

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-54-7
Relating to Exemptions under Section 27156
of the Vehicle Code

PRESTOLITE ELECTRICAL DIVISION OF ELTRA CORPORATION
"BID" BREAKERLESS INDUCTIVE IGNITION SYSTEM

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Section 39515 of the Health and Safety Code and Executive Order G-30A;

IT IS ORDERED AND RESOLVED: That the installation of the "BID" breakerless inductive ignition system manufactured by the Prestolite Electrical Division, 511 Hamilton Street, Toledo, Ohio 43694, and marketed as indicated herein has been found to not reduce the effectiveness of required motor vehicle pollution control devices and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for installation on 1971 through 1973 Ford Pinto vehicles with 1.6L (98 CID) engines and Kettering Ignition Systems.

This ignition system consists of an electronic pack, trigger wheel and pick up assembly. The following is a list of companies marketing this device.

<u>Company</u>	<u>Kit Number</u>
Co-Op	75C12
Montgomery Ward	15810
Rite-Line	RL-7037
Gulf	CM7037
Ford Motorcraft	DZ-5009
Wells	EL-9
Echlin	ECK-5G
Echlin -ACCEL	36014

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different from those listed by the vehicle manufacturer.

Changes made to the design or operating conditions of the device, as exempted by the Air Resources Board, that adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board.

This Executive Order does not constitute any opinion as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE PRESTOLITE ELECTRICAL DIVISION "BID" BREAKERLESS INDUCTIVE IGNITION SYSTEM.

No claim of any kind, such as "Approved by Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

Section 43644 of the Health and Safety Code provides as follows:

"43644. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the state board for certification of a device, represent, any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been certified by the state board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as a certified device which, in fact, is not a certified device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at Sacramento, California, this 16th day of August, 1977.

Original Signed By

Thomas C. Austin
Deputy Executive Officer-Technical

State of California

AIR RESOURCES BOARD

August 1, 1977

Staff Report

(Addendum to Staff Report dated August 31, 1976)

Evaluation of Prestolite Electrical
Division "BID" Breakerless Inductive
Ignition System for Exemption
from the Prohibitions of Section 27156
of the Vehicle Code

I. Introduction

Prestolite Electrical Division, 511 Hamilton Street, Toledo, Ohio 43695, was issued Executive Orders D-54 through D-54-6. These Executive Orders exempted certain vehicles from the prohibitions of Vehicle Code Section 27156 for the Prestolite "Bid" Breakerless Inductive Ignition System, which is also known by other brand names described in the referenced Executive Orders. The exemptions were for certain 1976 and older model year vehicles equipped with a standard Kettering ignition system using device part numbers as specifically listed in the Executive Orders. The exemptions did not apply to the 1971 through 1973 model year Ford Pinto vehicles with 98 CID (1.6L) engines. Prestolite Electrical Division has now applied (Exhibit A) to add a kit for the 1971-73 Ford Pinto vehicles with 1.6L (98 CID) engines. These kits are to be marketed by the following companies.

<u>Company</u>	<u>Kit Number</u>
Co-Op	75C12
Montgomery Ward	15810
Rite-Line	RL-7037

<u>Company</u>	<u>Kit Number</u>
Gulf	CM7037
Ford Motorcraft	DZ-5009
Wells	EL-9
Echlin	ECK-5G
Echlin - ACCEL	36014

II. System Description

The "BID" is a breakerless, retrofit ignition system utilizing a resonant magnetic pick-up coil and a metallic plated "toothed" trigger wheel which is mounted concentric to the distributor shaft. The wheel lowers the magnetic field strength in the pick-up coil intermittently when each tooth passes the coil. This voltage reduction triggers a change in a unistable switch which controls a power switching transistor. This power transistor controls current flow to the primary of the ignition coil.

III. System Evaluation

The applicant submitted ignition timing data and electrical characteristics for the Pinto 4 cylinder 98 CID (1.6L) engine (Appendix I) in accordance with the "Guidelines for Testing and Criteria for Emission Compliance of Ignition System Modifications dated May 25, 1976.

A summary of the applicant's test results are as follows:

- A. The centrifugal spark advance showed no significant change from the baseline.

B. Vacuum Spark advance - Distributor degrees

<u>Intake Manifold Vacuum-in. Hg</u>	<u>Degrees Advance</u>	
	<u>Baseline</u>	<u>Device</u>
9	6	5
12	7	5.0
15	7	5.9
18	7	5.9
20	7	5.9

C. Secondary Voltage Available With Load, KV

<u>Distributor RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Percent Change</u>
100	26.5	24.0	-9.4
300	23.5	23.0	-2.1
2000	21.0	20.0	-4.8

D. Spark Duration - Microseconds

<u>Distributor RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Percent Change</u>
100	2100	1620	-22.9
300	2150	1780	-17.2
2000	1600	1300	-18.8

E. Spark Voltage (average) - Volts

<u>Distributor RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Percent Change</u>
100	560	780	39.3
300	460	700	52.2
2000	440	640	45.5

F. Spark Current (average) Milliamps

<u>Distributor RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Percent Change</u>
100	18.0	17.6	-2.2
300	17.0	17.0	0.0
2000	16.0	15.6	-2.5

G. Spark Energy - millijoules

<u>Distributor RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Percent Change</u>
100	21.2	22.2	4.7
300	16.8	21.2	26.2
2000	11.3	13.0	15.0

IV. Discussion of the Applicant's Data

An examination of the applicant's data showed that the vacuum advance did not exceed the criteria of 4° engine retard. The data also showed that the available secondary voltage was within the maximum permitted variation of $\pm 10\%$. Although there was some degradation in spark energy, the minimum spark duration criteria of 100 microseconds was far exceeded. The device also showed an increase in spark energy over the OEM equipment by as much as 26 percent. However, this is not considered excessive. These results are consistent with the previous models approved and therefore no confirmatory testing was performed by the ARB laboratory on this device.

V. Manufacturer's Claims

The benefits claimed by the manufacturer are discussed in the staff reports dated April 13, 1976 and August 31, 1976. Some of the claims are as follows:

1. - Improved starting in temperatures as low as -20°F.
2. - Improved performance at all speeds
3. - More mileage in the aftermarket
4. - Increased spark plug life
5. - Better wet and cold weather starting

The staff does not agree with the above statements and the applicant did not submit any evidence to validate these claims.

VI. Conclusion and Recommendation

Based on the data submitted by the applicant, the staff is of the opinion that the device will have no adverse effects on the ignition system of the 1971 through 1973 Pinto vehicles with 98 CID (1.6L) engines and believes that the device will not increase the exhaust emissions from these engines. The staff therefore recommends the approval of Executive Order D-54-7.

Prestolite Electrical Division

511 Hamilton Street
Toledo, Ohio 43694

Phone: 419-244-2811

January 19, 1977

Mr. G. C. Haas
Chief, Vehicle Emission Control
Air Resources Laboratory
9528 Telstar Avenue
El Monte, California 91731

Subject: Prestolite B.I.D. Retrofit
Executive Order D-54
Section 27156 of Vehicle Code

Dear Mr. Haas:

Attached are copies of ignition system test data covering Prestolite manufactured B.I.D. retrofit kits for use on 4 cylinder Chevrolet Vega (IDL-5021), Ford Pinto 98 C.I.D. (IDL-5022) and Ford Pinto 140 C.I.D. (IDL-5023). Production samples are also being shipped to you under separate cover. We request approval of these three (3) retrofit kits for sale in California.

The following customers will be selling our kits in the state of California:

<u>Customer</u>	<u>Vega</u>	<u>Pinto 98 C.I.D.</u>	<u>Pinto 140 C.I.D.</u>
Engineering No.	IDL-5021	IDL-5022	IDL-5023
Prestolite	70-37	70-35	70-36
Co-Op	75C12	75C13	75C14
Montgomery Ward	15810	-	-
Rite-Line	RL-7037	RL-7035	RL-7036
Gulf	CM7037	CM7035	CM7036
Ford Motorcraft	DZ-5009	DZ-5010	DZ-5011
Wells	EL-9	EL-10	EL-11
Echlin	ECK-5G	ECK-4F	ECK-5F
Echlin - ACCEL	36014	36021	36022

RECEIVED

Prestolite Electrical Division

Attention: Mr. G. C. Haas

- 2 -

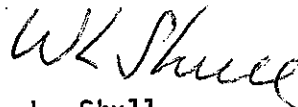
January 19, 1977

Packaging - The sample kits are packaged in a nondescript sleeve as we are currently developing a suitable message that conforms to your requirements. Mr. R. G. Raab will be writing to Mr. Thomas Austin very soon.

See copy of our brochure, form PP-466D, where we have indicated "availability to be announced".

If there are any questions, please let us know.

Very truly yours,



W. L. Shull
Administrative Assistant
Marketing - PED

dls 2-23

Prestolite Electrical Division

511 Hamilton Street
Toledo, Ohio 43694

Phone: 419-244-2811

May 19, 1977

California Air Resources Board
9528 Telstar Avenue
El Monte, California 91731

ATTN: Mr. I. Ettinger

Dear Mr. Ettinger:

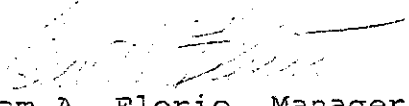
Attached please find a compilation of our test data on the Pinto 98 cu. in. engine. As you can see, our electronic ignition compares to the base line test.

Per our discussion, we agree with you after more extensive testing, that our system will not conform to base line testing on the Pinto 140 cu. in. engine. It is our feeling that, due to the cost of getting the 140 cu. in. to conform to base line, it would be poor economics. Consequently, we follow your suggestion to not approve the 140 cu. in. and authorize approval for the Vega and Pinto 98 cu. in. vehicles.

We appreciate your efforts in this matter and look forward to your approval of the Vega and Pinto 98 cu. in. engines.

Respectfully yours,

PRESTOLITE ELECTRICAL DIVISION


Sam A. Florio, Manager
Aftermarket Engineering

SAF/vnh

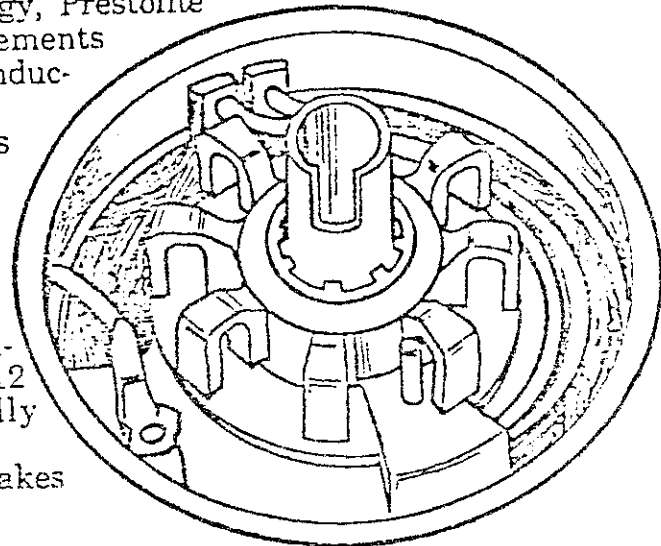
Attachment

Thanks to developments in electronic technology, Prestolite engineers surpassed the two previous achievements with the development of BID—Breakerless Inductive Discharge ignition.

As you can see, BID is the result of years of research and a series of design & performance improvements culminating in what we believe to be truly the ignition system of tomorrow.

Already it has been thoroughly tested in hundreds of thousands of miles of use. Reports indicate continued tuned performance after 10 or 12 thousand miles, when performance normally falls off.

Here is an electronic ignition system that makes your car's ignition as new as tomorrow.



PRESTOLITE
GIVES YOU
ALL OF THESE

BID

FEATURES AND ADVANTAGES!

- Improved starting in temperatures as low as -20°F .
- Improved performance at all speeds
- Fires spark plugs at any RPM above 0
- Fires spark plugs with as little as 6 volts available battery voltage
- Greatly extends spark plug life
- Uses existing coil, distributor cap, rotor and spark plug wires
- Is easily installed without removing distributor
- Protected against reverse polarity

A tune-up improves gas mileage, but after a few thousand miles, the tune-up begins to deteriorate, gas mileage drops off, and emissions increase. With the Prestolite Electronic Ignition System, spark plugs last longer, because timing and dwell are factory set and cannot change. That's why we say the tuned up engine stays tuned up longer, much longer.

Prestolite is the only independent ignition manufacturer furnishing an electronic ignition system to one of the Big Four car makers.

Prestolite Electrical Division • Toledo, Ohio 43694 • an **Eltra** company

installing the system

- Disconnect battery ground cable to prevent shorting during installation.
- Remove the distributor cap, leaving the spark plug wires attached, and place it aside.
- Remove the rotor.

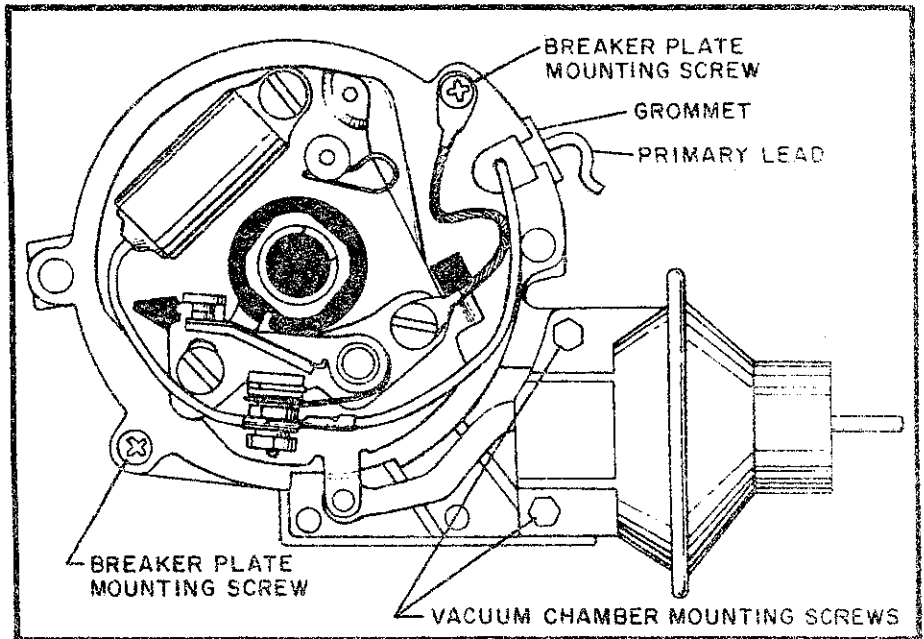


FIG. 1

Disconnect the distributor primary lead at the coil terminal marked Dist. or (-).

Remove, but do not discard, the two breaker plate attaching screws (Fig. 1). Lift out the complete assembly (with points, condenser, and lead). Remove the vacuum chamber mounting screws and take the vacuum chamber off the distributor. The distributor bowl is now stripped of all parts except the advance mechanism. Before installing the new components in the distributor, clean and lubricate the advance mechanism and wipe the cam clean.

CAUTION: Do not exert any undue pressure on the trigger wheel teeth during assembly. They are fragile and may be damaged.

Install the distributor cap adapter using the original breaker plate mounting screws.

Install the trigger wheel-sensor assembly on the cam. Turn the trigger wheel on the cam until it drops into place. The trigger wheel is designed to be a snug fit, so the assembly will have to be hand pressed onto the cam. Install the rotor and press the trigger wheel onto the cam as far as possible. Remove the rotor and use a 3/4" deep well socket to press the assembly on until the stops are against the top of the cam. Install the retaining ring making sure the ring is pushed all the way down against the trigger wheel.

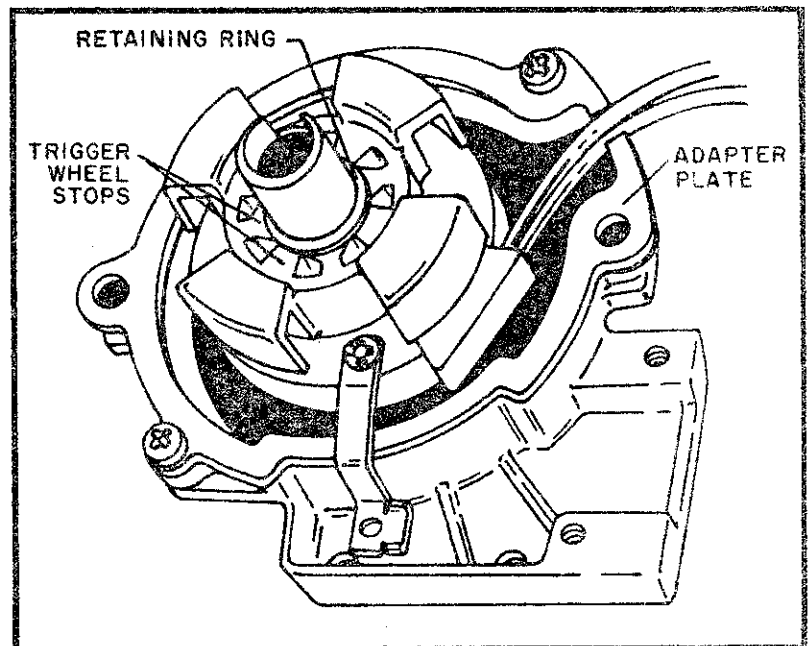


FIG. 2

FIG. 3

Reinstall the vacuum chamber and fasten the vacuum chamber arm to the vacuum arm bracket using the small self-locking screw furnished. **THIS CONNECTION MUST BE TIGHT.**

Route the sensor leads through the opening in the adapter. Provide a little slack in the leads for movement of the vacuum advance.

- Install the rotor.
- Install the cap.

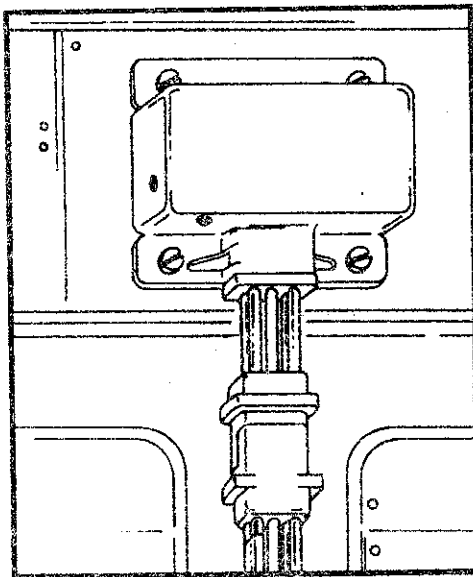
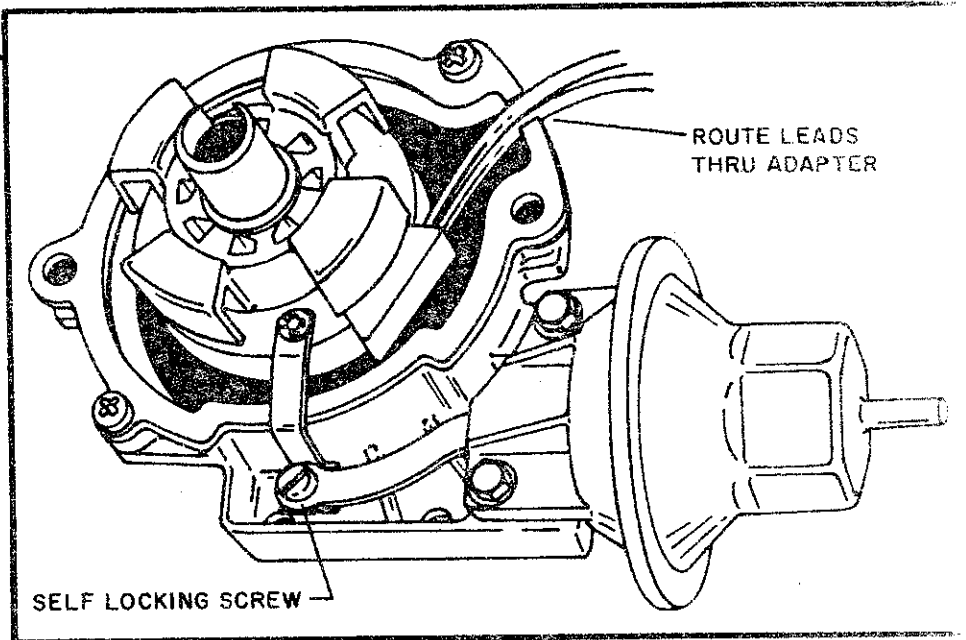


FIG. 4

Install the electronic control in a convenient location that will allow the harness leads to reach the coil and the distributor. Never install directly on the engine; the control may be installed on a grounded or ungrounded surface.

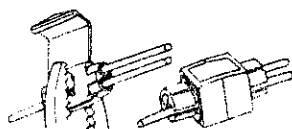
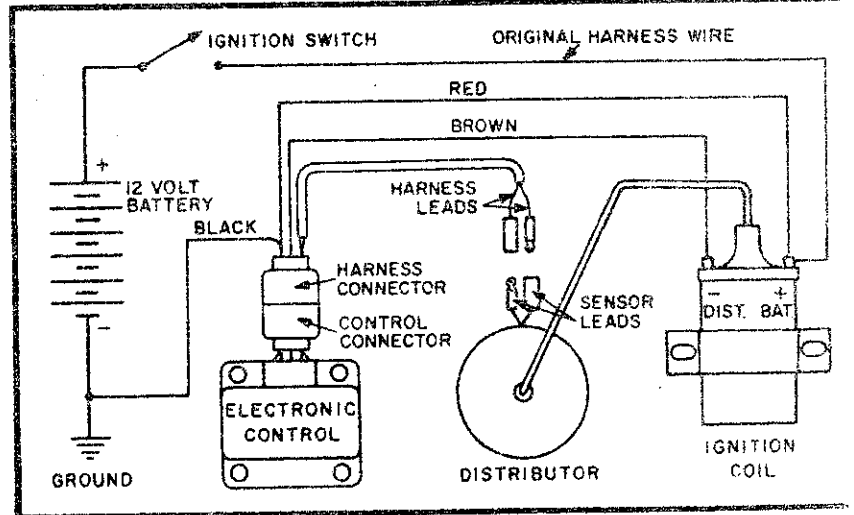
Connect the red wire to the coil positive (+) terminal. Leave the wire presently connected to this terminal attached. Connect the brown wire to the coil negative (-) terminal.

Applications with push-on type terminals at the coil may require using the "Scotchlok" splice connectors furnished. Cut the ring terminals from the red and brown leads and connect them as shown in the illustration.

Connect the black (ground) lead at a location that assures a good engine ground connection.

Route harness leads neatly. Avoid sharp bends. Keep away from chafing objects which may cut the insulation. Route away from hot surfaces such as exhaust manifolds. Provide slack in the harness wiring from the electronic control to allow for engine movement.

electrical connections



SCOTCHLOK®
SPLICE CONNECTOR

Tightly connect harness sensor leads to distributor leads using the molded connectors provided. **DO NOT CUT LEADS.** If any lead is longer than required, fold and tape clear of obstructions. Connect electronic control connector to mating harness connector. Make sure all connectors are fully engaged. Reconnect the battery cable. Adjust timing to manufacturer's specs. Any conventional timing light can be used. Do not attempt to adjust dwell (Dwell is preset and cannot be changed). Set engine idle speed. (Some tachometers do not work with electronic ignition systems.)

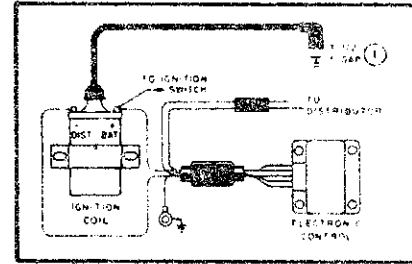
electronic ignition system trouble shooting

step chart CHECK ALL CONNECTIONS BEFORE BEGINNING TESTS

1

Establish 1/2" gap coil wire to ground — crank engine	
No Spark	Spark

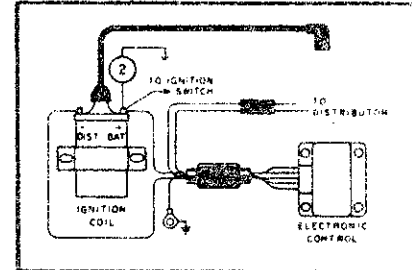
Trouble other than ignition



2

#57 bulb from coil positive to ground. Ignition switch to "on" and "start".	
Bulb lights in both positions	Bulb doesn't light in both positions

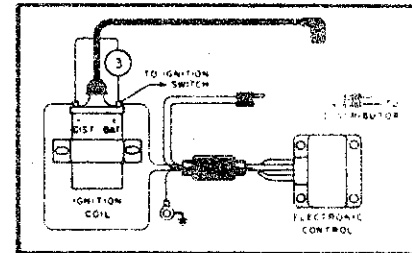
Trouble lies in circuit between battery and coil — check switch and wiring.



3

#57 bulb across coil terminals — unplug distributor leads — ignition switch "on"	
Bulb lights (Dim)	Bulb doesn't light

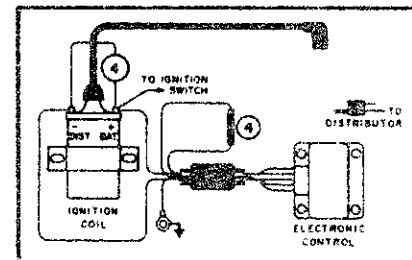
Check electronic control ground connection. If ok — replace electronic control



4

Short electronic control lead sensor terminals.	
Bulb switches off	Bulb stays on (Dim)

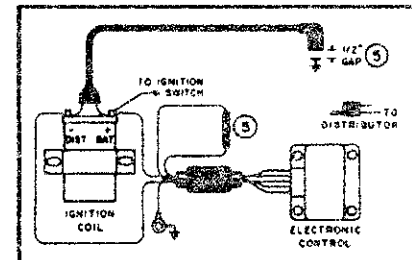
Replace electronic control



5

Remove bulb — check for spark at 1/2" gap each time harness sensor terminals are shorted.	
Spark	No Spark

Replace Coil



6

Check sensor with properly adjusted ohmmeter.	
Ohmmeter reads less than 1.5 ohms or over 3 ohms	Sensor reads 1.5 to 3 ohms

Replace sensor

Replace electronic control

