

VALTAI CONTROLLER

INSTRUCTION



Pursuing the Ultimate in Engine Performance and Efficiency
HKS Company Limited

E89570-N21021-00
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Ver. 3-1.03

NOTICE

This manual assumes that you have and know how to use the tools and equipment necessary to safely perform service operations on your vehicle. This manual assumes that you are familiar with typical automotive systems and basic service and repair procedures. Do not attempt to carry out the operations shown in this manual unless these assumptions are correct. Always have access to a factory repair manual. To avoid injury, follow the safety precautions contained in the factory repair manual.

PRODUCT	VALTAI CONTROLLER RB26
USE	HKS V-Cam System Control Device for RB26DETT
PART NUMBER	22007-AN001 22007-AN002
APPLICATION	NISSAN BNR32 / BCNR33 / BNR34
REMARKS	This product works only with HKS V-Cam System

HKS VALTAI CONTROLLER FOR RB26 (VALTAI CONTROLLER) is a device to control the variable valve timing function of HKS V-Cam System. This device allows setting of the valve timing referring to the engine specifications via 3D map which consists of the engine RPM and the airflow output voltage. Setting the valve timing improves the engine response and output.

- This manual indicates items you need to pay attention in order to install this product safely and lists precautions to avoid any possible damage and/or accidents.
- For any lost, defective and/or damaged parts, contact the dealer to order.
- This product was developed for race use. To use this product on the public road, follow the necessary procedures if there are any regulations for a tuned vehicle.
- HKS will not be responsible for any damage caused by incorrect installation and/or use or use after modifying and/or dismantling this product.
- HKS will not be responsible for any damage caused by removing vehicle's in/exterior, electric parts or modifying for installation.
- This product was designed based on installing it onto a factory vehicle or a vehicle using other HKS products. The performance and/or safety cannot be guaranteed if this product was installed onto other inapplicable vehicles.
- This product works only with a Japanese vehicle with DC12V negative grounding.
- The specifications of this product are subject to be changed without notice.
- This manual is subject to be revised without notice.
- This product is designed for use in Japan only. It must not be used in any other country.

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SAFETY INSTRUCTIONS

WARNING

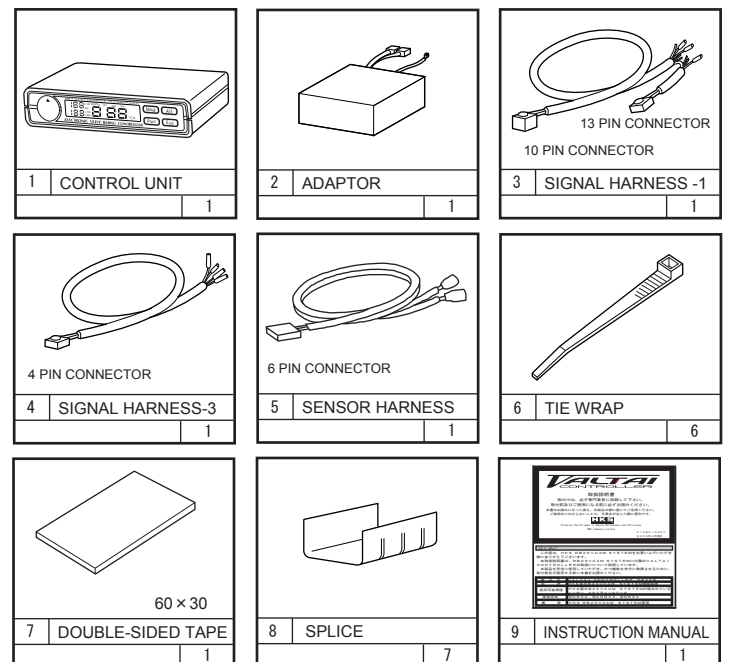
Make sure to work on the vehicle in a well-ventilated area to prevent possible explosion or a fire.
Do not mount the unit where distracts driving to avoid possible accident.
Do not install this product to a 24V vehicle. It may cause a fire. Make sure to remove the cable from the negative terminal of the battery to avoid possible damage to other electronics parts and/or a fire caused by a short circuit.
Make sure to hold connectors when removing them to avoid possible damage to other electronics parts and/or a fire caused by disconnection or a short circuit.
Stop using the product if any unusual situation is noticed. Consult the dealer immediately.

CAUTIONS

Do not install this product by yourself unless you have and know how to use the tools and equipment necessary to safely perform service operations on your vehicle.
Do not modify, disassemble, and/or remodel the product and attached parts to avoid any damage to the unit and/or harness. Handle the parts with caution at all times.
Avoid allowing oil and/or water from entering the unit. It may cause damage to the engine.
To avoid possible malfunction and damage to the engine, install the unit away from excessive heat or water/moisture. Make sure all connections and wiring are not disconnected, short circuited, or incorrect. If so, it may cause an electric shock, burn out, or damage to the vehicle.
Do not test the product on a public road.
If the product or the vehicle with the product does not perform properly, consult the dealer immediately.
Do not try to repair the product by yourself.
When unusual noise, smell, and/or vibration is noticed, consult the dealer immediately. □
Make sure all connections and wiring are correct.
If not, it may cause malfunction to the product and damage to the engine.

- Daily check-up on the vehicle must be done by the owner.
- When removing factory parts, refer to the factory manual.
- Do not lose and/or damage any removed parts.
- Use appropriate tool to tighten bolts and nuts. Make sure to tighten bolts and nuts with correct torque spec to avoid damaging to a screw thread.
- Make sure not to cause any damage to the vehicle's wiring when installing the product.

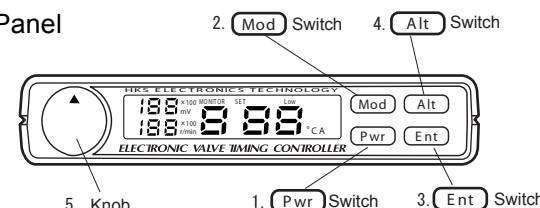
PARTS LIST



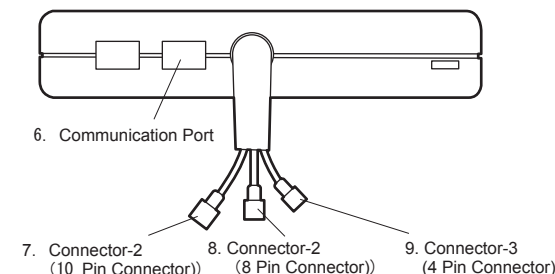
NAMES & FUNCTIONS

1. Names

Front Panel



Rear Panel

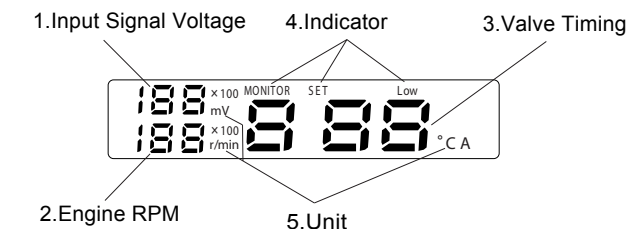


- Pwr Switch (Red Switch)**
This switch is turned on when the ignition is on. Pressing this switch does not turn off the power.
- Mod Switch (Green Switch)**
Press this switch to select a mode from the following:
 - Control Mode
 - RPM-axis Set Mode
 - Input Signal Voltage-axis Set Mode
 - Map Set Mode
 - Control Set Mode
 - Vehicle Type Set Mode
- Alt Switch (Green Switch)**
Press this switch to select items to set.
- Ent Switch**
Press this switch to enter a designated value. (While the unit is saving the entered value, the switch color changes to red from green.)
- Knob**
Turn this knob to set a value.
- Communication Port**
This is a port to communicate with a PC.
- Connector-1 (10 Pin Connector)**
This is a connector for the signal harness-1.
- Connector-2 (8 Pin Connector)**
Leave this connector unused.
- Connector-3 (4 Pin Connector)**
This is a connector for the signal harness-3.

2. Indicator

Digital Indicator

LED Back Light Type & Negative LCD
Red letters on the panel indicate the unit is on.
Units are printed in white.



1. Input Signal Voltage

Under the control mode, the input signal voltage is shown. Under the axis set mode, the input signal voltage to make a grid point is shown. Under the map set mode, the designated voltage of the input signal voltage-axis is shown. Under the control set mode, "3" is shown.

2. Engine RPM

Under the control mode, the engine RPM is shown. Under the RPM-axis set mode, the engine RPM to be a grid point is shown. Under the map set mode, the designated RPM of the RPM-axis is shown. Under the vehicle type set mode, "1" is shown while the most advance angle valve timing is being set. "2" is shown while the most retard angle valve timing is being set. "3" is shown while the indicator is under the off-set setting.

3. Valve Timing

Under the control mode, the valve timing is shown. Under the axis set mode, the grid point number is shown. Under the map set mode, the designated valve timing is shown. Under the control set mode, "0" or "1" is shown. Under the vehicle type set mode, the each set value is shown.

4. Indicator

"MONITOR" is shown under the control mode.
"SET" is shown under other modes.
"Low" is shown under the vehicle set mode.

5. Unit

The unit of the value is shown under the control mode.

NOTE

The LCD of the control unit may have a black line. This is caused by static electricity and it does not affect on the functions or performance of the unit. To remove the line, wipe the monitor with an antistatic cloth or a cloth with the antistatic solution.

INSTALLATION

WARNING

This product was designed to use with a Japanese vehicle with DC12V negative earthing, NOT 24V. If the product is used with a 24V vehicle, it may cause a fire. Use HKS camshafts with this product. If it's used with non HKS camshafts, it may cause damage to the vehicle.

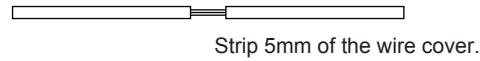
1. Disconnecting the Battery Terminal

(1) Disconnect the negative terminal from the battery.

2. Wiring

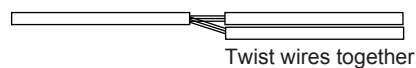
2-1 Installing Splices

① Strip 5mm of the wire cover for wiring as shown below.



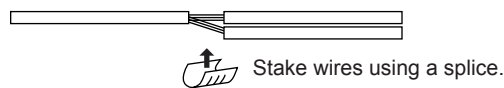
Strip 5mm of the wire cover.

② Connect another wire to the uncovered portion twisting wires together



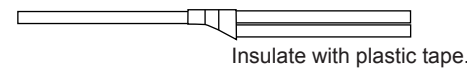
Twist wires together.

③ Stake the twisted wires using a splice.



Stake wires using a splice.

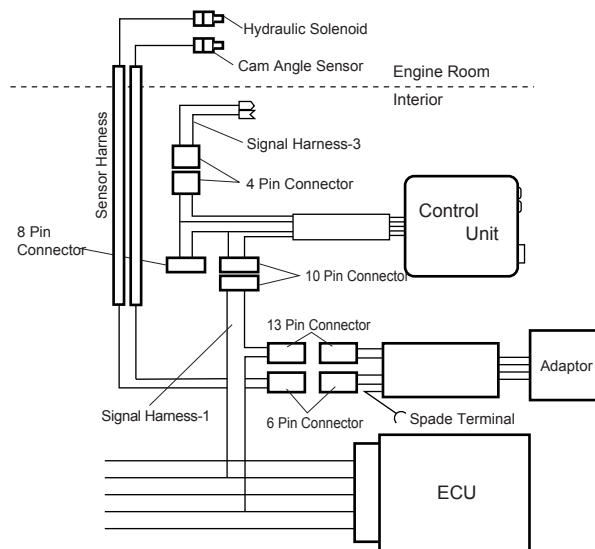
④ Cover the splice and wires with plastic tape to insulate.



Insulate with plastic tape.

2-2 Wiring

(1) Wiring Diagram



(2) Description of Signal

Signal Harness-1

No.	Color	Descriptions
1	Black	Ground
2	Red	IG power supply
3	Gray	Crank angle 1° signal ground
4	Orange/White	Crank angle 120° signal ground
5	Purple	Airflow meter signal input
6	Pink	Throttle signal input
7	Orange/Black	Water temp sensor signal input

※ For the pressure control, connect HKS Pressure Sensor to No.5 Purple. HKS Pressure Sensor is available separately.

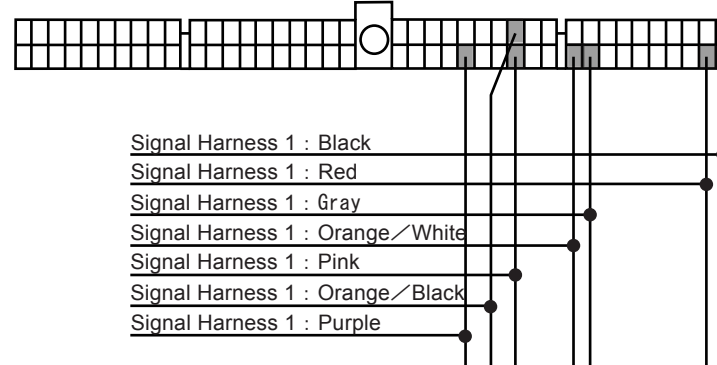
Signal Harness-3

No.	Color	Description
1	Orange/White	External control signal input
2	Brown/Black	Logger voltage output
3	Blue/White	Blank
4	Green/Black	Blank

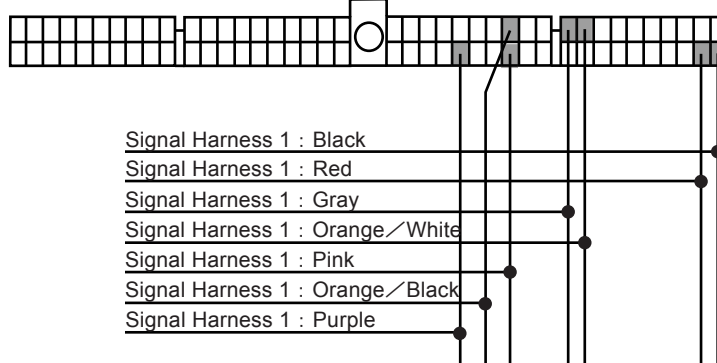
(3) Wiring Diagram

- The diagram below is the view of the vehicle's ECU connector from the side of the terminal inserts.
- in the diagram below represents splice's connecting.

BNR32 · BCNR33



BNR34



(4) Wiring

- Connect the sensor harness connector to the hydraulic solenoid and the camshaft angle sensor which are installed onto the engine.
- Pull the 6 PIN connector of the sensor harness from the engine room into the interior.
- When securing wires in the engine room with a tie wrap, leave extra slack for wiring to absorb the engine vibration.
- Make sure wiring position is correct referring to the wiring diagram.
- Connect the signal harness-1 to the ECU harness referring to the sec.2-1.

Advice

- If a tool to clinch a splice is not available, use radio pliers instead. In this case, the splice and the wire must be soldered. Make sure the wires are secured with the splice.

- Insulate the portions connected with splices with plastic tapes to prevent short-circuit.
- Connect the 10 PIN connector of the control unit and the 10 PIN connector of the signal harness-1.
- Connect the 13 PIN connector of the signal harness-1 to the 13 PIN connector of the adaptor.
- Connect the 6 PIN connector of the sensor harness to the 6 PIN connector of the adaptor.
- Connect the spade terminal from the adaptor to a chassis ground.
- In case of collecting data by the external control or logger, connect the signal harness-3 to the control unit.

3. Mounting the Unit

3-1 Mounting the Control Unit

- Remove any dirt, dust, and/or oil from the area the unit is going to be mounted.
- Secure the unit using the included double-sided tape. Do not mount the unit where disturbs driving. It may cause serious accident.
- Secure wiring using a tie wrap.

4. Complete the Installation

- Reinstall all removed factory parts.

Advice

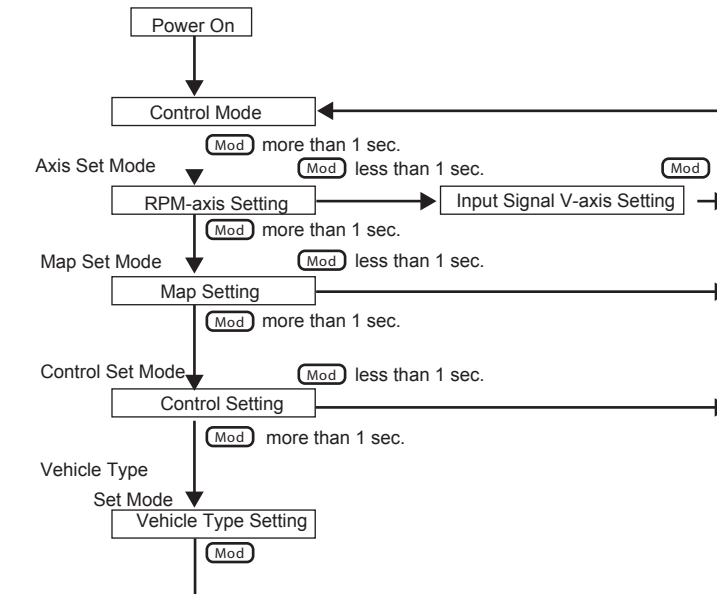
- If any factory part covers the Valcon unit, adjust the unit's position, and reinstall the factory part.
- Reconnect the negative terminal to the battery.

AFTER INSTALLATION

Check the following after the installation process is complete:

Check Point	Check
Make sure all wiring is correct.	
Make sure splices are connected securely.	
Make sure connectors are connected securely.	
Make sure insulation is done properly.	
Make sure the harness is not pinched at any place.	
Make sure the wiring harnesses and installed components are not in contact with other parts of the vehicle.	
Make sure the wiring harnesses and installed components do not disturb driving.	
Make sure all removed factory parts are reinstalled.	
Make sure the negative cable terminal is securely attached to the battery.	

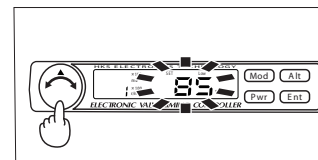
OPERATION



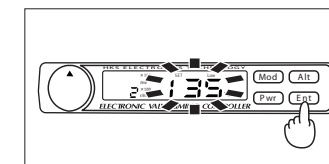
1. Vehicle Type Set Mode

This mode is to set the range of the variable valve timing for each vehicle. The valve timing at the most retard angle is the measured valve timing. The valve timing at the most advance angle is the value which is found by subtracting the variable angle from the measured valve timing. (For type A, the variable angle is 30 deg. For type B, the angle is 50 deg.)

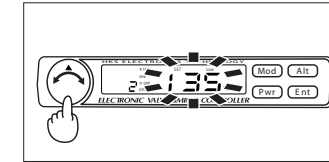
- Turn the ignition key on, but do not start the engine.
- Press **(Mod)** more than 1 sec, and repeat it 4 times.
 - The unit beeps every time the switch is pressed.
 - The valve timing indicator blinks.
 - The engine RPM indicator shows "1".



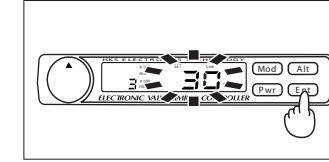
- Turn the knob and set the valve timing at the most advance angle.



- Under the vehicle type set mode, press **(Ent)** till "2" is shown on the engine RPM indicator.

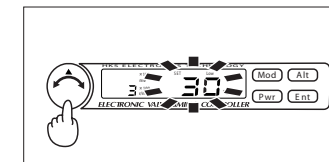


- Turn the knob and set the valve timing at the most retard angle.



- Under the vehicle type set mode, press **(Ent)** till "3" is shown on the engine RPM indicator. To set the offset value, correct the measured valve timing (the most retard angle) and the controller internal value. Increase the offset value if the value on the indicator is too small.

e.g. Most Retard Angle = 135°
The indicator shows 130°
Offset Value = 30°
※ In this case, the indicator shows 135° .
Therefore, the offset value must be corrected to 35.



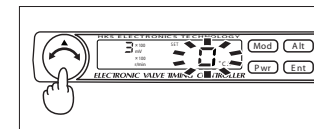
- Turn the knob and set the offset value of the valve timing indicated value.

- When changing the setting, the ignition must be turned off after returning to the control mode. Make sure the unit is turned off. The changes become effective after the ignition is turned on again.

2. Control Mode

Select the setting of control by the external signal.

- Under the control mode, press **(Mod)** more than 1 sec, and repeat it 3 times.
 - The unit beeps every time the switch is pressed.
 - The valve timing indicator blinks.
 - The input signal voltage indicator shows "3".



- Turn the knob for the control setting.
 - Select "0" for NON external signal control.
 - Select "1" for external signal control.
 - Default is set to "0".

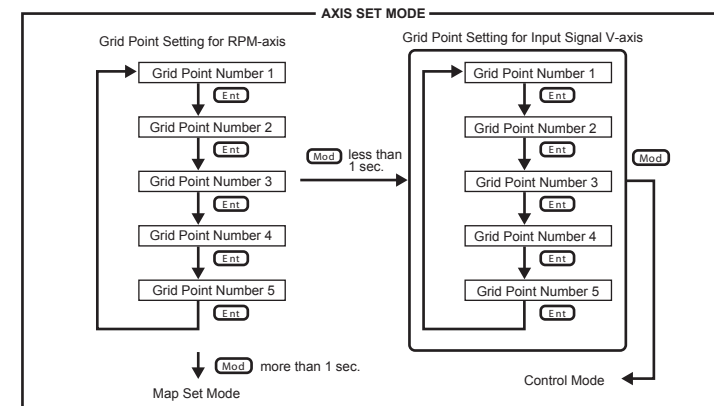
- When returning to the control mode, the setting becomes effective.

- Under the external control, the map in the controller is not used. The target valve timing to control is the ATDC 150° at 0V of the external signal voltage and the ATDC 50° at 5V of the external signal voltage.

3. Axis Set Mode

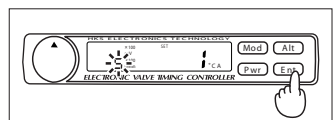
This mode is to set the grid points of the max axis for the engine RPM and the input signal voltage. Under the control mode, press **(Mod)** more than 1 sec.

The unit beeps, and the mode is switched to the RPM-axis set mode. The grid point number appears on the valve timing indicator. The grid point of the RPM-axis corresponding to the grid point number appears and blinks on the engine RPM indicator.



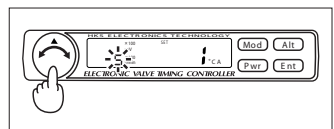
3-1 Setting for Engine RPM-axis Grid Points

Set the RPM of 5 grid points.
 • There are 5 RPM grid points; 1 is the smallest and 5 is the biggest number.
 • The setting range should be within 500-12000 r/min.
 The setting range for a point should begin from +100 r/min of the set speed of the previous point and end with -100 r/min of the next point.



(1) Press the **(Ent)** switch till the engine RPM grid point appears.

The unit beeps every time the switch is pressed.



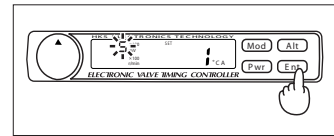
(2) Turn the knob and set the engine RPM grid point.

The RPM can be set by a unit of 100 r/m.

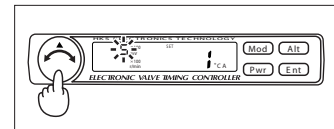
3-2 Setting for Input Signal Voltage-axis Grid Points

Set the input signal voltage of 5 grid points.
 • There are 5 input signal voltage grid points; 1 is the smallest and 5 is the biggest number.
 • The setting range should be within 500-5000 mV.
 The setting range for a point should begin from +100 mV of the set speed of the previous point and end with -100 mV of the next point.

- (1) Press the **(Mod)** switch less than 1 sec after pressing the **(Mod)** switch longer than 1 sec to switch the mode from the engine RPM-axis to the input signal voltage-axis setting.
- The unit beeps twice when the mode is switched to the input signal voltage grid point setting.
 - The valve timing indicator shows the grid point.
 - The input signal voltage grid point corresponding to the grid number flashes in the input signal voltage indicator.



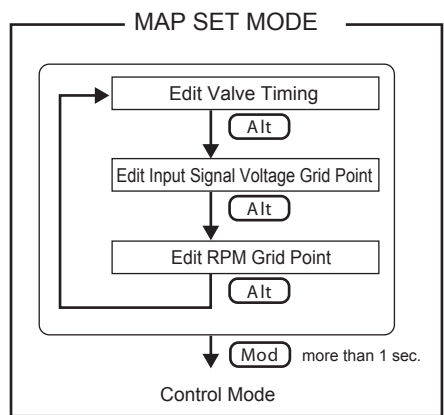
(1) Press the **(Ent)** switch till the input signal voltage grid point appears.
 • The unit beeps every time the switch is pressed.



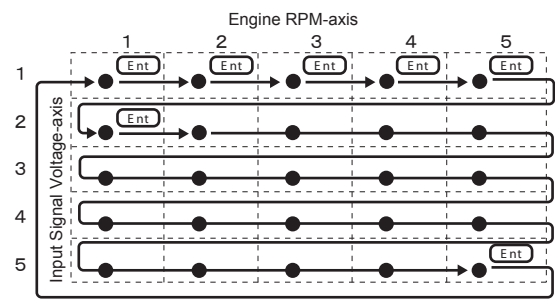
(2) Turn the knob and set the input signal voltage grid point.
 • The voltage can be set by a unit of 100 mV.
 • After the setting is complete, press the **(Mod)** switch to return to the control mode after a beep.

4. Map Set Mode

This mode is to set the valve timing for each map grid point. Under the control mode, press the **(Mod)** switch longer than 1 sec twice.
 • The unit beeps every time the switch is pressed.
 • The mode is switched to the map setting in the map set mode.
 • The engine RPM indicator shows the RPM-axis grid point.
 • The input signal voltage grid point flashes in the input signal voltage indicator.
 • The set valve timing flashes in the valve timing indicator.



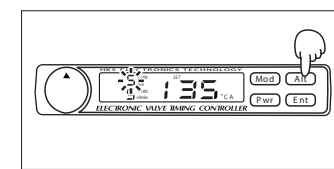
• When pressing the **(Ent)** switch while the valve timing is blinking, the unit beeps and the engine RPM grid point is switched to the next grid point number. When the RPM grid point is the maximum number, the point is switched to the minimum number, and the input signal voltage grid point is switched to the next grid point number.



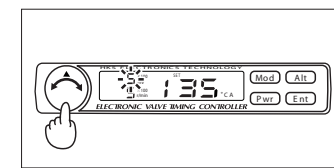
- The setting range is 50° CA from the most retard angle to the most advance angle.
- The unit of the valve timing and the set value is ATDC.

4-1 Setting Map

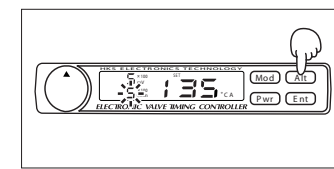
Set the valve timing of the map to the control camshafts phase angle.



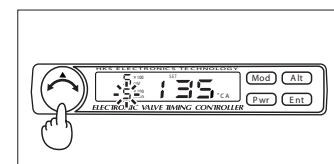
(1) Press the **(Alt)** switch.
 • The unit beeps and the valve timing on the panel is turned on, and the input signal voltage grid point starts flashing.



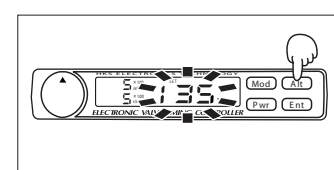
(2) Turn the knob and select the input signal voltage grid point to edit the map.



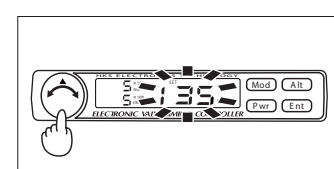
(3) Press the **(Alt)** switch.
 • The unit beeps and the input signal voltage grid point on the panel is turned on, and the engine RPM grid point starts flashing.



(4) Turn the knob and select the engine RPM grid point to edit the map.



(5) Press the **(Alt)** switch.
 • The unit beeps and the engine RPM grid point on the panel is turned on, and the valve timing starts flashing.



(6) Turn the knob and set the valve timing.

• When the valve timing on more than one grid point of the map, repeat the above procedure (1) - (6).
 When pressing the **(Ent)** switch while the valve timing is blinking, the engine RPM grid point is switched to the next grid point number. When the RPM grid point is "5", the point is switched to "1", and the input signal voltage grid point is switched to the next grid point number. After setting, return to the control mode and save the set values.

5. Saving the Setting and Data

All setting and data are saved to the internal memory when returning to the control mode. When the data or settings are edited, return to the control mode and do not turn off the ignition till the color of the **(Ent)** switch is changed from red to green.

While the **(Ent)** switch is turned in red under the control mode, the data and settings are being saved to the internal memory. If the ignition is turned off while the data and settings are being saved, the new data and settings are not saved correctly. Save them again. Edited data and/or settings do not become effective unless the ignition is turned off after changes are saved in the internal memory. Edited data and settings become effective when they are edited.

6. Control Mode

The controller works when the mode is switched to the control mode after the ignition is turned on, and the valve timing which is set under the map set mode becomes effective.

When the coolant's temperature is under 20°C or the engine RPM is under 600 r/min, the most retard valve timing is applied.

7. Voltage Output for Logger

From the voltage output for logger, the valve timing position under the running engine is output by voltage.

- The voltage output for logger outputs 0V at the valve timing ATDC 150° CA and 5V at ATDC 50° CA.

AFTER STARTING THE ENGINE

Advice
 • Check the following after starting the engine. Also, make sure to follow the installing conditions specified in the manual for the camshaft.
 • Setting must be done by referring to the data specifications of the camshaft.

Check Point	Check
Make sure the installed parts are not hitting each other.	
Make sure there is no excessive stress on harnesses.	
Make sure there is no loosen parts after stopping the engine.	

MAINTENANCE

CAUTIONS	
● Inspect the vehicle daily for optimal driving conditions.	
● Consult an expert to carry out the operations not shown in this manual.	

- Clean your hands and remove dirt and oil before handling this product. It may cause discoloration to the case.
- Do not use such solvents as the following to clean this product: alcohol, thinner, benzene, glass cleaner, and oil. Wipe off dirt with a dry soft cloth.

TROUBLESHOOTING

SYMPTOM	CAUSE	MEASURE
The power cannot be on.	Bad Connection	Make sure each connector is connected properly.
	Bad connection of the power supply or ground	Make sure the power and the ground lines are connected properly.
	Wrong wiring	Make sure all wiring is done correctly.
Bad Display	Bad contact	Make sure each splice connector is not contacted.
	Wrong wiring	Make sure all wiring is done correctly.
	Wrong application	Make sure the application is correct.

CAUTIONS	
● After removing this product, make sure all wires from the vehicle is insulated with a plastic tape, etc. It may cause a short circuit and damage to electric equipment.	

PRODUCT SPECIFICATIONS

- Working Voltage DC10~16V
- Control Capable Range
 - Engine RPM 500~1200 r/min
 - Airflow Voltage 500~5000 mV
 - Valve Timing 50~150° CA
- Workable Temperature
 - (Controller) -10~70°C
 - (Adaptor) -10~85°C
- Maximum Electric Power Consumption 10W