

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-1-4
Relating to Exemptions Under Section 27156
of the Vehicle Code

CONTIGNITRON COMPANY
"EQUALIZER MODEL 4 (MOD IV)"

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 the "Equalizer Model 4 (Mod IV)" electronic ignition device manufactured by the Contignitron Company 7625-24 E. Rosecrans Ave., Paramount, California 90723 has been found not to 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 except as follows:

- 1) Volkswagen and Honda vehicles.
- 2) Those vehicles equipped with capacitive discharge and transistorized ignition systems including breakerless types.
- 3) Those vehicles with special ignition coils.
- 4) Those 1966 through 1970 vehicles equipped with a NOx retrofit device using an electronic speed sensor (i.e., Air Quality Products, Carter or Dana).

This device consists of packaged electronic circuits for spark timing and dwell control.

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 approved by the Air Resources Board that adversely affect the performance of the vehicle's pollution control device 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 "MOD IV" IGNITION 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."

"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 30 day of May, 1975.

WILLIAM SIMMONS
Executive Officer

State of California

AIR RESOURCES BOARD

May 19, 1975

Staff Report

Evaluation of Contignitron Company's
"Equalizer Model 4 (Mod IV)" Ignition
Device for Exemption from the Provisions
of Section 27156 of the Vehicle Code

I. Introduction

Contignitron Company, 7625-24 E. Rosecrans Ave., Paramount, California 90723 has applied for an exemption for its "Mod IV" ignition device. Contignitron intends to market this device for 1974 and older model-year vehicles equipped with a standard Kettering ignition system. Volkswagen and Honda vehicles and vehicles equipped with a capacitive discharge or transistorized ignition system (including breakerless systems) are specifically exempted. A copy of the application is shown in Appendix I.

II. Device Description and Function

The "Mod IV" is an electronic device whose basic functions are to regulate the spark timing, the saturation of the ignition coil, and to reduce the current load flowing through the distributor breaker points.

In normal operation, the current flows in the coil primary circuit developing a magnetic field when the breaker points are closed (dwell time) and the induced coil secondary voltage is discharged to the spark plugs when the points open. With the "Mod IV" device, these events are controlled by an electronic timer circuit triggered by the breaker point signal. Upon receiving the signal, the timer circuit will discharge the coil within a given time frame. This delay is variable depending upon engine speed and controls the spark timing to within the tolerance allowed for OEM specifications. In addition, the timer circuit controls point dwell by the on-off conduction of the transistorized power switch. The transistor also relieves the heavy current switching performed by the breaker points. The device's installation instructions are shown in Appendix I.

III. Device Evaluation

A. Contignitron Company's Data

The applicant submitted electrical specifications for the operating characteristics of its device and spark timing curves illustrating the timing control produced by the device. The spark timing curves and specifications are shown in Appendix I.

B. ARB Data

Tests were performed on an ignition simulator comparing the performance of two devices with two representative OEM ignition systems. The systems selected for comparison were as follows:

Late-model Chrysler-breaker point type. Distributor

P/N 3656390

Late-model Fiat-breaker point type, centrifugal advance only.

Distributor P/N (Marelli S 147)

Table I compares the centrifugal advance characteristics of the above OEM systems and the characteristics obtained with the "Mod IV" device installed in these systems. At distributor speeds of 300 RPM and lower, the system input voltage was reduced to 6 vdc to simulate starting conditions. These data indicate that the device produces spark timing that is within acceptable variations from the OEM specifications.

In the evaluation of the "Mod IV" device, measurements were made of the electrical characteristics of the ignition systems considered critical to emission control during the operation of the vehicle. The methodology used for these tests was to determine the maximum spark gap setting for continuous arcing of the OEM system at a distributor speed simulating high cruise conditions. At this setting, measurements of the OEM system electrical characteristics were made. The device was then installed in the system and the sparking capability of the device was observed using the predetermined gap setting and corresponding distributor speed. If the sparking capability is considered equivalent to that of the OEM system, the device's electrical characteristics were measured. Inconsistent or an absence of sparking capability at the predetermined gap settings is unacceptable.

Table II shows a comparison of the electrical characteristics of each type of ignition system. In one of the tests, the data indicate that the device produced an increase in coil primary current. This may be the result of the method the applicant is using to increase dwell time. However, other related characteristics were not affected by this apparent increase in coil current. In all of the tests, no adverse effects were noted with the device.

IV. Device Limitations

The "Mod IV" device cannot be installed in the following vehicles:

1. Volkswagen and Honda vehicles.
2. Vehicles with positive ground.
3. Vehicles with capacitive discharge or transistorized ignition systems including breakerless types.
4. Vehicles with special ignition coils.

V. Conclusions and Recommendations

The staff is of the opinion that the "Mod IV" device will not affect the performance and operation of emission control systems. Therefore, the staff recommends that Contignitron Company be granted an exemption from the prohibitions of Section 27156 for its "Mod IV" ignition device on 1974 and older model-year vehicles except as noted in paragraph IV.

Table I

Centrifugal Advance Data-Distributor Degrees

Distributor Speed-RPM	Chrysler		Fiat	
	Baseline	Device	Baseline	Device
100*	1.0	0	-1.0	0.5
200*	0	0	-1.0	-0.5
300*	0	0	-1.0	-1.5
400	0	0	0	0
500	1.0	1.5	1.5	0.5
600	4.5	4.5	2.5	1.0
700	8.5	8.5	4.0	2.0
800	10.0	9.5	6.0	4.5
900	10.5	10.0	7.5	6.5
1000	11.0	10.0	8.0	7.0
1100	11.5	10.5	8.5	8.0
1200	11.5	11.0	9.0	8.5
1300	12.0	11.5	9.5	9.5
1400	12.0	12.0	10.0	10.0
1500	12.0	12.0	11.0	11.0
1600	-	-	11.5	12.0
1700	-	-	12.0	12.5
1800	-	-	12.5	13.0
1900	-	-	12.5	13.0
2000	-	-	12.5	13.0

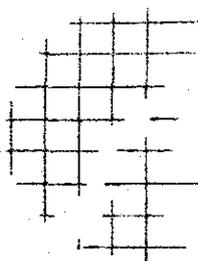
*System input voltage -6 vdc. All other speeds - 14 vdc.

Table II

Electrical Measurements

<u>Electrical Characteristics</u>	<u>Chrysler</u>		<u>Fiat</u>	
	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
Engine Speed (RPM)	3,000	3,000	4,000	4,000
Supply Voltage (Vdc)	14.0	14.0	14.0	14.0
Coil Primary Voltage (Vdc)	12.8	12.1	14.0	14.0
Coil Primary Current (Amp.)	1.5	1.5	1.2	1.7
Secondary Available Voltage (KV)	18.0	18.0	24.0	21.0
Secondary Required Voltage (KV)	11.0	11.0	12.0	12.0
Secondary Voltage Risetime (Usec)	55	40	40	50
Spark Duration (Usec)	1300	1300	1600	1600
Avg. Spark Voltage (V)	1500	1500	1500	1500
Avg. Spark Current (Mamp)	12.9	12.9	17.2	17.2
Spark Energy (Mjoules)	12.9	12.9	17.2	17.2
Maximum Spark Gap Setting (mm)	6.0	6.0	5.0	5.0

CONTIGNITRON

**The
EQUALIZERS**IGNITION
TIMING ADVANCE

Feb. 3, 1975

Richard Kenney, Senior Engineer
State of California Air Resources Board
9528 Telstar
El Monte, Calif.

Dear Mr. Kenney:

The Contignitron Company with this letter of application, requests an evaluation and a finding by the Air Resources Board, that the Equalizer Mod. 4 (Mod IV) Ignition System, when installed in Vehicles 1971 thru 1974 year models do not reduce the effectiveness of any required motor vehicle pollution control device, and that emissions after installation are at levels, which comply with existing State or Federal regulations for the 1971 thru 1974 model vehicles, and therefore complies with the requirements of section 27156 of the California Vehicle Code.

Ben L. Polo,
President

CONTROLLED IGNITION ELECTRONICS

The
EQUALIZERThe
EQUALIZER/IGNITION
TIMING ADVANCE

May 1, 1975

Mr. Gay Haas
State of California
Air Resources Board
9528 Telstar Ave.
El Monte, Calif. 91731

Dear Mr. Haas:

On February, 1975 we submitted an application for a finding of an exemption from the prohibitions of the 27156 Vehicle Code for our Performance Unit, The Equalizer Mod-4 (IV), as it applies to vehicles 1971 thru 1975.

Following a discussion with Mr. Bob Weis three weeks ago after some testing your lab performed on the device, it was agreed to modify the spark duration, which I substantially did and the units were delivered to Mr. Weis on April 14, 1975.

The modification allows for the variable dwell time, which is 40° (60° for a 6 cylinder and 80° for a 4 cylinder), at 600 RPM for an 8 cylinder engine. This dwell was down to 30° at 6,000 RPM for 8 cylinder engines, (45° for a 6 cylinder and 60° for a 4 cylinder). This type of variable dwell allows full time spark as the conventional system and at the same time the dwell time has been longer than normal will saturate the coil more totally and this higher saturation will result in a hotter spark or at least as good as conventional.

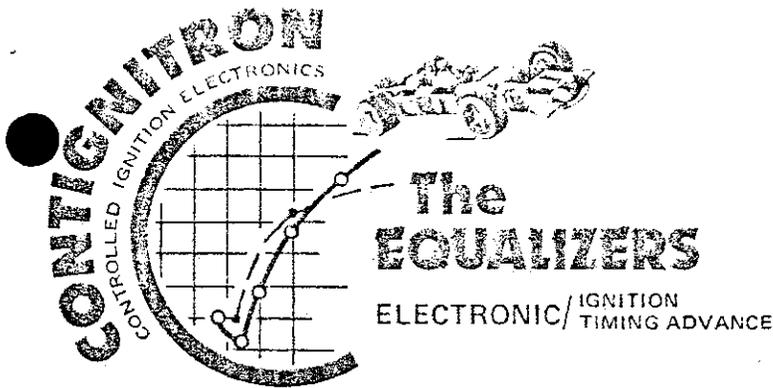
Hoping that this modification meets with your approval as far as the Air Resources Board requirements are concerned. If you have any further questions, please don't hesitate to contact me.

Truly yours,

Ben L. Polo
Ben L. Polo,
President

cc:
William Simmons, Executive Officer
Don Drashand
Richard Kenney
Bob Weis

CONTROLLED IGNITION ELECTRONICS
7625-24 E. Rosecrans Ave. ♦ Paramount, Ca. 90723
Tel. (213) 861-4940 ♦ 633-5085



May 21, 1975

Mr. Gay Haas
State of California
Air Resources Board
9528 Telstar Ave.
El Monte, Calif. 91731

Re: Application for Exemption of the Equalizer Mod.IV

Dear Mr. Haas:

On May 21 we had a meeting at your Air Resources Board Laboratories with Mr. Richard Kenney and Mr. Robert Weis, to discuss the evaluation of the Mod.IV as applied to Vehicles from 1971 thru 1975.

After analyzing the spark timing advance curves in a Volkswagon Distributor, it was found an increase in timing of 2° over base line, due to the fact that these Distributors have one of the lobes in the camshaft with 4° more advance than the others. It affects the Equalizer and results in 2° more advance than the base line.

It was decided because of this characteristic, to submit the application except for the Volkswagon and Honda Vehicles, which have this type of Distributor characteristics. Therefore I will be submitting an application for a modified Equalizer Mod.IV with no advance characteristic for the Volkswagon and Honda Vehicles.

If you have any further questions, please don't hesitate to contact me.

Sincerely yours,

Ben L. Polo
Ben L. Polo,
President

cc:
William Simmons, Executive Officer
Don Drashand
Richard Kenney
Bob Weis

I. Description of the System

A. Components of the System

1. A transistorized power switch to replace the heavy current switching performed by the breaker points in the conventional ignition system.
2. An electronic timer circuit that controls the transistorized power switch for spark time duration.
3. An electronic variable time delay to control spark timing advance.
4. A tachometer circuit to control the variable time delay as a function of engine RPM.
5. All of the above mounted on a printed circuit board contained in a high temperature plastic case.
6. Three (3) feet of cable with three conductors and a (mylar or braided) ground shield.
7. Electrical connecting hardware for installation of the device to the standard ignition coil and to provide a quick disconnect and connection of the conventional ignition system.

II System Operation and Purpose

1. The "Equalizer" systems provide a transistorized power switch that eliminates the high current (up to 6 amperes) through the distributor breaker points. The conventional circuit breaker points in the distributor must carry this current between the ignition coil primary winding and the chassis ground. This switching must take place in order to provide the engine cylinders with the appropriate high voltage spark from the secondary winding of the ignition coil to the spark plugs.
2. The Spark duration time control circuit actuates the transistorized power switch and maintains ignition coil saturation up to 90% of the time. (80° dwell time in a 4 cylinder engine and 40° dwell time in a 8 cylinder).
3. The time variable delay provides the necessary spark timing regulation by the Equalizer Mod. IV System. This electronic spark timing regulates the conventional vacuum advance and works in conjunction with the centrifugal advance. Timing advance curves are provided with and without the device and with VSAD only from 0 to 3000 engine RPM.

WARNING

DO NOT INSTALL ON VEHICLES WHICH ARE EQUIPPED WITH CAPACITIVE DISCHARGE IGNITION SYSTEMS. THIS DEVICE IS NOT COMPATIBLE WITH THESE SYSTEMS. FOR INSTALLATION ON NEGATIVE GROUND AND CENTRIFUGAL ADVANCE DISTRIBUTORS ONLY.

DO NOT INSTALL ON VEHICLES WHICH HAVE BEEN EQUIPPED WITH CAPACITIVE DISCHARGE IGNITION SYSTEMS. (OR REPLACE IGNITION COIL BEFORE INSTALLATION OF DEVICE).

FAILURE TO DO SO WILL CAUSE PRE-IGNITION AND VOID WARRANTY.

ANY MODIFICATION TO DEVICE CIRCUITRY, OPERATION OR INSTALLATION IS IN VIOLATION OF THE CALIFORNIA VEHICLE CODE, AND WILL RESULT IN A HEAVY FINE AND THE VOIDING OF ANY WARRANTY.

INSTALLATION OF THE DEVICE MUST BE MADE AWAY FROM THE EXHAUST MANIFOLD AND WHERE IT WILL BE MAINTAINED RELATIVELY DRY, DURING THE RAINY SEASON.

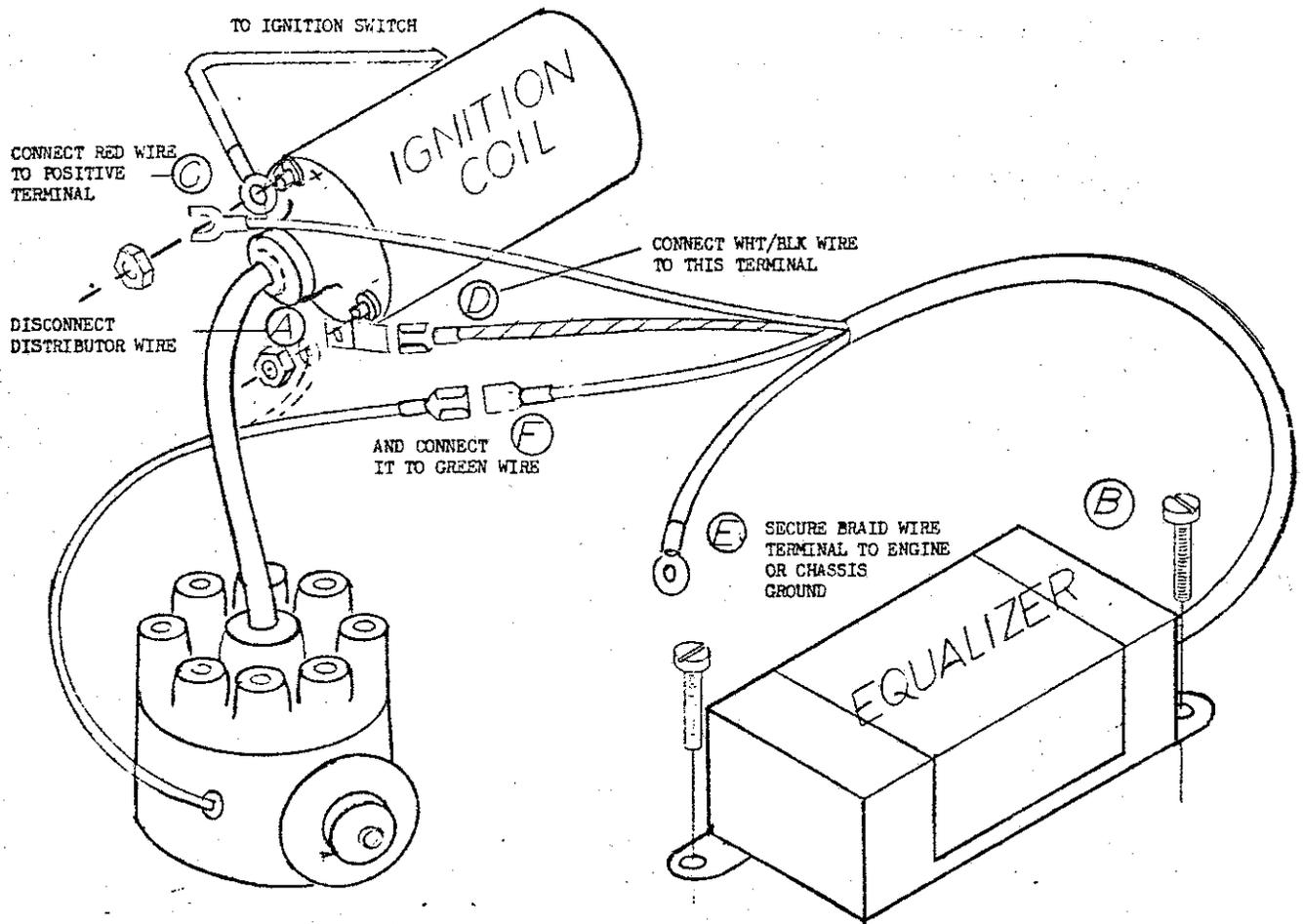
EXTREME CARE SHOULD BE TAKEN WHEN CONNECTING THE BLACK AND WHITE TERMINAL TO THE POINTS SIDE OF THE IGNITION COIL, FAILURE TO DO SO WILL RESULT IN A DAMAGED DEVICE AND VOID ANY WARRANTY.

Models 4, 6 & 8 Installation Instructions

1. Installation (See Figure 2)

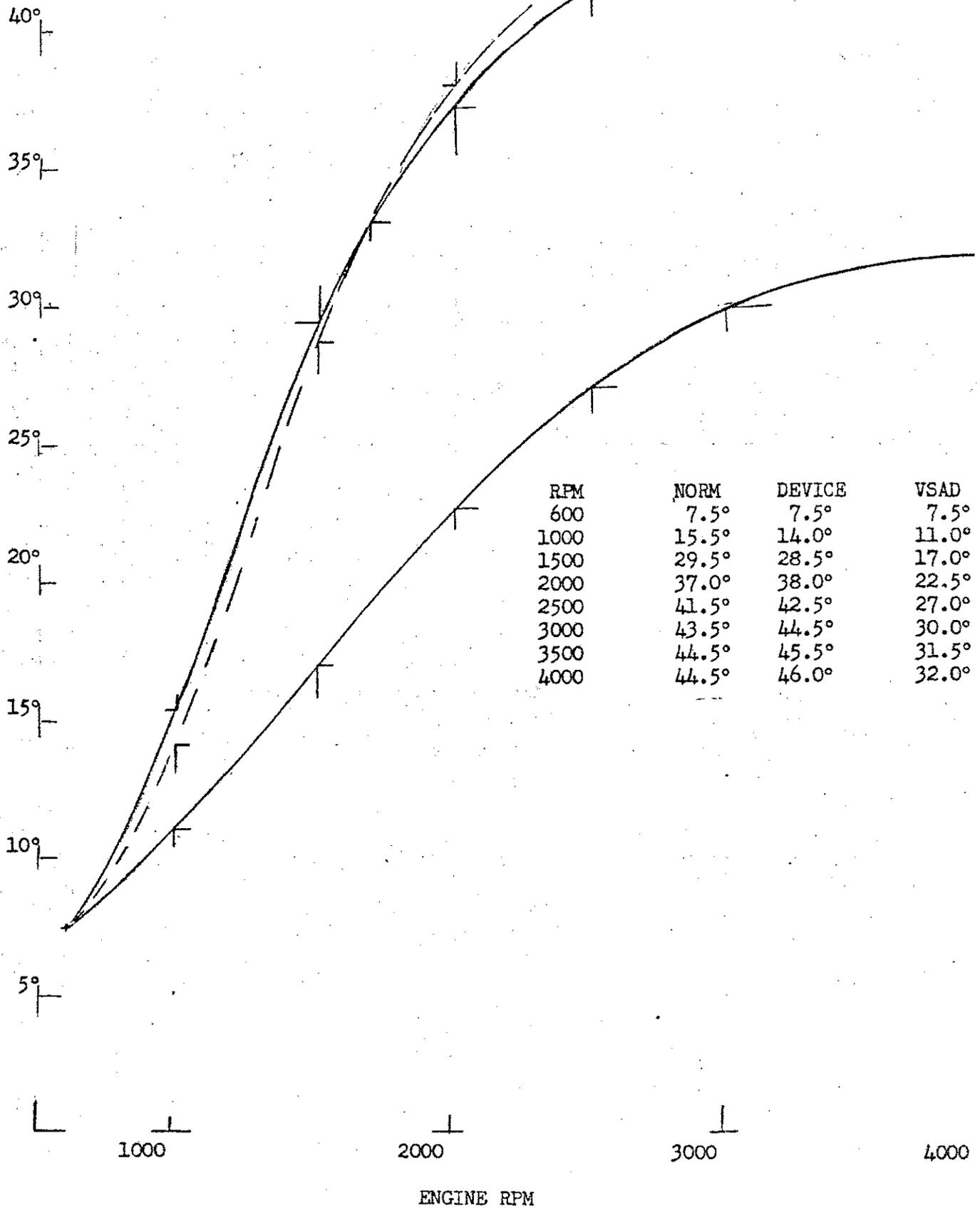
- A. Disconnect wire from distributor points at negative side of coil. Remove existing terminal and attach spring terminal supplied with unit to this wire.
- B. Mount device to chassis of vehicle utilizing metal clamp and metal screw supplied. Device should be mounted *as far from exhaust manifold as possible*. Use #31 drill bit for metal screw hole.
- C. Loosen nut on positive side of ignition coil, connect red wire and tighten nut. (For later model Ford products supplied with slip connectors, cut off connector.) Strip wire from ignition switch and connect standard spade lug. Connect red wire and wire from ignition switch with standard 10/32 nut.
- D. Connect black and white wire supplied with spring and spade lug to negative side of coil. (For later model Ford products connect with standard 10/32 nut.)
- E. Connect braided wire to engine or chassis ground.
- F. Connect wire from distributor points to green wire and slide insulator sleeve over connection.
- H. Start engine and reset timing¹ to manufacturers specifications. *It is extremely important that this step be followed because the device, when installed, will electronically retard timing 6° of crankshaft angle.*

¹ Distributors with dual diaphragms, timing must be set to manufacturers specifications and set idle speed to 600 RPM.



(H) RESET TIMING AFTER INSTALLATION WITHIN 1° OF MFG. SPECIFICATIONS

1970 CADILLAC
583 ASD



V The Equalizer Mod IV may be installed in all vehicles foreign and domestic except for the following:

Vehicles with Positive Ground

Vehicles with Capacitive Discharge Ignition

Vehicles with Special Ignition Coils

VI Contignitron Company agrees to provide the Air Resources Board with the necessary number of devices upon request of the Executive Officer for independent evaluation.

2. Secondary voltage rise time (10 NANO SECONDS TRANSISTOR)
SAME AS CONVENTIONAL
3. Secondary output energy (at input voltage) _____

4. Spark duration (specify engine RPM) and spark gap) _____
600 to 6000 RPM (Same as Conventional)

IV. Design details

Storage capacitor capacitance (uf) and stored voltage _____
 _____C-D unit inductance (uH) N.A.Pulse triggering source BREAKER POINTSType of transformer in C-D and turn ratio N.A.Transient voltage protection (open circuits and voltage surges)
 _____Close point time limit CONVENTIONALMaximum point current and ground circuit resistance 10 MA5 VOLTS @ 500 OHMOscillator frequency N.A.Number and type of power transistor BP 010(CONTIGNITRON CO. SPECIFICATIONS)Ballast resistors required? Yes X No _____Resistor Type _____ Resistor Size (ohms) CONVENTIONALSwitch back to stock system? Yes X No _____Describe methods QUICK DISCONNECT SPADE LUGS

Moisture and Vibration Protection Yes, Vinyl Coat and Plastic Case

Operating Temperature Range 0 to 100° C

Humidity Range 90

V. Modifications from O.E.M.

Ignition timing modified? Yes _____ No X

State modifications from O.E.M. Ignition System Characteristics _____

IGNITION TIMING MUST BE RESET TO O.E.M. SPECIFICATIONS

AFTER INSTALLATION

Engine Setting Changes? Yes _____ No X

Describe Changes _____

Specify any other changes from O.E.M. _____

VI. Device information

Please attach circuit diagram, O.E.M. and device spark advance curves and photograph of spark line produced by device.

Description of operating principle 1. Controlled Spark Timing Advance

2. Generation of 40° Dwell Time by the unit.