



# FUEL INJECTION PUMP

(ROOSA MASTER DM Series)

**service manual  
and  
parts catalog**

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## SAFETY RULES

Always before leaving the operator's seat and after making certain all people are clear of the machine, slowly lower the attachments or tools flat to the ground in a positive ground support position. Move any multi purpose tool to positive closed position. Return the controls to hold. Place transmission control in neutral and move engine controls to off position. Engage all control locks, set parking brake, and open and lock the master (key, if so equipped) switch. Consult Operation and Maintenance Instruction Manual.

Always follow the shut down instructions as outlined in the Operation and Maintenance Instruction Manual.

### MAINTENANCE

Do not perform any work on equipment that is not authorized. Follow the Maintenance or Service Manual procedures.

Machine should not be serviced with anyone in the operator's seat unless they are qualified to operate the machine and are assisting in the servicing.

Shut off engine and disengage the Power Take Off lever if so equipped before attempting adjustments or service.

Always turn the master switch (key switch if so equipped) to the *OFF* position before cleaning, repairing, or servicing and when parking machine to forestall unintended or unauthorized starting.

Disconnect batteries and *TAG* all controls according to local or national requirements to warn that work is in progress. Block the machine and all attachments that must be raised per local or national requirements.

Never lubricate, service or adjust a machine with the engine running, except as called for in the Operation and Maintenance Instruction Manual. Do not wear loose clothing or jewelry near moving parts.

Do not run engine when refueling and use care if engine is hot due to the increased possibility of a fire if fuel is spilled.

Do not smoke or permit any open flame or spark near when refueling, or handling highly flammable materials.

Always place the fuel nozzle against the side of the filler opening before starting and during fuel flow. To reduce the chance of a static electricity spark, keep contact until after fuel flow is shut off.

Do not adjust engine fuel pump when the machine is in motion.

Never attempt to check or adjust fan belts when engine is running.

When making equipment checks that require running of the engine, have an operator in the operator's seat at all times with the mechanic in sight. Place the transmission in neutral and set the brakes and lock. **KEEP HANDS AND CLOTHING AWAY FROM MOVING PARTS.**

Avoid running engine with open unprotected air inlets. If such running is unavoidable for service reasons, place protective screens over all inlet openings before servicing engine.

Do not place head, body, limbs, feet, fingers, or hands near rotating fan or belts. Be especially alert around a pusher fan.

Keep head, body, limbs, feet, fingers, or hands away from bucket, blade or ripper when in raised position.

If movement of an attachment by means of machine's hydraulic system or winches is required for service or maintenance, do not raise or lower attachments from any position other than when seated in the operator's seat. Before starting machine or moving attachments or tools, set brakes, sound horn and call for an all clear. Raise attachments slowly.

Never place head, body, limbs, feet, fingers, or hands into an exposed portion between uncontrolled or unguarded scissor points of machine without first providing secure blocking.

Never align holes with fingers or hands - Use the proper aligning tool.

Disconnect batteries before working on electrical system or repair work of any kind.

Check for fuel or battery electrolyte leaks before starting service or maintenance work. Eliminate leaks before proceeding.

**BATTERY GAS IS HIGHLY FLAMMABLE.** Leave battery box open to improve ventilation when charging batteries. Never check charge by placing metal objects across the posts. Keep sparks or open flame away from batteries. Do not smoke near battery to guard against the possibility of an accidental explosion.

Do not charge batteries in a closed area. Provide proper ventilation to guard against an accidental explosion from an accumulation of explosive gases given off in the charging process.

Be sure to connect the booster cables to the proper terminals (+ to +) and (- to -) at both ends. Avoid shorting clamps. Follow the Operation and Maintenance Instruction Manual procedure.

Due to the presence of flammable fluid, never check or fill fuel tanks, storage batteries or use starter fluid near lighted smoking materials or open flame or sparks.

Rust inhibitors are volatile and flammable. Prepare parts in well ventilated place. Keep open flame away - **DO NOT SMOKE.** Store containers in a cool well ventilated place secured against unauthorized personnel.

Do not use an open flame as a light source to look for leaks or for inspection anywhere on the machine.

**DO NOT** pile oily or greasy rags - they are a fire hazard. Store in a closed metal container.

## Construction and Operation

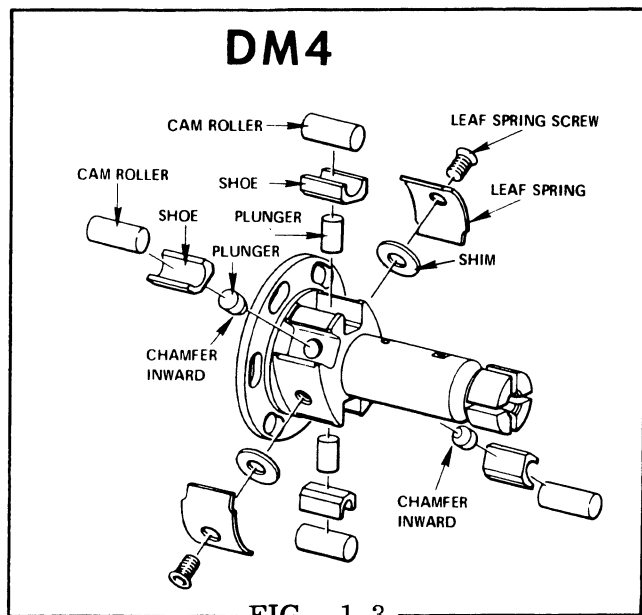


FIG. 1.3

Fuel under transfer pump pressure flows past the rotor retainers (4) into an annulus on the rotor. It then flows through a connecting passage (5) in the head to the advance (6) and also to the charging circuit (7). The fuel flows around the annulus (8) through a connecting passage to the metering valve (9). The radial position of the metering valve, controlled by the governor, regulates the flow of fuel into the charging annulus (10) which incorporates the charging ports.

As the rotor revolves, the two inlet passages (11) register with the charging ports in the hydraulic head, allowing fuel to flow into the pumping chamber. With further rotation, the inlet passages move out of registry and the discharge port of the rotor registers with one of the head outlets. While the discharge port is opened, the rollers (12) contact the cam lobes forcing the plungers together. Fuel trapped between the plungers is then pressurized and delivered by the nozzle to the combustion chamber.

With the exception of the drive shaft bearing, self-lubrication of the pump is an inherent feature of the Roosa Master design. As fuel at transfer pump pressure reaches the charging ports, slots on the rotor shank allow fuel and any entrapped air to flow into pump housing cavity.

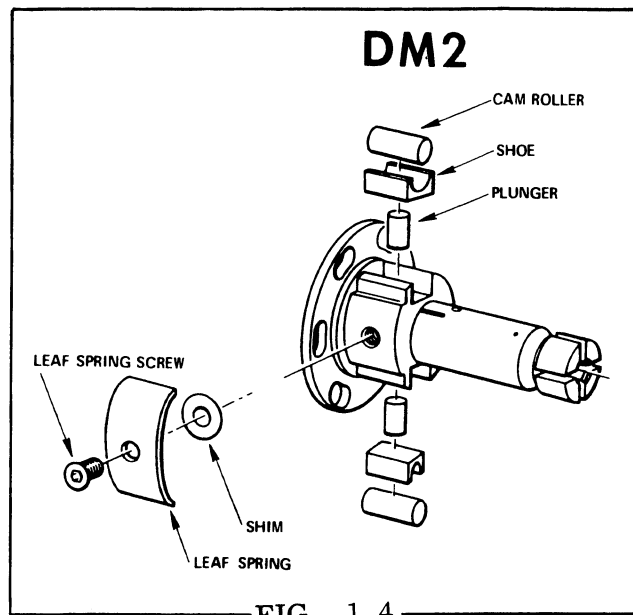


FIG. 1.4

In addition, an air vent passage (13) in the hydraulic head connects the outlet side of the transfer pump with the pump housing. This allows air and some fuel to be bled back to the fuel tank via the return line. The fuel thus by-passed fills the housing and lubricates the internal components.

### C. TRANSFER PUMP

The positive displacement vane type fuel transfer pump consists of a stationary liner and spring loaded blades which are carried in slots in the rotor. Since the inside diameter of the liner is eccentric to the rotor axis, rotation causes the blades to move in the rotor slots. This blade movement changes the volume between the blade segments.

Transfer pump output volume and pressure increase as pump speed increases. Since displacement of the transfer pump exceeds injection requirements, some of the fuel is recirculated by means of the transfer pump regulator to the inlet side of the transfer pump.

Figure 1.5 illustrates the pumping principle. Blade movement causes a volume increase in the quadrant between blade 1 and 2 (Fig. 1.5a). At this time, the quadrant is in

## TOPIC 3 DISASSEMBLY

### ⚠ DANGER

Extinguish all smoking materials and open flames before working around diesel fuel.

### ⚠ WARNING

- ⚠ Never use gasoline, solvent or other flammable fluids to clean parts.
- ⚠ Wear safety glasses with side shields or goggles when using compressed air for cleaning to reduce the danger of personal injury from flying particles. Limit the pressure to 30 psi (2.1 kg/cm<sup>2</sup>) according to OSHA requirements.

Study the Manual first. Before commencing the disassembly of the pump, cover inlet and outlet holes, remove all external grease and dirt by washing the unit with non-flammable, non-toxic commercial solvent and blowing it off with filtered, compressed air. It must be constantly kept in mind that dirt, dust, and foreign matter are the greatest enemies of the fuel injection pump. As an added precaution to prevent dirt from entering the fuel system while servicing the pump, it is essential that a clean work space, clean tools, and clean hands be used.

**NOTE:** All seals and gaskets should be discarded during disassembly.

A clean pan should be available in which the parts may be placed upon disassembly, and a pan of clean fuel oil must be available in which the parts may be flushed. It is recommended that these be deep drawn pans which rounded corners to lessen the chances of dirt pockets.

It is necessary for assembly to lubricate parts with clean diesel fuel. Make sure that all smoking materials are extinguished and no open flames and sparks are near. Place all parts prior to assembly in a closed container of clean diesel fuel for lubrication.

**STEP 1** Remove the pump flange seal from the housing (Fig. 3.1).

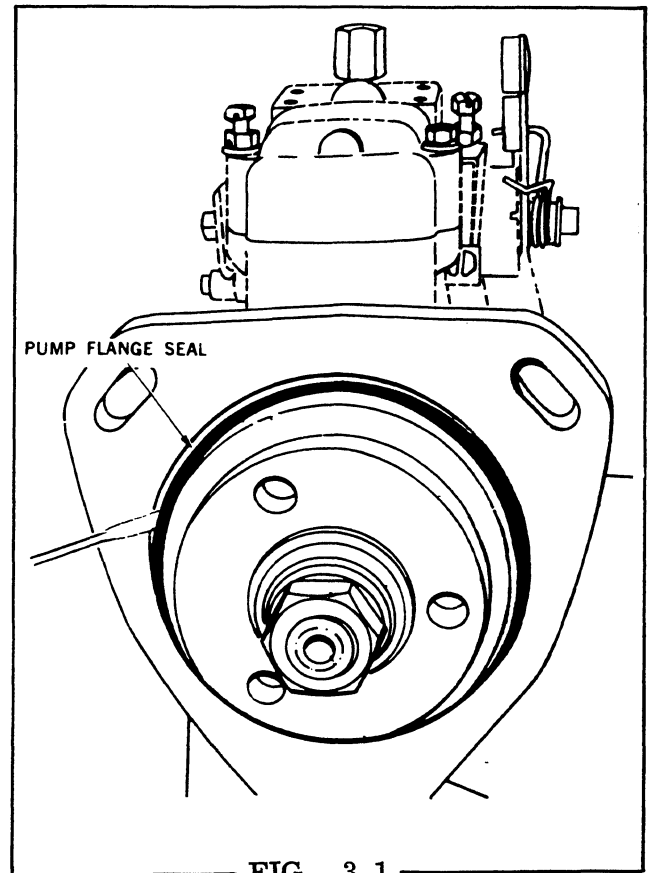


FIG. 3.1

**STEP 2** Mount the pump in holding Fixture No. 19965. Never clamp the pump in a vise, always use a fixture. Remove all lead plumb seal wires. Unscrew the three cover hold-down screws (Fig. 3.2a). Remove the governor control cover and cover gasket (Fig. 3.2b).

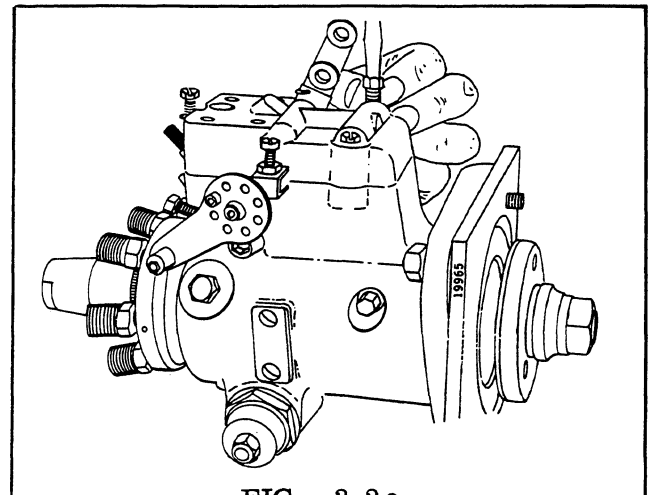


FIG. 3.2a

Study SAFETY RULES, pages I thru III, thoroughly for the protection of personal and machine safety.

## Disassembly

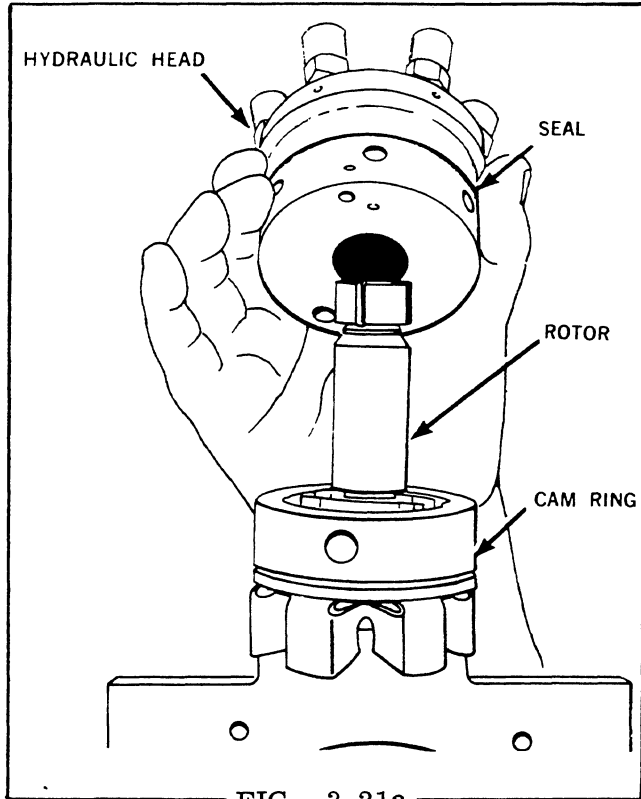


FIG. 3.21a

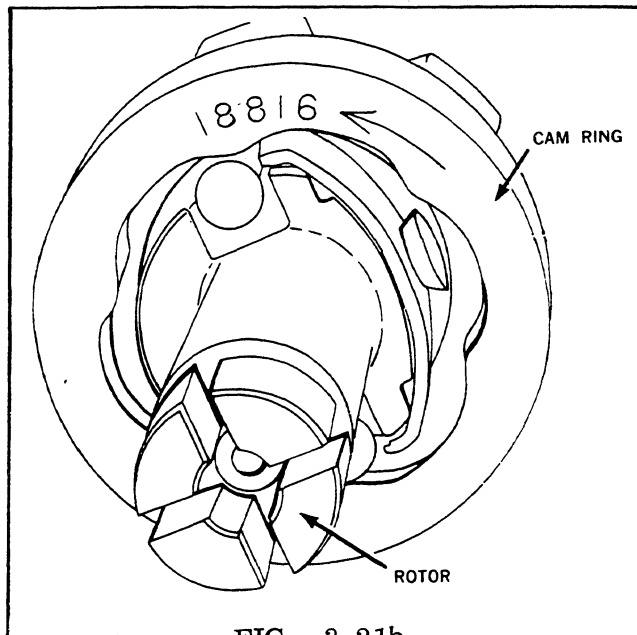


FIG. 3.21b

**STEP 21** Lift the head from the rotor (Fig. 3.21a). Lift the cam ring from the rotor (Fig. 3.21b).

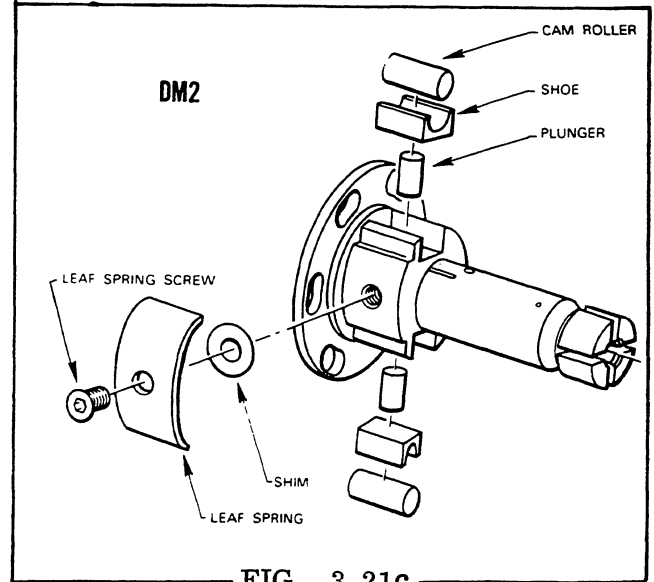


FIG. 3.21c

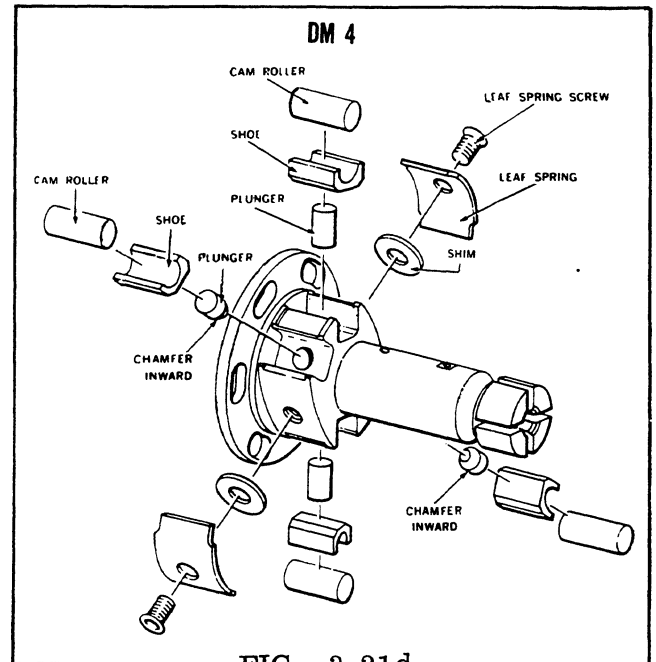


FIG. 3.21d

Check and record roller-to-roller dimension as instructed on page 5-6, Step 7, DM2 or DM4. Compare this dimension with that called for on the pump specification. Remove roller shoes and plungers (Fig. 3.21c and 3.21d). Use brass Tool No. 13301 to push pumping plungers from their bore. Handle all parts carefully with clean hands wet with fuel oil or calibrating oil. Avoid handling the precision ground surface of the rotor. Use a 5/32" hex key wrench to loosen and remove the leaf spring adjusting screw(s), leaf spring(s) and shims (if used) from the rotor.

## Reassembly

the bearing shoulder ring is flush with the bearing (Fig. 5.2b).

Press the drive shaft roll pin into the drive shaft pin hole until pin bottoms (Fig. 5.2c).

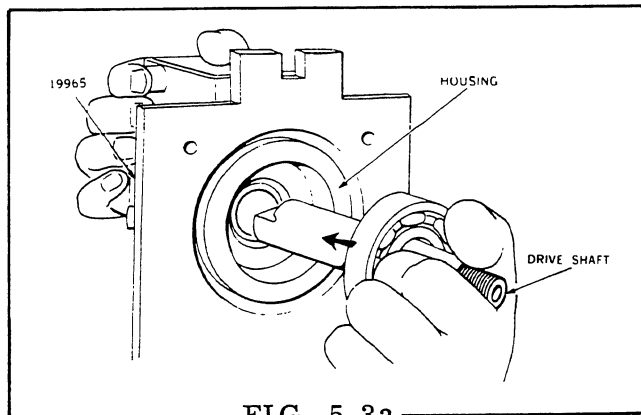


FIG. 5.3a

**STEP 3** Mount the pump housing in holding Fixture No. 19965. Never clamp the pump into a vise, always use a fixture. Lubricate the O.D. of the drive shaft bearing with mineral oil and install the drive shaft assembly into the housing (Fig. 5.3a). Do not force bearing into the housing bore.

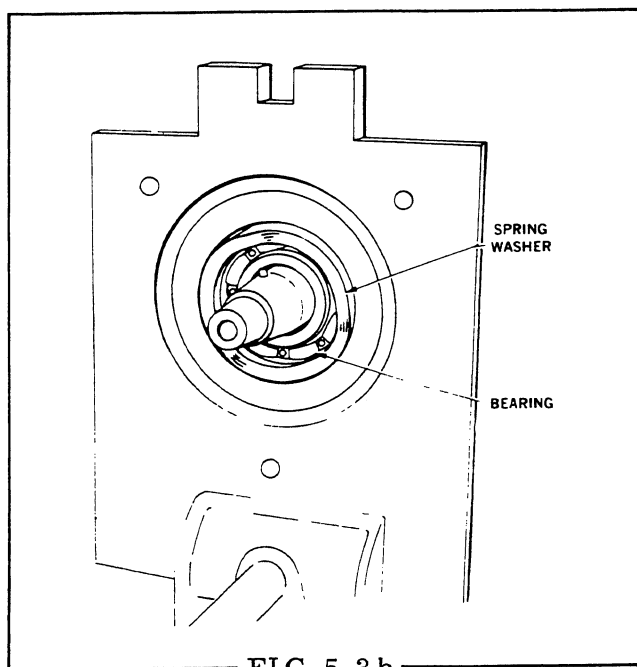


FIG. 5.3b

Place the drive shaft spring washer against the bearing (Fig. 5.3b).

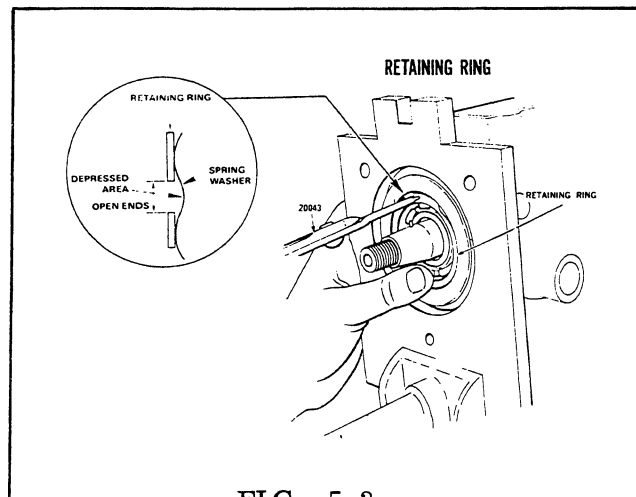


FIG. 5.3c

Assemble the retaining ring to the housing so that the open ends are against the depressed area of the spring washer, using retaining ring pliers (No. 20043)(Fig. 5.3c).

**NOTE:** This retaining ring will take considerable compression force to insert in the housing. Use the recommended retaining ring pliers (No. 20043) and be extremely careful not to let the retaining ring slip off the pliers when installing.

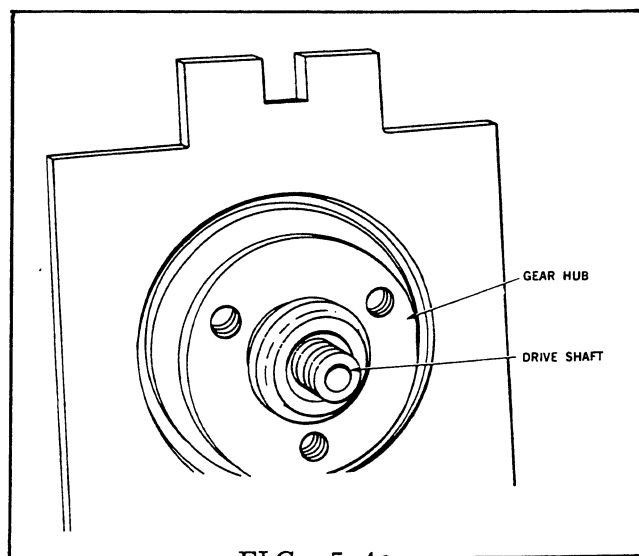


FIG. 5.4a

**STEP 4** Assemble the gear hub to the drive shaft, with the notched portion of the gear hub in line with the drive shaft roll pin (Fig. 5.4a).

## Reassembly

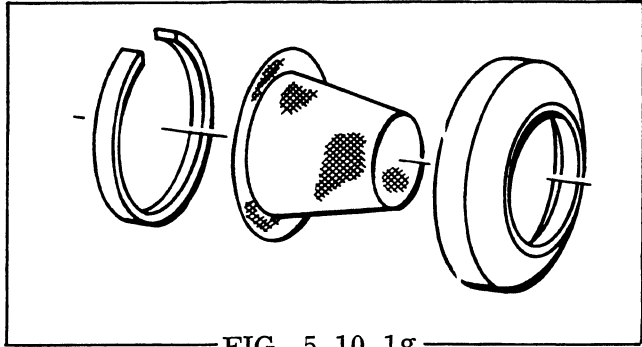


FIG. 5.10.1g

the regulator assembly "C" or "CC" is stamped for clockwise or counterclockwise pump rotation.

Assemble the filter screen to the pressure plate and install the screen retaining ring (Fig. 5.10.1g).

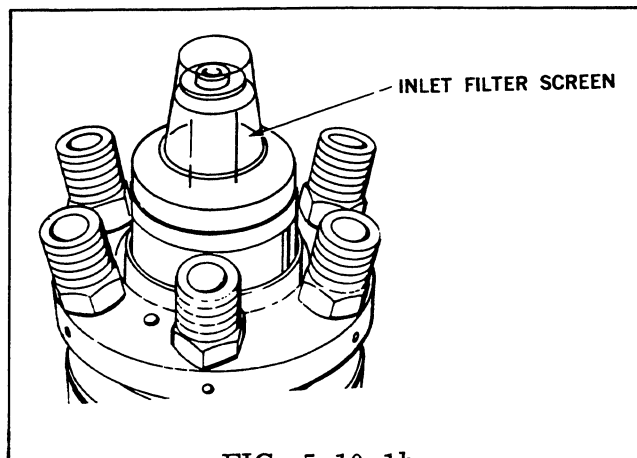


FIG. 5.10.1h

Coat the beveled surface of the pressure plate and the threads on the outside diameter of the end cap with Lubriplate #630AA or equivalent.

Install the assembled pressure plate and screen onto the transfer pump regulator assembly (Fig. 5.10.1h).

Install the transfer pump end cap and thread into the hydraulic head by applying a slight pressure on top of the end cap. Rotate the cap counterclockwise until a slight "click" is heard, now turn the cap clockwise by hand until tight (Fig. 5.10.1i).

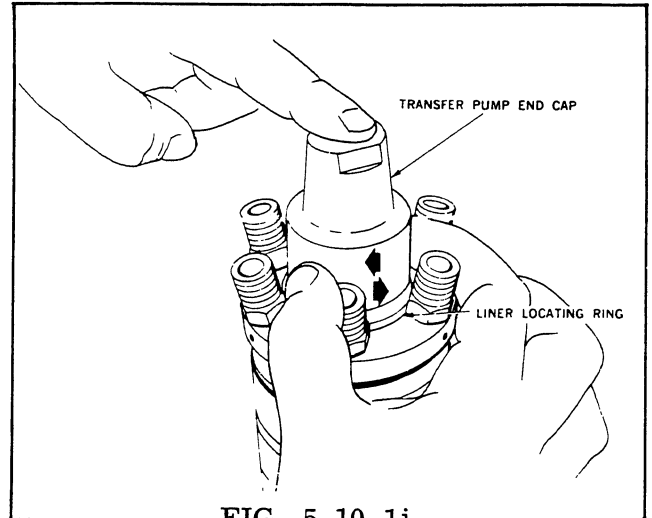


FIG. 5.10.1i

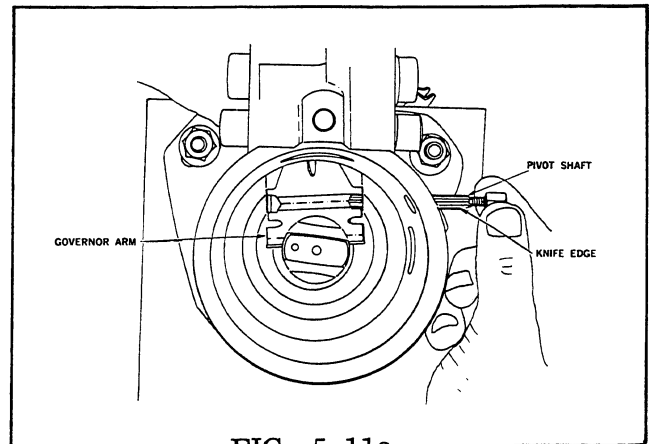


FIG. 5.11a

**STEP 11** Place the governor arm in position in the housing with the fork for the governor linkage hook assembly facing the rear of the pump. Insert the pivot shaft (knife edge facing the rear of the pump), in the arm slot (Fig. 5.11a).

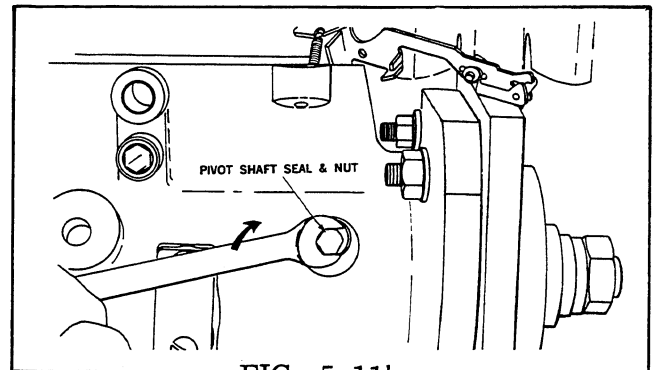


FIG. 5.11b

Assemble the pivot shaft seal and nut, and tighten both cap nuts successively to the specified torque (Fig. 5.11b).

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## Accessories

### REASSEMBLY AND ADJUSTMENT

Assemble the shut-off arm and spring to the coil. Before installation of the solenoid assembly to the cover is made, adjustment of the arm travel and spring tension should be carried out as indicated (Figs. 6.5 through 6.8) using tools 14067 and 14725. Check the linkage hook adjustment, with reference to Section 5, Step 20. Install new insulating tubes to both contact screws. Insert the assembly into the governor control cover as a unit. Replace the insulating washer and assemble the contact nuts (10-15 inch pounds). Mount the cover assembly, with new cover seal, to the pump and tighten securely.

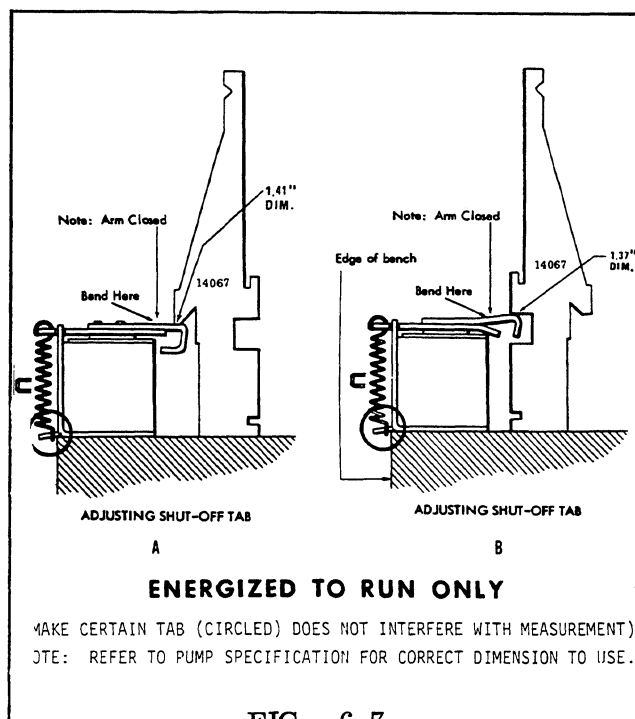


FIG. 6.7

### REASSEMBLY-MECHANICAL OVERRIDE

1. Screw guide into the rear of the governor cover, securing the washer and seal.
2. Push in the control rod and secure it from the inside with the snap ring.
3. During normal run conditions when the electric shut-off is in operating position, keep the rod extended to its full outward movement.

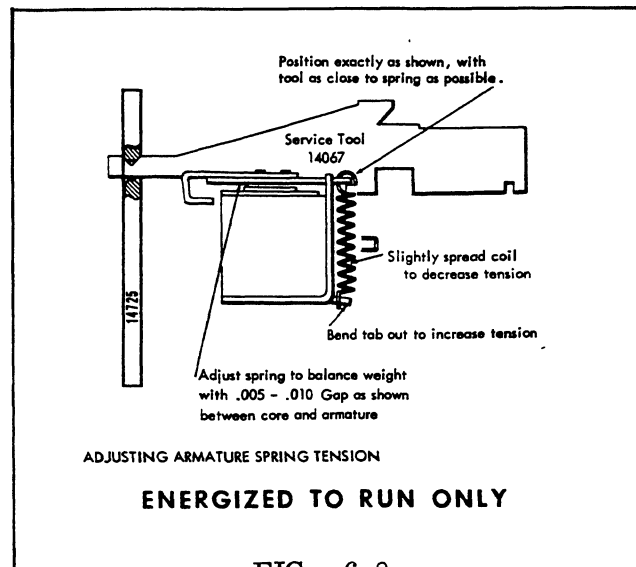


FIG. 6.8

### TESTING

With the pump mounted on the test bench, the electrical shut-off device must be checked with designated voltage rating (stamped on cover) and wide open throttle at the following speeds:

- A. 400 RPM
- B. Full Load governor speed
- C. High idle (shut-off only)

A good, heavy duty battery charger can be used as long as voltage can be selected and will hold with minimum drop (1/2 volt max.) during application to the solenoid coil.

Connect battery charger to the electrical shut-off device before applying power to charger. This will reduce the possibility of a spark at the pump.

Use of small, inexpensive trickle chargers is not recommended, since a voltage drop of 2-3 volts can be expected when current is applied to the coil. This can result in questionable operation and rejection of good coils under some conditions.

NOTE: Do not attempt to check solenoid operation with the cover removed from the pump. The governor linkage spring aids operation when the cover is assembled.

## TOPIC 8 TEST BENCH DATA

### A. BENCH COMPONENT AND TEST FLUID RECOMMENDATIONS

#### TEST BENCH HORSEPOWER

Because engine horsepower ratings, and injection pump fuel flows have substantially increased in the last few years, Fiat-Allis, today, recommends TEST BENCH CAPACITY BE A MINIMUM OF 7.5 kw (10 horse power). Although test benches of 5.6 kw (7.5 horse power) are usually acceptable, even these benches can be stalled out when testing the larger fuel pumps; it is important to note that even though the bench does not completely stall, erratic flows, questionable data and a decrease in bench life may be experienced.

For those Fiat-Allis dealers who do not have enough fuel injection pump overhaul business to warrant the expense of an adequate heavy duty test bench, it is recommended that they use the facilities of their local Rossa-Master service station for their Ross-Master pump repairs and adjustments.

**IMPORTANT:** To be certain your pump is calibrated using the most current data, we advise supplying the Roosa-Master Service Station with a copy of the appropriate data from this manual as well as the calibration procedures.

#### TEST BENCH SUPPLY LINES

Flexible, transparent hose is recommended; this will allow pump metering action surge pressures to dissipate; it will also allow fuel flow observation to determine when fuel is free of air bubbles.

#### TEST BENCH FILTERS

Primary filter size--maximum, 30 micron.

Final stage filter size--maximum, 5 micron.

#### CALIBRATION FLUID

The meaningful difference in calibrating fluids (as utilized for testing outlined in this manual) is basically viscosity. Note also that viscosity changes as the temperature of the fluid changes. Therefore, even though the various bench manufacturers may state their particular fluid viscosity and temperature requirements differently, the calibration testing data obtained (when using fluid of the following SAE recommendation at the specified pump test temperature recommendation) will be acceptable in all cases.

NOTE: The fluid recommend by the SAE is, SAE J-967d. A fluid meeting this specification has been developed by the Viscosity Oil Co. under specification:

Viscor Calibration Fluid #1467

"Viscor" may be purchased from:  
Viscosity Oil Co.  
3200 Western Avenue  
Chicago, Ill., 60608

Other acceptable fluids are:

Allis-Chalmers  
Part #4040036  
Roosa-Master "S.B. 201"  
Fiat "CFB"  
(Standardization Spec. #55787)  
-Not available in North America-

#### FLUID SPECIFICATIONS

The calibrating fluid shall be formulated from straight-run, low odor fuel stocks containing the additives as required to meet the fluid specifications: (See chart on next page).

#### CALIBRATING FLUID CHANGE PERIOD

Change calibrating fluid every 6 months, or 200 pump tests (whichever comes first) or at any time the fluid viscosity falls out of a viscosity range of 34 -- 38 SUS (2.4 -- 3.18 cSt kinematic viscosity) at 37°C (100°F).

#### TEST BENCH FLUID HEATER

The test bench calibration fluid heater must be capable of controlling the fluid temperature within 5° at a temperature range of 38° -- 49°C (100° -- 120°F); this accuracy will cover the range of test recommendations.

Roosa-Master and SAE recommend 43° -- 46°C (110° -- 115°F).

#### FLUID GRADUATES (ACCUMULATORS)

The graduation accuracy of the graduates (may be called accumulators or test measure tubes) should be within 1% of the full scale; the graduations should be 1% of full scale.

E. CALIBRATION DATA (Roosa-Master-DM)

F/A PUMP NO. Mfr. Pump No.	74321924 DM4631FB3129	74321973 DM4631AL3153	←←←← ←←←←	74322021 DM4631PF3256
TEST NOZZLE Nozzle Holder Pressure-bar (psi)	8S2C BKB50SD 172.4 (2500)	8S2C BKB50SD 172.4 (2500)	12SD12 ←←←← ←←←← ←←←←	8S2C BKB50SD 172.4 (2500)
ANEROID	(Refer to page 9-3 for Aneroid Adjustments)			
APPLICATION	Wh. Loader 745-C	Scrapers 262-B, 263-B	←←←← ←←←←	Wh. Loader 745-C
ENGINE High Idle rpm Low Idle rpm Full Load rpm Timing B.T.D.C.	11000 MK II 2350-2450 750-800 2200 14°Static	11000 MK II 2280-2340 600-700 2100 14°Static	685T ←←←← ←←←← ←←←← ←←←←	11000 MK II 2350-2450 750-800 2200 14°Static
ADJUSTMENTS Roller-Roller Dim. Timing Mark Angle Gov. Linkage Gap Gov. Regulation	50.241 ± .038mm (1.978 ± .0015") 348.50° 3.175 - 3.683mm (.125 - .145") 7-10%	49.911 ± .038mm (1.965 ± .0015") 350° 3.175 - 3.683mm (.125 - .145") 7-10%	49.96 ± .038 mm (1.967 ± .0015") ←←←← ←←←← ←←←←	50.241 ± .038mm (1.978 ± .0015") 348.50° 3.175-3683mm (.125-.145") 7-10%
TRANSFER PUMP Pressure-bar (psi) @ rpm(full throttle)	6.55 -6.895 (95-100) 915	5.86-6.205 (85-90) 1050	←←←← ←←←← ←←←←	5.86-6.205 (85-90) 915
FLOW CHECK (R-R) cc @ 500 Strokes @ rpm(full throttle) Max. Variation Between Cylinders	84-87 915 -	71-74 600 5	60-64 750	84-87 915 -
FLOW CHECK (Min.) cc @ 500 Strokes @ rpm(full throttle) @ Trans.Pump Press-bar (psi)	52.5 75 .6895 min. (10)	44 75 .5516 min. (8)	40 ←←←← ←←←← ←←←←	52.5 75 .6895 min. (10)
HIGH IDLE (Set) cc @ 500 Strokes @ rpm(full throttle) Max. Variation Between Cylinders	12-14 1212 -	22-28 1150 -	←←←← ←←←← -	12-14 1212 -
TORQUE SCREW (Set) cc @ 500 Strokes @ rpm(full throttle) Max. Variation Between Cylinders	73-77 915 -	60-62 1050 2.5	54-56 ←←←← 5	73-77 915 -
LOW IDLE (Set) cc @ 500 Strokes @ rpm	14-16 412	25-30 360	12-14 ←←←←	14-16 412
AUTO. SPEED ADV. Pump Engine @ rpm	1° 2° 200-400	10° 20° 750-700	11° 22° by 875	1° 2° 200-400
GOV. CUT-OFF(Check) cc @ 500 Strokes @ rpm(full throttle)	5 1237	5 max. 1225	10 max. ←←←←	5 1237

TROUBLE SHOOTING

PROBLEM

PROBLEM MAY OCCUR	CAUSE										CORRECTION
	Numbers in "Problem" Check Chart indicate order in which to check possible "Causes" of Problem.										
DURING OPERATION	PROBLEM										CORRECTION
	A. Fuel not reaching pump.	B. Fuel delivered from transfer pump but not to nozzles.	C. Fuel reaching nozzles but engine won't start.	D. Engine starts hesitates but engine	E. Engine starts hard.	F. Engine starts and stops.	G. Erratic engine operation - surging, misfiring, poor governor regulation.	H. Engine idles imperfectly, out of speed.	I. Engine does not develop full power.	J. Engine smokes black.	
Water in fuel.					2	5	1	23			Drain fuel system and pump housing, provide new fuel, prime system.
Return oil line or fittings restricted.				29	4	23	19	8			Remove line, blow clean with filtered air and reassemble. Replace if damaged.
Engine rotation wrong.	4										Check engine rotation. See engine manual.
Air intake restricted.				3			26	2			Check. See engine manual.
Wrong Governor spring.						17	27				Remove and replace with proper spring as in pump specifications.
Pump housing not full of fuel.					7	2					Operate engine for approximately 5 minutes until pump fills with fuel.
Low cetane fuel.			13	11		6	14	20	8		Provide fuel per engine specifications.
Fuel lines incorrect, leaking or connected to wrong cylinders.			6			1	28				Relocate fuel lines for correct engine firing sequence.
Tang Drive excessively worn.						22	19		5		Remove and install new head and rotor assembly and drive shaft as necessary.
Governor sleeve binding on drive shaft.						16					Remove, inspect for burrs, dirt, etc. Correct and reassemble.
Shut-off device interfering with Governor linkage.			8	15				2			Check and adjust governor linkage dimension.
Governor high-idle adjustment incorrect.								3			Adjust to pump specifications.
Torque Screw incorrectly adjusted.	5	9	23					22	11		Adjust to specification.
Throttle Arm travel not sufficient.			4					1			Check installation and adjust throttle linkage.
Rotor excessively worn.	12	16	27								Replace hydraulic head and rotor assembly.
Maximum fuel setting too high.								10			Reset to pump specifications.
Engine overheating.					5			3			Correct as in engine manual.
Exceeding rated load.								1			Reduce load on engine.
Engine cold.				30						1	Check thermostats or shutter controls, warm to operating temperature. See engine manual.
Lube oil pumping past valve guides or piston rings in engine.									6		Correct as in engine manual.
Excess lube oil in engine air cleaner.									2		Correct as in engine manual.

INJECTION PUMP PARTS (Continued)

ITEM	PART NO.	QTY.	DESCRIPTION
100	74059064	1	□ SEAL, piston ring
101	74061677	1	PISTON, advance
102	74061852	1	SLEEVE, governor thrust
103	74061148	1	WASHER, governor thrust sleeve
104	74061149	6	WEIGHT, governor
105	74061150	1	RETAINER ASSY., governor
106	74055970	1	SCREW, leaf spring
107	74055890	2	SPRING, leaf
108	74055969	1	SCREW, leaf spring
109	74369436	4	ROLLER, cam
110	74061157	4	SHOE, cam roller (-.508mm)(-.020")
	74061590	4	SHOE, cam roller (-.381mm)(-.015")
			} Use as required
112	74061156	6	□ CUSHION
113	74061155	3	RETAINER, cushion
114	74061154	6	□ RING, retaining "E" clip
116	74062211	1	VALVE, delivery
117	74061188	1	SPRING, delivery valve
118	74061161	1	STOP, delivery valve
119	74061160	1	SCREW, delivery valve
120	74062051	1	RING, cam
121	74369444	1	□ SEAL, hydraulic head
122	74061152	1	HEAD ASSY. (Includes rotor, plungers, 3 screws, 1 vent wire and item 125)
123	74061661	1	□ SEAL, transfer pump
124	74061663	2	RETAINER, rotor
125	74061195	6	CONNECTOR, fuel line
126	74061187	1	SCREW, locking plate
127	74061159	1	PLATE, locking
128	74061158	1	WASHER, locking plate
129	74061172	1	LINER, transfer pump
130	74059733	4	BLADE, transfer pump
131	74055958	2	SPRING, transfer pump blade
132	74061665	1	RING, inner locating
133	74061162	1	ROLL PIN
134	74061163	1	□ SEAL, regulating piston
135	74061174	1	REGULATOR ASSY., transfer pump
136	74061164	1	□ SEAL, inlet filter screen
137	74061165	1	PISTON, regulating
138	74061175	1	SPRING, regulating
139	74055960	1	PLUG ASSY., end plate adjustment
140	74061666	1	RING, screen retainer
141	74061662	1	SCREEN, inlet filter
142	74061664	1	PLATE, transfer pump pressure
143	74061660	1	CAP, transfer pump end
144	74053829	2	NUT, lock terminal contact
145	74060067	3	WASHER, terminal contact
146	74060058	1	WIRE ASSY., terminal ground
147	70912739	1	LOCKWASHER, terminal contact
148	74051383	2	WASHER, terminal insulating
149	74061205	1	LOCKWASHER, cover screw
150	74049437	2	NUT, terminal contact

(Continued)

## INJECTION PUMP PARTS

USAGE: 645-B Wheel Loader (Model 3500 MK II Engine)

ITEM	PART NO.	QTY.	DESCRIPTION
-	74036268	1	PUMP ASSY., injection (Includes items 1 thru 168)
1	70910345	1	NUT, hub retaining
2	74061132	1	WASHER, hub retaining
3	74061140	1	HUB, gear
4	70925995	1	RING, retaining
5	74061141	1	WASHER, drive shaft spring
6	74061142	1	BEARING, ball
7	74061135	1	PIN, spring, drive shaft
8	74061134	1	RING, bearing shoulder
9	74061574	1	SHAFT, drive
10	74061133	1	RING, seal retaining
11	74061570	2	□SEAL, drive shaft
13	74062050	2	SCREW, head locking
15	74051559	1	CLIP, shaft retainer
16	74049532	1	LEVER, throttle shaft
17	74048639	1	CAM, shut-off
18	74052915	1	SHIM, metering valve
19	74061670	1	SPRING, metering valve
20	74061178	1	VALVE, metering
21	74054579	1	ARM ASSY., metering valve
22	74048627	1	GUIDE, idling spring
23	74049533	1	SPRING, idling
24	74048635	1	RETAINER, spring
26	74061168	1	ARM, governor
27	74061836	1	SPRING, governor control (Blue-Blue)
28	74048624	1	SPRING, governor linkage
--		1	HOOK ASSY., governor linkage (Includes items 29, 30, 37, 38)
29	74059171	1	LINK ASSY., adjusting
30	74062261	1	HOOK, governor linkage
31	74053267	3	WASHER, plain
32	70906957	3	LOCKWASHER, cover screw
33	74053266	3	SCREW, cover
34	74055293	1	CONNECTOR ASSY., return line
35	74062198	1	COVER, governor control
36	74048630	1	□GASKET, governor cover
37	74061206	1	WASHER, adjusting link
38	74059170	1	SCREW, adjusting link
39	74055625	1	SCREW, throttle lever spring
40	74051412	1	RETAINER, throttle lever spring
41	74051413	1	SPRING, throttle lever
42	74054594	1	LEVER ASSY., throttle
46	74056799	1	SCREW, low idle adjusting
47	74051409	1	NUT, low idle adjusting screw
48	74061599	1	SHAFT ASSY., throttle
49	74061186	1	NUT, high idle adjusting screw
50	74056799	1	SCREW, high idle adjusting
51	74053375	2	□WASHER, throttle shaft seal
52	74369878	2	□SEAL, throttle shaft
53	74050910	2	□SEAL, pivot shaft
54	74048642	2	NUT, pivot shaft

(Continued)

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