

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-57
Relating to Exemptions under Section 27156
of the Vehicle Code

PER-LUX, INC.
PER-LUX "IGNITOR" 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 Per-Lux Ignitor Ignition System manufactured by Per-Lux, Inc. 804 East Edna Place, Covina, CA 91723 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 1975 and older model year vehicles except as follows:

- 1) Those vehicles equipped with Chrysler Corporation 6 or 8 cylinder engines.
- 2) Those vehicles originally equipped with GM breakerless ignition systems or dual point ignition systems where one of the points is used to retard timing for emission control.
- 3) Those 1966 through 1970 vehicles equipped with "NOx retrofit devices" with a 4° retard in basic ignition timing (i.e., Carter, Echlin, STP Air Computer, Pure Power - Electro-NOx). This exception does not apply to General Motors or American Motors 8 cylinder engines.

This device replaces the breaker points and consists of a number of permanent magnets (one for each cylinder) embedded in the distributor rotor. As the rotor turns, the magnets trigger an electronic chip (Hall Cell) which opens and closes the primary circuit to the coil.

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 and the packaging container is clearly labeled to indicate specific vehicle applications for the unit.

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.

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 "PER-LUX IGNITOR 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 13th day of August, 1975.

WILLIAM SIMMONS
Executive Officer

State of California

AIR RESOURCES BOARD

August, 1975

Staff Report

Evaluation of Per-Lux "Ignitor" Ignition System
for Exemption from the Provisions of Section
27156 of the Vehicle Code

I. Introduction

The Per-Lux Corporation has applied for an exemption to the prohibitions of Section 27156 of the Motor Vehicle Code for the "Per-Lux Ignitor" breakerless ignition system. This section prohibits the installation of any device which reduces the effectiveness of motor vehicle emission control systems unless found by the Air Resources Board to not adversely affect emissions. The applicant intends to sell the product as an aftermarket part for 1975 and older model-year vehicles.

II. Device Description and Function

This device replaces the breaker points and consists of a number of permanent magnets (one for each cylinder) embedded in the distributor rotor. As the rotor turns, the magnets trigger an electronic chip (Hall Cell) which opens and closes the primary circuit to the coil. A more detailed description of the device is contained in Appendix A.

III. Device Evaluation

The device was evaluated on the basis of bench tests made at the Air Resources Board Laboratory (as detailed in the SAE ignition system measurement procedure J973a) using a Sun Model 504 ignition analyzer equipped with secondary voltage accessories and primary voltage supply. Timing and spark advance were determined with the aid of a Sun Model 918 ignition scope and timing light. Secondary voltages, spark duration, and voltage rise time were measured with a Tektronics Model 585A Oscilloscope. The device was compared to a Chrysler, Ford and General Motors conventional O.E.M. distributor.

A. Centrifugal Spark Advance

Table I compares the centrifugal spark advance of the Per-Lux device with the O.E.M. ignition system in engine degrees. An analysis of this data show a 1° to 3° advance between 1000 and 4000 rpm for the Chrysler, 1° to 2° retard for the Ford between 1400 rpm and 2400 rpm, and a 1° to 2° retard for the Chevrolet between 2000 and 3800 rpm. All other data showed good correlation.

B. Vacuum Spark Advance

Table II compares the vacuum spark advance characteristics of the Per-Lux device with the same OEM ignition system in engine degrees. This data shows a 2° to 6° retard between 9" to 18" Hg vacuum for the Chrysler, a 2° to 4° retard between 9" to 18" Hg

vacuum for the Ford and a 0.5 to 1-1/2° retard between 9" and 18" Hg vacuum for the GM distributor. The spark retard for the Chrysler exceeded the accepted limit of 4°. The spark retard for the Ford can be considered a borderline case but within the limit of experimental variability.

C. Ignition System Performance

Table III compares the electrical characteristics of the Per-Lux device with the Ford, Chrysler and General Motors OEM ignition systems. The Per-Lux system showed an 8% decrease in spark energy at 3000 engine RPM as measured against the Chrysler System, a 17% decrease as measured against the Ford system and no decrease for the General Motors system. The decrease in spark energy for the Ford is somewhat higher than the other two but still within test variability.

IV. Conclusion and Recommendation

The staff is of the opinion that the above system may be granted an exemption from the prohibitions of Section 27156 of the Vehicle Code except for the following:

- 1) Those vehicles equipped with Chrysler Corporation 6 or 8 cylinder engines.

- 2) Those vehicles originally equipped with GM breakerless ignition systems or dual point ignition systems where one of the points is used to retard timing for emission control.
- 3) Those 1966 through 1970 vehicles equipped with "NOx retrofit devices" with a 4° retard in basic ignition timing (i.e., Carter, Echlin, STP Air Computer, Pure Power - Electronic-NOx). This exception does not apply to General Motors or American Motors 8 cylinder engines.

Table I

Centrifugal Spark Advance - OEM Versus Per-Lux

Spark Advance - Crankshaft Degrees

Engine RPM	<u>72 Chrysler (8 cyl)</u>		<u>67 Ford (8 cyl)</u>		<u>68 Chev (6 cyl)</u>	
	OEM	Per-Lux	OEM	Per-Lux	OEM	Per-Lux
200	0	0	-3	-3	0	0
400	0	0	-1	-1	0	0
600	0	0	0	0	0	0
800	0	0	1	1	0	0
1000	2	4	3	3	1	1
1200	8	11	4	4	4	4
1400	16	17	6	5	8	8
1600	19	19	7	6	11	11
1800	20	19	8	7	15	15
2000	20	20	10	9	18	17
2200	22	21	13	11	20	18
2400	23	22	15	13	21	19
2600	23	23	16	16	22	20
2800	23	24	17	17	23	21
3000	24	24	18	17	24	22
3200	25	25	19	17	25	23
3400	26	25	20	18	26	24
3600	26	26	21	19	27	26
3800	27	27	22	20	28	27

Table II

Vacuum Spark Advance - OEM Versus Per-Lux

Distributor

Spark Advance - Crankshaft DegreesVacuum
"Hg72 Chrysler

OEM

Per-Lux

67 Ford

OEM

Per-Lux

68 Chev (6 cyl)

OEM

Per-Lux

0
3
6
9
12
15
180
0
0
2
9
21
210
0
0
0
7
15
150
0
0
6
14
16
160
0
0
4
10
12
120
0
0
3-1/2
8-1/2
12
120
0
0
3
7
10-1/2
10-1/2

Table III

Ignition Performance - OEM Versus Per-Lux
Electronic Measurements

Test Variables	72 Chrysler 365390						67 Ford C7AF12127AH					
	200	Baseline Engine RPM		*Per-Lux Engine RPM			200	Baseline Engine RPM		**Per-Lux Engine RPM		
		600	3000	200	600	3000		600	3000	200	600	3000
1. System Primary Voltage.	6	14	14	6	14	14	6	14	14		14	14
2. Coil Primary (w/ballast resistor) voltage	6	10	12.8	6	11.5	13.2	6	9.0	11.8	6	10.8	12.9
3. Ignition Primary Current (amps)	1.8	2.1	1.3	1.2	1.7	1.0	2.0	2.3	1.7	1.4	1.9	1.3
4. Secondary Voltage Available (KV)	20	27	22	18	26	18	20	22	20	15	20	18
5. Secondary Voltage Required (KV)	10	11	10	10	11	10	10	10	10	10	10	10
6. Required Voltage Rise Time (Micro-seconds)	40	35	35	50	35	40	40	30	30	40	35	35
7. Spark Duration (micro-seconds)	1200	1500	1300	1000	1500	1000	800	1000	1200	750	1000	100
8. Spark Voltage - Average Voltage	1300	1200	1500	1500	1200	1800	1300	1200	1300	1500	1200	1500

Table III (Cont'd)

Ignition Performance - OEM Versus Per-Lux
Electronic Measurements

Test Variables	72 Chrysler 365390						67 Ford C7AF12127AH					
	Baseline Engine RPM			*Per-Lux Engine RPM			Baseline Engine RPM			**Per-Lux Engine RPM		
	200	600	3000	200	600	3000	200	600	3000	200	600	3000
9. Spark Current - Average Current - (Mamps)	12.07	12.93	10.78	10.34	12.93	10.78	12.93	12.95	15.09	10.34	12.92	12.95
10. Spark Energy Mjoules	18.83	23.28	21.01	15.51	23.28	19.40	13.45	15.52	23.53	11.64	15.52	19.40

* Per-Lux Part No. 0382G

**Per-Lux Part No. 0281G

Table 3 (Con't)

**Ignition Performance - OEM Versus Per-Lux
Electrical Measurements**

Test Variables	<u>68 Chevrolet- 1110399</u>					
	Baseline			***Per-Lux		
	200	600	3000	200	600	3000
1. System Primary Voltage	6	14	14	6	14	14
2. Coil Primary (w/ballast resistor) voltage	6	10.5	12.5	6	10.6	12.5
3. Ignition Primary Current (amps)	18	2.0	1.0	1.6	1.9	1.2
4. Secondary Voltage Available (KV)	30	30	26	26	28	22
5. Secondary Voltage Required (KV)	13	12	12	13	12	12
6. Required Voltage Rise Time (Microseconds)	40	40	30	40	35	30
7. Spark Duration (microseconds)	1800	2000	1700	1700	1900	1700
8. Spark Voltage - Average Voltage	1000	1000	1200	1000	1000	1200
9. Spark Current - Average current (amps)	12.9	15.1	12.9	12.9	15.1	12.9
10. Spark Energy Mjoules	23.3	30.2	26.4	22.0	28.7	26.4

***Per-Lux Part No. 0161G

ECONOMICAL ... the PER-LUX *IGNITOR* pays for itself as a result of less shop time for tune-ups and increased gas mileage.

EASY TO INSTALL ... The perfect after-market ignition system. The *IGNITOR* fits inside the distributor and it's as easy to install as changing points. No holes to drill, no wires to cut and there are no external "black boxes" to mount.

ELIMINATE MINOR TUNE-UPS ... No more points to replace or adjust. The *IGNITOR* extends spark plug life. Once the timing is set, dwell remains constant.

INCREASED GAS MILEAGE ... No change in timing due to points and/or spark plug wear or fouling.

The PER-LUX *IGNITOR* is a precisely engineered system. A permanent magnet for each cylinder, imbedded in the rotor, triggers an electronic chip (Hall cell) thus eliminating the need for a reluctance pick-up coil and magnet. The *IGNITOR* switches twice the energy of any other system. And it's immune to dust, dirt, moisture and oil. The *IGNITOR* will fire down to zero RPM for fast cold weather starting requiring only minimum battery power. In the unlikely event that the unit fails, points can be re-installed in a roadside emergency situation. That's something that's impossible with other aftermarket breakerless ignitions. The PER-LUX *IGNITOR* is guaranteed for 5 years. Update your car or truck to '75 specs today with a PER-LUX *IGNITOR*.

Specifications:

Operating Voltage: 6-V to 16-V DC

Temperature Range: -50° to 300° F.

RPM Range: Full operating range of engine down to Zero RPM. (There is no minimum starting RPM)

Timing Accuracy: 1/4°

12-V Negative Ground Only

Available for:

Ford V-8/6 cyl. 1960-75*

Lincoln-Mercury V-8 1960-75*

International Harvester V-8 1960-75*

Porsche 4 & 6 cyl. All**

PER-LUX *IGNITOR*®

804 EAST EDNA PLACE, COVINA, CALIF. 91723

*Will not fit cars or trucks with factory installed electronic breakerless distributors

**12-v only without vacuum control

Additional models are now being developed. If your car or truck is not listed, check with the factory directly.

Conventional ignition system wiring diagram

Ignitor system wiring diagram (only one additional wire to install)

PER-LUX, INC.

804 EAST EDNA PLACE
COVINA, CALIFORNIA 91723
AREA CODE (213) 331-4801

IGNITOR

INSTALLATION INSTRUCTIONS FOR FORD 8 DISTRIBUTORS

- Make sure the ignition switch is "OFF".
- Remove the distributor cap from the distributor. Leave high voltage wires connected to the distributor cap.
- Remove and discard rotor. (1)
- Remove and discard points and screws. (2)
- Remove and discard grommet and wire which connected points to ignition coil. (3)
- Clean all oil and dirt from breaker plate and cam.
- Install the two wire grommet assembly through the distributor wall from the inside. The grommet will lock in place when the ears pass through the hole in the distributor wall. (4)
- Prior to installing the "Ignitor", push the right angle connector from the grommet assembly onto the pin in the "Ignitor". (5)
Use caution when making this connection to avoid bending pin.
- Install the "Ignitor". Be sure that the locating pin on the adaptor plate (6) is in the correct hole on the breaker plate. (7) It is imperative that the adaptor plate sits flat on the breaker plate and the slotted hole in the adaptor plate (8) lines up with the threaded hole in the breaker plate. (10)

- Install the 8-32 x 5/16 screw (9) through the ground lug and adaptor plate and into the breaker plate. Do not tighten at this time.
- Using the furnished 6-32 locking nut, connect the condenser lead and the black spade lug to the threaded stud on the "Ignitor". (11)

DO NOT OVER TIGHTEN THIS CONNECTION.

- Install the replacement rotor (12) in the same manner as the conventional rotor. Be sure the rotor is fully seated on the distributor shaft.
- Using the furnished plastic feeler gauge, adjust "Ignitor" to skirt of rotor to clearance of gauge and tighten screw (9) securely. Clearance should be .015 to .022.
- Replace the distributor cap making sure all high voltage wires are securely seated.
- Connect the black wire from the grommet assembly to the side of the ignition coil marked "Dist" or (—). 13
- Connect the red wire from the grommet assembly to the side of the ignition coil marked "Batt" or (+). (14) UNSNAP THE MOULDED RIGHT ANGLE TERMINAL FROM THE COIL TERMINAL — ATTACH LEAD FROM IGNITOR WITH ADAPTER/NUT SUPPLIED AND REATTACH MOULDED RIGHT ANGLE TERMINAL TO THREADED POST ON THIS ADAPTER.
"CAUTION" — Prior to starting the engine be sure that all high voltage wires are securely seated.
- The engine can now be started. Let the engine run for a few minutes and then set the timing in the conventional manner. It will be worth while to set the timing exactly as it will never vary and never have to be reset.
- The wiring diagram of the original and the conversion systems are shown in Figures 1 & 2.

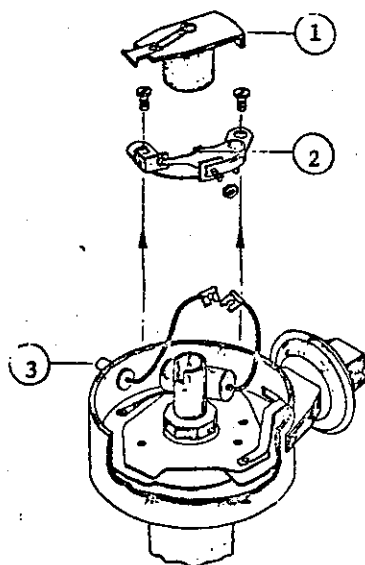


DIAGRAM SHOWING
CONVENTIONAL POINTS

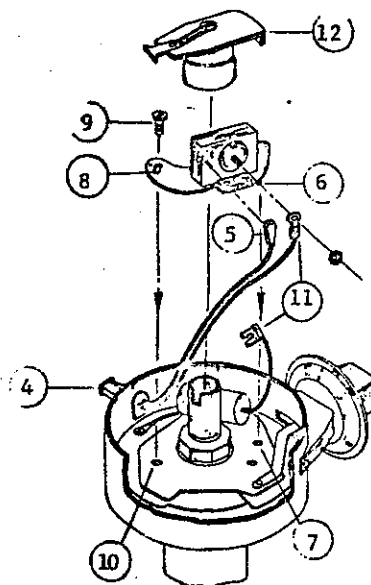
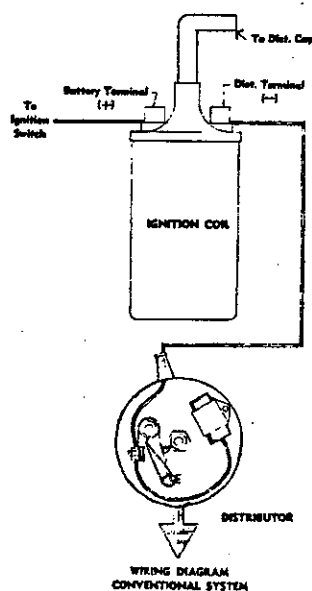
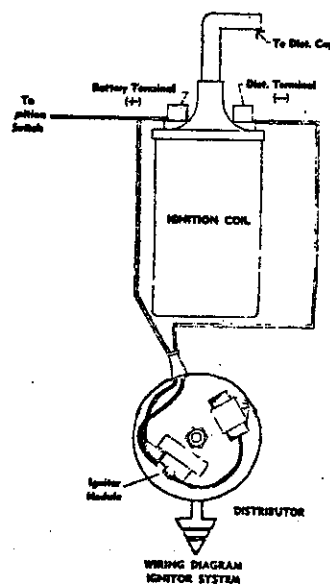


DIAGRAM SHOWING
INSTALLATION PROCEDURE
ON IGNITOR



WIRING DIAGRAM
CONVENTIONAL SYSTEM



WIRING DIAGRAM
IGNITOR SYSTEM

**Suggestions for added
Reliability and Performance**

Installation of Silicone high tension wiring will strengthen the overall system and give added reliability to your vehicle. To take full advantage of the "Ignitor's" capability and obtain added performance from your vehicle, replace the ignition coil with a high performance coil. If the condenser is old it is suggested that it be replaced. The use of a high performance distributor cap is recommended in conjunction with Silicone wiring.

This "Ignitor" has been thoroughly tested and is guaranteed. However, in the unlikely event that it should fail, and another "Ignitor" module is not available, simply replace the module with a set of points, regap and you are on your way. There is no need to remove the red wire as it is fully insulated and cannot ground. Simply leave it inside the distributor. The coil wire remains the same and the rotor does not need replacement.