



**Hydrostatic Transmission  
Compact Tractors  
Service Manual 9-50371**

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**JI Case**  
A Tenneco Company



## SERVICING POLICY ON HYDROSTATIC TRANSMISSION

Since the extremely close tolerances of the internal components of this hydrostatic transmission require immaculate "white room" working conditions, repair parts except for the input shaft are not available and dealer disassembly is not authorized. Warranty is automatically void if this transmission is disassembled by anyone other

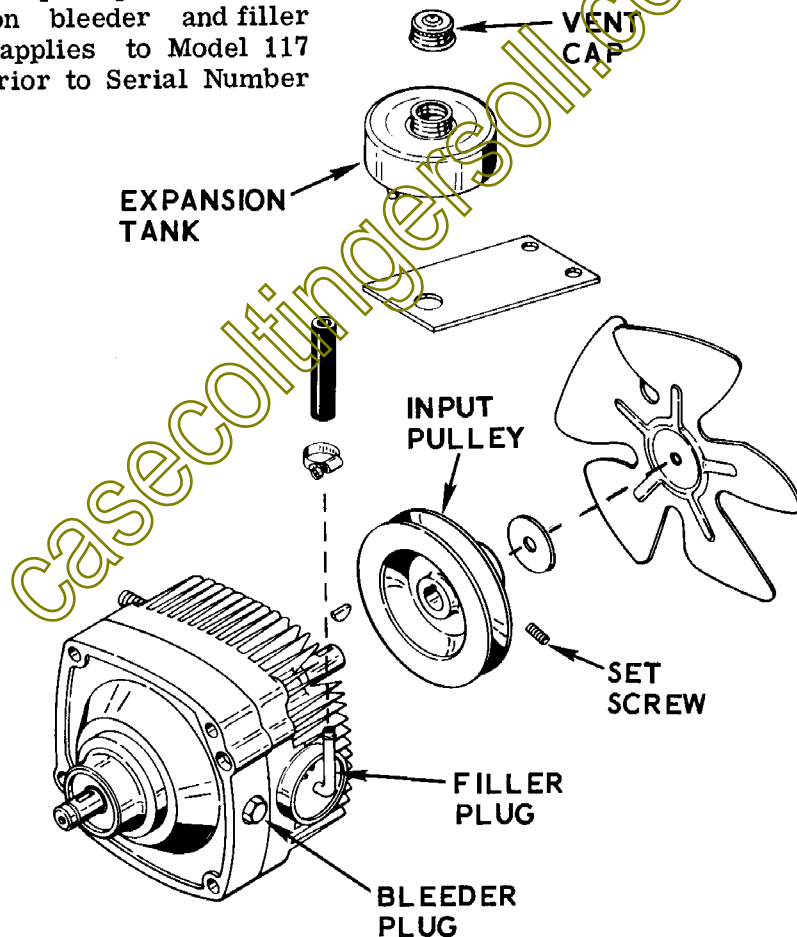
than the manufacturer. Units requiring service beyond the warranty period must also be replaced with a complete transmission unit.

### TRANSMISSION INPUT SHAFT AND PULLEY

An occasional report is received stating the pulley was loose on the transmission input shaft. (See illustration.) If this condition is noted, check the tightness of the two setscrews. If the setscrews are loose, tighten them using loctite. However, if the setscrews appear tight, remove the pulley and check to make certain the threads extend

through the pulley hub. This can be done by turning the setscrews through to the bore of the pulley. If threads do not go through the hub, either install a new pulley or run a 1/4" - 20 tap through the original pulley and install setscrews with loctite. If the input shaft has become damaged, it is permissible to replace it.

**NOTE** Illustration depicts position of the transmission bleeder and filler plugs as applies to Model 117 Tractors prior to Serial Number 9646801.



# SERVICING THE MODEL 117 AND 118 HYDROSTATIC TRANSMISSION

## INTRODUCTION

The hydrostatic transmission converts mechanical energy at the input shaft into liquid pressure in a nearly incompressible working fluid, and then reconverts it into mechanical energy at the output shaft. The purpose of this transformation is to provide a means of varying the output torque, speed and direction, with a constant input speed. In operation, the pressure within the hydrostatic transmission is variable and will increase and decrease automatically as the

drawbar load of the tractor increases and decreases.

The Marshallmatic 6 transmission is composed of three major parts - a variable displacement radial-piston pump; a fixed displacement piston motor; a system of valves located between pump and motor. By varying the displacement of the pump, an infinite number of speeds are available.

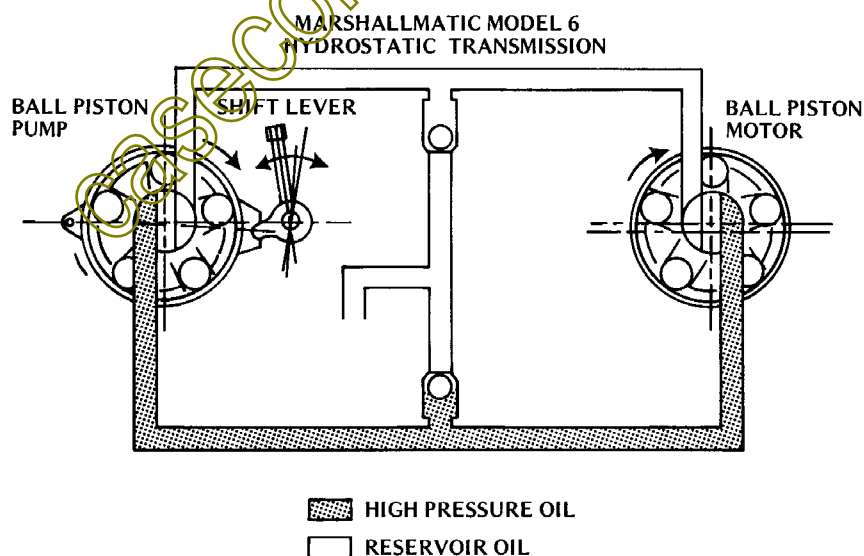
## OPERATION

In operation, the pump produces a flow of oil through internal channeling forming a closed loop between the pump and the motor. The oil flow produced by the pump is represented on the chart by the checked area and that flow returning from the motor to the pump is the white area on the chart (pump intake).

The flow of oil driven back by the motor is less than the oil required by the pump, thus some means of replacing the oil lost due to leakage must be provided. Therefore, the check valve on the inlet side of the pump is open to the reservoir, enabling the pump to draw oil as needed.

Speed regulation is achieved by changing the

oil delivery of the variable displacement pump. When the lever is moved in the forward (clockwise) direction, the cam ring is moved off center and oil immediately begins to flow through the circuit. Moving the position of the speed control lever in the forward direction will vary the flow of oil, which in turn will vary the speed of the output shaft. When the speed control lever is moved in the reverse direction (counter clockwise), the flow of oil is reversed and the output shaft will also reverse its direction. It should be kept in mind that since the circuit is a closed-loop and that oil is relatively incompressible, whatever flow reaches the fixed displacement motor will immediately be transformed into a certain speed, depending on the volume and direction of the flow.



## TO REPLACE THE INPUT SHAFT

1. Remove the screen and fan, Figure 2.
2. Loosen the setscrews on the input pulley and remove the pulley, Figure 2.
3. Steam clean the hydrostatic transmission and transaxle areas.
4. Lift the expansion tank off its mounting bracket and remove the four bolts which connect the hydrostatic transmission to the transaxle. Note the oil level in the expansion tank and replace the vent cap with a "seal" cap (or install the original cap with plastic film to seal the tank.)
5. Carefully move the hydrostatic transmission away from the transaxle and lift it out of the chassis.
6. Thoroughly steam clean the input shaft area and blow dry with compressed air. Do the same to the new replacement input shaft and bearing assembly.

**NOTE** Do not use cloth or paper towels to clean this area since lint particles deposited will cause the transmission to seize if they get inside.

7. Place the transmission onto blocks or a frame so the input shaft faces straight upward. Also, if possible keep the expansion tank anchored higher than the transmission.
8. Remove the snap ring, Figure 3, with an internal snap ring pliers and carefully lift the input shaft assembly straight upward and out of the housing.

**CAUTION** Keep in mind that even a minute particle of dirt or paint can cause this transmission to seize or fail.

9. Carefully insert the new input shaft and bearing assembly into the housing and secure with the new snap ring provided. Also use the new Woodruff Key provided in the kit.

10. Install a new gasket (and O ring on tractors above S/N 9646800) on the transmission mounting flange.
11. Place the transmission back on the transaxle and engage the transmission output shaft with the transaxle idler gear. Secure the transmission to the transaxle with the four original bolts and lockwashers.
12. Install the original vent cap, place the expansion tank back on its mounting bracket and check oil level. If the oil level is higher than when transmission was removed it will be necessary to "bleed" the system following the procedure outlined in the Oil Level Check section.

**NOTE** If the pulley has 1/4" setscrews, drill and tap the two holes for 5/16" setscrews. Also check to make certain the setscrews can be turned into the bore of the pulley before installing.

13. Install a new input pulley, with 5/16" setscrews, using the new Woodruff key provided in the kit. Make certain the pulley fits snugly to the shaft. Install the setscrews with Loctite.
14. Install the fan by piloting it on the roll pin and secure with original plain washer, lockwasher and bolt.

**NOTE** The roll pin must not extend beyond the outer face of the fan. Tap it further into the pulley if necessary. Also be certain, the I.D. of the plain washer is only slightly larger than the bolt. If necessary, use a new plain washer, part number 195-2012. Do not use a plain washer between the fan and the pulley.

15. Install the screen and check operation of tractor.

**NOTE** If tractor operation is erratic or jerky, check for air in the system. Refer to oil level check section.

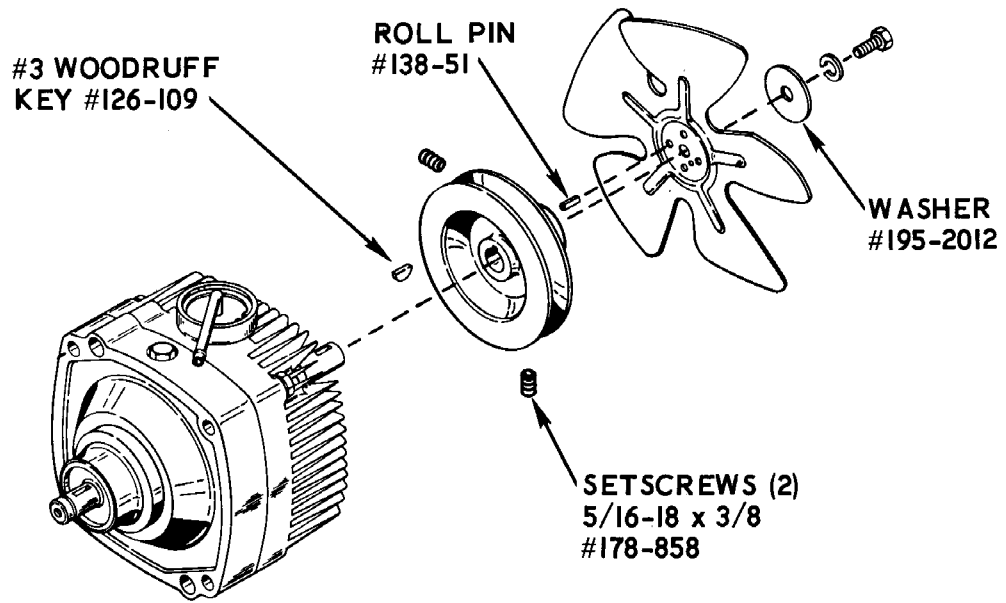


Figure 2. Pulley and Fan Assembly

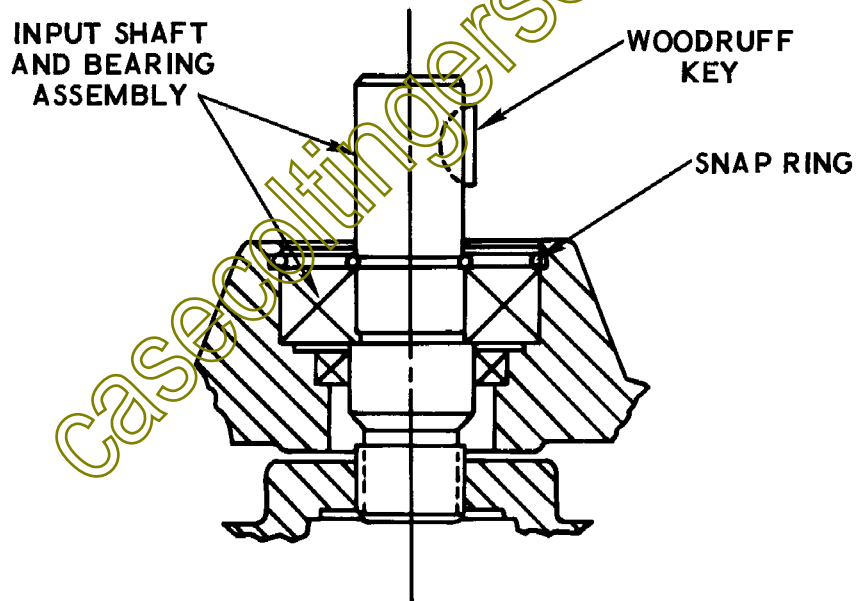


Figure 3. Input Shaft Kit, Part Number C18233

## OIL LEVEL CHECK

**NOTE** Extreme care must be exercised when performing this function.

There is no need to check, add or change oil on this unit unless one or more of the following conditions exist:

1. Fluid is lost for any reason.
2. System is air bound causing jerky, hesitant or erratic tractor operation. Trapped air can also cause the tractor to stop moving.

**IMPORTANT** THIS SYSTEM CAN BE AIR BOUND EVEN THOUGH THERE IS FLUID IN THE EXPANSION TANK.

To add fluid or eliminate air trapped in the system, proceed as follows:

**NOTE** If tractor was just operated, leave it stand for at least one hour to allow the air bubbles (foam) in the oil to dissipate. Use only Case TCH or Type A Transmission Fluid in this system.

1. Thoroughly steam clean the bleeder plug, filler plug and expansion tank areas on the transmission and blow dry with compressed air.

**NOTE** Do not use cloth or paper towels as they may deposit lint particles which will damage the system.

2. Model 117 Tractors prior to Serial Number 964801 - These tractors have the transmission installed with the "bleeder" and "filler" plugs on the front side. (See illustration.) Proceed as follows:
  - a. Remove the battery and empty or seal off the gas tank.
  - b. Carefully raise and support the front end of the tractor to the vertical position. Do not allow the seat support to contact the floor while rais-

ing as the weight of the tractor could cause it to bend.

**NOTE** The filling-bleeding procedure outlined in paragraph 3 can be followed providing a longer hose is used between the expansion tank and filler plug for accessibility to apply mouth pressure. Following is an alternate procedure:

1. Disconnect the expansion tank hose and discard any remaining fluid.
2. Remove the retainer ring at the filler plug and remove the plug.
3. Remove the filter screen with a magnet. **DO NOT USE ANY OTHER DEVICE TO REMOVE THIS SCREEN.**

**CAUTION** Be extremely careful not to allow any foreign material to enter the transmission.

4. Remove the bleeder plug and gasket.
5. Add Case TCH or Type A Transmission Fluid to the "filler" port until it and the "bleeder" port are completely filled.
6. Carefully install the filter screen, filler plug and retainer ring. Connect the expansion tank hose.
7. Reinstall the bleeder plug and gasket.
8. Lower the tractor to its normal position and fill the expansion tank about 1/3 full with Case TCH or Type A Transmission Fluid.

**IMPORTANT** Make certain the vent in the expansion tank is functional to allow free displacement of the fluid as the hydraulic system warms and cools.

3. Model 118 Tractors and Model 117 Tractors, After Serial Number 964800 - These tractors have the transmission installed with the bleeder and filler plugs on top.

- a. Carefully detach the expansion tank from its mounting bracket, keeping the hose connected.
- b. Fill the tank about 1/2 full with Case TCH or Type A Transmission Fluid.
- c. Remove the bleeder plug and gasket.

d. Using mouth pressure, force the fluid from the expansion tank through the filler plug until it starts to overflow at the bleeder plug.

**NOTE** Make certain the expansion tank outlet is always covered with fluid to prevent additional air from entering the system.

- e. Carefully install the bleeder plug and gasket.
- f. Adjust the fluid level in the expansion tank if necessary to about 1/3 full.

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