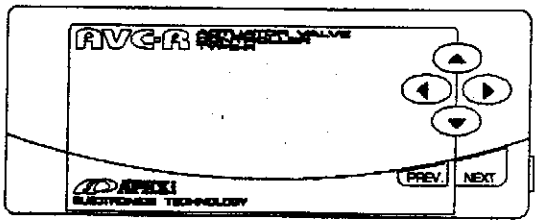
AVC-R

ACTUATOR VALVE CONTROLLER TYPE-R

INSTRUCTION MANUAL

Thank you for purchasing the A'PEXi AVC-R
In order to properly use this unit, please be sure to read this instruction manual carefully.
Please store this manual inside of the vehicle for reference.
Please be sure to include this manual with the unit when selling.

A'PEX



Product Name	AVC-R
Product Code	420-A004
Vehicle	This unit may not be used on any vehicle that is not listed on the Vehicle Specific Wiring Table
Function	Boost control for turbo-charged engines

A'PEXi
ELECTRONICS TECHNOLOGY

Chasing Our Dreams - A complete line of customized car and automotive parts developed with state of the art technology and new ideas. Our company is A'PEX which means the highest in quality.

Instruction Manual Number 7607-0110-00E '99.6.4pub. ver.1

■Table of Contents

1 Safety Precautions

Please be sure to read the safety precautions.
Please keep this manual in a readily accessible location for future reference.

●Signal Words and their Meanings

We have included warnings throughout the manual to protect both the user and others from harm and injury.
These key words are called "Signal Words."
Please carefully read the cautions before reading the rest of the manual.

● Explanation of "Signal Words"

⚠DANGER

Failure to obey this warning will likely result in DEATH or severe injury to the user.

⚠WARNING

Failure to obey this warning may cause DEATH or severe injury to the user.

⚠CAUTION

Failure to obey this warning will likely result in injury to the user, product damage, or damage to the surrounding area.

■Safety Precautions (cont'd)

⚠WARNING

●**Never install this product on a vehicle that is not listed in this manual.**
We do not guarantee product operation on non-listed vehicle applications. Failure to follow instructions may cause unexpected accidents.

●**Discontinue use of this product immediately if there is smoke or a burning odor.**
Failure to do so may result in engine or vehicle fire. Please take the unit back to the place of purchase for further assistance.

●**Only use this product for the intended purposes listed within this manual.**
A'PEX is not responsible for any harm or accidents caused by the improper use of this product.

●**Never operate this unit while driving.**
Failure to do so may result in injury or accident.

●**Securely mount this unit away from any area that may affect driving.**
Failure to do so may result in injury or accident.

●**This unit is designed only for DC12V type vehicles with a negative ground.**
Do not install on big trucks, refrigerated trucks, or diesel trucks with 24V.
This could lead to an engine or electrical fire.

●**Be sure to disconnect the negative terminal of the battery before proceeding with installation.**
Failure to do so may result in vehicle fire, electrical shortage, electrical system damage, and product damage.

●**Be sure to securely hold the connector when disconnecting**
Failure to do so may result in electrical shortage and damage to the unit.

●**Always connect the wiring EXACTLY as shown in the instruction manual.**
Failure to do so may result in product failure and engine damage.

●**Do not adjust the unit while driving. Obey all of the rules and regulations of the highway while driving.**
Failure to do so may result in accidents.

■Safety Precautions (cont'd)

⚠CAUTION

●**Installation should only be performed by an experienced installer.**
Installation requires experience and skill. To the installer: Please install the product in a professional and functionally correct manner.

●**Never disassemble, modify, or tamper with this unit.**
Failure to do so may lead to electrical fire, vehicle fire, and engine damage.

●**Do not drop or expose this unit to excessive shock.**
This may damage the unit and cause damage to the engine.

●**Keep this unit away from direct sunlight and water.**
Failure to do so may cause product failure eventually leading to electrical fire, vehicle fire, and engine damage.

■To Begin

Thank you for purchasing the AVC-R boost controller
Please read these instructions to ensure proper product usage.

●The AVC-R controls swing valve type and poppet type wastegates to allow boost pressure control. By utilizing the VFD (Vacuum Fluorescent Display) the unit is able to display boost pressure, engine RPM, vehicle speed, and throttle position.

●If utilizing the scramble boost feature, a separate momentary button and wiring (not included) must be added in order to activate the function.

●This unit does NOT come equipped with a fuel cut eliminator. Some vehicles will require some sort of fuel cut eliminating device and possibly fuel enrichment when the boost pressure has been raised.

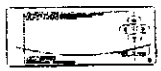
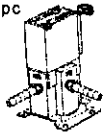
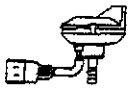
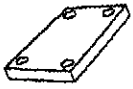
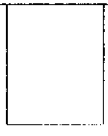
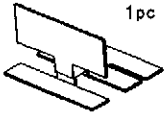
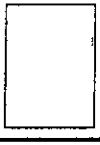
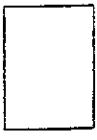
~Features~
① Desired boost level and solenoid duty can be set according to engine RPM
② Gear specific boost control
③ Self Learning Function
④ Sensor Output display monitor

⚠ CAUTION

- Do not use this product on any vehicle that is not specified in our vehicle specific application guide.
- Do not use this product for any other purpose than its original intent.
- Installation of this unit MAY cause radio noise or TV interference depending upon installation position and method.
- Mild heat caused by the unit is not unusual.
- Please do not use this unit under extremely hot or cold conditions.

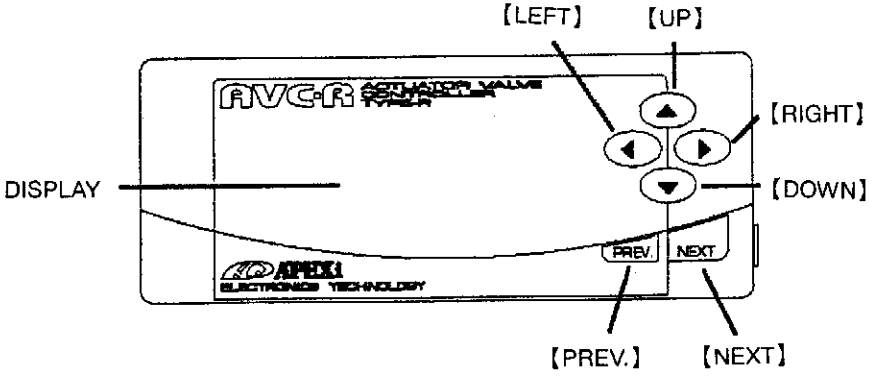
■Part Names and Function

●parts List

1.Unit	2.Solenoid Valve	3.Pressure Sensor	4.Harness
1pc 	1pc 	1pc 	1pc 
5.φ6 Hose	**6.φ4 Hose**	**7. φ6Hose Clamp**	**8.φ6 3Way**
2m 	0.5m 	12pcs 	2pcs 
9.φ4 3Way	**10.Bolt**	**11.Splice**	**12.Zip tie(lg/sml)**
1pc 	4pcs 	6pcs 	3pcs each 
13.Air Filter	**14.Mounting Rubber**	**15. φ8-φ6-φ8**	**16.φ8 Hose Clamp**
1pc 	1pc 	1pc 	2pcs 
17.Nipple	**18. φ8 2 Way**	**19. φ4-φ6 Adapter**	**20.Warranty Card**
1pc 	1pc 	2pcs 	1pc 
21.Instruction Manual	**22.Mounting Bracket**	**23.Vehicle Specific Wiring Diagram**	**24.Location Diagram**
1pc 	1pc  includes tape	1pc 	1pc 

■Part Names and Functions(cont'd)

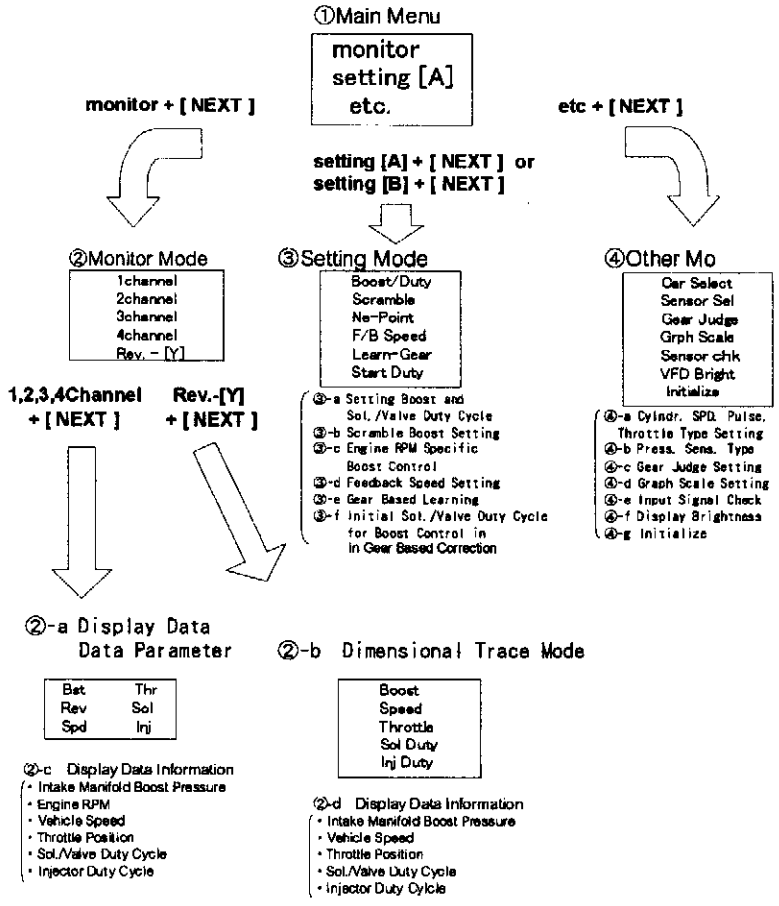
● Product



⚠Caution

●The AVC-R should only be installed on an applicable vehicle
Installation of the AVC-R on any other type of vehicle may cause severe engine damage.

■Function and Set-Up



⚠Caution

- When setting the AVC-R, be sure to take the engine capabilities into account. Improper tuning may cause severe engine and vehicle damage
- Be sure to contact an experienced tuner before changing the settings on the AVC-R Failure to do so may result in engine damage

■AVC-R Set-up Procedure

Installing the Pressure Sensor and Solenoid Valve
(P38～P51)

Connecting the AVC-R head unit(P52～P54)

Checkpoints after Installation (P55)

Initial Setting
Cylinder Setup (P32)
Vehicle Speed Pulse Setup (P32)
Throttle Sensor Type Setup (P33)

Start Engine

Setup Boost Control (P18～P21)

9
■main 《Main Menu Selection》

The AVC-R, with included solenoid valve, allows voluntary setting of boost pressure for any turbo-charged system.

All data is programmed into the unit. The AVC-R will retain all data in memory until the INITIALIZE function has been activated. Removing the key from the ignition or disconnecting the battery will not affect the stored data.

⚠WARNING

● Do not operate this unit while driving.
Operating this unit while driving may interfere with normal driving procedure and be the cause of accidents.

⚠ CAUTIONS

● Never start the engine or turn the ignition key ON/OFF while the AVC-R is in use. Failure to do so may cause improper operation and damage the engine.

①Main Menu Selection

This is the basic menu for the AVC_R

Main Menu

1 *《Select》*

【▲】up Key/【▼】down Key

Use these keys to select parameter
The selected parameter will illuminate

2 *《Enter》*

【next】Key

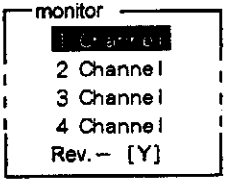
Use this key to select
The selected parameter will illuminate

Pressing the【 NEXT】Key【 PREV.】Key at the same time for longer than 0.5 sec. will allow the user to toggle between Monitor Mode and Setting Mode.

■monitor 《Display Parameter Select》

② Display Selection Mode 【 monitor】

Selecting [monitor] on the menu will activate the display selection mode.



1 《Select》

【▲】up Key/【▼】down Key

Use these keys to select parameter

The selected parameter will illuminate

2 《Enter》

【next】Key

Use this key to select parameter

The selected parameter will illuminate

Selecting【1Channel】 will display 1 parameter of data
Selecting【2Channel】 will display 2 parameter of data
Selecting【3Channel】 will display 3 parameter of data
Selecting【4Channel】 will display 4 parameter of data
Selecting【Rev. - [Y]】 will display engine RPM on the horizontal scale of the 2 D Trace Mode

②-a Selecting Display Parameters

【monitor】→【1, 2, 3, 4, Channel】

Select display parameters after choosing display channels.
The user can select from channels 1,2,3,4 and choose parameters from the list below.

●Display Data Information

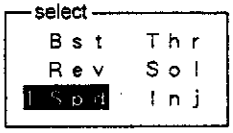
1. Bst…Intake Manifold Boost Pressure
2. Rev…Engine RPM *1
3. Spd …Vehicle Speed
4. Thr …Throttle Position
5. Sol …Solenoid Valve Duty Cycle
6. Inj …Injector Duty Cycle *2

*1 If you connect the purple wire to the injector signal, the unit will not display correct RPM during Fuel Cut/ Max Injection

*2 Unit will only display injector duty cycle if the purple wire is connected to the injector signal wire.

■monitor 《Data Display》

●If Selecting[1channel]



1 *《Display Parameter Selection》*

【▲】up Key / 【▼】down Key

Use these keys to select

The selected parameter will illuminate. The corresponding channel assignment will appear next to the parameter.

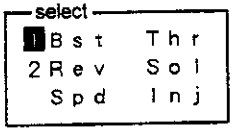
2 *《Display Parameter Entry》*

【NEXT】Key

Use this key to select

The selected parameter will illuminate

●If selecting[2channel]~[4channel]



1 *《Channel Selection》*

【▲】up Key / 【▼】down Key

Use these keys top select

The selected channel number will illuminate

2 *《Channel Entry》*

【▶】 right Key

Press this key to move to display parameter selection

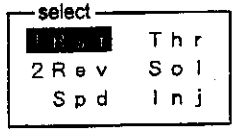
The display parameter and channel will illuminate

3 *《Display Parameter Selection》*

【▲】up Key/ 【▼】down Key

Use these keys to select desired parameter

The selected parameter will illuminate



4 *《Display Parameter Entry》*

【NEXT】Key

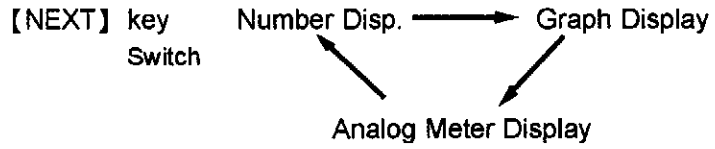
Use this key to enter

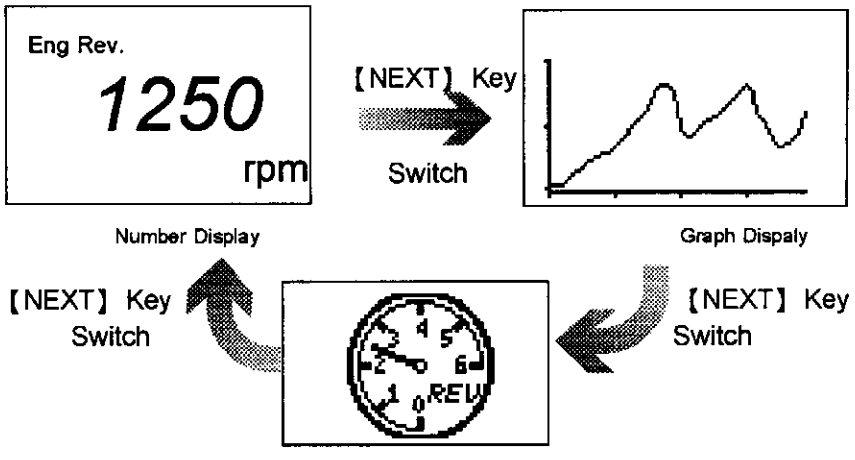
Selected parameter will illuminate

■monitor 《Data Display》

a. Real Time Display

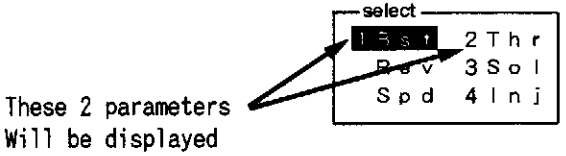
②-aThe data parameters selected in the previous menu can be displayed in numbers, graph or analog meter formats.





*The Analog Meter display mode can only display 2 parameters at a time

【3channel】【4channel】If has been selected, only parameter 1 and 2 will appear

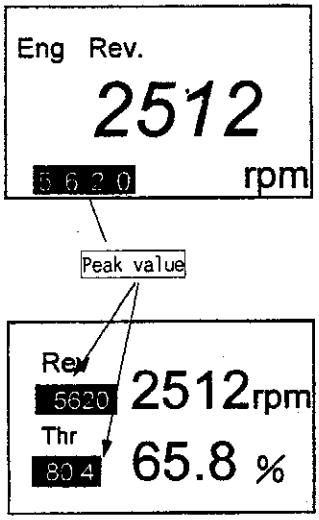


■monitor 《Data Display》

b. Peak Hold Function

The peak hold function may be used in numerical and analog meter display modes.

＊In Numerical Display



1 *《Peak Hold Setting》*

＊During Real Time Display

【▲】up key

Use this key to show peak hold

The value will illuminate

If in 3ch/4ch mode, real time display will not appear along with the peak hold values.

2 *《Peak Hold Value Reset》*

＊During Peak Hold

【▶】right key

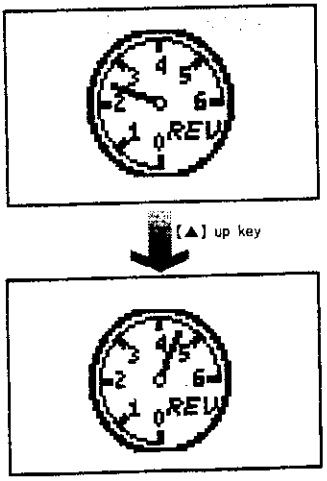
Use this key to reset the peak hold value

3 *《Releasing the Peak Hold》*

【▼】down Key

Use this key to release the peak hold value

＊During Analog Meter Display Mode



During Peak Hold

1 *《Peak Hold Setting》*

＊During Real Time

【▲】up Key

Use this key to display Peak Hold

2 *《Peak Hold Reset》*

＊During Peak Hold

【▶】right key

Use this key to reset Peak Hold

3 *《Releasing Peak Hold》*

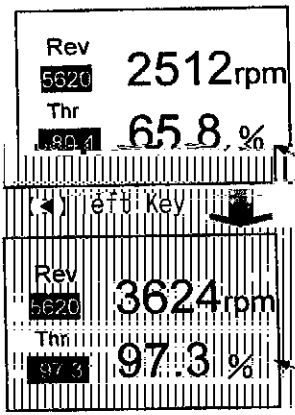
【▼】down key

Use this key to release peak hold

■monitor《Data Display》

c. Hold Function

It is possible to freeze the data on screen while in Numerical or Analog Meter Mode



1 《Data Hold Setting》

＊During Numerical or Analog Meter Mode

【◀】 left key

Use this key to hold data

2 《Releasing Data Hold》

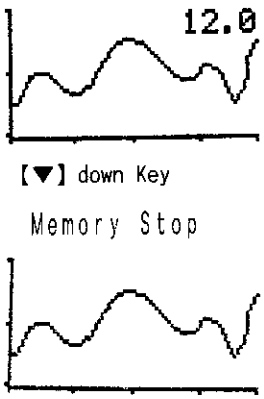
＊During Hold

【◀】 left Key

Use this key to return to normal mode

d. Memory Replay Function

It is possible to record data for a certain amount of time and replay the data while in graph mode.



1 《Graph Display Memory》

＊During Real time Display

【▲】 up Key

Use this key to memorize the data

Memory times are as follows

[1channel]……60sec

[2channel]……30sec

[3channel]……20sec

[4channel]……15sec

2 《Graph Mode Memory Termination》

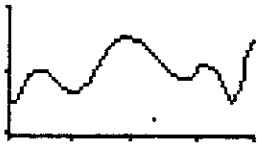
＊During Graph Display Memory

【▼】 down Key

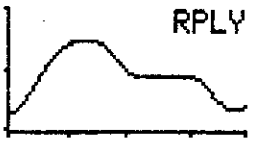
Use this key to terminate memory function

■monitor《Data Display》

During real time display



【▶】right Key



3 《Graph Display Replay》

＊During Real Time display

【▶】right Key

Use this key to start the replay to the left of the screen. If you push the following key during the replay,

【▶】right Key

The replay will stop.

Also,

【◀】left key

Use this key to start the replay to the right of the screen. If you push the following key during the replay,

【◀】left Key

The replay will stop

4 《Ending Graph Display Replay》

＊During Graph Display Replay

【▼】down key

this will end the graph display replay

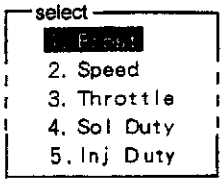
②-b 2 Dimensional Trace Mode【monitor】→【Rev.-[Y]】

Horizontal scale is engine RPM, Vertical scale can be selected from one of the following parameters.

●Display Data Information

1. Bst…Intake Manifold Boost Pressure
2. Rev…Engine RPM
3. Spd…Vehicle Speed
4. Thr…Throttle Position
5. Sol…Solenoid Valve Duty Cycle
6. Inj…Injector Duty Cycle

■ monitor 《2 D Trace Mode》



1 *《Display Parameter Selection》*

【▲】 up key/ 【▼】 down Key

Use these keys to select

The selected parameter will illuminate

2 *《Display Parameter Entry》*

【NEXT】 Key

Use this key to enter

The selected parameter will illuminate

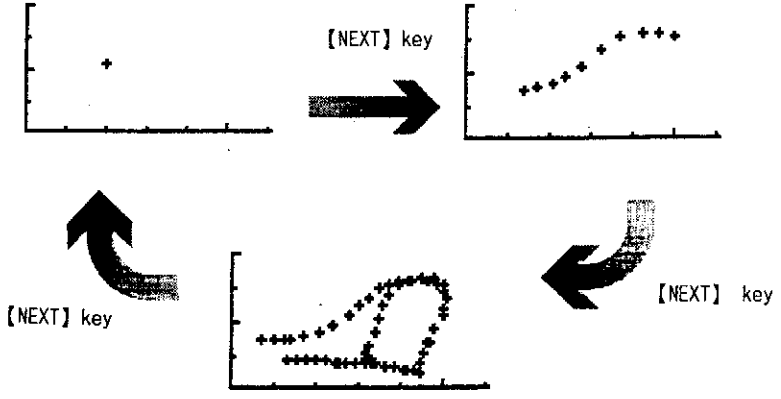
a Real Time Display

②-b The selected data can be displayed in graph form with the horizontal scale being engine RPM and the vertical scale being the selected parameter

【NEXT】 Key Switch

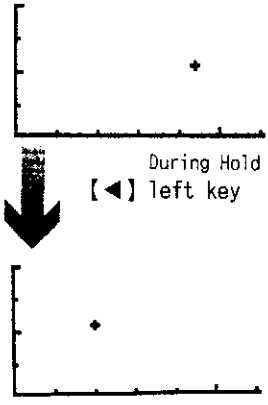
1 Point Display → 10 Point Display

Ghost Map Trace Display



b. Hold Function

Allows the user to stop the 2 D Trace Mode display function



1 《Hold Setting》

*During 1 point, 10 point and ghost map tracing

【◀】 left key

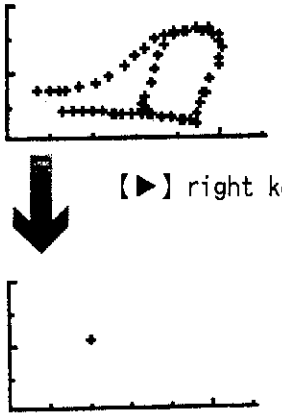
Use this key to hold the graph

2 《Releasing the Hold》

*During hold

【◀】 left key

c. Clearing Ghost Map Trace Display



1 《Ghost Map Clear》

*During Ghost map Trace mode

【▶】 right key

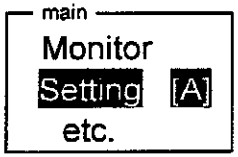
Use this key to clear

■setting 《Setting Mode》

③Setting Mode 【setting[A] / setting[B]】

This unit is able to set 2 preset boost levels (setting [A] and setting [B])
For example, if channel A is for HIGH boost and channel B is for LOW boost, the user can choose between HIGH and LOW boost levels by switching between channels.

Selecting either channel A or B 【setting [A]】 【setting [B]】 will initiate the SETTING MODE.



1 《Channel Setting Selection》

【▶】 right key

use this key to select channel setting

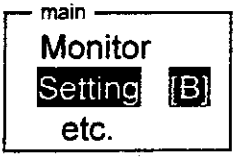
switch with 【▶】 right key

2 《Channel Setting Entry

【NEXT】 Key

Use this key to enter

This will change the screen to the setting parameter selection screen



3 《Boost Control OFF》

【◀】 left key

Use this key to turn the setting OFF

【◀】 left key will make setting OFF

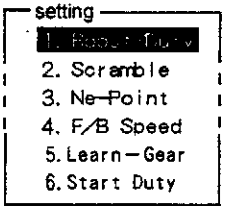
This will deactivate the solenoid valve and boost levels will be regulated by the wastegate alone.

Pressing the 【NEXT】 Key 【PREV.】 Key at the same time for longer than 0.5 sec. will allow the user to toggle between Monitor Mode and Setting Mode.

■setting《Setting Mode》

●Setting Parameter Selection

3-a [Boost/Duty]…Setting Boost and Duty cycle levels
3-b [Scramble]…Scramble Boost setting
3-c [Ne-Point]…Engine RPM Specific Boost Control
3-d [F/B Speed]…Feedback Speed Setting
3-e [Learn Gear]…Gear Based Learning
3-f [Start Duty]…Initial solenoid valve duty cycle for boost control in gear based correction

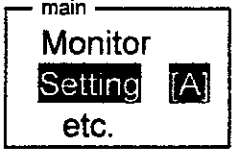


1 *《Setting Parameter Selection》*

【▲】up key/【▼】down key
Use these keys to select parameter
The selected parameter will illuminate

2 *《Setting Parameter Entry》*

【NEXT】Key
use this key to enter
Menu will change to selected parameter



3 *《Ending Setting Parameters》*

【PREV.】key
Exits current mode
After the setting parameter selection
The screen will go to the setting parameter selection menu
After the setting parameter selection menu
The screen will go to the Main Menu

【PREV.】key returns to the previous menu

⚠Warning

- Be sure to consult an experienced tuner before adjusting settings
  Improper settings may damage the engine and vehicle.
- Never adjust this unit while driving.
  Failure to do so could lead to fatal accidents.

■AVC-R Setting

※ *Basic Setting*

Setting Desired Boost Level (P22)

↓

Setting Solenoid Valve Duty Cycle (P22~P23)

※ *Detailed Setting*

Gear Based Setting (P34)

↓

Engine RPM Based Boost Setting (P24)

↓

Engine RPM Based Solenoid Valve Duty Cycle Setting (P25)

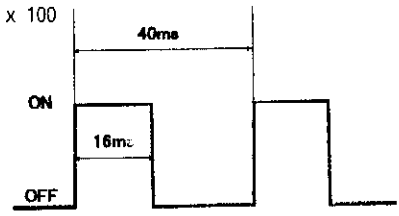
↓

Gear Based Self Learning Mode Setting (P29)

※ What is DUTY?

$$\text{Duty} = \frac{\text{Solenoid Valve duration}}{\text{Total Solenoid Valve Operation duration}} \times 100$$

$$= \frac{16\ \text{ms}}{40\ \text{ms}} \times 100 = 40\ (\%)$$



■Arrange Setting

※ *Scramble Boost Setting*

↓

Setting the Scramble Boost (P26)

※ *I want to have a little bit of boost spiking, OR I want to minimize boost spiking (overshooting)*

↓

Setting the Start Duty (P30)

※ *I want to correct unstable boost OR cure boost drop*

↓

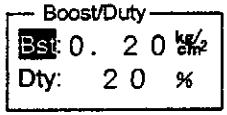
Set Feed Back Speed (P28)

■setting 《Boost/Duty》

③-a (1) Target Boost Pressure/Solenoid Valve Duty Set Up

【setting[A]・setting[B]】→【Boost/Duty】

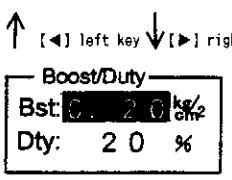
[Boost/Duty] will allow setting of target boost pressure and solenoid valve duty cycle.



1 *《Parameter Selection》*

【▲】up Key/【▼】down Key

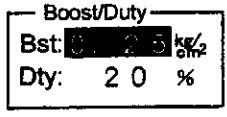
use these keys to select parameter



2 *《Target Boost Pressure Parameter Entry》*

【▶】right Key

Use this key to select boost pressure parameter



3 *《Target Boost Pressure Setting》*

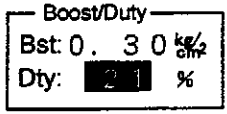
【▲】up Key/【▼】down Key

Use these keys to select desired boost pressure

Desired boost pressure range

0.2kg/cm²～2.0kg/cm²

0.05kg/cm² increments



4 *《Solenoid Valve Duty Settings》*

【▲】up Key/【▼】down Key

Use these keys to select solenoid valve duty cycle

Solenoid Valve Duty Cycle Range

20%～90%

1% increments

advice Solenoid Valve Duty Cycle Setting

1.Turn the SETTING OFF at the MAIN MENU and deactivate boost control

2.Drive in a gear with heavy load to reconfirm boost pressure levels.

3. Example: If target boost pressure is 1.0 kg/cm2 , and ACTUAL boost pressure in STEP 2 above is:

0.4kg/cm² set the boost duty to about 70%

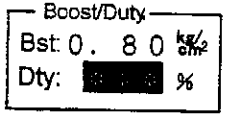
0.8kg/cm² set the boost duty to about 40%

4. When max boost of ACTUAL driving is HIGHER than target boost, adjust the duty LOWER. If the max boost of ACTUAL driving is LOWER than target boost, set the duty HIGHER.

※In some instances, unstable boost may occur. This may be caused by a large difference between ACTUAL boost pressure and Preset Boost Pressure. In these cases, please re adjust the duty cycle setting.

■setting 《Boost/Duty》

Reconfirm boost pressure after the solenoid valve duty cycle has been set. If the throttle position is over 85% and the boost pressure is stable, the unit will begin self learning the solenoid valve duty cycle.
(If a throttle sensor signal has not been connected, the unit will begin self learning once a stable and accurate boost pressure level has been achieved. The unit will NOT self learn if the boost pressure level is too low or the boost pressure is over-shooting. Please re-try the procedures in STEP 4 above.

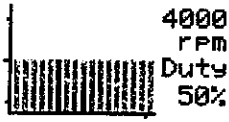


will appear on the screen when the Self Learning Mode is active.

↓ 【NEXT】key

After Self Learning

By pushing the 【NEXT】key, the self learning mode for the solenoid valve duty cycle can be seen.



Before Self Learning

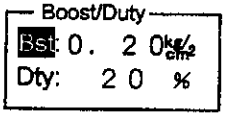
※ Cautions for solenoid valve duty cycle setting on external waste-gates

Please proceed with steps1~4 on PG 22. However, the external waste gate spring rate will dictate the boost control range. Because of this reason, please set the spring rate so that MAX boost pressure can be controlled with a 70% duty cycle.

■setting 《Boost/Duty》

(2) Engine RPM Specific Boost Pressure Setting

The boost pressure may be set according to desired Engine RPM



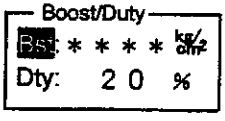
1 *《Going to Engine RPM Specific Boost Control Setting Screen》*

During screen to the left

【NEXT】 Key

Use this key to access the screen

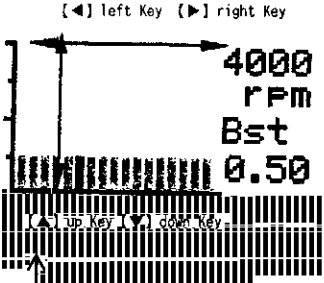
※When the Engine RPM Specific Boost Pressure is different, the unit will read ****kg/cm2



2 *《Engine RPM Area Setting》*

【◀】 left Key/ 【▶】 right Key

Use these keys to select desired engine RPM.
The selected graph column will illuminate.
※Refer to ③-c to change the change the setting point



3 *《Desired Boost Pressure Setting》*

【▲】 up key/【▼】 down key

Use these keys to select desired boost pressure.

Desired boost range is 0.2kg/cm²~2.0kg/cm²

0.05kg/cm² increments

4 *《Display Change》*

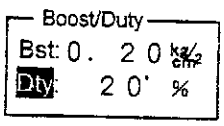
【NEXT】 Key

Use these keys to switch between desired boost pressure screen and solenoid valve duty screen.

■setting 《Boost/Duty》

(3) Engine RPM Specific Solenoid Valve Duty Cycle Setting

The Solenoid Valve Duty Cycle Setting may also be adjusted according to Engine RPM. Also, the solenoid Valve Duty Cycle will automatically change while the self learning mode is active.



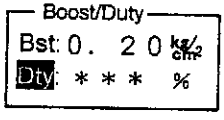
1 *《Going to the Engine RPM Specific Solenoid Valve Duty Cycle Setting Screen》*

During Screen on the left

【NEXT】 Key

Use this key to switch to this screen.

※ When the Engine RPM Specific Solenoid Valve Duty Cycle is different the screen will display *** % .



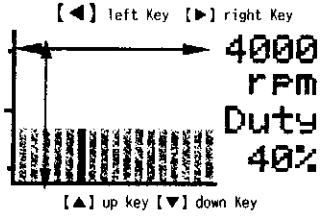
2 *《Engine RPM Area Setting》*

【◀】 left Key/ 【▶】 right Key

Use these keys to select this screen.

The selected graph column will illuminate

※ Refer to ③-c to change setting points.



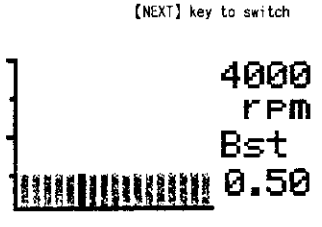
3 《*Solenoid Valve Duty Cycle Setting*》

【▲】 up Key 【▼】 down Key

Use these keys to select this screen

Duty Setting Range is from 20%~90%

1% increments



4 *《Display Change》*

【NEXT】 Key

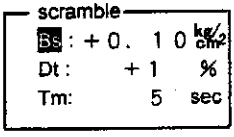
use these keys to change between solenoid valve duty cycle screen and boost pressure setting screen.

■setting 《Scramble》

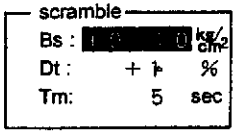
③-b Setting Scramble Boost

【setting[A]/setting[B]】→【Scramble】

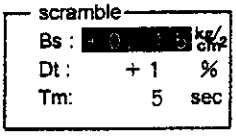
By adding a Scramble Boost Switch※ The boost pressure can be increased or decreased for a certain amount of time. Please be sure to set the Bs(Scramble Boost) and Dt(Scramble Duty) ※Switch not included. Non-Locking Switch required.



【▶】right key to select parameter



【▲】up Key



1 *[Parameter Selection]*

【▲】up Key / 【▼】down Key

Use these keys to select throttle parameter

Bs: Scramble Boost
③-a(1) and ③-a (2)will be added to the preset Boost Pressure for the specified amount of time.

Dt: Scramble Duty
③-a (1) and ③-a (3) will be added to the solenoid duty for the specified amount of time.

Tm: Scramble Time
Sets the specified Scramble Time

2 *[Parameter Entry]*

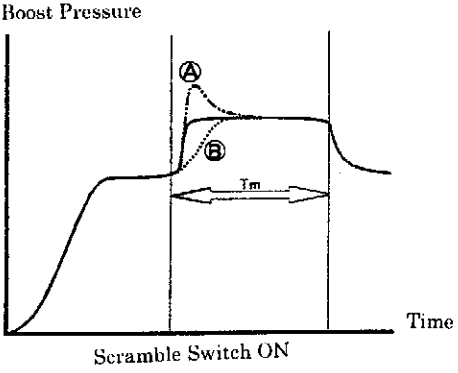
【▶】right key

Use this key to Enter

3 *[Changing Setting Values]*

【▲】up Key 【▼】down Key

Use these keys to change setting values.



Advice Dt setting

If a scramble boost overshooting characteristic is desired like in A, turn the Dt value up with the + key.

If a scramble boost characteristic with restrained boost response is desired like in B , turn the Dt value close to 0 % with the + key.

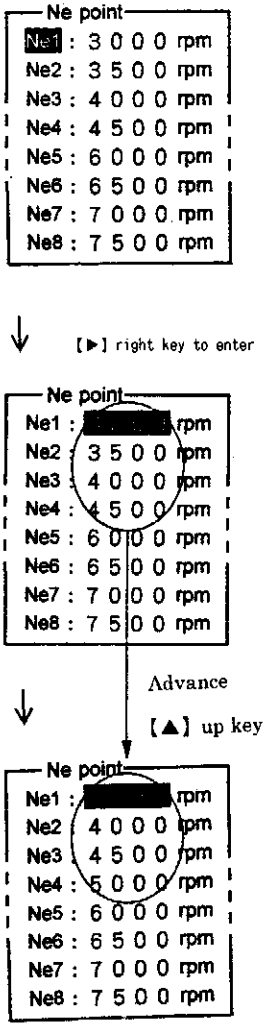
The Dt value will determine scramble boost response.

■setting 《Ne-Point》

③-c Boost Control Engine RPM Setting

【setting[A] · setting[B]】→【Ne-Point】

Set the engine RPM point to control Boost Pressure.



1 *《Engine RPM Value Selection》*

【▲】up Key / 【▼】down Key

use these keys to select

The selected channel will illuminate

2 *《Channel Entry》*

【▶】right Key

Use this key to select channel

Selected engine RPM will illuminate

3 *《Changing Engine RPM Setting》*

【▲】up Key 【▼】down Key

Use these keys to select desired engine RPM

※ Upper Limit 9500rpm

Lower Limit 1500rpm

Increment 500rpm

When the engine RPM is within 500 RPM increments like shown to the left, the remaining RPM levels will rise accordingly.

※Ne:ENGINE RPM

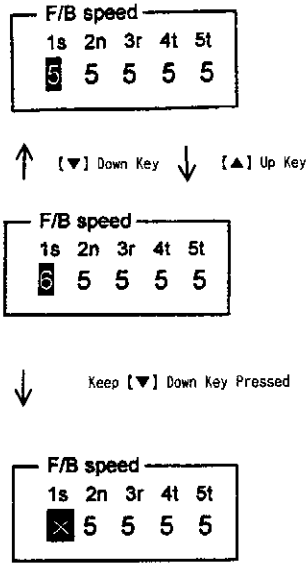
Ne1<Ne2<Ne3<Ne4<Ne5<Ne6<Ne7<Ne8

■setting 《F/B Speed》

③-d Feedback Speed Setting

【setting[A] · setting[B]】→【F/B Speed】

If unstable boost or boost drop occurs during boost control, the Feedback Speed Setting may be necessary.



1 *《Gear Selection》*

【◀】left Key/【▶】right Key

Use these keys to select

The selected parameter will illuminate

2 *《Feedback Speed Setting》*

【▲】up Key / 【▼】down Key

Use these keys to change the Feedback setting

Feedback Speed Setting Range

(Slow) 1～9 (Fast)

3 *《Feedback Control OFF》*

【▼】down Key

Keep this key depressed to turn the Feedback Mode OFF

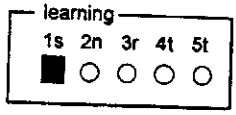
If turned OFF, only the engine RPM Specific Solenoid Valve Duty Cycle control will be active for boost control.

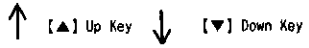
■setting 《Learn-Gear》

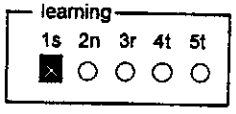
③-e Setting the Learn Gear

【setting[A]・setting[B]】→【Learn-Gear】

This allows the user to either activate or deactivate the gear-based learning.







1 *《Gear Selection》*

【◀】left Key/【▶】right Key

Use these keys to select.

The selected parameter will illuminate

2 *《Gear Specific Self Learning Mode Setting》*

【▲】up Key/【▼】down Key

Use these keys to select either ON or OFF

○:WITH Gear Specific Learning Mode

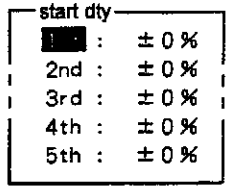
×:WITHOUT Gear Specific Learning Mode

■setting 《Start Duty》

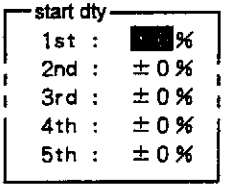
③-f Setting Solenoid Valve Duty Cycle when Boost Control Starts

【setting[A]・setting[B]】→【Start Duty】

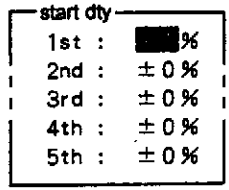
Use the START DUTY setting when the boost pressure overshoots (actual boost pressure is higher than desired), or when you would like the boost pressure to overshoot.
Higher Start Duty values will make the boost pressure levels higher.



【▶】right key to select parameter



【▼】Down Key 【▲】Up Key



1 *《Gear Selection》*

【▲】up Key/【▼】down Key

Use these keys to select
The selected parameter will illuminate

2 *《Gear Entry》*

【▶】right Key

Use this key to switch to the desired gear.
The selected start duty value will illuminate.

3 *《Start Duty Setting》*

【▲】up Key/【▼】down Key

Use these keys to change start duty

Start Duty Setting Range
-50% ～ +50%

※If the Start Duty is set to 0%, the self learning will be active.

If the boost pressure over-shoots, the self learning mode will automatically attempt to suppress that condition.

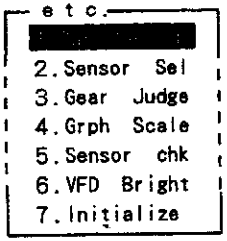
■etc. 《Etc》

④ Other 《etc.》

Selecting 【etc.】 on the Main Menu will activate the ETC mode

● Etc Mode

④-a[Car Select]…Cylinder, Vehicle Speed Pulse, Throttle Type Setting
④-b[Sensor Sel]…Pressure Sensor Type Setting
④-c[Gear Judge]…Gear Judge Setting
④-d[Grph Scale]…Graph Scale Setting
④-e[Sensor chk]…Input Signal check display
④-f[VFD Bright]…Display Brightness
④-g[Initialize]…Initialize all data to default



1 *《Etc Parameter Selection》*

【▲】 up Key/ 【▼】 down Key

Use these keys to select parameter
The selected parameter will illuminate

2 *《Etc Parameter Entry》*

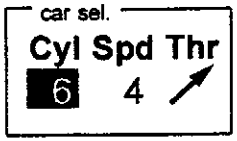
【NEXT】 Key

Use this key to enter
Display will change to selected parameter

■etc. 《Car Select》

④-a Cylinder/ Vehicle Speed pulse/ Throttle Sensor Type Setting

【etc.】→【Car Select】



【▶】right Key

【◀】left Key

1 *《Cylinder Setting》*

【▲】up Key/【▼】down Key

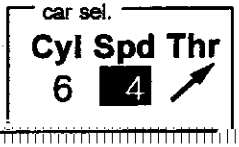
Use this key to select cylinder

Cylinder Setting Range is 1～16

※ Rotary Engine Setting should be the Number of Rotors x 2

※ Please set Toyota V8 engines to setting 4

Caution ※ Be sure to set this setting to 1 if the purple wire of the harness is connected to the injector signal wire.



2 *《Switching Between Cyl · Spd · Thr》*

【◀】left Key/【▶】right Key

Use these keys to switch between cylinder setting, vehicle speed setting, and throttle type setting.

The selected parameter will illuminate.

【▼】Down Key

【▲】Up key

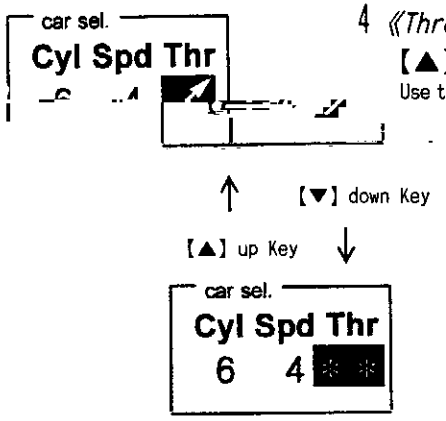
3 *《Vehicle Speed Pulse Setting》*

【▲】up Key/【▼】down Key

Use these keys to adjust Vehicle Speed Pulse.

Y32 Cedric/ Gloria	:16
Y32 Cima	:16
All other NISSAN Vehicles	:2
All other Japanese Vehicles	:4

■etc. 《Car Select》



4 *《Throttle Sensor Type Setting》*

【▲】up Key/【▼】down Key

Use these keys to adjust Throttle Sensor type

↗…When Throttle is CLOSED 0V～1V
… When Throttle is OPEN 3V～5V

↙…When Throttle is CLOSED 3V～5V
…When Throttle is OPEN 0V～1V

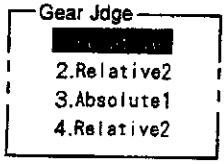
＊＊…When there is no Throttle Signal

※ Please confirm Fully CLOSED and OPEN Voltage of the sensor in the ④-e《Sensor Voltage Check》section before setting

■etc. 《Sensor Sel》

④-b Pressure Sensor Type Setting

【etc.】→【Sensor Sel】



1.Relative1:Relative Boost Pressure Sensor (Normal Range)
2.Relative2:Do not use
3.Absolute1:Do not use
4.Absolute2:Do not use

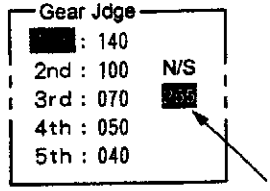
※Select【1.Relative1】when using the included pressure sensor.

■etc. 《Gear Judge》

④-c Gear Judge Setting 【etc.】→【Gear Judge】

In order for this unit to identify gears, a Gear Judge Value must be entered per gear. Setting method is as follows.

N/S means engine RPM divided by Vehicle Speed



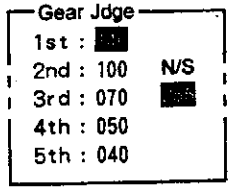
Actual Driving Value

1 *《Gear Selection》*

【▲】up Key/【▼】down Key

Use these keys to select
Selected parameter will illuminate

【▶】right Key to enter



2 *《Gear Entry》*

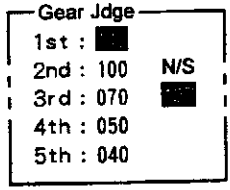
【▶】right Key

Use this key to move to desired gear

3 *《Put in Gear and Drive》*

If selecting 1st, place the gear in first gear and drive.

※ Vehicle Speed and Engine RPM will not be requested

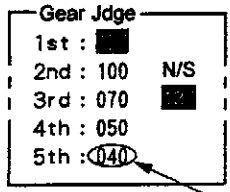


4 *《Set the Gear Based Value》*

【NEXT】Key

Pressing this key will set the Actual driving value as the Gear Based value
【UP】【DOWN】Keys will also allow modifications of these values.

【NEXT】Key



5 *《Setting other gear values》*

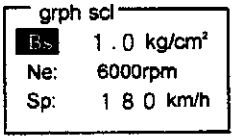
Repeat the same steps for all other gears

※ For 4 speed A/T vehicles, press the down key and set 5th Gear to 1

■etc. 《Grph Scale》

④-d Graph Scale Setting 【etc.】→【Grph Scale】

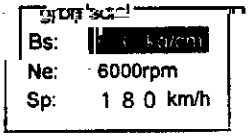
Allows setting of MONITOR MODE Graph Display, Analog Meter Mode, and 2 D Trace Mode.



1 *《Setting Parameter Selection》*

【▲】up Key/【▼】down Key

Use these keys to select desired parameter
The selected parameter will illuminate



2 *《Setting Parameter Entry》*

※ After Setting Parameter Selection Entry

【▶】right key.

Use this key to enter
Selected parameter will illuminate

【▲】up Key/【▼】down Key

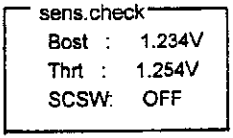
Use these keys for changes

	Setting Range
Bs:Boost Pressure	-760mmHg～ +1.0kg/cm²
	-760mmHg～ +2.0kg/cm²
	-760mmHg～ +3.0kg/cm²
Ne:Engine RPM	0rpm ～ 6000rpm
	0rpm ～ 7000rpm
	0rpm ～ 8000rpm
	0rpm ～ 9000rpm
	0rpm ～ 10000rpm
Sp:Vehicle Speed	0～180km/h : 0～240km/h
	0～300km/h : 0～360km/h

■etc. 《Sensor chk》

④-e Sensor Voltage Check 【etc.】→【Sensor chk】

This will check the voltage of the pressure sensor, throttle sensor, and SCRAMBLE Switch ON/OFF. This is to check if all the connections have been properly connected after installation.
Also, this feature is necessary for ④-a Throttle Sensor Type Setting
For more information, please refer to ④-b.



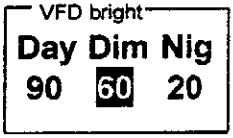
Boost: Pressure Sensor Voltage

Thrt:Throttle Sensor Voltage

SCSW: Scramble Switch ON/OFF

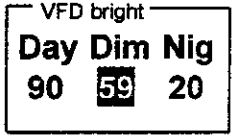
④-f Display Brightness 【etc.】→【VFD Bright】

Adjusts the brightness of the VFD(Vacuum Florescent Display)



【▼】down key ↓

↑ 【▲】Up Key



1 *《Setting Parameter Selection》*

【◀】left Key/【▶】right Key

Use this key to select setting parameter
The selected parameter will illuminate

2 *《Changing Setting Parameter》*

【▲】up Key/【▼】down Key

Use these keys to change the value

Day:Afternoon

Dim:Sunset

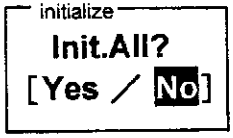
Nig:Night

Please use this as a reference

■ etc. 《Initialize》

④-e Initializing ALL data 【etc.】→【Initialize】

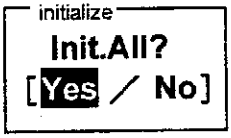
This will restore all data to factory default settings. All previously saved data WILL be lost.



1 *《Initialization Selection》*

【◀】left Key

Select[Yes]



2 *《Proceed with Initialize》*

【NEXT】Key

This will prepare for initialization
THEN,

Ignition Switch OFF→ON

Will finalize all initialization of data

■Installation

●Prior to Installation

① *Remove negative terminal(-)of the battery*

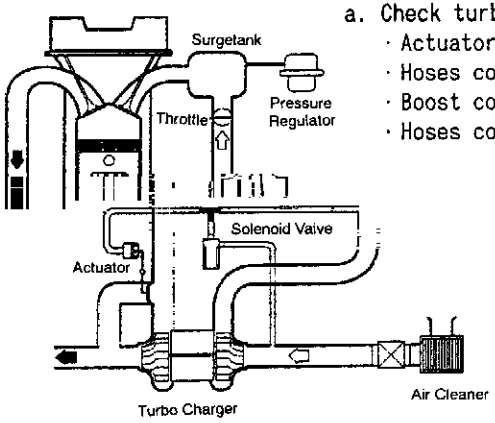
advice!
Disconnecting the negative terminal of the battery may erase memory settings of car audio, and navigation components. Please be sure to write down the settings before disconnecting the battery.

⚠Caution

- **Disconnect the negative terminal of the battery BEFORE proceeding with installation**
  Electrical shorts may cause sever damage to the unit and engine.
- **We are not responsible for any damages cause to the engine, vehicle or unit caused by installation error.**

↓

② *Check where factory components are installed*



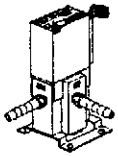
a. Check turbocharger location
- Actuator
- Hoses connecting to actuator
- Boost control solenoid valve
- Hoses connecting to solenoid valve

c Surgetank. pressure regulator or any location where manifold pressure can be measured

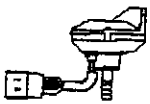
↓

■ Installation

③ *Find a suitable mounting location for solenoid valve and pressure sensor*



a. Mounting Location for Solenoid Valve
Locate a position where the hose length would be shortest
Mount the solenoid valve away from high heat using the included rubber mount and screws



b. Mounting Location for Pressure Sensor
Locate a position where the hose length would be shortest
Mount the pressure sensor away from high heat using the included screws. Make sure that the hose connection nipple faces DOWNWARD.

⚠Caution

- Be sure to mount the connection nipple of the pressure sensor facing DOWNWARDS and away from high heat and water.
  Failure to do so may result in improper functioning of the unit and severe damage to the engine.
- The solenoid valve will emit a clicking noise during operation. This is normal.
  Be sure to mount the unit using the rubber mount.

⚠Caution

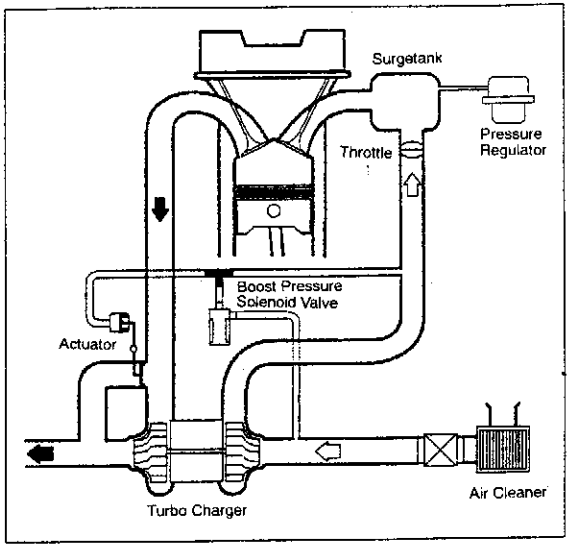
- **Disconnect the negative terminal of the battery BEFORE proceeding with installation**
  Electrical shorts may cause severe damage to the unit and engine.
- We are not responsible for any damages caused to the engine, vehicle or unit caused by installation error

■Installation

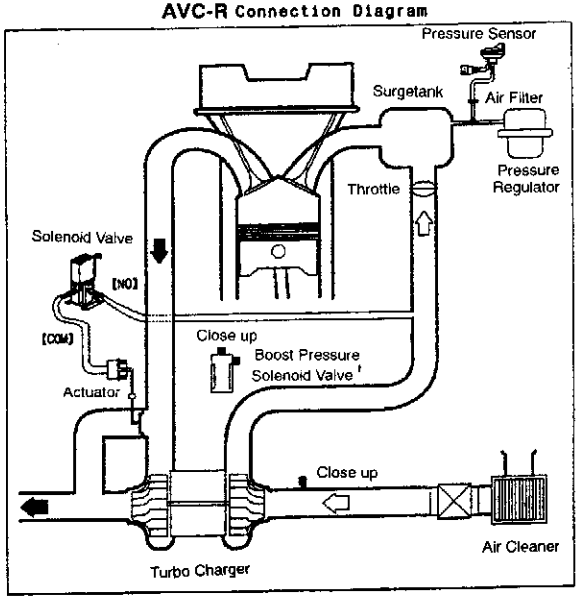
【1】Actuator Type

※Common on NISSAN and MITSUBISHI types

Factory Vacuum Diagram



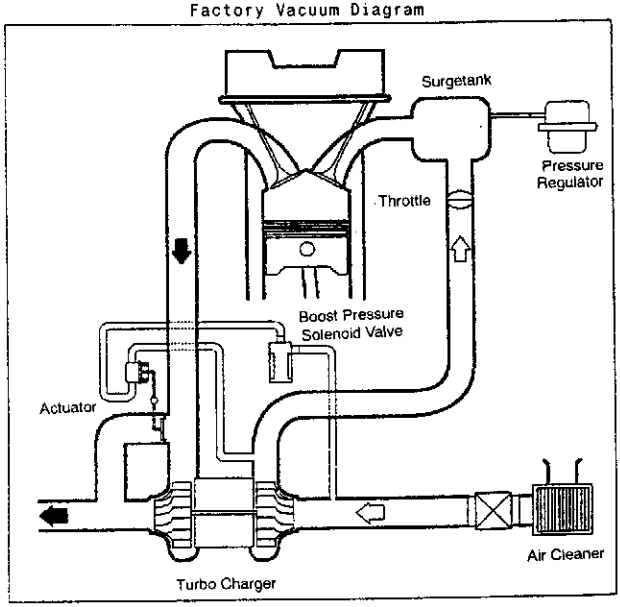
AVC-R Connection Diagram



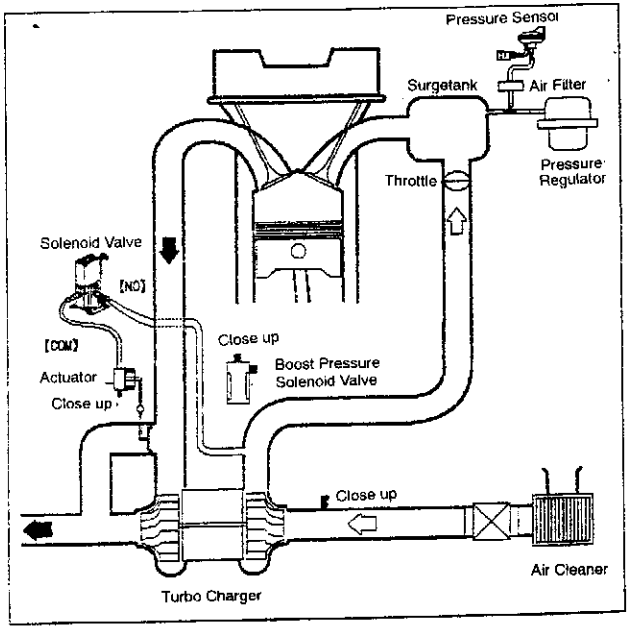
Installation

※ Common on TOYOTA and MAZDA types

Factory Vacuum Diagram

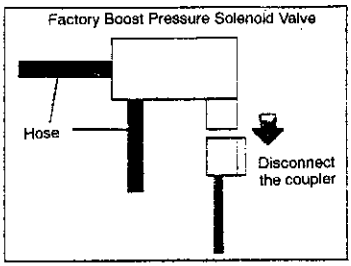


AVC-R Connection Diagram



■Installation

●Installation Procedures

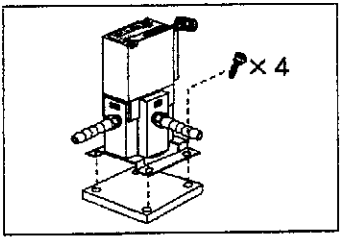


① *Deactivate the factory boost control solenoid valve*

(1)Disconnt the coupler going to the factory boost control solenoid valve

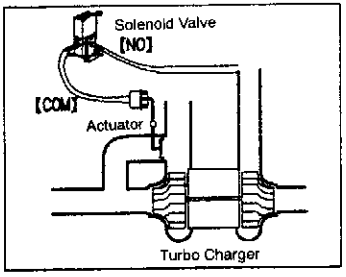
(2)Disconnect the hose going between the factory actuator and solenoid valve and cap the outlet of the front of the turbo compressor housing.

Advice!
Mark all other disconnected hoses to ensure proper connection later.



② *Mount the AVC-R Solenoid Valve*

(1)Mounting Location for Solenoid Valve
Locate a position where the hose length would be shortest. Mount the solenoid valve away from high heat using the included rubber mount and screws



③ *Connect the Solenoid Valve*

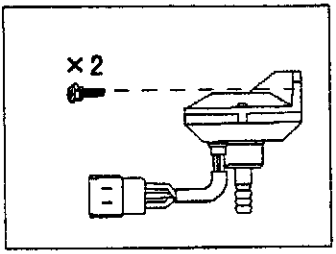
(1)Cut an ample length of hose for the actuator and connect the hose to the 【COM】 port of the solenoid valve. Be sure to secure all connections with hose clamps. Cut an ample length of hose for the compressor and connect the hose to the 【NO】 port of the solenoid valve. Be sure to secure all connections with hose clamps.

Advice!
The NC port should be kept open atmosphere
Keep hose length as short as possible
Subaru vehicles require a WAY to connect to the solenoid valve

⚠Caution

Never mount the solenoid valve near high temperatures or without the rubber mount. This will shorten the life of valve and may cause malfunction of the unit.

■ Installation

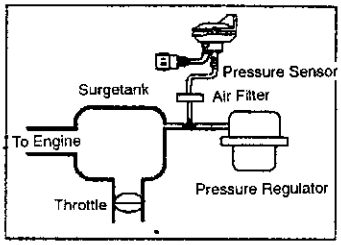


④ *Mount the Pressure Sensor*

(1) Mounting Location for Pressure Sensor
Locate a position where the hose length would be shortest. Mount the pressure sensor away from high heat using the included screws. Make sure that the hose connection nipple faces DOWNWARD.

⚠Caution

- Be sure to mount the connection nipple of the pressure sensor facing DOWNWARDS and away from high heat and water.
  Failure to do so may result in improper functioning of the unit and severe damage to the engine.



⑤ *Connect the Pressure Sensor*

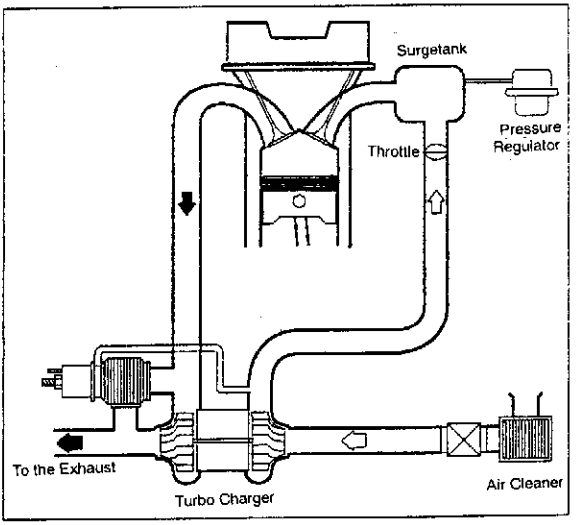
(1) Cut the hose going from the surge tank to the fuel pressure regulator and connect a ϕ4 3-way in between. Make sure to zip tie all connections.

(2) Connect a ϕ4 hose to the 3- way and connect the other end of the hose to the pressure sensor.

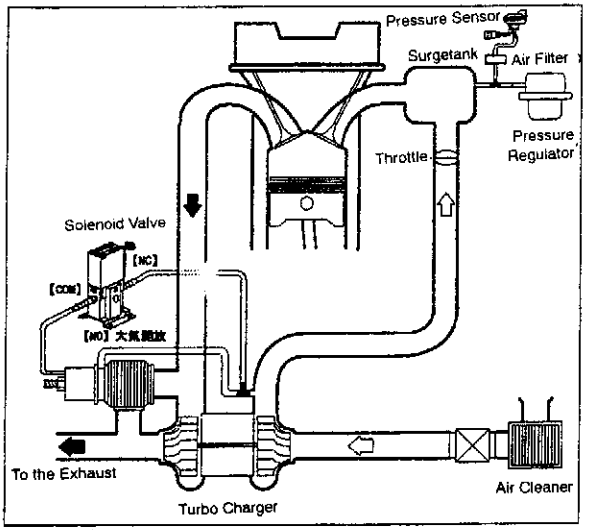
■ Installation

【2】 Wastegate Type

Basic Hosing Diagram

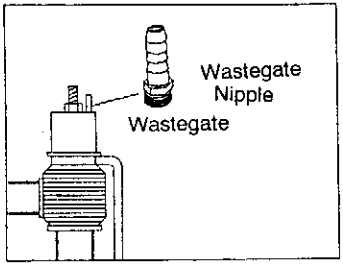


AVC-R Connection Diagram



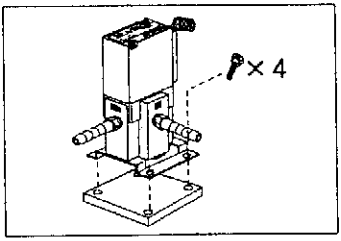
■Installation

●Installation Procedures



①*Connect to the Wastegate*

(1) Screw in the included wastegate nipple into the top port of the wastegate using a sealing agent.

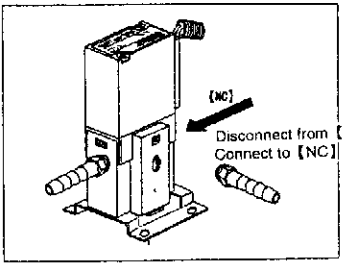


②*Mount the Solenoid Valve*

(1)Mounting Location for Solenoid Valve
Locate a position where the hose length would be shortest. Mount the solenoid valve away from high heat using the included rubber mount and screws

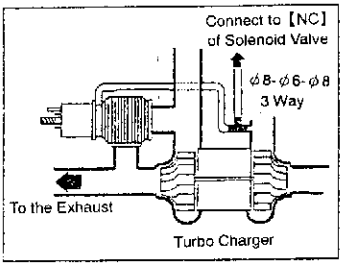
⚠Caution

● Never mount the solenoid valve near high temperatures or without the rubber mount. This will shorten the life of valve and may cause malfunction of the unit.



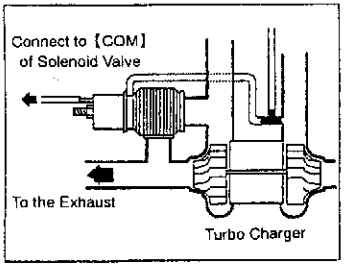
③ *Connect the Solenoid Valve*

(1) Disconnect the NO nipple of the solenoid valve and connect the nipple to the [NC] port of the solenoid valve using a sealing agent.

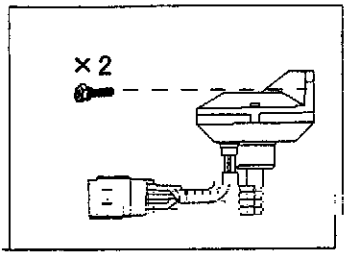


(2) Cut the φ8 hose coming from the bottom of the wastegate. Insert a φ8-φ6-φ8 3-WAY into the hose and connect a φ6 hose to the φ6 nipple.
Connect this hose to the [NC] port of the solenoid valve. Make sure to secure all connections with zip-ties.

■ Installation



(3) Connect a φ6 hose to the top port of the wastegate and connect that hose to the [COM] port of the solenoid valve. Be sure to secure all connections with zip-ties.

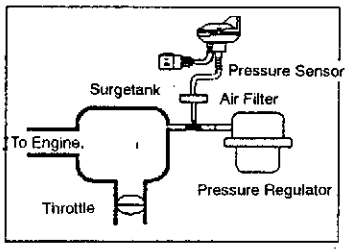


④ *Mount the Pressure Sensor*

(1)Mounting Location for Pressure Sensor
Locate a position where the hose length would be shortest. Mount the pressure sensor away from high heat using the included screws. Make sure that the hose connection nipple faces DOWNWARDS.

⚠Caution

● Be sure to mount the connection nipple of the pressure sensor facing DOWNWARDS and away from high heat and water.
Failure to do so may result in improper functioning of the unit and severe damage to the engine.

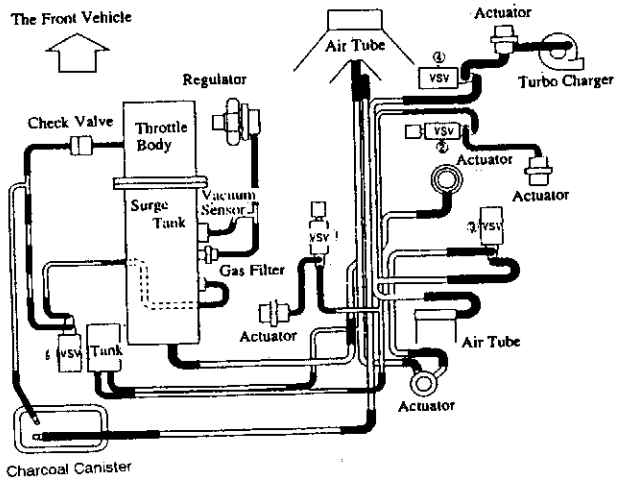


⑤*Connect the Pressure Sensor*

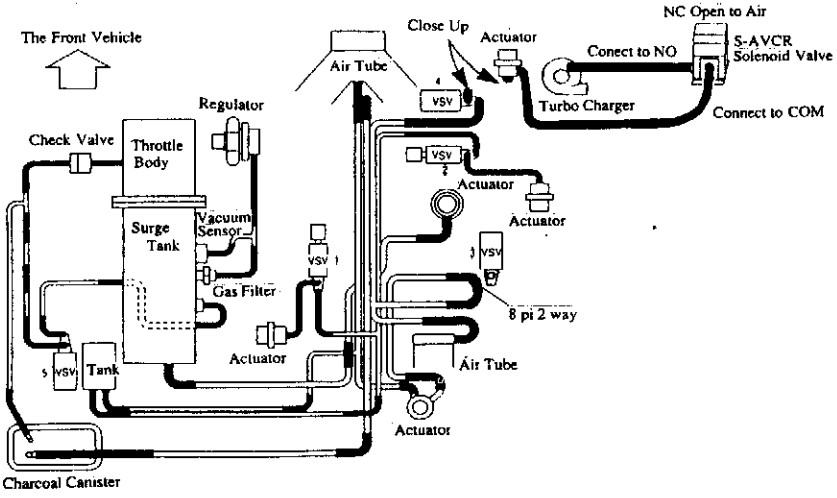
(1) Cut the hose going from the surge tank to the fuel pressure regulator and connect a 3- way in between. Make sure to zip tie all connections.

(2) Connect a φ4 hose to the 3- way and connect the other end of the hose to the pressure sensor.

JZA80 SUPRA · JZS147 Specific Hosing Diagram

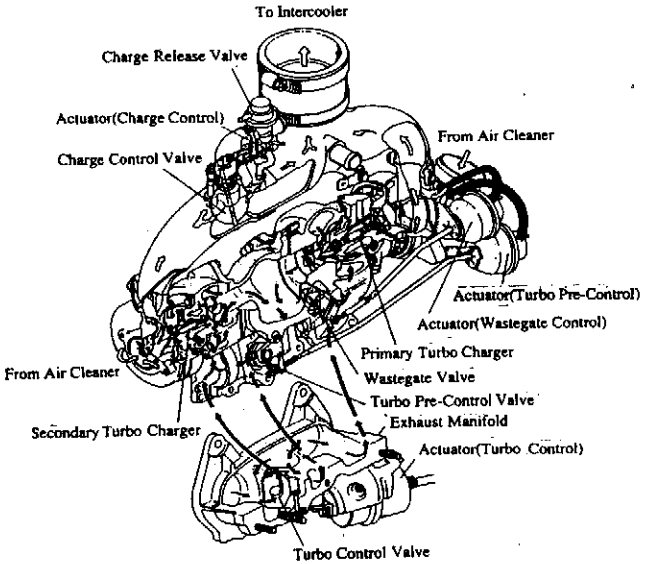


Factory Vehicle Hosing Diagram

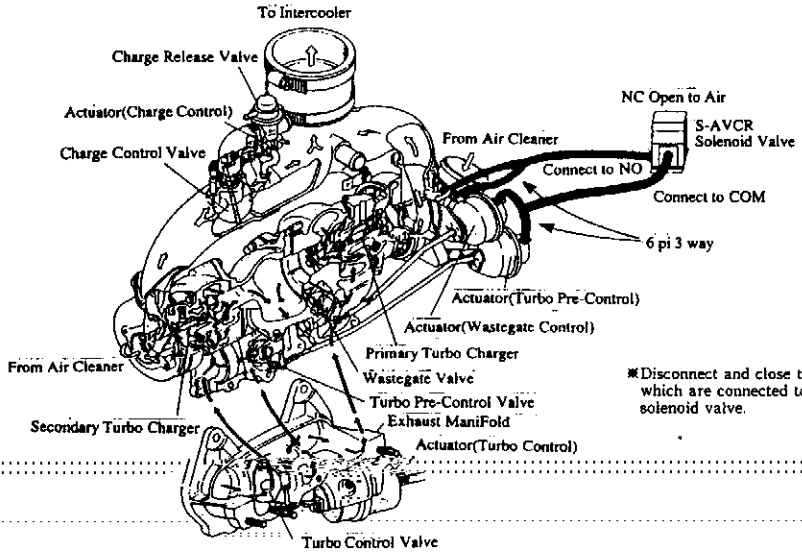


AVC-R Connection Diagram

FD3S Specific Hosing Diagram

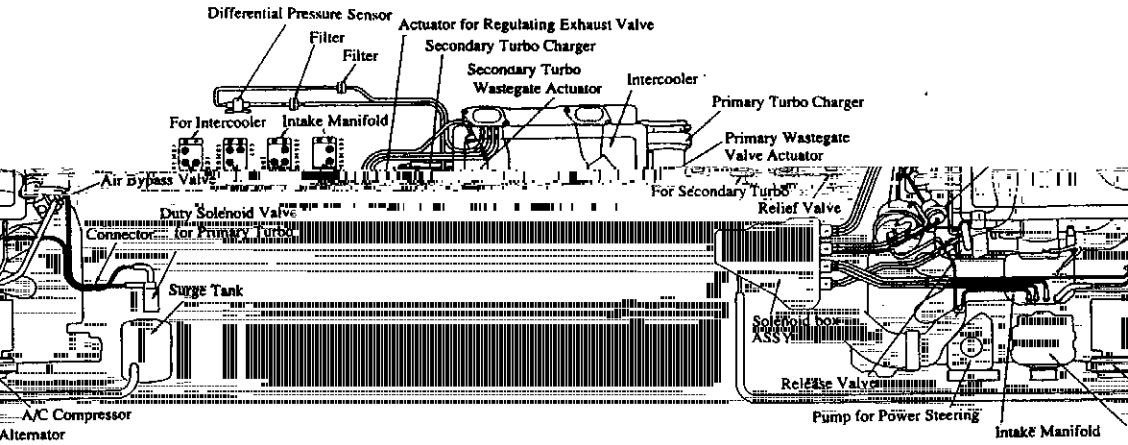


Factory Hosing Diagram



AVC-R Connection Diagram

BD5 · BG5(EJ20H) Specific Hosing Diagram



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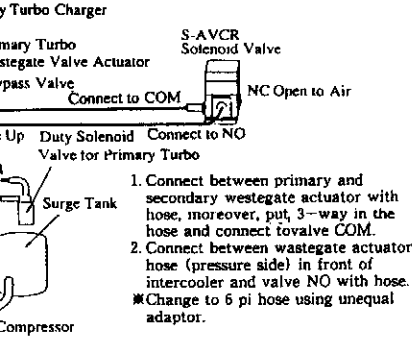
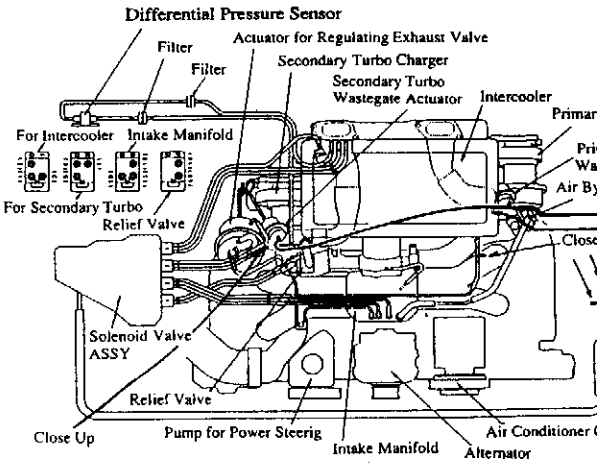
Factory Hosing Dia



1. Connect between primary and secondary westegate actuator with hose, moreover, put, 3-way in the hose and connect tovalve COM.
2. Connect between wastegate actuator hose (pressure side) in front of intercooler and valve NO with hose.

*Change to 6 pi hose using unequal adaptor.



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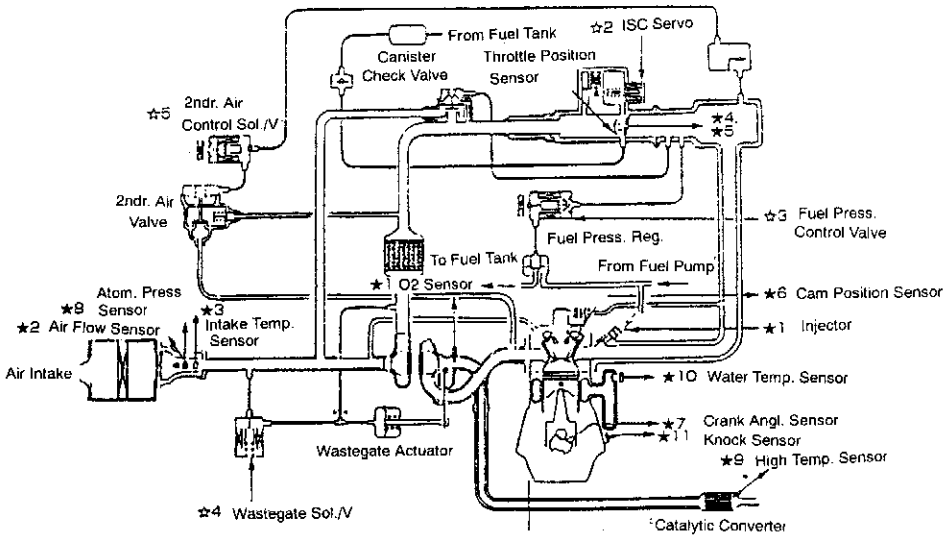
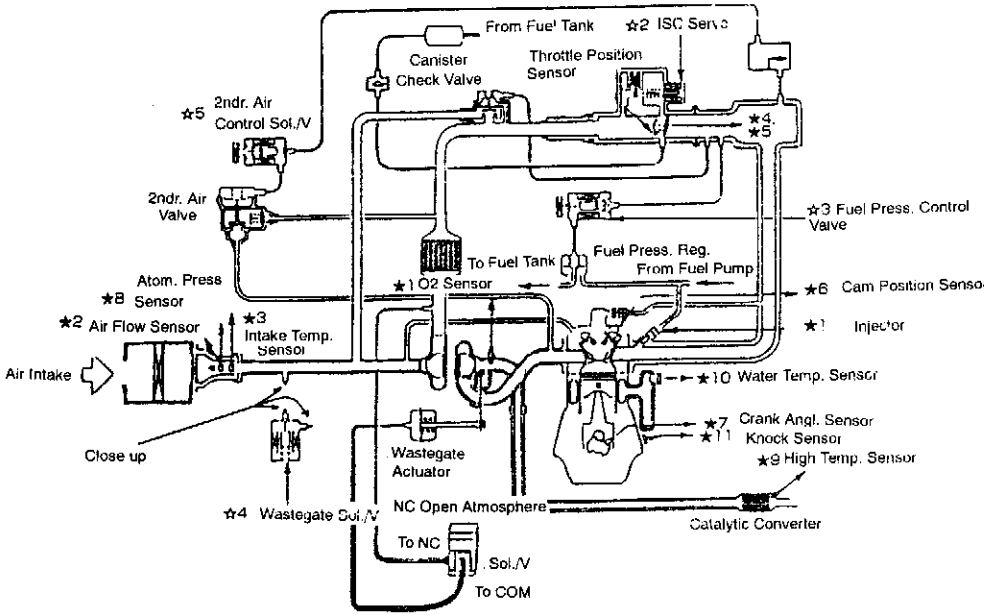
AVC-R Connection D

CN9A Specific Hosing Diagram

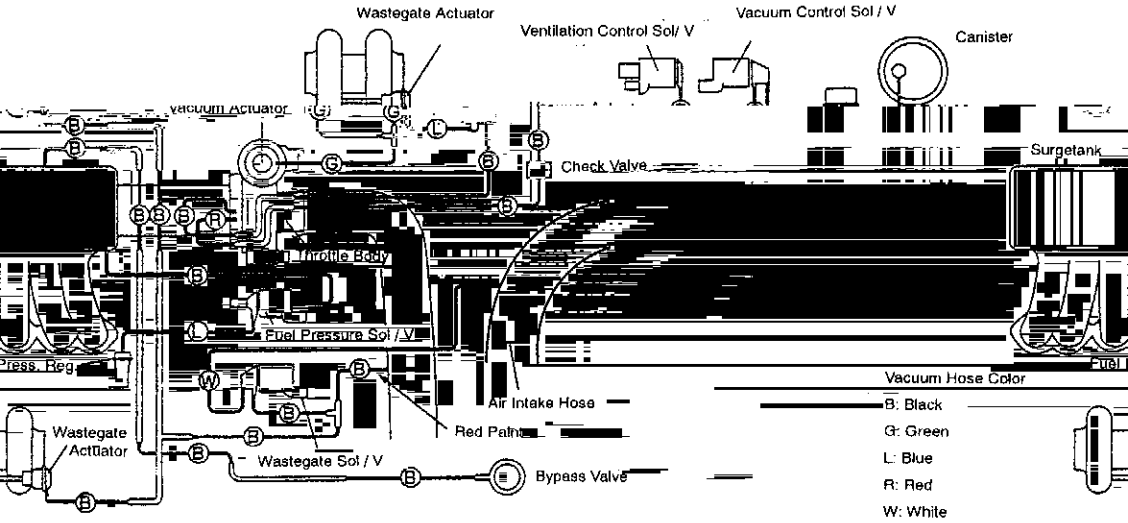


Factory Hosing Diagram

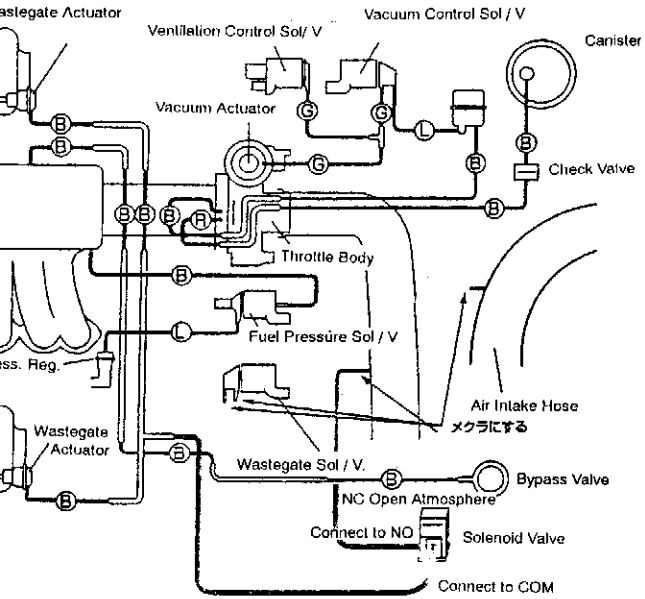


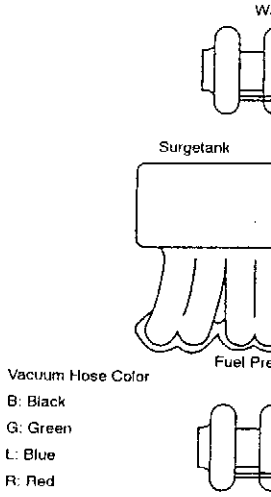
AVC-R Connection Diagram

EC5A EC5W Specific Hosing Diagram



Factory Hosing Diagram





AVC-R Connection Diagram

■ Installation

●AVC-R Wiring Instructions

1 *Disconnect the Negative (-) Terminal of the Battery*

advice!

Disconnecting the negative terminal of the battery may erase memory settings of car audio, and navigation components. Please be sure to write down the settings before disconnecting the battery.

⚠Caution

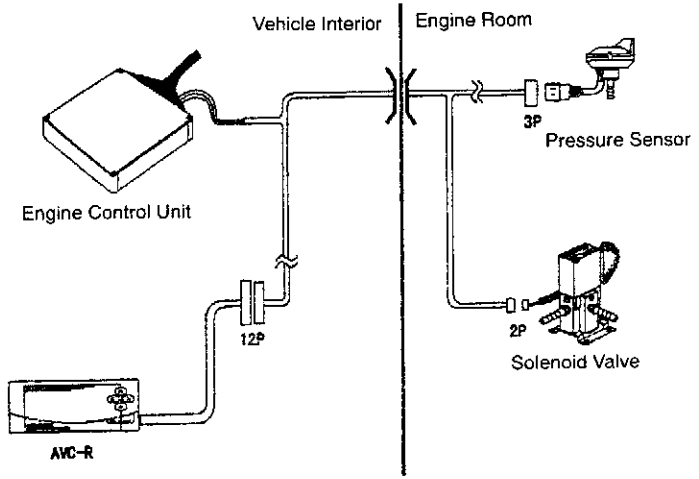
- **Disconnect the negative terminal of the battery BEFORE proceeding with installation**
  Electrical shorts may cause sever damage to the unit and engine.
- **We are not responsible for any damages cause to the engine, vehicle or unit caused by installation error**

↓

2 *Find the appropriate ECU (Electronic Control Unit) wiring diagram from the other instruction manual included with this unit.*

↓

3 *Route the 12P coupler of the AVC-R harness through the firewall into the cabin. Connect the 2P female coupler of the harness to the 2P male coupler of the solenoid valve and the 3P female coupler of the harness to the 3P male coupler of the pressure sensor.*



■ Installation

1 *Use the other Vehicle Specific Wiring Diagram to connect the Power, Ground, Engine RPM, Throttle Signal, Vehicle Speed Signal, to the ECU (Electronic Control Unit) Harness.*

※The purple wire should be connected to the engine RPM signal. However, if you would like to monitor injector signal, please connect this wire to the injector signal wire. (Caution : The Self Learning Mode will be limited in this mode when compared to engine RPM monitoring.)

Red Wire—Connect to POWER

↓

Purple Wire—Connect to Engine RPM

(Injector Signal Wire)

Gray Wire—Throttle Signal Wire

White Wire—Connect to Vehicle Speed Signal

Black Wire—Connect to Ground

Yellow Green Wire—Connect to Ground

※ Refer to diagram on P54

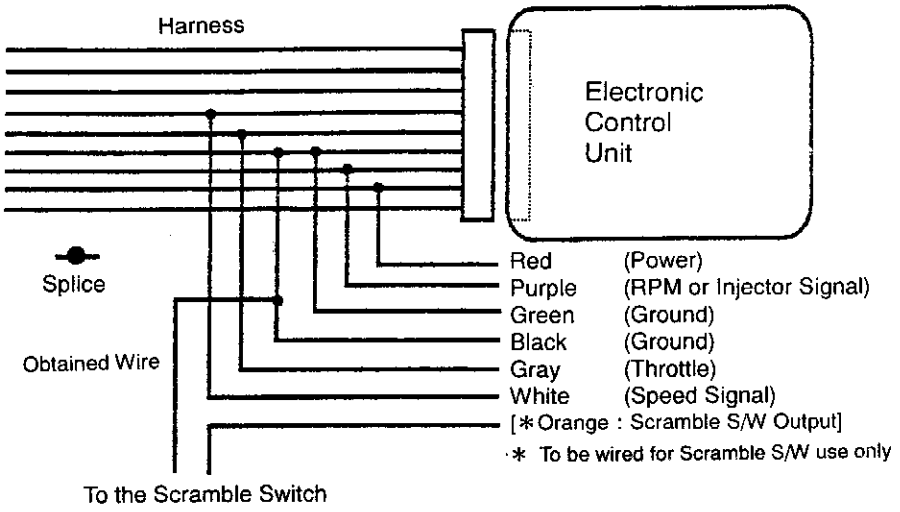
5 *Wrap all connections in electrical tape*

↓

6 *Reconnect the negative (-) terminal of the battery*

■ Installation

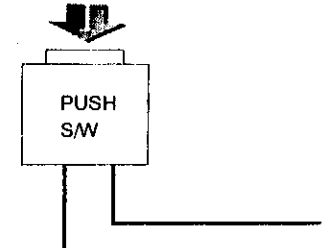
Wiring Diagram



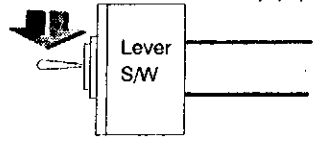
How to connect the Scramble Switch

By adding a simple momentary switch to this unit, the user can either raise or lower the boost level for a specified amount of time.
The switch may be a momentary PUSH switch or a lever style HORN switch. Please obtain wiring for the switch separately.

A switch that immediately pops back if depressed.



A switch that immediately pops back if depressed.



⚠ Warning

- Install the AVC-R so that it does not interfere with normal driving operation. Failure to do so may prevent proper driving procedure and cause accidents.
- Mount the AVC-R away from high heat and direct water
  Failure to do so may result in electrical shorts which may cause severe engine damage.
- Make sure that the AVC-R harness does not interfere with any moving parts under the hood.
  Failure to do so may result in electrical shorts.

● Checkpoints After Installation

Please check the following points after installation

- Has the AVC-R harness been properly connected?
- Is there excessive strain on the harness?
- Has the AVC-R , Pressure Sensor, and Solenoid Valve been securely mounted?
- Has the negative terminal (-) of the battery been properly connected?

● When the Ignition Key is ON···

Please check the following points when the ignition key is ON

- Does the AVC-R screen properly illuminate?

If the screen does not display properly, please discontinue use immediately and kindly repack ALL the contents of this unit and return the unit to the dealer of purchase.

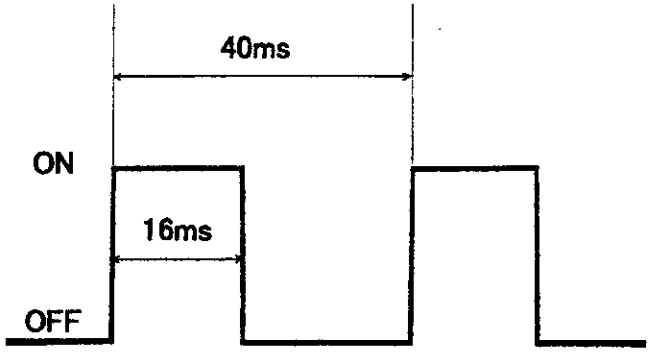
- Is there any unusual odor or noise coming from the unit?

If there is any unusual odor or noise coming from the unit, please discontinue use immediately and kindly repack ALL the contents of this unit and return the unit to the dealer of purchase.

- Was the AVC-R set for initial use?

This product requires initial setup of cylinder setting, vehicle speed pulse, and throttle type. Please refer to this manual for proper setup procedures.

DUTY is···



$$\text{Duty} = \frac{\text{Solenoid Valve ON time}}{\text{Solenoid Valve Operation time}} \times 100$$

$$= \frac{16\text{ms}}{40\text{ ms}} \times 100 = 40(\%)$$

In the example above, the solenoid duty is 40%. The solenoid ON time is 16 ms while the solenoid OFF time is 24 ms. The higher the duty, the higher the boost.
Some vehicles even set at 0% duty may show excessively high boost levels.

In case of Malfunction

⚠Caution

- In case of malfunction, do not attempt to repair the unit yourself.
  This may lead to electrical shorts and cause severe engine damage.

⚠Warning

- **If there is any unusual odor or noise coming from the unit, please discontinue use immediately and kindly repack ALL the contents of this unit and return the unit to the dealer of purchase.**
  Failure to do so may result in engine fire and electrical shorts.

- We reserve the right to change the contents, price, packaging and other aspects of this product without prior notification
- The contents of this instruction manual may change without prior notification

This product is designed for domestic use only.
It must not be used in any country.

Product Specifications

- Operational Voltage DC10V DC16V
- Operational Temperatures -20 +60

About the Warranty

This product does not carry any warranty outside of the Japanese market.

Manual Information

No.	Print Date	Product Number	Version
1	July 1, 1999	7607-0110-00E	Ver.1

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