File, E.O.

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-47-3
Relating to Exemptions under Section 27156
of the Vehicle Code

ALLISON AUTOMOTIVE COMPANY
"ALLISON OPTO-ELECTRIC IGNITION SYSTEM"
MODEL XR-700

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 Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-5;

IT IS ORDERED AND RESOLVED: That the installation of the "Allison Opto-Electric Ignition System" model XR-700 manufactured by Allison Automotive Company, of 1613 Flower Street, Duarte, CA 91010, 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 the following vehicles:

1. 1975 through 1983 model-year four-, six-, and 12-cylinder vehicles equipped with a Lucas brand breakerless ignition system;

2. 1974 through 1983 model-year four- and six-cylinder vehicles equipped with a Hitachi brand breakerless ignition system;

3. 1977 through 1983 model-year four- and six-cylinder vehicles equipped with a Nippondenso brand breakerless ignition system; and

4. 1975 through 1983 model-year four- and six-cylinder vehicles equipped with a Bosch brand breakerless ignition system.

The device consists of a light emitting diode with a detector block, a control rotor, and a transistor switching module.

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different from those submitted by the device 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. Exemption of a kit shall not be construed as an exemption to sell, offer for sale, or advertise any component of a kit as an individual device.

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 "ALLISON OPTO-ELECTRIC IGNITION SYSTEM" MODEL XR-700.

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."

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 El Monte, California, this 23rd day of May, 1983.

K. D. Drachand, Chief
Mobile Source Control Division

STATE OF CALIFORNIA
AIR RESOURCES BOARD

EVALUATION OF THE "ALLISON OPTO-ELECTRIC IGNITION SYSTEM" MODEL XR-700 FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

May 9, 1983

Issue Date: May 9, 1983

EVALUATION OF THE "ALLISON OPTO-ELECTRIC IGNITION SYSTEM" MODEL XR-700 FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

by

State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731

SUMMARY

Allison Automotive Company has requested an update to their existing exemption, Executive Order No. D-47-2, of their "Allison Opto-Electric Ignition System" model XR-700. They have requested that their system be also exempted from the prohibitions in Vehicle Code Section 27156 for the following vehicles:

A. 1975 through 1983 model-year four-, six-, and 12-cylinder vehicles equipped with a Lucas brand breakerless ignition system;

B. 1974 through 1983 model-year four- and six-cylinder vehicles equipped with a Hitachi brand breakerless ignition system;

C. 1977 through 1983 model-year four- and six-cylinder vehicles equipped with a Nippondenso brand breakerless ignition system; and

D. 1975 through 1983 model-year four- and six-cylinder vehicles equipped with a Bosch brand breakerless ignition system.

The Allison Automotive Company submitted ignition system bench test data on four late model-year ignition distributors. The data show that:

A. The secondary available voltage of the device test is within ten (10) percent of the baseline secondary available voltage;

B. The rise time with the device is more than ten (10) microseconds;

C. The spark duration with the device is more than 100 microseconds; and

D. The spark energy with the device is not degraded from the baseline spark energy. The only exception is with the Bosch system at 2000 RPM. The degradation for this is less than ten (10) percent.

Based on the applicant's bench test data, the staff concludes that the "Allison Opto-Electric Ignition System" model XR-700 complies with the requirements for the exemption update. The staff recommends adoption of Executive Order No. D-47-3.

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EVALUATION OF THE "ALLISON OPTO-ELECTRIC IGNITION SYSTEM" MODEL XR-700 FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

I. INTRODUCTION

Allison Automotive Company (AAC), of 1613 Flower Street, Duarte, CA 91010, has requested an update to their existing exemption, Executive Order (E.O.) No. D-47-2, of their "Allison Opto-Electric Ignition System" model XR-700. In particular, AAC requested that their system model XR-700 be also exempted from the prohibitions in Vehicle Code Section 27156 for the following vehicles:

A. 1975 through 1983 model-year four-, six-, and 12-cylinder vehicles equipped with a Lucas brand breakerless ignition system;

B. 1974 through 1983 model-year four- and six-cylinder vehicles equipped with a Hitachi brand breakerless ignition system;

C. 1977 through 1983 model-year four- and six-cylinder vehicles equipped with a Nippondenso brand breakerless ignition system; and

D. 1975 through 1983 model-year four- and six-cylinder vehicles equipped with a Bosch brand breakerless ignition system.

AAC submitted comparative (without and with their system installed on test ignition distributors) ignition system bench test data on four late model-year ignition distributors (a Lucas, a Hitachi, a Nippondenso, and a Bosch brand).

II. CONCLUSIONS

Based on the comparative ignition system bench test data submitted by AAC, the staff concludes that the "Allison Opto-Electric Ignition System" model XR-700 complies with the requirements for the exemption, and that the

system will have no adverse effect on exhaust emissions from vehicles for which exemption is requested.

III. RECOMMENDATIONS

The staff recommends that AAC be granted their request to update the exemption of their "Allison Opto-Electric Ignition System" model XR-700 as requested, and that Executive Order No. D-47-3 be adopted.

IV. ALLISON IGNITION SYSTEM DESCRIPTION AND OPERATION

The major components of the "Allison Opto-Electric Ignition System" model XR-700 are a control rotor, a detector block, and a transistor switching module. The components are packaged with installation hardware and instructions and sold as a unit.

The Allison system utilizes the vehicle's original equipment manufacturer (OEM) coil for primary voltage source of the ignition system.

The control rotor, which replaces the OEM rotor, has window cuts (one for each cylinder) and is placed over the cam of the distributor. The detector block sits below the rotor and is mounted on the stator plate. It consists of a light emitting diode and an infrared detector. The detector block, in conjunction with the control rotor, derives signals that are fed into the Allison module for switching of the ignition system primary coil.

A schematic diagram of the "Allison Opto-Electric Ignition System" model XR-700 is shown in the Appendices.

V. EVALUATION

Evaluation of the Allison system consisted of comparative (without and with the Allison system installed on test ignition distributors) ignition system test data on four late model-year ignition distributors. The tests were performed by Allison, at their test facility, as required per Air Resources Board "Criteria for Aftermarket Ignition System Modifications" procedures. A description of the vehicles from which the distributors were obtained are tabulated in the Appendices.

VI. RESULTS

Allison's submitted test data are shown in the Appendices. The submitted test data show that:

A. The secondary available voltage of the device test is within ten (10) percent of the baseline secondary available voltage;

B. The rise time with the device is more than ten (10) microseconds;

C. The spark duration with the device is more than 100 microseconds; and

D. The spark energy with the device is not degraded from the baseline spark energy. The only exception is with the Bosch system at 2000 RPM. The degradation for this is less than ten (10) percent.

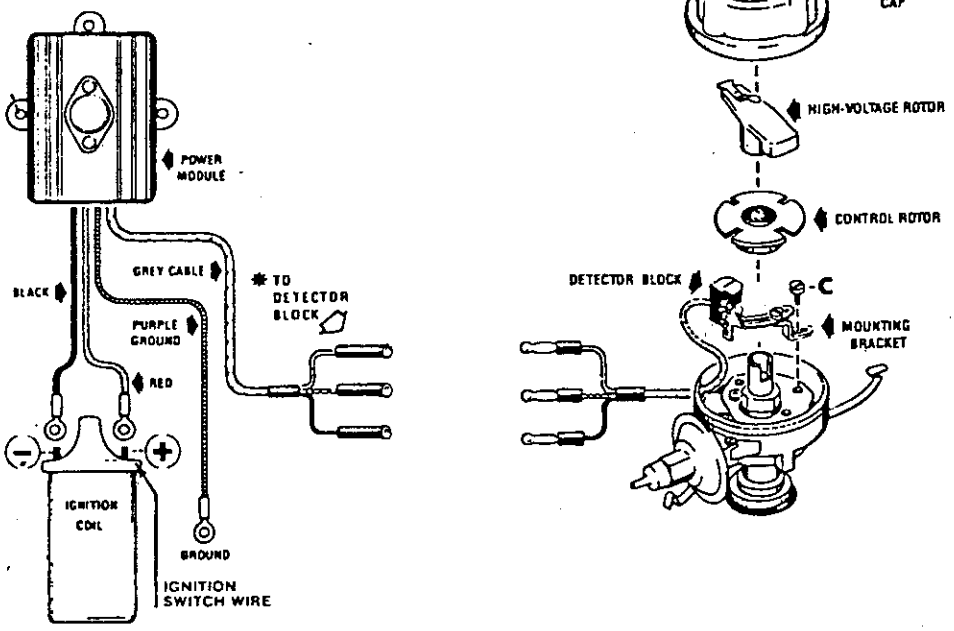
The model XR-700 system, therefore, meets the requirements of the Board's evaluation criteria.

VII. DISCUSSION

Based on the applicant's bench test data, the staff concludes that the "Allison Opto-Electric Ignition System" model XR-700 complies with the requirements for the exemption update.

APPENDICES

Skematic Diagram
Allison Opto-Electric Ignition System
Model XR-700



IGNITION DISTRIBUTORS TESTED

EVALUATION OF "ALLISON OPTO-ELECTRIC IGNITION SYSTEM"
MODEL XR-700

	IGN. DIST. #1	IGN. DIST. #2	IGN. DIST. #3	IGN. DIST. #4
Ign. Dist. Brand:	Lucas	Hitachi	Nippondenso	Bosch
Ign. Dist. P/N:	45 DM6	DK4802	1910028040	049905
Vehicle Model-Year:	1981	1981	1981	1981
Vehicle Manufacturer:	Jaguar	Datsun	Toyota	Volkswagen
Vehicle Model:	XJ6	210	Corolla	Rabbit
Engine Size (cylinders):	6	4	4	4

TABLE 1

Ignition System Test Data
Evaluation of the "Allison Opto-Electric Ignition System"
Model XR-700

Lucas Brand Ignition System

	Baseline			Device		
	Start	Idle	1750 RPM	Start	Idle	1750 RPM
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	25	28	26	24	27	24
Secondary Available Voltage (simulating fouled plug) (KV)	18	23	20	17	22	18
Spark Energy (mjoules)	30	45	30	30	51	30
Spark Duration (microsec.)	1500	1500	1000	1000	1000	1500
Rise Time (microsec.)	15	15	20	15	15	20

* : Not affected by Allison system.

TABLE 2

Ignition System Test Data
Evaluation of the "Allison Opto-Electric Ignition System"
Model XR-700

Hitachi Brand Ignition System

	Baseline			Device		
	Start	Idle	2000 RPM	Start	Idle	2000 RPM
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	35	35	30	33	34	30
Secondary Available Voltage (simulating fouled plug) (KV)	24	24	18	23	26	20
Spark Energy (mjoules)	34	34	17	34	51	24
Spark Duration (microsec.)	2700	3000	2300	2700	3400	1900
Rise Time (microsec.)	25	25	30	25	25	25

* : Not affected by Allison system.

TABLE 3

Ignition System Test Data
Evaluation of the "Allison Opto-Electric Ignition System"
Model XR-700

Nippondenso Brand Ignition System

	Baseline			Device		
	Start	Idle	2000 RPM	Start	Idle	2000 RPM
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	32	32	25	34	35	27
Secondary Available Voltage (simulating fouled plug) (KV)	20	20	15	21	22	16
Spark Energy (mjoules)	27	25	17	30	41	21
Spark Duration (microsec.)	2700	2500	2000	3000	3300	1700
Rise Time (microsec.)	30	30	30	25	30	25

* : Not affected by Allison system.

TABLE 4

Ignition System Test Data
Evaluation of the "Allison Opto-Electric Ignition System"
Model XR-700

Bosch Brand Ignition System

	Baseline			Device		
	Start	Idle	2000 RPM	Start	Idle	2000 RPM
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	24	26	24	24	24	23
Secondary Available Voltage (simulating fouled plug) (KV)	22	24	22	22	22	23
Spark Energy (mjoules)	45	45	21	48	45	19
Spark Duration (microsec.)	2500	2500	1800	2700	2500	1500
Rise Time (microsec.)	18	18	15	18	18	15

* : Not affected by Allison system.