

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-246  
Relating to Exemptions Under Section 27156  
of the Vehicle Code  
of the  
Nelson Enterprises  
SUPERCHARGER KIT MODEL NO. SN-89, PART NO. 10N004

Pursuant to the authority vested in the Air Resources by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Section 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 add-on supercharger kit, with a 3.05" pulley, model number SN-89, part no. 10N004 manufactured by Nelson Enterprises of 3724 Overland Ave., Los Angeles, California 90034, 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 installation on 1986-1992 model-year Mazda RX7 sports cars powered by a 1.3 liter rotary gasoline fuel injected engine.

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 the product as an individual device.

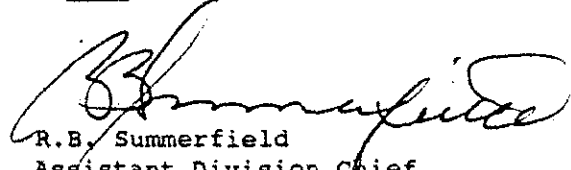
This Executive Order does not constitute any opinion as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

**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 NELSON ENTERPRISES SUPERCHARGER KIT MODEL NO. SN-89, PART NO. 10N004.**

No claim of any kind, such as "Approved by the Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communications.

Violation of any of the above conditions shall be grounds for revocation of this order. The order may be revoked only after ten day written notice of intention to revoke the order, in which period the holder of the order may request in writing a hearing to contest the proposed revocation. If a hearing is requested, it shall be held within ten days of receipt of the request and the order may not be revoked until a determination after hearing that grounds for revocation exist.

Executed at El Monte, California, this 4<sup>th</sup> day of March, 1992.



R.B. Summerfield  
Assistant Division Chief  
Mobile Source Division

State of California  
AIR RESOURCES BOARD

EVALUATION OF NELSON ENTERPRISES ADD-ON SUPERCHARGER KIT  
MODEL NO. SN-89 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE  
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE  
CALIFORNIA CODE OF REGULATIONS

March 1992

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AIR RESOURCES BOARD

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by

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Air Resources Board  
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(This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.)

SUMMARY

Nelson Enterprises (Nelson) of 3724 Overland Ave., Los Angeles, California 90034, has applied for an exemption from the prohibitions of Vehicle Code Section 27156 for their add-on supercharger kit model number SN-89, part no. 10N004. The supercharger kit part no. 10N004 is intended for installation on 1986-1992 model-year Mazda RX7 sports cars powered by a 1.3 liter rotary gasoline engine equipped with fuel injection.

Nelson has submitted data from tests conducted on a 1991 Mazda RX7 sports car powered by a 1.3 liter rotary engine. Based on these results, the staff concludes that Nelson's add-on supercharger kit will not adversely affect exhaust emissions on those vehicles for which an exemption is requested.

The staff recommends that Nelson be granted an exemption for their add-on supercharger kit model number SN-89, part no. 10N004, for installation on 1986-1992 model-year Mazda RX7 sports cars powered by a 1.3 liter rotary gasoline engine, and that Executive Order D-246 be issued.

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I. INTRODUCTION

Nelson Enterprises (Nelson) of 3724 Overland Ave., Los Angeles, California 90034, has applied for an exemption from the prohibitions of Vehicle Code Section 27156 for their add-on supercharger kit model number SN-89, part no. 10N004. The supercharger kit part no. 10N004 is intended for installation on 1986-1992 model-year Mazda RX7 sports cars powered by a 1.3 liter rotary gasoline engine equipped with fuel injection.

II. CONCLUSIONS

Nelson has submitted data from tests conducted on a 1991 Mazda RX7 sports car powered by a 1.3 liter engine. Based on these results, the staff concludes that Nelson's add-on supercharger kit will not adversely affect exhaust emissions on those vehicles for which an exemption is requested.

III. RECOMMENDATION

The staff recommends that Nelson be granted an exemption for their add-on supercharger kit model number SN-89, part no. 10N004, for installation on 1986-1992 model-year Mazda RX7 sports cars powered by a 1.3 liter rotary gasoline engine, and that Executive Order D-246 be issued.

IV. SUPERCHARGER KIT DESCRIPTION

The Nelson supercharger kit Model No. SN-89 is specifically designed for installation on 1986-1992 model-year Mazda RX7 sports cars powered by a 1.3 liter rotary gasoline engine. The kit operates in conjunction with the original equipment manufacturer (OEM) computer controlled fuel injection

systems and emission control systems already certified with the stock engine.

The purpose of supercharging an engine is to increase the volumetric efficiency of an engine by forcing more air into the engine than it would consume in normal aspirated, non-supercharged condition. This is accomplished by the addition of a centrifugal blower, Nelson Model No. SN-89, that is belt driven at 1.5 times the speed of the engine on a 3.05" pulley. Intake air is delivered from the OEM air filtering system to the centrifugal blower. It is then compressed by the supercharger and routed to the throttle body of the electronic fuel injection system. Maximum positive manifold pressure or boost is limited to 5 psi by the blower scroll housing and the impeller design. No wastegate or other active boost limiting device is used.

To provide additional fuel to maintain the proper air/fuel ratio during boost conditions, a fuel control unit is added. The fuel control unit when placed in series with the OEM fuel pressure regulator in the fuel return line will increase the fuel pressure and fuel delivery, under boost conditions. The unit is activated by a solenoid valve that is turned "on" and "off" via a pressure switch which is set at 0.95 psi. This pressure setting is based on the inlet manifold pressure. The fuel control unit has a set static pressure of 70 psi. Maximum static pressure of the OEM fuel pressure regulator is about 34 psi. The blower is self lubricated by a piston-type oil pump. The oil sump has a capacity of 12 fluid ounces and uses type "F" automatic transmission fluid. All OEM emission controls are left intact.



V. DISCUSSION OF THE SUPERCHARGER KIT

A 1991 Mazda RX7 sports car, powered by a 1.3 liter engine with fuel injection, was used for the evaluation of the supercharger kit. The dynamometer inertia weight and loading used during the testing were 3,125 lbs. and 6.4 hp.

Emission tests conducted by Milton Roy Company consisted of cold-start CVS-75 emission tests with the supercharger installed on the RX7. This test was used to compare vehicle exhaust emissions in the modified configuration with the applicable emission standards. Test results are shown below:

Table 1

Exhaust Emissions Test Results from  
Milton Roy Company

1991 Mazda RX7

<u>Test Mode</u>	<u>Exhaust Emissions (gm/mi)</u>		
	<u>HC</u>	<u>CO</u>	<u>NOx</u>
Standard	0.39	7.0	0.4
Device (w/ applied DF)	0.25	3.907	0.314
Difference	-0.14	-3.093	-0.086

Test results submitted by Nelson show that Carbon Monoxide (CO), Oxides of Nitrogen (NOx), and Hydrocarbon (HC) exhaust emissions of the RX7 vehicle in the modified configuration are below the applicable emission standards. The test has shown the Nelson supercharger model number SN-89, part no. 10N004, does not reduce the effectiveness of the emissions control systems of the vehicle.

Nelson has fulfilled the requirements for the exemption and, therefore, Executive Order D-246 must be issued.

**APPENDIX**

The following tools are needed to install the Nelson Supercharger™ kit in a Mazda RX7.

- 1- Metric Sockets. (8mm.-10mm.-12mm.-13mm.-14mm. and 22mm.)
- 2- Metric open end wrenches. (10mm.-12mm.-13mm.-14mm.-17mm. and 32mm.)
- 3- Allen wrenches 1/4" or 6 mm. and 3/16 or 4mm.
- 4- Hose Cutter or Knife.
- 5- Flathead Screwdriver.
- 6- Drain pan.
- 7- Pry bar

Before commencing to install your new Nelson Supercharger™, you should check the following items to insure a successful installation.

- 1- Have a compression check from a Mazda Dealer, or reputable mechanic shop. A regular (piston) compression gauge doesn't work. They should be within Mazda specifications.
- 2- Engine firing timing also should be as specified,
- 3- Spark plugs also should be in good working order and should be the ones recommended by the manufacturer.
- 4- Muffler and exhaust system must be the original one! If not the 6 port system will not be functional, due to the difference on back pressure.

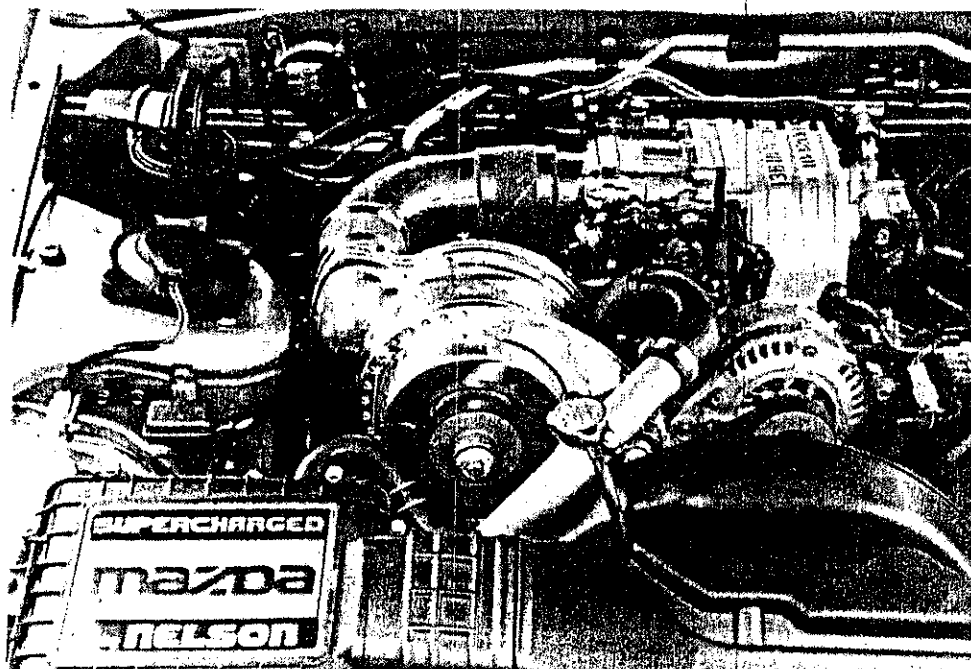
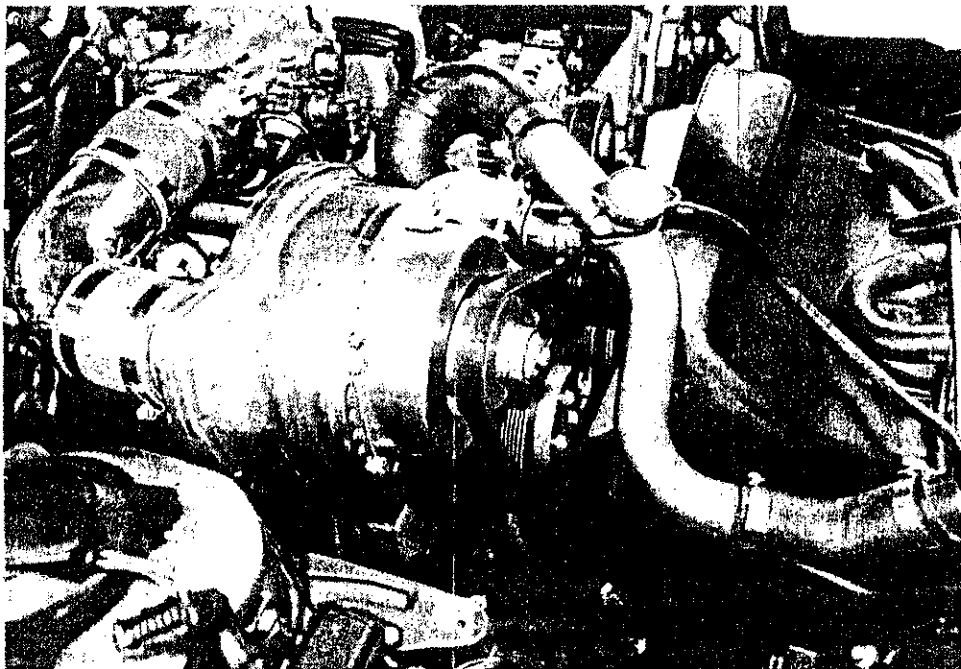


Fig. #\_g\_

LET'S START TO WORK. BUT REMEMBER, SAVE ALL BOLTS NUTS AND WASHERS!  
DO NOT TAKE CHANCES, COVER ALL POSSIBLE INTAKE OPENINGS TO PREVENT  
ENTRANCE OF FOREIGN MATERIALS.

- 1- DISCONNECT BATTERY, POSITIVE AND GROUND TERMINALS!
- 2- Drain same coolant, about one gallon, save it.
- 3- Remove upper radiator hose.
- 4- Remove cooling fan from water pump pulley
- 5- Remove, if equipped power steering and a/c belt/s
- 6- Remove Excentric shaft front pulley, save 4 - 6 mm. bolts and big washer.
- 7- Remove air intake, from upper tank of radiator.
- 8- Remove 3 - 6mm. holdown bolts from air filter unit, remove hose from air pump to air filter.
- 9- Remove hose clamp from Air Flow Meter and carefully lift the unit, disconnect electrical connector, then remove air filter assembly from car.
- 10- Remove molded hose from throttle air horn.
- 11- Undo two 8mm. nuts and remove throttle air horn.
- 12- Remove smog air pump and hose that connect to Air Supply Valve, (cover inlet and outlet with silver tape-duct tape) remove pulley, and again, save all bolts, spacers, discard brace.
- 13- Remove 3 - 8mm. bolts from smog pump bracket, discard bracket.
- 14- Remove thermostat housing, remove old gasket, we'll use a new one.
- 15- Remove alternator pulley





## INSTALLATION INSTRUCTIONS

- 1- Install new alternator pulley, (P/N 18N005) ( Big V grove toward alternator) To tighten nut properly wait until serpentine belt is on, and holding on the belt, tight the nut, (22mm.) Install new alternator belt over new pulley and water pump pulley, ( on models 89 up, install new water pump pulley (P/N 15N024) adjust belt to proper tension, pry alternator, tighten 8mm. bolt on brace.
  - 2- Install aluminum spacer (P/N 15N018) (P/N 15N018-1 on cars 89 up) over thermostat (use a new gasket as nec.) in top of these install the new thermostat housing (P/N 15N007) with gasket (P/N 15M007-G) (Or P/N 15M007-1 on cars 89 up)
  - 3- Install lower idler pulley (P/N 10N023) with 8mm. bolt and washers supplied, in the hole left vacant from removing air pump brace. Fig. # 3
  - 4- Install Excentric Shaft Pulley (P/N 10N002) ( see HLP-HINTS) with 4 - 6mm. bolts and big washer saved from original pulley. Note that one of the 4 holes is off. Be sure to locate the pulley accordingly en order to keep the timing marks aligned. TIGHTEN SECURELY. Fig. # 3
  - 5- Replace Air Pump Inlet Elbow, with (P/N 13N020) and install the pump in the bracket (P/N 10N001). Be sure to use horseshoe back spacer.
  - 6- Install belt tensioner (P/N 10N010) with pulley on bracket (P/N 10N001) using bolt and washer supplied. Figs # 2/10/11
- N O T E : Before proceeding with step #7 rearrange the wires that run on the side of the right strut tower to prevent any damage and/or crimping.
- 7- Lower the entire assembly into engine compartment and affix to front of engine using the 3 bolts from the smog pump bracket removed previously, be sure the smog pump hose to Air Control Valve is conected properly, DO NOT tighten bolts.
  - 8- Install Supercharger (P/N 10N004) unit onto bracket (P/N 10N001 using 3- 5/16 bolts (P/N 516E20) and washers in the correspond= ing (marked) holes, install rubber elbow (P/N 10P111) to super= charger inlet. NOW tighten the 3 bracket bolts, don't over tighten, or damage to water pump housing can occur!

NOTE: After step # 8 ie completed fill the Supercharger oil reservoir with 10 oz. of Type-F Transmission Fluid. See enclosed Paxton Blower Warranty and Maintenance Bulletin for further details.

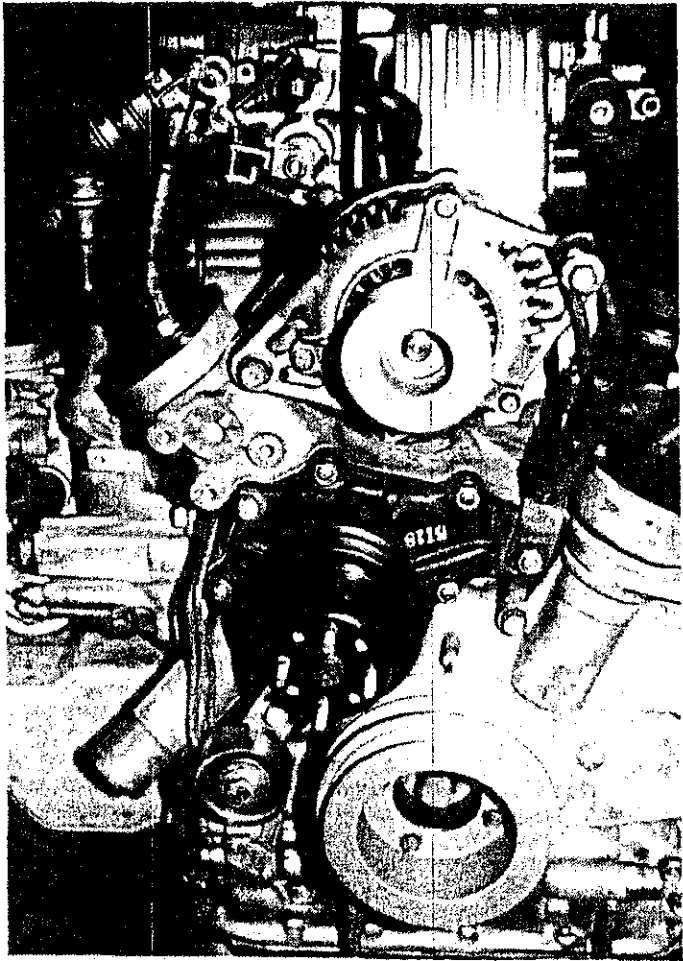
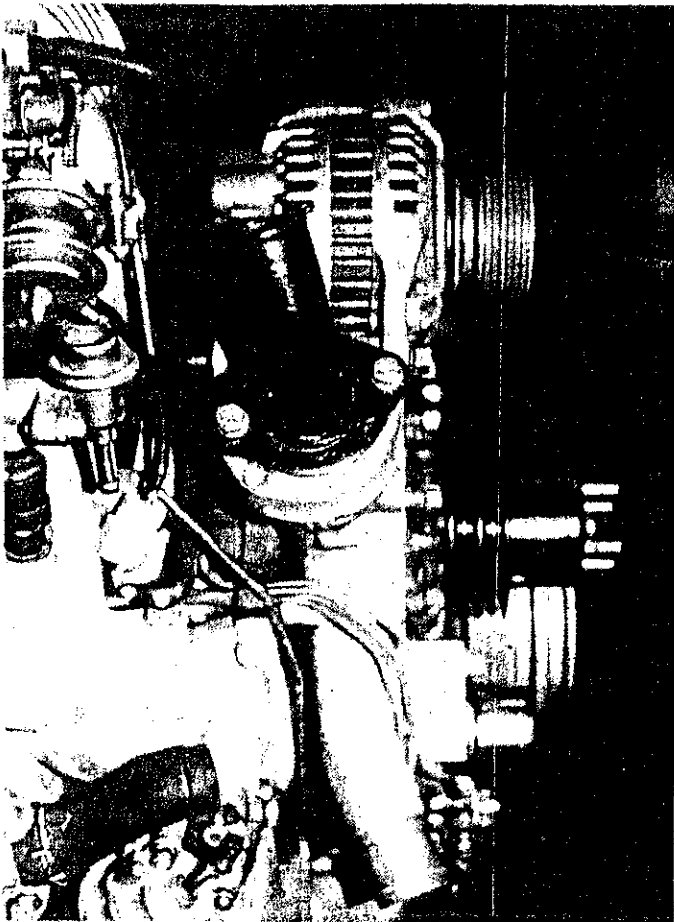


FIG # 3



- 9- Install New pulley (P/N 10N003) (see HLP-HINTS) in smog pump shaft. Use new 6mm. bolts (P/N 6ME14) and washers (P/N 6MPW-6MFW)
- 10- Route serpentine belt (P/N 10N028) according to Figs. # 11/12  
NOTE: It is necessary to install the serpentine drive belt very tightly to help compensate for initial stretching. Check tension after some mileage of use and readjust belt tension if necessary
- 11- Reinstall A/C and Power steering belts if equipped.
- 12- Install new throttle air horn (P/N 13N011) with 2 - 8mm. nuts.
- 13- Turn the Air filter/Air Flow Meter unit upside down. Remove 4 - 6mm. bolts that hold A.F.M. to A/filter. Remove old gasket. Install Wedge (P/N 13N006) and 2 gaskets (P/N 13N006-G) with 2 - 6mm. bolts (P/N 6MEH50) and 2 - 6mm. bolts (P/N 6MEH60) and 4 spacers (P/N 13N017). Be sure to install wedge with arrow pointing to A.F.M.! Fig. # 5  
On models from year 1989 up ONLY! remove Air Mass Sensor from Air filter assembly and install rubber flex mounts (P/N 6MRFM) instead of 6 MM. bolts and tilt A.M.S. accordingly.
- 14- Install 3"1/2" to 3"1/4" sleeve (P/N 10S019) on A.F.M. and then the flex 3"1/2" tube with clamps (P/N HC60 )

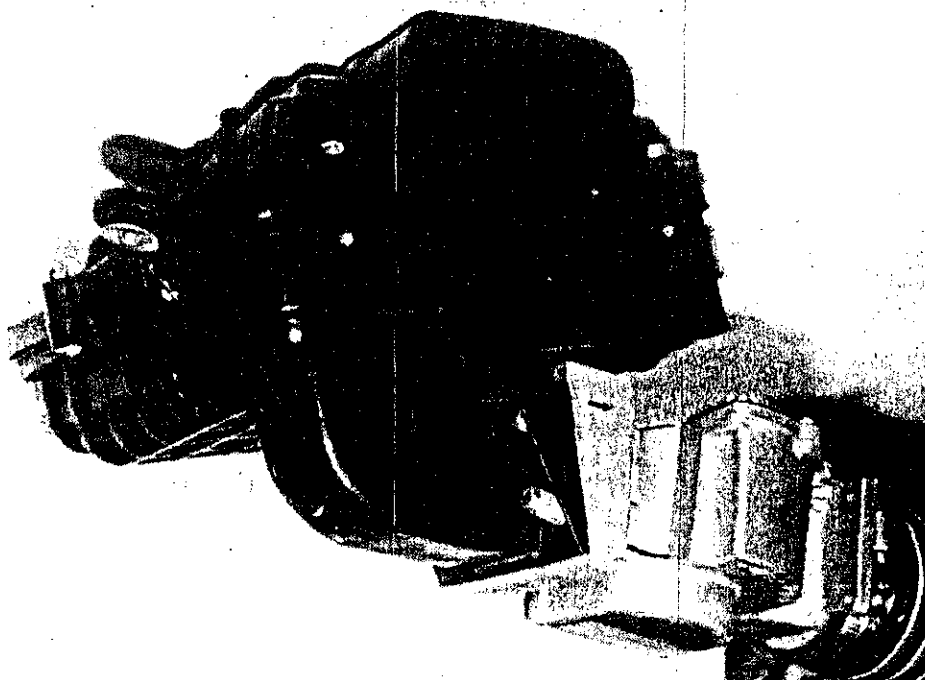


Fig # 5



- 9- Install New pulley (P/N 10N003) (see HLP-HINTS) in smog pump shaft. Use new 6mm. bolts (P/N 6ME14) and washers (P/N 6MPW-6MFW)
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- 12- Install new throttle air horn (P/N 13N011) with 2 - 8mm. nuts.
- 13- Turn the Air filter/Air Flow Meter unit upside down. Remove 4 - 6mm. bolts that hold A.F.M. to A/filter. Remove old gasket. Install Wedge (P/N 13N006) and 2 gaskets (P/N 13N006-G) with 2 - 6mm. bolts (P/N 6MEH50) and 2 - 6mm. bolts (P/N 6MEH60) and 4 spacers (P/N 13N017). Be sure to install wedge with arrow pointing to A.F.M.! Fig. # 5  
On models from year 1989 up ONLY! remove Air Mass Sensor from Air filter assembly and install rubber flex mounts (P/N 6MRFM) instead of 6 MM. bolts and tilt A.M.S. accordingly.
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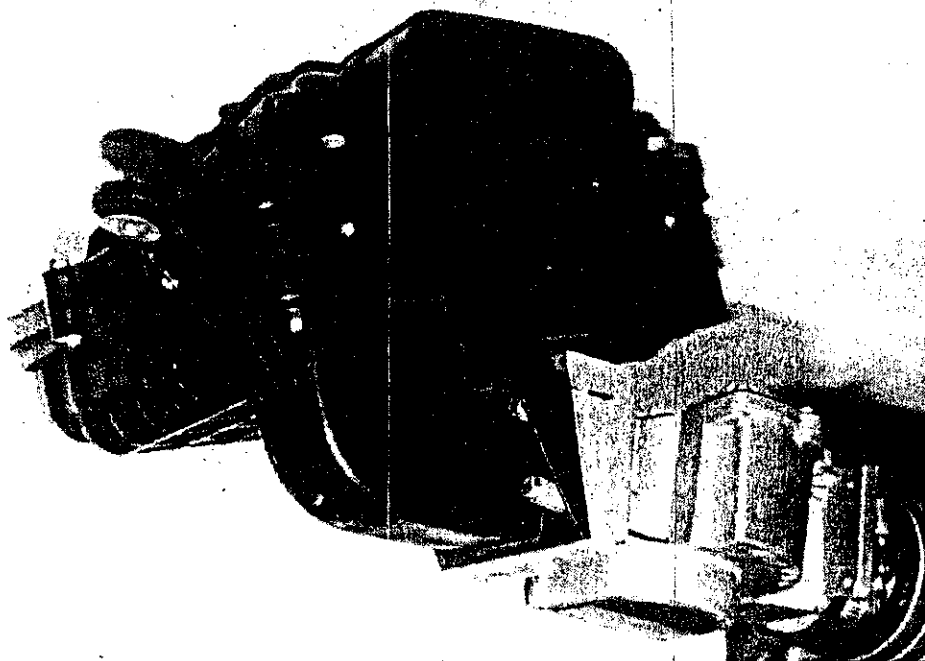


Fig #13-

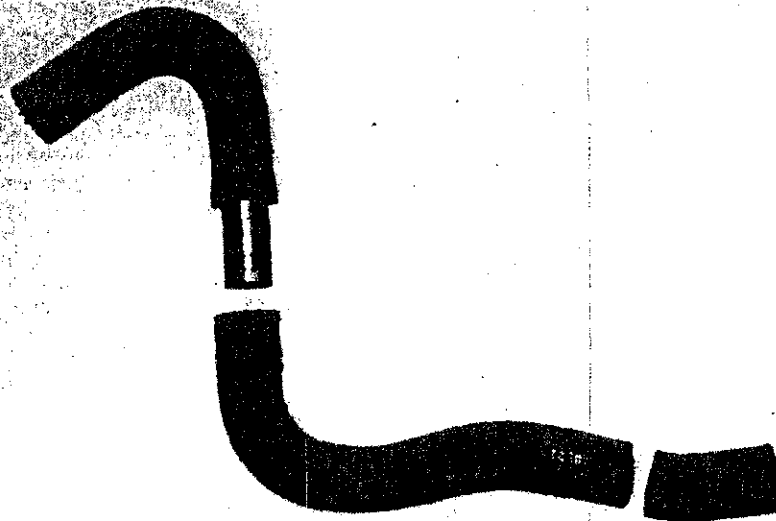


FIG # 6

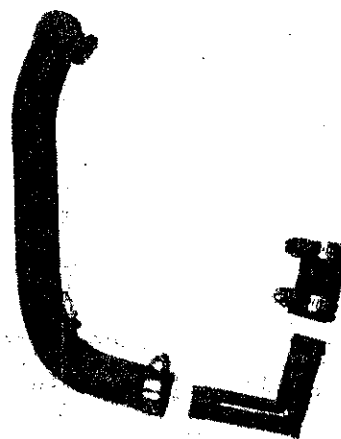


FIG # 7

- 16- Reconnect wire harness to A.F.M. and re-position A/filter assy. in place driving flex tube under supercharger unit connecting it onto the 3 1/2" rubber elbow ( P/N 13P111)air intake part of the blower with clamp (P/N HC )
- 17- Connect the air discharge elbow (P/N 13P222) with sleeve (P/N 10P014) and clamps (P/N HC 44 ) to Throttle horn. Before to reinstall the hose from B.A.C. valve to bottom tube in elbow (P/N 10P222) cut a piece @ 1"1/2" at bottom end, Fig # 7. And slide it to the bottom tube in elbow (P/N 10P222) to be used as a sleeve, and removing the metal elbow from original rubber duct, connect it to sleeve and hose, install supplied clamps (P/N HC 019 ).On cars 89 up install both hoses to correspondents tubes on elbow (P/N 13P222-1)
- 18- Connect hose (P/N 15N180) to thermostat housing ( P/N 15N007) with hose clamps (P/N HC24 ) from the hose to radiator use metal pipe (P/N 15N008). From the original upper radiator hose cut from radiator end about 3 inches from curb, we'll use to connect the metal pipe (P/N 15N008) to radiator neck. On models from 1986 to 1988 ONLY, remove coolant filler neck from original thermostat housing and reinstall filler neck to flange on pipe (P/N 10N008) use a new "O" ring supplied. Fig. # 9
- 19- To improve acceleration under boost we have to re-route same pressure hoses to the actuators. Using supplied kit (P/N555) follow these directions, disconnect hoses from pressure source and interconnect between source and actuators, the hose kit supplied. Hose marked red to original source, hose marked white to actuators, and hose marked yellow to any source of boost pressure. Fig # 8
- 20- Reconnect battery terminals, check belts for proper tension, clamps and bolts for tightness, all electrical connections, replenish radiator with coolant.Re-check oil (ATF) at supercharge unit.
- 21- Start engine, check belts for smoothness and alignment.  
Note: re-check coolant level with a cool engine!  
To prevent any engine damage use ALWAYS Premium Octane Gasoline (92)

NOTE: HELP/HINTS

To locate bolts holes on Exentric Shaft Pulley (P/N 10N002) use a 6mm.x 50mm. long (2"0) bolt as a boss; Then install proper bolts, same with Smog Air Pump Pulley (P/N 10N004). Be careful with wires and hoses, vaccum and gasoline, rearrange it properly, to prevent any damage.

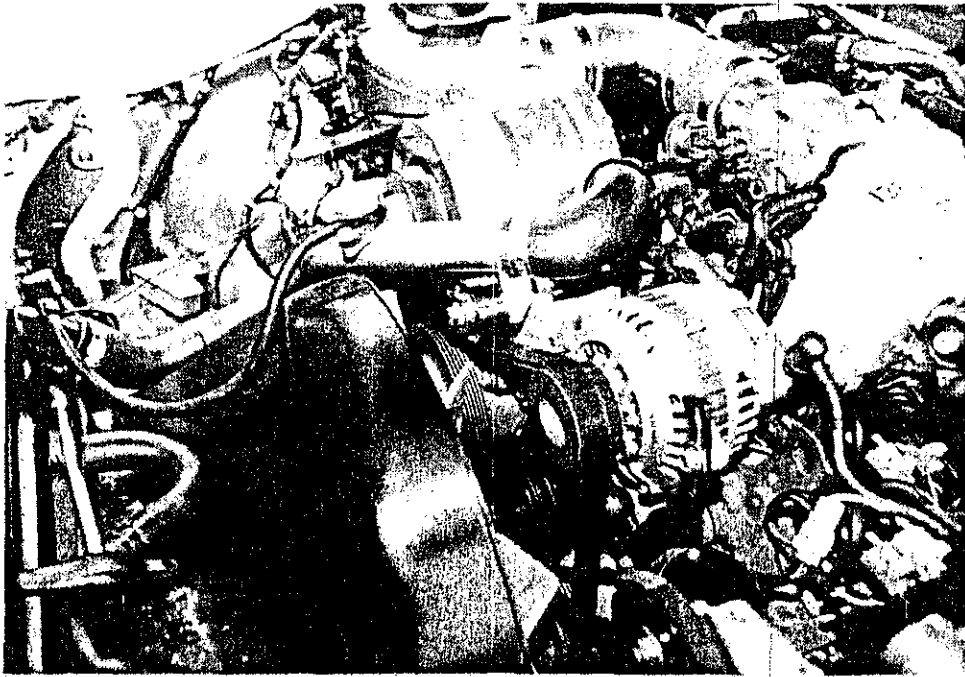
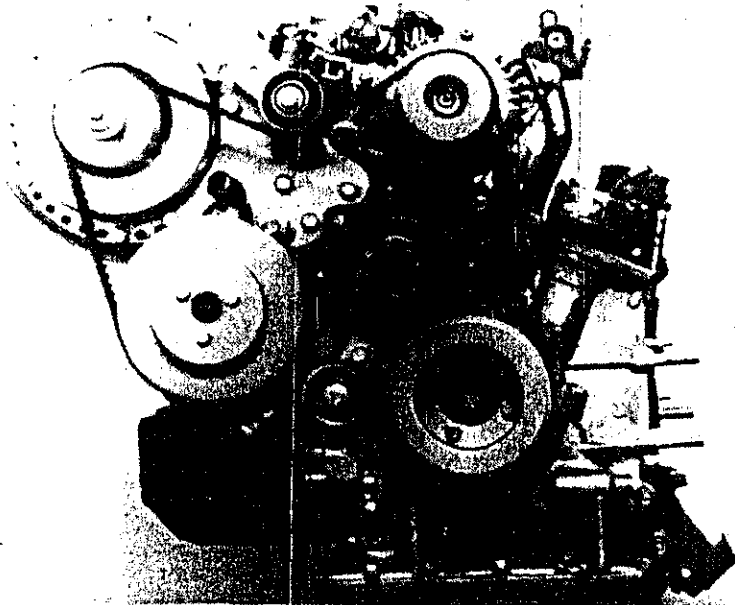
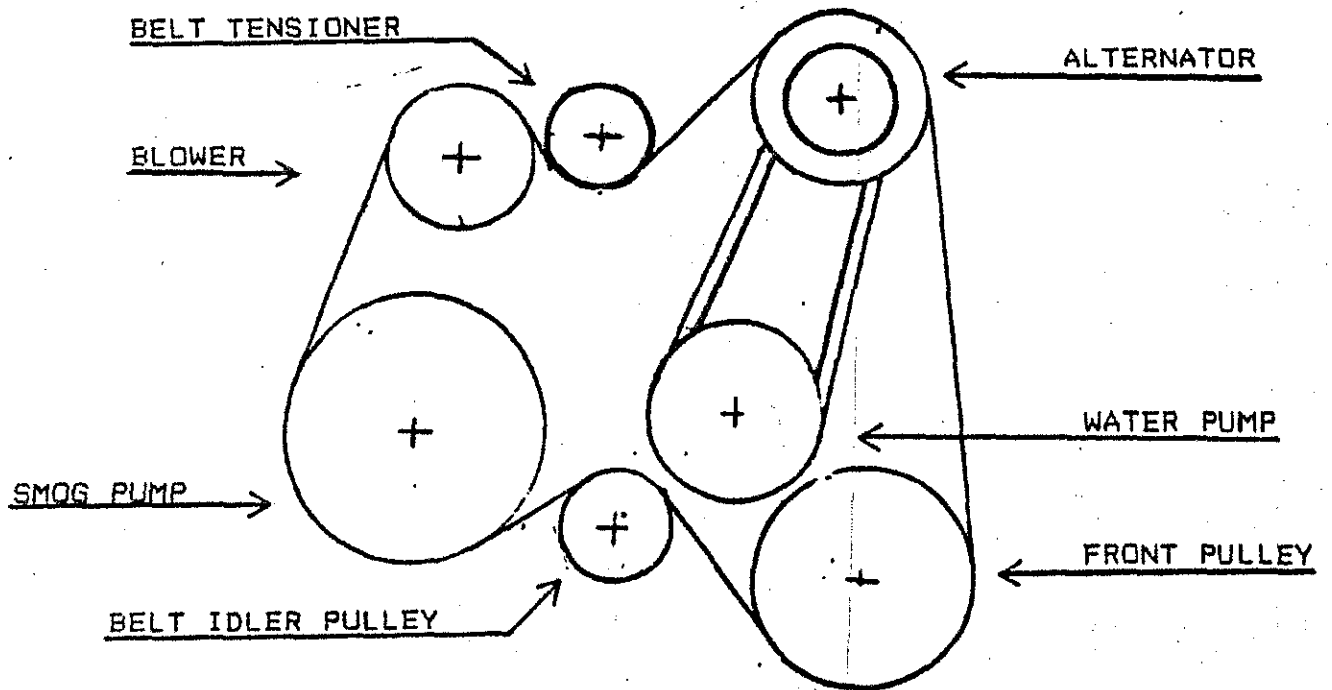


FIG. # 10



SERPENTINE BELT ROUTING DIAGRAM



NOT SHOWING POWER STEERING AND OR A/C.

FIG. 12