Chapter II
TROUBLE SHOOTING AND DIAGNOSIS

SECTION ONE—PRE-DIAGNOSIS STEPS

It is vital in diagnosis not to assume that you know the answer to a trouble, for almost any given condition can be caused by two or more separate and different troubles. For example, in one case, throttle linkage adjustment may correct a faulty shift condition. But in another case, with exactly the same faulty shift condition, band adjustment may be the answer. For this reason, no one should assume that what is the answer once is always the answer. In diagnosing a transmission problem . . . first, always make the preliminary checks listed below to make sure you will not overlook certain simple factors, which can cause malfunction. By doing these things, you will save time, eliminate comebacks and satisfy your customers.

Make all the preliminary checks and follow the various steps of diagnosis in the order given. Always consider the inter-relationship of various tests, for unless all are made, real troubles may not be uncovered. One test will not give you a complete check on possible causes of transmission malfunction.

Also, it is important to pay close attention to the customer's description of the complaint, and to make sure that you understand what the customer means. While it is true that a customer means. While it is true that a customer may describe things in an awkward manner, careful questioning will bring out what is bothering him. Thus, this is actually the first step in careful, accurate, and effective diagnosis.

A. Preliminary Checks and Adjustments

1. Check the fluid level. The first step in any Fordomatic or Merc-o-matic work is to check the fluid level. If it is not at the proper level it can be the cause of transmission malfunction. To check the fluid level --

(a) Set the emergency brake, and place the selector in neutral.

(b) Run the engine at idle for about 4 minutes.

CAUTION For safety, place the selector in park during the warm-up period.

(c) When engine and transmission reach normal operating temperature, move the selector through all positions, to assure that fluid is distributed throughout the transmission, and then return the lever to park.

NOTE While checking fluid level, let the engine idle.

(d) Clean all dirt from around the indicator cap.

(e) Pull the indicator out, wipe it clean and then push it down all the way into the transmission.

NOTE On some cars, the indicator is reached from under the hood, and on others, through the access hole in the front floor pan.

(f) Remove the indicator again, and check the fluid level.

(g) If necessary, add enough automatic transmission fluid -- type A -- to raise the level to the "F" mark on the indicator.

CAUTION Do not overfill the transmission. This will cause foaming, which, in turn, causes improper operation and inaccurate pressure readings.

2. Check the engine. After checking the fluid level, check to make sure the engine does not stall, miss, backfire or hesitate at any RPM range, and that it has no mechanical knock, chatter or unusual noise. This is important, because often what seems to be a transmission malfunction can be traced to engine trouble.

3. Check the engine idle speed as follows:

(a) Place the selector in "N" (neutral) or drive position depending on model.

(b) Start the engine. Run it at idle speed until normal operating temperature is reached.

(c) Connect a tachometer and check the engine idle speed. Idle "specs" for various models are listed in Table 1 below.

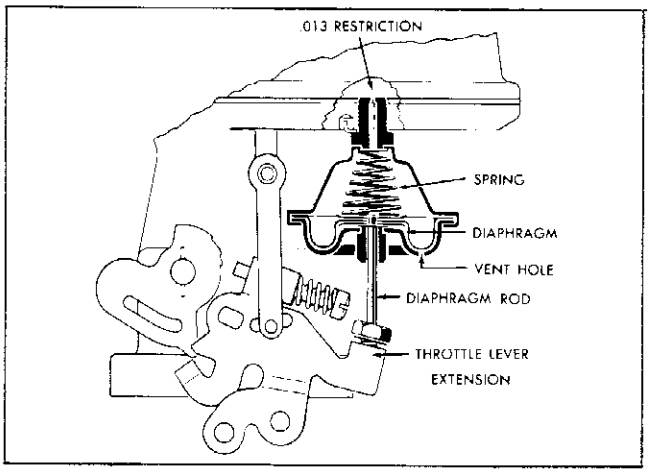
TABLE 1 -- ENGINE IDLE SPECIFICATIONS

	1951-52-53	1954	1955	1956-57
Ford 6-cyl.*	440-460 rpm in neutral	440-475 rpm in neutral	450-475 rpm in neutral	425-450 rpm in drive
Ford V-8*	415-425 rpm in neutral	415-425 rpm in neutral	450-475 rpm in neutral	425-450 rpm in drive
Thunderbird			475-500 rpm in neutral	450-475 rpm in drive
Ford Police Interceptor			475-500 rpm in neutral	450-475 rpm in drive
Mercury	425 rpm in neutral	425-450 rpm in drive	425-450 rpm in drive	425-450 rpm in drive
Lincoln			425-450 rpm in drive	425-450 rpm in drive

*Specifications apply to trucks and cars.

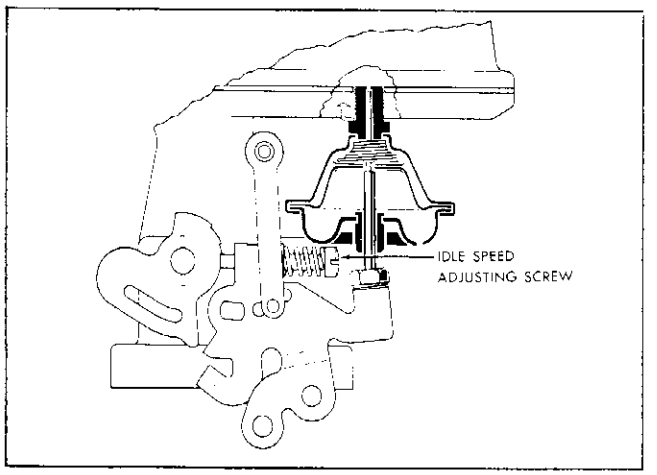
4. If idle speed is not within limits, turn the idle adjusting screw until correct idle speed is reached.

5. If the dashpot holds the throttle open, thus preventing correct idle adjustment, adjust the dashpot to get correct idle speed. There are a number of types of dashpots. Procedures for the basic types are given below.

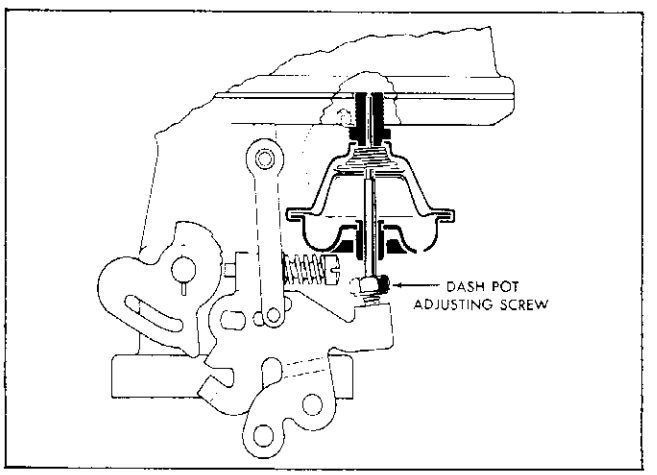


6. For the mechanical type dashpot, adjust as follows:

   (a) Turn the dashpot adjustment screw to the bottom of its adjustment.



   (b) Turn the idle speed adjusting screw until it just touches the lowest idle step on the cam, with the throttle held firmly in the closed position.

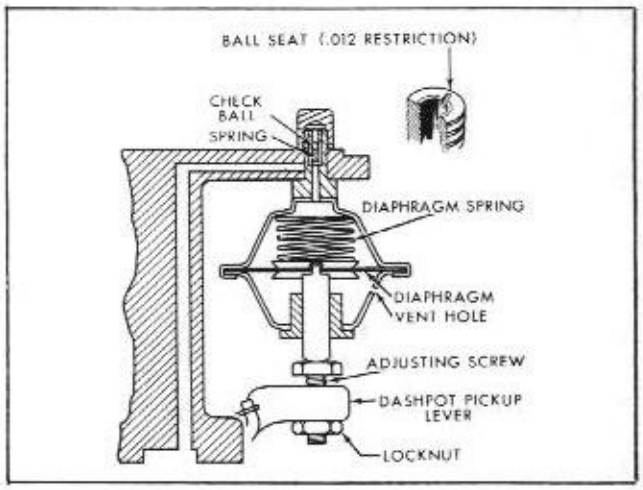


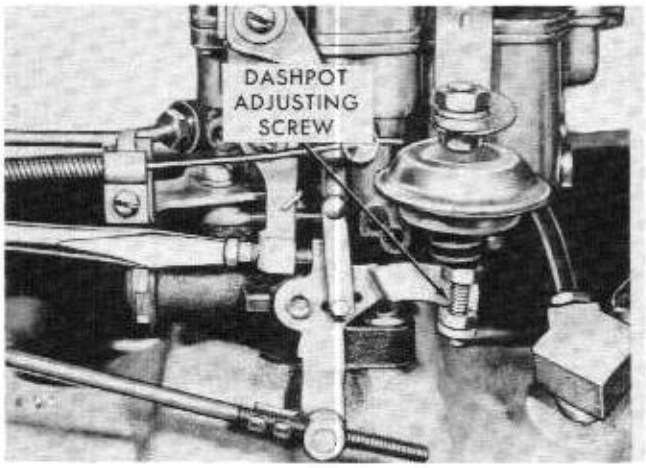
   (c) Turn the dashpot adjusting screw to lengthen it until the idle speed adjusting screw just starts to leave the low step of the cam. Finally, and this is very important, turn the dashpot adjusting screw back one complete turn.

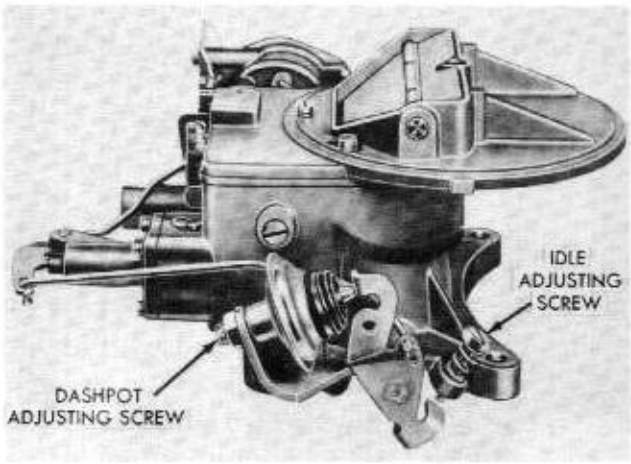
7. For one vacuum type dashpot, make the adjustment as follows:

   (a) Make sure the engine temperature has stabilized and that the fast idle cam is in the slow position. The dashpot adjusting screw must not be touching the bottom of the dashpot rod.

   (b) Place a .020 inch feeler gauge between the dashpot rod and adjusting screw. Loosen the adjusting screw locknut and adjust the screw to .020 inch gap between the diaphragm rod and screw. Then tighten the adjusting screw locknut. Recheck for .020 inch gap.







8. For the dashpots shown in the above pictures, make the dashpot adjustment as follows:

   (a) Loosen the adjusting screw locknut.

   (b) Then, with the throttle in closed position, depress the dashpot plunger in as far as it will go.

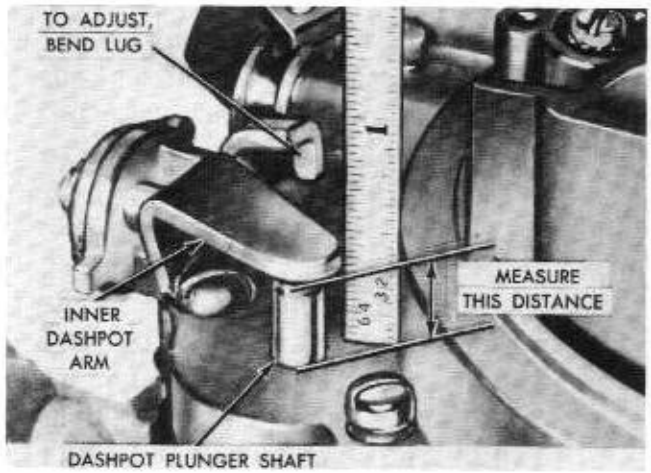
   (c) While holding the plunger in, turn the adjusting screw in (clockwise) to get a clearance of .045 to .064 inch between the plunger and the throttle shaft lever.

   (d) After the adjustment has been made, tighten the dashpot adjusting screw locknut securely.

9. On Holley carburetors, installed in some 1957 Mercurys, the dashpot is adjusted by loosening the dashpot locknut, and rotating the dashpot to get a .067-inch clearance between the dashpot plunger and throttle lever. Then tighten the locknut.

   NOTE Be sure throttle is closed so hot idle screw is against the stop.

10. The internal type dashpot (Carter carburetor), used on some 1957 Fords and Mercurys, is adjusted as follows:
    (a) With the primary throttle valves wide open, check distance from top surface of air horn assembly to top of plunger shaft. The distance should be 7/16 inch.
    (b) If measurement is incorrect, bend lug on dashpot operating lever.



11. Check and adjust all linkage. Since malfunction can be directly caused by linkages, it is important to check them before making any transmission adjustments. With the engine off, operate and check all pivot points and check "movement action" of all linkages.
    (a) Check action of linkage running from accelerator pedal to carburetor, linkage running to the transmission throttle lever, and linkage running from the selector to manual lever on the transmission.
    (b) If any linkage sticks, binds, or there are signs of excessive wear, correct the condition by repairing or replacing faulty parts.
    (c) Adjust linkage according to procedures in Chapter II.

12. Check for leaks. Make careful visual checks for external fluid leakage, which can cause damage or malfunction. Possible points of fluid leaks and their corrections are as follows:

    NOTE 1957 transmissions are filled at the factory -- with a red-dyed oil to help trace leaks.

    (a) Inspect the bottom of the floor pan at the rear of the transmission for fluid leaks. If fluid is found here, the extension housing rear seal is leaking and should be replaced.
    (b) Check the speedometer cable connection at the transmission. Replace the rubber seal if necessary.
    (c) Inspect the governor inspection plate for leakage. Install a new gasket if needed.
    (d) Leakage at the bottom oil pan gasket often can be stopped by tightening the attaching bolts to the proper torque (10-13 foot-pounds). If necessary, install a new gasket.
    (e) Check the bottom oil pan drain plug, or the fluid filler tube connection, depending upon car model. Tighten the drain plug or connection.

    CAUTION If tightening the drain plug to 20-25 foot-pounds torque does not stop leakage, replace the plug and its gasket. The gasket is never replaced separately.

    (f) Inspect the two hexhead pipe plugs on each side of the transmission case at the front. If either plug leaks, tighten the plug to 7-15 foot-pounds torque. If tightening does not stop the leaks, replace the leaking plug.

    NOTE After 1955, most models have a hex plug on the rear face of the case.

(g) On air cooled models, inspect the inside of the discharge air duct. Leakage here may be caused by loose converter cover bolts, loose converter drain plugs, the front pump seal, gasket or front pump attaching bolts. Do not confuse engine oil leaks with transmission leaks at this point.

(h) Check the converter cover nuts for proper tightness (15-28 foot-pounds torque). Do not tighten the converter cover nuts when they are hot, as leakage may result. Remove the two converter drain plugs with a six-point socket wrench. Coat the threads with No. 3 Permatex and install the plugs. Tighten the drain plugs 7-10 foot-pounds torque.

NOTE The drain plugs are 180 degrees apart. When only one is removed the converter will not drain.

(i) On air cooled models, fluid in the discharge air duct may be caused by engine oil leaking past rear main bearing. Be sure to determine the exact cause of the leak.

(j) On water cooled models, check the oil lines from the transmission to the radiator oil cooler for leaks.