E.O.

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-50
Relating to Exemptions under Section 27156
of the Vehicle Code

MARDEK CORPORATION
"MOBELEC 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 39023 of the Health and Safety Code;

IT IS ORDERED AND RESOLVED: That the installation of the "Mobelec Ignition System" marketed and manufactured by Mardek Corporation, P.O. Box 2860, Newport Beach, California 92663, 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 for 1974 and older model-year General Motors and American Motors Vehicles with 8 cylinder Delco distributors and foreign vehicles originally equipped with a conventional breakerpoint ignition system and concentric pivot-point distributors.

The device consists of a magnetic pick-up unit and mounting plate installed inside the distributor and a capacitive discharge system mounted in the engine compartment. A cam lobe adapter is used for 4 cylinder applications, and a special adapter circuit for those vehicles equipped with a Dana electronic speed sensor.

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 originally submitted to the Air Resources Board for evaluation that adversely affect the performance of the vehicle's pollution control devices 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 "MOBELEC 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 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. Any violation of this section 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 has he deems advisable.

Executed at Sacramento, California, this 28 day of March, 1975.

WILLIAM SIMMONS
Executive Officer

State of California

AIR RESOURCES BOARD

March 11, 1975

Staff Report

Evaluation of Mardek Corporation "Mobelec Electronic Ignition System" for Compliance with the Requirements of Section 27156 of the Motor Vehicle Code

I. Introduction

Mardek Corporation, P.O. Box 2860, Newport Beach, California 92663 has submitted an application requesting an exemption from the prohibitions of Section 27156 of the Vehicle Code for the "Mobelec Electronic Ignition Sytem" (Reference - Exhibit A).

Vehicle Code Section 27156 prohibits the installation of any device or mechanism which adversely affects the operation or performance of the emission control system. This section of the vehicle code also authorizes the Air Resources Board to exempt any device from this prohibition if a finding is made showing the device does not reduce the effectiveness of the emission control system. The applicant originally requested the exemption be granted on all 1974 and older model-year vehicles originally equipped with convertional breakerpoint system. However, the applicant's letter of March 10, 1975 limited the vehicle application to General Motors 8 cylinder and foreign vehicles originally equipped with a conventional breakerpoint ignition system and concentric pivot-point distributors. (Reference - Exhibit A)

II. System Description

The "Mobelec Electronic Ignition System" consists of the magnetic

pick-up unit, switching amplifier, a cam adapter for 4-cylinder application, a mounting plate for the magnetic pick-up unit and a special electric circuit for those Dana NOx device with an electronic speed sensor. The magnetic pick-up unit is mounted approximately the same location as breakerpoints (Reference - Exhibit B). Air gap between the cam lobe and the pick-up unit is determined by a plastic feeler gauge. When the distributor shafts rotates, the high points of the cam lobe moving past the magnetic pick-up will generate an electronic signal. This signal actuates the switch within the amplifier controlling the current flow to the primary side of the coil. The amplifier is basically a capacitive discharge system with typical electrical characteristics. (Reference - Exhibit C).

The purpose of the "Mobelec Electronic Ignition System" is to reduce the maintenance associated with a breakerpoint system. It is claimed by the applicant that the installation of this device would simplify tune-up and provide better control of ignition timing.

III. System Evaluation

The applicant submitted Hot CVS-1972 emission data performed by Olson Laboratories, Inc. of 421 East Cerritos Avenue, Anaheim, California 92805. The test vehicles are described below:

Make and Model-Year	Engine (CID)	Transmission	Carburetor	Emission Control System
1967 Buick Le Sabre	340	Automatic	4-Barrel	AI-EM-Carter NOx devic
1967 Volkswagen	97	Manual	1-Barrel	STP NOx device

The following tables summarize the emission results:

Vehicle Configuration	Hot CVS-1972 Exhaust Emission Tests (grams/mile) HC	CO	NOx
1967 Buick			
Baseline	1.9	53	2.1
Mobelec	1.6	57	1.9
Baseline-Carter NOx	1.7	51	2.2
Mobelec-Carter NOx	1.7	53	1.9
1967 Volkswagen			
Baseline	5.8	53	2.0
Mobelec	5.6	49	1.9
Baseline-STP NOx	5.3	56	1.4
Mobelec-STP NOx	5.6	52	1.3

The above data with the Carter NOx device are inconclusive. Based on emission tests with the Carter device the Air Resources Board Laboratory has recorded significant NOx reductions. The Volkswagen data indicate the device does not have any adverse effect on the emission control system.

The Air Resources Board Laboratory conducted tests to compare the advance characteristics and the electrical outputs with and without the device on a vehicle. A comparison of the advance characteristics of a Chrysler and Ford distributor using a distributor machine was performed. In addition tests were performed to determine the compatibility of the "Mobelec" device with the Carter and Dana speed sensors.

The vehicle used in the ARB tests is described below:

Make and Model-Year	Engine (CID)	Transmission	Carburetor	Emission Control System
1974 American Motors Ambassador Station Wagon	360	Automatic	2-Barrel	AI-EM-EGR

The following tables summarize the results of the ARB tests:

Centrifugal Spark Advance
(Crankshaft Degree)

Engine Speed (rpm)	1974 Ambassador		Ford Dist.		Chrysler Dist.	
	Baseline	Device	Baseline	Device	Baseline	Device
Idle	0	0	0	0	0	0
1000	4	4	3	3	3	4
1500	12	12	7	7	19	18
2000	15	15	11	8	21	19
2500	17	17	16	13	22	21
3000	19	19	19	16	24	23

Vacuum Spark Advance
(Crankshaft Degree)

Vacuum (in Hg)	1974 Ambassador		Ford Dist.		Chrysler Dist.	
	Baseline	Device	Baseline	Device	Baseline	Device
0	0	0	0	0	0	0
5	0	0	1	0	1	0
10	7	7	8	6	2	2
15	15	14	14	11	22	14
20	15	14	15	11	22	14

Spark Duration
(Microseconds)

Engine Speed (rpm)	1974 Ambassador	
	Baseline	Device
Idle	1300	180
1500	1300	180
2000	1000	180
3000	700	180

Secondary Voltage Rise Time
(Microseconds)

Engine Speed (rpm)	1974 Ambassador Baseline	Device
Idle	40-50	12-20
2000	40-50	20
3000	50	20

Secondary Voltage Required
(Kilovolt)

Engine Speed (rpm)	1974 Ambassador Baseline	Device
Idle	13	12
1200	14	14
2000	14	14
3000	11	12

Secondary Voltage Available
(Kilovolt)

Engine Speed (rpm)	1974 Ambassador Baseline	Device
Idle	28	40
1200	29	40
2000	30	40
3000	29	40

The above data show typical changes in rise time, spark duration and available secondary voltage from capacitive discharge ignition system and would not be expected to have any adverse effects on the exhaust emission.

Installation of the "Mobelec Electronic Ignition System" indicated a significant change in spark timing on the Chrysler and Ford applications above 10" Hg. vacuum. A spark retard of 8 degrees and 3 degrees was observed on the Chrysler and Ford distributors, respectively. An additional 3 degree retard was observed on the Ford distributor when the engine speed is greater than 1500 rpm. This spark retard is caused by the off-center pivot movement of these distributors. Movement of this pivot causes the spark to advance on breakerpoints system but has no effect on the timing of breakerless systems.

The staff has established limits allowing no more than 4 degree of sustained retard above 55 mph. Therefore, the installation of this device on Chrysler and Ford vehicles is unacceptable. Excessive timing retard at high speed operation will reduce valve life. This deterioration allows the valves to lose their sealing capacity which will increase hydrocarbon emission.

The Dana speed sensor in addition, is not compatible with the "Mobelec" device therefore a special adopter circuit is used for the Dana applications. No incompatibility exists between the Carter and "Mobelec" device. The tests show the speeds which the speed sensor solenoid actuate are approximately identical with and without the "Mobelec" device.

IV. Conclusion and Recommendation

The staff believes the installation of the "Mobelec Electronic Ignition System" will not lead to increases in exhaust emission on motor vehicle applications. Therefore, the staff recommends that "Mardek Corporation be granted an exemption from the prohibitions of Section 27156 for 1974 and older model-year vehicles equipped with concentric pivot distributors (i.e. General Motor 8 cylinder) and conventional breakerpoint ignition system.

Exhibit A
Application

January 30, 1975.

Application by Mardek Corporation for Resolution of Compliance with Section 27156, State of California Vehicle Code.

Re: Item II. Request for Board Finding.

1. Detailed Description:

The Mobelec Electronic Ignition System features an electronic triggerhead sensing device. This unit is located within the distributor housing and next to, but not touching the O.E.M. distributor cam. As the distributor cam turns, the cam lobes revolve past the sensing triggerhead to break a magnetic field, that in turn is the signal required for discharging spark to the plugs as supplied by the Mobelec power module and O.E.M. coil.

2. Purpose of the device:

The Mobelec Electronic Ignition is designed to replace conventional breaker points and condenser. This eliminates the need for regular replacement, simplifies tune-ups, and cuts maintenance costs.

3. Detailed Instructions for Installation: See attached.

4. Applicable emission test data: See attached.

5. Listing of makes and models of vehicles: See attached, Page 8, 9, 10 of Installation Instructions.

6. Agreement:

Mardek Corporation, P.O. Box 2860, Newport Beach, California 92663, hereby agrees that upon request will be delivered to the Executive Officer a Mobelec device for Independent evaluation.

Edward R. Bryan

Edward R. Bryan, Man. Research
MARDEK COPPORATION

March 10, 1975

State of California
Air Resources Board
9528 Telstar Ave.
El Monte CA 91731

Attention: Mr. George Lew

Dear George:

In agreement with our meeting of Friday, March 7 1975 we are changing our application as follows:

We will drop the Ford and Chrysler. We will block out the plate number reference in the instructions. When we have completed our tests on the Ford and Chrysler we will get back with Mr. Kenny and show him what we have done.

Very truly yours,

Bud Bryan

Bud Bryan
Manager, Technical Services

BB:lr

3/11/75

Following discussion at ARB, it was decided by me, Bud Bryan, that an amendment was in order per the above. Mardek wishes to apply for certification per revised application list attached - cc: Ford & Chrysler.

Bud Bryan

MARDEK CORPORATION
P.O. BOX 2860
NEWPORT BEACH
CALIF. 92663
(714) 548-3471

ELECTRONIC BREAKERLESS IGNITION SYSTEM

INSTALLATION INSTRUCTIONS

GENERAL INFORMATION

We have developed the highest quality, most advanced, breakerless C. D. electronic ignition available.

The Mobelec Breakerless Ignition System has been designed for simple installation. Anyone familiar with tune-up procedures can complete the installation in about 45 minutes.

The Mobelec system is extremely reliable and maintenance free, requiring very little service, once installed. Since normal distributor tune-ups will no longer be required, it is worthwhile to spend a little extra time making sure everything is just right.

When you have completed your installation you may find that you have extra parts. Don't be concerned. We have included items such as adapter plates, screw(s), washers, and a tachometer adapter; some of which your car may not require. Retain these parts in the event that you change automobiles and wish to put your Mobelec unit on your next car.

It is recommended the directions be read through once before beginning the installation, to become familiar with the procedure.

The following tools will be required:

1. Medium sized screwdriver
2. Drill - 1/8 inch (3mm)
3. Wire strippers
4. Pliers or wire crimpers
5. TIMING LIGHT

INSTALLATION PROCEDURE

MOUNTING THE ELECTRONIC POWER MODULE

1. In selecting a mounting location for the unit, several things must be considered: the module must be close enough so the wires reach to the distributor and coil. The electrical wires may be shortened or lengthened; however, the thick triggerhead lead wire MUST NOT BE CUT OR CRUSHED. Try to find a cool place at least 12" away from the exhaust system. Often the ideal location is somewhere near the front of the engine compartment, where cool air enters.
2. After you have decided on the best place for the electronic module, mark the location for the three mounting holes. Drill three holes 1/8" diameter (3mm). Place the ground wire under one of the mounting screws, making sure a good, clean connection is made. The spacers provided may be used to mount the unit on uneven surfaces.
3. A good, clean ground connection is essential for correct operation. The ground wire may be extended if necessary.

TRIGGERHEAD INSTALLATION

1. Remove distributor cap and rotor.
2. Remove ignition points and condenser.
3. See List A (back page) for appropriate adapter plate.
4. The adapter plates are designed to fit in place of the conventional breaker points. Position the adapter plate where the points had been. Notice that the threaded holes are used to mount the triggerhead while the remaining holes secure the adapter plate.

NOTE: If the adapter plate doesn't appear to fit, see "Troubleshooting Tips" (in the back of the instruction manual).

5. Secure adapter plate with 8-32 flathead screw(s).

6. Position the triggerhead on the adapter plate and secure with two 10-32 screws. Lightly tighten screws, with the triggerhead clear of distributor cam lobes.

NOTE: On Chrysler cars the triggerhead must be inverted(Fig. 1). Place the two flat washers on top of the triggerhead to compensate for plate thickness.

FOUR CYLINDER ENGINES ONLY

1. Position the black timing cap over the top of the distributor cam. Make sure the cap slips all the way down, letting the rotor seat properly. (Fig. 2) If the timing cap is loose, secure with Loctite Lock n' Seal. The function of the timing cap is to give a very precise timing point for the triggerhead, as the peak of the cam lobe on many four cylinder distributors is not pronounced. (Some late model Datsuns, however, do not require the timing cap, as the cam lobes are precise).

GAPPING THE TRIGGERHEAD

1. Crank the engine slowly or roll the car in gear until the peak of the distributor cam lobe is facing the triggerhead sensors, indicated by arrow (Fig. 3).

2. Set the clearance gap between triggerhead sensors and cam lobe at .004" (orange gauge). On four cylinder engines, using the Timing Disc, the clearance should be set at between .002" - .004".

3. Tighten screws and re-check gap.

4. Route the triggerhead wire at least halfway around the inside of the distributor. This provides plenty of slack for movement of the distributor advance system. On some distributors, a small notch should be made in the distributor cap for the exit of the wire. The cap may be notched with a round file. Make sure the wire is not pinched or bent when the cap is installed. Check that the triggerhead wire is clear of all moving parts and allows free movement of the vacuum advance mechanism.

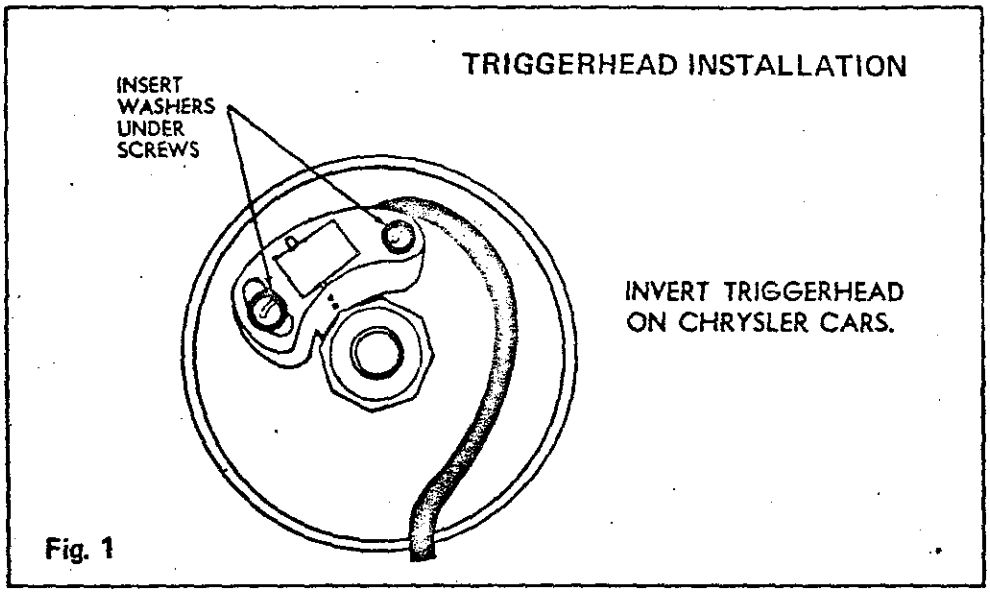


Fig. 1

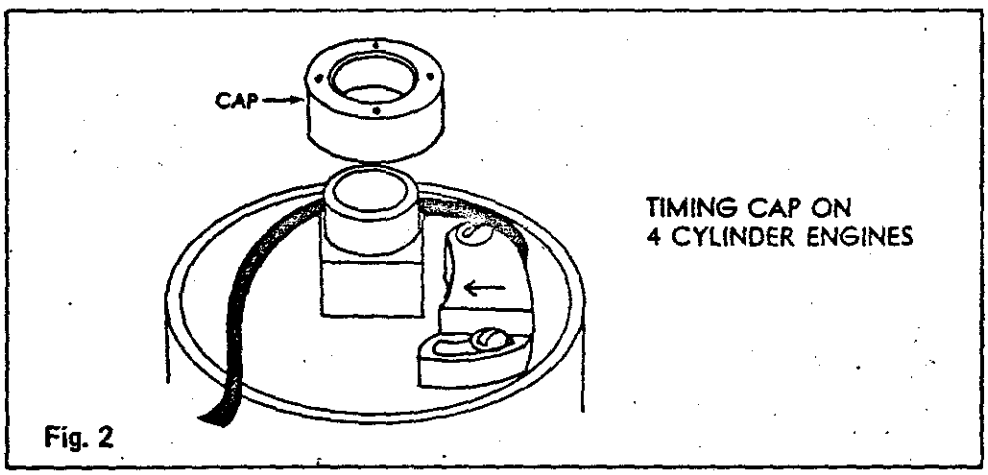


Fig. 2

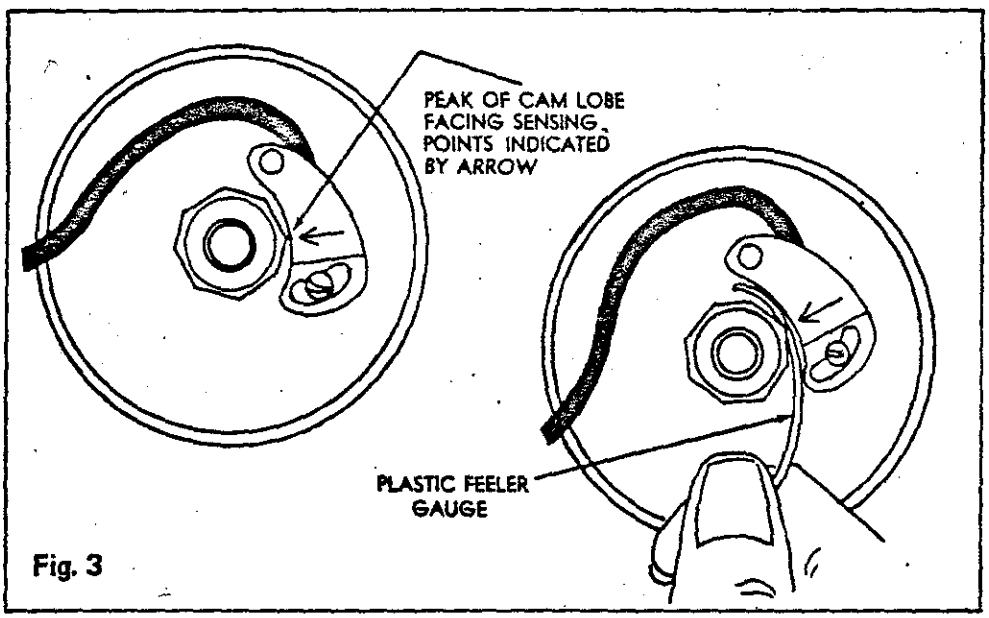


Fig. 3

5. Inspect and reinstall distributor rotor and cap, making sure the rotor is correctly in place and the contact point is clean.

6. Check that spark plug wires are correctly installed and in good condition.

ELECTRICAL INSTALLATION

CARS WITH NEGATIVE GROUND (most automobiles). See (Fig. 4).

Short Black = Ground Green = negative (-) side of coil. Yellow = positive (+) side of coil Red = Voltage (ignition).

1. Remove original wires from the negative (-) side of the coil. Wrap with electrical tape.
2. Connect green wire of the Mobelec to the negative (-) side of the coil.
3. Remove original wires from the positive (+) side of the coil. Wrap with electrical tape.
4. Connect red wire of the Mobelec to the wire(s) removed from positive (+) side of the coil. (This is the ignition switch wire and enclosed small adaptor may be used for this connection).
5. Connect yellow wire of the Mobelec to the positive (+) side of the coil.
6. Place the short black wire under one of the Mobelec module mounting screws. Be sure a good clean ground connection is made.

CHECK THIS INSTALLATION CAREFULLY AS REVERSE POLARITY WILL DAMAGE THE MOBELEC UNIT. MAKE SURE LOOSE WIRES ARE CAREFULLY WRAPPED.

CARS WITH POSITIVE GROUND (ONLY early English Imports have Positive Ground)

The red wire of the Mobelec becomes the ground, and the short black Mobelec wire becomes the voltage input. The yellow and green Mobelec wires are connected

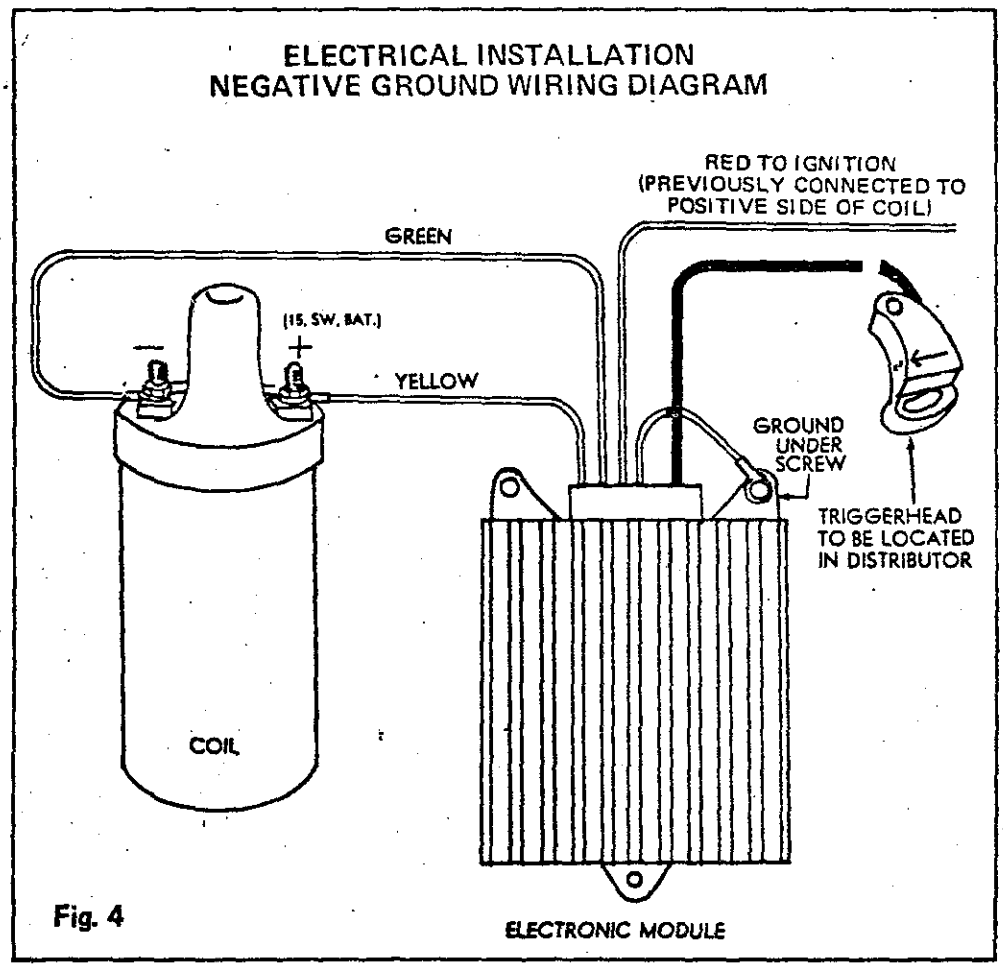

ELECTRICAL INSTALLATION
NEGATIVE GROUND WIRING DIAGRAM
RED TO IGNITION
(PREVIOUSLY CONNECTED TO
POSITIVE SIDE OF COIL)
GREEN
(15, SW, BAT.)
YELLOW
GROUND
UNDER
SCREW
TRIGGERHEAD
TO BE LOCATED
IN DISTRIBUTOR
COIL
ELECTRONIC MODULE

Fig. 4

as above. Resistors and radio interference capacitors are not required and should be disconnected from the coil.

OPERATIONAL ADJUSTMENTS

1. Check electrical installation and connections. Tape any exposed connections and route wires away from exhaust system, using wire ties provided. Do not route triggerhead wire too close to high current cables.
2. Start engine and allow to warm up. A faint whistle may be heard from the electronic module. This is normal.
3. Set timing to manufacturer's recommendations, using a TIMING LIGHT.

February 25, 1975

Air Resources Board Laboratory
9528 Telstar Avenue
El Monte, CA 91731

Attention: George Lew

Dear George,

In accordance with your request of yesterday, attached herewith is the revised Adaptor Plate Selection Chart.

You will note, George, that the 009 plate reference, accidently omitted from the original list is included. Also, you will note that the dual point application has been deleted and a statement indicating that the Mobelec system is not applicable in automobiles where dual points are used, i.e. (retard/advance ignition systems)

Yours truly,

Derek

Derek M. Torley

DMT/ch
enclosures

MARDEK
CORPORATION

P.O. BOX 2860
NEWPORT BEACH
CALIF. 92663
(714) 548-3471

ADAPTOR PLATE SELECTION CHART

DOMESTIC AUTOMOBILES

PLATE NUMBER	MAKE AND MODEL
009	American Motors ('67-'74) 8 cyl. Chevrolet ('64-'74) 8cyl. Cadillac ('60-'74) Pontiac ('63-'74) 8 cyl. Oldsmobile ('64-'74) 8 cyl.
M21	Jensen Interceptor

ADAPTOR PLATE SELECTION CHART

FOREIGN AUTOMOBILES

PLATE NUMBER	MAKE AND MODEL
M5	Audi ('68-'74) *BMW ('68-'74) 1600,2000,2002tii *Capri ('69-'74) 4 cyl. Opel ('67-'74) Manta, Rallye, Kadett *Pinto ('71-'74) 1600, 2000 (Bosch dist.) *Porsche (031 dist.) 912 ('66-'69) 914-4 ('70-'74) *Volkswagen ('68-74) Volvo (4 cyl.) 121 ('68-74), 123 ('68-'74), 142 ('68-'72) 144 ('68-'74), 145 ('68-74), 142/144 Grand Luxe ('70-'74) 1800 ('69-'74) *Mercedes 4 cyl.
005	*BMW ('68-'74) 3.0S, 3.0CS, 3.0SI, 3.0CSI *Capri ('69-'74) 6 cyl. Ford Mustang II (Bosch dist.) *Porsche 914-6 *Mercedes ('53-'74)
012	Honda Civic 1200 Toyota Corolla('67-'74) Celica('72-'74) Crown('68-'74) Trucks('72-'74)
013	*Datsun ('70-'74) single point
015	*Pinto 1600 (U.S. dist.)
018	*Datsun ('65-'74) single point
022	*BMW 1600, 2000, 2002, 3.0S, 3.0CS *Mercedes ('53-'72) *Volkswagen ('67)
024	*Mercedes ('65-'72) *Porsche ('72-'74) 911 (Bosch dist.),912 ('68-'69)Bosch dist., 914-6

*Some cars appear more than once in the list. This is because manufacturers occasionally equip same year/model cars with various distributors.

The Mobelec Electronic Ignition is not suitable for use in those automobiles equipped with dual points, i.e. (retard/advance ignition systems.)

The following cars do not require adaptor plates:

Austin ('65-'74) Cooper, America, Marina, Jensen Healy
Jaguar ('59-'74) All models except V-12
Lotus ('64-'71) Elan, Elite, Europa
M.G. ('50-'74) TD, TF, MGA, J5, Midget, MCB
Morgan ('58-'68) Plus 4
Morris ('53-'74) Minor
Rover 2000 TC ('67-'74)
Sunbeam (all U.K. Chrysler)
Super 7 (with Lucas dist.)
Triumph ('56-'74)(Lucas dist.only) TR2, TR3, TR4, TR4A
TR250, TR6, Spitfire

February 17, 1975.

Air Resources Board Laboratory,
9528 Telstar Ave.,
El Monte, CA. 91731.

For the Attention of Mr. K. D. Drachand, Chief, Vehicle Compliance.

Dear Mr. Drachand,

Thank you for your letter of February 11, 1975 regarding our application for exemption from Section 27156 on the Mobelec Electronic Ignition.

Re: Paragraph 1. Enclosed herewith is technical data concerning the compatibility of the Mobelec with the Carter and Dana devices.

Re: Paragraph 2. We have made changes on our vehicle application list to exclude those vehicles originally equipped with a breakerless ignition system.

Re: Paragraph 3. Installation instructions for those vehicles, i.e. Porsche, Audi, originally equipped with capacitive discharge system are enclosed.

Re: Paragrph 4. We have excluded from our list of vehicle applications the Datsun cars equipped with dual point distributors (retard/advance ignition system).

We very much hope that the above information will enable the Air Resources Board to complete the evaluation of our application.

Sincerely,

Derek M. Torley.

MARDEK CORPORATION

P.O. BOX 2860
NEWPORT BEACH
CALIF. 92663
(714) 548-3471

February 17, 1975.

To: Air Resources Board
From: Mardek Corporation.

The Carter Speed Sensor circuit operates according to manufacturers specifications with the Mobelec ignition system by simply reconnecting the green lead from the Carter unit to the yellow lead terminal on the H.T. coil from the Mobelec.

By connecting in this way, the Carter pulse sensing circuit is actuated by the ignition pulses from the Mobelec system and will operate at the same pulse speed setting.

The system performance was verified in accordance with the makers standard specifications.

Testing Method: Carter Device

Automobile 1967 8 cylinder 340 CID Engine.

Using Carters specifications and collaborated by Mitchells Consumer Protection Handbook for retrofit smog devices, the following tests were conducted with the aid of an Autoscan 4000 apparatus. The Carter device was tested with conventional ignition. At 2510 RPM a change in vacuum was observed. This was found to be per manufacturers specification. The test was repeated with consistancy six times.

The conventional ignition was removed and the Mobelec ignition was installed. The green lead from the Carter device was changed from the negative side of the coil to the yellow lead of the Mobelec Ignition. This was done to actuate the Carter ignition pulse through and from the Mobelec Ignition. At 2510 RPM a change in vacuum was observed. The test was repeated six times. Results were consistant.

Tests were conducted at Olson Laboratories in Anaheim.

February 17, 1975.

To: Air Resources Board,
From: Mardek Corporation.

The Dana Retrofit NOx Speed Sensor device is normally connected to the positive terminal on the coil. The Dana device derives its power source from the nominal 8 - 12 volts positive on the coil terminal and incorporates an additional pulse sensing circuit which is actuated by the 8 - 12 volt pulses on the terminal of the coil, caused by the operation of the contact breakers and resistance drop across the ballast resistor. When the pulse rate is approximately equal to 1300 RPM on an 8 cylinder engine, the solenoid valve circuit is switched.

The Mobelec ignition system allows the Dana system to work according to the manufacturers specifications when the enclosed adaptor is wired as per instructions.

Laboratory tests measuring vacuum changes at manufacturers recommended RPM speeds indicated that the Dana Speed Sensor device functions correctly. No variations in the Dana Speed Sensor were found between conventional ignition with Dana retrofit, versus Mobelec ignition with adaptor and the Dana on a 1967 Buick 8 cylinder.

Testing Method: Dana Device

Automobile 1967 8 cylinder 340 CID Engine.

Using Dana's specifications and collaborated by specifications found in the Mitchell Consumer Protection handbook for retrofit smog devices, the following tests were conducted with the aid of an Autoscan 4000 apparatus. Conventional ignition equipped with the Dana NOx device was set to Dana's specification. When the engine was brought to 1300 RPM vacuum change was observed on the vacuum gauge. The test was repeated six times.

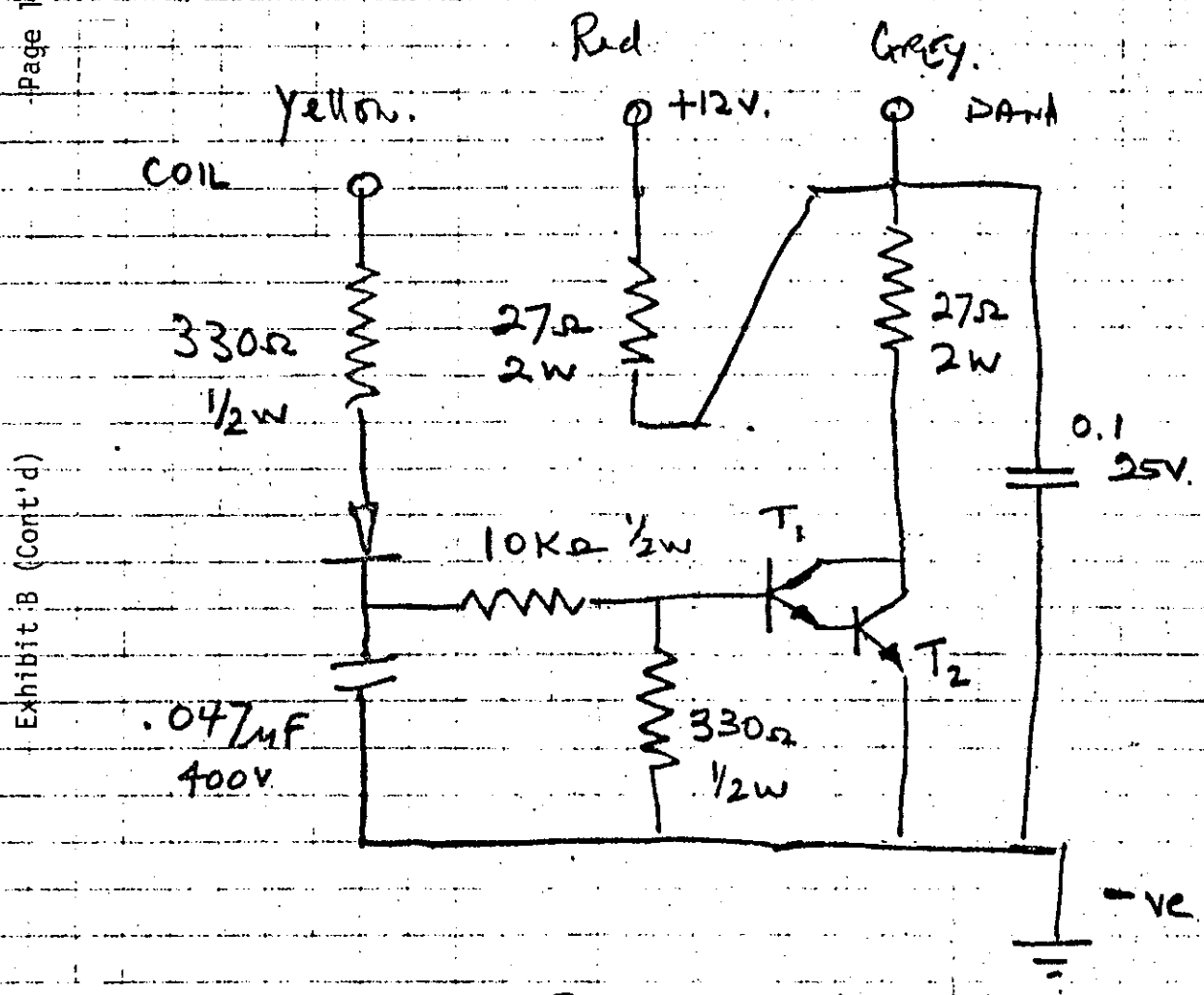
The conventional ignition was removed and the Mobelec ignition with adaptor and the Dana device was equipped to the car and the test proceedure was repeated six times.

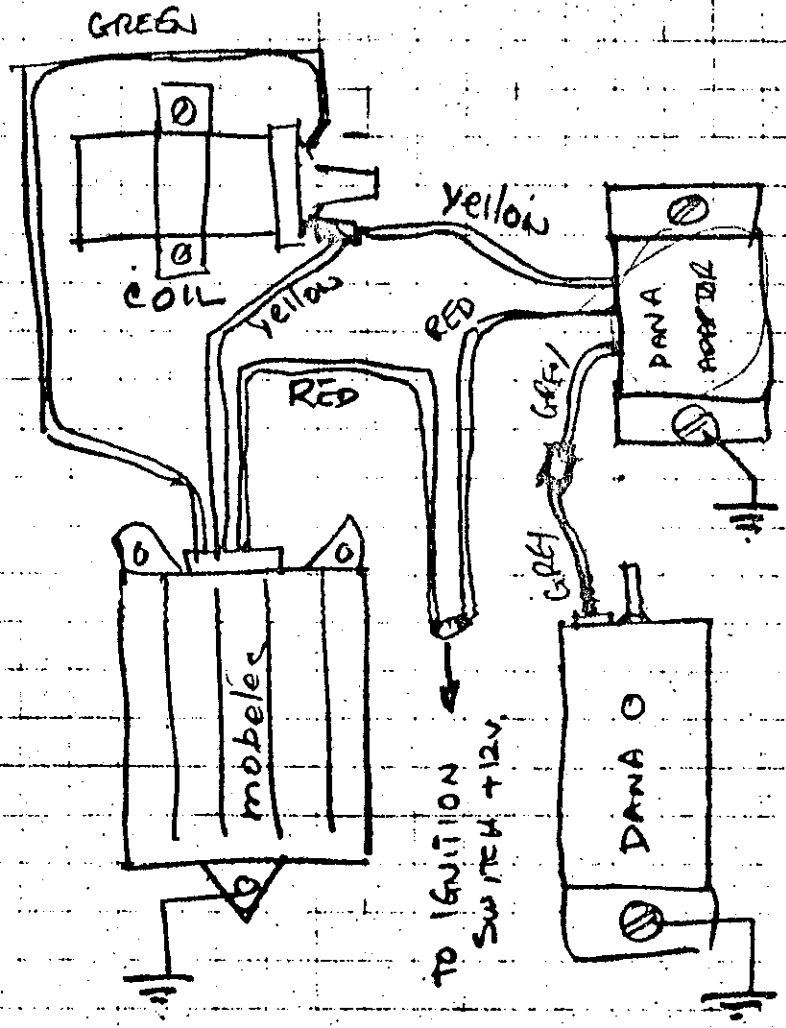
The Dana device functioned exactly as it had with conventional ignition testing method.

Tests were conducted at Olson Laboratories in Anaheim.

MOBELEC. ADAPTOR FOR DANA NOX DEVICE SPEED SENSOR

Exhibit B (Cont'd)





ALL RESISTORS 5%

T_1 - BCY70 (100mA 50V. NPN Si)

T_2 - TIP31A (5 Amp 50V NPN Si)

FEB 14 1975.

February 17, 1975.

To: Air Resources Board
From: Mardek Corporation.

Mobelec Installation Instructions for Porsche/Audi vehicles originally equipped with a capacitive discharge system

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When fitting a Mobelec breakerless ignition system to an Audi or a Porsche incorporating the Bosch electronic ignition system, i.e. BHKZ, the connector on the end of the Bosch ignition unit must be withdrawn, and taped to one side as it will not be required when the Mobelec system is installed. Also the leads connected to the terminals 1 and 15 on the H.T. coil are removed and taped securely to one side as they will not be required.

The Mobelec system is then installed on the car in accordance with the standard fitting instructions.

Care must be taken to insure that the red lead of the Mobelec is connected to a 12 volt ignition switch circuit which is operative during the cranking period. Also the idle solenoid valve fitted on the Audi carburetor must be left connected to the ignition switch, and on some models this means re-connecting this lead which was previously connected to the ignition coil terminal number 15, to an alternative supply, i.e. where the red lead of the Mobelec system is connected.

State of California
AIR RESOURCES BOARD

SPECIFICATIONS - IGNITION SYSTEM

I. Product Description

Manufacturer Mobelec LTD./Nardek Corp. Name & Model No. Mobelec Electronic Ignition

Address P.O.Box 2860, Newport Beach, CA 92663 Telephone 714-548-3471

Mounting Position Inside Engine compartmen

Type of Ignition

Kettering _____ Capacitive Discharge X Electronic X

Other Breakerless Capacitive Discharge

II. Input Requirement

System input voltage and current (volts and amps - RPM curve)

7 - 17 volts D.C.

.5 - 2.5 Amps

III. OUTPUT Characteristics

A. Primary System

1. System output voltage and current (volts and amps - RPM curve)

380 Volts - No curve

B. Secondary System

1. Available output secondary voltage (specify RPM or submit voltage- rpm curve)

38 KV 1 - 10,000 RPM

2. Secondary voltage rise time 5 - 15 m. sec

3. Secondary output energy (at input voltage) ≐.050 joules.

4. Spark duration (specify engine RPM) and spark gap)

150 m. sec. nom. 10MM gap

IV. Design details

Storage capacitor capacitance (uf) and stored voltage

1 uf - 380 Volts

C-D unit inductance (uH) not applicable

Pulse triggering source patented magnetic triggerhead

Type of transformer in C-D and turn ratio

ferrite toroid 10-0-10/250

Transient voltage protection (open circuits and voltage surges)

none

Close point time limit: not applicable

Maximum point current and ground circuit resistance

not applicable

Oscillator frequency 7 KHz

Number and type of power transistor 2 x Texas Instrument

R2433

Ballast resistors required? Yes - No -

Resistor Type - Resistor Size (ohms) -

Switch back to stock system? Yes X No

Describe methods replace points

Moisture and Vibration Protection yes

Operating Temperature Range -40°F - + 300°F

Humidity Range Electronics covered by a polyurethane compound functioning as a moisture barrier.

V. Modifications from O.E.M.

Ignition timing modified? Yes _____ No X

State modifications from O.E.M. Ignition System Characteristics none

Engine Setting Changes? Yes _____ No X

Describe Changes none

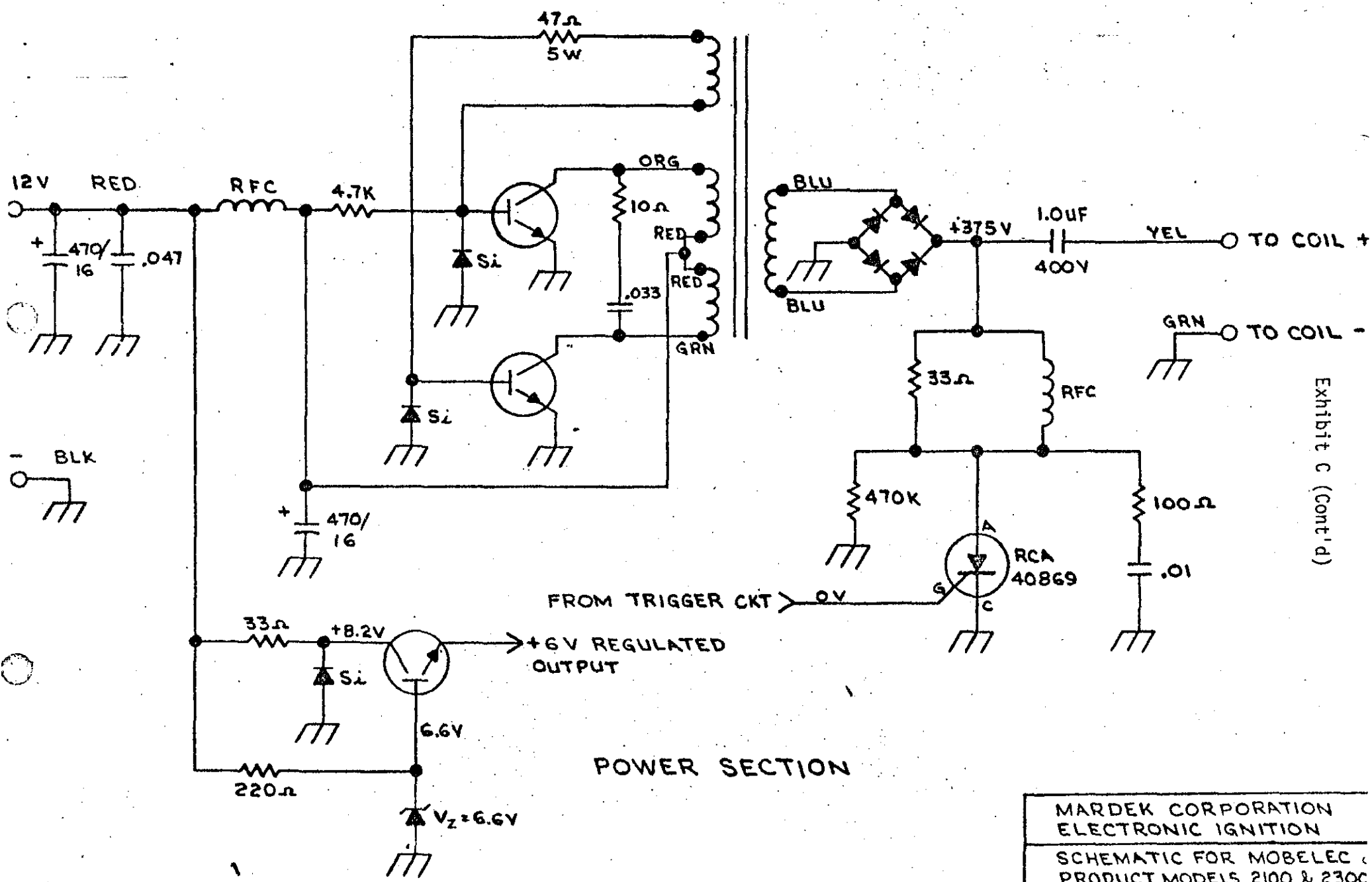
Specify any other changes from O.E.M. none

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

The triggerhead works on discharging magnetic path hence is very fast and independent of temperature variations.

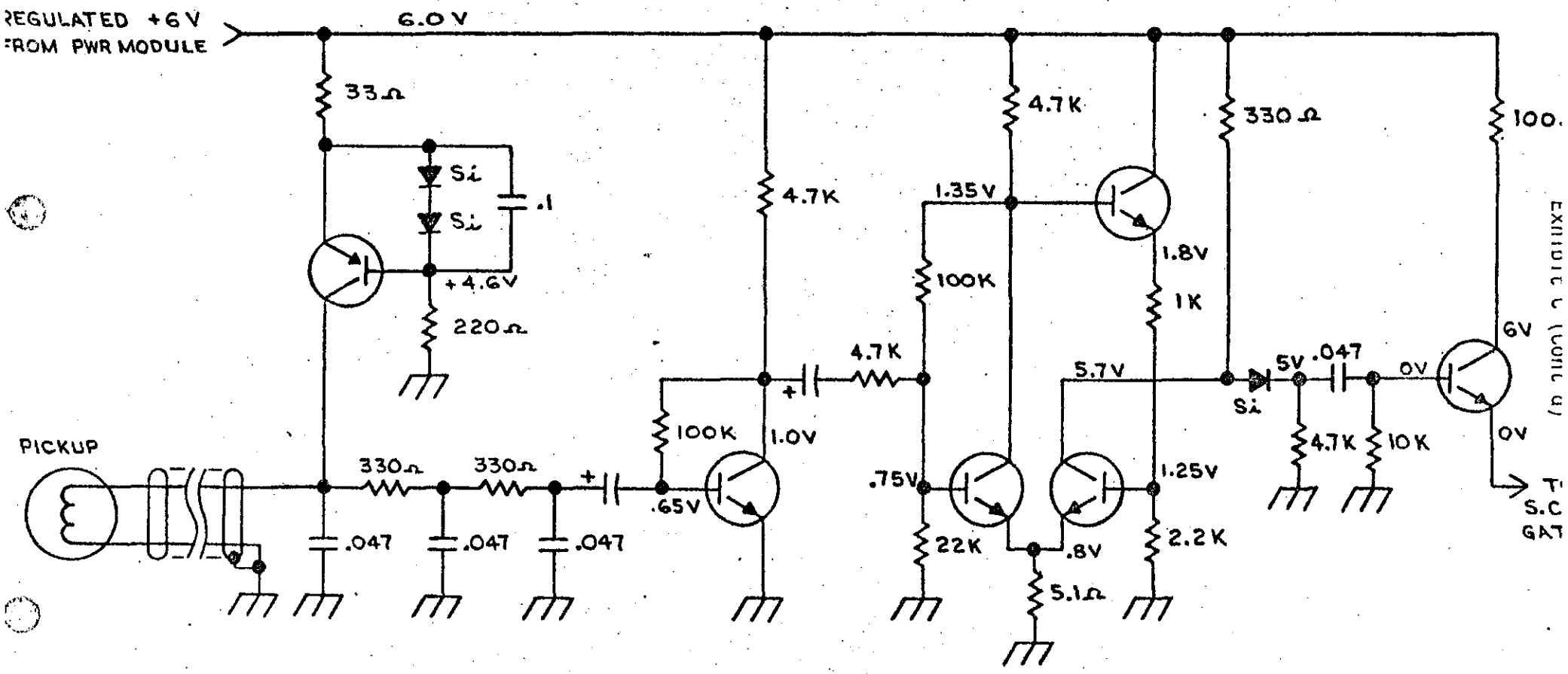


POWER SECTION

Exhibit C (Cont'd)

ALL RESISTORS 1/2 W EXCEPT WHERE NOTED

MARDEK CORPORATION ELECTRONIC IGNITION
SCHEMATIC FOR MOBELEC PRODUCT MODELS 2100 & 230C
DATE: 6-1-74
DRAWN BY:
APPROVED BY:
PROJECT MGR:



TRIGGER SECTION

ALL RESISTORS ½ W

MARDEK CORPORATION ELECTRONIC IGNITION
SCHEMATIC FOR MOBELEC PRODUCT MODELS 2100 & 2300
DATE: 6-1-74
DRAWN BY: D. Lowry
APPROVED BY:
PROJECT MGR: