E.O.

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-56
Relating to Exemptions under Section 27156
of the Vehicle Code

EDELBROCK-HADLEY CORPORATION
"THERMALSPARK 9200" 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 39023 of the Health and Safety Code;

IT IS ORDERED AND RESOLVED: That the installation of "Thermalspark 9200" electronic ignition devices manufactured and marketed by Edelbrock-Hadley Corporation of 4771 Arrow Highway, Montclair, California 91763 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 1974 and older model-year vehicles with 12 volt battery, standard ignition coil and negative ground. This exemption does not include those vehicles originally equipped with breakerless or electronic ignition system.

The electronic circuit of the device consists of transistors, resistors, capacitors and diodes enclosed in an aluminum housing and designed to provide transistor switching of the primary circuit of a conventional ignition system.

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different than 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 the 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.

EDELBROCK-HADLEY CORPORATION EXECUTIVE ORDER D-56

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 "THERMALSPARK 9200" DEVICE.

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 unlawful, untrue or misleading advertising, and Section 17534 makes violation punishable as a misdemeanor.

Sections 39130 and 39184 of the Health and Safety Code provide as follows:

> "39130. No person shall install, sell, offer for sale, or advertise, or, except in an application to the board for certification of a device, represent, any device as a motor vehicle pollution control device unless that device has been certified by the 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 section is a misdemeanor."
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> "39184. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the board for accreditation 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 accredited by the board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as an accredited device which, in fact, is not an accredited 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 22nd day of September, 1975.

WILLIAM H. LEWIS, JR.
Executive Officer

State of California

AIR RESOURCES BOARD

August 5, 1975

Staff Report

Evaluation of Edlebrock Hadley Corporation "Thermalspark 9200" Electronic Ignition System for Compliance with the Requirements of Section 27156 of the California Motor Vehicle Code

I. Introduction

Edlebrock Hadley Corporation of 4771 Arrow Highway, Montclair, California 91763 has submitted an application requesting an exemption from Section 27156 of the California Vehicle Code for the "Thermalspark 9200" electronic ignition system. Vehicle Code Section 27156 prohibits the sale, advertisement and installation of any device or mechanism which adversely affect performance of the emission control system. This vehicle code section also authorizes the Air Resources Board to exempt devices from this prohibition if a finding shows the device does not reduce the effectiveness of the emission control system. The applicant is requesting the exemption be granted for 1974 and older model year vehicles.

II. System Description and Function

The "Thermalspark - 9200" system is an aftermarket device which is installed into the engine's ignition system (Ref. Exhibit A - Installation Instruction). The electronic circuitry of the device consists of transistors, diodes and resistors enclosed in a metallic housing (ref. Exhibit B - Device Schematic).

According to the applicant the purpose of this device is to increase point life by reducing high current flow across the points. High current flow can cause electrical arcing which deteriorates the points rapidly. Installation of this device diverts the main portion of the current through the device's transistors. The main feature of this ignition system device is to fire the spark plugs by a more effective method of terminating current flow to the ignition coil. Current cut-off is achieved by an SCR transistor upon receiving a low level signal from the points. A signal to the coil primary is generated each time the points open. Faster current cut-off is achieved by the use of the transistorized circuit.

III. System Evaluation

The applicant submitted hot 7-mode emission data on five vehicles to support the application. Data generated by the applicant are summarized below.

	Hot 7-Mode Exhaust Emissions - gms/mi		
	HC	CO	NOx
1970 Ford (390 CID)			
Baseline	3.01	62.89	2.53
Thermalspark	3.11	65.63	2.06
1973 Ford (360 CID)			
Baseline	2.48	11.20	2.08
Thermalspark	2.19	10.96	1.95
1975 Camaro (350 CID)			
Baseline	3.91	24.30	0.18
Thermalspark	3.62	16.18	0.01
1970 Chrysler (440 CID)			
Baseline	6.05	68.49	4.13
Thermalspark	5.67	74.80	3.90
1974 Chevrolet (400 CID)			
Baseline	1.80	24.54	0.75
Thermalspark	1.99	24.90	0.80

These data on the 1970 Ford and 1970 Chrysler indicate excessively high CO values and are not representative of the general vehicle population. The 1970 standard for CO based on cold 7 mode tests is 23 grams/mile. It is widely accepted that a hot 7 mode test will result in lower CO emissions. Average ARB surveillance data for 1974 model-year vehicles (ref. Quarterly Progress Report No. 38) had HC, CO and NOx values of 1.99, 15.86 and 1.84 grams/mile based on a vehicle population of 208. This would also indicate the HC emissions of the 1975 Camaro are significantly higher than the norm and the NOx unbelievably low. Therefore the data generated from the 1975 Camaro also appears not representative of the typical vehicle population. The 1973 Ford and 1974 Chevrolet test results are within normal variability and not necessarily indicative of adverse affect on the performance of the emission control system.

The applicant submitted emission data to show the effects of the "Thermalspark 9200" device with the Carter and Dana NOx devices. No apparent compatibility problems exist with the two NOX devices and the "Thermalspark 9200" device.

Confirmatory emission tests were performed at the Air Resources Board Vehicle Test and Laboratory Facility at El Monte on the applicant's 1974 Chevrolet. Results of the hot start CVS-1972 tests are shown in the following table:

	Hot CVS-1972 Exhaust Emissions - gms/mi				Fuel Economy mpg
	HC	CO	NOx	CO_2	
Baseline	1.18	21.1	1.54	937.4	9.11
Thermalspark	0.93	18.0	1.48	896.2	9.57

These results indicate the installation of this device did not cause an increase in exhaust emissions.

In addition, the staff conducted ignition simulator tests comparing the electrical performance of the stock ignition system with the "Thermalspark" ignition device. The following table summarizes these test results on the Chrysler 8 cylinder distributor no. 656390:

Centrifugal Advance - engine degrees

Engine RPM	Baseline	Device
600	0	0
1000	2	3
1600	19	19
2000	21	20
2400	23	22
3000	25	24

Electrical Measurements

Variables	Baseline			Device		
Engine RPM	200	600	3000	200	600	3000
Primary Voltage	(6)	14 (14)	14 (14)	(6)	14 (14)	14 (14)
Secondary Voltage Available (KV)	(19)	22 (23)	20 (20)	(18)	20 (22)	18 (18)
Secondary Voltage Required (KV)	(11)	15 (11)	12 (11)	(11)	14 (11)	13 (11)
Rise Time (Micro-seconds)	(45)	60 (40)	40 (40)	(70)	80 (50)	60 (50)
Spark Duration (micro-seconds)	(1100)	1100 (1400)	1100 (1300)	(900)	900 (1200)	800 (1100)
Spark Energy (milli-joules)	(14.2)	26.5 (18.1)	27.0 (23.5)	(10.3)	19.8 (14.5)	17.2 (16.6)

( ) second unit retest data

Installing this device shows a 25 to 36% decrease in spark energy. This decrease is judged to be a significant degradation of the ignition system. However, no adverse effects on emission occurred in the limited ARB tests which were performed on engines which had been properly maintained and tuned just prior to the test. The measured degradation in electrical system critical parameters is believed to be capable of causing an increase in exhaust emissions of certain vehicles due to cold start misfires, ignition system conditions, lean air fuel mixtures, engine loading, etc. The staff intends to conduct further ignition system studies to determine minimum standards of performance for ignition systems designed to replace the original OEM system to determine the effect on vehicle emissions.

IV. Conclusion and Recommendation

Based on the applicant's data and the data generated by the Air Resources Board tests, the staff is of the opinion, at this time, that the installation of the "Thermalspark 9200" device will not have an adverse effect on emissions of properly maintained engines. Therefore, the staff recommends Edlebrock-Hadley Corporation be granted an exemption for the "Thermalspark 9200" electronic ignition system pending the positive identification of emissions related effects of degraded ignition systems and engine conditions.

Exhibit A - Installation Instruction 1/23/75

EDELBROCK INSTRUCTION SHEET

THERMALSPARK

This system is designed to work with any car, truck or recreational vehicle with 4, 6, or 8 cylinder (4 cycle) engines using point type ignitions, with negative ground electrical system.

CAUTION: Do not use with any magnetic or photo cell pointless type ignitions.

This unit will not interfere with the operation of most electric tachs. In most cases if the tach wire connects to the - or negative side of the coil, the tach will function.

INSTALLATION:

1. Install Thermalspark unit at a convenient location so the wiring harness will reach the coil. This is approximately 36" to 40". We suggest the firewall or the fender-well panel as a good location.

CAUTION: Do not mount close to the exhaust system or expose to water splash from pavement.

2. With location determined, hold unit in place and mark the four mounting holes. Mount with plug-in side down as arrow indicates.

CAUTION: Before drilling holes make sure there are no wires or hoses behind where you are going to drill. Use a #28 drill and mount with screws furnished in kit.

VEHICLE TUNE:

3. If there is any indication of bad plugs, cracked or hardened ignition wire or badly pitted points, they should be replaced if needed. For maximum efficiency you should gap the plugs at .045.

WIRING:

4. This unit is for 12 volt negative ground systems only as shown in the stock installation drawing.

5. Using the Thermalspark drawing the following connections should be made:

   A. Disconnect the distributor lead from the coil and install insulator tab and white wire to - or negative side of coil. Using long machine screw, nut and washer furnished connect distributor wire and yellow wire to other end of insulator tab as shown.

   SPECIAL NOTE - FORD ONLY: Most Fords use a slip-on type connection for the coil. Special machine screws in this kit are long so yellow wire may be installed on insulator and tightened, you may then push your stock distributor wire on remaining threads for a good connection. Install screw with threads up.

   B. Connect black wire to good ground such as coil bracket hold-down bolt

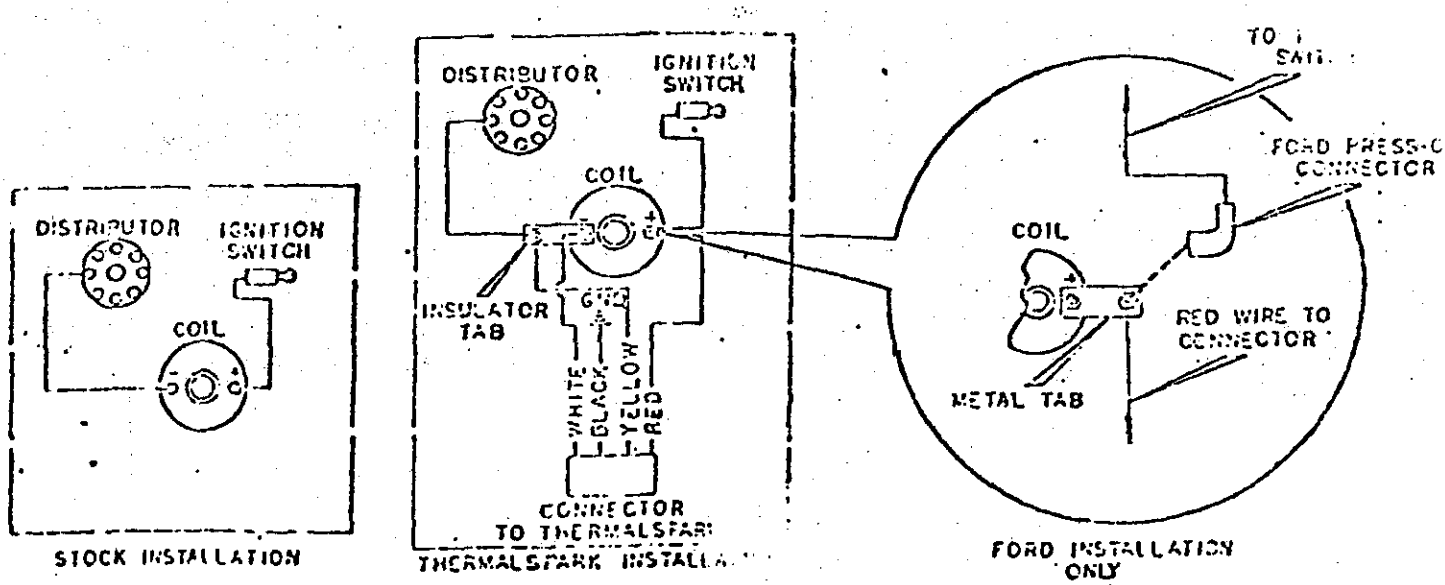
C. Connect red wire to + or positive side of coil: SPECIAL NOTE - FORD ONLY: because of the pus-on type connection for a single wire, a metal tab is furnished to make positive type connections. Remove wire from + side of coil, install metal tab to + or ignition side of coil using nut and washer furnished. Connect red wire to other end of metal tab using long machine screw, nut and washer furnished and tighen push stock ignition wire on remaining threads of long machine screw for ignition connection. Check to be sure metal tab does not touch air cleaner.

5. Plug the harness into the Thermalspark unit. The harness will only plug in one way so do not use force. There are two square edges and two angled edges on the coupler, align these with the matching edges on the unit. The engine is now ready for operation.

6. If for any reason you may want to go to the stock ignition system we furnish a plug for this purpose in the kit. Unplug harness from unit and insert plug in harness. The engine will now be on the stock system. If you have any problems contact your dealer or Edelbrock at once.

7. SPECIAL NOTE - On all Chevrolet Vegas that have a rubber boot over the spark plugs, a gounding of the spark can occur if the boots are dirty or coated with oil or road film. We advise cleaning them with WD-40 or a suitable subber cleaning solvent to eliminate the problem.

8. If on any foreign built vehicles, you should have a problem with the tach we suggest you contact Edelbrock for assistance with your particular vehicle.



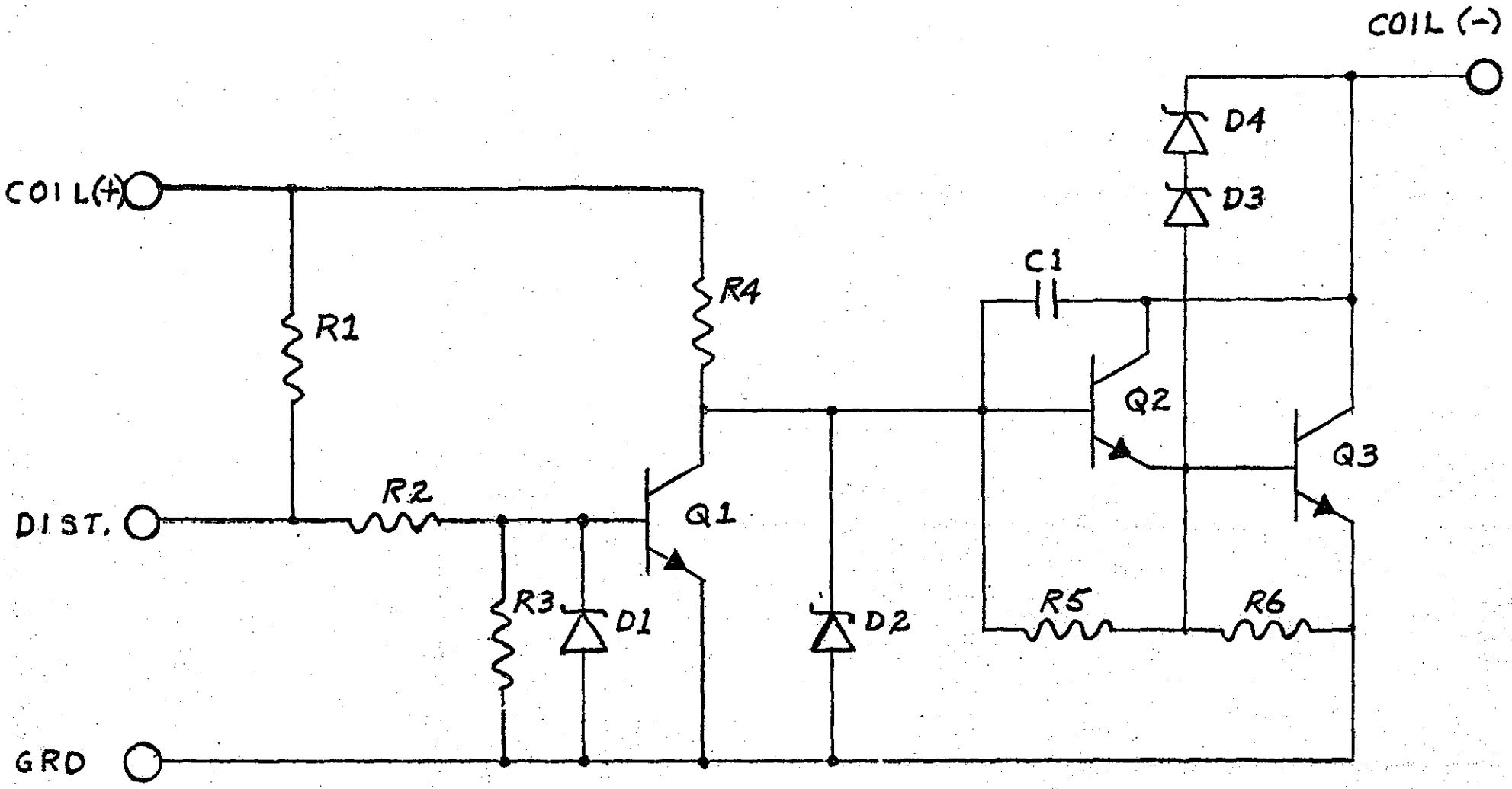


Exhibit B

THERMALSPARK SCHEMATIC

FIG. 2