

E.O. Rose

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State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-60-3
Relating to Exemptions under Section 27156
of the Vehicle Code

SUPERIOR INDUSTRIES INC.
MAGNETIC BREAKERLESS ELECTRONIC
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 magnetic breakerless electronic ignition system described herein and manufactured by Superior Industries, Inc. of 10797 Harry Hines Blvd., Dallas, Texas 75220 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 1976 and older model year vehicles with 12 volt negative ground Kettering ignition systems except for the following:

1. Chrysler 6 and 8 cylinder engines.
2. General Motors, American Motors and Checker Motors 6 cylinder engines.
3. 1972 and older year model Ford 6 and 8 cylinder engines with distributors equipped with an eccentric breaker plate.
4. Vehicles originally equipped with capacitive discharge, transistorized or breakerless electronic ignition systems.
5. Vehicles equipped with dual point distributors where one set of points is used for emission control.
6. 1966-70 vehicles equipped with a retrofit NOx device which incorporates retard of basic ignition timing (i.e., Carter - CER, Echlin, STP-Air Computer, and AQP-Electro-NOx or Kar Kit).

The device will be packaged under the brand names and part numbers indicated and marketed by the following companies:

<u>Brand Name</u>	<u>Marketing Co.</u>	<u>Part Numbers</u>
Acculite II Ignition System	APQ of America, Inc. 3003 LBJ Freeway Suite 131 Dallas, Texas 75234	MA-6/1, MA-6/2, MA-6/3, MA-6/4, MA-6/5, MA-6/6, MF-5/11, MF-5/12, MF-5/13, MF-5/14, MF-5/15.
Electronition Magnetic Retrofit Ignition System	Superior Industries, Inc. 10797 Harry Hines Blvd. Dallas, Texas 75220 Superior Industries Inc. 14721 Keswick St. Van Nuys, CA 9405	SI-1001, SI-1002, SI-1003, SI-1004, SI-1005, SI-1006, SI-2011, SI-2012, SI-2013, SI-2014, SI-2015.
Silver Beauty MSW Magnetic Ignition System	K-Mart Enterprises Inc. P.O. Box 749 Royal Oak, MI 48068 Triple-A Specialty Co. 5750 West 51st St. Chicago, Ill. 60638	7271, 7272, 7273, 7274, 7275, 7276, 7281, 7282, 7283, 7384, 7285.
Micro-Start Magnetic Ignition System	Triple-A Speciality Co. 5750 West 51st St. Chicago, Ill. 60638	57271, 57272, 57273, 57274, 57275, 57276, 57281, 57282, 57283, 57284, 57285.
Wellstronic Magnetic Retrofit Ignition System	Wells Manufacturing Co. 26 South Brooke St. Fond du Lac, WI 54935	EL-1001, EL-1002, EL-1003, EL-1004, EL-1005, EL-1006, EL-2011, EL-2012, EL-2013, EL-2014, EL-2015.
Thunderbolt Magnetic Retrofit Ignition System	Jack Cotten Ignitions 701 Oriole Lane Pasadena, Texas 77502	SI-1001, SI-1002, SI-1003, SI-1004, SI-1005, SI-1006, SI-2011, SI-2012, SI-2013, SI-2014, SI-2015.

The device consists of a magnetic pickup coil, adapter, and electronic control module and is designed to replace the breaker points within the distributor.

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 SUPERIOR INDUSTRIES INC. MAGNETIC BREAKERLESS ELECTRONIC 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."

~~(b) Subdivision (a) shall not preclude any person from installing, selling, offering for sale, or advertising a device as a motor vehicle pollution control device for use on a particular classification of used motor vehicle results in such vehicles meeting the state exhaust emissions standards."~~

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 12 day of July, 1976.

original signed by
Thomas C. Austin
Deputy Executive Officer-Technical

State of California

AIR RESOURCES BOARD

Staff Report

June 22, 1976

Evaluation of Superior Industries Inc.
Magnetic Breakerless Electronic Ignition Systems

I. Introduction

Superior Industries Inc. of 10797 Harry Hines Blvd., Dallas, Texas 75220 has submitted an application dated April 27, 1976 (Exhibit A) requesting an exemption from the prohibitions of Section 27156 of the California Motor Vehicle Code for its magnetic breakerless electronic ignition system for 1976 and older model year vehicles with 12 volt negative ground Kettering ignition systems except for the following:

1. Vehicles originally equipped with transistorized, capacitive discharge, or breakerless electronic ignition systems.
2. Vehicles equipped with dual point distributors where one set of points is used for emission control.
3. 1966-70 vehicles equipped with a retrofit NOx device which incorporates retard of basic ignition timing (i.e., Carter - CER, Echlin, STP-Air Computer, and AQP-Electro NOx or Kar Kit).

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The applicant, by letters dated February 13, 1976 (Exhibit B) and April 27, 1976 (Exhibit C), amended his application to delete the following vehicles from his original request:

1. Chrysler 6 and 8 cylinder engines.
2. General Motors, American Motors and Checker Motors 6 cylinder engines.
3. 1972 and older model year Ford 6 and 8 cylinder engines with distributors equipped with an eccentric breaker plate.

The device will be packaged under various brand names and part numbers and sold by different marketing companies. However, the device will be identical in design and performance regardless of brand name. The following is the list of the marketing companies and their product brand names and part numbers.

<u>Brand Name</u>	<u>Marketing Co.</u>	<u>Part Number</u>
Acculite II Ignition System	APO of America, Inc. 3033 LBJ Freeway Suite 131 Dallas, Texas 75234	MA-6/1, MA-6/2, MA-6/3, MA-6/4, MA-6/5, MA-6/6, MF-5/11, MF-5/12, MF-5/13, MF-5/14, MF-5/15.
Electronition Magnetic Retrofit Ignition System	Superior Industries Inc. 10797 Harry Hines Blvd. Dallas, Texas 75220 Superior Industries, Inc. 14721 Kewsick St. Van Nuys, CA 9405	SI-1001, SI-1002, SI-1003, SI-1004, SI-1005, SI-1006, SI-2011, SI-2012, SI-2013, SI-2014, SI-2015
	K-Mart Enterprises Inc. P.O. Box 749 Royal Oak, MI 48068	

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<u>Brand Name</u>	<u>Marketing Co.</u>	<u>Part Number</u>
Silver Beauty MSW Magnetic Ignition System	Triple-A Specialty Co. 5750 West 51st St. Chicago, Ill. 60638	7271, 7272, 7273, 7274 7275, 7276, 7281, 7282, 7283, 7284, 7285.
Micro-Start Magnetic Ignition System	Triple-A Specialty Co. 5750 West 51st St. Chicago, Ill. 60638	57271, 57272, 57273, 57274, 57275, 57276, 67281, 57282, 57283, 57284, 57285.
Wellstronic Magnetic Retrofit Ignition System	Wells Manufacturing Co. 26 South Brooke Street Fond du Lac, WI 54936	EL-1001, EL-1002, EL-1003, EL-1004, EL-1005, EL-1006, EL-2011, EL-2012, EL-2013 EL-2014, EL-2015.
Thunderbolt Magnetic Retrofit Ignition System	Jack Cotten Ignitions 701 Oriole Lane Pasadena, Texas 77502	SI-1001, SI-1002, SI-1003, SI-1004, SI-1005, SI-1006, SI-2011, SI-2012, SI-2013 SI-2014, SI-2015

II. System Description

Superior Industries Inc. magnetic breakerless electronic ignition system is a unit intended to replace the breaker points within a distributor. It consists primarily of a magnetic pick-up coil which senses the distributor cam lobes. The timing pulse from the pick-up coil signals the electronic control module which accomplishes transistor switching of the current to the primary coil in the ignition system.

Attached (Exhibit D) is a detailed description of the ignition system, installation instructions, and an electrical schematic.

III. System Evaluation

A. Applicant's data

The applicant submitted ignition timing data and electrical characteristics of the unit. In order to evaluate the device, the output characteristics of an ignition system with and without the device when tested according to SAE - J973a Ignition System Measurements Procedure are compared.

A review of the applicant's test data shows excessive timing changes on a 1974 GM 6 cylinder distributor and on a 1972 Chrysler 6 and 8 cylinder distributor. These are distributors equipped with an eccentric breaker plate. The 1974 GM 6 cylinder data in Table I shows a vacuum advance change of +5.6 crankshaft degrees at 20 inches mercury and +4.8 degrees at 15 inches of mercury as compared with the OEM data. The 1972 Chrysler 6 cylinder data in Table II shows a 4 degree retard in vacuum advance at 15 through 20 inches of mercury vacuum and 1.4 degrees retard in centrifugal advance at 2600 engine rpm. This results in a total of 5.4 degrees retard from the OEM data. These timing changes are in excess of ARB criteria of +0° - 4° ignition timing tolerance.

Ignition advance from OEM values will increase engine peak combustion temperatures with a consequent increase in NOx emissions. Excessive ignition retard can cause an increase in engine operating

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temperatures which can result in an increase in hydrocarbon emissions due to premature exhaust valve failures. Insufficient timing advance will also affect engine performance and could cause an increase in hydrocarbon and carbon monoxide emissions on some vehicles where the power enrichment circuit may be activated prematurely due to excessive throttle depression.

The applicant's test data did not show any significant timing changes on a 1974 Datsun 4 cylinder distributor (Table III) equipped with a concentric breaker plate and a 1973 Ford 6 cylinder distributor (Table IV) equipped with a pivotal concentric breaker plate.

B. ARB Test Data

A confirmatory test on a 1972 Chrysler 8 cylinder distributor equipped with an eccentric breaker plate was conducted by the ARB laboratory (Project B-76-6 dated May, 1976). Table V is a summary of the test data.

The results indicate an ignition retard of 7 crankshaft degrees from the baseline data, primarily due to the vacuum advance change. It appears that the mechanical design of the device could induce an excessive ignition timing change on the eccentric breaker plate advance mechanism.

The centrifugal advance data indicates the maximum delay inherent in the electrical module is one crankshaft degree. When the device is installed in a vacuum advance distributor equipped with a concentric breaker plate, it is expected that the device will not cause any significant ignition advance change.

The test data also indicates no significant degradation of other critical ignition parameters such as spark energy, spark duration, and secondary voltage.

IV. Manufacturer's Claims

The manufacturer stated the purpose of the device is to replace the breaker point ignition system but made no statement of benefits or performance claims for their device in the application. It is the staff's judgement that the installation of the device on a vehicle could result in the following:

1. The breakerless system offers potential for reduced maintenance.
2. The electrical characteristics of this system do not indicate that there would be any greater benefits on performance, economy or emission reduction than would be obtained from a properly tuned engine.

V. Conclusions and Recommendations

The evaluation of the ARB test data and data submitted by the applicant shows that the installation of the device on distributors equipped with a concentric breaker plate (i.e., Delco and foreign distributors), and distributors equipped with a pivotal concentric breaker plate (i.e., 1972 and newer Ford 6 and 8 cylinder distributors) will not significantly affect the OEM ignition parameters and therefore will not adversely affect the OEM emission control system. However, the installation of the device on distributors equipped with an eccentric breaker plate (i.e., Chrysler 6 and 8 cylinder, GM 6 cylinder 1972 and older Ford 6 and 8 cylinder) will significantly affect OEM ignition timing and may increase exhaust emissions.

The staff therefore recommends that Superior Industries Inc. be issued an exemption from the prohibitions of Section 27156 of the California Motor Vehicle Code for its magnetic breakerless electronic ignition system (to be marketed as specified in the introduction) for 1976 and older model year vehicles except as follows:

1. Chrysler 6 and 8 cylinder engines.
2. General Motors, American Motors and Checker Motors 6 cylinder engines.
3. 1972 and older model year Ford 6 and 8 cylinder engines with distributors equipped with an eccentric breaker plate.

June 22, 1976

4. Vehicles originally equipped with capacitive discharge, transistorized, or breakerless electronic ignition systems.
5. Vehicles equipped with dual point distributors where one set of points is used for emission control.
6. 1966-70 vehicles equipped with a retrofit NOx device which incorporates retard of basic ignition timing (i.e., Carter, Echlin, STP-Air Computer and AQP-Electro-NOx or Kar Kit).

Table I - Superior Industries Inc. Magnetic Breakerless
Electronic Ignition System Data Summary (Applicant's
Test Data)

1966 GM - 8 cylinder

1974 GM - 6 cylinder

A. Centrifugal Spark Advance in Crankshaft Degrees

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	0	0	0	0
1400	9.0	10.0	6.0	5.2
2000	16.0	15.0	14.4	11.6
2600	20.0	20.0	17.6	15.2
3000	22.0	22.0	19.6	16.8
3400	-	-	21.2	18.4

B. Vacuum Spark Advance in Crankshaft Degrees

<u>Vacuum in. Hg.</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
3	0	0	0	0
6	0	0	0	0
9	0	0	6.4	6.4
12	2.0	2.0	14.8	16.0
15	7.0	6.0	20.0	24.8
20	14.0	13.0	20.0	25.6

C. Spark Duration in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	1800	1800	1500	1500
2000	1500	1300	1275	1275

D. Secondary Voltage Rise Time in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	40	45	40	45
2000	35	40	35	40

E. Spark Energy in Millijoules

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	28	26	27	25
2000	26	24	25	25

F. Available Voltage in Kilovolts (with Load)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	30	29	30	29
2000	27	27	27	27

Table II - Superior Industries Inc. Magnetic Breakerless
Electronic Ignition System Data Summary (Applicant's
Test Data)

1972 Chrysler - 6 cylinder

1973 Chrysler - 8 cylinder

A. Centrifugal Spark Advance in Crankshaft Degrees

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	0	0	0	0
1400	9.6	8.0	20.0	20.0
2000	13.6	12.2	22.0	22.0
2600	15.2	13.8	26.0	24.0
3000	16.4	15.0	27.0	25.0
3400	17.8	15.8	-	-

B. Vacuum Spark Advance in Crankshaft Degrees

<u>Vacuum in. Hg.</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
3	0	0	0	0
6	0	0	0	0
9	3.0	1.4	5.0	4.0
12	9.8	6.0	12.0	11.0
15	13.8	9.8	16.0	16.0
20	13.8	9.8	18.0	20.0

Table III - Superior Industries Inc. Magnetic Breakerless
Electronic Ignition System Data Summary (Applicant's
Test Data)

1974 Datsun - 4 cylinder

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	0	0
1400	1.0	0.4
2000	5.6	3.6
2600	9.0	7.2
3000	12.0	9.6
3400	16.0	12.0
4000	19.6	16.0

B. Vacuum Spark Advance in Crankshaft Degrees

<u>Vacuum in. Hg.</u>	<u>Baseline</u>	<u>Device</u>
3	0	0
6	0	0
9	4.2	5.2
12	7.8	8.0
15	7.8	8.0
20	7.8	8.0

Table IV - Superior Industries Inc. Magnetic Breakerless
Electronic Ignition System Data Summary for
1973 Ford Distributor (Applicant's Test Data)

A. Centrifugal Spark Advance in Crankshaft Degrees

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	0	0
1400	6.0	7.0
2000	16.0	16.5
2600	20.5	20.0
3200	24.0	22.0
3400	24.0	22.0

B. Vacuum Spark Advance in Crankshaft Degrees

<u>Vacuum in. Hg.</u>	<u>Baseline</u>	<u>Device</u>
3	0	0
6	2.0	2.0
9	13.0	12.5
12	17.0	15.0
15	17.0	15.0
20	17.0	15.0

Table V - Superior Industries Inc. Magnetic Breakerless
Electronic Ignition System Data Summary for
1972 Chrysler 8 Cylinder Distributor (ARB Confirmatory
Test)

A. Centrifugal Spark Advance in Crankshaft Degrees

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	0	0
1400	19.0	19.0
2000	20.5	20.5
2600	24.5	23.5
3000	26.0	25.0

B. Vacuum Spark Advance in Crankshaft Degrees

<u>Vacuum in. Hg.</u>	<u>Baseline</u>	<u>Device</u>
3	0	0
9	1	1
12	11	6
15	21	14
20	21	14

C. Spark Duration in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	2000	1600
3000	1750	1100

D. Secondary Voltage Rise Time in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	120	100
3000	120	100

E. Spark Energy in Millijoules

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	28.5	21.7
3000	16.03	24.7

F. Available Secondary Voltage in Killovolts (simulating fouled spark plug)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	19	19
3000	15	14

G. Available Secondary Voltage in Killovolts (with load)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	26	26
3000	22	22

**SUPERIOR INDUSTRIES INC.**

10797 Harry Hines Blvd.

Dallas, Texas, 75220

Phone: 214/350-9911

January 12, 1976

Mr. G. C. Hass, Chief
Division of Vehicle Emission Control
Air Resources Board
9528 Telstar Avenue
El Monte, California 91731

Dear Mr. Hass:

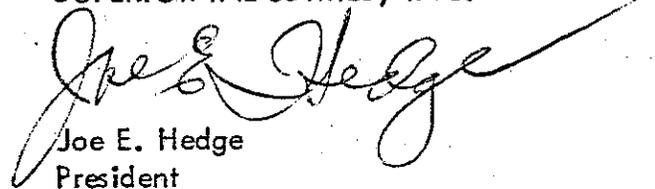
We are hereby applying to the Air Resources Board of California for exemption to vehicle code number 27156 for our new magnetic breakerless electronic ignition systems manufactured by Superior Industries, Inc.

These electronic ignition systems will be marketed by the companies and under the brand names as separately listed in this application.

Thank you for your help in this matter.

Yours very truly,

SUPERIOR INDUSTRIES, INC.



Joe E. Hedge
President

JEH:cr

Enclosures

The following is a list of each O.E. M. Sensing Electronic Ignition System manufactured by Superior Industries, Inc. and marketed as indicated:

✓ Acculite II Ignition System

APO of America, Inc.
3003 LBJ Freeway
Suite 131
Dallas, Texas 75234

P & D Magnetic Ignition System

P & D Automotive Products
74 Conalco Drive
P.O. Box 1767
Jackson, Tenn. 38301

Borg Warner Magnetic Ignition System

Automotive Parts Division
Borg Warner Corporation
11045 Gage Avenue
Franklin Park, Ill. 60131

✓ Electronition Magnetic Retrofit Ignition System

Superior Industries Inc.
10797 Harry Hines Blvd.
Dallas, Texas 75220

Superior Industries Inc.
14721 Keswick St.
Van Nuys, Calif. 9405

K-Mart Enterprises Inc.
P.O. Box 749
Royal Oak, Mich. 48068

✓ Silver Beauty MSW Magnetic Ignition System

Triple-A Specialty Co.
5750 West 51st St.
Chicago, Ill. 60638

✓ Micro-Start Magnetic Ignition System

Triple-A Specialty Co.
5750 West 51st St.
Chicago, Ill. 60638



SUPERIOR INDUSTRIES INC.

10797 Harry Hines Blvd.

Dallas, Texas, 75220

Phone: 214/350-9911

FEB 13, 1976

MR. G. C. HASS, CHIEF
 DIVISION OF VEHICLE EMISSION CONTROL
 AIR RESOURCES BOARD
 9528 TELSTAR AVE.
 EL MONTE, CALIFORNIA 91731

DEAR MR. HASS,

THIS LETTER WILL AMEND OUR SUBMISSION OF THIS DATE COVERING MAGNETIC IGNITION SYSTEMS TO DELETE GM-6 CYLINDER, CHRYSLER-6 CYLINDER, AND FORD-6 CYLINDER '72 AND OLDER (ECCENTRIC), PENDING THE ACCUMULATION OF ADDITIONAL INFORMATION AND DATA; AND TO REQUEST THAT THE OTHER APPLICATIONS, INCLUDING FOREIGN VEHICLES, BE PROCESSED AS IS. ADDITIONAL DATA WILL BE SUPPLIED BY US FOR THE '73 AND NEWER FORD-6 PIVOTAL CONCENTRIC SYSTEM.

YOURS VERY TRULY,
 SUPERIOR INDUSTRIES, INC.

Gary C. Davies
 GARY C. DAVIES
 ELECTRONICS GENERAL MANAGER

Our request for exemption from the prohibitions of vehicle code 27156 covers all 1976 and older model year vehicles except those originally equipped with transistorized, C.D. and breakerless ignition systems, or in those applications where the second set of points, in a dual set, serves as an emission control device. The Superior magnetic ignition systems is compatible with the Carter and Dana speed sensors used in the California NOx Retrofit Program.



SUPERIOR INDUSTRIES INC.

10797 Harry Hines Blvd.

Dallas, Texas, 75220

Phone: 214/350-9911

April 27, 1976

Mr. K. D. Drachand, Chief
Vehicle Compliance
California Air Resources Board Laboratory
9528 Telstar Avenue
El Monte, California 91731

Dear Mr. Drachand:

Due to the discovery by your laboratory of excessive vacuum advance losses in some of our breakerless magnetic electronic ignition systems, please amend our request for exemption to vehicle code 27156 to apply to the following.

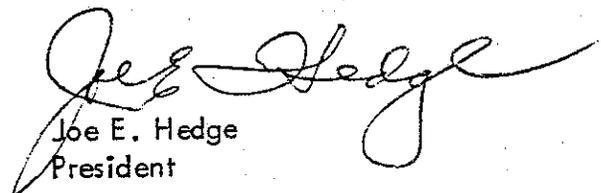
1. General Motors and American Motors
8 cylinder concentric
2. Ford 4, 6 and 8 cylinders pivotal concentric
3. All Foreign concentric

Please find enclosed new application charts as requested by Mr. Lucynski.

We trust that this information will allow you to complete processing our application for exemption to vehicle code 27156. Should you require that we furnish additional information, please do not hesitate to call me or Mr. Allen Best of A.P.O. Again, we appreciate the expeditious manner in which you have handled our applications.

Yours very truly,

SUPERIOR INDUSTRIES, INC.


Joe E. Hedge
President

JEH:cr

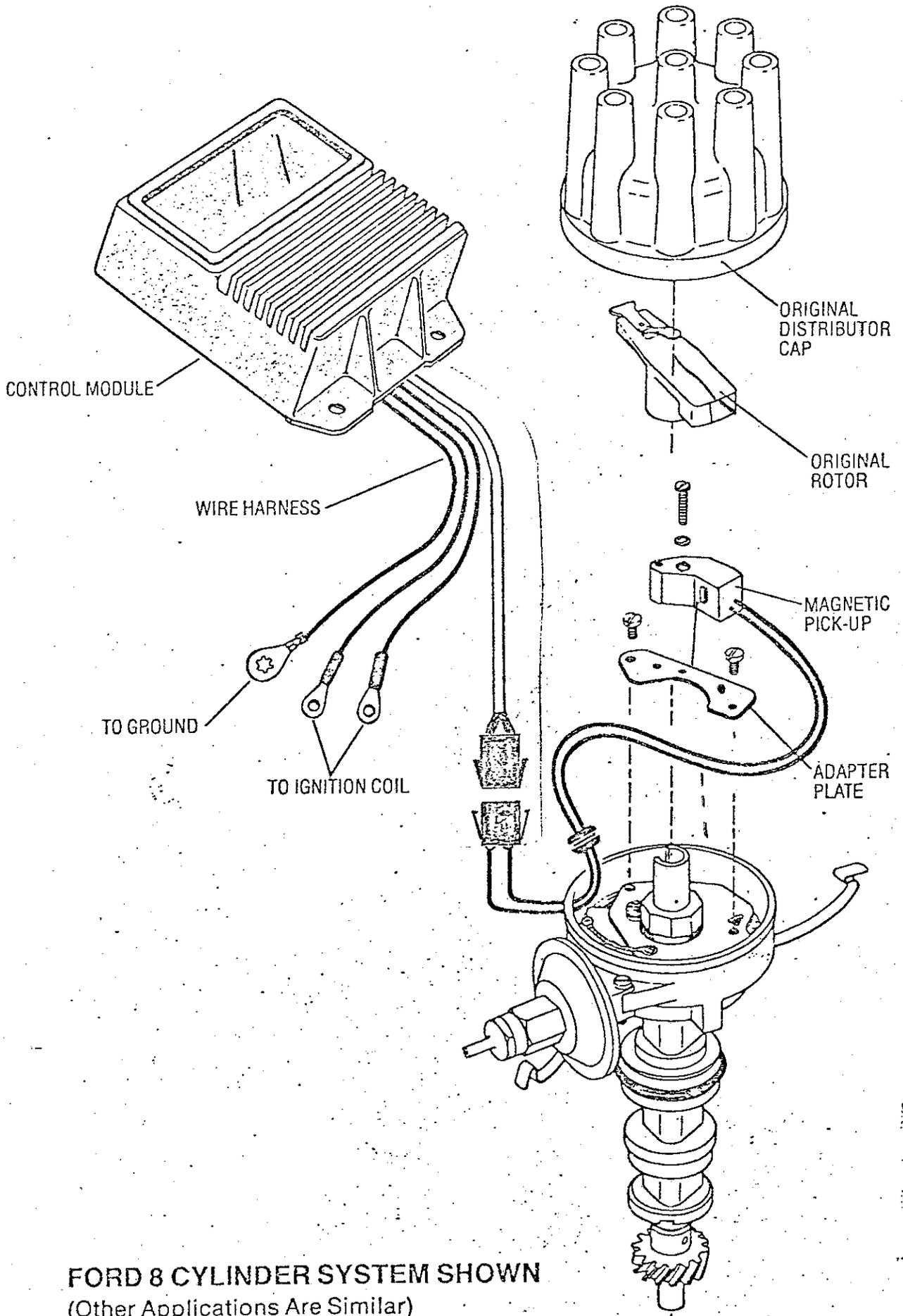
Enclosures

OPERATING PRINCIPAL

In principle this system is similar to the conventional point and condenser system, where the voltage necessary to fire the spark plugs is produced by interrupting current flowing through the primary winding of the ignition coil by opening mechanical breaker points. In the Superior System, the voltage is developed in the same manner, except that the current in the primary winding is interrupted by a transistor in the electronic control module. This occurs each time the control module receives a "Timing Pulse" from the distributor.

The Superior Magnetic Ignition System operates like this. A signaling device consisting of a magnet and pick-up coil is mounted on the distributor plate. The O.E.M. cam rotating on the distributor shaft generates a switching signal which is sent to the power switching transistor in the solid state control module. When receiving this signal, the control module breaks the coil ground connection to interrupt the current in the primary winding. This induces a high voltage in the secondary coil winding to fire the spark plugs. The length of time this flow is broken is determined by the electronics in the control module. The "Dwell" is built into the electronics and is always correct.

The Superior Ignition System, is designed to reduce regular ignition maintenance to cleaning or replacing spark plugs. The distributor components do not make contact and therefore do not wear. Engine timing and dwell do not require periodic adjustment.



FORD 8 CYLINDER SYSTEM SHOWN
 (Other Applications Are Similar)

G. M. 8 CYLINDER INSTALLATION

1. Remove distributor cap. Check for cracks or burnt electrodes. Replace if found defective.
2. Remove rotor hold down screws from rotor and remove rotor. Check rotor for burnt or oxidized contacts, replace if necessary.
3. Disconnect distributor lead from contact points and remove points. It may be necessary to crank engine to position centrifugal advance to remove hold down screws. Remove condenser and condenser bracket screw.
4. Remove distributor lead from negative (-) terminal on the ignition coil and pull it out of the distributor completely.
5. Remove metal side door on distributor cap with a pair of pliers.
6. Insert magnetic pick up assembly wire through replacement distributor cap housing door (see figure 1).
7. Securely mount magnetic adapter plate to distributor base plate, using existing mounting holes previously occupied by contact set. Replace hold down screws. (see figure 2).
8. Mount magnetic pick up assembly to adapter plate with screw provided in hardware package. Tighten pick up assembly screw only enough to keep the assembly in position. (see figure 3).

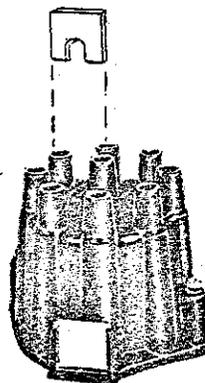
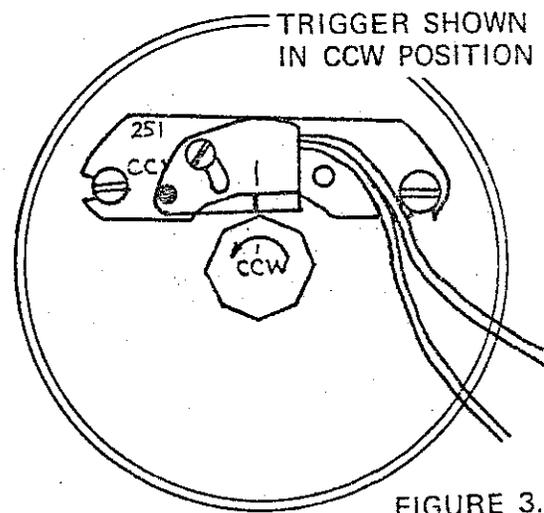
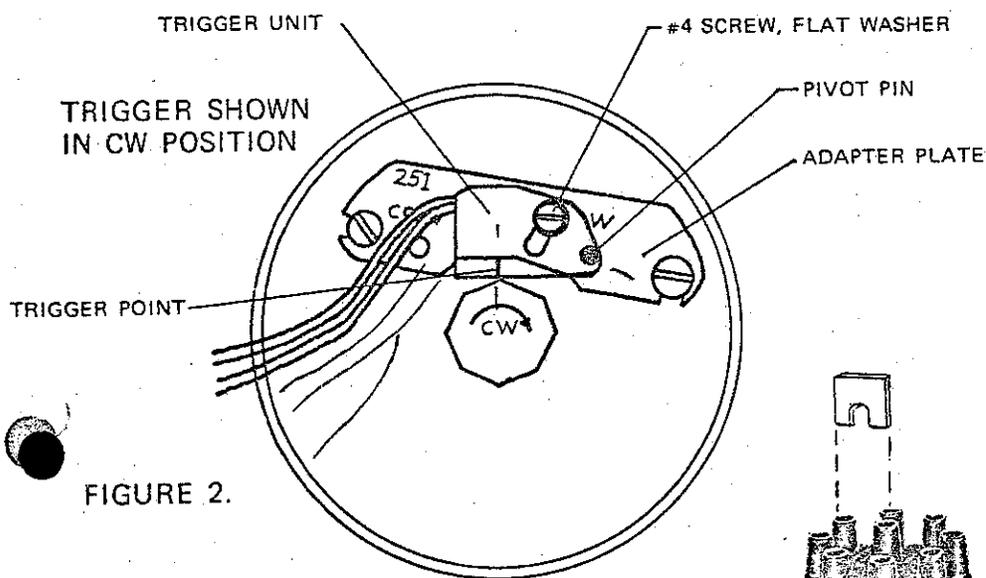


FIGURE 1.

9. Adjust gap between pick up assembly and cam lobe (high point of cam) to .015" using feeler gauge (provided in hardware package) and tighten assembly screw securely.
10. Check original rotor and cap; if worn, replace. If not, reinstall.
11. Before reinstalling a good distributor cap, make sure that an ample amount of wire is provided to allow the distributor vacuum advance chamber to work freely.
12. Install dust plug (included in package) in hole where wire previously extended from base of distributor.
13. **CAUTION:** Before mounting control module make sure wire harness will reach from distributor leads to control module and that it is subjected to the least amount of heat. A fender well may be best suited. Drill three 1/8" holes using the control module as a template.
14. Mount control module with screws provided.
15.
 - A. Using plastic housing that is provided in hardware package, plug wires from distributor into housing matching wire colors on wire harness housing from control module.
 - B. Connect black wire to good engine ground.
 - C. Connect orange wire to positive (+) or battery terminal on the coil. Make sure that the original source of battery voltage is also still on this terminal.
 - D. Connect blue wire to the negative (-) or distributor terminal on the coil.
16. Start engine, check timing and reset to manufacturer's specifications if needed.
17. **IMPORTANT:** For maximum performance, check the condition of all spark plug wires and spark plugs. If plugs show heavy carbon build up or burning - replace.

FORD 6 & 8 CYLINDER INSTALLATION

1. Remove distributor cap. Check for cracks or burnt electrodes. Replace if found defective.
2. Remove rotor. Check for burnt electrodes or oxidized contacts. Replace if necessary.
3. Remove points, condenser and relocate copper braided ground strap wire to condenser mounting hole using condenser mounting screw.
4. Remove distributor lead from negative (-) terminal on the ignition coil and pull it out of the distributor completely.
5. Securely mount magnetic adapter plate to distributor base plate, using existing mounting holes previously occupied by contact set. Replace hold down screws. (see figure 1).
6. Mount magnetic pick up assembly to adapter plate with screw provided in hardware package. Tighten pick up assembly screw only enough to keep the assembly in position. (see figure 2).

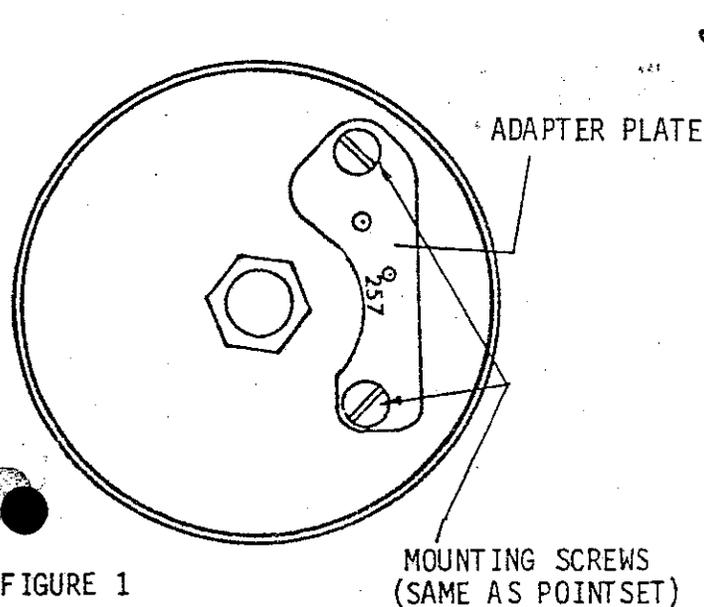


FIGURE 1

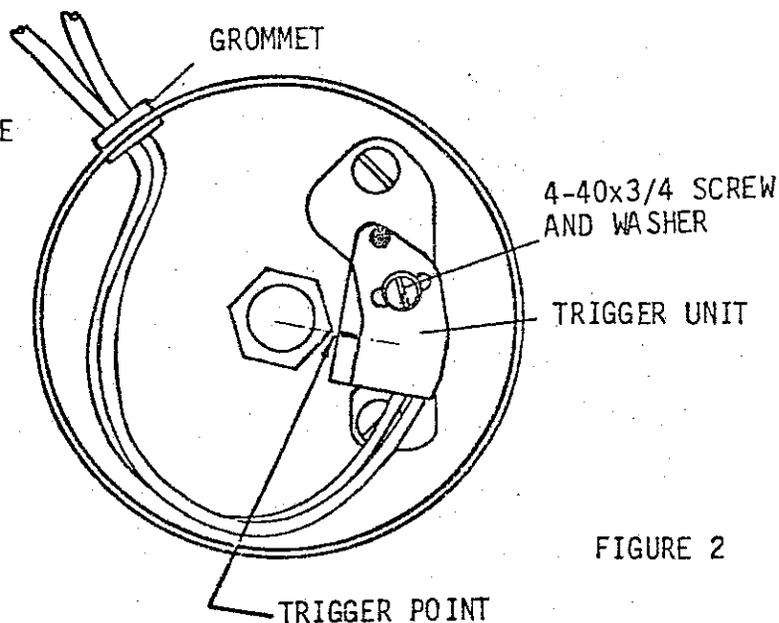


FIGURE 2

7. Adjust gap between pick up assembly and cam lobe (high point of cam) to .015" using feeler gauge (provided in hardware package) and tighten assembly screw securely.
 8. Check original rotor and cap; if worn, replace. If not, reinstall.
 9. Before reinstalling a good distributor cap, make sure that an ample amount of wire is provided to allow the distributor vacuum advance chamber to work freely. Position rubber grommet in distributor housing.
 10. Install a good distributor cap.
 11. **CAUTION:** Before mounting control module make sure wire harness will reach from distributor leads to control module and that it is subjected to the least amount of heat. A fender well may be best suited. Drill three 1/8" holes using the control module as a template.
 12. Mount control module with screws provided.
 13.
 - A. Using plastic housing that is provided in hardware package, plug wires from distributor into housing matching wire colors on wire harness housing from control module.
 - B. Connect black wire to good engine ground.
 - C. Connect orange wire to positive (+) or battery terminal on the coil. Make sure that the original source of battery voltage is also on this terminal. Use new 10/32 nut provided in package.
- NOTE:** It is suggested that the original bullet clip be cut off of the wire supplying voltage to the coil and a new terminal (included in package) be installed.
- D. Connect blue wire to negative (-) or distributor terminal on the coil. Use 10/32 nut included in package.
 14. Start engine, check timing and reset to manufacturer's specifications if needed.
 15. **IMPORTANT:** For maximum performance, check the condition of all spark plug wires and spark plugs. If plugs show heavy carbon build up or burning - replace.

THE SHAFTS OF THESE DISTRIBUTORS CAN ROTATE BOTH CLOCKWISE (CW) AND COUNTERCLOCKWISE (CCW). BE SURE TO DETERMINE THE DIRECTION OF ROTATION OF YOUR DISTRIBUTOR TO INSURE CORRECT POSITION OF THE TRIGGER UNIT.

- () 1. Remove the distributor cap and rotor. Remove the condenser, condenser bracket, and insulator terminal from the side of the distributor. Remove the pointset and wire. Retain the electrical parts in the adapter kit bag.
- () 2. Install the adapter plate in the distributor as shown in figure 1. Be sure the projection at the bottom of the adapter plate fits into the pivot pin hole in the breakerpoint mounting plate. Use the 8-32 flat head screw provided

4 AND 6 CYLINDER BOSCH DISTRIBUTORS WITH ONE
PIECE POINTSET AND RIGHT HAND PIVOT POST

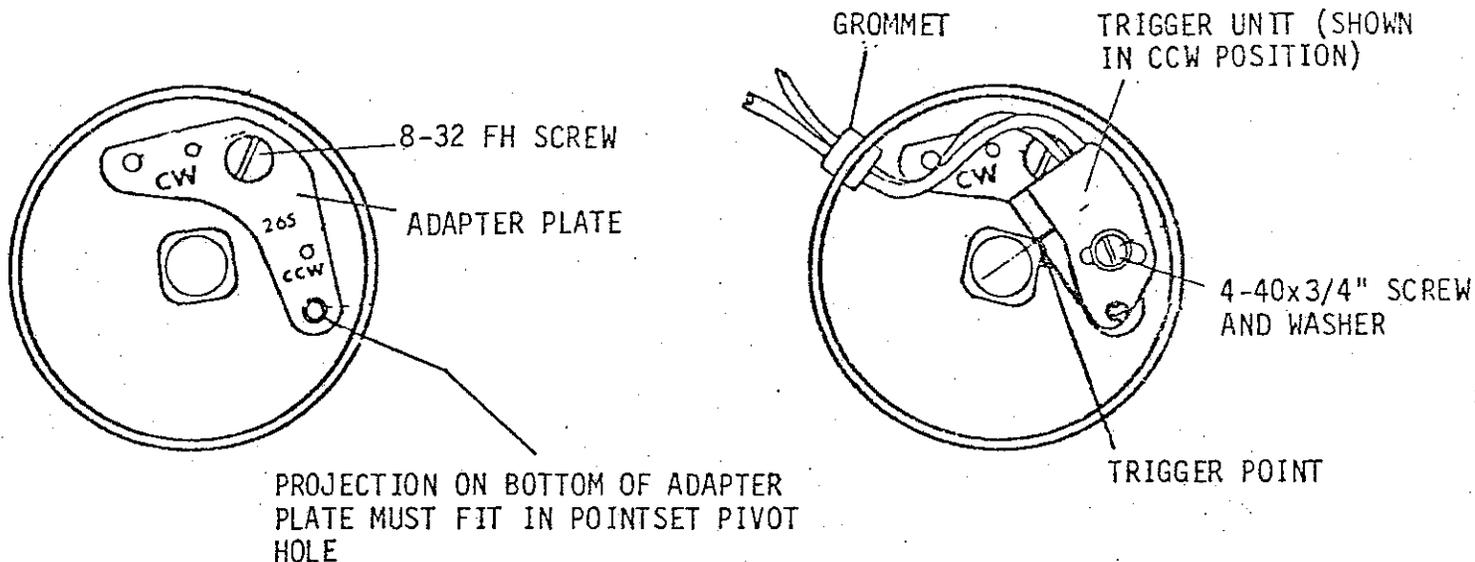
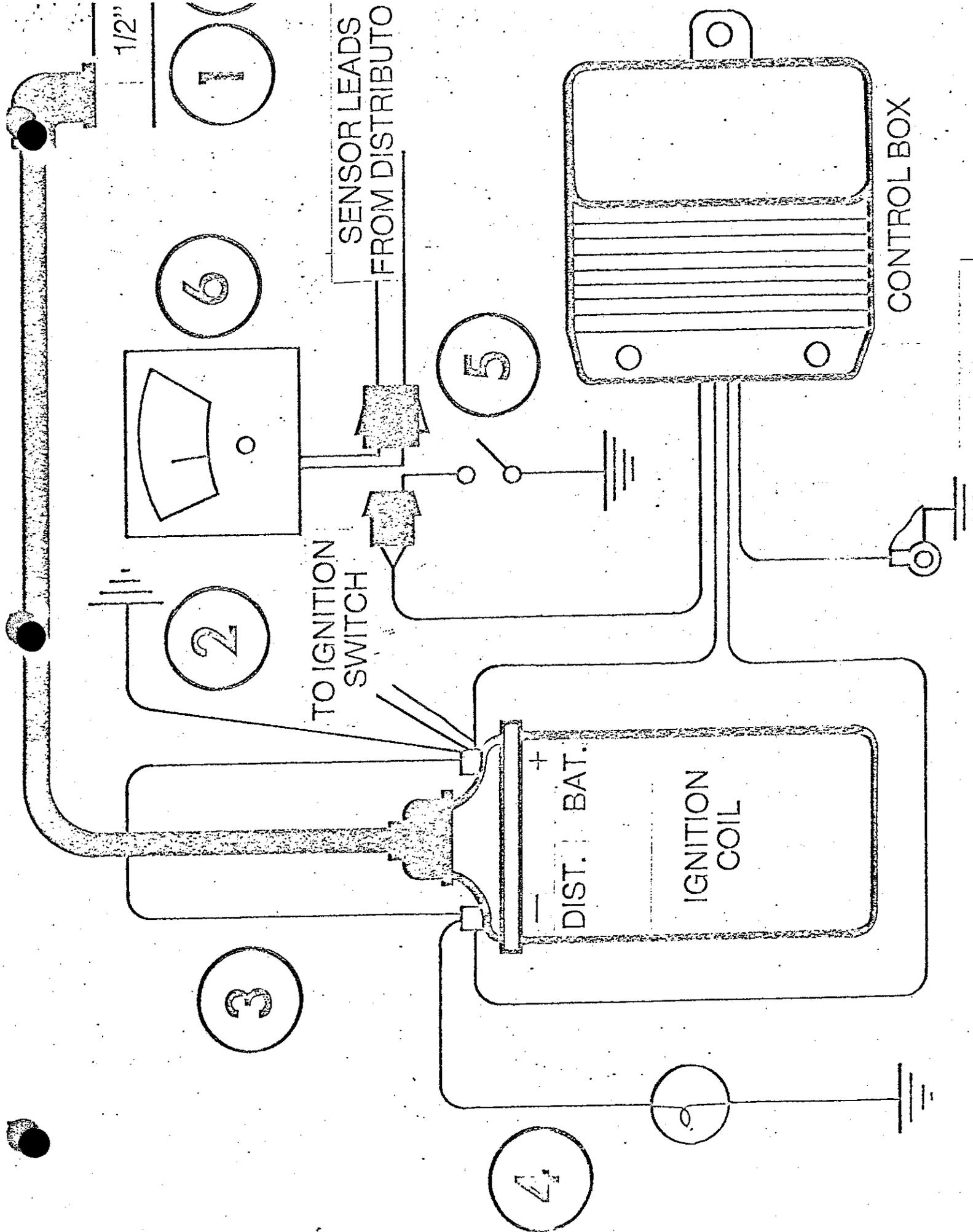


FIGURE 1

FIGURE 2

- () 3. Assemble the trigger unit to the adapter plate with the 4-40x3/4" screw and compression washer. Do not tighten. Be sure to place the trigger in the correct holes for the rotation direction of the distributor shaft. See figure 2.
- () 4. Crank or rotate the engine so that the peak of the distributor cam is opposite the trigger point.
- () 5. Set the gap between the trigger point and the cam peak to $.010 \pm .004$ inches. Insert the feeler gauge and tighten the screw while pressing the side of the trigger unit.
- () 6. Insert the rubber grommet into the wall of the distributor. Run the trigger wires through the grommet hole and drape the wire inside the distributor as shown.
- () 7. Carefully examine the distributor cap and rotor for cracks and wear. Replace if necessary. Install the rotor on the shaft. NOTE: In some cases the bottom of the rotor may contact the trigger unit. If this occurs, carefully sand or grind the bottom of the rotor to clear when the rotor is fully seated.
- () 8. Replace the distributor cap and proceed to the main instruction sheet.



IGN
(COIL-1)

