State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-246-1
Relating to Exemptions Under Section 27156
of the Vehicle Code

NELSON ENTERPRISES
SUPERCHARGER KIT MODEL NO. SN-89, PART NO. 11N004

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 3.10" pulley, model number SN-89, part no. 11N004 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 1990-1993 model-year Mazda MX-5 Miatas powered by a 1.6 liter gasoline engine equipped with Multiport Fuel Injection.

Modifications of the emissions control components include the replacement of the original equipment air cleaner with an aftermarket air cleaner, Part Number 11NOAF, included in the kit.

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. 11N004.

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 21st day of October, 1992.

R.B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF NELSON ENTERPRISES SUPERCHARGER KIT MODEL NO. SN-89, PART NO. 11N004 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

October 1992

State of California
AIR RESOURCES BOARD

EVALUATION OF NELSON ENTERPRISES SUPERCHARGER KIT MODEL NO. SN-89, PART NO. 11N004 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

by

Mobile Source Division
State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731-2990

SUMMARY

Nelson Enterprises (Nelson) of 3724 Overland Avenue, 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. 11N004. The supercharger kit part no. 11N004 is intended for installation on 1990-1993 model-year Mazda MX-5 Miatas powered by a 1.6 liter gasoline engine equipped with Multiport Fuel Injection.

Nelson has submitted data from tests conducted on a 1993 Mazda MX-5 Miata powered by a 1.6 liter engine. Based on these results, the staff concludes that Nelson's 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 supercharger kit model number SN-89, part no. 11N004, for installation on 1990-1993 model-year Mazda MX-5 Miatas powered by a 1.6 liter gasoline engine equipped with Multiport Fuel Injection, and that Executive Order D-246-1 be issued.

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EVALUATION OF NELSON ENTERPRISES SUPERCHARGER KIT MODEL NO. SN-89, PART NO. 11N004 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

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 supercharger kit model number SN-89, part no. 11N004. The supercharger kit part no. 11N004 is intended for installation on 1990-1993 model-year Mazda MX-5 Miatas powered by a 1.6 liter gasoline engine equipped with Multiport Fuel Injection.

II. CONCLUSIONS

Nelson has submitted data from tests conducted on a 1993 Mazda MX-5 Miata powered by a 1.6 liter engine and equipped with Multiport Fuel Injection. Based on these results, the staff concludes that Nelson's 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 supercharger kit model number SN-89, part no. 11N004, for installation on 1990-1993 model-year Mazda MX-5 Miatas powered by a 1.6 liter gasoline engine and equipped with Multiport Fuel Injection, and that Executive Order D-246-1 be issued.

IV. SUPERCHARGER KIT DESCRIPTION

The Nelson supercharger kit Model No. SN-89 is specifically designed for installation on 1990-1993 model-year Mazda MX-5 Miatas powered by a 1.6

liter 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 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 1.6 times the speed of the engine on a 3.10" 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 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 1993 Mazda MX-5 Miata, powered by a 1.6 liter engine with Sequential Multiport Fuel Injection, was used for the evaluation of the supercharger kit. The dynamometer inertia weight and loading used during the testing were 2,500 lbs. and 8.8 hp.

Emission tests conducted by Milton Roy Company consisted of cold-start CVS-75 emission tests with the supercharger installed on the 1993 MX-5 Miata. 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

1993 Mazda MX-5 Miata

	Exhaust Emissions (gm/mi)		
Test Mode	HC	CO	NOx
Standard	0.25	3.4	0.4
Device (w/ applied DF)	0.187	2.153	0.092
Difference	-0.063	-1.247	-0.308

Test results submitted by Nelson show that Carbon Monoxide (CO), Oxides of Nitrogen (NOx), and Hydrocarbon (HC) exhaust emissions of the MX-5 Miata vehicle in the modified configuration are below the applicable emission standards. The test has shown the Nelson Supercharger model number SN-89, part no. 11N004, 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-246-1 must be issued.

APPENDIX

NELSON SUPERCHARGERS™

INSTALLATION INSTRUCTIONS

N E L S O N S U P E R C H A R G E R™

M A Z D A M I A T A - M X 5

FOUR CYLINDER 1600 CC. 16 VALVES - FUEL INJECTED

NELSON SUPERCHARGER™
MODEL SN-89 * P/N 11N004
BLOWER BY PAXTON

NELSON SUPERCHARGERS™

A Division of NELSON ENTERPRISES
3724 OVERLAND AVENUE.
LOS ANGELES, CA. 90034
(310) 204-0126

INSTALATION INSTRUCTIONS

BEFORE ATTEMPTING TO WORK IN THE ENGINE COMPARTEMENT FOLLOW SPECIFIC INSTRUCTIONS ON "HOW TO DISCONNECT THE BATTERY" IN WORKSHOP MANUAL!

I -Remove the air flow meter wire harness from the air flow meter, be careful not to damage the clip or harness. Remove the three mounting bolts from Air Filter / Air Flow Meter Assy. and remove it. Separate the two.

II -All the plumbing from the A.F.M. Assy. to the throttle body must be removed. At the throttle end you will notice a black rubber sleeve where the clamp sits, save both, it's used later.

III -The power steering pump (if equipped) must be removed, to add. proper space for the supercharger.

IV -Using a small container @ 1 quart of capacity, place it below the power steering oil reservoir and disconnect the return hose from the pipe close to frame and drain the fluid from the reservoir, and save the fluid.

V -Disconnect the fluid supply hose from the reservoir by loosening the hose clamp, now you can remove it from the chassis.

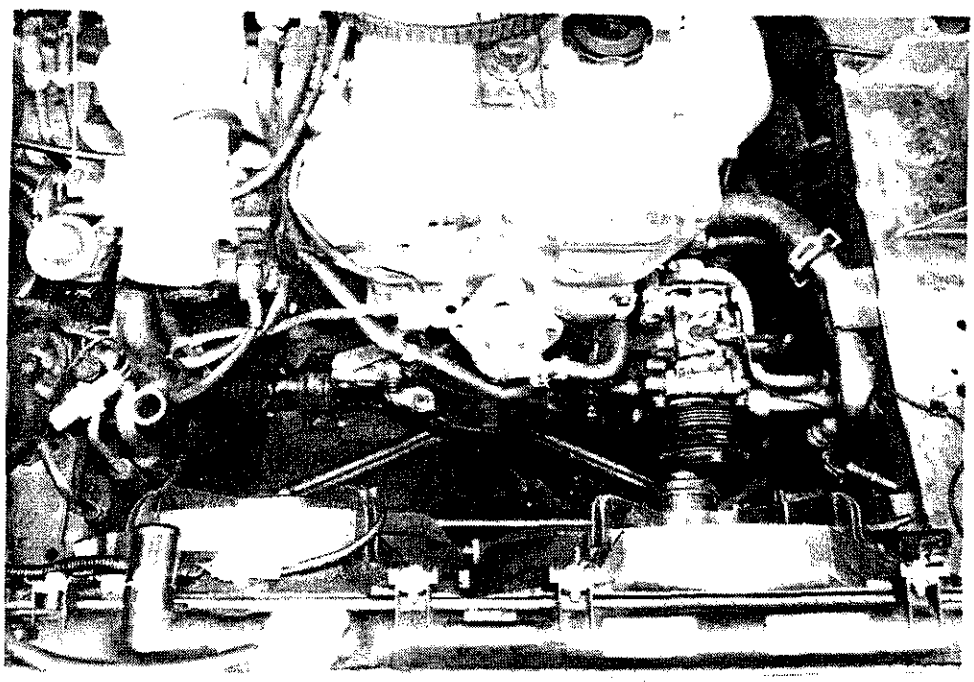


Fig. # 1

VI -Remove the power steering pump from it's support bracket, and disassemble the belt tensioner from the pump body,

VII -Disconnect the high pressure hose from the pump to the steering rack and pinion unit.

VIII-Remove the alternator belt tensioner assy. from the alternator and from the engine block, remove the alternator by removing the 10MM. bolt from the bottom bracket.

IX -Drain the entire cooling system, and save the coolant. Remove the upper radiator hose from the radiator and engine. Then the thermostat housing can be removed.

X -Remove the lower radiator hose from the radiator and engine and remove the metal tube, then remove the metal bracket from the chassis. fig. # 1

XI -Remove the 6MM. bolt that holds the alumimum tube to the side the a/c compressor and exchange it for the one thats holds the electrical wire for the a/c. clutch compressor. Slide the protector rubber (P/N 11NBRP) over the bracket, to cover the bolt protruding the clamp. Fig. # 2

XII -Remove the breather tube from the side of the valve cover,(the chome one).

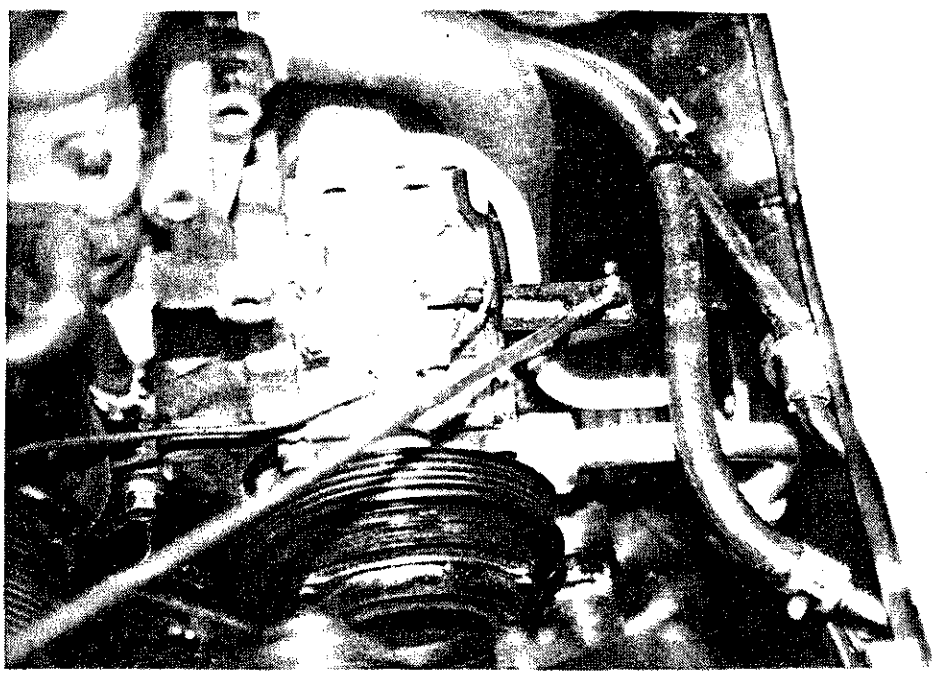


Fig. # 2

INSTALATION

1 -Set the timing mark on the crankshaft pulley to T.D.C. Remove all four 6MM. bolts, install the additional crank shaft pulley (P/N 11N002) in the center of original pulley with the 4 Allen head bolts (P/N 6MAHB40) Fig. # 3

2 -Install the high pressure hose (P/N 11NHPH) to the P/S-Pump, with the hose toward the front. Install the oil supply hose (P/N 11NOSH) to the inlet elbow, install the P/S-Pump bracket (P/N 11N005) on top of the pump with bolt (P/N 10MEHB120).
And install it on the old alternator location with the bolt (P/N 10MEHB120), now you should connect the high pressure hose end to the rack and pinion steering assy.

3 -Install P/S oil reservoir on the right side of engine compartement next to the strut and behind fuel lines using bolts and brackets supplied (P/N's 11N006-1 & 006-2), connect the oil supply hose from the pump to the reservoir. Fig. # 4.
The oil return will be connected with the hose (P/N 11NLPH) to the return pipe on the left side of the frame at front. (see step # IV page #1) Fig. # 2

4 -Refill P/S. reservoir with saved oil, add more if necessary.

5 -Install new lower radiator hose (P/N 15N182) with 2 clamps supplied (P/N 10HC24)

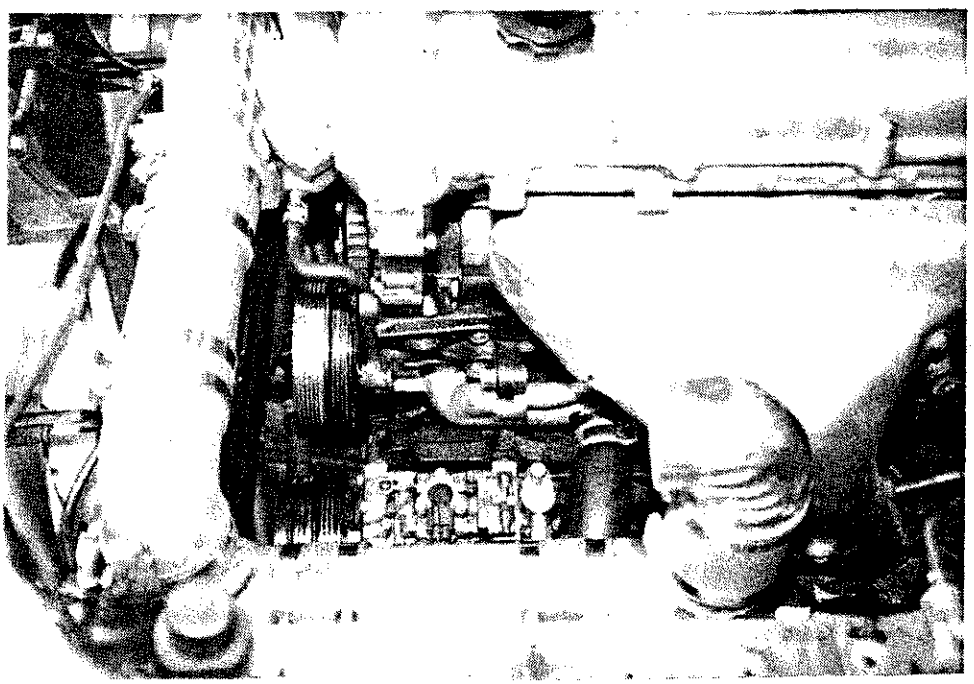


Fig. # 3

6 -Install the alternator bracket (P/N 18N007) on the side of engine block (were the alt. belt tensioner was located) with 3 supplied bolts (P/N 12MEH35) Now you can install the alternator using the original bolt, onto the bracket. Fig. # . Install the new brace (P/N 18N008) with the long 6 mm. bolt (from the original belt tensioner).Install the alternator belt (P/N 18N009) and tension it properly. See belt installation diagram.

7 -Mount A/C. P/S. Belt tensioner pulley (P/N 11N009) with bracket (P/N 11N011) with bolts (P/N 8MEH50 & 8MEH60)

8-Install thermostat housing spacer (P/N 15N018-M) with original bolts and on top of it install the thermostat housing (P/N 11N007) with new gasket (P/N 11N007G) and bolts (P/N 8MEH30). Re-install the temperature sensor,witch was removed from old thermostat housing, to the new one.(P/N 11N007) Fig. # 6

9 -Install the elbow (P/N 11N222) with the sylicone rubber sleeve (P/N 10P014) and clamps (P/N 10HC24) to the Air Flow Meter, Fig # 6. Install the flange (P/N 11N008) to the air Flow Meter with the original nuts, replace gasket if necessary.

10-Momentarly install this unit, using the bracket (P/N 13N010) to hold it, mounting the bracket under the left 8MM. bolt at the thermostat housing spacer (P/N 15N018-M), and the 6MM. bolts on the flange that were installed on the A.F.M.. Insert the sylicone sleeve (P/N 10N014) with the black rubber sleeve and clamp saved from step # II, in the throttle body. Fig. # 5.

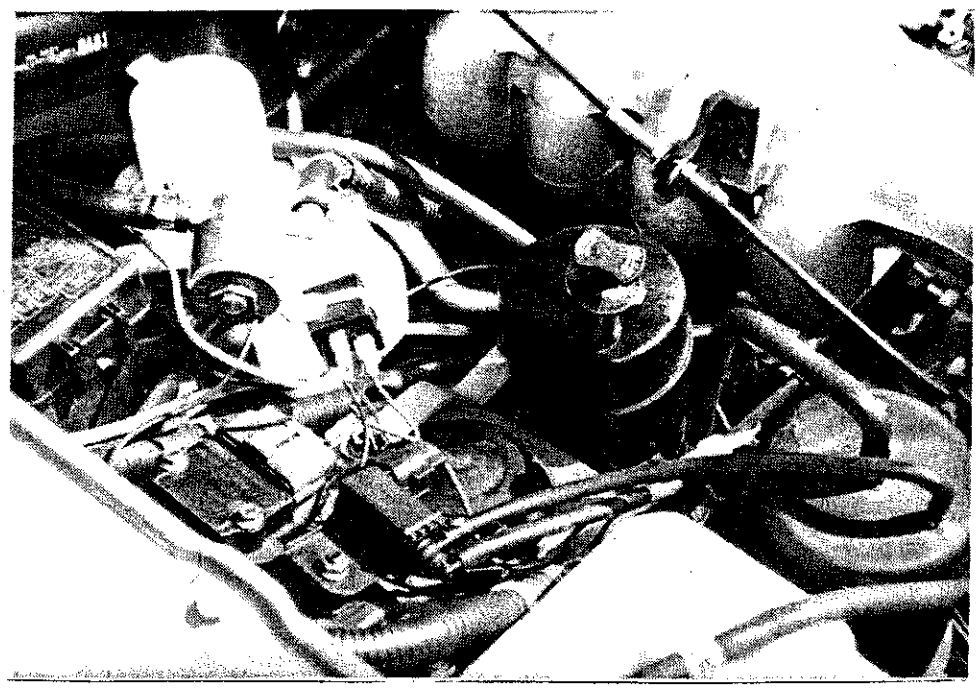


Fig. # 4

11-Install discharge tube assy. (P/N's 11N220 & 11N221) on top of a/c. compressor. over the rubber protector installed on step # XI Fig # 2. and connect it to the flange (P/N 13N008) at A.F.M. with silicone sleeve and clamps provided. (P/N's 10P014 & 10H024) All the plumbing will be aligned properly later, after the blower instalation.

12-Mount blower unit in bracket (P/N 11N001) on marked holes with bolts (P/N 516E20) and washers provided. On the 10MM. bolt at the bottom of the bracket (P/N 11N001) install the idler pulley (P/N 11N023) with nut (P/N 10MEN) and spacer (P/N 11N017)

13-Using the P/S.Pump. original mounting bolt, install it in lower hole of bracket (P/N 11N001) and slide it into the P/S bracket, install washer and nut. On top of the bracket install the serpentine belt tensioner (P/N 11N010) with the black fiber washer (P/N 12MBFW) between bracket and tensioner with (P/N 12MEH40) bolt and washers.Now tighten lower bolt nut. Fig. # 5.
NOW YOU SHOULD FILL THE BLOWER RESERVOIR WITH 8 OUNCES OF A.T.F. OIL (TYPE F)
NOTE: See enclosed Paxton Blower Warranty and Maintenance Bulletin for further details

14-Install the serpentine belt and apply tension, then tighten the tensioner.
N O T E : 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

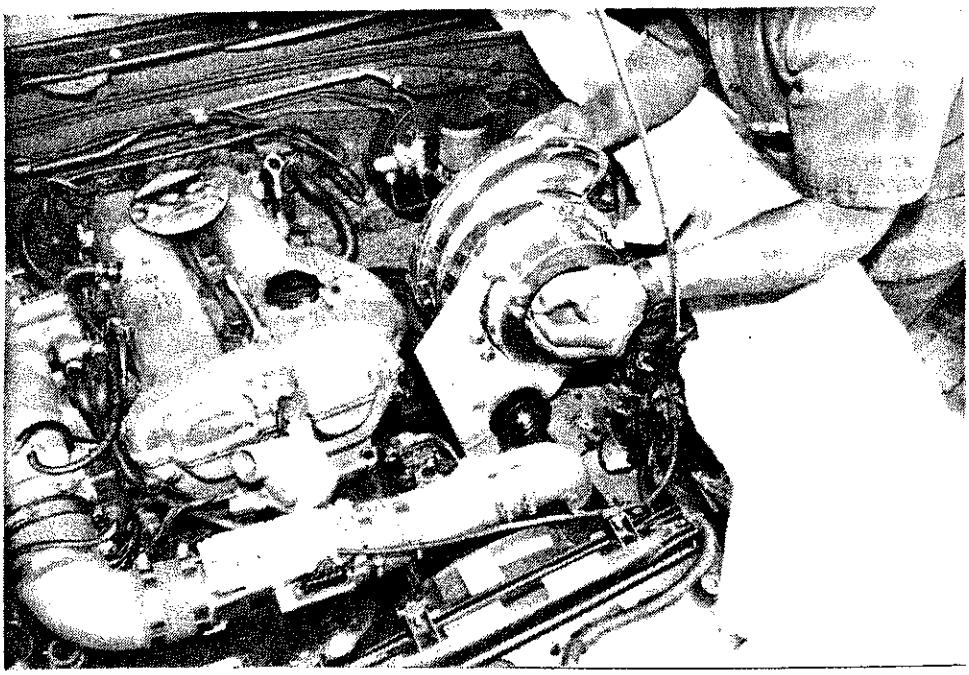


Fig. # 5

15- Now align all the plumbing assy. and A.F.M. accordingly, tighten all sleeves clamps. Be sure plumbing tubes won't hit against frame.

16-Connect new wiring assy. (P/N 13N001) to A.F.M. and original harness terminal.

17-Install new upper radiator hose (P/N 11N180) and 2 clamps (PN 11HC24) Fig. # 6

18-Re-fill radiator with the coolant saved, add. if needed

19-Install rubber elbow (P/N 11N111) and air filter (P/N 11N0AF) at the intake side of blower, tighten clamp (P/N 10HC52) Reconnect the breader rubber tube removed from one end of the original breader tube removed on step # XII Page 3, from the engine valve cover to the bottom of the air filter assy.

18-Install F.P.R. according the instructions supplied with it. Fig. # 4.

19-Reconnect battery.

20-Re-check everything one more time, connections, hoses, belts, nuts, hose clamps, blower oil, cranck engine but DO NOT START IT, check for belt alignment, if they all look fine, YOU CAN START THE ENGINE!

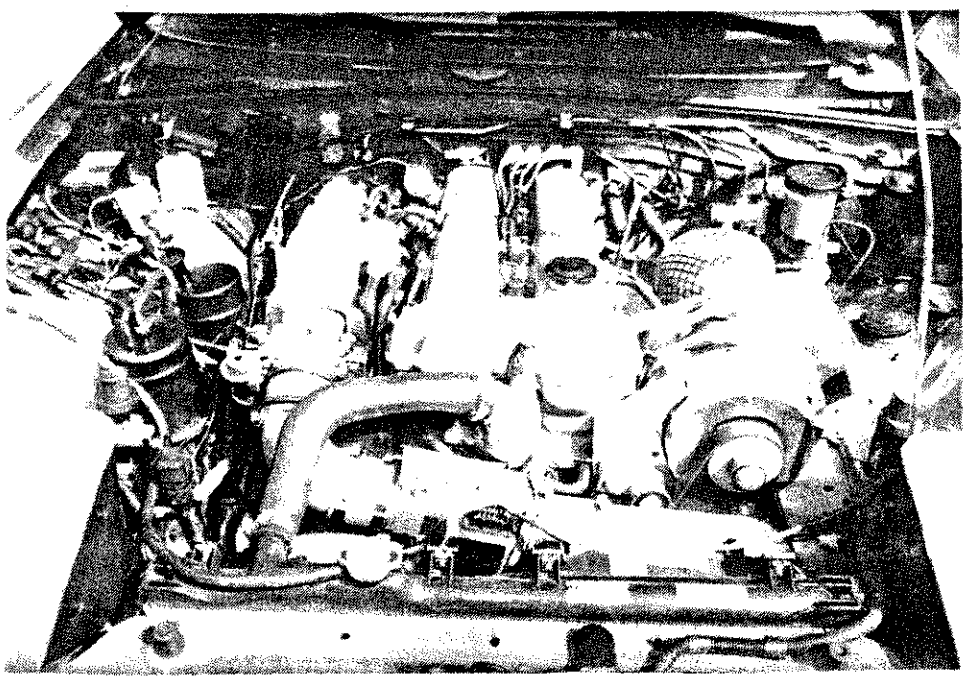
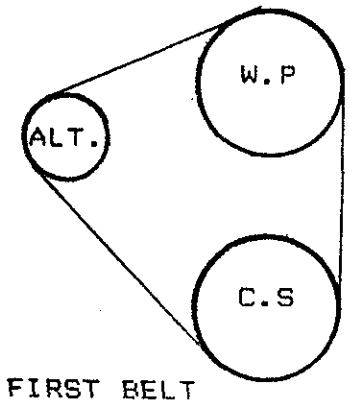
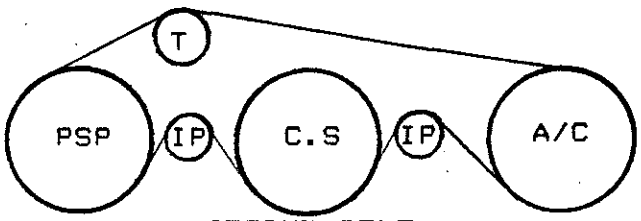


Fig. # 6

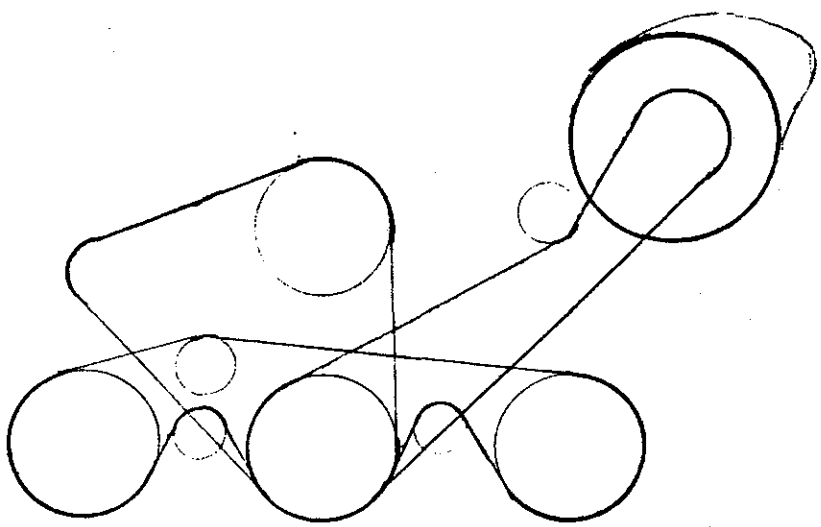
BELTS INSTALATION DIAGRAMS



FIRST BELT



SECOND BELT



ALL BELTS DIAGRAM