SHOP TIPS

Autolite Ford

VOL. 9, NO. 11 JULY, 1971

DISTRIBUTOR...
On-The-Car Services

SEE CENTER INSERT FOR TIMELY PROMOTIONS!

DISTRIBUTOR...

Technical parts and service information published by the Autolite-Ford Parts Division and distributed by Ford and Lincoln-Mercury Dealers to assist servicemen in Service Stations, Independent Garages and Fleets.

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Be sure to file this and future issues for ready reference. If you have any suggestions for articles that you would like to see included in this publication, please write to: Autolite-Ford Parts Division, Merchandising Services Dept., P.O. Box 3000, Livonia, Michigan 48151.

The information in this publication was gathered from materials released by the National Service Department of Autolite-Ford, Ford and Lincoln-Mercury Divisions, as well as other vehicle and parts manufacturers. The descriptions and specifications contained in this issue were in effect at the time it was approved for printing. Our policy is one of continuous improvement and we reserve the right to change specifications or design without notice and without incurring obligation.

Autolite Ford

VOL. 71 MSD 59 LITHO IN U.S.A.

GENERAL INFORMATION

Distributor service is much more than just installing a new set of breaker points. In fact, of all the services that can be performed on the distributor, the installation of a new point set is the easiest of all maintenance work needed.

Complete servicing of the distributor is a must whenever you perform a tune-up. This includes the checking, testing and/or replacement of the condenser, the rotor, the cap, the distributor cam, the centrifugal and vacuum advance/retard mechanism plus the shaft bearings.

You should also be constantly alert to the fact that point life is directly affected by charging system voltage, battery condition, electrical connections in the primary circuit, point alignment, point spacing and condenser capacity to name just a few.

In this issue, you will find simple to perform methods to check the electrical side of the distributor using accurate test equipment, up-to-date specifications, and details on distributor adjustments. Remember, the distributor is one of the major units in the control of hydro-carbon and carbon monoxide emissions for reducing air pollution.

It deserves quality attention, quality service and the use of quality parts . . . Autolite-Ford parts.

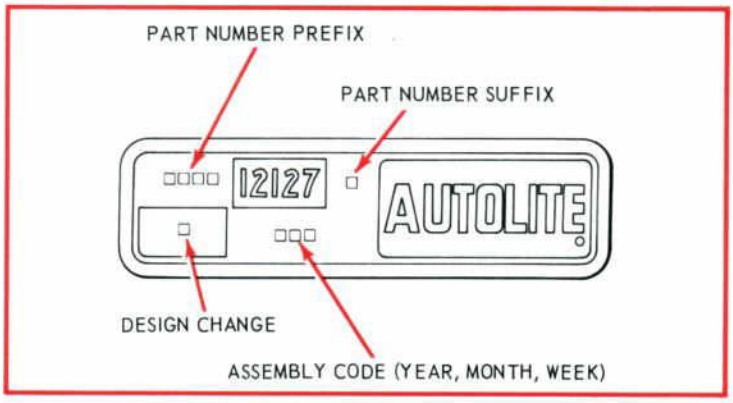

Figure 1—The distributor identification number is stamped on the distributor housing. The basic part number for distributors is 12127. To order replacement parts, it is necessary to know the part number prefix and suffix and, in some cases, the design code change.

BASICS OF IGNITION/DISTRIBUTOR OPERATION

The ignition system has both a primary (low voltage) and a secondary (high voltage) circuit. See Figure 2.

The PRIMARY CIRCUIT consists of the:

1. Battery
2. Ignition switch
3. Primary circuit resistance wire
4. Primary windings of the ignition coil
5. Breaker points
6. Condenser

The SECONDARY CIRCUIT consists of the:

1. Secondary windings of the ignition coil
2. Distributor rotor
3. Distributor cap
4. Ignition Cables–High tension wires
5. Spark plugs

When the breaker points are closed, current flows from the battery through the ignition switch to the primary windings in the coil, then to ground through the closed breaker points. When the breaker points open, the magnetic field built up in the primary windings of the coil moves through the secondary windings of the coil, producing high voltage. High voltage is produced each time the breaker points open. The high voltage flows through the coil high tension lead to the distributor cap where the rotor distributes it to one of the spark plug terminals in the distributor cap. This process is repeated for every power stroke of the engine.

Ignition system troubles are caused by a failure in the primary and/or the secondary circuit; incorrect ignition timing; or incorrect distributor advance. Circuit failures may be caused by shorts, corroded or dirty terminals, loose connections, defective wire insulation, cracked distributor cap or rotor, defective distributor points, fouled spark plugs, or by improper dwell angle.

If an engine starting or operating trouble is attributed to the ignition system, start the engine and verify the complaint. On engines that will not start, be sure the fuel system is operating properly and there is gasoline in the fuel tank.

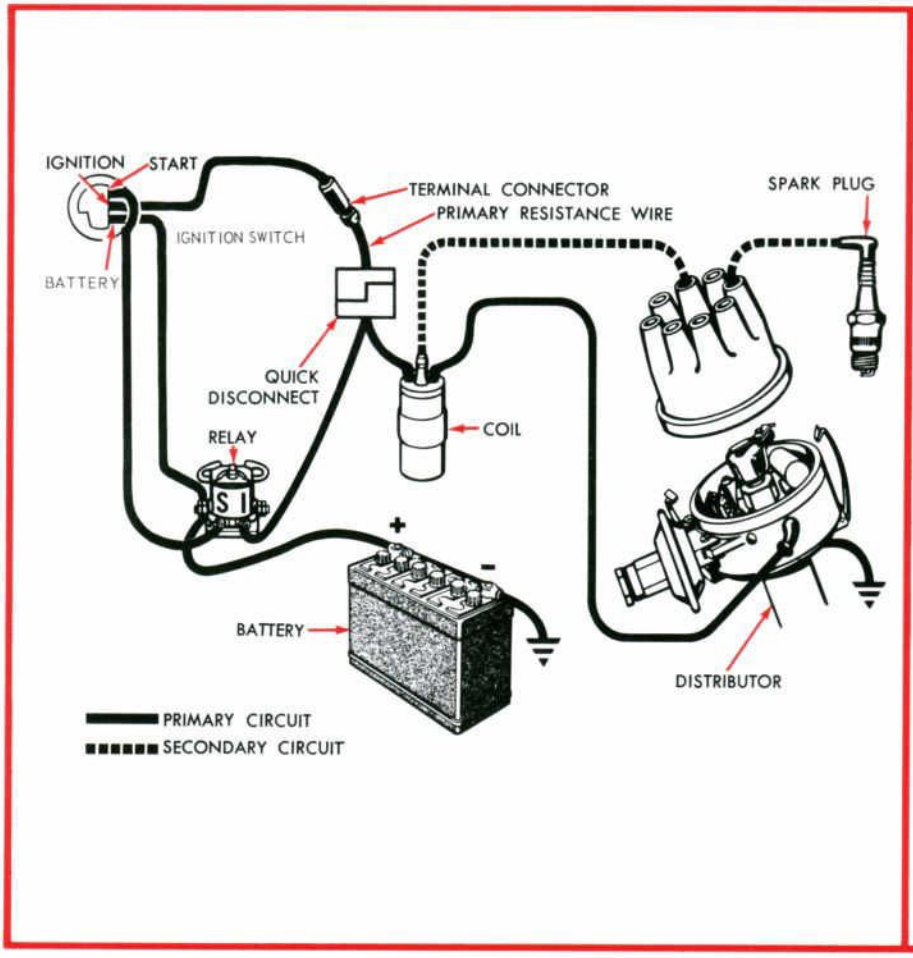

Figure 2–Typical Units in a Conventional Ignition System Circuit

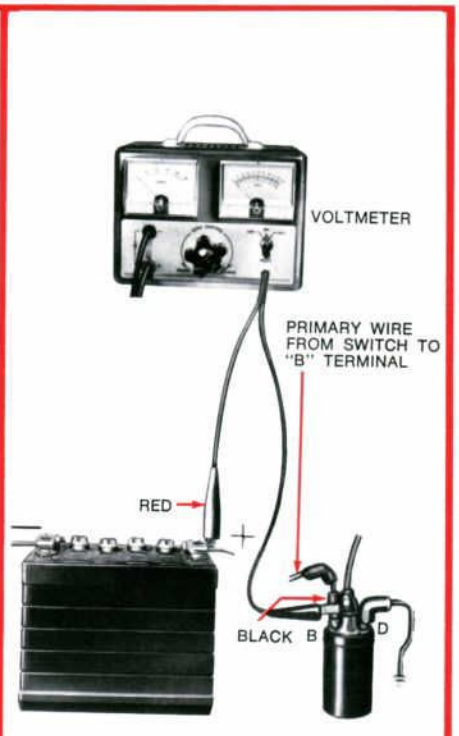

Figure 3 – Battery-to-Coil and Starting Ignition Circuit Tests

DISTRIBUTOR...

TESTING THE IGNITION CIRCUIT

SPARK INTENSITY TEST

1. To perform this test, disconnect the brown wire from the starter relay I terminal and the red and blue wire from the starter relay S terminal.
2. Remove the coil high tension lead from the distributor cap.
3. Turn the ignition switch to *ON* position.
4. While holding the high tension lead approximately 3/16 inch from the cylinder head, or any other good ground, crank the engine by using an auxiliary starter switch between the starter relay battery and S terminals.

If the spark is good, the trouble lies in the secondary circuit.

If there is no spark or a weak spark, the trouble is in the primary circuit, coil to distributor high tension lead, or the coil.

PRIMARY CIRCUIT

A breakdown or energy loss in the primary circuit can be caused by: defective primary wiring, loose or corroded terminals; burned, shorted, sticking, or improperly adjusted breaker points; a defective coil, or defective condenser.

A complete test of the primary circuit consists of checking the circuit from the battery to the coil, the circuit from the coil to ground, and the starting ignition circuit.

Excessive voltage drop in the primary circuit will reduce the secondary output of the ignition coil, resulting in hard starting and poor performance.

To isolate troubles in the primary circuit, use a voltmeter and perform the following tests; Battery to Coil; Starting Ignition Circuit; Resistance Wire; Coil to Ground.

SECONDARY CIRCUIT

A breakdown or energy loss in the secondary circuit can be caused by: fouled or improperly adjusted spark plugs; defective high tension wiring; or high tension leakage across the coil, distributor cap, or rotor resulting from an accumulation of dirt.

To check the spark intensity at the spark plugs, thereby isolating an ignition problem to a particular cylinder, proceed as follows:

1. Disconnect a spark plug wire. Check the spark intensity of one wire at a time.
2. Install a terminal adapter in the terminal of the wire to be checked. Hold the adapter approximately 3/16 inch from the exhaust manifold and crank the engine, using a remote starter switch. The spark should jump the gap regularly.
3. If the spark intensity of all the wires is satisfactory, the coil, condenser, rotor, distributor cap, and the secondary wires are probably satisfactory.

If the spark is good at only some wires, check the resistance of the faulty leads.

If the spark is equal at all wires, but weak or intermittent, check the coil, distributor cap, and the coil to distributor high tension wire. The wire should be clean and bright on the conducting ends, and on the coil tower and distributor sockets. The wire should fit snugly and be bottomed in the sockets.

BATTERY TO COIL VOLTMETER TEST

1. Connect the voltmeter leads as shown in Figure 3.
2. Install a jumper wire from the distributor terminal of the coil to a good ground on the distributor housing.
3. Turn lights and accessories *OFF* and turn the ignition switch *ON*.
4. If the voltmeter reading is between 4.5 and 6.9 volts, the primary circuit from the battery to the coil is satisfactory.
5. If the voltmeter reading is greater than 6.9 volts, check the following: ■ The battery and cables for loose connections or corrosion. ■ The primary wiring for worn insulation, broken strands, and loose or corroded terminals. ■ The resistance wire for defects. ■ The starter relay to ignition switch for defects.

If the voltmeter reading is less than 4.5 volts the resistance wire should be replaced.

STARTING IGNITION CIRCUIT VOLTMETER TEST

1. Connect the voltmeter leads as shown in Figure 3 and disconnect and ground the coil to distributor high tension lead at the distributor.
2. With the ignition switch *OFF* crank the engine by installing a jumper wire between the battery and the S terminal of the starter relay while observing the voltage drop.
3. If the voltage drop is 0.1 volt or less, the starting ignition circuit is satisfactory.
4. If the voltage drop is greater than 0.1 volt, clean and tighten the terminals in the circuit or replace the wiring as necessary.

IGNITION SWITCH VOLTMETER TEST

1. Connect the voltmeter leads as shown in Figure 4, and install a jumper wire from the distributor terminal of the coil to a good ground on the distributor body.

2. Turn all of the accessories and lights *OFF* and turn the ignition switch *ON*.
3. If the voltmeter reading is 0.3 volt or less, the ignition switch and the relay to switch wire are satisfactory.
4. If the voltmeter reading is greater than 0.3 volt, either the ignition switch and/or the wire is damaged.

RESISTANCE WIRE VOLTMETER TEST

1. Connect the voltmeter leads as shown in Figure 5 and install a jumper wire from the *DIST* terminal of the coil to a good ground.
2. Turn all of the accessories and lights *OFF* and turn the ignition switch *ON*.
3. If the voltmeter reading is between 6.6 and 4.5 volts, the resistance wire is satisfactory.
4. If the voltmeter reading is greater than 6.6 volts, or less than 4.5.replace the resistance wire.
5. Turn the ignition switch *OFF*. Disconnect the voltmeter leads. Remove the jumper wire connected to the coil DIST terminal. Connect the BAT lead to the BAT terminal and go on to the Coil to Ground Test.

COIL TO GROUND VOLTMETER TEST

1. Connect the voltmeter leads as shown in Figure 6 and close the breaker points.
2. Turn all lights and accessories *OFF* and turn the ignition switch *ON*.
3. If the voltmeter reading is 0.25 volt or less, the primary circuit from coil to ground is satisfactory.
4. If the voltmeter reading is greater than 0.25 volt, test the voltage drop between each the following: The coil and the breaker point connections of the coil to distributor primary wire ■ The movable breaker point and the breaker plate ■ The breaker plate and the distributor housing ■ The distributor housing and engine ground.
5. Turn the ignition switch *OFF*. Disconnect the voltmeter leads.

SECONDARY (High-Tension) WIRES RESISTANCE TEST

The secondary wires include the wires connecting the distributor cap to the spark plugs and the wire connecting the center terminal of the distributor cap to the center terminal of the ignition coil.

Clean and inspect the secondary wiring.

These wires are the radio resistance type which filter out the high frequency electrical impulses that are the source of ignition noise interference. The resistance of each wire should not exceed 1000 ohms per inch. When checking the resistance of the wires or setting ignition timing, do not puncture the wires with a probe. The probe may cause a separation in the conductor.

When removing the wires from the spark plugs grasp and twist the moulded cap, then pull the cap off the spark plug. Do not pull on the wire because the wire connection inside the cap may become separated or the insulator may be damaged.

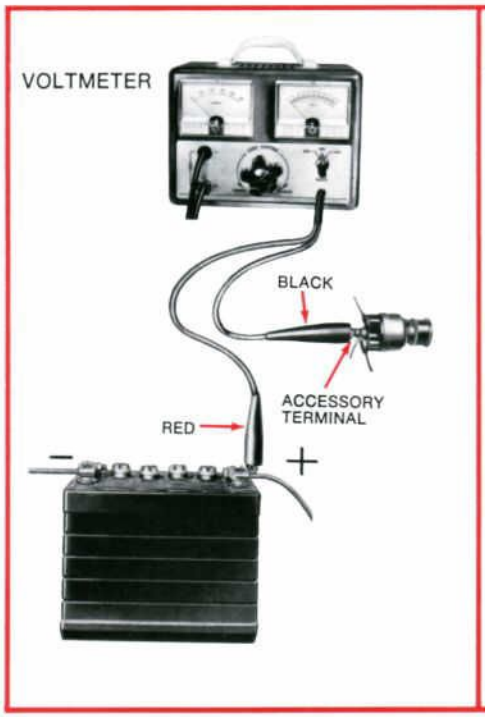

Figure 4—Details for Connecting Voltmeter to Make Ignition Switch Test

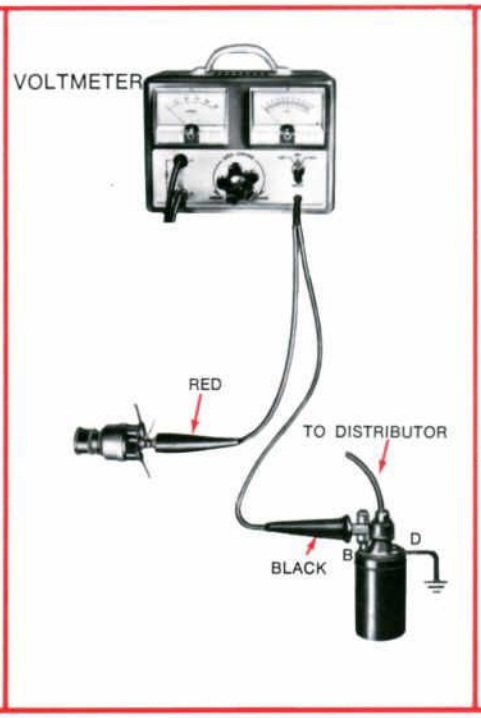

Figure 5—Details for Connecting Voltmeter to Make Resistance Wire Test

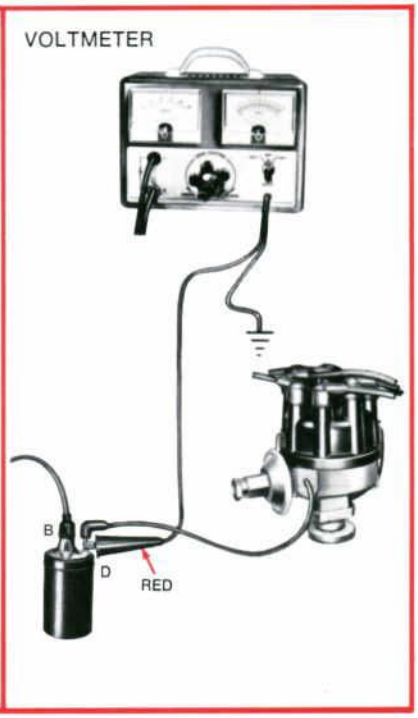

Figure 6—Details for Connecting the Voltmeter to Make the Coil to Ground Test

DISTRIBUTOR...

DISTRIBUTOR SHAFT END PLAY CHECK

If the shaft end play is not within specifications, check the location of the gear on the shaft (6-cyl. engine distributor) or the distributor shaft collar (8-cyl. engine distributor).

6-Cylinder Engine Distributor

The shaft end play can be checked with the distributor installed on the engine.

1. Mount a dial indicator on the distributor so that the indicator tip rests on the top of the distributor shaft.
2. Push the shaft down as far as it will go and set the dial indicator on zero.
3. Pull the distributor shaft upward as far as it will go and read the end play. The end play should be within specifications, as shown in the chart on this page, with the distributor either removed or installed.

8-Cylinder Engine Distributor

1. Remove the distributor from the engine.
2. Place the distributor in the holding tool and clamp it in a vise with the gear end up.
3. Push the distributor shaft upward as far as it will go, and check the end play with a feeler gauge placed between the shaft collar and the distributor base. The end play should be within the specified limits as shown in the chart below. If the shaft end play is not to specifications, check the location of the distributor shaft collar.

Engine	Distributor Shaft End Play (1)	Gear Location (2)
170	0.022-0.033	2.510-2.515
200	0.022-0.033	
240	0.003-0.010	
250	0.022-0.033	
302	0.024-0.035	4.031-4.038
351	0.024-0.035	4.031-4.038
390	0.022-0.033	3.071-3.078
428	0.022-0.032	3.071-3.078
429	0.024-0.035	4.031-4.038
460	0.024-0.035	4.031-4.038

(1) Measured with Distributor Removed.

(2) Distance from bottom of mounting Flange to bottom of gear.

ADJUSTMENTS

Accurate ignition system adjustments are of great importance in the control of hydro-carbon and carbon monoxide emissions for reducing air pollution.

After any adjustment of ignition timing and distributor point dwell, check the distributor automatic advance for proper operation.

To keep engine emission control within the limits of government regulations, the carburetor fuel mixture and idle speed adjustments should also be checked after making ignition system adjustments. Also the exhaust control valve (if so equipped), crankcase ventilation system, and vacuum systems must be in good operating condition.

BREAKER POINTS AND/OR ALIGNMENT

The vented-type pivoted breaker points must be accurately aligned and strike squarely to assure normal breaker point life. Misalignment of these breaker point surfaces can cause premature wear, overheating and pitting.

However, misalignment of pivotless points is not so critical, and as Figure 7 indicates, alignment tends to improve with use.

1. Turn the cam so that the breaker points are closed and check the alignment of the points. See Figure 8.

If the distributor is in the engine, close the points by proceeding as follows:

Disconnect the brown wire and the red and blue wire from the starter relay and, with the ignition switch OFF, crank the engine by using an auxiliary starter switch between the S and the battery terminals of the starter relay.

2. Using the tool shown and exerting very light pressure, align the breaker points to make full face contact by bending the stationary breaker point bracket as shown in Figure 9. DO NOT BEND THE BREAKER ARM.
3. After the breaker points have been properly aligned, adjust the breaker point gap or dwell.

BREAKER POINT GAP ADJUSTMENT

A scope or a dwell meter should be used to check the gap of used breaker points. Due to the roughness of used points, it is not advisable to use a feeler gauge to check the gap.

To check and adjust the breaker points with a feeler gauge:

1. Check and adjust the breaker point alignment.
2. Rotate the distributor until the rubbing block rests on the peak of a cam lobe.

If the distributor is in the engine, place the rubbing block on the peak of the cam by proceeding as follows:

Disconnect the brown wire and the red and blue wire from the starter relay and, with the ignition switch off, crank the engine by using an auxiliary starter switch between the S and battery terminals of the starter relay.

Insert the correct blade of a clean feeler gauge between the breaker points. Adjust the points to the correct gap and tighten the screws.

Apply a light film of distributor cam lubricant (C4AZ-19D530-A) to the cam when new points are installed. Do not use engine oil to lubricate the distributor cam.

Set the ignition timing.

If a scope or a dwell meter is used to adjust new points, be sure the points are in proper alignment. Also, set the contact dwell to the low setting.

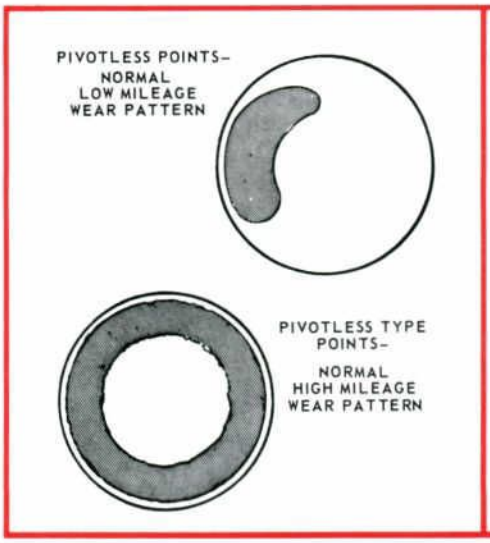

Figure 7–Note the Wear Pattern on the Face of Pivotless Points as Mileage Increases

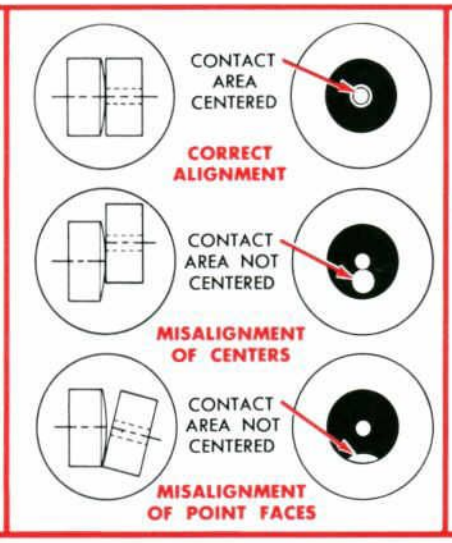

Figure 8 – Checking for Contact Area Alignment of Pivoted Points

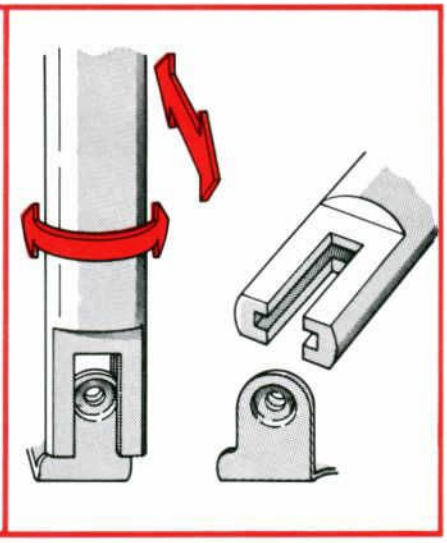

Figure 9–Correct Use of a Distributor Point Alignment Tool

BREAKER POINT SPRING TENSION ADJUSTMENT

Correct breaker point spring tension is essential to proper engine operation and normal breaker point life. If the spring tension is too great, rapid wear of the breaker arm rubbing block will result, causing the breaker point gap to close up and retard the spark timing. If the spring tension is too weak, the breaker arm will flutter at high engine rpm resulting in an engine miss.

To check the spring tension on either the pivot-type or the pivotless breaker points, place the hooked end of the spring tension gauge over the movable breaker point. Pull the gauge at a right angle (90 degrees) to the movable arm until the breaker points just start to open as shown in Figure 10. If the tension is not within specifications, adjust the spring tension on the pivot-type points or replace the breaker point assembly on the pivotless points.

To adjust the spring tension (Figure 11) proceed as follows:

1. Disconnect the primary lead wire and the condenser lead.
2. Loosen the nut holding the spring in position. Move the spring toward the breaker arm pivot to decrease tension and in the opposite direction to increase tension.
3. Tighten the lock nut; then check spring tension. Repeat the adjustment until the specified spring tension is obtained.
4. Install the primary lead wire and the condenser lead.

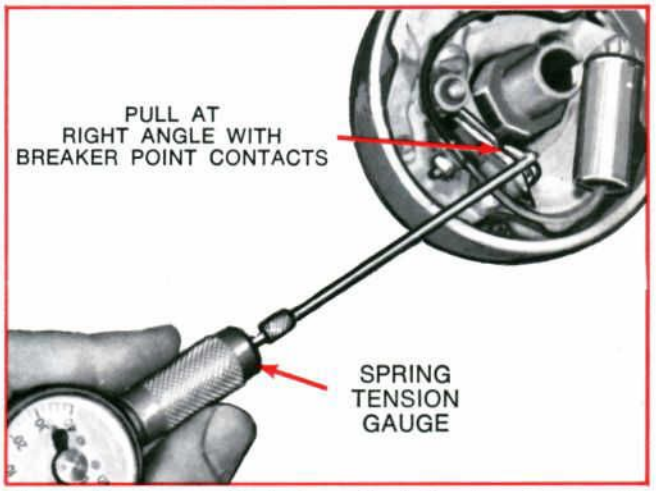

Figure 10 – Correct Method to Check Breaker Point Spring Tension

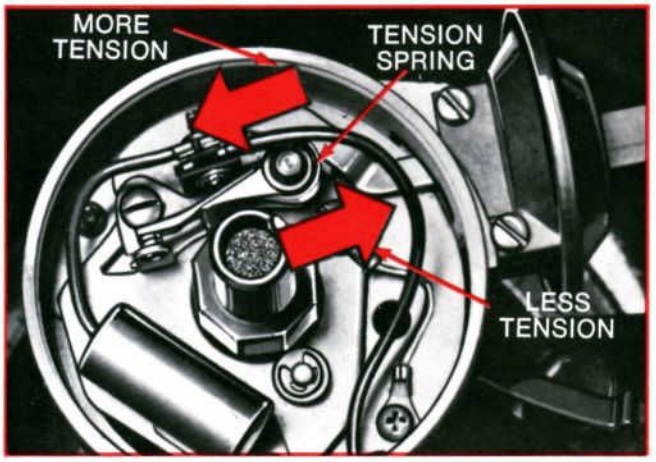

Figure 11–Correct Method for Adjusting Breaker Point Spring Tension

DISTRIBUTOR . . . On-The-Car Services *Continued*

IGNITION TIMING

The 1971 timing marks and their locations are illustrated in the chart on the following page.

For checking and adjusting the ignition timing with a scope refer to the scope manufacturer's instructions. To check and adjust the timing with a power timing light, proceed as follows:

INITIAL IGNITION TIMING

1. Clean and mark the timing marks. Be sure the distributor vacuum lines are properly connected.
2. Disconnect the vacuum line (single-diaphragm distributors) or vacuum lines (dual-diaphragm distributor), and plug the disconnected vacuum line(s).
3. Connect a timing light to the No. 1 cylinder spark plug wire. Install an engine speed tachometer.
4. Start the engine and reduce the idle speed to 600 rpm to be sure that the centrifugal advance is not operating. Adjust the initial ignition timing to specifications by rotating the distributor in the proper direction.
   - On a six cylinder engine turn the distributor counterclockwise to advance the timing.
   - On a V-8 engine turn the distributor clockwise to advance the timing.
5. Check the centrifugal advance for proper operation. Start the engine and accelerate it to approximately 2000 rpm.

   If the ignition timing advances, the centrifugal advance mechanism is functioning properly. Note the engine speed when the advance begins and the amount of advance. Stop the engine.
6. Unplug the vacuum line and connect it to the distributor vacuum advance unit (outer diaphragm on dual-diaphragm distributors). Start the engine and accelerate it to approximately 2000 rpm. Note the engine speed when the advance begins and the amount of advance. Advance of the ignition timing should begin sooner and advance farther than when checking the centrifugal advance alone. Stop the engine.
7. Check the vacuum retard operation on dual-diaphragm distributors. Connect the intake manifold vacuum line to the inner (retard) diaphragm side of the vacuum advance. Reset the carburetor to normal idle speed. The initial timing should retard to approximately TDC, if the initial ignition timing is correct. On some engines it will go as low as six degrees ATDC.
8. If the vacuum advance or vacuum retard (dual-diaphragm distributors) is not functioning properly (refer to steps 6 and 7 above), remove the distributor and check it on a distributor tester. Replace the dual-diaphragm unit if either of the diaphragms is leaking or if the retard portion is out of calibration. Replacement is also called for if the advance portion cannot be calibrated to specifications.

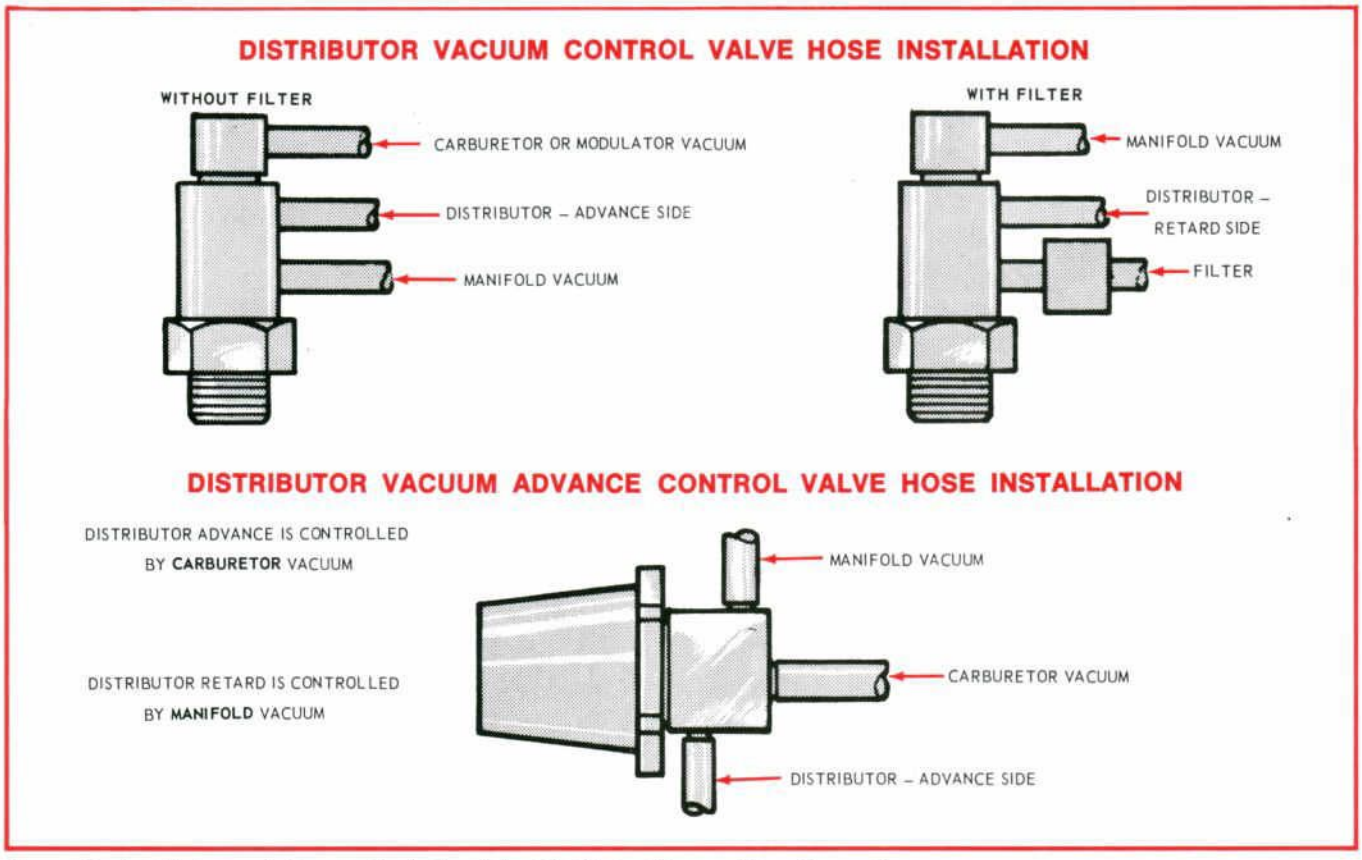

Figure 12–Installation and Correct Hook-Up of the Distributor Vacuum Hose Connections

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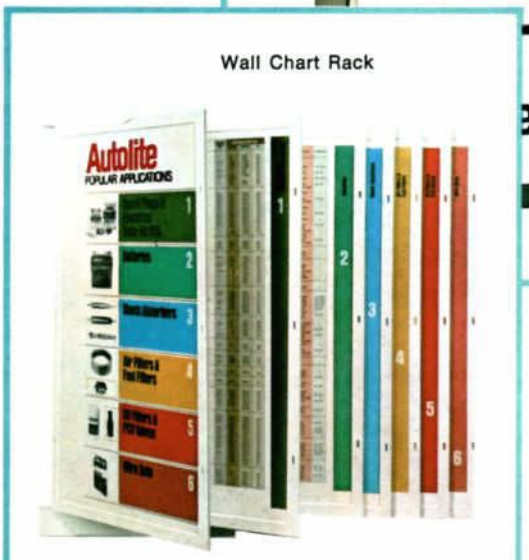

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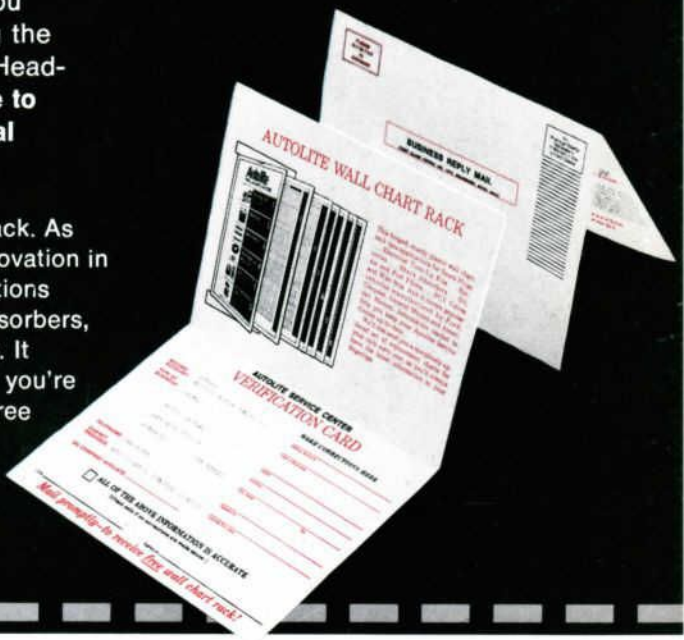

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ELECTRICAL PARTS • *Alternators* • *Armatures* • *Generators* • *Distributors* • *Voltage Regulators* • *Starters*

ENGINES • *Complete Assemblies* • *Short Block Assemblies*

ENGINE COMPONENTS • *Cylinder Heads* • *Water Pumps* • *Carburetors* • *Rocker Arm Kits* • *Crankshaft Kits* • *Fuel Pumps* • *Power Steering Pumps*

POWER TRAIN COMPONENTS • *Clutch Discs* • *Pressure Plates* • *Brake Shoes* • *Torque Converters* • *Transmissions* • *Power Brake Boosters*

NATIONAL WARRANTY

Every Remanufactured Ford Part is warranted nationally by the Remanufacturer to be free of defects in materials and workmanship for 90 days or 4000 miles from date of installation, whichever occurs first. Complete OHV engine assemblies are warranted for 12 months or 12,000 miles on passenger vehicles, and 6 months or 12,000 miles on trucks, whichever occurs first. This Warranty includes parts replacement plus related labor.

Ford and Lincoln-Mercury dealers will honor this warranty anywhere in the country.

Remanufactured

Ford

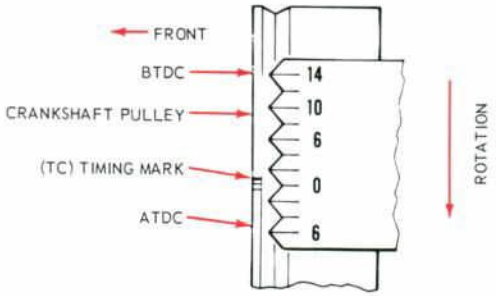
Engines · Parts

DISTRIBUTOR . . .
On-The-Car Services *Continued*

ENGINE TIMING AND CYLINDER FIRING ORDER 1971 FORD-BUILT ENGINES

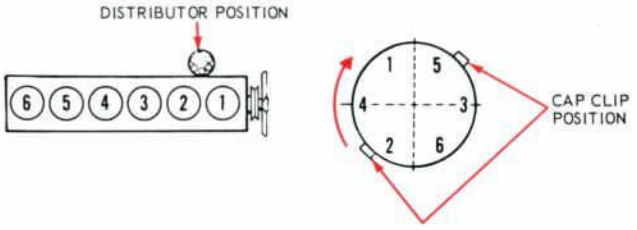
170, 200, 240 AND 250 6 CYLINDER

TIMING MARK SKETCH



VIEWED FROM LEFT SIDE OF ENGINE

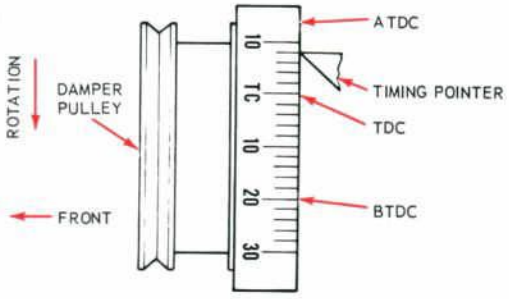
CYLINDER AND DISTRIBUTOR NUMBERING



FIRING ORDER–1–5–3–6–2–4

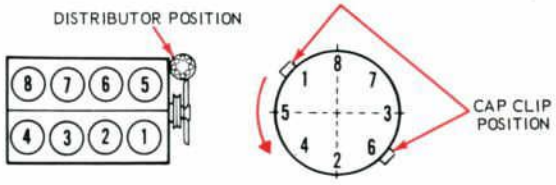
302, 351, 390, 400, 429 AND 460 V-8

TIMING MARK SKETCH



VIEWED FROM LEFT SIDE OF ENGINE

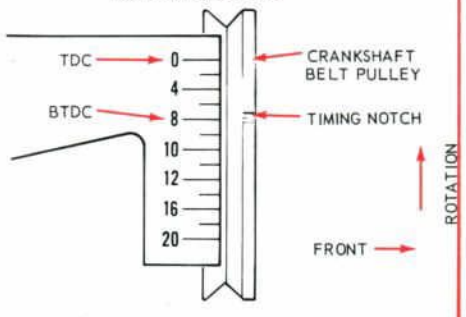
CYLINDER AND DISTRIBUTOR NUMBERING



FIRING ORDER (351 AND 400)–1–3–7–2–6–5–4–8
(OTHERS)–1–5–4–2–6–3–7–8

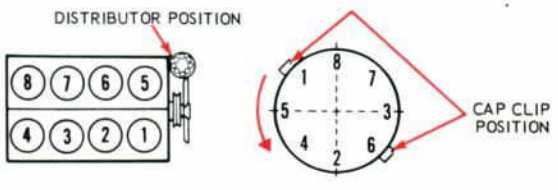
429 HO V-8

TIMING MARK SKETCH



VIEWED FROM RIGHT SIDE OF ENGINE

CYLINDER AND DISTRIBUTOR NUMBERING



FIRING ORDER–1–5–4–2–6–3–7–8

Figure 13–1971 Engine Timing and Cylinder Firing Order–All Ford-Built Engines

DISTRIBUTOR...

OPERATION OF THE DUAL-DIAPHRAGM VACUUM ADVANCE DISTRIBUTOR

The centrifugal advance unit is the same on dual-diaphragm vacuum advance distributors as on single-diaphragm vacuum advance distributors. The dual-diaphragm unit consists of two independently operating diaphragms. See Figure 14. The outer (primary) diaphragm utilizes carburetor vacuum to advance ignition timing. The inner (secondary) diaphragm is actuated by intake manifold vacuum to provide additional ignition timing retard during periods of closed throttle idle, thereby assisting in the reduction of exhaust system hydrocarbon emission.

The outer diaphragm is coupled to the movable breaker plate much the same way as in single-diaphragm distributors. An increase in vacuum pressure moves the diaphragm against the advance diaphragm spring tension, causing the movable breaker plate to pivot opposite to distributor rotation. Thus, ignition timing is advanced, and this is calculated to occur during normal road-load operation, but not during deceleration or idle.

When intake manifold vacuum is applied to the inner diaphragm (retard), it moves inward toward the distributor. See Figure 14. This allows the advance diaphragm spring to move the advance diaphragm, causing the movable breaker plate to pivot in the same direction as distributor rotation. This retard of the ignition timing automatically occurs during engine idle or deceleration except when a distributor modulator is installed in the vacuum supply line.

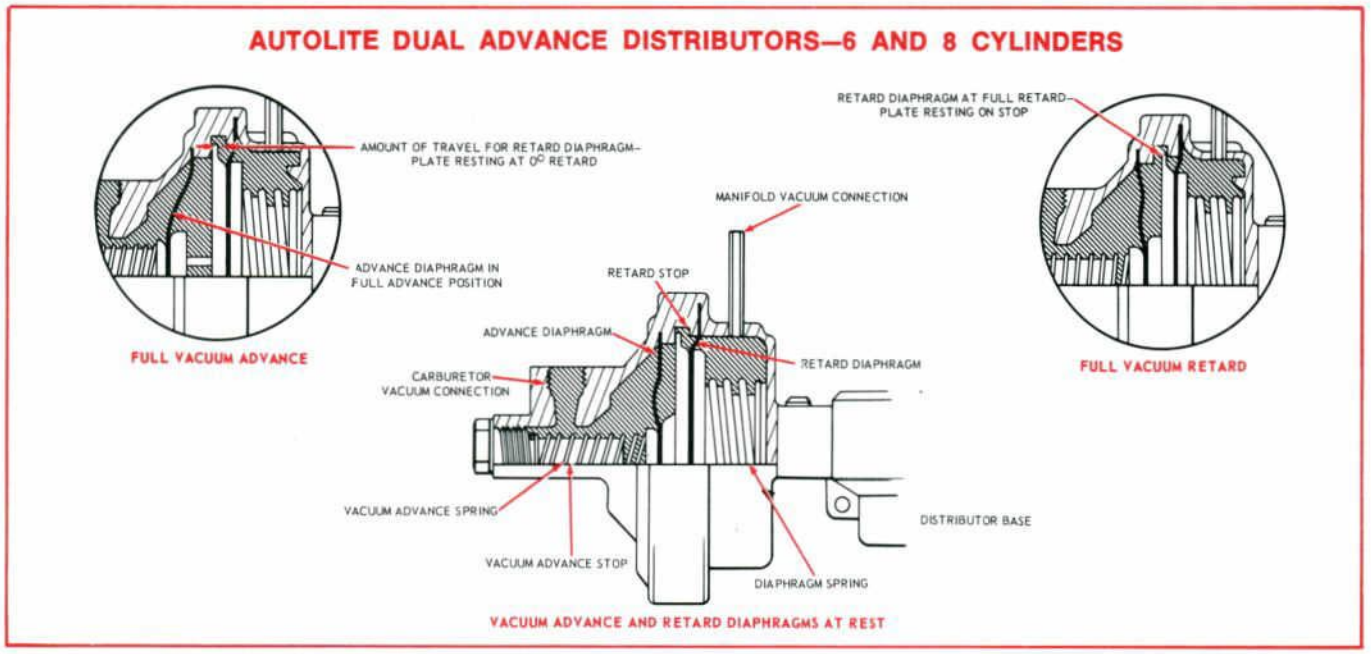


Figure 14—The Internal Operating Mechanism of Autolite's Dual-Diaphragm Vacuum Advance Distributor Used on Both 6 and 8 Cylinder Engines

TESTING DUAL-DIAPHRAGM DISTRIBUTOR ON ENGINE

VACUUM ADVANCE

1. Disconnect the vacuum lines from both the outer and inner diaphragms. Plug the line removed from the inner diaphragm.
2. Using a tachometer, increase the idle speed by setting on the first step of the fast idle cam.
3. Using a timing light observe ignition timing setting.
4. Connect the carburetor vacuum line to the outer diaphragm. The timing should advance immediately. Adjust if necessary.

VACUUM RETARD

1. Readjust the engine idle speed to 550-600 rpm.
2. Using a timing light observe the spark timing.
3. Remove the plug from the manifold vacuum line and connect the line to the inner diaphragm.
4. The timing should retard immediately. Replace the dual-diaphragm unit if either of the diaphragms are leaking or if the retard portion is out of calibration. Replacement is also called for if the advance portion cannot be calibrated to specifications.

1971 FORD-BUILT DISTRIBUTOR APPLICATIONS

Engine	Vehicle Application	DISTRIBUTOR TYPE AND NUMBER (DUAL DIAPHRAGM)			
		California Only		Non-California	
		Standard Transmission	Automatic Transmission	Standard Transmission	Automatic Transmission
170	Maverick, Comet	D1DF-FA		C9DF-B	
200	Maverick, Comet	D1DF-BB	D1DF-GA	D0DF-C	D0DF-C
240	Ford, Taxi, Police			D1AF-CA	C8AF-B
250	Torino, Montego, Mustang, Maverick	D1OF-AB①	D1OF-BB①	D1OF-CA	D1OF-CA
250	Comet		D1OF-BB①		D1OF-CA
302-2V	Comet	D0AF-Y	D1DF-EA	D0AF-Y	D1DF-EA
302-2V	Ford	D0AF-Y	D0AF-AE	D0AF-Y	D0AF-AE
302-2V	Torino, Mustang, Montego	D0AF-Y	D0OF-AC	D0AF-Y	D0OF-AC
302-4V H.O.	Mustang	D1ZF-AA		D1ZF-AA	
351W-2V	Ford, Mercury	D1AF-GA	D1AF-KB	D1AF-GA	D1AF-HA
351C-2V	Torino, Montego	D0OF-T	D1OF-GA	D0OF-T	D0OF-U①
351C-4V	Torino, Montego, Mustang	D0OF-V	D1OF-LA	D0OF-V	D0OF-G
390-2V-R.F.	Ford				D1AF-LB
400-2V-R.F.	Ford, Mercury		D1OF-GA		D0OF-U①
429-2V	Ford, Mercury		D1MF-FA		C8VF-C
429-4VPI.	Ford, Mercury, Police		D1AF-NA		D1AF-NA
429-4V CJ & SCJ	Cougar, Torino, Montego, Mustang	D0OF-AA	D1AF-NA	D0OF-AA	D1AF-NA
429-4V	Thunderbird		D0AF-Z①		D0AF-Z①
429-4V	Ford, Mercury		D1MF-FA		C8VF-C
460-4V	Lincoln, Mark III		D1VF-AA①		D1VF-AA①

① Single Diaphragm

1971 FORD-BUILT ENGINE IGNITION SPECIFICATIONS

Engine	Initial Ignition Timing BTDC	Dwell Angle at Idle Speed (Degrees)	Distributor Point Gap	Spark Plug Gap	Spark Plug Number
170, 200	6° (1) (4)	33-38°	.027″	.032″-.036″	BRF-82
250	6° (1) (4)	34-39½° (2) 33-38° (3)	.025″ (2) .027″ (3)	.032″-.036″	BRF-82
240	6° (1) (4)	33-38°	.027″	.032″-.036″	BRF-42 (5)
302-2V	6° (4)	(6)	(6)	.032″-.036″	BRF-42
351-W-2V	6° (4)	(6)	(6)	.032″-.036″	BRF-42
351-C-2V	6° (4)	(6)	(6)	.032″-.036″	ARF-42
351-C-4V	6° (4)	(6)	(6)	.032″-.036″	ARF-42 (7)
390-2V	6° (4)	24-29°	.021″	.032″-.036″	BF-32
400-2V	6° (4) (9)	(6)	(6)	.032″-.036″	ARF-42
429-2V	4° (4)	(6)	(6)	.032″-.036″	BRF-42
429-4V	4° (4)	(6)	(6)	.032″-.036″	BRF-42
460-4V	10° (4)	27-31½°	.017″	.032″-.036″	BRF-42
429-CJ	10° (4)	Man. Trans. (8) Auto. Trans. 27½-29½°	.020″	.032″-.036″	ARF-32
429 SCJ & P.I.*	10° (4)	Man. Trans. (8) Auto. Trans. 27½-29½°	.020″	.032″-.036″	ARF-32

* Police Interceptor

(1) Idle Speed Set with Headlamps on Hi-Beam—Air Conditioning OFF (if so equipped)

(2) Single Diaphragm Distributor

(3) Dual Diaphragm Distributor

(4) Distributor Vacuum Lines Disconnected

(5) Taxi and Police use BRF-6

(6) Dual Diaphragm Distributor with Single Points 24-29 dwell angle .021″ point gap
Single Diaphragm Distributor with Single Points 26-31 dwell angle .017″ point gap

(7) Manual Transmission ARF-32

(8) Isolate and Set Individual Points 25-25½ Degrees Dwell to Obtain 30-33 Degrees Combined Dwell

(9) California 6°, Non-California 10°

AUTOLITE SIPCON...

FOR ALL FORD VEHICLES AND POPULAR GENERAL MOTORS AND CHRYSLER APPLICATIONS!

INTRODUCTION TO DEPENDABILITY...

All Ford-built cars and most trucks since 1954 have been built with resistance type spark plug cables. Since that time, Ford Engineering has led the way by perfecting this product to such an extent that, today, Autolite Tailored Ignition Cables are equal to or better than any ignition set on the market.

During 1965, Autolite made a major breakthrough in the termination used on suppression type ignition cables. After that time, ALL Ford-built cars and ALL Ford trucks have used Autolite Tailored Ignition sets as original equipment. The quality features perfected over the years have now been proven dependable by millions of Autolite Ignition Cables in actual vehicle use.

In order to dramatize the dependability of Autolite Tailored Ignition Sets, they have been branded SIPCON (SIlent Power CONductors).

This is what SIPCON means–

- **SI** (SIlent) indicates that SIPCON supresses radio and TV interference.
- **P**(Power) SIPCON ignition sets allow the engine to develop its rated horespower.
- **CON** (CONductors) The connection between the distributor and the spark plugs which transmits the electrical energy to fire up the engine for peak performance.
- **SIPCON**–The proven dependable ignition set.

THE PURPOSE OF SIPCON IGNITION CABLES...

The primary purpose of the ignition cable is to transmit electrical energy from the distributor to the spark plug to ignite the air/fuel mixture. In recent years it has been modified to reduce radio and TV interference by adding resistance.

DON'T LET THE TERM RESISTANCE FRIGHTEN YOU because the voltage required to bridge the gap of a spark plug (.035") through a copper or steel cable will fire the same plug through a suppression type cable. Adding resistance to the ignition cables will NOT make the engine hard to start–will NOT reduce gas mileage or impair performance.

Adding resistance to the secondary ignition circuit reduces or eliminates the *inductive* portion of electrical energy created when voltage jumps a spark plug gap. One way to achieve this is to use resistor spark plugs. However, this lumps the resistance into one spot and limits the frequency range that can be controlled.

Another way is to incorporate a resistance of 3 to 7 thousand ohms per running foot in the secondary spark plug cables. Distributing the resistance along the entire length of cable is particularly desirable because: first, a cross-firing condition is less likely to occur between wires; and second, ignition suppression is controlled over a wider frequency range, as opposed to locating the resistance in one spot.

Both standard spark plugs and resistor spark plugs can be used with SIPCON cables.

THE SPARK...

Spark plugs do not fire until enough voltage is built up to jump the gap. The surge of electrical energy that jumps the gap is divided into two parts. *Only the first part (capacitive portion) actually ignites the air/fuel mixture. It's practicalily impossible to see. The balance of electrical energy (inductive portion) causes the noticeable flash. It contributes nothing to combustion.* However, this continuing discharge after ignition is radiated as a pulse of electrical noise by "metallic" conductor ignition cables in a manner similar to an antenna. *It is a major factor in radio and TV interference and severe electrode wear.* From this, one must conclude that ignition sets with the so-called "hotter spark" do not contribute to better engine performance and in fact, will shorten the service life of the spark plugs and and may even cause objectionable radio and TV interference.

SIPCON OFFERS MANY BENEFITS...

SIPCON Tailored Ignition Cables will give performance equal to copper sets with the following additional benefits:

- SIPCON will reduce radio and TV interference which copper does not.
- SIPCON ignition sets reduce spark plug gap erosion. Metallic sets contribute to gap growth. Therefore, SIPCON increases spark plug life.
- SIPCON used with non-resistor spark plugs permits using a wider plug gap (.035") for improved idling and cold weather starting.
- SIPCON can be used with resisitor spark plugs for added noise suppression.
- SIPCON can be used to replace ALL metallic core ignition sets.

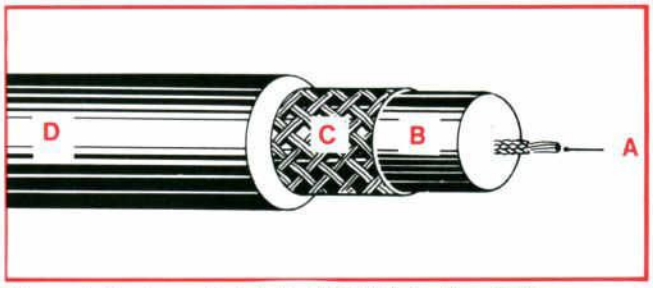


Figure 1–Features of Autolite SIPCON Ignition Cable

Tailored Ignition Sets

BUILT-IN QUALITY . . . Proven by millions of cables in actual vehicle usage.

A ■ CONDUCTOR: Non-metallic core, impregnated with conducting graphite to reduce radio and TV interference. It is covered with a cotton and glass braid, which is coated with a conductive Neoprene coating, to provide high tensile strength with greater flexibility for easier handling and better vibration resistance. The tensile strength of SIPCON (above 150 pounds under controlled laboratory test conditions) is much greater than the strength of the terminal attachment. In other words, the terminal will pull off before the core will separate.

B ■ INNER CORE: Special rubber compound with high dielectric properties. Insulates and guards against voltage loss.

C ■ OUTER BRAID: A skeleton braid of fiber glass reinforces the insulating core. It provides extra strength and resists stretching of the cable and separation of the conductor; a major cause of ignition cable failure in pin terminated sets.

D ■ OUTER SHEATH: A tough Autolite Neoprene or Hypalon jacket of synthetic rubber covers the insulated conductor and braid. It's highly resistant to flame, heat, corona, water, and oil. Autolite SIPCON Ignition Cable meets or exceeds rigid original equipment specifications.

SIPCON TERMINATIONS ARE SUPERIOR . . .

Starting in 1965, Autolite began the "strip and fold" method of terminating ignition cables, eliminating the use of pins entirely. In the "strip and fold" method, about 5/8" of the insulation is stripped from the center conductor. The conductor is then folded back over the insulation and securely fastened under the crimped terminals. Dependability has been proven by millions of these terminations in actual vehicle service since 1965. Controlled laboratory torture tests have proven that the SIPCON "strip and fold" method of construction is ten times as durable as the "pin" construction method . . . further evidence of SIPCON superiority.

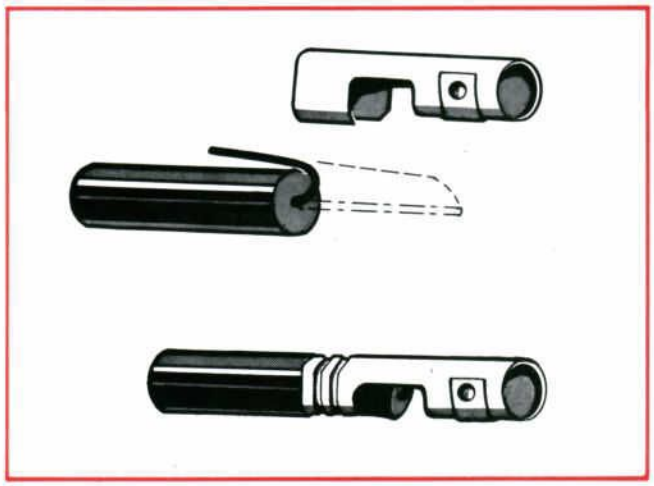


Figure 2—Autolite's 2-piece spring lock terminals anchor securely to spark plug terminals and will not vibrate loose. This provides a positive sure-fire connection.

TESTING . . .

A spark plug cable should be replaced when it deteriorates from the effects of age, heat, electrical tracking, etc. An ohmmeter test provides the most positive method of finding a faulty cable. Generally, a cable with resistance in excess of 1000 ohms per inch should be replaced. However, if one of the shorter cables in a set shows an abnormal reading in comparison to the others, it should be replaced.

For example: a short cable that has 40,000 ohms resistance, while the other cables vary from 5,000 to 20,000 ohms. Also a test for a full continuity while jiggling the cable is recommended.

INSTALLATION INSTRUCTIONS . . .

DO NOT CHANGE MORE THAN ONE CABLE AT A TIME BECAUSE—the practice of numbering each ignition cable to designate cylinder location has been discontinued to greatly reduce the number of sets required to service Ford-built vehicles.

By eliminating the cylinder designation, cables of a given set may be used in a variety of cylinder locations for different engines, making the set more universal. This makes it easier to stock; better coverage provides for faster turnover and improved profits.

TO ASSURE PROPER FIRING ORDER . . .

1. Make sure of the type of terminal required for the spark plug connection.
2. Select new cable of approximately the same length as the old cable. (If original cable has a molded-on grommet to retain cable in a bracket, cut away the grommet and use it on new cable.)
3. Attach spark plug terminal to plug. Insert other end into the distributor.
4. Replace the coil-to-distributor cable.
5. After cables are installed on engine, make sure cables do not interfere with any engine or transmission linkage or are not resting on or touching exhaust manifolds, braces, or tubing connected to the engine which could damage the cable jacket by excessive heat.

All Autolite SIPCON Tailored Ignition Sets you install meet the same high quality standards required for the SIPCON sets that go on every Continental Mark III.

TECHNICAL SERVICE BRIEFS

CARBURETOR DECELERATION VALVE—OPERATION AND SERVICE
(PINTO—ALL ENGINES—1971)

All Pinto engines are equipped with a deceleration valve mounted to the engine adjacent to the carburetor. The purpose of the "DECEL" VALVE is to meter to the engine an additional amount of fuel and air during the engine deceleration periods. This additional amount of fuel and air, together with engine modifications, permits more complete combustion with resultant lower levels of exhaust emissions. During periods of engine deceleration, manifold vacuum forces the diaphragm assembly against the spring (see Figure 1) which, in turn, raises (open position) the decel valve. With the valve now open, existing manifold vacuum pulls a metered amount of fuel and air from the carburetor (see Figure 2) and travels through the valve body assembly into the intake manifold. The decel valve remains open and continues to feed additional air and fuel for three to five seconds.

The decel valve timing (time valve remains open during engine deceleration) can be checked by performing the following:

1. Remove hose from carburetor and install vacuum gauge (see Figure 3).
2. Attach engine "tachometer" and raise engine rpm to 3000.
3. Release throttle and observe the time required for vacuum gauge to drop to zero. Correct decel valve timing is between 3-5 seconds.
4. Time readings below 3 seconds can be raised to specification by turning nylon adjusting cap at top of decel valve body in a counterclockwise direction.
5. Time readings above 5 seconds can be reduced by turning the adjustment cap inward or clockwise.

If the valve timing cannot be adjusted within the 3-5 second specification, it will be necessary to replace the valve assembly.

Malfunction of the decel valve body will normally occur in one of two ways. The following guide will aid in diagnosing the type of malfunction, engine symptoms and recommended corrective action.

TROUBLE SHOOTING CHART

PROBLEM:	CAUSE:	CORRECTION:
Rough idle/excessive lean mixture	Ruptured/leaking decel valve diaphragm	Cover small hole in bottom of decel valve assembly (See Figure 1). Improvement of idle quality indicates defective diaphragm. Replace decel valve assembly, Part No. D1FZ-9K793-A.
Excessive high idle (Approximately (1200-1300 rpm)	Valve in decel assembly sticking open	Attach vacuum gauge to decel valve assembly as shown in Figure 3. A vacuum reading at idle indicates the decel valve is sticking open. Replace decel valve assembly, Part No. D1FZ-9K793-A.

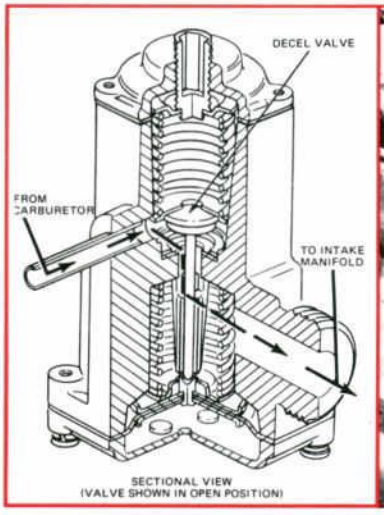


Figure 1—Carburetor Deceleration Valve—Sectional View

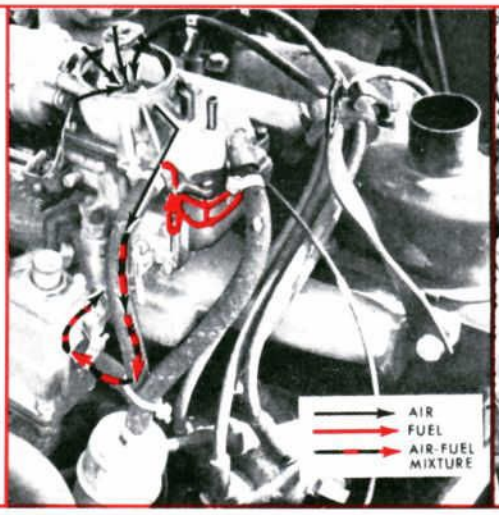


Figure 2 — Carburetor Deceleration Valve—Open Position

Figure 3 — Carburetor Deceleration Valve—with Vacuum Gauge

NEW AUTOLITE PARTS RELEASED

The following is a listing of new parts recently released by Autolite-Ford Parts Division. Keep this handy for quick reference and ordering convenience.

Autolite Sales No.	Part Description	Application
	ELECTRICAL PARTS	
DAE-1101-A	Distributor Assy.	October 1968 to October 1969 Cortina except GT
DA-1118	Distributor Assy.	1971 Mustang 8 Cyl. 351 CID "Boss"
DAE-1119	Distributor Assy.	1971 Capri 122 CID except Calif.
DAE-1120	Distributor Assy.	1971 Capri 122 CID Calif. only
DA-1123	Distributor Assy.	1971 Ford Truck 8 Cyl. 302 CID
DA-1124	Distributor Assy.	1971 Ford Police & Taxi 8 Cyl. 302 CID
DDE-269	Vacuum-Control Distributor	1971 Capri 98 CID
DD-270	Vacuum-Control Distributor	1971 Mustang 8 Cyl. 351 CID
DF-364-A	Shaft Assy.-Distributor	1960-68 Falcon, Fairlane, Ford, Mercury 8 Cyl. All
DF-369-A	Shaft Assy.-Distributor	1968 Lincoln, Thunderbird, 1969 Mark III, 8 Cyl. 429 & 460 CID
DF-372-A	Shaft Assy.-Distributor	1970 Cougar, Ford, Mustang 8 Cyl. 351 CID
DF-374-A	Shaft Assy.-Distributor	1970 Comet, Fairlane, Ford, Mustang, 8 Cyl. 302 CID
DF-391-A	Shaft-Distributor	1971 Ford, Mercury 8 Cyl. 400 CID
GCE-310	Stator-Alternator	1971 Capri 122 CID
GLE-100	Alternator Assy.	1971 Capri
GME-442	Rotor Assy.-Alternator	1971 Capri
GP-508	Pulley-Alternator	1971 Ford Vehicles with 65 Amp.
GPE-509	Fan-Alternator	1971 Capri
GRE-388	Regulator Assy.	1971 Capri 122 CID
GRE-389	Regulator Assy.	1971 Capri 98 CID
MCE-214	Bearing-Starter End Plate	1971 Capri
MM-298-A	Motor Assy.-A/C Blower	1966-71 Ford Truck
MM-301	Motor Assy.	1970-71 Ford Truck W900-1000
SAE-673	Starter Assy.	1971 Capri
SAX-674	Starter Assy.	1966-71 American Motors 8 Cyl.
SAX-675	Starter Assy.	1969-71 American Motors 6 Cyl.
SBE-154	Brush Set-Starter	1971 Capri A/T
SBE-158	Brush Set-Starter	1971 Capri S/T, 98 CID
SBE-159	Brush Set-Starter	1971 Capri 122 CID
SCE-394	Coil-Starter Kit	1971 Capri S/T
SCE-396	Coil-Starter	1971 Capri 122 CID
SCE-397	Coil-Starter	1971 Capri A/T
SD-188	Drive-Starter	1969 Ford Truck with 8 Cyl. 401, 477, 534 CID
SDE-190	Drive-Starter	1971 Capri S/T
SDE-191	Drive-Starter	1971 Capri
SDE-192	Drive-Starter	1971 Capri
SDE-193	Drive-Starter	1971 Capri 122 CID
SDX-194	Drive-Starter	1966-71 American Motors 8 Cyl., 1966-71 6 Cyl.
SEE-134	D.E. Head Starter	1971 Capri
SEE-135	D.E. Head Starter	1971 Capri
SEX-136	D.E. Head Starter	1966-71 American Motors 8 Cyl.
SEX-137	D.E. Head Starter	1969-71 American Motors 6 Cyl.
SF-552B	Flasher-Emergency Warning	1971 Pinto
SME-337	Armature Assy.-Starter	1971 Capri A/T
SME-340	Armature Assy.-Starter	1971 Capri 122 CID
SMX-341	Armature Assy.-Starter	1966-71 American Motors 8 Cyl., 1969-71 6 Cyl.
SWE-1033A	Back-Up Light Switch	1971 Capri
SWE-1051	Solenoid Assy.-Starter	1971 Capri S/T
SWE-1056	Solenoid Assy.-Starter	1971 Capri
SWE-1057	Solenoid Assy.-Starter	1971 Capri
SWE-1058	Solenoid Assy.-Starter	1971 Capri
SW-1060	Headlamp Switch	1971 Pinto
SW-1061	Back-Up Light Switch	1969 Montego, Torino 3 Speed Trans.
	SHOCK ABSORBERS	
AX-154	Shock Absorber	1969-70 Cadillac (Rear)
AX-155	Shock Absorber	1967-70 Mustang H.D. Susp. & Cobra Jet (Front)
AX-156	Shock Absorber	1967-70 Mustang H.D. Susp. & Cobra Jet (Rear)
	FILTER	
FL-228	Oil Filter	1971 Capri 122 CID
	CARBURETOR	
CA-885-A	Carburetor Assy.	1971 Cougar, Mustang 8 Cyl., 351 CID 4 Bbl.
CG-335	Gasket Set	1971 Mustang 8 Cyl. 351 CID
CJ-196	Jet-Main	1971 Pinto 98 CID
CT-721-A	Tune-Up Kit	1968-71 Dart, Dodge, Dodge Truck, Valiant, 8 Cyl. 273, 318, 361 CID
CT-765-A	Tune-Up Kit	1966-67 Buick 8 Cyl. 300, 340 CID
CT-810-A	Tune-Up Kit	1965-70 Kaiser Jeep 4 Cyl. 134 CID
CT-831-A	Tune-Up Kit	1968-69 Buick, Camaro, Chevelle, Chevrolet, Olds F-85, Tempest 6 Cyl. 250 CID
CT-837-A	Tune-Up Kit	1969 Dart, Valiant 6 Cyl. 170, 225 CID
CT-838-B	Tune-Up Kit	1969-70 Dart, Dodge, Plymouth 8 Cyl. 340 CID
CT-862	Tune-Up Kit	1971 Mustang 8 Cyl. 351 CID 4 Bbl.
	GENERAL SERVICE PARTS	
	OIL BREATHER CAPS	
EC-12-B	Oil Breather Cap	1971 Pinto

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