



# Installation Manual

## REV-SHIFT TIMER

Product Name: Rev-Shift Timer  
 Product Number: 101A-001 (type-BLUE) / 101A-002 (type-RED)  
 Application: Display vehicle engine rev, heater and post idling  
 Suit for: Vehicle with DC12V body earth battery

### Introduction

#### Thank you very much for purchasing Rev-Shift Timer.

This manual is for the user to reference when using this product as well as for the installation. Please read it carefully and use this product correctly after understanding its functions and using conditions.

- Please provide this manual to the end user.
- Note**
- Ark Design reserves the right to change the specification, price, appearance etc in the Rev-Shift Timer and its manual, without prior notices.
- When any modification is made to this product, the warranty is void immediately and no responsibility will be taken.
- Ark Design does not take any responsibility when the Rev-Shift Timer and its accessories have been used in unspecified location or method, which does not matter the damage was caused by the end user or other parties.
- Ark Design does not take any responsibility when the damage occurred to the vehicle and its parts during installation.
- Ark Design does not take any responsibility for the effects resulted from using the Rev-Shift Timer, such as engine trouble or incapable of using this product.

#### The Rev-Shift Timer has following displays and functions

- The engine INITIATE BURDON to be shown clearly for easy understanding which achieves environmental friendly driving and economical energy consumption.
- Post idling function \*1**
  - Auto accumulative mode: it calculates the post idling timing from the prior engine TORQUE without wasting the energy
  - Manual mode: the post idling is performed based on the defaulted value or set up during the operation
- Rev/ Shift Timing display function \*2**
  - The pulse from alternator was detected without connecting to rev signal line.
  - The light flashes to show the shift up to represent the rev and rev set up
- Simple A/F display function \*3**
  - Based on the JIRUKONIA type O2 sensor signal line distribution, the simple A/F value is displayed. According to the A/F value, full colour LED changes, which shows the engine TORQUE and fuel consumption
- Battery voltage display function**
  - Based on the display of battery voltage, the battery level and status can be monitored
- Safety function**
  - Based on the connection to the PARKING brake signal line, it prevents driving from its operation
- Large LED display**
  - Does not easily disrupted by surrounding situation, the large LED can ensure its clear vision

\*1 \*3 When the vehicle is not fitted with O2 sensor, JIRUKOA type nor sensor is easily degraded, some function or display may not be operated properly.

\*2 The rev reading may not be displayed properly in some vehicles. In that situation, connecting the rev signal line could resume the display.

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### 1. Safety Notes

- Wording explanation**
- Warning** This word is used to show if the warning is ignored or operated wrongly, it could cause death or serious injury to the operator or third party
- Caution** This word is used to show if the caution is ignored or operated wrongly, it could cause middle or minor injury to the operator or third party

- Warning**
- Please do not disassemble, modify, or repair the product
- Please do not fit this product to other than vehicle model specified. Warranty is void when fitted into unsuitable vehicles. Further, it could cause unexpected damage to the vehicle, please do not fit to the unsuitable vehicles.
- Please do not use the product other than specified. Ark Design does not take any responsibility for the user nor the third party when damages occurred.
- Please affix the product, and do not locate it in the location could affect driving or rattling. When it is affecting driving, it could cause accident.
- Please detach the negative (-) terminal of the battery before installation. Electrical short could cause fire, damage to wiring and components.
- Please do not pull the wire harness when detaching the connector, the connector has to be hold when detach. Electrical short could cause fire, damage to wiring and components.
- Please stop using the product immediately when noise and/or smell has occurred. When usage continues, it is possible to cause fire, wire harness, engine or vehicle damage. If the above happens, please enquire to the distributor or Ark Design.
- Please be cautious not to damage the wire harness or pipes during installation. Electrical short could cause fire, damage to wiring and components.

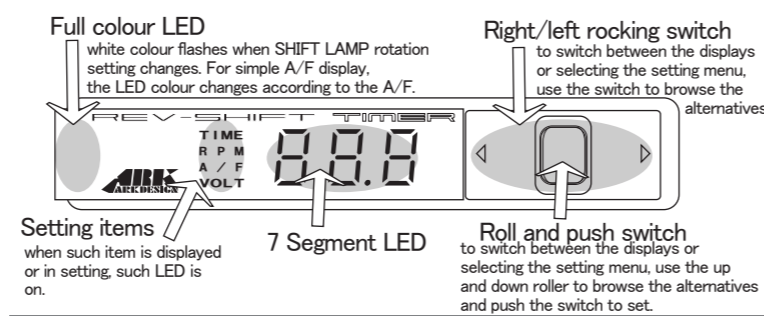
- Caution**
  - Please be cautious not to drop or shock the product. It could cause malfunction, accident, fire, electric shock, damage to the wire harness and components.
  - The installation must be done by professionals. The installation needs professional knowledge to perform.
  - Please be cautious not to lose or damage the original components when detach them during the installation. Ark Design does not take any responsibility for the damage during the installation.
  - Please use the appropriate tool to tighten up the bolts and nuts. The screw section of the bolt could be damage when more than required torque is applied.
- Note for Installation
- When timer is in use, the following function may not be functional in the vehicles with remote control starter, auto light system, wireless door lock/ micro computer preset driving position system.
  - A vehicle harness needs to be prepared separately when installing. Also, when using the turbo timer, depends on the voltage drop in the vehicle side, when the key is turned to OFF, some vehicle models could cause the engine to stop (such as small litre vehicles), in that case, additional stall prevention kit is required.

### 2. Part List

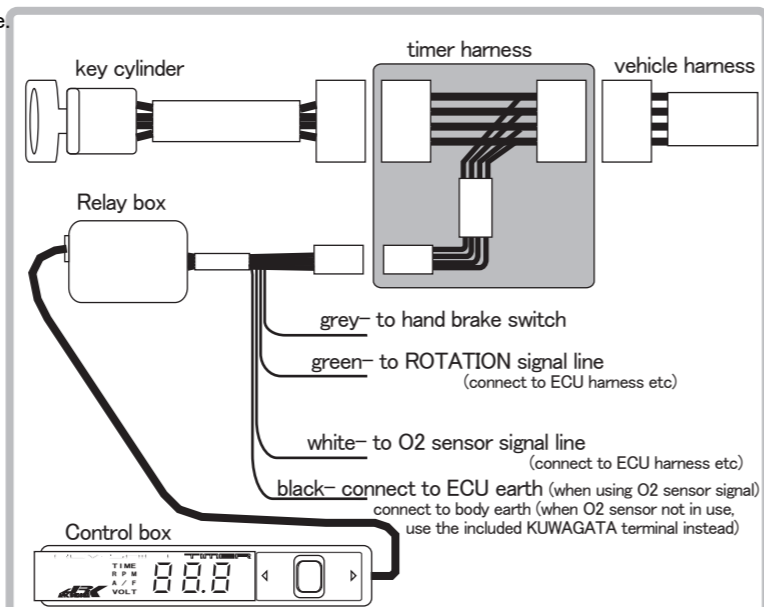
Please check all the parts listed are correct and included before installation.

1. Control box	quantity 1	6. Splice	quantity 4
2. Relay box	quantity 1	7. Manual	quantity 1
3. Cable tie	quantity 2	8. Circuit layout	quantity 1
4. Double sided tape	quantity 1	9. Serial number sticker	quantity 1
5. KUWAGATA terminal	quantity 1	(to be stuck on the Warranty)	

### 3. Control Box



### 4. Circuit Layout



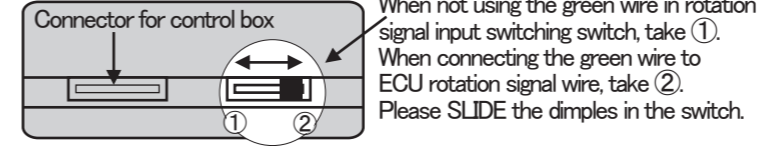
### 5. Installation

- Installation for relay box**
- Caution: the splices have to be insulated**
- 1. Detaching the negative terminal (-) from the battery
- 2. Disconnecting the connector from the key cylinder and connecting the timer harness (depends on the vehicle model, some key cylinder would have CARRIED coupler)
- 3. Connecting the timer harness to the 3 terminals coupler of relay box
- 4. Connecting the while wire of relay box (O2 sensor signal) to the O2 sensor signal of ECU by splice
- 5. Connecting the black wire of relay box (earth) to the ECU control earth by splice
- 6. Connection the grey wire of relay box to hand brake by splice (It will be 0V when key is on at the parking brake position, and it will be 12V when it is disengaged. Please check the parking brake switch before making the connection)
- 7. Using the cable tie to fix the relay box and harnesses to avoid driving interference.
- \* (Please refer to individual vehicle circuit layout for O2 sensor signal and earth terminal position. If it is not stated in the specific vehicle circuit layout, please refer to the service manual/ general circuit layout).
- \* In the case when simple A/F display and post idling time do not automatically calculated, connecting the additional WAKUGATA terminal to earth and ensuring the body earth is properly connected.
- Installation for control box**
- 1. Using the enclosed double sided tape to attach the control box.
- 2. Connecting the control box harness to relay box, using the cable tie to fix harnesses to avoid driving interference.
- \* The vehicle time and audio etc memories would be changed during the installation, please reset to their previous setting.

### 6. Installation Confirmation

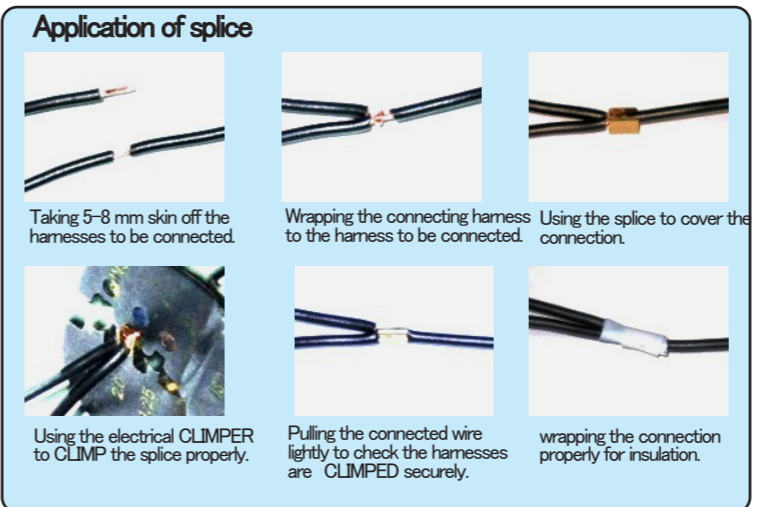
- After the installation is confirmed, please perform all functional checks.
- Please check if the following installation works have been completed.
    - The bolts and nuts detached during installation have been attached to their original position.
    - There is no interference among the installed parts, harnesses and any other car parts.
    - Control box, relay box and all harnesses have been affixed to avoid driving interferences.
    - There is no mistaken connection made, all connections are insulated properly.
    - The battery negative (-) has been connected.
  - Starting the engine to confirm perform all functional checks.
    - Safety function confirmation**
      - Starting the engine and set the timer to anytime more than 30 seconds.
      - Checking that the hand brake is on.
      - Confirming that the timer starts function when key is at OFF position.
      - During the count down, if the brake is pressed and hand brake is disengaged, timer should stop and the engine should be stopped.
    - Engine rev reading confirmation**
      - Checking if the relay box input circuit switching switch is in 1. situation. \*1.
      - Setting the cylinder reading at control box operation (Refer to the method ON THE OTHER PAGE).
      - Setting the rev reading at control box display, checking if the rev reading goes up together as the TACHO meter in the vehicle when accelerating slowly. In the vehicle without a TACHO meter, check the idling rev reading changes smoothly when accelerating slowly.
- Some vehicles cannot take the engine rev reading from the alternator pulse. In this case, please rework the harness to the ECU rotation signal line as below.
- Detaching the battery negative (-) terminal.
  - Connecting the green wire in relay box to the rotation signal line in ECU by splice.
  - Using the cable tie to fix the harnesses to avoid driving interference.
  - Checking if the relay box input circuit switching switch is in 2. situation. \*1.
  - Connecting the battery terminal. When completed, please following step B above to check the rev reading function. (Please refer to the individual vehicle circuit layout for rotation signal pin out)

#### \*1 Side view of relay box



### 7. Troubleshooting

- When the timer is not function as normal, please refer to the following to reconfirm the circuit layout and connection.**
- Q: When the key is ON, there is no display on the control box.  
 A: It is possible to be at OFF mode, connection failure or the earth line is not connected properly.
- Q: the control box is constantly in display does not matter it is in key ON or OFF status.  
 A: It is possible that the green wire (thick wire) is constantly connected to power.
- Q: The engine stops together with the key off.  
 A: It is possible to be caused by following:
  - The time is set to 0 second.
  - Hand brake is not on properly (safety function)
  - Low battery caused low voltage
  - The green wire is not connected properly
  - Timer harness connection is failed.
- Q: Rev reading and simple A/F display are abnormal.  
 A: When the rev reading is failed, please refer to 6. Installation Confirmation. When the A/F display is failed, it is possible to be the O2 sensor type is different, sensor degraded rapidly or the harness connections have failed.



### 8. About This Manual

Manual no. 101A-Z01 Issue date June 2006 Version 1  
 The specification, price and appearance of this manual could be revised without prior notice.

### 9. Warranty

When the product is used in its normal operation and failure occurs due to manufacturing issues within the warranty period (one year from date of purchase), the product will be repaired without charge per stated in manual. The warranty will not be reissued in any circumstances, please keep it securely.

### 10. Contact Us

ARK-DESIGN Co.Ltd. 〒192-0362 32-5 MATUKI HACHIOUKI TOKYO JAPAN  
<http://www.arkdesign.co.jp>

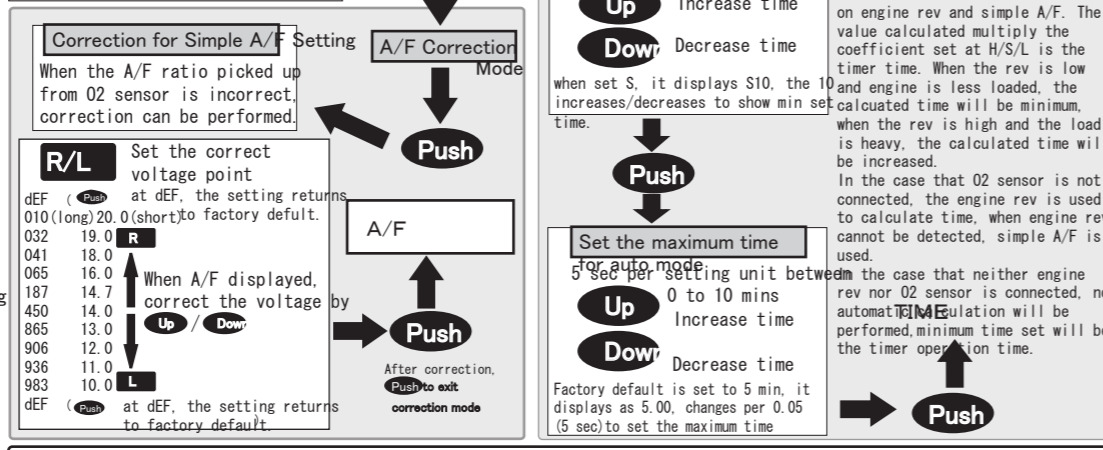
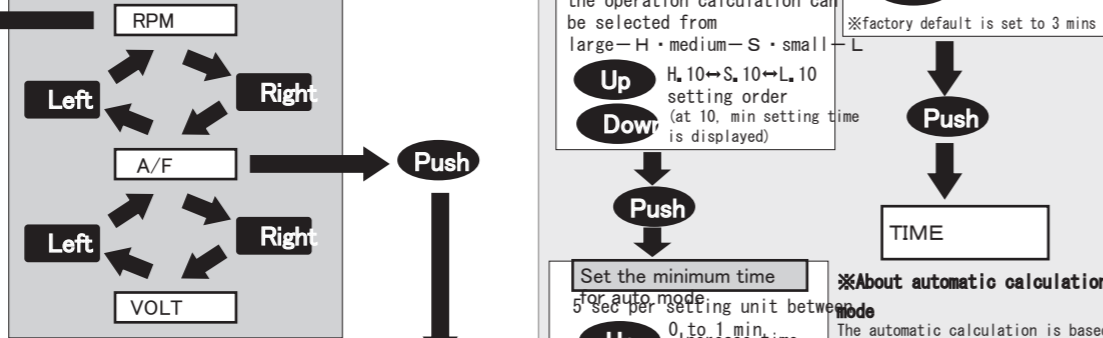
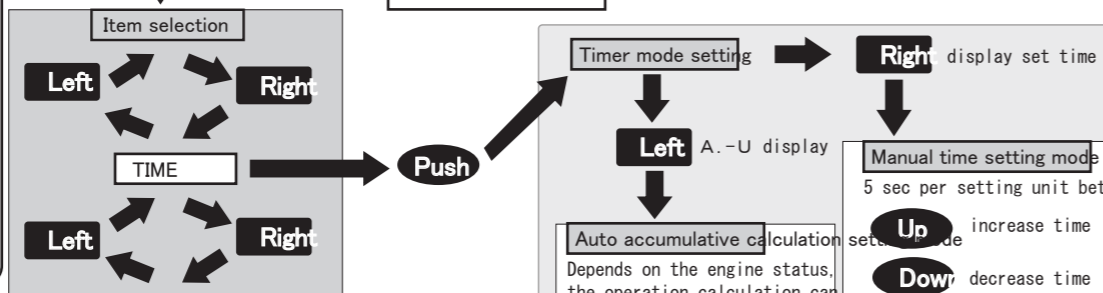
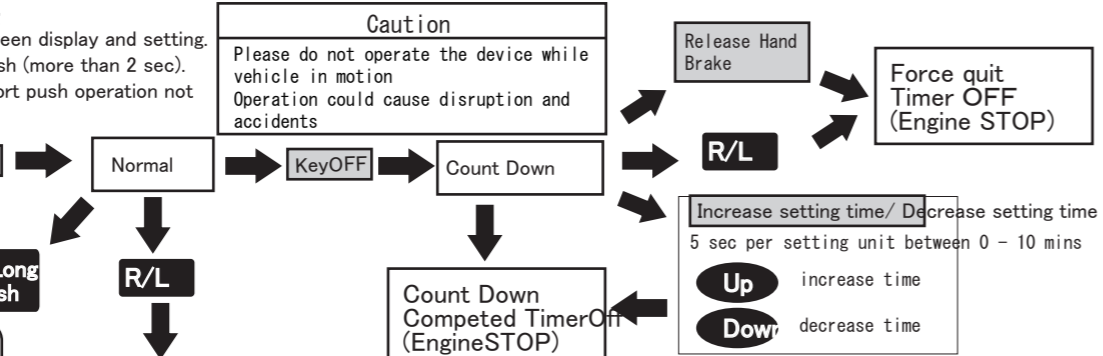
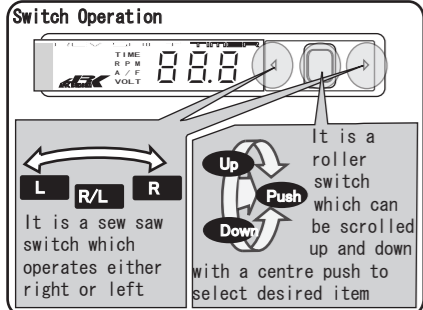
Warranty	
Product name	Rev Shift Timer
Thank you for purchasing the Rev Shift Timer. Under the normal usage, when a failure occurred due to manufacturing issues, Ark Design will repair the failure without charge within the warranty period which is one year from the date of the purchase. Please attach the warranty to the shop this product is purchased.	
Warranty period	One year from the date of the purchase (to retail shops)
Please fill in the purchase date, manufacturing number, odometer and retail shop details (with shop stamp) in this warranty card. If the information is missing, the repair will still be charged during the warranty period. Thank you for your understanding.	
Purchasing date	please affix the included serial seal here
Vehicle odometer at installation	
Retail Shop	It is mandatory to stamp the shop stamp and telephone number
(To the end customer)	
Please reconfirm all information is filled when receiving this warranty card, if there is information missing, please contact your retail shop immediately.	
Vehicle odometer at installation	
Vehicle name	
Engine type	
Year	
End customer address	
End customer telephone number	
End customer name	
Warranty rules	
This warranty states important information in regards to the warranty, please read all information.	
1.If the product is malfunctioned, please contact the retail shop where the product was purchased.	
2.When sending the product for repair, please send this warranty together with the description of malfunction, retail shop name and purchase date to the retail shop.	
3.Further, the repair will be charged in the following condition even within the warranty period.	
-If the product was not used as prescribed in the manual or unusual usage which has caused the failure.	

# 11.Operation

## Switching Between Display and Setting

Two length of pushes to switch between display and setting.  
Short push (below 1 sec), and long push (more than 2 sec).  
This manual only states long push, short push operation not stated.

When timer operation not required, please set to OFF mode, in this case, no information displayed



### Timer Display

注 O2センサーに信号線が接続されていない場合、回転信号が検出できない場合は、数字表示・フルカラー表示は行われません。

#### Timer Mode

Timer light on, indicate timer time while driving.

At manual mode, it displays set time.  
At auto mode, it displays calculated time.

numerical display (7 segments)

0.00 is 0 sec  
0.10 is 10 sec  
1.00 is 1 min  
9.60 is 10 mins

#### RPM Mode

RPM light on, indicating engine rev while driving. (x 10rpm)

numerical display (7 segment)

1 is 10rpm  
10 is 100rpm  
100 is 1000rpm  
999 is 9990rpm

#### VOLT Mode

VOLT light on, indicating battery voltage while driving.

value display (7 segments)

— flashes when below 10.0 V

10.0 is 10.0V  
12.0 is 12.0V  
16.0 is 16.0V

|| flashes when above 16V

■□■About Economical Driving■□■  
Petrol and air mix is the power for the petrol engine. The ratio of mixed air to air is normally called the air flow ratio (A/F). The normal ideal air flow ratio is about 14.7, when acceleration and greater engine output is required, the output air flow ratio is about 12.5. For the economical engine, during idling when no output required, the A/F is about 16. When engine is in motion, there is a limitation for A/F, sometimes without a knowing reason, the petrol is consumed without great horse power output, that could be the reason of high petrol consumption. By monitoring A/F to keep the A/F ratio stays above 14, the driver can adjust by the acceleration, only minimum petrol is needed which also reduce the load to engine light on, indicating simple A/F while driving.

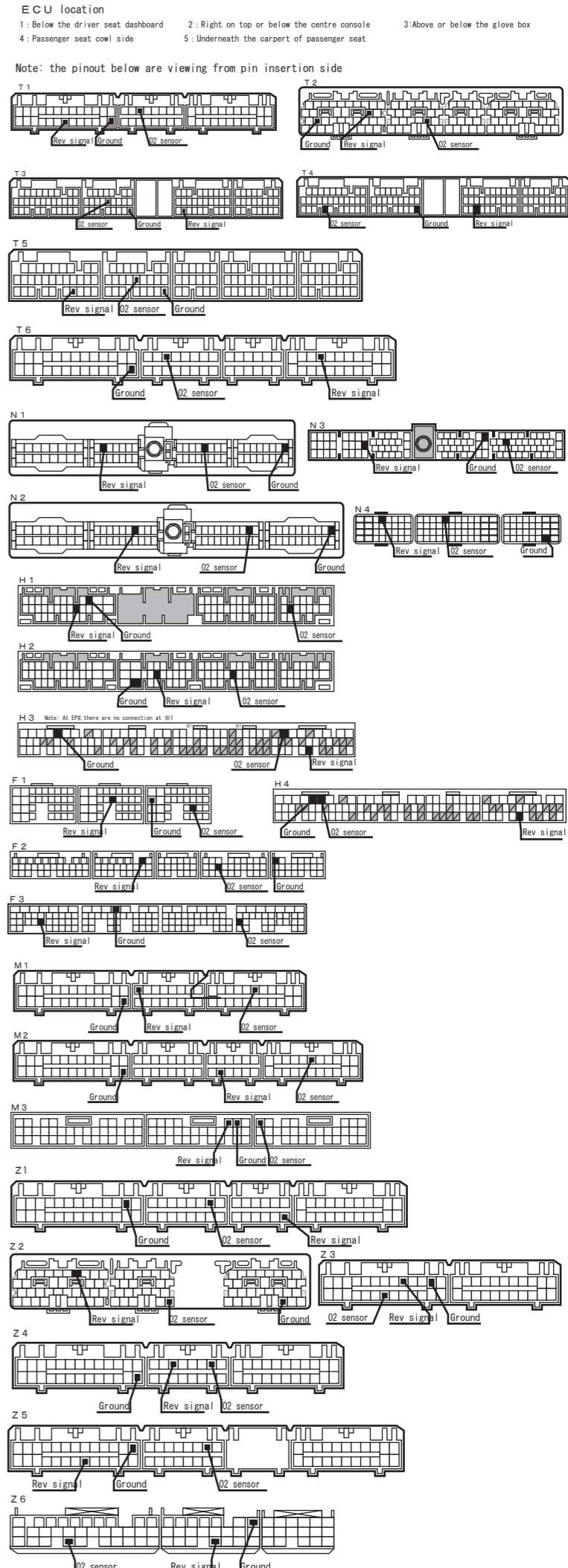
■□■About automatic calculation mode  
The automatic calculation is based on engine rev and simple A/F. The value calculated multiply the coefficient set at H/S/L is the timer time. When the rev is low and engine is less loaded, the calculated time will be minimum, when the rev is high and the load is heavy, the calculated time will be increased. In the case that O2 sensor is not connected, the engine rev is used to calculate time, when engine rev cannot be detected, simple A/F is used.

■□■About automatic calculation mode  
In the case that neither engine rev nor O2 sensor is connected, no automatic calculation will be performed, minimum time set will be the timer operation time.

Full colour LED is normally showing the simple A/F when change to shift rev setting, white colour flashes. When simple A/F not in display, if long push the right switch, the display turns off. The white light still flashes even when the display is off. When do not want the white flashing light, please set the rev to a zone that would not be used.

# VehicleECUPinout (Only representative models are stated, for other models, please refer to the service manual)

車名	年式	型式	エンジン型式	場所	ECU	備考
dB	00/2 ~	NCP31/35	1N2-FE	3	T6	
	00/2 ~	NCP30	2N2-FE	3	T6	
ビッツ	00/10~05/1	NCP13	1N2-FE	3	T6	
	99/10~05/1	NCP10/15	2N2-FE	3	T6	
	01/12~05/1	SCP10	1S2-FE	3	T6	アイドルストップ付き
ファンカーゴ	99/1 ~01/11	SCP10	1S2-FE	3	T6	
	99/8 ~02/7	NCP21/25	1N2-FE	3	T6	
MR-2	99/8 ~02/7	NCP20	2N2-FE	3	T6	
	93/10~99/9	SW20	3S-GTE	トランク	T1	
	89/10~93/9	SW20	3S-GTE	トランク	T1	
カローラ	95/5 ~05/6	AE111	4AGE	2	T1	
	91/6 ~95/4	AE101	4A-6ZE	2	T1	
	89/5 ~91/5	AE92	4A-6ZE	2	T1	
セリカ	94/2 ~99/8	ST205	3S-GTE	2	T1	
	99/9 ~	ZT231	2Z2-GE	E格ルーム	T3	
	99/9 ~	ZT230	1Z2-GE	E格ルーム	T3	
カルティナ	97/9 ~02/8	ST215W	3S-GTE	3	T3	
	97/9 ~02/8	ST215G	3S-GE	3	T3	
アルテッツァ	98/10~	SXE10	3S-GE	E格ルーム	T4	
マークII	96/9 ~00/9	JZX100	1JZ-GTE	2	T2	
ソアラ	96/8 ~01/3	JZZ30	1JZ-GTE	5	T2	
アリスト	97/8 ~02/8	JZS161	2JZ-GTE	E格ルーム	T5	
スープラ	97/8 ~02/8	JZA80	2JZ-GTE	5	T5	
	98/7 ~00/8	Z32	V630DET	5	N2	
みか10P	99/1 ~02/8	R34	RB26DET	4	N2	
	98/5 ~01/5	R34	RB25DET	4	N3	
	95/1 ~98/12	R33	RB26DET	4	N2	
シルビア	93/8 ~98/4	R33	RB25DET	4	N2	
	99/1 ~02/7	S15	SR20DET	4	N1	
	99/1 ~02/7	S15	SR20DE	4	N1	
180SX	96/6 ~98/12	S14	SR20DET	4	N1	
	93/10~96/5	S14	SR20DET	4	N2	
	93/10~98/12	S14	SR20DE	4	N1	
ウィングロード	96/8 ~98/12	PRS13	SR20DET	4	N1	
	96/8 ~98/12	PRS13	SR20DE	4	N1	
キューブ	05/11~	NY12	HR15DE	E格ルーム	N4	
ノート	05/5 ~	YZ11	HR15DE	E格ルーム	N4	
マーチ	05/1 ~	E11	HR15DE	E格ルーム	N4	
フィット	05/8 ~	YK12	HR15DE	E格ルーム	N4	
シビック	02/9 ~	GD3/4	L15A	4	H4	
	01/6 ~	GD1/2	L13A	4	H4	
インテグラ	01/12~	EP3	K20A	3	H3	
	98/9 ~00/8	EK9	B16B	4	H2	
	97/8 ~98/8	EK9	B16B	4	H1	
レガシィ	95/9 ~00/8	EK4	B16A	4	H1	
	01/7 ~	DC5	K20A	3	H3	
	95/9 ~01/6	DC2	B18C	4	H1	MT
インプレッサ	03/5 ~	BL/BP5	EJ20	5	F3	TB
	01/5 ~03/4	BH/BE5	EJ20 6/8	5	F2	
	98/6 ~01/4	BH/BE5	EJ20 6/8	5	F1	
フォレスター	02/5 ~	GDB	EJ20 7	5	F2	
	00/10~	GD/GG B	EJ20 7	5	F2	
	00/8 ~	GD/GG A	EJ20 7	5	F2	
ランサー/ミラージュ	98/9 ~00/10	GC/GF 8	EJ20 5/7	5	F1	
	98/9 ~00/7	GC/GF 8	EJ20 4	5	F1	
	02/2 ~	SG5	EJ20	5	F2	TB
リベロ	98/9 ~02/1	SF5	EJ20 5	5	F1	
	03/1 ~	CT9A	4663	3	M3	Evo8~9
	01/2 ~02/12	CT9A	4663	3	M2	Evo7 MT
パジェロイオ	96/8 ~01/1	CP9A	4663	4	M2	Evo4~6
	92/11~96/7	CE9A	4663	4	M1	Evo1~3
	95/10~	CM5A	4693	4	M2	
ロードスター	91/10~95/9	CDA	4693	4	M1	
	94/1 ~00/5	CD5W	4693	4	M1	
	94/9 ~97/10	N23W/G	4663	4	M1	
RX-7	92/10~97/10	N13W/23W	4663	4	M1	
	97/11~02/8	N61/71W	4693	5	M2	
	95/12~03/1	FD3S	13B-REW	4	Z2	
RX-7	91/11~95/12	FD3S	13B-REW	4	Z1	
	00/7 ~05/7	NB8C	BP	5	Z6	
	02/7 ~05/7	NB8C	BP	5	Z6	
	95/8 ~97/11	NB8C	BP	5	Z5	
	97/12~00/6	NB8C	BP	5	Z4	
	97/12~02/6	NB6C	BP	5	Z4	
	89/9 ~93/7	NAGC	BP	5	Z3	
	93/8 ~95/7	NAGC	BP	5	Z3	



### About Engine Rev Auto Detection

This product is utilising the weak noise in power line together with simple harness to display the engine rev. However, depends on the vehicle model, sometimes the engine rev cannot be read due to noise wave form. In that case, please adjust the volume in the relay box side to display the engine rev. Further, scattered display could happen at the moment of powered on, it is not a fault. If the engine rev is still not in display, please take a harness from ECU and connect to the rev signal line (thin green wire), and switch the rev signal input switch to 1)

Adjust volume

Use a fine driver to change the volume to right or left to detect the engine rev and set.