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State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-11
Relating to Exemptions under Section 27156
of the Vehicle Code

THERMO KING CORPORATION
"THERMOTRONIC"

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 a "THERMOTRONIC" capacity discharge ignition system manufactured by Thermo King Corporation has been found to not reduce the effectiveness of required emission control devices in vehicles and therefore is exempt from the prohibitions of Section 27156 of the Vehicle Code for 1966-1973 model-year vehicles. The device consists of a sensor, d-c converter, storage capacitor and a electronic switch.

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.

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 "THERMOTRONIC" 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.

Section 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. 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 policy or laws will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at Sacramento, California, this 22 day of June, 1973.

JOHN A. MAGA
Executive Officer

State of California

AIR RESOURCES BOARD

May 25, 1973

Staff Report

Evaluation of Thermo King Corporation
"Thermotronic Ignition System" Breakerless
Capacitive Discharge Ignition System For
Exemption to the Prohibitions of Section
27156 of the Motor Vehicle Code.

I. Introduction

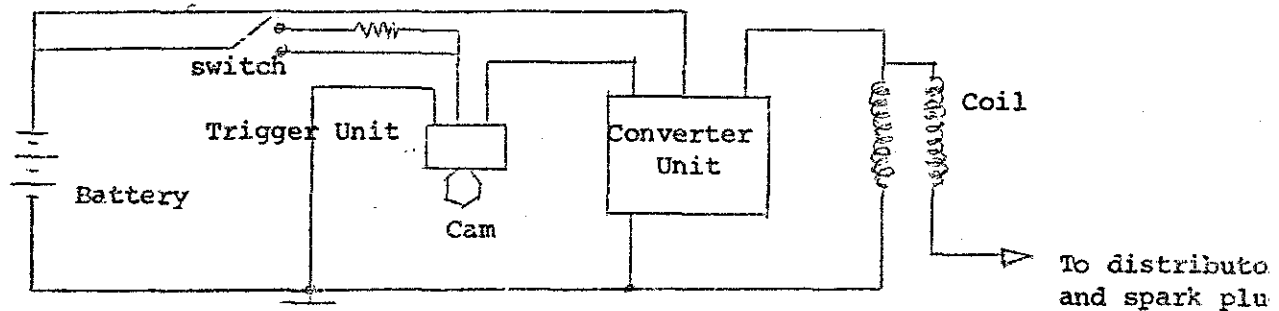
Thermo King Corporation, Minneapolis, Minnesota, has applied for exemption to the prohibitions of Section 27156 of the Motor Vehicle Code for the "Thermotronic" breakerless capacitive discharge system. Section 27156 prohibits the installation of any device which reduces the effectiveness of motor vehicle emission control systems. The applicant intends to sell the device as an "after-market" part to replace the standard ignition system.

The Air Resources Board has adopted criteria for the evaluation of "after-market" devices for compliance with Section 27156. The basis for evaluation is defined in the "Air Resources Board Criteria for Determining Compliance with Section 27156 of the Motor Vehicle Code", dated february 17, 1971.

II. System Description

For a general description of breakerless capacitive discharge systems, see staff report "Evaluation of Capacitive Discharge and Transistorized Ignition Systems for Compliance with the Requirements of Section 27156 of the Motor Vehicle Code", dated February 14, 1973.

The "Thermotronic" device consists of two major components: A sensor and power unit (see schematic).



The sensor is a magnetic pulse generator whose pulses are generated by movement of the distributor cam in the magnetic field. This signal is fed into the capacitive discharge circuit discharging the storage capacitor into the primary windings of the ignition coil. The capacitive discharge circuit consists of a D-C converter, storage capacitor and an electronic switching circuit. The system is capable of an output of 32 KV and 60 millijoules.

II. Emission Testing

The applicant has submitted hot CVS test data conducted by Scott Laboratories (Tables 1 and 2). The hot CVS test data are summarized below:

	<u>Hot CVS</u>		
	<u>Percent Deduction</u>		
	<u>HC</u>	<u>CO</u>	<u>NOx</u>
Thermotronic (2 vehicle fleet)	6	9	-3

(-) indicates an increase

Because of the number of exemption applications received from manufacturers of capacitive discharge ignition systems, Air Resources Board Laboratory confirmatory tests were not performed on the "Thermotronic" system. A Clytronics Corporation "Clytron" breakerless C-D system was selected for testing to represent this group. The results of these tests are shown in the staff report "Evaluation of Clytronics Corporation "Clytron" Breakerless Capacitive Discharge Ignition System for Exemption to the Prohibitions of Section 27156 of the Motor Vehicle Code". These data verify that a breakerless capacitive discharge ignition system does not adversely affect the exhaust emissions of a "tuned" engine.

IV. Conclusions and Recommendations

It is the staff opinion that Thermo King "Thermotronic" breakerless capacitive discharge ignition system will not adversely affect motor vehicle exhaust emissions when evaluated with respect to the exhaust emissions obtained with a conventional ignition system of a "tuned" engine. This device may also have a beneficial effect in the control of exhaust emissions in that the device may maintain the "tuned" condition for a longer period of time. Therefore, the "Thermotronic" breakerless capacitive discharge ignition system should be exempt from the prohibitions of Section 27156 of the motor vehicle code.

Table 1
Description of Test Vehicles

	<u>Car 1</u>	<u>Car 2</u>
Year	1973	1973
Make	Chevrolet	Ford
Model	Pick-Up	Grand Torino
License No.	82901 M (Calif.)	826 GH1 (Calif.)
I. D. No.	CCY1432105399	3A31H117559
Engine CID	350	351
Carb. BBLs	4V	2V
Transmission	Auto	Auto

Table 2

Emission Test Results

<u>Vehicle</u>	<u>Exhaust Emissions, gms/mi.</u>				<u>Idle Readings</u>		<u>Remarks</u>
	<u>HC</u>	<u>CO</u>	<u>NO_x*</u>	<u>CO₂</u>	<u>RPM</u>	<u>Timing</u>	
1973 Chev.	1.66	25.84	2.50	710.7	600	12°BTC	Baseline Test
1975 Chev.	1.49	24.66	2.39	670.8	620	12°BTC	With Device Test
1973 Ford	1.66	17.53	1.93	796.4	625	6°BTC	Baseline Test
1973 Ford	1.64	14.66	2.16	768.9	625	6°BTC	With Device Test

* Total oxides of nitrogen measured by chemiluminescence method and corrected for ambient humidity