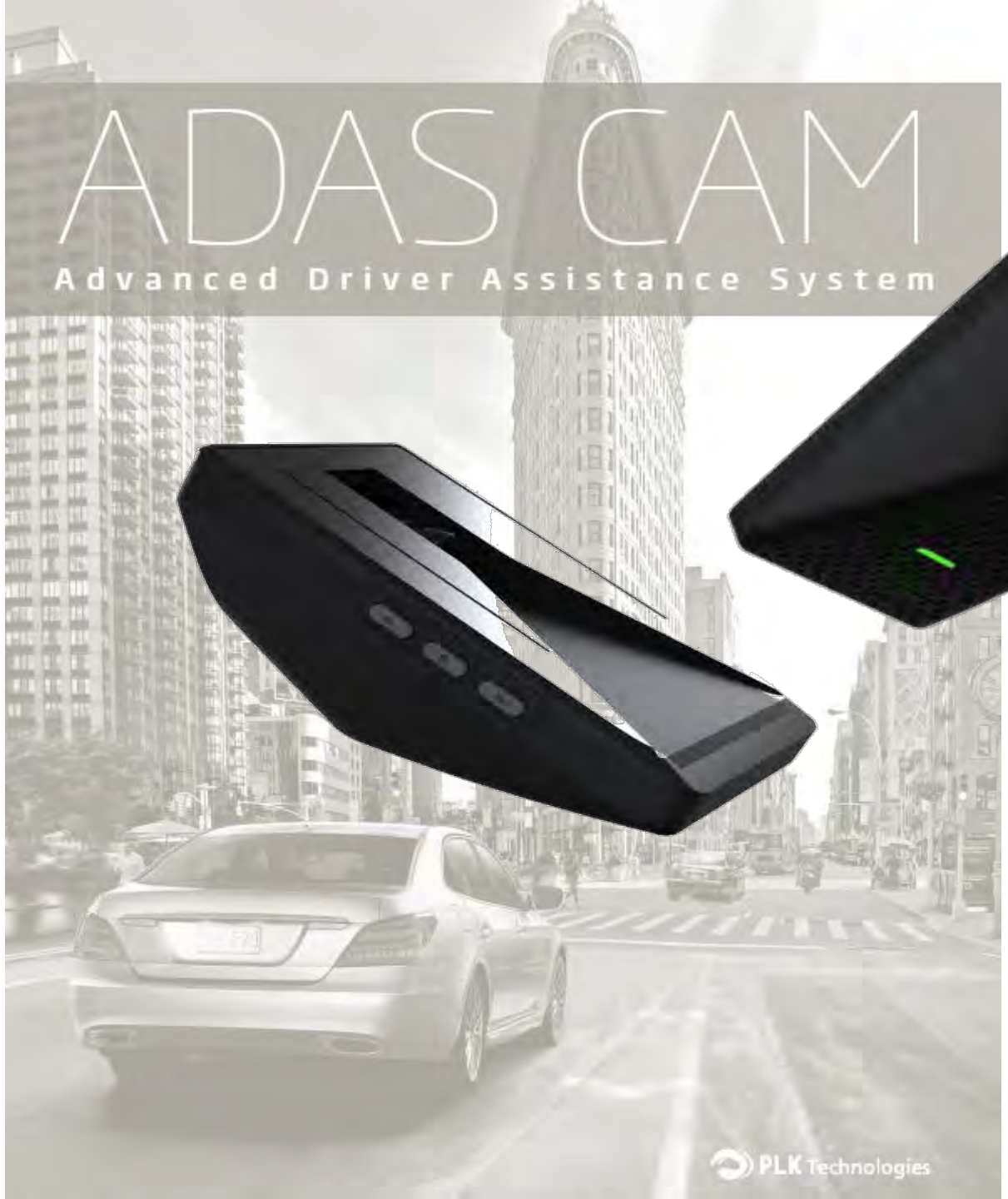

RoadScope 7

Installation Manual

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1. Precautions

1.1 General

Please carefully read following "Notes" below before attempting to install Roadscope 7.

Precautions

Roadscope 7 is an Advanced Driver Assistance System aiming to alert the driver to potential risky collisions. Roadscope 7 does not replace the responsibility and duty of the driver to remain focused on the road at all times , driver is solely responsible for accidents caused by driver’s negligence.

Roadscope 7 cannot and does not guarantee 100% accuracy in the detection of front vehicles, driving lanes, pedestrians or traffic signs. The detection rate can be adversely affected by extremely bad weather, road and other abnormal conditions.

Drivers should concentrate on forward-looking while driving by paying full attention to safe driving.

* Roadscope 7 is designed to assist in careful driving , however, it is not a substitute for careful driving practices and the manufacturer of Raodscope 7 takes no responsibility for any damage caused by reckless driving behavior.

1. Precautions

1.2 System Limitation

▪If the view of camera is blocked partially or completely, the functionality may be adversely affected or may not work.
▪ Lane Departure Warning 【LDW】 performance can be affected adversely if lanes are poorly marked or unmarked.
▪ Front vehicle detection 【 HMW, FCW, VB and FCDA 】 performance can be affected adversely if rear lamps of a front vehicle are in abnormal conditions 【broken or low light】 at night.
▪ Traffic Sign Recognition 【TSR】 performance can be affected adversely if traffic signs are severely tilted or decolorized.
▪ Pedestrian Detection 【PD】 and Traffic Sign Recognition 【TSR】 do not work at low illuminance or at night .
▪ Each ADAS function remains active at or above the set start speed threshold .
▪ ADAS Setting ranges are shown as below

Function	LDW	HMW	FCW	VB	PD	FCDA	TSR
Setting Range	40~80kph 25~50mph	20~80kph 12~50mph	-	-	-	-	-
Operational Speed	Above the set start speed threshold	Above the set start speed threshold	Over1kph Over 1mph	1~20kph 1~12mph	5~30kph 3~18mph	0kph 0mph	Over1kph Over 1mph
Sensitivity setting*	O	O	-	O	-	O	-
Sensitivity setting **	O	O	-	-	-	-	-

▪ Sensitivity setting: * marked parts can be set in R7 manager PC program and ** marked parts can be set in the display device.
▪ Roadscope 7 does not output another same-type alarm for 5 seconds after an alarm is generated (except FCW)

1. Precautions

1.3 Installation and Safety Precautions

- Roadscope7 must be installed using the appropriate tools by professional technicians
- Install Roadscope7 when parked on a flat surface with vehicle power supply at OFF 【Wiring connections】
- Roadscope7 should be operated with only 12 ~ 24v power supply.
- Be careful not to have the camera coated with contaminated materials and pay attention to proper camera angle while installing .
- After installation, change settings in accordance with the Installation guide.
- Do not connect or disconnect any cable if vehicle engine is ON.
- Roadscope 7 does not guarantee 100% accuracy in the detection of front vehicles, driving lanes, pedestrians and traffic signs. The detection rate can be adversely affected by extremely bad weather, road and other abnormal conditions.
- If not installed according to this manual instruction , R7 may not work properly .

2. System Structure

2.1 System Description

- Roadscope7 Main Body System
- Display Device
- Hub [part name: dual hub]
- Vehicle connection cable
- Setup software Program 【 R7 manager program will be provided by the manufacturer separately 】

Please check following parts before installation

① **Roadscope7 main body system** :
main body with Hub connection Cable

② **Display Device:**
Indication of detection info , warnings and sensitivity settings

2. System Structure

2.1 System Description

③ Hub : Main body , display device , vibrator 【option】 , vehicle power & signal input

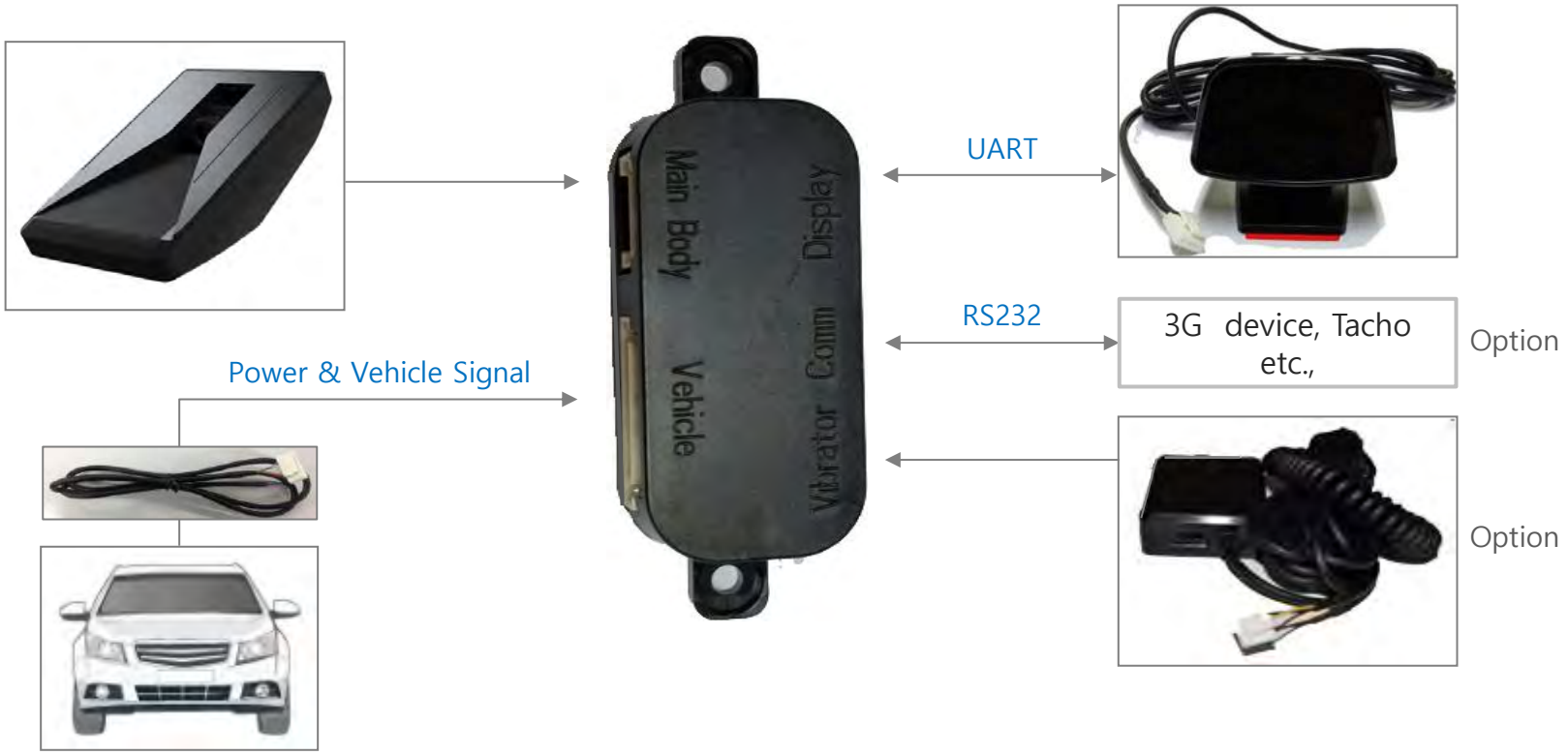
④ Vehicle Cable : Vehicle power supply and signal input cable

⑤ R7 manager : Setup Software 【 provided separately by the manufacturer】

⑥ Manager Program Connection Cable
【 the quantity should be negotiated with the manufacturer separately 】

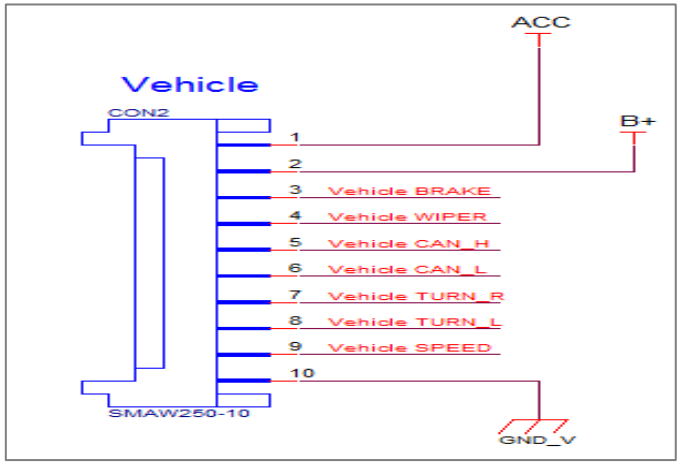
2. System Structure

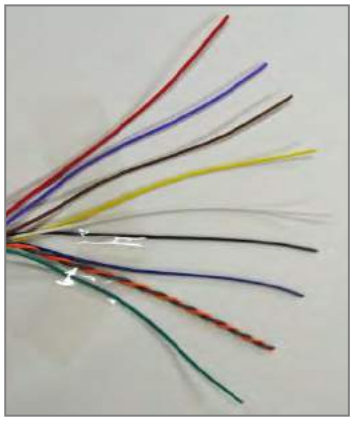
2.2 Hub Connection Diagram



2. System Structure

2.3 Hub to Vehicle Cable - Pin Map





2.3.1 Basic Connection

No.	Name	Wire Color	Description	Recommend
1	IG【ACC】	Red	IG2【Key-On】power	Vehicle Signal
3	BRAKE	Brown	Brake signal	Vehicle Signal
7	TURN_R	Yellow	Right turn signal	a. Vehicle Signal b. CAN Signal
8	TURN_L	White	Left turn signal	
9	VSS	Blue	Speed signal	a. Vehicle Signal b. CAN Signal
10	GND	Black	Ground signal	Vehicle Signal

• If TURN wires are not connected, LDW function will generate warnings every time the driver changes driving lanes even with blinkers turned on

2.3.2 Optional Connection

No.	Name	Wire Color	Description	Recommend
2	B+	Violet	B+	not connect
4	WIPER	Green	Wiper signal	High speed
5	CAN_High	Orange	CAN【High】Connection	Contact manufacturer
6	CAN_Low	Gray	CAN【Low】 Connection	

• Wiper needs to be connected to High-speed wiper signal if available.
• Roadscope7 can use CAN signal communication method to receive vehicle CAN signals ,such as TURN , SPEED and BRAKE . For the CAN connection, please consult with manufacturer of R7 .

2. Roadscope 7 manager

2.4 R7 manager

▪ **How to Install**

- Install the driver and manager software programs which are provided by your dealer or manufacturer, in your laptop PC

▪ **How to install the driver**

- The driver file should be installed based on your OS spec . Please install accordingly
- 32bit : CP210 x VCPinstaller_x86
- 64bit : CP210 x VCPinstaller_x64

▪ **Manager Function**

① Camera calibration
② Product setting
③ Real-time camera image check and image saving
④ Check error code
⑤ Check program version information

▪ **Manager Connection**

- Connect Roadscope 7 to R7 manager program by pressing the 'Connect' button 【Connect】.

▪ **Recommended OS**

- Window7/8/8.1/10【32/64bit】

3. Installation

3.1 Installation in brief [please refer to 3.2 for detailed installation methods]

1.Separate the cover of Roadscope 7

2. Attach Roadscope 7 to the windshield

3. Connect Roadscope 7 cable to Hub, and connect vehicle cable to Hub

4. Connect to R7 manager to finish setup

5. Calibrate camera angle via R7 manager program

6. Test drive on the road to check if speed signal and warnings work properly

3. Installation

3.2 Installation in detail


① Pull the Cap cover downwards to separate

② To separate the upper cover ,please loosen side screws and keep unlocked screws in a safe place to avoid losing them



③A buzzer is attached to the upper cover . First, separate the connector, then separate the cover

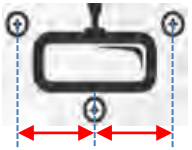


④ Clean the front windshield and install the product, please ensure to firmly attach body tape to the windshield by pressing the main body manually, but without giving pressure on PCB board

Installation & Precautions

- install the product when parked on the flat ground
- connect the product when vehicle power is turned off
- wipe out if dirt is attached to the main body camera
- ensure to attach to the windshield area which is not highly humid
- do not touch the adhesive side of tape with your hands .it may deteriorate the adhesive strength.
- install R7 in the place where it does not interfere with driver's sight
- install R7 in parallel to the flat ground
- R7 is recommended to be installed at the center of windshield , if not possible, the offset distance from center should not be bigger than 20cm

▪Recommended install position



Camera offset【center=0cm】

BUS

Truck

3. Installation

3.2 Installation in detail【System Installation】

• Connect the cables by following the diagram sequence above

1. Connect main body and display device to Hub
2. Connect vehicle cable to Hub thereafter

Install-caution

▪ please ensure to place the display device on the dashboard arear where it does not interfere with driver sight

▪ First, connect main body and display device to Hub,

▪ Then ,connect the vehicle signal cable to Hub

Default Connection			Optional Connection		
No	**Wire**	**Color**	**No**	**Wire**	**Color**
1	IG	Red	4	Wiper【High】	Green
3	BRAKE	Brown	5	CAN_High	Orange
7	TURN_R	Yellow	6	CAN_Low	Grey
8	TURN_L	White			
9	SPEED	Blue			
10	GND	Black			

▪ If you do not know the pulse value of vehicle, it can be automatically set by pressing the button on the display device while driving.

▪ If the turn signal is not connected , LDW function will generate warning signal every time driver changes driving lanes even with the blinker light turned on .

▪ For the CAN connection method, a separate prior consultation is required depending on the car model.

3. Installation

3.2 Installation in detail【Manager Program Connection】

① Connect the configuration cable to the connector of main body

② Connect the configuration cable to your laptop PC ,
afterwards , run the manager program ,

When the program start screen appears ,click [connect] button to check if LED light of cable turns on.

If there is no LED light, you may need to install R7 driver in your PC OS.
[Refer to page 11 for R7 driver installation procedures]

Installation & Precautions

- The setup process will take around 5 to 10 minutes . Check if the remaining battery power of your laptop is enough before attempting to install .

③ First, check if the manager program is connected to R7,
then, check if vehicle cable is connected properly

A. When pressing the brake pedal , the brake icon will indicate in the manager program
B. Turn on the left blinker to see if the left arrow icon turns on
C. Turn on the right blinker to see if the right arrow icon turns on
D. Drive slowly to see if the speed data reading works properly

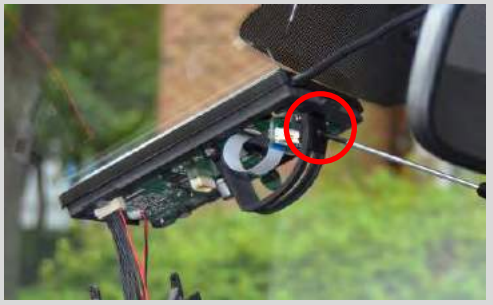
3. Installation

3.2 Installation in detail【Angle Adjustment】

Press the 'Calibration' button of R7 manager.

Adjust the angle of the camera by following the red arrow direction.

If the word 'Calibration' in the middle of the Manager window turns green, firmly fasten the camera .



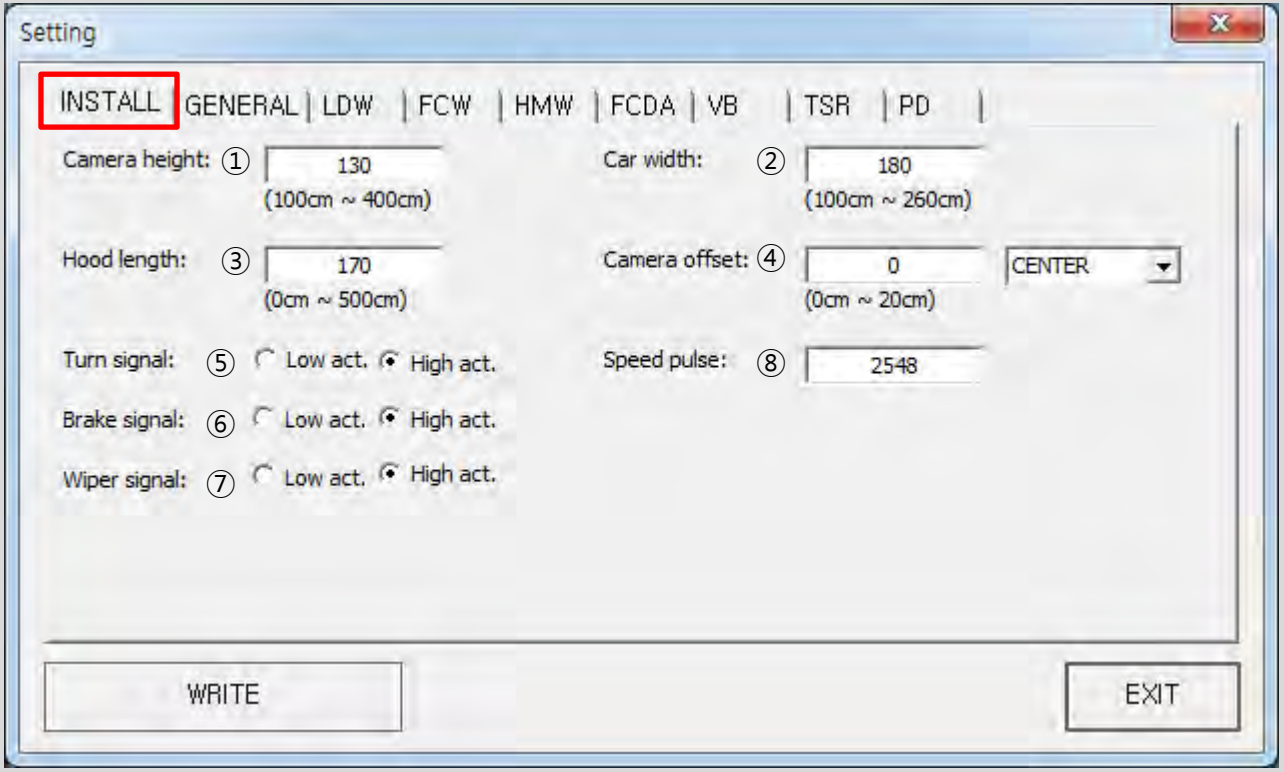
After fastening the camera , exit calibration mode by pressing the 'Calibration' button.

Install-caution

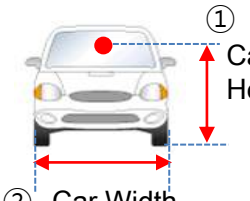
- Tighten screws until the camera angle does not turn further.
- If not fastened enough, the camera angle can be changeable when driving over speed bumps or receiving routine impacts.
- If the camera angle is not calibrated well , it can cause detection failures or false alarms.

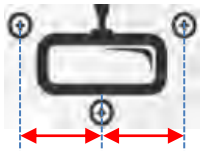
3. Installation

3.2 Installation in detail【Install Setting】



Press the 'Setting' button of R7 manager.





Choose the install position and input accordingly

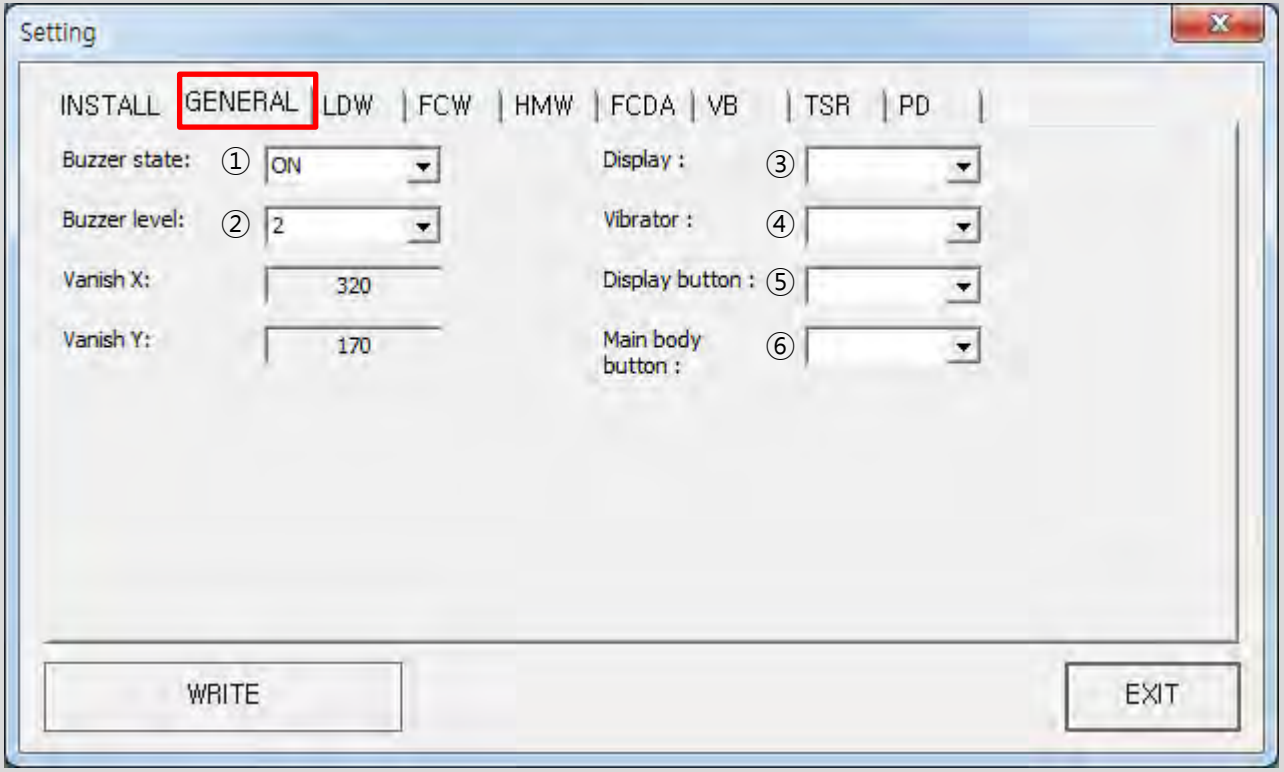
④ Camera offset 【Center=0mm】

⑤~⑦ Select the appropriate signal type of Turn / Brake / Wiper signals.

⑧ Enter the speed pulse value of the vehicle. If not known, set the value manually by referring to page 29.

3. Installation

3.2 Installation in detail【General Setting】



① set the alarm ON / OFF.

② adjust the volume of the alarm.

③ set the Display ON / OFF.

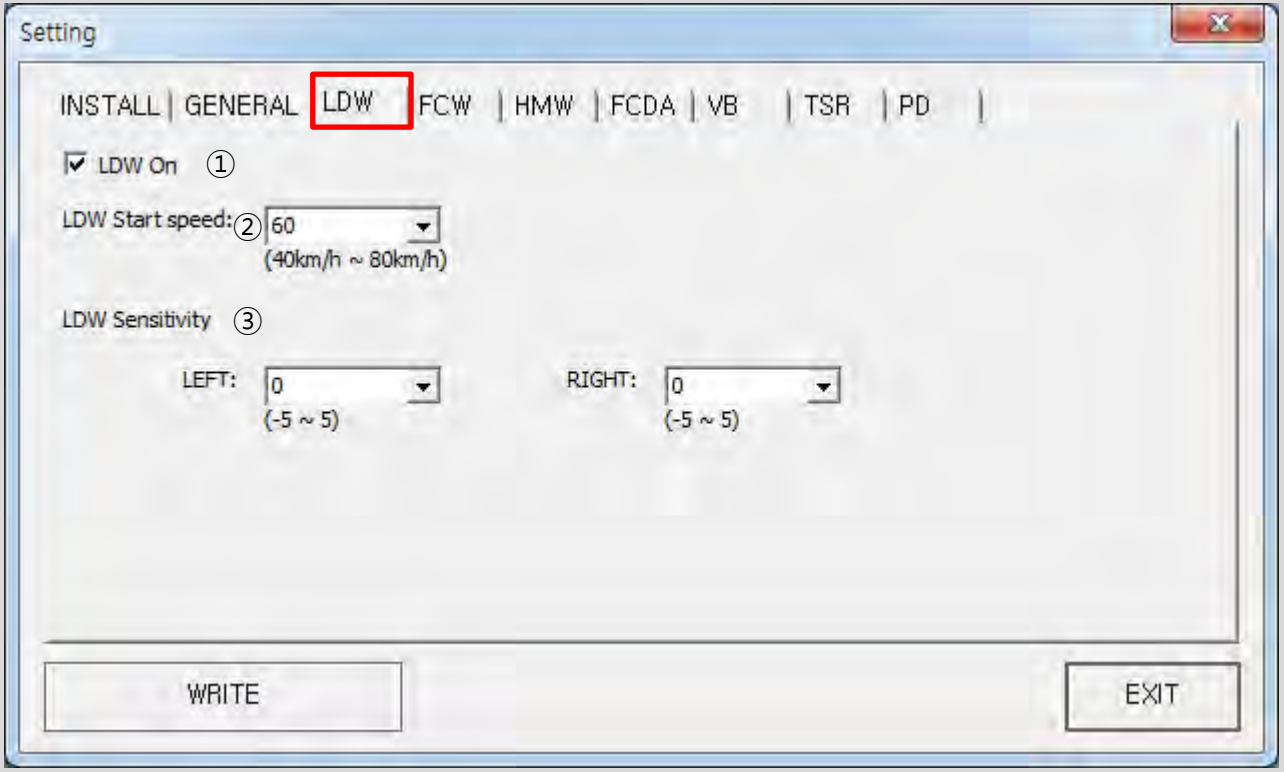
④ set the Vibrator ON / OFF.

⑤ set the Display button operation ON / OFF.

⑥ set the body button operation ON / OFF.

3. Installation

3.2 Installation in detail【LDW Setting】



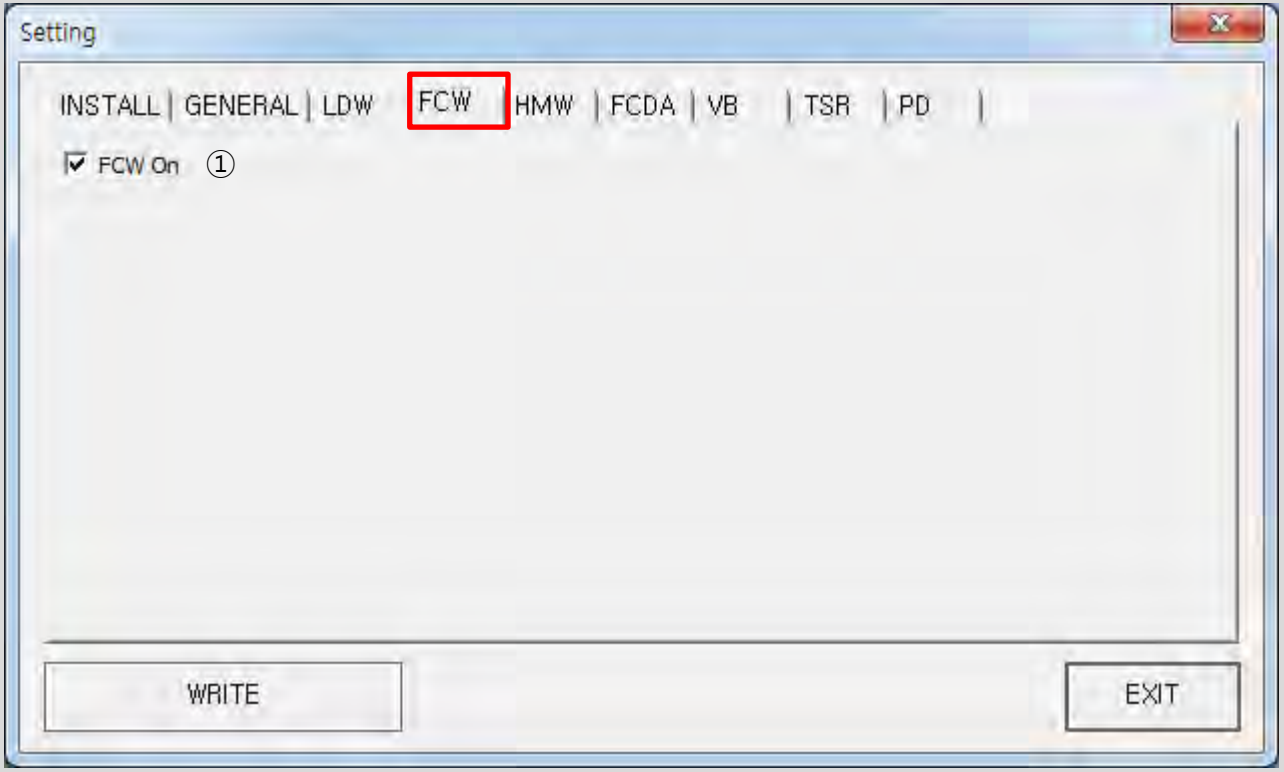
① set the LDW alarm ON / OFF.

② set LDW function start speed.

③ set the LDW sensitivity of left and right respectively. 【 If input value is smaller, the function will become less responsive 】

3. Installation

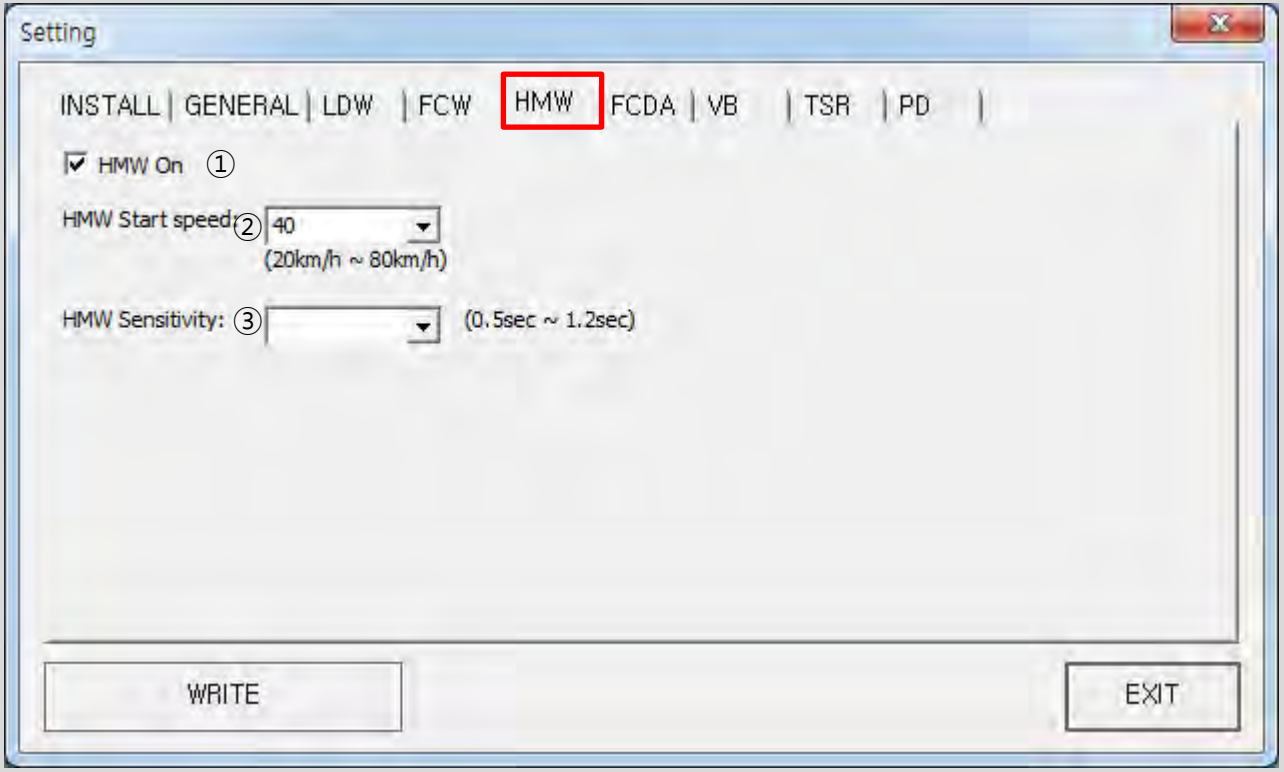
3.2 Installation in detail【FCW Setting】



① set the FCW alarm ON / OFF.

3. Installation

3.2 Installation in detail【HMW Setting】



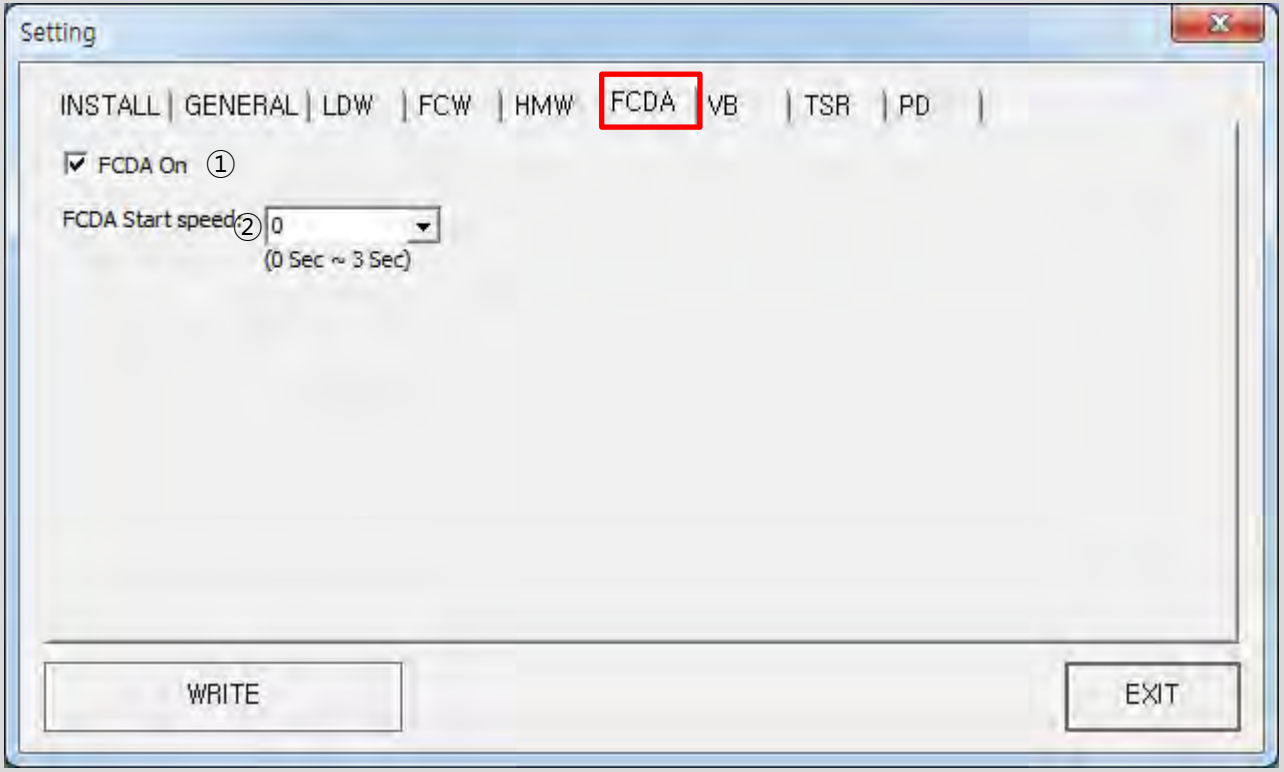
① set the HMW alarm ON / OFF.

② set the HMW function start speed.

③ set the HMW function sensitivity. 【 If input value is smaller, the function will become less responsive 】

3. Installation

3.2 Installation in detail【FCDA Setting】



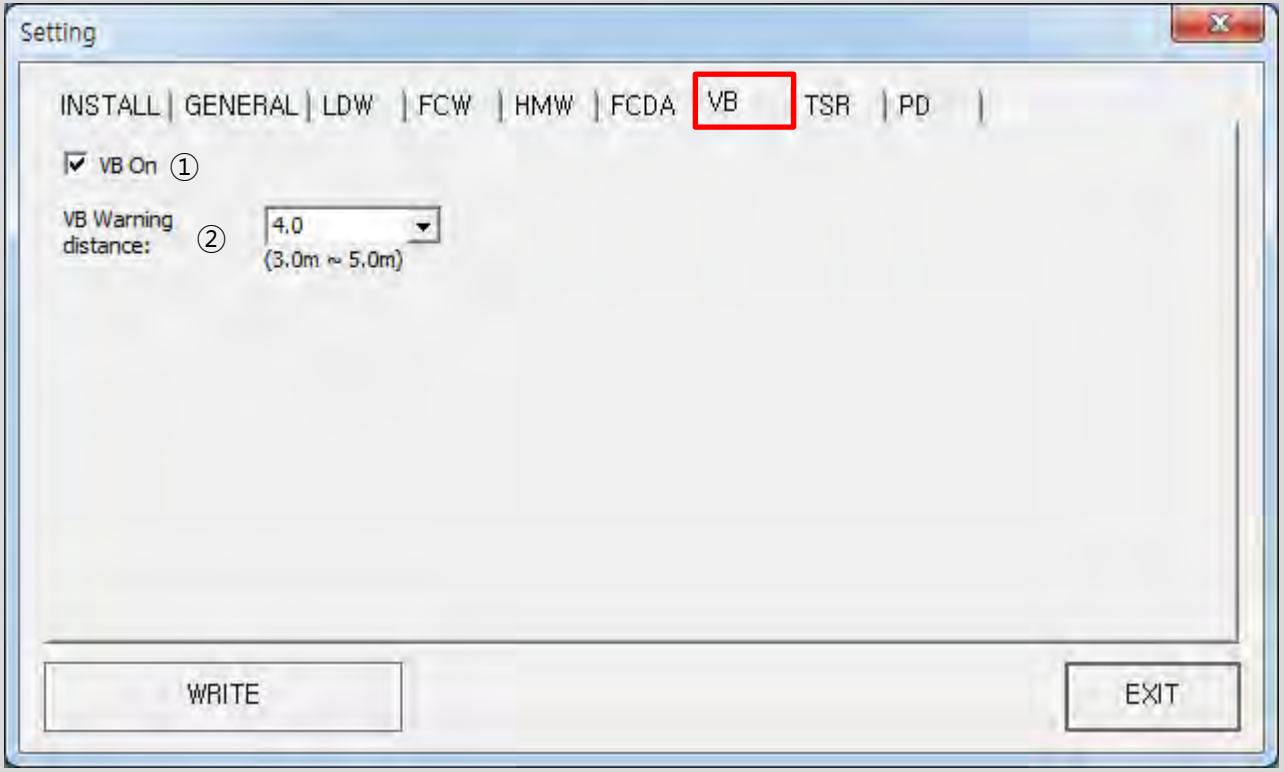
① set the FCDA alarm ON / OFF

② set the responsiveness of FCDA notice after the movement of front car

- 0 sec: inform immediately if the movement of a front car is detected
- 1 sec: inform with 1 second delay if the movement of a front car is detected

3. Installation

3.2 Installation in detail【VB Setting】



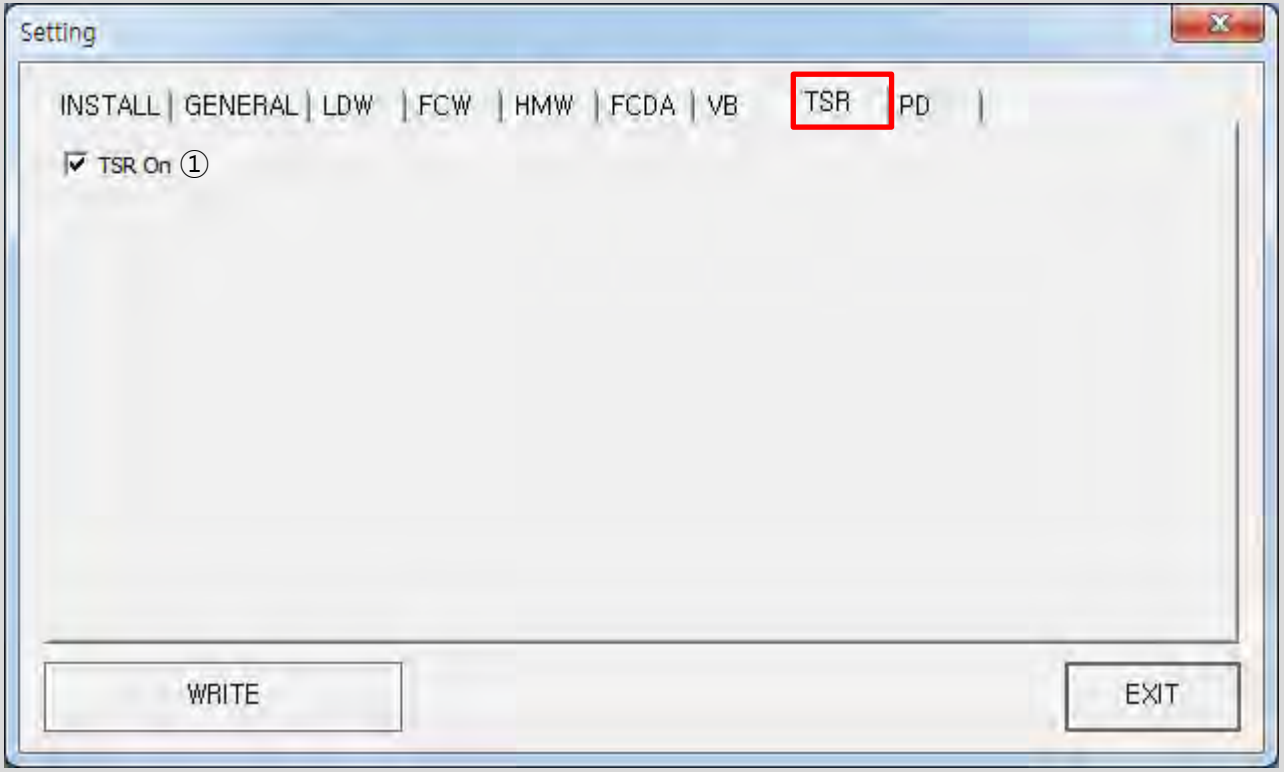
① set the VB alarm ON / OFF.

② set the VB alarm sensitivity.

【 If input value is smaller, the function will become less responsive 】

3. Installation

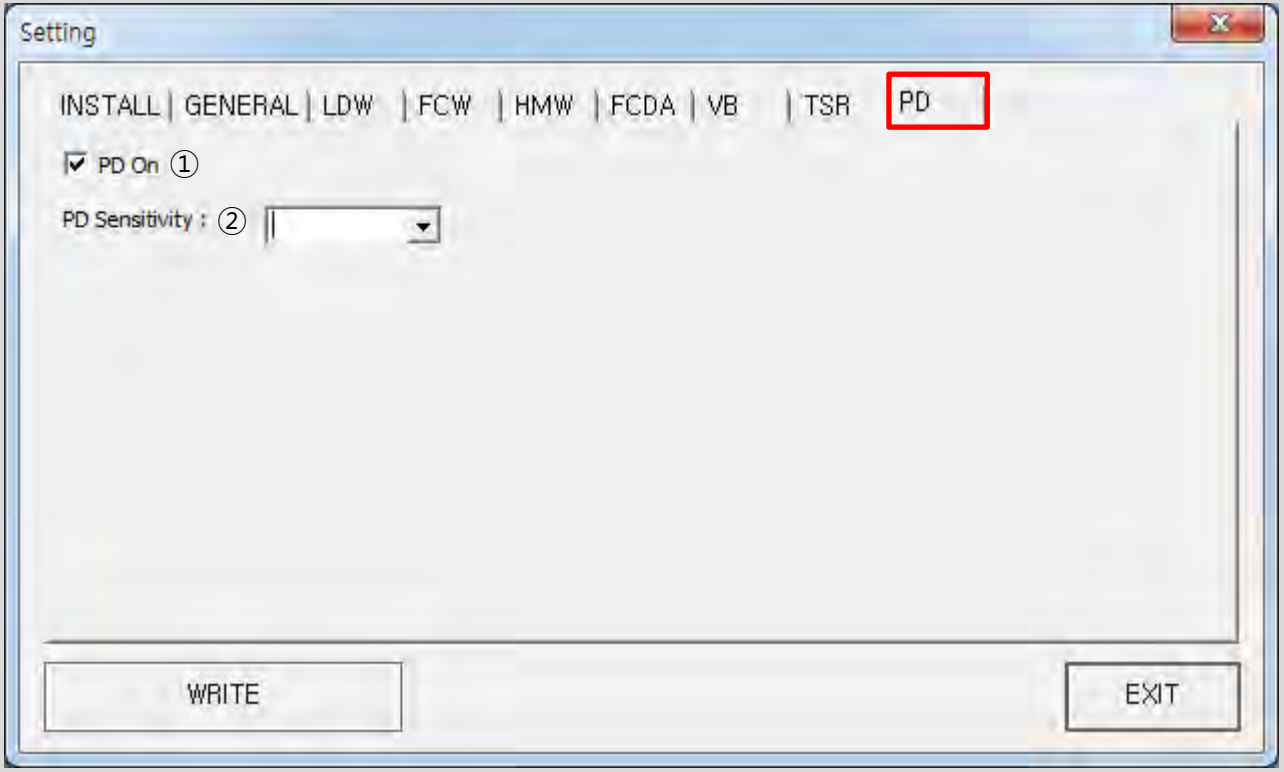
3.2 Installation in detail【TSR Setting】



① set the TSR alarm ON / OFF

3. Installation

3.2 Installation in detail【PD Setting】



① set the PD alarm ON / OFF

② set the PD alarm sensitivity.

【 If input value is smaller, the function will become less responsive 】

3. Installation

3.2 Installation in detail【Check Images & Save】

Press the 'Camera Image' button of R7 manager.

①

②

① If the 'Camera Image' button is pressed, what camera sees will appear in the middle of R7 manager

② If the 'Image Save' button is pressed, what camera sees will be saved as jpg files. The images will be saved in the designated path selected by user. In order to pause image saving process, just press the 'Image save' button again

③ After finishing the image saving process , press the 'Camera Image' button to exit the mode

3. Installation

3.2 Installation in detail【Check Information】

① Press 'Info' button to check following information

- Roadscope7 Serial number
- Error code
- F/W version
- R7 Manager version

3. Installation

3.2 Installation in detail【Check while driving 】

Install-caution

- It is recommended to check system operation while driving in order to confirm the correct installation settings of Roadscope 7.
- If R7 manager program is connected, you can check whether the speed input is being received correctly and you can also adjust the sensitivity for each function.
- It is important to have a person on the passenger seat to monitor system operation . Careless driving will cause accidents.

3. Installation

3.3 Vehicle Pulse Input

- The speed wire of vehicle can output pulse signal which is in proportion to actual driving speed.

Roadscope 7 can calculate and apply the pulse value during driving even if the vehicle pulse value is unknown.

- As Roadscope 7 calculates driving speed with the interval of 1 second by detecting the number of pulses, it is not affected by wheel diameter of tire or gear ratio, etc.

How to Input Pulse	
	Press and hold button ③ of main body for over 3 seconds and release the button when driving speed reaches 60 km/h 【37mph】, R7 can automatically calculate the pulse value. Keep the driving speed at 60 km/h 【37mph】 for over 10 seconds on the flat road to enable correct system calculation.
	Press and hold button ③ of display device for 3 seconds and release the button when driving speed reaches 60 km/h 【37mph】, R7 can automatically calculate the pulse value. Keep the driving speed at 60 km/h 【37mph】 for over 10 seconds on the flat road for the correct system calculation.

Caution

Note that driver attention should remain focused on the road at all times and driver should not operate R7 or display device while driving. It is necessary to have a person on passenger seat to operate the system instead in order to prevent possible accidents that could be caused by driver inattention .

3. Installation

3.4 Calibration

- The vanishing point calibration will be implemented to optimize system performance of Roadscope 7
- Automatic calibration
  - When driving speed reaches 70 km/h 【43 mph】 after initial installation, it will automatically calibrate by understanding the driving condition.
- Manual calibration
  - If alarm timing accuracy is not ideal , user can start manual calibration to correct the vanishing point.
  - Manual calibration should be done when lanes are clearly visible on flat & straight road.

How to calibrate manually	
	When LED of main body is Green , Press and hold button ① on the main body for more than 3 seconds before driving on the road. When driving speed reaches 70 km/h , the system will calibrate by itself if the driving condition is appropriate for calibration. 【 Driving on the flat road for 30 seconds 】
	When LED of display device is Green , Press and hold button ① on the display device for more than 3 seconds before driving on the road. When driving speed reaches 70 km/h , the system will calibrate by itself if the driving condition is appropriate for calibration . 【 Driving on the flat road for 30 seconds 】

Caution

- ADAS functions are active during calibration process.
- Do not operate buttons while driving. Driver inattention may cause accidents.

4. Main Body Description

4.1 Functions & Names

4. Main Body Description

4.2 Button Instruction

Function	Button	Description
Function ON/OFF	②	All functions will be turned OFF if pressed and held for more than 3 seconds when the system is ON .
	②	All functions will be ON if pressed and held for more than 3 seconds when the system is OFF. 【If functions are turned OFF in the manager program , the system will keep OFF settings 】
Volume Adjustment	①	Volume Level UP 【 3 adjustment levels are available 】
	③	Volume Level Down 【 3 adjustment levels are available 】
Install Mode	① ①	Press and hold any 2 buttons for 3 seconds to enter into Install Mode to calibrate the camera
	②	While in Install Mode, press middle button to exit Install Mode
Manual Calibration	①	Press and hold for over 3 seconds , the calibration will be done on the road if the driving speed is over the calibration start speed .
Pulse Calculation	③	While driving at 60km/s , press and hold for 3 seconds to enter into pulse input mode.

4. Main Body Description

4.3 LED Description

Color	Status	Description
Green	flickering	Booting up
	ON	At operation-ready status after booting up 【* Green LED will indicate even some of functions are OFF 】
Yellow	ON	All functions OFF
		LDW function OFF or inactive
		Not possible to output warning signal because of function OFF setting
		Not possible to operate function because of wiper operation
		Failures /malfunctions
White	flickering	F/W Update 【check the manager program update status window 】
Blue	ON	In communication with manager program
		Sensitivity setup via Display device

5. Display Device Description

5.1 Functions & Names

The display device allows the driver to check detection of lanes, front vehicles , traffic signs , pedestrians and time to collision.

5. Display Device Description

5.2 Button Instruction

Function	Button	Operation	GUI
Function ON/OFF	②	Press and hold for 3 seconds to turn OFF all functions	
	②	Press and hold for 3 seconds to turn ON all functions 【If a specific function is turned OFF in manager program , the system will keep the function OFF regardless of Button operation】	
Volume Adjustment	– ①	Volume DOWN 【3 levels are available 】	
	+ ③	Volume UP 【3 levels are available 】	
Sensitivity Setting: – +		Press and hold for **2 seconds** to enter into the setting mode	all blinking
LDW	, 1st	If pressed , it will enter into LDW Left line departure sensitivity setting mode	blinking
	–	If pressed , it will get less responsive	-1, -2, -3, -4, -5 level indication
	+	If pressed , it will get more responsive	1, 2, 3, 4, 5 level indication
	, 2nd	If pressed twice , it will enter into LDW Right line departure sensitivity setting mode	blinking

5. Display Device Description

5.2 Button Instruction

Function	Button	Operation	GUI
HMW Sensitivity	, 3rd	HMW sensitivity setting 【Default setting : 0.7 / setting range 0.5~1.2 】,	
	–	If pressed , it will get less responsive	Adjusted TTT Indication
	+	If pressed , it will get more responsive	Adjusted TTT Indication
Manual Calibration	–	Before driving the vehicle, press and hold for 3 seconds to enter into manual calibration mode	
Pulse Calculation	+	Press and hold for 3 seconds while driving at 60km/s to enter into pulse input mode	

5. Display Device Description

5.3 Graphic Interface Description

Function	Condition	UI Operation Description	GUI
Power ON	Booting	At the end of booting process , All LED lights will be ON for seconds and will be turned off thereafter	
	After Booting	TTT indication dot will be ON 【If all Functions OFF , no indications 】	
LDW	Above start speed	If lines are detected , white lane icon will appear	
	Warning	Blink twice according to lane departure direction	
	LDW OFF	Circle icons will output constant Yellow lights	
HMW	Above start speed【No vehicle ahead】	TTT dot in the middle will appear	
	Above start speed【 A vehicle ahead 】	Green vehicle icon with TTT information will appear. If above TTT 3.0 , only Green vehicle icon will appear	
	Warning	A Red vehicle icon will blink	
FCW	Warning	A Red vehicle icon will blink	
FCDA	0km/s	TTT indication will turn into clockwise rotating 0.0 icon	
	Alarm	A Green icon will blink	

5. Display device Description

5.3 Graphic Interface Description

Function	Condition	UI Operation Description	GUI
VB	Warning	A red vehicle icon will blink	
PD	Operation	If a pedestrian is detected, a green pedestrian icon will be ON	 
	Warning	A Red pedestrian icon will blink	
TSR	Warning	If driving over the detected speed limit , it will indicate over speed value .	
Failure	Function OFF【All 】	2 Yellow lines and circle icons will appear	
	Error	2 Yellow lines and circle icons will appear	

6. Diagnosis

6.1 Check Errors

Check Errors	
	If there is any Error in Roadscope 7 , the LED will indicate with a constant Yellow light
	If there is any Error in Roadscope 7, the display device will indicate with constant yellow lights as shown in the left image.
	User can check error code via Roadscope 7 manager program. Click ‘Info’Button of Manager program to check error code

7. Repair Handling

① Separate PCB part from bracket

② Separate main body cable

③ Assemble the Bottom cover and CAP cover and return it to receive repair service

8. Specification

1. Normal Operation Voltage	12/24V
2. Min. Operation Voltage	9V
3. Max. Operation Voltage	36V
4. Max. Electric Consumption	2.8W
5. Operating Temperature	-30~+85【C】
6. Storage Temperature	-40~ +105【C】
7. Camera Type	Color CMOS
8. External INTERFACE	UART
9. Main Body Size【mm】	76 x 120 x 46
10. Main Body Weight【g】	280g
11. Display device Size【mm】	72.6 x 63.5 x 55.9
12. Display device Weight【g】	120g