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# Shop Tips FROM FORD

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# DISTRIBUTOR ADJUSTMENT AND LIGHT REPAIR

*PLUS OTHER TIMELY TOPICS*

Be sure to file this and future bulletins for ready reference. If you have any suggestions for additional information that you would like to see included in this publication please write to: Ford Division of Ford Motor Company, Parts and Service Promotion and Training Dept., P.O. Box 658, Dearborn, Michigan, 48121.

FoMoCo GENUINE PARTS

AUTOLITE

ROTUNDA

From Your Ford Dealer

Stephen Spak

# DISTRIBUTOR ADJUSTM

**THIS ARTICLE IS DESIGNED TO AID SERVICE PERSONNEL IN THE DIAGNOSIS, ADJUSTMENT AND LIGHT REPAIR OF THE THREE BASIC TYPES OF DISTRIBUTORS USED IN FORD CARS AND TRUCKS: LOADOMATIC, DUAL ADVANCE AND CENTRIFUGAL ADVANCE DISTRIBUTORS.**

## LOADOMATIC DISTRIBUTOR

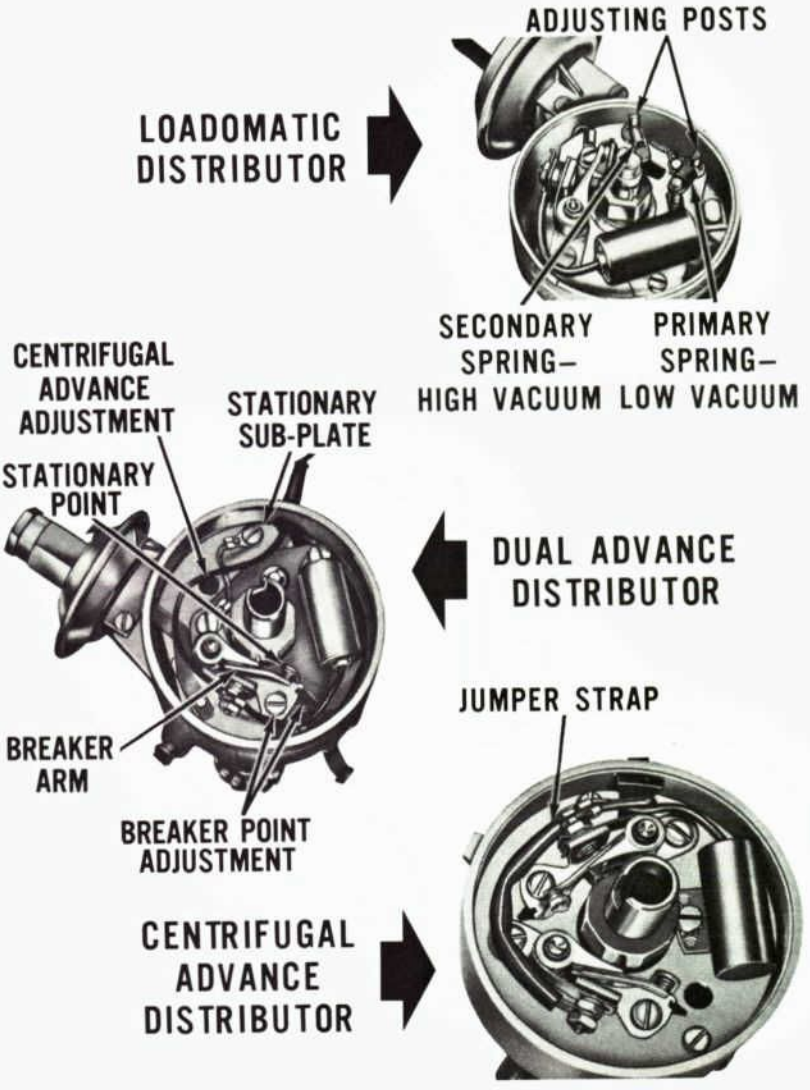
In the Loadomatic Distributor, the breaker plate is controlled by a vacuum-actuated diaphragm working against the tension of two calibrated breaker plate springs. (On a car with a 6-cylinder engine and a Fordomatic transmission, the distributor has only one spring.)

## DUAL ADVANCE DISTRIBUTOR

Dual Advance Distributors have two independently operated spark advance systems. A centrifugal advance mechanism is located below the stationary sub-plate assembly, and a vacuum-operated spark control diaphragm is located on the side of the distributor base.

## CENTRIFUGAL ADVANCE DISTRIBUTOR

A Centrifugal Advance Distributor is a straight mechanical-type unit. A governor-type centrifugal advance is located below the stationary breaker plate. Two centrifugal weights cause the cam to advance or move ahead with respect to the distributor drive shaft. The weights turn the cam by means of a stop plate that has two slots which fit over pins in the weights. The slots determine the maximum amount of advance. The rate of advance is controlled by two calibrated springs.




DISTRIBUTOR ASSEMBLIES

## BREAKER POINT ADJUSTMENT

Breaker points should be inspected, cleaned and adjusted, as necessary. Breaker points can be cleaned with chloroform and a stiff bristle brush. Crocus cloth may also be used. Do not use sandpaper or other abrasives because they may damage point surfaces and leave particles which may cause excessive wear.

Replace the breaker point assembly if the contacts are badly burned or if excessive metal transfer between the points is evident. Metal transfer is considered excessive when it equals or exceeds the gap setting.

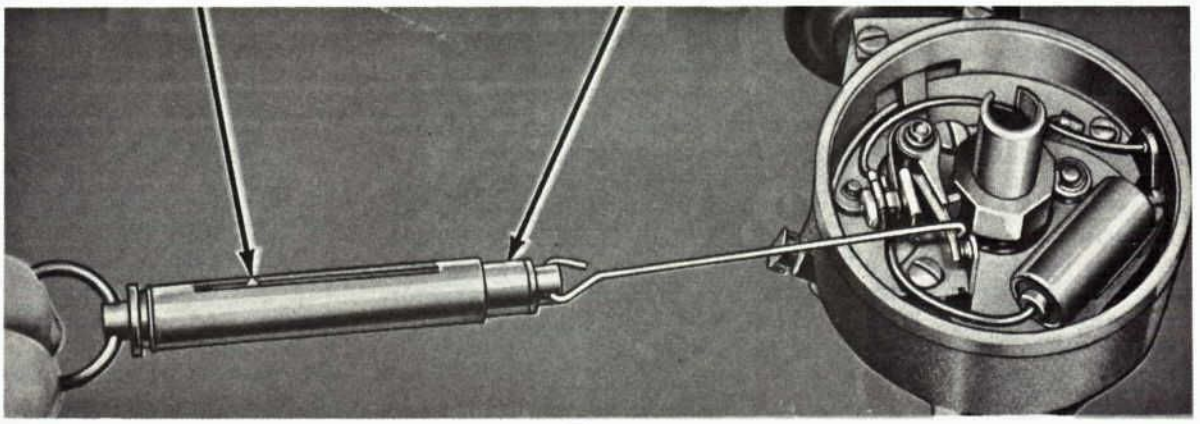



*Figure 1*

## CHECKING BREAKER POINT SPRING TENSION

### SPRING TENSION

When adjusting the spring tension, breaker points should be closed and a small piece of paper inserted between the breaker points. Then place the hooked end of a spring tension gauge over the moveable arm and pull at right angles to the points until the points just start to open. When the points are opening, the paper should fall out. Compare the gauge reading with the specifications shown on pages 10 and 11. If the pivotless-type breaker point tension is not within specifications, replace the points. If the pivot-type breaker point tension is not within specifications, adjust the spring tension as follows:

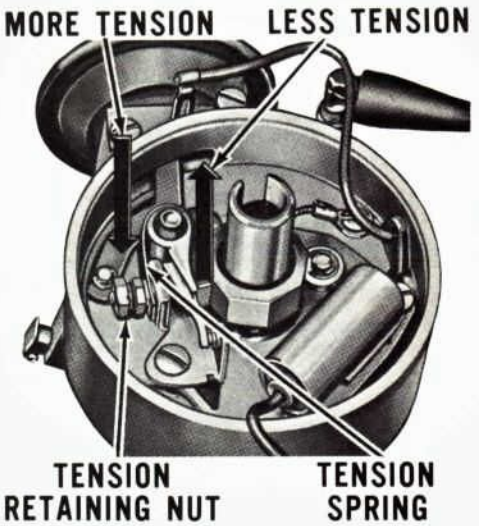
1. Disconnect the primary and condenser leads (and the jumper strap on the high performance engine centrifugal advance distributor) at the breaker point assembly primary terminal.

2. Loosen the nut holding the spring in position. Move the spring toward the breaker arm pivot to decrease the tension and in the opposite direction to increase the tension. (See Figures 1 and 2).

3. Tighten the lock nut, and check the spring tension again. Repeat the adjustment until the specified spring tension is obtained.

4. Install the primary and condenser leads (and the jumper straps on the centrifugal advance distributor), the lock washer, and tighten the nut securely.

On the centrifugal advance distributor, loosen the lock nut holding the jumper strap to the other breaker point assembly and follow steps 2 and 3. After the adjustment is complete, connect the jumper strap.




Adjusting Spring Tension

*Figure 2*

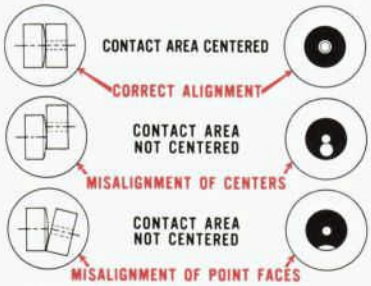
# DISTRIBUTOR ADJUSTM

## BREAKER POINT ALIGNMENT

The vented type breaker points must be accurately aligned and must strike squarely in order to realize the full advantages provided by this design, and to assure normal breaking point life. Any misalignment of the breaker point surfaces can cause premature wear, overheating and pitting. To align the breaker points, proceed as follows:

1. Turn the cam so that the breaker points are closed and check the alignment of the points as shown in Figure 3.
   If the distributor is in the engine, the points can be closed by disconnecting the starter relay brown wire and the red-blue wire. With the ignition switch in the OFF position, crank the engine by using a remote starter switch connected between the starter relay "S" and battery terminals.
2. Align the breaker points to make full face contact by bending the stationary breaker point bracket. Do not bend the breaker arm.
3. After the breaker points have been properly aligned, adjust the breaker gap or dwell.


ALIGNING BREAKER POINTS




BREAKER POINT ALIGNMENT

*Figure 3*

## ADJUSTING GAP OR DWELL

The gap is the maximum breaker point opening obtained when the rubbing block is on a cam lobe. The dwell is the period during which the distributor points remain closed. Therefore, if the point gap is increased the dwell will be decreased.

On the dual advance distributor, as the pivot plate is rotated from the retard (no vacuum) position to the full vacuum position, the dwell decreases slightly. This is because the breaker point rubbing block and cam rotate on a different axis. The centrifugal advance distributor used with the conventional ignition system has a dual set of breaker points. The transistorized ignition system has only one set of breaker points.

### NEW BREAKER POINTS

New breaker points can be adjusted with a feeler gauge or a dwell meter. When using a feeler gauge on new breaker points follow this procedure:

1. Check and adjust the point alignment. Rotate the distributor cam until the rubbing block rests on the peak of the cam lobe.
2. Insert the correct blade of a clean feeler gauge between the breaker points (see Figure 4). The gap should be set to the larger specified dimension (see specifications on pages 10 and 11) because the rubbing block will wear down slightly while seating the cam. The use of too small a blade can result in burned points and too large a blade can result in ignition failure at high speeds.
3. Apply a light film of Distributor Cam Lubricant (Ford Part Number C4AZ-19D530-A) to the cam when new points are installed; a quantity equal in size to the head of a kitchen match is adequate. *Do not* use engine oil to lubricate the distributor cam.
4. If the dwell of the new points is to be adjusted, set the contact dwell to the low specified setting. New points must be set to the low dwell as the rubbing block will wear down slightly while seating to the cam.
5. Set the ignition timing.

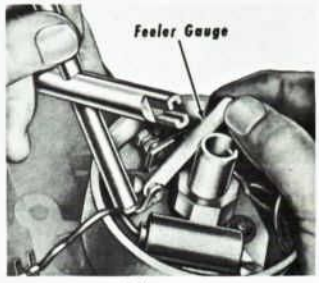



*Figure 4*

### OLD BREAKER POINTS

Old breaker points can be adjusted by using a dwell meter, since the roughness of the points makes an accurate gap reading or setting impossible using a feeler gauge. Clean the breaker points, then check and adjust the dwell as follows:

1. Calibrate the dwell meter to the set line and connect the leads from the tach-dwell unit. The black lead goes to the ground and the red lead goes to the distributor side of the coil.
2. Set the selector switch to the position that corresponds to the number of cylinders in the engine being tested.
3. Operate the engine at idle speed and note the reading on the dwell meter.
4. Stop the engine and adjust the gap. Now check the dwell again.

On the centrifugal advance distributor with dual points, after the combined dwell has been set to specifications (See pages 10 and 11), the individual dwell, should be checked. To check the individual dwell, block one set of breaker points open with a piece of insulating material and check the dwell of the other set. The individual dwells should be the same.

## BREAKER POINT REPLACEMENT

### LOADOMATIC AND DUAL ADVANCE DISTRIBUTORS

When removing and installing breaker points in a Loadomatic or Dual Advance Distributor, the following steps should be followed:

1. Remove the distributor cap and rotor.
2. Disconnect the primary and condenser leads.
3. Remove the screws that secure the breaker point assembly to the breaker plate and remove the breaker point assembly.
4. Position the breaker point assembly on the breaker plate. Install the hold-down screws. Make sure that the ground wire terminal is on the screw farthest from the adjustment slot on the dual advance distributor with 8-cylinder engine or under the condenser retaining screw on the 6-cylinder engine; and on the screw nearest the adjustment slot on the Loadomatic distributor.
5. Place the primary and condenser leads on the breaker point assembly primary terminal. Install the lock washer and nut and tighten the nut securely.
6. Adjust for proper spring tension and point gap.

### CENTRIFUGAL ADVANCE DISTRIBUTORS— CONVENTIONAL IGNITION SYSTEM

When replacing breaker points on a Centrifugal Advance Distributor, follow these steps:

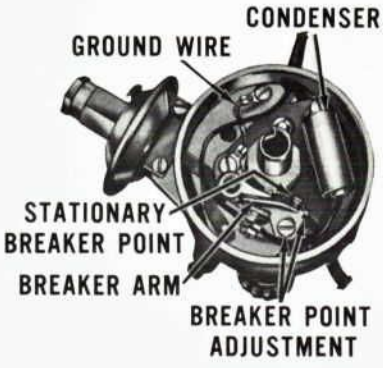
1. Remove the distributor cap and rotor and disconnect the primary lead, condenser lead and the jumper strap from the breaker point assembly. (See Figure 5.)
2. Remove the breaker point assembly.
3. Position the breaker point assemblies on the breaker plate and install the retaining screws.
4. Place the primary wire, one end of the jumper strap, and the condenser wire in position on the primary terminal of the breaker point assembly closest to the primary wire, and tighten the locknut.
5. Place the other end of the jumper strap on the primary terminal of the other breaker point assembly and tighten the locknut. Adjust for proper spring tension (pivot-type points) and point gap.

### CENTRIFUGAL ADVANCE DISTRIBUTOR— TRANSISTORIZED IGNITION SYSTEM

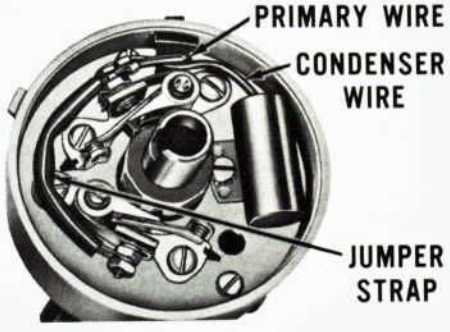
When replacing breaker points on a Centrifugal Advance Distributor in a Transistorized Ignition System, follow these steps:

1. Remove the distributor cap, rotor and dust cover.
2. Disconnect the distributor-transistor wire from the breaker point assembly. Remove the retaining screws from the breaker point assembly and lift the breaker point assembly out of the distributor.
3. Place the breaker point assembly in position and install the retaining screws. Be sure to place the ground wire under the breaker point assembly retaining screw farthest from the breaker point contacts. Align and adjust the breaker point assembly.
4. Connect the distributor transistor wire to the breaker point assembly.
5. Install the dust cover, rotor and distributor cap.


LOADOMATIC DISTRIBUTOR




DUAL ADVANCE DISTRIBUTOR




CENTRIFUGAL ADVANCE DISTRIBUTOR

*Figure 5*

# DISTRIBUTOR ADJUSTM

## IGNITION TIMING

The timing marks on all engines are graduated from top dead center (TDC) through varying degrees before top dead center (BTDC). The timing marks are inscribed on either the timing pointer or on the crankshaft pulley or damper. (See Figure 6.) To adjust the ignition timing, align the proper timing mark with the pointer or timing notch. (See specifications on pages 10 and 11.)

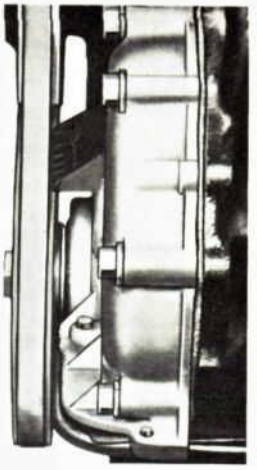
Under some conditions, the initial ignition timing may be advanced up to 5 degrees over the "normal" setting. To do this, advance the timing progressively until the engine detonation (spark knock) is evident under actual road test acceleration. Retard the timing until the detonation is eliminated. If the individual requirements of the engine require, and/or if sub-standard fuels are used, the initial timing may be retarded from the recommended setting not to exceed 2 degrees BTC. *If the initial timing is advanced or retarded too far, damage could result to the engine.*

### CHECKING AND ADJUSTING

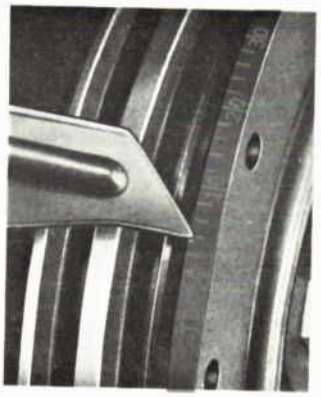
When checking and adjusting ignition timing the following procedure should be used:

1. On the Loadomatic or Dual Advance Distributor, disconnect the distributor vacuum line.
2. Connect the timing light high tension lead to the No. 1 spark plug and the other two leads of the timing light to the battery terminals. *Do not puncture the spark plug wire or molded battery cap.*
3. Clean the dirt from the timing marks and if necessary, chalk the proper mark for legibility.
4. Operate the engine at idle speed. Be sure the engine is idling below 550 rpm so that there will be no centrifugal advance on engines with dual advance or centrifugal advance distributors. The timing light should flash just as the proper mark lines up with the pointer or pin to indicate correct timing. The operator's eye should be in line with the center of the pulley or damper and the timing pointer or notch.
5. If the proper timing mark is not aligned with the pointer, pin or notch, rotate the distributor until the correct timing mark and the pointer, pin or notch are aligned. On all 6-cylinder engines, timing is advanced by counterclockwise rotation of the distributor body, and retarded by clockwise rotation. On all V8 engines, timing is advanced by clockwise rotation of the distributor body and retarded by counterclockwise rotation.
6. After the ignition timing has been properly set, connect the distributor vacuum line. (Loadomatic or Dual Advance Distributor.)
7. Check the distributor to determine if the advance mechanism is operating. Hold the timing light so that the marks and the pointer, pin or notch can be seen, and accelerate the engine. If no advance is evident, one of the following is the probable cause:

- On the Loadomatic or Dual Advance Distributor, no vacuum available at the distributor; vacuum diaphragm leaking; diaphragm link disconnected from the breaker plate; or the breaker plate binding in the housing or on the bushing are the probable causes.
- On the Dual Advance or Centrifugal Advance Distributor, the centrifugal advance is not operating properly due to weights binding on their pivot points; weight spring tension is too great; or the weights are binding in the stop plate slots.



6-CYLINDER TIMING MARKS



8-CYLINDER TIMING MARKS

CHECKING IGNITION TIMING

*Figure 6*

## DISTRIBUTOR SPARK ADVANCE

### LOADOMATIC DISTRIBUTORS

The spark advance is checked to determine if the ignition timing advances in proper relation to the engine speed and load. The distributor used with manual-shift transmissions has two breaker plate springs while the automatic transmission distributor has only one breaker plate spring. The automatic transmission distributor has a calibration shim, gasket, return spring, stop and washer attached to the diaphragm assembly. These items are not on the manual-shift transmission distributor. When adjusting the dwell and spring tension, follow these three steps:

1. Mount the distributor in the distributor tester.
2. Check the breaker point contact dwell. If the dwell is not within specifications, adjust it. See specifications on pages 10 and 11.)
3. Check the breaker arm spring tension and adjust, if necessary, to bring the tension within specifications. If the pivotless-type breaker point spring tension is not within specifications, replace the points.

When adjusting the spark advance on a distributor used with a manual-shift transmission, follow this procedure:

- Calibrate the test set and adjust it to 0 inch vacuum and the initial rpm setting specified by the equipment manufacturer.
- Check the operation of the vacuum advance at the lowest and highest rpm settings given in the specifications supplied by the equipment manufacturer.

If the spark advance is not within the limits under low vacuum, the primary spring adjustment is at fault. If the spark advance is not within the limits under high vacuum, the secondary spring adjustment is at fault.

To adjust the spark advance, release the tension on the retard springs by turning the adjusting posts as re-required. (See figure 7.) Adjust the primary setting (Spring farthest from the vacuum chamber) first, for the low vacuum settings. Adjust the secondary spring last, for the high vacuum settings. As a final check, check the advance throughout the entire range.

If it is impossible to adjust both springs to give the correct spark advance throughout the range, one or both springs should be replaced and the spark advance readjusted. If the advance characteristics still cannot be brought within specifications, replace the diaphragm assembly.

### DUAL ADVANCE DISTRIBUTOR

To adjust the dwell and spring tension on a dual advance distributor follow the procedure as outlined for the Loadomatic Distributor. Check the breaker arm spring tension and on the pivot-type breaker points, adjust it, if necessary, to bring the tension within the specifications specified by the equipment manufacturer. If the pivotless-type breaker point spring tension is not within specifications, replace the points. However, the dual advance distributor has two independently operated spark advance systems. Each system is adjusted separately. Adjust the centrifugal advance before you adjust the vacuum advance. When adjusting the centrifugal advance adjustment, follow these steps:

1. Check the centrifugal advance by setting the test to 0° advance and the initial rpm setting specified.
2. Turn the motor control knob to the left position and slowly increase the rpm to the setting recommended for the first advance reading specified. If the correct advance is not indicated at this rpm, stop the distributor and bend one spring adjustment bracket to change its tension. Bend the adjustment bracket away from the distributor shaft to decrease advance by increasing spring tension, and toward the shaft to increase advance by decreasing spring tension. Then identify the bracket.

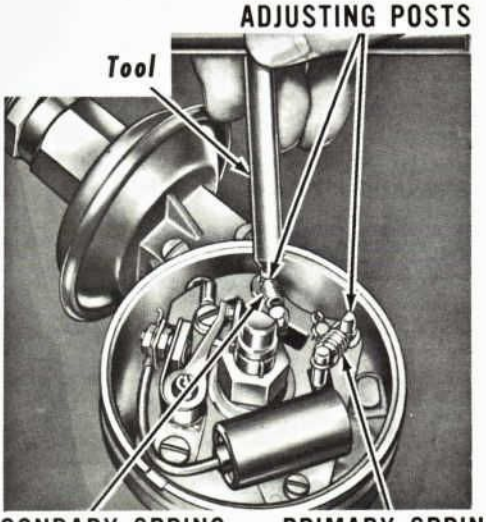



*Figure 7*

## DISTRIBUTOR SPARK ADVANCE—(continued)

3. After the adjustment has been made to one spring, check the minimum advance point again.

4. Operate the distributor at the specified rpm to give an advance just below the maximum. If this advance is not to specifications, stop the distributor and bend the other spring to give the correct advance.

5. Check the advance at all rpm settings specified. Operate the distributor both up and down the rpm range.

## VACUUM ADVANCE ADJUSTMENT

1. Set the test set to 0 inch vacuum at 1000 rpm.

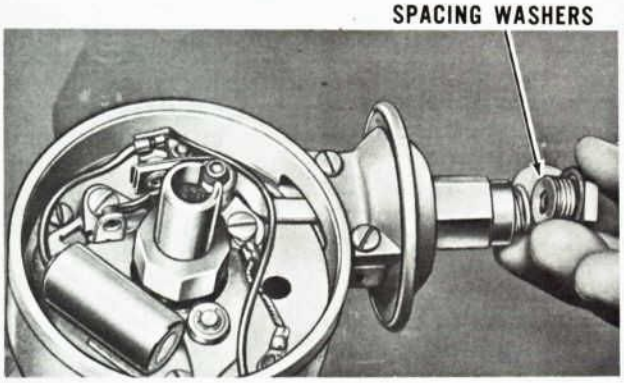
2. Check the advance at the first vacuum setting specified by the manufacturer of the test equipment.

3. If the advance is incorrect, change the calibration washers between the vacuum chamber spring and nut. After installing or removing the washers, position the gasket in place and tighten the nut. The addition of a washer increases advance.

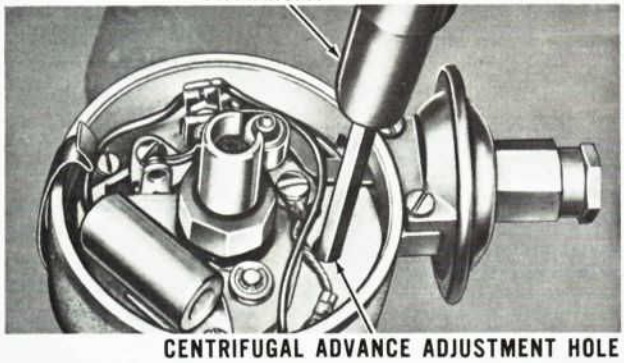
4. After one vacuum setting has been adjusted, the others should be checked. Do not change the original rpm setting when going to a different vacuum setting. Settings not within limits indicate incorrect spring tension, leakage in the vacuum chamber or line, or that the wrong fiber stop has been installed in the vacuum chamber of the diaphragm housing.

## CENTRIFUGAL ADVANCE DISTRIBUTOR

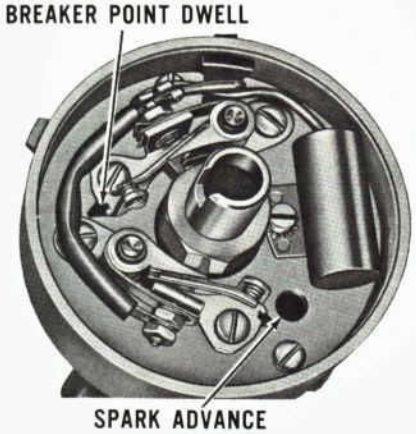
To adjust dwell and spring tension follow the same procedure as outlined under Loadomatic or dual advance distributors. To adjust the spark advance, this distributor has only one centrifugal advance mechanism. Adjust the advance as outlined above under centrifugal advance adjustment for the dual advance distributor.




VACUUM ADVANCE ADJUSTMENT–
DUAL ADVANCE DISTRIBUTOR



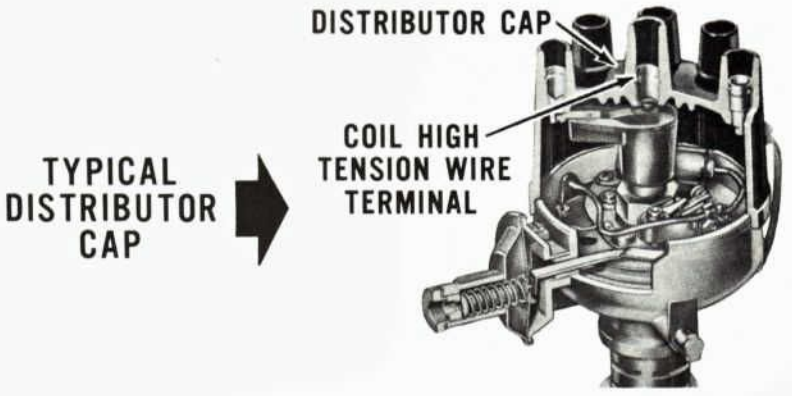

CENTRIFUGAL ADVANCE ADJUSTMENT–
DUAL ADVANCE DISTRIBUTOR




## CENTRIFUGAL ADVANCE DISTRIBUTOR ADJUSTMENTS

## DISTRIBUTOR CAP SERVICE

To clean the distributor cap, soak it in a mild cleaning solvent or mineral spirits. Do not use a harsh cleaning solution. After foreign deposits have been removed or loosened by soaking, scrub the cap with a soft bristle brush. Do not use a wire brush, file or other abrasive objects. Dry the cap with compressed air. Inspect the cap for cracks or wear. If the cap needs replacing, the wires from the old cap may be used in the new cap. Also the coil wire may be transferred from the old cap to the new one.



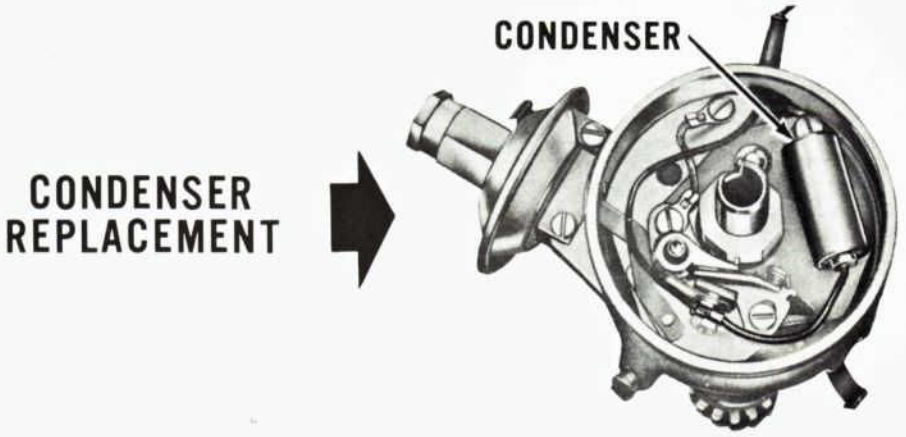

## DISTRIBUTOR ROTOR SERVICE

To clean the rotor, a mild cleaning solvent or mineral spirits should be used. Harsh solutions should be avoided. Use a soft bristle brush and clean in the same manner as is recommended for cleaning the distributor cap. Dry with compressed air. To remove the rotor, remove the distributor cap and lift the rotor straight up. The distributor shaft is notched so that when the rotor is in position for replacement, it should be pressed down firmly. Then replace the distributor cap.


## CONDENSER REPLACEMENT

The following procedure should be used when replacing the condenser:

1. Remove the distributor cap and rotor.
2. Disconnect the condenser lead at the breaker point assembly.
3. Remove the screw that holds the condenser to the breaker plate and remove the condenser.
4. Place the condenser in position on the breaker plate and replace the retaining screw.
5. Place the condenser lead on the breaker point assembly and tighten the nut securely.
6. Install the rotor and distributor cap.



# IGNITION SPECIFICATIONS

## FALCON AND MUSTANG

| SERIES OR MODEL • YEAR • ENGINE TYPE | ENGINE CUBIC INCH DISPL. | TIMING DEGREES B.T.D.C. | POINT SETS | | DWELL ANGLE • DEGREES | ENG. FIRING ORDER | SPARK PLUG GAP • STANDARD |
|---|---|---|---|---|---|---|---|
| | | | GAP (IN.) | SPRING TENSION (OZ.) | | | |
| 1960—6 Cyl. | 144 | 2 (B) | .026 | 17-20 | 35-38 | (A) | .035 |
| 1961-62—6 Cyl. | 144-170 | 4 (C) | .026 | 17-20 | 35-38 | (A) | .035 |
| 1963-64—6 Cyl.—Std. | 144 | 8 | .026 | 17-20 | 35-38 | (A) | .035 |
| Auto. | 144 | 12 | .026 | 17-20 | 35-38 | (A) | .035 |
| 1963-65—6 Cyl.—Std. | 170 | 6 | .026 | 17-20* | 35-38 | (A) | .035 |
| Auto. | 170 | 12 | .026 | 17-20* | 35-38 | (A) | .035 |
| 1964-65—6 Cyl.—Std. | 200 | 6 | .026 | 17-20* | 35-38 | (A) | .035 |
| —Auto. | 200 | 12 | .026 | 17-20* | 35-38 | (A) | .035 |
| 1964—8 Cyl. (4-V) | 289 | 6 (C) | .016 | 17-20 | 26-28.5 | (D) | .035 |
| 1965—8 Cyl. (2-V and Reg. 4-V) | 289 | 6 | .016 | 17-21 | 26-28.5 | (D) | .035 |
| 1965—8 Cyl. (High Perf.) | 289 | 12 | .021 | 27-30 | 30-33 | (D) | .030 |

(A) 6-Cylinder firing order 1-5-3-6-2-4.
(B) Automatic trans. vehicle set at 6°.
* 1965 models: 17-21
(C) Automatic trans. vehicle set at 10°.
(D) 8-Cylinder firing order 1-5-4-2-6-3-7-8

## THUNDERBIRD

| SERIES OR MODEL • YEAR • ENGINE TYPE | ENGINE CUBIC INCH DISPL. | TIMING DEGREES B.T.D.C. | POINT SETS | | DWELL ANGLE • DEGREES | ENG. FIRING ORDER | SPARK PLUG GAP • STANDARD |
|---|---|---|---|---|---|---|---|
| | | | GAP (IN.) | SPRING TENSION (OZ.) | | | |
| 1958 4 Bbl. | 352 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 4 Bbl. (Optional Engine) | 430 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 1959 4 Bbl. | 352 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 4 Bbl. (Optional Engine) | 430 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 1960 4 Bbl. | 352 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 4 Bbl. (Optional Engine) | 430 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 1961 4 Bbl. | 390 | 8 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 1962-63 4 Bbl. | 390 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 3-2 Bbl. | 390 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| 1964-65—Conventional Ignition Sys. | 390 | 6 | .016 | 17-20 | 26-28.5 | (A) | .035 |
| —Transistor Ignition Sys. | 390 | 6 | .021 | 19-21 | 22-24 | (A) | .030 |

(A) V-8 firing order 1-5-4-2-6-3-7-8.

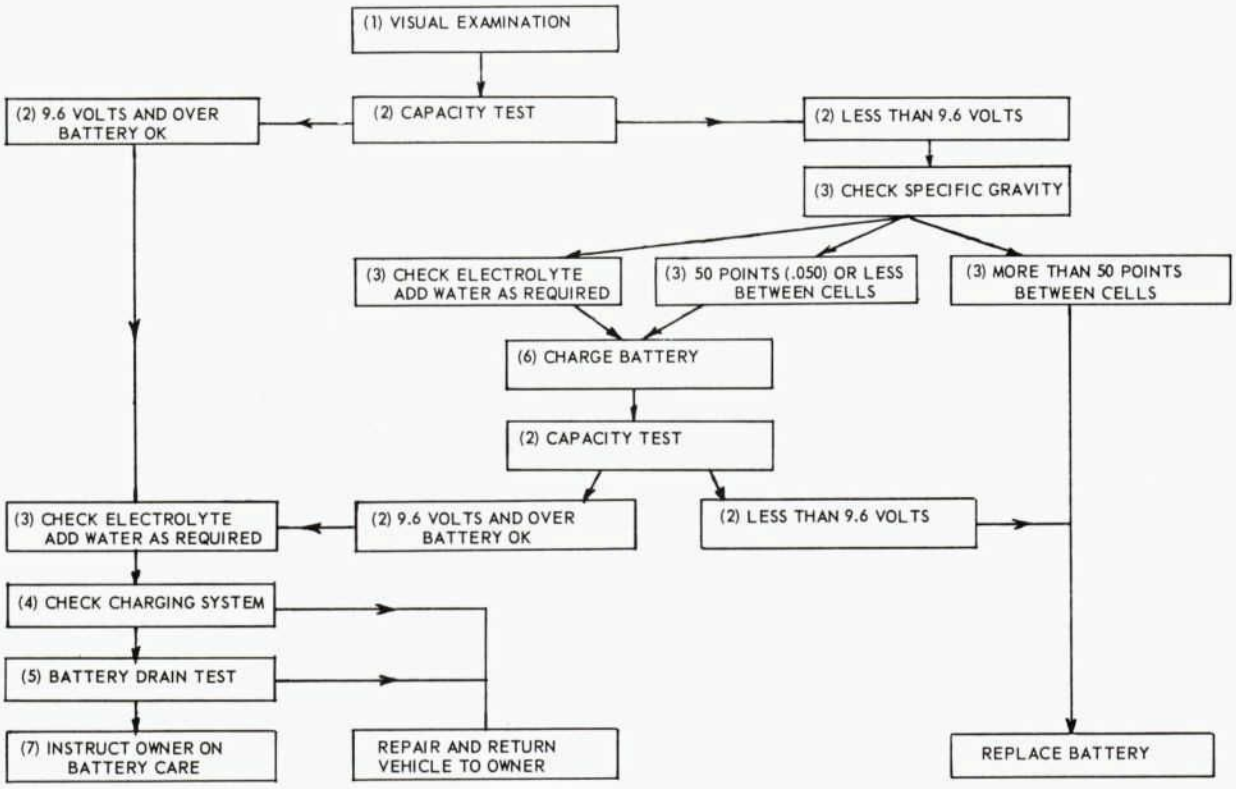
# FORD AND FAIRLANE

| SERIES OR MODEL • YEAR • ENGINE TYPE | ENGINE CUBIC INCH DISPL. | TIMING DEGREES B.T.D.C. | POINT SETS | | DWELL ANGLE • DEGREES | ENG. FIRING ORDER | SPARK PLUG GAP • STANDARD |
|---|---|---|---|---|---|---|---|
| | | | GAP (IN.) | SPRING TENSION (OZ.) | | | |
| 1958—6 Cyl. O.H.V. | 223 | 4 (A) | .026 | 17-20 | 35-38 | (F) | .035 |
| 8 Cyl. Custom 300 Fairlane (2 Bbl.) | 292 | 3 (A) | .016 | 17-20 | 26-28.5 | (G) | .035 |
| Fairlane "500" (2 & 4 Bbl.) | 332 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| Power Option (4 Bbl.) | 352 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| 1959—6 Cyl. O.H.V. | 223 | 4 (A) | .026 | 17-20 | 35-38 | (F) | .035 |
| 8 Cyl. (2 Bbl. Carb.) | 292 | 3 (A) | .016 | 17-20 | 26-28.5 | (G) | .035 |
| Power Options: | | | | | | | |
| (2 Bbl. Carb.) | 332 | 3 | .016 | 17-20 | 26-28.5 | (H) | .035 |
| (4 Bbl. Carb.) | 352 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| 1960—6 Cyl. | 223 | 4 (A) | .026 | 17-20 | 35-38 | (F) | .035 |
| 8 Cyl. (2 Bbl. Carb.) | 292 | 3 (A) | .016 | 17-20 | 26-28.5 | (G) | .035 |
| Power Options: | | | | | | | |
| (2 Bbl. Carb.) | 352 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| (4 Bbl. Carb.) | 352 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| 1961—6 Cyl. | 223 | 4 (A) | .026 | 17-20 | 35-38 | (F) | .035 |
| 8 Cyl. (2 Bbl. Carb.) | 292 | 3 (A) | .016 | 17-20 | 26-28.5 | (G) | .035 |
| Power Options: | | | | | | | |
| (2 Bbl. Carb.) | 352 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| (4 Bbl. Carb.) | 390 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| (High Perf.) | 390-406 | 3 | .016 | 17-20 | 26-28.5 | (H) | .035 |
| 1962—6 Cyl. Fairlane & "500" | 170 | 4 (C) | .026 | 17-20 | 35-38 | (F) | .035 |
| Galaxie & "500" | 223 | 4 (A) | .026 | 17-20 | 35-38 | (F) | .035 |
| 8 Cyl. Fairlane & "500" | 221-260 | 6 | .016 | 17-20 | 26-28.5 | (H) | .035 |
| Galaxie & "500" (2 Bbl.) | 292 | 3 (A) | .016 | 17-20 | 26-28.5 | (G) | .035 |
| Power Options: | | | | | | | |
| Galaxie & "500" (2 Bbl.) | 352 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| (4 Bbl. Carb.) | 390 | 5 (B) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| (High Perf.) | 406 | 5 (B) | .016 | 27-32 | 26-28.5 | (H) | .035 |
| 1963—6 Cyl. Fairlane & "500" | 170 | 6 (D) | .026 | 17-20 | 35-38 | (F) | .035 |
| Galaxie & "500" | 223 | 4 (C) | .026 | 17-20 | 35-38 | (F) | .035 |
| 8 Cyl. Fairlane & "500" | 221 | 4 (D) | .016 | 17-20 | 26-28.5 | (F) | .035 |
| Fairlane & Galaxie & "500" | 260 | 4 (C) (H) (E) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| Power Options: | | | | | | | |
| Galaxie & "500" (2 Bbl.) | 352 | 3 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| (4 Bbl. Carb.) | 390 | 3 (A) | .016 | 17-20 | 26-28 | (H) | .035 |
| (4 Bbl. & 3-2 Bbl.) | 406 | 8 | .016 | 27-32 | 33-36 | (H) | .035 |
| 1964—6 Cyl. Fairlane | 170 | 6 (D) | .026 | 17-20 | 35-38 | (F) | .035 |
| 6 Cyl. Fairlane | 200 | 6 (D) | .026 | 17-20 | 35-38 | (F) | .035 |
| 6 Cyl. Ford | 223 | 4 (C) | .026 | 17-20 | 35-38 | (F) | .035 |
| 8 Cyl. Fairlane | 260 | 6 (C) | .016 | 17-20 | 26-28.5 | (K) | .035 |
| 8 Cyl. (2 Bbl.) Ford & Fairlane | 289 | 6 (C) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| 8 Cyl. Ford | 352 | 6 (C) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| 8 Cyl. (4 Bbl.) Ford | 390 | 4 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| 8 Cyl. (2 Bbl.) Ford | 390 | 6 (A) | .016 | 17-20 | 26-28.5 | (H) | .035 |
| 8 Cyl. Ford—Conventional Ign. Sys. | 427 | 8 | .021 | 27-30 | 33-36 | (H) | .035 |
| Transistor Ign. Sys. | 427 | 8 | .021 | 21-24 | 22-24 | (H) | .035 |
| 1965—6 Cyl. Fairlane | 200 | 6 (D) | .026 | 17-21 | 35-38 | (F) | .035 |
| 6 Cyl. Ford | 240 | 6 (B) | .026 | 17-21 | 35-38 | (F) | .035 |
| 8 Cyl. (2 Bbl.) Ford & Fairlane | 289 | 6 (A) | .016 | 17-21 | 26-28.5 | (H) | .035 |
| 8 Cyl. (4 Bbl.) Fairlane | 289 | 6 (A) | .016 | 17-21 | 26-28.5 | (H) | .035 |
| 8 Cyl. (High Perf.) Fairlane | 289 | 12 (D) | .021 | 27-30 | 30-33 | (H) | .030 |
| 8 Cyl. Ford | 352 | 6 (A) | .016 | 17-21 | 26-28.5 | (H) | .035 |
| 8 Cyl. (4 Bbl.) Ford | 390 | 4 (A) | .016 | 17-21 | 26-28.5 | (H) | .035 |
| 8 Cyl. (2 Bbl.) Ford | 390 | 6 (A) | .016 | 17-21 | 26-28.5 | (H) | .035 |
| 8 Cyl. Ford—Conventional Ign. Sys. | 427 | 8 | .021 | 27-30 | 30-33 | (H) | .030 |
| Transistor Ign. Sys. | 427 | 8 | .021 | 22-24 | 22-24 | (H) | .030 |

(A) Automatic transmission vehicles set at 6° B.T.D.C.
(B) Automatic transmission vehicles set at 8° B.T.D.C.
(C) Automatic transmission vehicles set at 10° B.T.D.C.
(D) Automatic transmission vehicles set at 12° B.T.D.C.
(E) Standard transmission Galaxie set at 6° B.T.D.C.
(F) 6-Cylinder firing order 1-5-3-6-2-4
(G) V-8 firing order 1-5-4-8-6-3-7-2
(H) V-8 firing order 1-5-4-2-6-3-7-8

# REVISED RECOMMENDED BATTERY

## *for all batteries with one-piece cover*




## BATTERY DIAGNOSIS PROCEDURE

Battery failure may be caused by a defect within the battery, a charging system defect, or owner misuse. When faced with a battery problem the diagnosis and test procedure outlined above should be followed.
This procedure is the new standard test required with the incorporation of the one piece cover which completely seals the battery top and individual cell connectors.
NOTE: The battery cover must not be pierced with test probe to perform individual cell test.

### VISUAL EXAMINATION

Moisture on the outside of the case and/or low electrolyte level in one or more of the cells are indications of possible battery case damage.

### CAPACITY TEST

(A) Connect a Battery-Starter Tester (with carbon pile) and voltmeter to the battery.
(B) Adjust the discharge resistance until the ammeter registers three times the ampere-hour battery rating. (A 45 ampere-hour battery should be tested at a 135 ampere load).
(C) Hold for 15 seconds and note voltage.
CAUTION: Avoid leaving the high discharge load on the battery for periods longer than 15 seconds.
(D) If the voltage reading is 9.6 volts or more, the battery has good output capacity.
If the voltage reading is less than 9.6 volts, the battery might be defective. Check the specific gravity.

### SPECIFIC GRAVITY CHECK

(A) If the water is added to facilitate a specific gravity reading, charge battery at a high rate until all the cells are gassing freely before taking hydrometer reading.
(B) If the specific gravity is below:
Standard Battery—1230 at 80°F.
Sta-Ful Battery*—1220 at 80°F.
*(Marked on battery top)
the battery should be charged. Charge per Chart.
(C) A specific gravity difference of 50 points (.050) or less between cells indicates an internally sound battery.
(D) A specific gravity difference greater than 50 points (.050) between cells indicates an internally defective battery.
(E) Fully charged battery specific gravity.
Standard Battery—1280 at 80°F and maximum electrolyte level.
Sta-Ful Battery—1265 at 80°F and maximum electrolyte level.

### CHARGING SYSTEM CHECK

(A) Check for loose fan belt, also loose and/or corroded connections.
(B) Disconnect and clean corroded battery cable terminals and battery terminal posts and apply a light coat of mineral grease to non-conducting exposed metal surfaces.
(C) Check charging system performance.

# DIAGNOSIS and TEST PROCEDURE

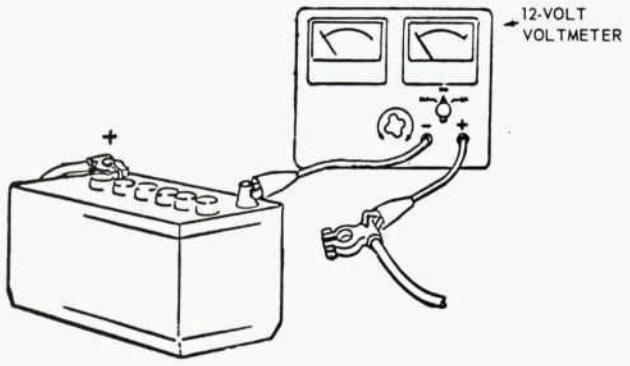
## BATTERY DRAIN TEST

(A) Equipment: 12 volt Voltmeter and battery cable wrench.

(B) Disconnect battery ground cable from battery and attach Voltmeter positive lead to negative cable terminal –See Fig. 1. Attach voltmeter negative lead to that battery negative post.

(C) With all circuits off, the meter should read zero. Any current draw due to an accessory or wire harness defect will register a battery voltage reading. When checking vehicles equipped with an electric clock, a full battery voltage reading should not necessarily be construed as unnecessary current draw. Clock wind-up contact occurs approximately every two minutes and will register a full battery voltage reading.

The meter will continue to show full battery voltage until the clock is energized by touching the negative cable terminal to the battery negative post. After the clock has been energized, the meter should register zero until the clock runs down again.




Battery Drain Test Hookup

*Figure 1*

## CHARGING THE BATTERY

The table in Chart 1 outlines the charging time and rate.

The charge rate and time schedule is based on an average charge rate of 35 amps for the recommended time. When using charging equipment not capable of delivering the full 35 amp rate for the duration of the recommended time period, it may be necessary to extend the charge time until the specific gravity reaches:

1260 at 80°F (Standard battery)
1250 at 80°F (Sta-Ful battery)

This is not a fully charged battery but it is adequate for normal customer service.

The battery is fully charged when the cells are all gassing freely and the specific gravity ceases to rise for three successive readings taken at hourly intervals.

## INSTRUCT OWNER ON BATTERY CARE

(A) Generator does not develop maximum output at road speeds under 25 MPH. It is advised that electrical equipment be used with discretion at speeds under 25 MPH to avoid excessive power draw on the available generated electrical supply.

(B) At engine idle no reserve electrical power is generated for accessory use.

(C) Check battery water level.

CHART 1

## HIGH RATE OF CHARGE SCHEDULE

| Specific Gravity Reading | Charge Rate Amperes | BATTERY CAPACITY—AMP HOURS 40 | 45 | 55 | 65 | 70 | 80 |
|---|---|---|---|---|---|---|---|
| | | HIGH RATE CHARGING TIME | | | | | |
| 1.125* to 1.150 | 35 | 1 Hr. | 1 Hr. 5 Min. | 1 Hr. 20 Min. | 1 Hr. 35 Min. | 1 Hr. 40 Min. | 1 Hr. 55 Min. |
| 1.150 to 1.175 | 35 | 45 Min. | 50 Min. | 1 Hr. 5 Min. | 1 Hr. 15 Min. | 1 Hr. 20 Min. | 1 Hr. 35 Min. |
| 1.175 to 1.200 | 35 | 35 Min. | 40 Min. | 50 Min. | 1 Hr. | 1 Hr. | 1 Hr. 10 Min. |
| 1.200 to 1.225 | 35 | 25 Min. | 30 Min. | 35 Min. | 40 Min. | 45 Min. | 50 Min. |
| Above 1.225 | 5 | | NOTE: Charge at low rate only until specific gravity reaches: 1.260 at 80°F (Standard Battery) 1.250 at 80°F (Sta-Ful Battery) | | | | |

*If the specific gravity is below 1.125, use the indicated high-rate of charge, then use a low rate of charge (5 amperes) until the specific gravity reaches: 1.260 at 80°F: Standard Battery 1.250 at 80°F: Sta-Ful Battery

## CORRECTION ON PREVIOUS BATTERY TESTING ARTICLE

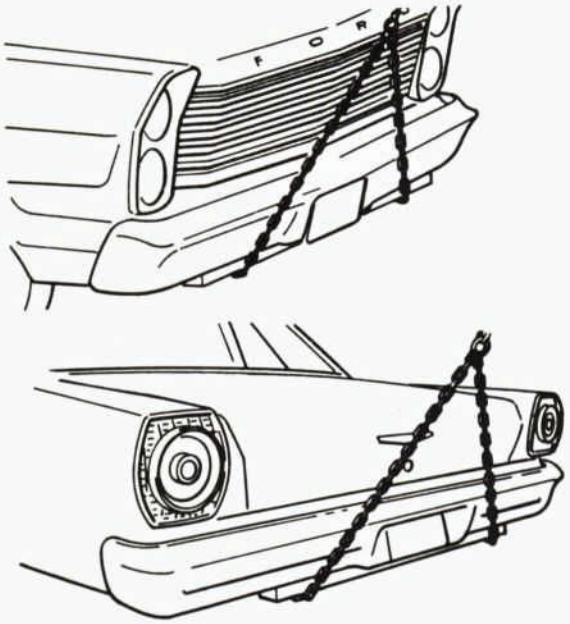
The paragraph on the Three Minute Battery Test which appeared in the article entitled "Revised Battery Testing Procedure For All Car Lines" on page 16 of July-August SHOP TIPS should have read as follows:

If voltage was below 4.8 volts for a 6 volt battery or 9.6 volts for a 12 volt battery during the capacity test, place the battery on fast charge for 3 minutes at a rate of 75 amps for a 6 volt battery or 40 amps for a 12 volt battery. After charging, if the total voltage is over 7.75 volts for a 6 volt battery or 15.5 volts for a 12 volt battery, the battery is probably sulphated. The battery should then be placed on slow charge for de-sulphating, then retested for capacity. If the second test is satisfactory, place the battery back in service, if not, replace the battery.

If total voltage is under 7.75 volts for 6 volt battery or 15.5 volts for a 12 volt battery, test the specific gravity, then either charge the battery, or, if the specific gravity is above 1.225, the battery may be placed back in service.

# PUSHING and TOWING 196

## PASSENGER CARS



### SPECIAL PRECAUTIONS IN TOWING

If the car must be towed, it is important that the towing chains be fastened only to the front suspension lower arms or the rear axle using suitable spacers beneath the underbody so that the towing chain or cable does not bear on the body lower panels or bumpers (see illustration). *Do not lift the car by the front or rear bumpers.* Make sure that the parking brake is released and that the gear selector is in neutral. It is important to know that the transmission and rear axle are in proper working order before towing.

To move a car with an inoperative axle, it is necessary to raise the rear wheels. If the transmission is inoperative, the drive shaft must be removed, or the rear wheels raised, whichever is more convenient. Caution: If a car is to be towed with the rear wheels raised, a locking device should be installed to hold the front wheels in a straight ahead position. If the car must be towed with the rear wheels on the ground, do not exceed 30 mph or a distance of 15 miles. If this distance must be exceeded, it is best to disconnect the drive shaft.

### 1965 FORDS WITH CRUISE-O-MATIC TRANSMISSION

1965 Ford passenger cars equipped with Cruise-O-Matic transmission should not be started by pushing or towing methods. A booster battery or jumper cables from the battery in another car should be used. Connect positive terminal to positive terminal and negative terminal to negative terminal. If the battery is completely discharged, operate the engine at a fast idle for several minutes after it is started with a booster. This will create enough current to excite the alternator until there is some charge in the battery. Remove the air cleaner and check to see that the choke plate is fully closed.

### 1965 FORDS WITH MANUAL-SHIFT TRANSMISSION

Passenger cars equipped with a manual-shift transmission may be started by pushing. Place the shift lever in high gear before pushing, and keep the clutch pedal fully depressed. In addition, if the car has Overdrive, pull the Overdrive control all the way out. Then with the ignition switch on, slowly release the clutch pedal when the car reaches a speed of 10 mph, and press the accelerator pedal halfway down until the car starts moving under its own power.

### 1965 FAIRLANES AND FALCONS

The same information applies as for 1965 Fords (above). Also, it is recommended that the towing chains be fastened only to the arms or brackets that attach the bumper to the underbody. The chains must be routed under the bottom edge of the bumper.

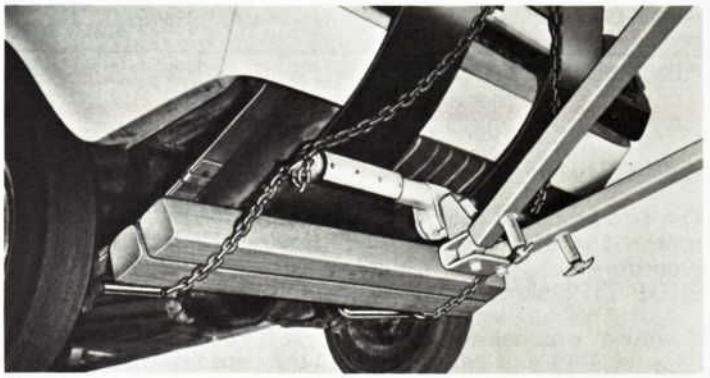
### 1965 THUNDERBIRDS

The same information applies as for 1965 Fords (above).

### 1965 MUSTANGS

The same information applies as for 1965 Fords (above). The photographs below illustrate the use of wood block spacers in towing the car.

**Front spacers in the above photo are 4 x 4 wood beams approximately 55" long. It is important that they rest on the body rails just behind the body lower panel.**



**To tow the Mustang by the rear end, the chains are hooked around the rear axle housing. Before lifting, 4 x 4 wood beams approximately 55" long should be placed between the chains and the underside of the car.**

# 5 FORD CARS and TRUCKS

## LIGHT TRUCKS

### WITH CRUISE-O-MATIC TRANSMISSION

Trucks with Cruise-O-Matic transmission should not be started by pushing. As in the case of passenger cars, a booster battery or jumper cables should be used.

### WITH MANUAL-SHIFT TRANSMISSION

If the truck is equipped with a manual-shift transmission, a push from another truck will usually prove effective, providing that it will not start normally. Shift the selector to high gear before pushing and keep the clutch pedal fully depressed. If equipped with Overdrive, the Overdrive control should be all the way out. Then with the ignition switch on, slowly release the clutch pedal when the truck's speed reaches 10 mph, and press the accelerator pedal halfway down until the truck is moving under its own power.


### SPECIAL PRECAUTIONS IN TOWING

A truck equipped with a manual-shift transmission should not be towed unless the drive shaft is disconnected from the rear axle and tied up. Some transmissions have gears that will rotate even in neutral gear without adequate lubrication. A 4-wheel drive truck can be towed forward without disconnecting the front or rear axle shafts or drive shafts only when both the transmission and the transfer case are in neutral gear.

Should it be necessary to tow the truck backward with the rear wheels raised off the ground, remove the two front axle driving hubs and spacers so that the front axle differential won't rotate. If the front axle is equipped with free running hubs, set them to the unlocked position.

It is important that towing chains be fastened only to the arm or brackets that attach the bumper to the frame. The chains must be routed under the bottom edge of the bumper. Make sure that the parking brake is released and the transmission is in neutral.

It is important to know that the transmission and rear axle are in proper working order before towing. To move a truck with an inoperative rear axle, it is necessary to raise the rear wheels. If the transmission is inoperative, the drive shaft must be removed or the rear wheels raised.

When towing with the rear wheels raised lock the front wheels in a straight ahead position.

To tow a truck with Cruise-O-Matic less than 15 miles, place the selector lever at "N." Don't tow at speeds of more than 30 mph with the rear wheels on the ground. If the truck must be towed farther than 15 miles or if the Cruise-O-Matic is inoperative, raise the rear wheels or disconnect the drive shaft from the axle.

## HEAVY TRUCKS

Ford heavy trucks are equipped with various combinations of transmissions and axles. Each has its own particular characteristics with regard to pushing or towing.

### WITH TRANSMATIC DRIVE

In general, a truck equipped with Transmatic Drive should only be towed by raising the rear wheels off the ground or disconnecting the drive shaft from the rear axle and tying it up.

### WITH FULLER ROADRANGER TRANSMISSION

To tow a Ford truck equipped with a Fuller Roadranger transmission, raise the rear wheels off the ground or disconnect the drive shaft and tie it up.

### WITH SPICER SYNCHRO-MASTER TRANSMISSION

To tow trucks equipped with the Spicer Synchro-Master transmission, it is advisable to pull the axles or disconnect the propeller shaft, especially when towing at high speeds or for long distances.

### TWO-SPEED TANDEM EQUIPPED TRUCKS

After towing a 2-speed tandem equipped Ford truck with the forward rear tires raised, do not drive it until the lubricant is drained from the forward rear axle and the power divider and these units are refilled with lubricant to the proper level.

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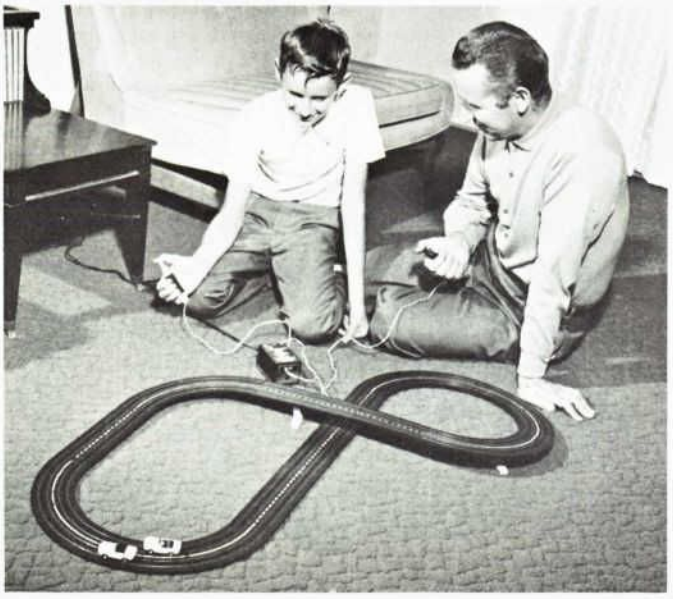

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