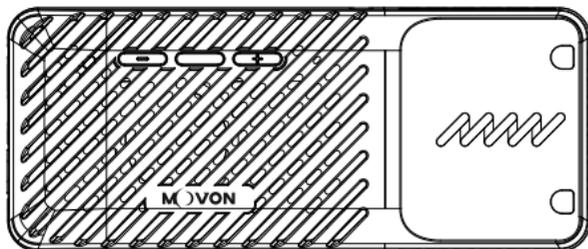


MRV-21

User Manual



MOVON

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※ Thank you for purchasing Movon's Vision RADAR Fusion Advanced Driver Assistance System (MRV-21)

Please read the manual carefully before using MRV-21.

- **Any inappropriate or illegal activities or violation of traffic rules on the roads are drivers' responsibility.**
Movon Corporation will not compensate any damage nor accept responsibility related to behaviors mentioned.
- Please be aware of Movon's policy that private information and traffic related laws are users' responsibility. **MRV-21 only gives warnings to drivers. The final decision to maneuver / control shall be made by drivers themselves.**
- The safety function performance might be affected by road environments, weather conditions and installations.
- Customer service incurred by controlling while driving or damaging / revamping will not be guaranteed by Movon's policy.
- Movon shall NOT be responsible for any problems and / or damages that may occur from not using genuine or Movon authorized parts and accessories. It is strongly recommended to use parts and accessories (including micro SD card) provided by Movon or Movon's Authorized seller to avoid any problems and/or damages.
- The information may not be up-to-date on the user manual for upgrading or editing purposes. The manual can be modified at any time without notification in order to enhance software.
- The product software may be modified for upgrading for better performance without informing in advance. Please refer to the **<http://www.movon.co.kr>** for latest information.

Warnings / Cautions : Violating the following precautions may result in personal injury, death, or property damage.

- Do not install in disregard of installation instruction. It is recommended to go to authorized workshop.
- Do not use damaged/modified cables or voltage out of the rated voltage. It may cause injury, death or property damage.
- Do not modify nor disassemble the product and cables. It can cause explosion or fire resulted in injury or property damages.
- Do not use chemical on the device. It can cause fire or electric short, or malfunction of the device.
- Do not attach MRV-21 in which it can obstruct the driver's view.
- Do not operate while driving, it is prohibited by law. If it is necessary, operate after stopping at a secure area. Do not apply excessive force when pushing the buttons on the device. Do not leave the product where infants, children or pets can reach it.
- Operating temperature is -4°F~ 158°F(-20 °C~ 70°C). MRV-21 may not operate properly and be damaged in excess of the temperature.
- Forward collision warning, Lane departure warning, Pedestrian collision warning , Speed limit sign recognition may not work properly due to camera location and angle, excessive tint, weather conditions.
- Recorded videos are only for personal use purpose. The video quality is not guaranteed to prove plate numbers or specific images.
- If the product is damaged or the power supply is cut due to an accident, video may not be recorded.
- While entering or exiting a tunnel, during daytime in the face of bright sunlight, or at night with no lights, the quality of recorded video can deteriorate.
- Foreign substance or finger print on the lens may cause improper safety function performance. If recorded videos are broken due to users mishandling, the damaged video is not guaranteed to recover.
- Do not separate micro SD card from MVR-21 while the power is on. Separate after turning off MVR-21 if necessary.

Contents

1. About Product	
1.1 Product Overview	5
1.2 Part Description	7
1.3 Button Description	8
2. Indicator	
2.1 Indicator Display	9
2.2 Indicator Setting	11
3. Function	
3.1 Digital Video Recorder (Dashcam)	14
4. Limitations & Limited Warranty	
4.1 Limitations	15
4.2 Limited Warranty	15

1. About Product

1.1 Product Overview

Movon Vison RADAR Fusion Advanced Driver Assistance System (MRV-21) helps to drive safely by using both a machine vision recognition technology and RADAR sensor to prevent drowsy or reckless driving.

[Main functions]

	<p>Forward Collision Warning (FCW) Provides the driver with a warning in critical situations where a collision is impending.</p> <p># Night Stable FCW performance at complete darkness and any lighting conditions</p> <p># Heavy Rain & Fog Consistent FCW performance even at heavy rain, severe snow and thick fog</p> <p># Motorcycle & Cyclists Show excellent performance to detect and track motorcycles & cyclists</p>
	<p>Pedestrian Collision Warning (PCW) Provides the driver with a warning in critical situations when there is a pedestrian in the vehicle's pathway</p>
	<p>Lane Departure Warning (LDW) Provides the driver with a warning to regain direction if the host vehicle departs lanes unintentionally</p>
	<p>Speed Limit Recognition (SLR) (Optional) Recognizes speed limit signs and provides warnings for over speed</p>

1. About Product

Movon Vison RADAR Fusion Advanced Driver Assistance System (MRV-21) helps to drive safely by using both a machine vision recognition technology and RADAR sensor to prevent drowsy or reckless driving.

[Main functions]

 SDA	Safety Distance Alarm (SDA) Attracts the driver's attention to keep the safe distance with front vehicle by warning the driver.
 FPW	Forward Proximity Warning (FPW) Attracts the driver's attention to keep the safe distance with front vehicle by warning the driver.
 FVSA	Front Vehicle Start Alarm (FVSA) Notifies the driver if the front vehicle started moving forward from 0 speed (complete stopped status) and the host vehicle is not moving in 2 seconds.
 DVR	HD Digital Video Recording - Parking recording is not supported Records scenes before and after an accident along with imminent crash situations. DVR function records data into micro SD card every minute in a loop.

- In the initial calibration procedure, the distance between “Bumper to camera” must be input as exactly as possible. Otherwise it could trigger wrong distance measurement or false alerts due to miscalculation. FVSA may not operate properly if the distance between two vehicles is over 8 meters.

If the unit is placed over 2.0m (6.55feet) on Truck or Bus and the front vehicle is a small passenger vehicle, MRV-21 may not detect the front vehicle properly.

1. About Product

1.2 Parts Description



1. About Product

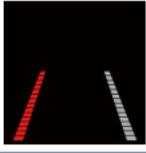
1.3 Button Description

● : Hold for 5 seconds ○ : Press once

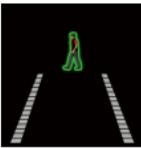
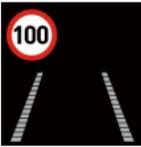
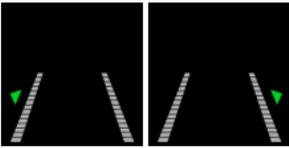
Mode	Function				Description	Voice Guidance
DVR	User Recording		○		Triggering video recording manually	Recording
	Mic.On/Off		○	○	Voice recording on/off	Voice recording started /ended
	SD Card Format	●		●	Format SD card	Please press the center button to format Micro SD card
VOL	Volume Up			○	Volume up	(Increasing sound)
	Volume Down	○			Volume down	(Decreasing sound)
ETC	Reboot	●	●	●	Reboot MRV-21	Rebooting the system

2. Indicator

2.1 Indicator Display

	Booting Mode MRV-21 is turning on.		Front Vehicle Detection Front vehicle is detected. FCW function is available.
	Lane Detection Lanes are detected. LDW function is available.		Front Vehicle Start Alarm The vehicle stays in 2 seconds after front vehicle starts moving.
	Lane Detection Unavailable Lanes can't be detected. LDW function might be limited.		Forward Proximity Warning Front vehicle is within the range of FPW warning settings.
	Left Lane Departure Alarm The vehicle is crossing the left lane without turn signal.		Safety Distance Alarm Front vehicle is closer than safe distance.
	Right Lane Departure Alarm The vehicle is crossing the right lane without turn signal.		Forward Collision Warning Collision with front vehicle is impending.

2. Indicator

	<p>Pedestrian Detection Pedestrian ahead is detected.</p>		<p>Camera Connection Error Camera connection is not good. Contact your local distributor/ installer.</p>
	<p>Pedestrian Collision Warning Collision with pedestrian is impending.</p>		<p>CAN Communication Error CAN communication has a problem. Contact your local distributor/installer.</p>
	<p>Speed Limit Detection Speed limit sign is detected.</p>		<p>Other Error Icons E3_Camera view block error. E4_Indicator communication error. E5_RADAR communication error.</p>
	<p>Speed Limit Indication Current speed limit is displayed. If the sign is blinking, the vehicle speed is over the limit.</p>		<p>Low Visibility Indication ADAS performance might be limited due to inclement weather condition.</p>
	<p>Left & Right Turn Signal turn signal is on.</p>		<p>Calibration Error MRV-21 needs to be re-calibrated because of the tilted angle.</p>

2. Indicator

2.2 Indicator Setting

-Display Turning Off : Press the center button until the display turns off. (It still gives a warning sound)

-Display Turning On : Press the center button until the display turns on.

Setting Mode

	<p>1) Voice Recording Control Mode</p> <p>Press the (-) button for 3 seconds, then it enters voice recording control mode. Two options (On/Off) are available. Press the (-) and (+) button to select each option and the center button to save new settings. If there is no button operation for 5 seconds, it returns to driving mode.</p>
 1 2 3 4 5	<p>2) Volume Control Mode</p> <p>Press the center button once, then it enters volume control mode. Five levels (1-5) are available. Press the (-) and (+) button to decrease or increase the volume and save new settings. Press the center button again, then it goes to brightness control mode. If there is no button operation for 5 seconds, it returns to driving mode.</p>
 1 2 3 4 5	<p>3) Brightness Control Mode</p> <p>Press the center button once, then it changes to brightness control mode. Five levels (1-5) are available. Press the (-) and (+) button to decrease or increase the brightness level and save new settings. Press the center button again, then it goes to left LDW sensitivity control mode. If there is no button operation for 5 seconds, it returns to driving mode.</p>
 1 2 3 4 5	<p>4) Left LDW Sensitivity Control Mode</p> <p>Press the center button once, then it changes to left LDW sensitivity control mode. Five levels (1-5) are available. Press the (-) and (+) button to decrease or increase the left LDW sensitivity and save new settings. Press the center button again, then it goes to right LDW sensitivity control mode. If there is no button operation for 5 seconds, it returns to driving mode.</p>

2. Indicator

	<p>5) Right LDW Sensitivity Control Mode</p> <p>Press the center button once, then it changes to right LDW sensitivity control mode. Five levels (1-5) are available. Press the (-) and (+) button to decrease or increase the right LDW sensitivity and save new settings.</p> <p>Press the center button again, then it goes to FCW sensitivity control mode.</p> <p>If there is no button operation for 5 seconds, it returns to driving mode.</p>
	<p>6) FCW Sensitivity Control Mode</p> <p>Press the center button once, then it changes to FCW sensitivity control mode. Five levels (1-5) are available. Press the (-) and (+) button to decrease or increase the FCW sensitivity and save new settings.</p> <p>Press the center button again, then it goes to SDA sensitivity control mode.</p> <p>If there is no button operation for 5 seconds, it returns to driving mode.</p>
	<p>7) SDA Sensitivity Control Mode</p> <p>Press the center button once, then it changes to SDA sensitivity control mode. Five levels (1-5) are available. Press the (-) and (+) button to decrease or increase the SDA sensitivity and save new settings.</p> <p>Press the center button again, then it goes to FPW sensitivity control mode.</p> <p>If there is no button operation for 5 seconds, it returns to driving mode.</p>
	<p>8) FPW Sensitivity Control Mode</p> <p>Press the center button once, then it changes to FPW sensitivity control mode. Three levels (1-3) are available. Press the (-) and (+) button to decrease or increase the FPW sensitivity and save new settings.</p> <p>Press the center button again, then it goes to SLR sensitivity control mode.</p> <p>If there is no button operation for 5 seconds, it returns to driving mode.</p>
	<p>9) SLR Sensitivity Control Mode</p> <p>Press the center button once, then it changes to SLR sensitivity control mode. Five levels (0, 5, 10, 15, 20) are available. Press the (-) and (+) button to decrease or increase the SLR sensitivity and save new settings.</p> <p>Press the center button again, then it goes to volume control mode.</p> <p>If there is no button operation for 5 seconds, it returns to driving mode.</p>

2. Indicator



10) Date and Time Settings Mode

Press the (+) button for 3 seconds, then it enters date and time settings mode.

Year → month and day → hours and minutes settings are available in order.

Press the (-) and (+) button to move backward and forward and the center button to adjust the numbers.

Select green box and press the center button to save new settings.

If there is no button operation for 5 seconds, it returns to driving mode.

3. DVR

3.1 Digital Video Recorder (Dash cam)

* File name format : 20211001_063903_N (Date_Time_Type)

1. Normal mode : Records videos regularly. (File name: _N / Location: ory_rec)
2. Event mode : When an event is detected by Gravity-force sensor. (File name: _E / Location: evt_rec)
3. User mode : Records before and after the center button was pressed. (File name: _U / Location: usr_rec)
4. MRV-21 viewer works normally on computers with 2GHz CPU and 2GB RAM.
5. **Total** recording hours (approximately)

Memory storage	Normal+Event+User (1CH)
16GB	About 4 hours
32GB	About 8 hours
64GB	About 16 hours

Caution & Note :

- Depending on your environment, actual recording duration and micro SD card lifespan may vary.
- For stable performance, it is recommended to format the micro SD card every 2-3 weeks.
- Formatting will delete all data in micro SD card. If you want to keep the data, please back up in advance.
- If MRV-21 fails to format the micro SD card more than twice, please try with PC.
- When you remove the micro SD card, please make sure MRV-21 is completely off.
- Micro SD card is a consumable accessory. Movon does not guarantee a certain period of lifespan of micro SD card. It is recommended to check the status of micro SD card on a regular basis and if micro SD card is not working properly, please contact the seller and purchase a new micro SD card.

4. Limitations & Limited Warranty

4.1 Limitations

The MRV-21 is designed to operate on the paved roads with lanes which are clearly marked.

The MRV-21 cannot recognize better than the driver. It is the driver's responsibility to be alert and aware at all times while driving.

The MRV-21 detects the visible vehicles ahead and the crossing, oncoming and passing vehicles cannot be detected.

The MRV-21 doesn't guarantee 100% accuracy in detecting vehicles, lanes, pedestrians, speed limit signs or in providing warnings for all potential accident on the road. The inclement weather condition can adversely affect the MRV-21's recognition performance. In case of partial or full blockage of the vision sensor's view, its ability to detect may be limited or the MRV-21 doesn't work.

4.2 Limited Warranty

The term of this product warranty is 1 year from the purchase date.

This MRV-21's Limited Warranty is non-assignable and covers the original purchaser of the MRV-21 installed on the vehicle for which the MRV-21 was purchased against defects in material or workmanship for a period of one year from the date of purchase.

The sole obligation of MOVON Corporation under this Limited Warranty is to repair or replace, at MOVON's discretion, any MRV product that is determined by MOVON to have been defective in materials or workmanship. MOVON will not be responsible for conditions arising as a result of installation.

The following are excluded from warranty coverage: (a) Damage from misuse, negligence, improper installation or accident, (b) Installation on a vehicle other than the vehicle for which this device was designed, (c) Repair or alteration of this device by any party other than MOVON.

Micro SD card is a consumable accessory. Movon does not guarantee a certain period of lifespan of micro SD card. It is recommended to check the status of micro SD card on a regular basis and if micro SD card is not working properly, please contact the seller and purchase a new micro SD card.



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