on the right side of the engine suspension plate (5). Caution must be taken to position the drive hub without dropping the hex head bolts (3), Figure (9), from the drive plate or moving the crankshaft pulley (1). Make sure that all of the hex head bolts (3), are partially started in the holes of the crankshaft pulley before attempting to tighten them securely.

ASSEMBLY

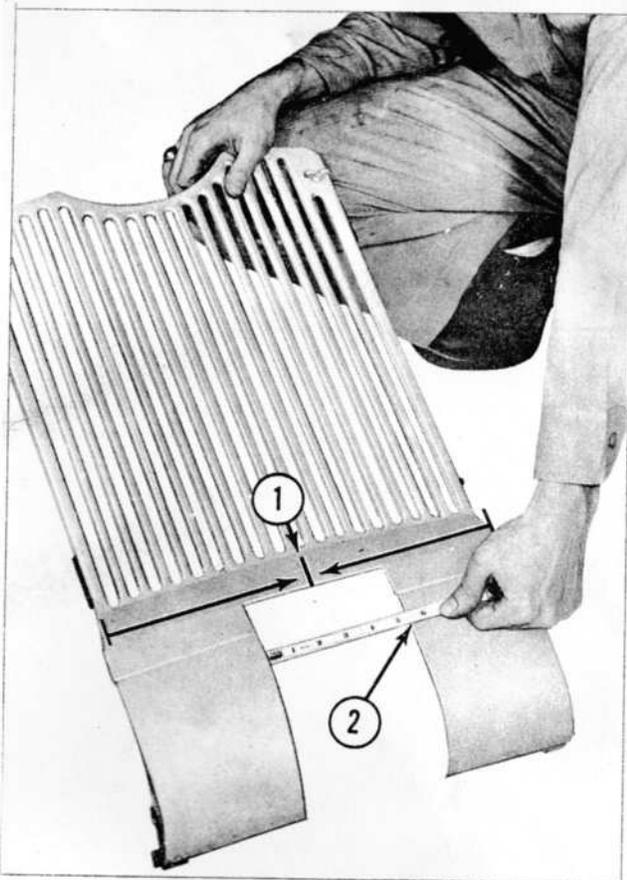


Figure 12
Reinstalling the Radiator Grille

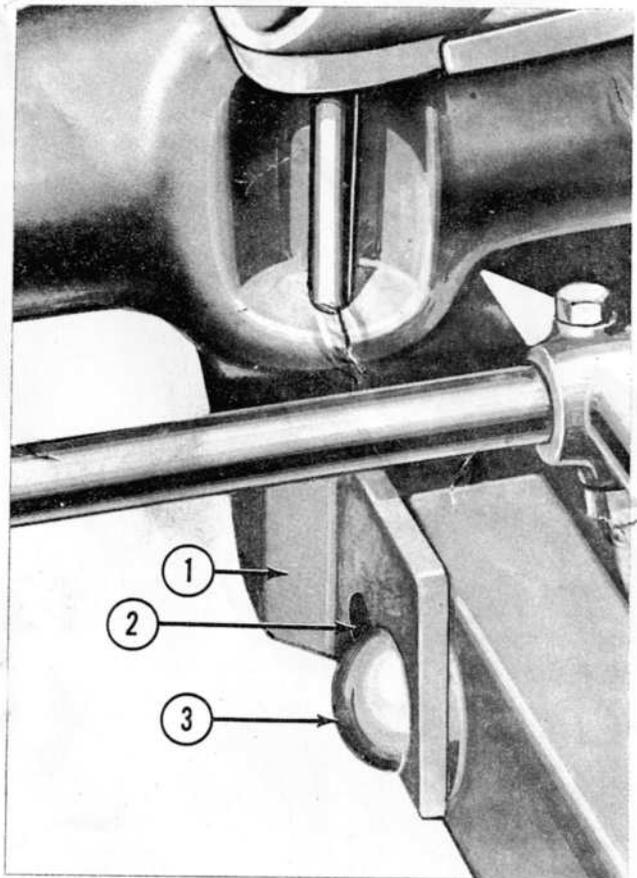


Figure 13
Rear Mounting Bracket Installed Right Side

NOTE: It may be necessary to remove the bolt (2), Figure 11, and plate (3), and unscrew the pin (4), to allow sufficient clearance between the pulley (1), Figure 9, and the suspension plate (5) for installation of the drive hub (2).

5. Use a thin wrench to tighten the hex head bolts (3), Figure 9.
6. Insert the two $\frac{3}{4}$ " x $12\frac{1}{2}$ " rods (8), Figure 11, through the holes provided in the engine support and install the $\frac{3}{4}$ " self-locking nuts (7).
7. Position the front support plate (9), Figure 11, and the pump mounting bracket (11), over the front of the $\frac{3}{4}$ " x $12\frac{1}{2}$ " rods (8) and install the $\frac{5}{8}$ " x $1\frac{1}{2}$ " hex head bolt (1) and lockwasher provided.
8. Install the $\frac{3}{4}$ " self-locking nuts (10), Figure 11, and secure.
9. When all nuts and bolts in the support assembly have been tightened, use the front support plate as a template and drill two $\frac{1}{2}$ " holes in the axle support as shown at (3) and (4), Figure 10. Insert two $\frac{1}{2}$ " bolts in these holes and secure with lockwashers and nuts.
10. Assemble the drive shaft and Morflex coupling as follows:

- a. Position a Woodruff key on the drive shaft 4, Figure 8.
- b. Insert the drive shaft (4), Figure 8, and Woodruff key into the Morflex coupling (6), until the end of the drive shaft is flush with the face of the flange (5).
- c. Tighten the Allen screw on the flange (5), Figure 8.
11. Insert the splined end of the drive shaft (4), Figure 8, in the hub (3).
12. Attach the pump as follows:
 - a. Position the Woodruff key on the pump shaft.
 - b. Insert the pump shaft in the flange (7), Figure 8.
 - c. Install the pump on the mounting bracket (11), Figure 11, using the two hex head bolts (13), and lockwashers provided. Leave the two hex head bolts loose and turn over the engine a few times by means of the starter. This will align the pump drive assembly. Tighten the two hex head bolts.
 - d. Tighten the Allen screw on the flange (7), Figure 8.
13. Install the inlet pipe (12), Figure 11, the $\frac{1}{2}$ " x 90° street ell (6), on the pump.

ASSEMBLY

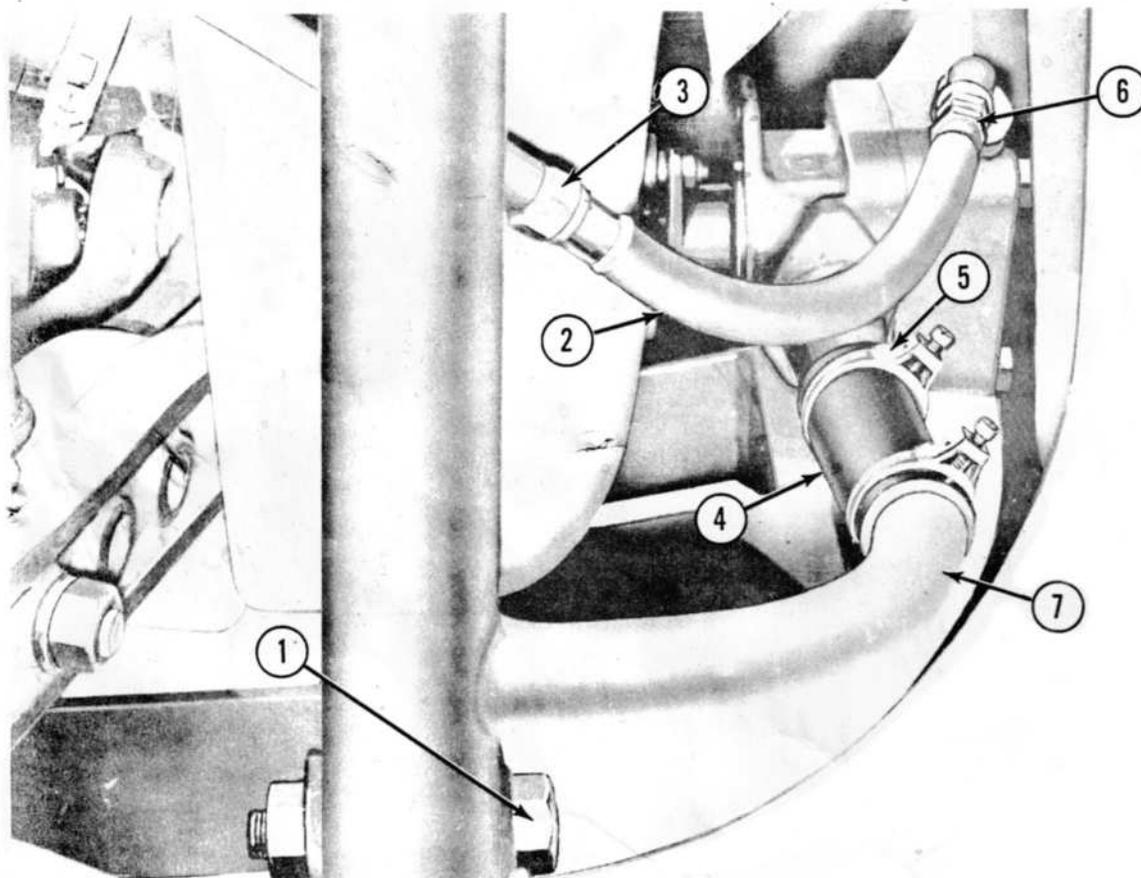


Figure 14
Frame and Hose Installation

NOTE: It will be necessary to use a suitable pipe compound on all threaded hydraulic fittings.

14. Modify and reinstall the radiator grille as follows:
 - a. Find the center line of the tractor radiator grille and mark as shown at (1), Figure 12.
 - b. With a hacksaw, make two cuts $2\frac{5}{8}$ " from the center line and extending to the height 2" below the grille slots shown. Bend the metal back and forth, until it breaks off, then hammer the edge over to remove sharp edges. When the cut is completed, the opening should be $5\frac{1}{4}$ " wide as shown at (2), Figure 12.

CAUTION: It is necessary to reinstall the radiator grille to protect the radiator against possible damage caused by falling material.
15. Install the rear mounting brackets as follows:
 - a. Remove the nuts and lockwashers from the tractor fender bolts.
 - b. Attach the rear mounting brackets (1), Figure 13, to the axle loosely with nuts and lockwashers. Do not tighten nuts.

INSTALLING THE FRAME AND LIFT ARMS

1. Position the loader frame and lift arms on the

tractor using a suitable hoist. Caution should be taken at this time not to damage the hydraulic pump or proofmeter.

2. Attach the rear frame members to the rear mounting brackets with two $1" \times 4\frac{1}{4}"$ round head pins, see (3) Figure 13, and two $\frac{1}{4}" \times 2"$ cotter pins. *NOTE: Use the front hole when mounting the loader on Series 600 or 800 tractors, and use the rear hole (2), Figure 13, when mounting the loader on the Model NAA tractor.*
3. Secure the front of the loader to the front mounting bracket with one $1"-8 \times 4\frac{1}{4}"$ hex head bolt (1), Figure 14, and hex lock nut, on both sides.
4. Secure the rear mounting bracket bolts.

INSTALLING THE CYLINDER HOSES

1. Install a $\frac{1}{2}" \times 16"$ hose (2), Figure 14, into the elbow (6), in the pump outlet port and to the hydraulic line (3).
2. Install one $\frac{3}{8}"$ street ell in each bucket cylinder cap end as shown at (3), and (5), Figure 15.
3. Install four $\frac{3}{8}" \times 25"$ hoses (2), Figure 15, into the cylinder ports (1), and to the proper hydraulic line as shown.

ASSEMBLY

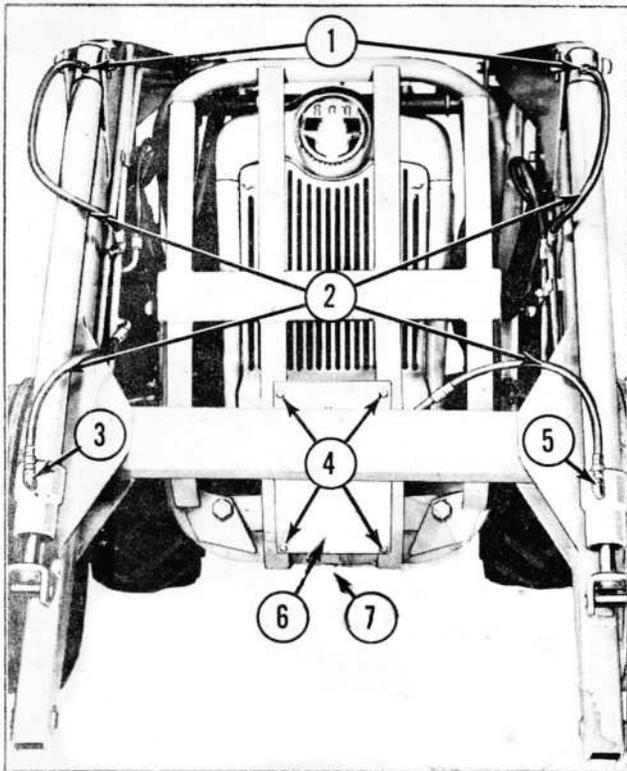


Figure 15
Hose and Protection Plate Installation

INSTALLING THE CONTROL VALVE HOSES

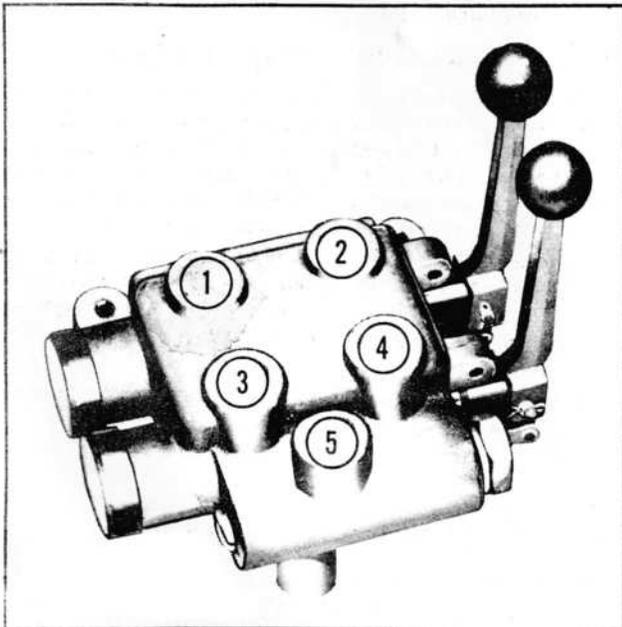


Figure 16
Model 19-97 Control Valve

Model 19-97 (double acting lift cylinder):

1. Install one $\frac{1}{2}$ " x 16" hose in port (5), Figure 16, and to the pump to valve line.
 2. To obtain valve action to raise the lift arms when the left hand valve lever is pulled back, install one $\frac{1}{2}$ " x 25" hose in port (4), Figure 16, to line leading to the cap end of the lift cylinder. Install a $\frac{1}{2}$ " x 25" hose in port (3), to the hydraulic line leading to the barrel end of the lift cylinder.
 3. To dump the bucket when pushing the right hand lever forward, install one $\frac{1}{2}$ " x 25" hose in port (2), Figure 16, to the hydraulic line leading to the barrel end of the bucket cylinder. Install a $\frac{1}{2}$ " x 25" hose in port (1) to the hydraulic line leading to the cap end of the bucket cylinder.
- NOTE: To reverse the valve action, reverse ports (1) and (2), and ports (3) and (4).

Model 19-105 (single acting lift cylinder):

1. Install one $\frac{1}{2}$ " x 16" hose in port (4), Figure 17, and to the pump to valve line.
 2. To obtain valve action to raise lift arms when left hand lever is pulled back, install one $\frac{1}{2}$ " x 25" hose in port (3), Figure 17, and to the hydraulic line leading to the barrel end of the lift cylinder.
- NOTE: As the lift cylinder on the 19-105 is single acting, no other action is possible.
3. To dump the bucket when the right hand lever is pushed forward install one $\frac{1}{2}$ " x 25" hose in port (2), Figure 17, and to the hydraulic line leading to the barrel end of the bucket cylinder. Install a $\frac{1}{2}$ " x 25" hose in port (1), to the hydraulic line leading to the cap end of the bucket cylinder.

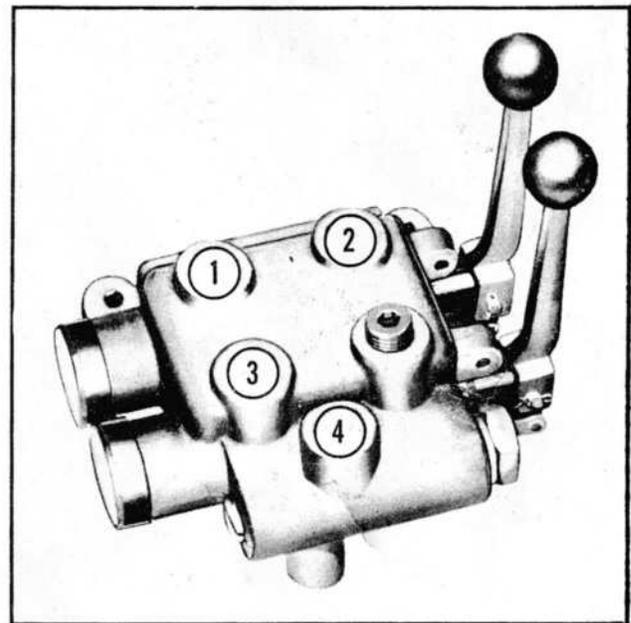


Figure 17
Model 19-105 Control Valve

ASSEMBLY

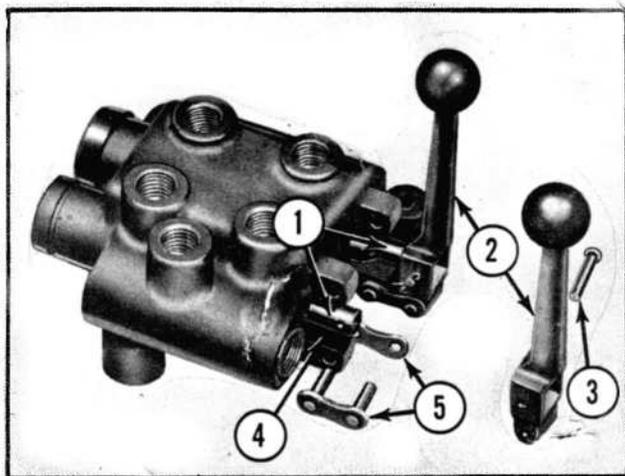


Figure 18
Control Valve Handle Installation

NOTE: Bucket action may be reversed by reversing ports (1) and (2).

VALVE LEVER INSTALLATION

1. Make certain the valve spools (1), Figure 18, are free of paint or burrs that would destroy the U-cup seals in the valve body.
2. Position the handles (2) Figure 18, over the

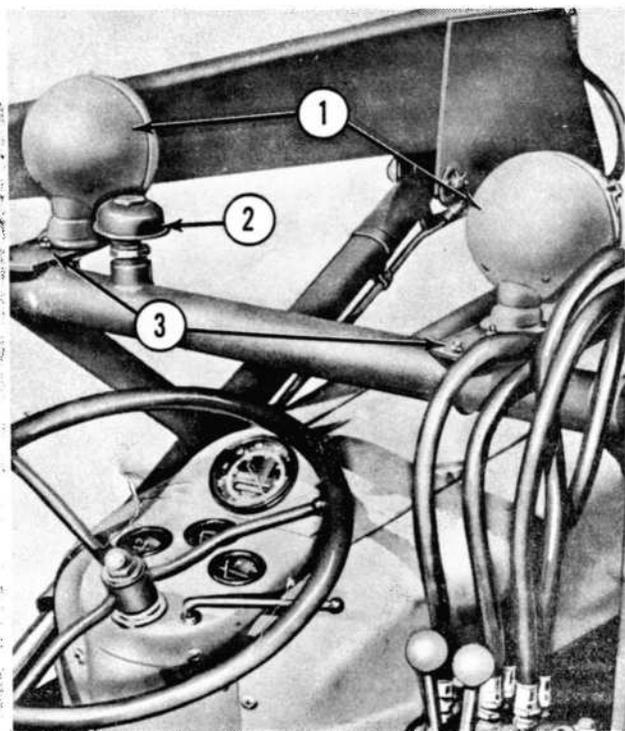


Figure 19
Headlights Installed on the Loader

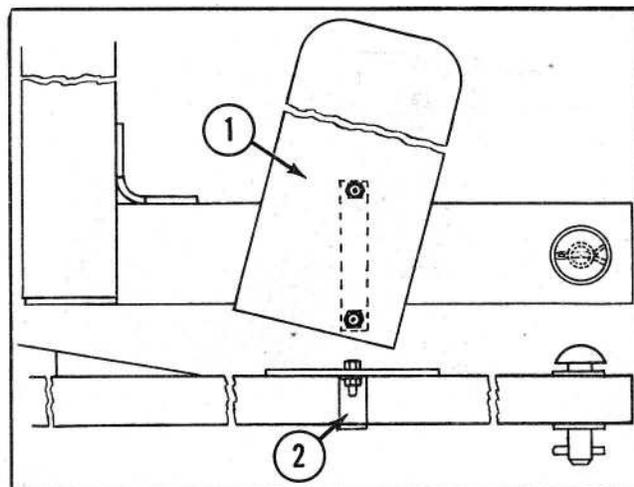


Figure 20
Guard Plate Installed

- spools (1), and secure with $\frac{1}{4}$ " x $1\frac{15}{64}$ " clevis pins (3), and $\frac{1}{16}$ " x $1\frac{1}{2}$ " cotter pins.
3. Secure the ends of the handles to the valve body (4), with the $\frac{1}{2}$ " link assemblies (5).

HEADLIGHT INSTALLATION

1. Attach the headlight plates (3), Figure 19, to the frame crossmember, using the U-bolts, $\frac{3}{8}$ "-16 nuts, and lockwashers.
2. Install the headlights and flanges (1), Figure 19, on the headlight plates (3), with nuts and lockwashers.
3. Relocate the tractor headlight wires and attach to the headlights.

GUARD PLATE INSTALLATION

The guard plates are designed to protect the operators feet from contact with the tractor tires. The design of the plate permits lateral adjustment to meet the needs of the individual. The guard plate is located on the outside of the rear frame member as shown in Figure 20. Install the guard plates as follows:

1. Position one clamp on the inside of each rear frame member as shown in (2), Figure 20.
2. Attach the guard plate (1), to the clamp with two $\frac{5}{16}$ " x $\frac{3}{4}$ " hex head bolts, lockwashers and install two hex nuts loosely.
3. Adjust as necessary to afford operator maximum protection. Secure the bolts.

FLUSHING THE RESERVOIR

The loader oil reservoir, tubing, and cylinders were cleaned in production processing at the factory; however, damaging foreign material can be loosened in shipment and immediately drawn into the pump if the loader hydraulic system is not thoroughly flushed

ASSEMBLY

before the loader is operated. The loader should be flushed with hydraulic loader oil (Ford specification M-4864-D).

NOTE: To thoroughly flush the loader hydraulic system will require the use of approximately 10 gallons of hydraulic oil. The oil used for flushing may be subsequently used in the loader if filtered through a funnel with cylindrical sides 3" deep and a minimum of 10" in diameter fitted with a piece of 100-mesh wire screen of the same diameter. This will provide adequate flow at wide open throttle.

1. Make sure the frame drain plug, located at the center rear of the frame sump member, (7), Figure 15, and the reservoir level pipe cap, (1), Figure 5, are installed. Remove the shipping tape from the crosspipe filler plug, (2), Figure 19.
2. Install one end of a three foot length of 1 1/4" diameter, braid reinforced hose to the pump intake pipe nipple, (12), Figure 11. Install a return hose two feet long and the same diameter to the curved frame intake pipe, (7), Figure 14.
3. Place the open end of the three foot length of hose into a five gallon (or larger) container of hydraulic oil (Ford specification M-4864-D). Place the two foot length of hose into a 10" diameter funnel containing a 100-mesh wire screen of the same diameter. Place the funnel spout into the flushing container.
4. Start the tractor engine at idle speed and increase the engine speed gradually to 1200 RPM. Operate the lift cylinders and bucket cylinders for a period of five minutes. This will bleed the cylinders of air as well as flush them.
5. Increase the tractor engine speed to wide open throttle and flush the loader frame oil reservoir for twenty minutes.

NOTE: It will be necessary to add another five gallons of oil to produce the most effective flow for flushing the complete frame and to maintain an adequate reserve in the flushing container.

6. After flushing the frame for twenty minutes, stop the tractor engine and permit oil to return to the container. Remove flushing hoses and install the intake hose, (4), Figure 14, with the hose clamps, (5).
7. Install the bumper plate, (6), Figure 15, with four 5/16" x 3/4" bolts, lock washers and nuts (4).

INSTALLING THE BUCKET OR FORK

1. Attach the bucket or fork to the loader lift arms by using the 1" x 4 1/2" straight pins (6), Figure 21.
2. Secure the straight pins with two 5/16" x 1 7/8" hex head bolts (2), lockwashers and nuts.
3. Attach the loader bucket cylinders to the bucket or fork with the 1" x 4 1/2" straight pins (1).
4. Secure the straight pins with the 5/16" x 1 7/8" hex bolts (3), lockwashers and nuts.

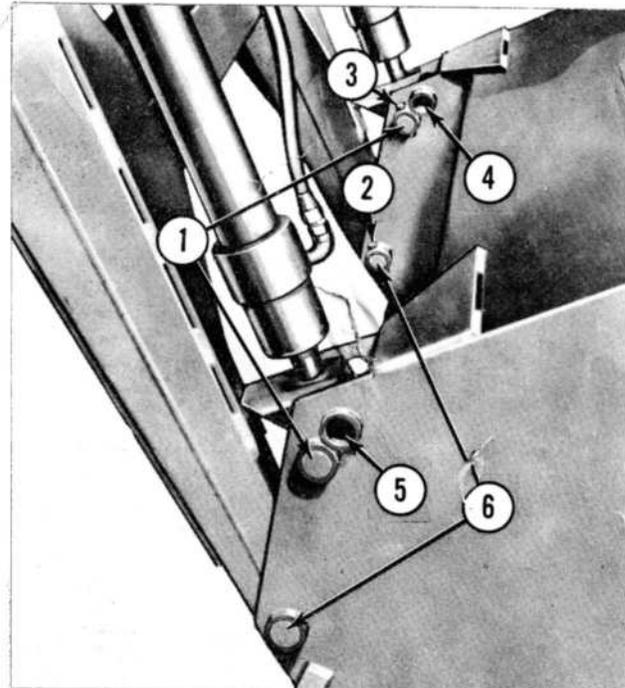


Figure 21

Attaching the Bucket or Fork

FILLING THE OIL RESERVOIR

The hydraulic oil reservoir capacity of the Ford Industrial Loader is approximately (6) six gallons. The cylinders and frame sump after flushing will contain approximately (2) two gallons of oil. Ford Loader Oil, specification M-4864-D, (sold separately) is recommended for best performance. For cold weather operation, (below -10° F) dilute the hydraulic oil with kerosene, as required, up to 50 per cent by volume to maintain normal operating characteristics. Fill reservoir as follows:

1. Remove the reservoir filler plug, (2), Figure 19, from the frame cross pipe and the oil level pipe cap, (1), Figure 5. Fill the reservoir with the same oil used for flushing until the level is up in the level pipe and re-install cap.
2. Submerge the breather cap (2), Figure 19, in hydraulic oil to completely saturate the element, and install in the filler opening.
3. Operate the loader for approximately five minutes at 1500 RPM with bucket installed to properly bleed all air from the hydraulic system.

IMPORTANT: After the loader has been operated for approximately 25 hours, it is recommended that flushing procedure be repeated. This will clean out any particles of foreign material which may have loosened during the initial operation. After 500 hours or one year of operation, (whichever occurs first) the loader oil reservoir should be drained, the system flushed and filled with new Ford Loader Oil, Ford specification M-4864-D.

MODEL 8N TRACTOR

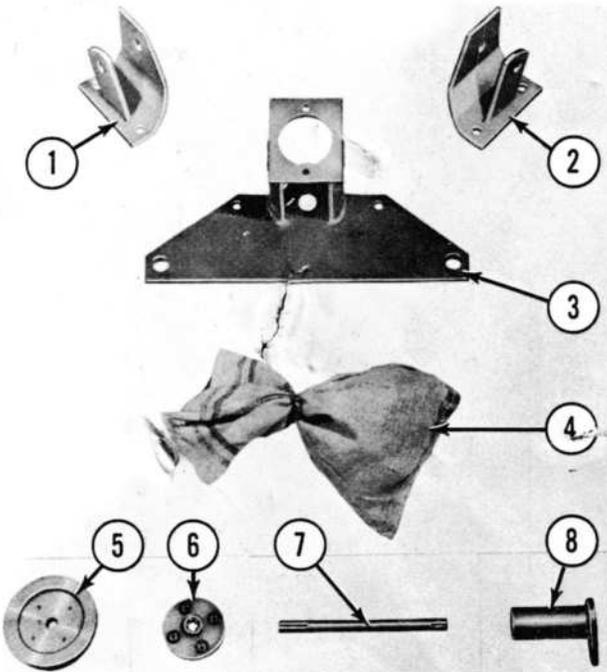


Figure 22
Model 19-115 Attaching Kit

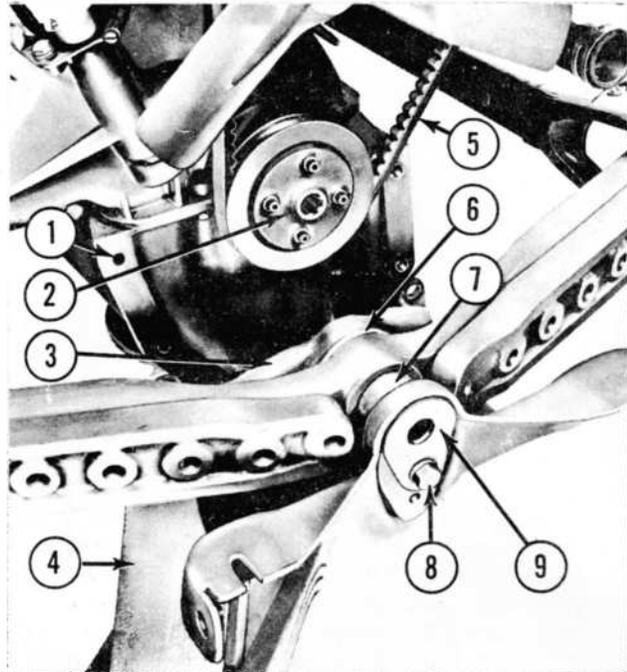


Figure 23
Adaptor Sheave Installed on Tractor

The Attaching Kit, Model 19-115 for attaching the 19-97 and 19-105 Industrial Loaders to a Model 8N tractor is shipped as Bundle No. 19-115 and is shown in Figure 22. The contents are listed below.

Item No.	Description	No. Required
1	Rear Mounting Bracket, R.H.	1
2	Rear Mounting Bracket, L.H.	1
3	Front Suspension Assembly	1
4	Bag of Hardware	1
5	Sheave	1
6	Hub Assembly	1
7	Drive Shaft	1
8	Axle Pin Assembly (NAA-3126-B) ..	1

PREPARING THE TRACTOR

Prepare the 8N tractor for installation of the Ford Industrial Loader in the following manner:

1. Remove the tractor hood, side panels, radiator grille and radiator from the tractor. See the Tractor Owner's Manual for this procedure.
2. Place a jack (4), Figure 23, under the engine crankcase so the head of the jack is about 4" behind the front of the crankcase. Raise the jack until it touches the crankcase.

3. Remove the six bolts which hold the front end of the crankcase (1), Figure 23, to the tractor front axle support (3), and then jack up the engine. The axle assembly and wheels may raise somewhat as the engine is jacked up. As this happens, push the axle assembly down until the wheels rest on the floor.
 4. Remove the fan belt (5), Figure 23.
 5. Remove the fan belt pulley.
- NOTE: On tractors prior to Serial No. 8N 263844, it is necessary to remove the distributor cap in order to remove the fan belt pulley. The crankshaft ratchet nut which holds the pulley to the tractor crankshaft has a right hand thread.
6. Install the new adaptor sheave (2), Figure 24, on the end of the tractor crankshaft. Be sure the

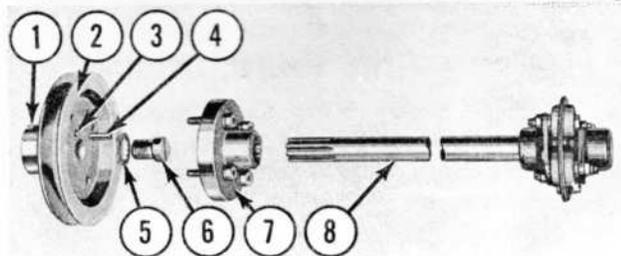


Figure 24
Hydraulic Pump Drive

MODEL 8N TRACTOR

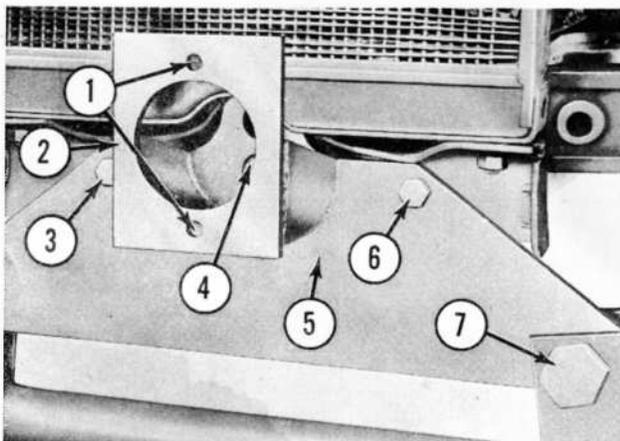


Figure 25

Front Mounting Plate Installed

keyway (1), in the sheave (2), fits over the key on the crankshaft. Then drill a $\frac{1}{4}$ " hole $\frac{7}{8}$ " deep into the pulley and tractor crankshaft through the pilot hole (3). Clean out the hole and insert the $\frac{1}{4}$ " x $\frac{3}{4}$ " straight pin (4). Fit the $\frac{5}{8}$ " internal tooth lockwasher (5) on the sheave retaining roundhead slotted screw (6) and turn the sheave retaining drive hub (7), Figure 24, on the sheave as shown at (2), Figure 23, and secure it in place with the four Allen head screws and lockwashers provided.

7. Replace the fan belt and adjust it for proper tension.
8. Remove the hex head bolt (8), Figure 23, and raise or lower the jack slightly until the axle pin (9), can be easily removed from the tractor. Remove the washers (6) and spacer (7) as the pin (9) is pulled out.
9. Insert the new axle pin through the axle, repositioning the washers (6), Figure 23, and the spacer (7), on the pin as it is installed.
10. Lower the jack to align the holes and re-attach the crankcase to the front axle support assembly with the original six bolts.
11. Position the front mounting plate (5), Figure 25, on the axle support assembly as shown and secure with one $\frac{5}{8}$ " x $1\frac{1}{2}$ " hex head bolt (4), and lockwasher.
12. Using the mounting plate as a template, drill two $\frac{1}{2}$ " holes in the axle support at (3) and (6), Figure 25, and secure the mounting plate to the tractor with two $\frac{1}{2}$ " x $1\frac{3}{8}$ " hex head bolts (3) and (6), flat washers and hex nuts.
13. Follow steps 10, 11, 12 and 13, page 13, of this manual with the following exceptions:

To install the pump on the mounting plate use the holes shown at (1), Figure 25.

14. Reinstall the tractor radiator and remount the hood and side panels.

NOTE: Trim metal from the side panels to accommodate the front mounting plate.

15. Install the rear mounting brackets as follows:

- a. Remove the hex nuts (3), Figure 26, and lockwashers from each of the four fender bolts (1).
- b. Attach one rear mounting bracket (2), Figure 26, to each side of the tractor using the four fender bolts (1), lockwashers and hex nuts (3). Do not tighten nuts.

1. Secure the rear of the loader frame to the rear mounting brackets, see (2), Figure 26, with two $1" \times 4\frac{1}{4}"$ round head pins through the loader frame and mounting brackets, see (4), and two $\frac{1}{4}" \times 2"$ cotter pins. Secure bracket bolts.

2. Secure the front of the loader to each side of the tractor mounting plate, as shown at (7), Figure 25, with two $1" \times 4\frac{1}{4}"$ hex head bolts and $1"-8$ hex locknuts.

3. Continue the installation of the Ford Industrial Loader with the section "Installing the Cylinder Hoses," on page 14, of this manual.

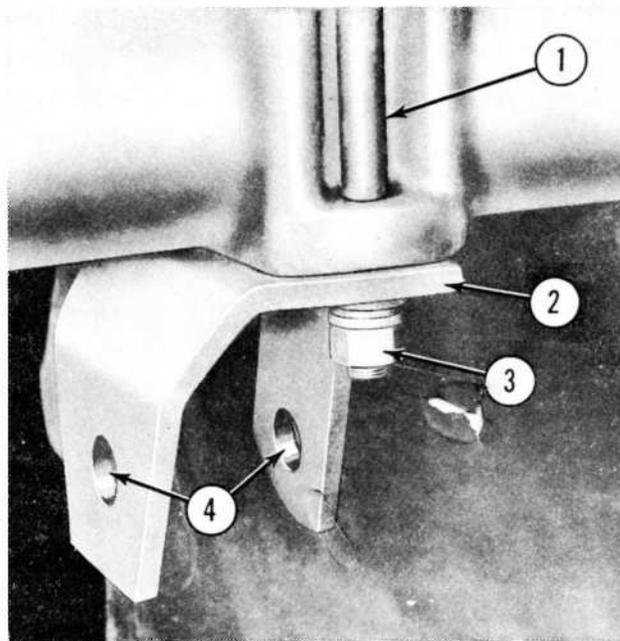


Figure 26

Rear Mounting Bracket Installed

PRE-DELIVERY

Ford Industrial Loader Pre-Delivery Check List

Owner's Name _____

Address _____

Loader Model _____ Serial No. _____

AFTER IMPLEMENT ASSEMBLY

- Loader lubricated thoroughly as outlined in lubrication section.
- All bolts checked for tightness.
- Frame drain plug secure.
- All pins and cotter pins in place.
- Radiator grille reinstalled.
- Paint, masking, and other foreign material cleared from valve spools and cylinder rods.
- Hydraulic system flushed as directed.
- Hydraulic fluid checked for proper level.
- Hydraulic system bled free of air.
- Hydraulic lines and/or hoses checked for leaking joints.
- Valve assembly tight to manifold plate.
- Valve relief pressure set properly.
- Hydraulic pump properly aligned as outlined in assembly section.
- Bucket dumps and returns properly.
- Lift arms raise and lower freely.
- Loader cleaned and touch-up enamel used where necessary.
- Breather cap filter lubricated.

AT TIME OF DELIVERY

- Operation and adjustments of loader explained to owner as outlined in this manual.
- All lubrication fittings pointed out to owner.
- Safety rules and precautions explained to owner.
- Procedures for mounting and dismounting loader on tractor explained to owner.

DATE _____

DEALER'S SIGNATURE _____