

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-186-2
Relating to Exemptions Under Section 27156
of the Vehicle Code

HKS U. S. A., INC.
HKS PERFORMANCE PACKAGE P/N SR71XX-90000X

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 HKS Performance Package P/N SR71XX-90000X comprised of exhaust system, T-25 G turbo upgrades, intercooler upgrades, Vein Pressure Converter, 485 ccpm fuel injectors, air filter system, electronic valve controller wastegate, spark plugs, oil cooler and boost gauge, manufactured by HKS USA, Inc. of 20312 Gramercy Place, Torrance, CA 90501, has been found not to reduce the effectiveness of the applicable vehicle pollution control system and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for 1990-1991 model-year Nissan 300 ZX Twin Turbo vehicles powered by a 3.0 liter fuel injection engine.

This Executive Order is valid provided that installation instructions for this supercharger kit will not recommend tuning the vehicle to specifications different from those submitted by HKS USA, Inc.

Changes made to the design or operating conditions of the performance package, as exempt by the Air Resources Board, which adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of this performance package using any identification other than that shown in this Executive Order or marketing of this performance package 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 the performance package shall not be construed as exemption to sell, offer for sale, or advertise any component of the kit as an individual device.

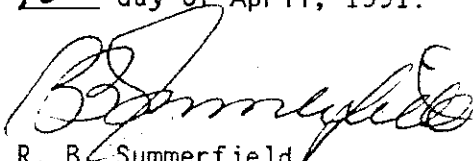
This Executive Order does not constitute any opinion as to the effect the use of this performance package may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE HKS USA, INC. PERFORMANCE PACKAGE.

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 communication.

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 10th day of April, 1991.



R. B. Summerfield
Assistant Division Chief
Mobile Source Division

Original



State of California
AIR RESOURCES BOARD

EVALUATION OF HKS USA, INC.'S HKS PERFORMANCE PACKAGE P/N SR71XX-90000X
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE
CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE
CALIFORNIA CODE OF REGULATIONS

April 1991

State of California
AIR RESOURCES BOARD

EVALUATION OF HKS USA, INC.'S HKS PERFORMANCE PACKAGE P/N SR71XX-90000X
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CALIFORNIA CODE OF REGULATIONS

by

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

(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 mention of trade names or commercial products constitute endorsement or recommendation for use.)

SUMMARY

HKS USA, Inc., of 20312 Gramercy Place, Torrance, California 90501 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for the HKS performance package P/N SR71XX-90000X. The HKS performance package is designed for installation on 1990-91 Nissan 300 ZX Twin Turbo vehicles equipped with a 3.0 liter engine.

Based on the results from comparative exhaust emission tests performed at an independent laboratory on a 1990 Nissan 300 ZX Twin Turbo, the staff concludes that HKS USA, Inc.'s HKS performance package P/N SR71XX-90000X will not adversely affect exhaust emission from vehicles for which an exemption is requested.

The staff recommends that HKS USA, Inc. be granted an exemption as requested and that Executive Order D-186-2 be issued.

TABLE OF CONTENTS

	Page Number
SUMMARY	i
CONTENTS	ii
I. INTRODUCTION	1
II. CONCLUSION	1
III. RECOMMENDATION	1
IV. DESCRIPTION	2
V. PERFORMANCE KIT EVALUATION AND DISCUSSION	5
APPENDIX	
APPENDIX A: TURBO SYSTEM DRAWINGS	
APPENDIX B: INTERCOOLER COMPARISON	

EVALUATION OF HKS USA, INC.'S HKS PERFORMANCE PACKAGE P/N SR71XX-90000X
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE
CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE
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I. INTRODUCTION

HKS USA, Inc. of 20312 Gramercy Place, Torrance, California 90501 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code for the HKS Performance Package P/N SR71XX-90000X. The HKS Performance Package is designed for installation on 1990-91 Nissan 300 ZX Twin Turbo vehicles powered by a 3.0 liter fuel-injected engine.

HKS USA, Inc. has submitted data from comparative emission tests conducted on a 1990 Nissan 300 ZX Twin Turbo at California Environmental Engineering, Anaheim, California.

II. CONCLUSIONS

Based on the results from comparative exhaust emission tests performed at California Environmental Engineering on a 1990 Nissan 300 ZX Twin Turbo, the staff concludes that HKS USA, Inc.'s HKS Performance Package P/N SR71XX-90000X will not adversely affect exhaust emissions from vehicles for which an exemption is requested.

III. RECOMMENDATION

The staff recommends that HKS USA, Inc. be granted an exemption for their HKS Performance Package P/N SR71XX-90000X for installation on 1990-1991

model-year Nissan 300 ZX Twin Turbo vehicles powered by a fuel-injected 3.0 liter engine. The staff also recommends that Executive Order D-186-2 be issued.

IV. DEVICE DESCRIPTION

The HKS Performance package is designed for installation on 1990-91 Nissan 300 ZX Twin Turbo vehicles powered by a 3.0 liter fuel-injected engine. The performance package consists of an exhaust system, T-25 G turbo upgrades, intercooler upgrades, Vein Pressure Converter, 485 ccpm fuel injectors, HKS Power Flow air filter system, electronic valve controller wastegate, spark plugs, oil cooler and boost gauge. The kit operates in conjunction with the original equipment manufacturer (OEM) computer controlled electronic port fuel injection and emission control systems already certified with the stock engine. The tune-up specifications remain the same.

The OEM exhaust system is replaced with a 300 ZX VG30DETT exhaust system. The modified exhaust system uses two sub-mufflers instead of one and enlarges the pipe diameter from 54 mm to 60 mm. Due to the larger pipe diameter, the exhaust pressure is reduced from 16.6 psi to 15.9 psi. The noise out of the tailpipe is slightly increased in the modified configuration.

The stock Garrett Airesearch T-25 twin turbos are replaced with two Garrett Airesearch T-25 G twin turbos. Garrett manufactures all the rotating assemblies, turbine housing and wastegate swing valve while HKS manufactures the compressor housing for the modified turbo system. Appendix A illustrates the compressor housing and the turbo system. The modified turbos increase

the area ratios for the turbine and compressor from .58 to .64 and .42 to .80 respectively and increases the maximum boost from 8.5 psi to 14.3 psi.

The OEM intercoolers are removed and replaced with two HKS intercoolers. The upgraded intercoolers reduce the charged air temperature during boost operation to a point where the inlet temperature to the engine at the higher rates on boost pressure specified as safe with this full package are very similar to those of the non-modified vehicle. The intercooler core dimensions are increased from 165 mm to 260 mm in height, 170 mm to 200 mm in width and 60 mm to 65 mm in thickness. The modified intercooler increases the efficiency from 65% to 80% and increases the air density from 15% to 23%. A comparison of the OEM to the modified intercoolers is enclosed in Appendix B.

The modifications specific to the fuel injection system include, increase injector nozzles size from 405 to 485 cc/min and removal of the factory air mass sensor system, which is replaced with a sensitive absolute pressure transducer system. The new signal is read by an HKS three dimensionally programmed computer interface known as the Vein Pressure Converter (VPC). The HKS VPC computer interfaces with factory OEM style computer plug connectors and does not require any cutting or splicing of OEM wire harness. The HKS VPC allows precise control of the larger injectors, while staying within the emission test parameters. The elimination of the air inlet restriction posed by the factory sensor allows for a crisper throttle reaction as well as increased power.

Installation of the HKS performance package requires replacement of the OEM accordion paper air intake system with the HKS Power Flow air filter assembly. The HKS Power Flow air filter does not in any way interfere, remove, interrupt, re-route or modify the factory emission system.

The OEM boost control on/off solenoid is replaced with the HKS electronic valve controller (EVC). The EVC unit is utilized to monitor and correct boost pressure, up to, but not in excess of maximum specifications. It performs this function eight times per second. For the purpose of including the EVC in this package, HKS has redesigned the EVC to eliminate any cockpit override of boost level settings. It offers the driver access to three preselected levels of boost pressure (low, mid and high), but these are precalibrated to exacting specifications and are within the basic design parameters of this system. These settings will allow a range of operation from a safe operation of the vehicle in less than ideal weather, as well as a spirited acceleration when conditions are more favorable.

The remaining modifications to the OEM system include changing the spark plugs from the OEM NGK PFR6B-11 to the HKS M35I, installing the HKS Turbo Boost meter and installing a larger oil cooler to prevent increased oil temperatures. The oil cooler unit is a direct replacement and maintains the OEM thermostatic controls, so that engine warm up characteristics and general operational temperatures remain consistent with original specifications. All remaining emission control components are unchanged.

V. PERFORMANCE PACKAGE EVALUATION AND DISCUSSION

A 1990 Nissan 300 ZX Twin Turbo with a 3.0 liter fuel-injected gasoline engine was used for the evaluation of the HKS Performance Package. The dynamometer inertia weight and loading used were 3875-lbs and 7.7-hp respectively.

Comparative emissions tests conducted by California Environmental Engineering for HKS USA, Inc. consisted of one Cold-Start CVS-75 emission test in the unmodified (baseline) configuration, followed by one Cold-Start CVS-75 emission test in the modified (performance package installed) configuration. The ARB did not perform tests to confirm the test results submitted by the applicant. A summary of the test results is shown below:

Exhaust Emissions Test Results
On A 1990 Nissan 300 ZX Twin Turbo

Test Mode	Exhaust Emissions (gm/mi)		
	<u>HC</u>	<u>CO</u>	<u>NOx</u>
Baseline	.235	3.082	.079
Device	.300	3.440	.097
Difference	+.065	+.362	+.018
% Difference	+27.7%	+11.7%	+22.8%

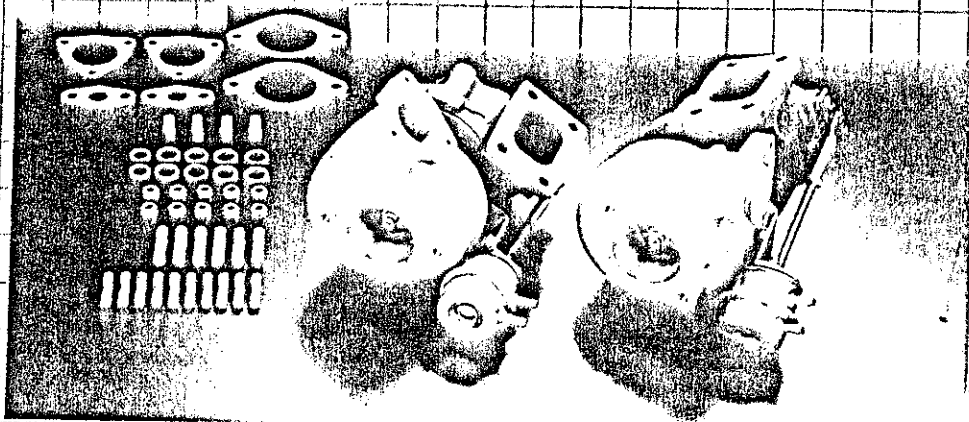
The differences between the device emission test results and baseline emission test results submitted by the applicant were within the allowed limits of .1 gm/mile HC, 1.0 gm/mile CO and .1 gm/mile NOx as specified in the "Procedures for Exemption of Add-On and Modified Parts." Therefore, the installation of the HKS Performance Package P/N SR71XX-90000X did not have an adverse effect on exhaust emissions on the test vehicle. HKS USA, Inc. submitted all the required information and fulfilled the requirements for exemption.

Appendix

HKS USA INCORPORATED
COMPETITION/PERFORMANCE PARTS

**Tuning
Guide**

300ZX VG30DETT
HKS SPORT TURBO T-25"G"
PHOTO-2



SPORT TURBOCHARGER UPGRADES
FOR 300ZX VG30DETT
UTILIZING GARRETT T-25"G"
TURBOS

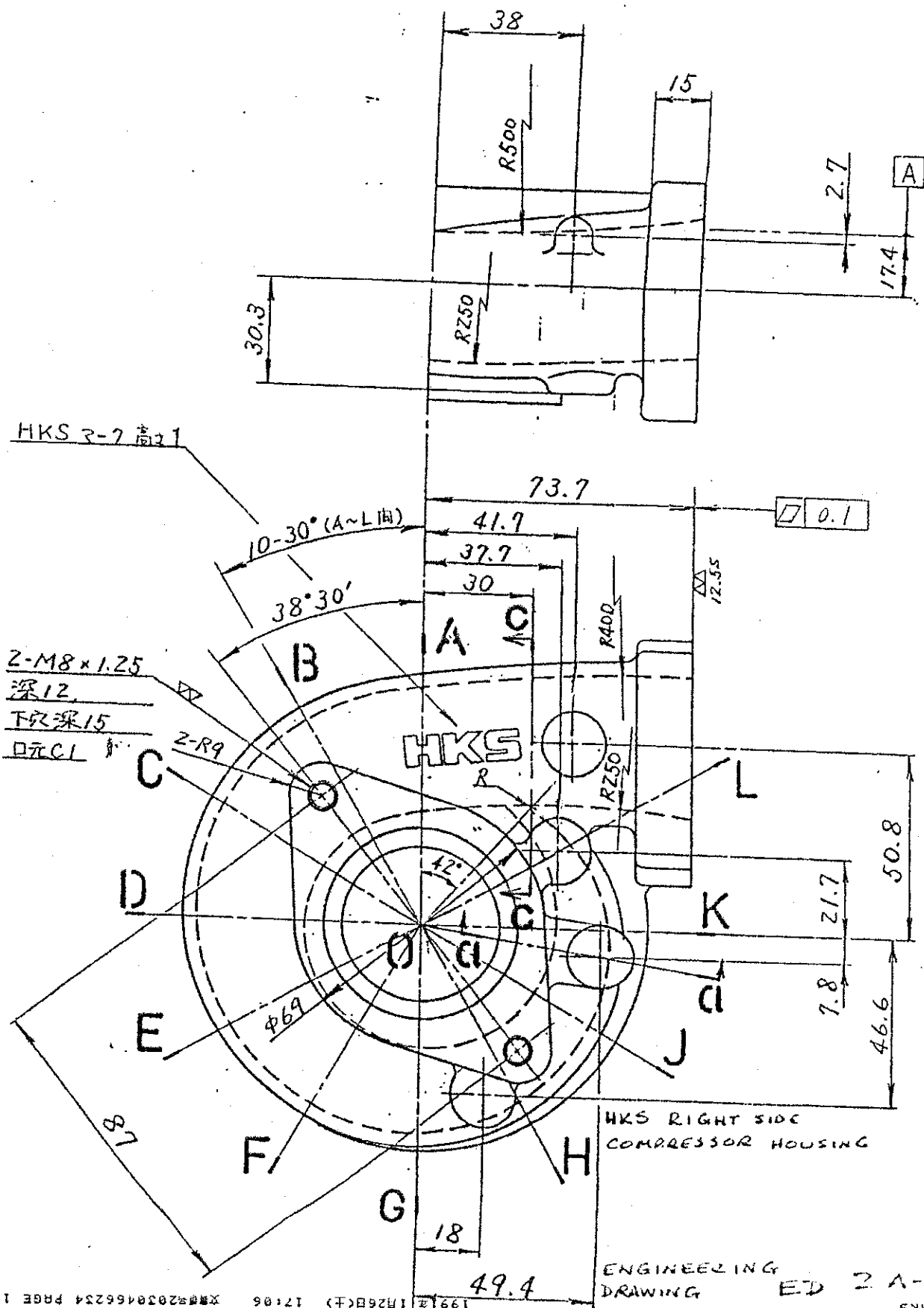
NOTE: FLOW MAP ALSO INCLUDED,
SEE EXHIBIT

PRODUCT SAMPLE ALSO
INCLUDED, SEE PART #2

PHOTO 2

PHOTO 2

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HKS RIGHT SIDE
COMPRESSOR HOUSING

ENGINEERING
DRAWING ED 2 A-1

FROM HK5

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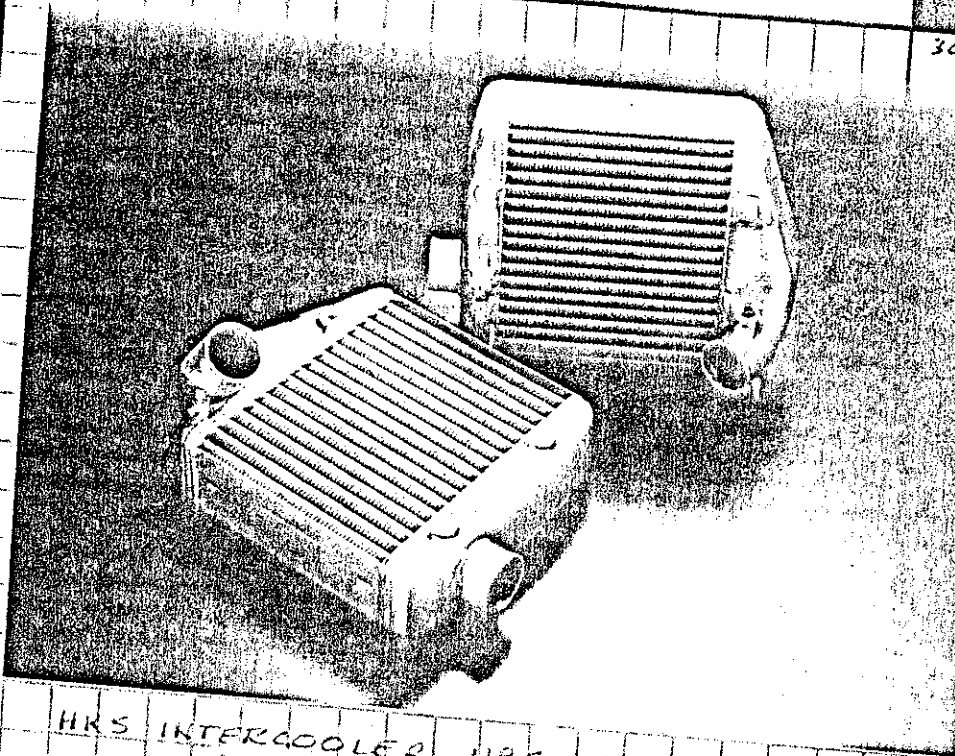
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HKS USA INCORPORATED
COMPETITION/PERFORMANCE PARTS

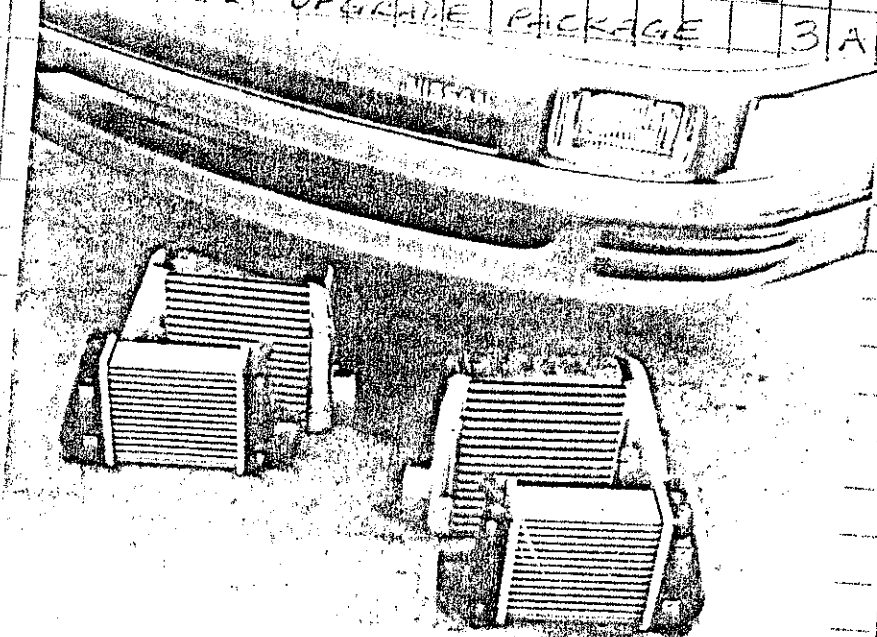
Tuning Guide

300EX V6 30DETT
HKS INTERCOOLERS

PHOTOS 3A + 3B



HKS INTERCOOLER UPGRADE PACKAGE 3A



COMPARISON PHOTO TO STOCK I.C. 3B

PHOTOS 3A & 3B

PHOTOS 3A & 3B