INVIEW 360 AI

FHD 360° Surround View System with Recording and AI Functionality

RVS-03-360

Instruction Manual

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Rear View Safety, 1797 Atlantic Ave., Brooklyn NY 11233
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1. INTRODUCTION

The InView 360 AI system is a next-generation safety solution designed to enhance driver awareness and safety through the power of artificial intelligence. By integrating real-time image recognition and alerting technologies, the system continuously monitors the vehicle's surroundings, providing timely visual and audio feedback to help drivers avoid potential hazards.

Leveraging advanced AI algorithms, InView 360 AI intelligently detects and identifies pedestrians, vehicles and driving lanes delivering critical alerts when needed. Whether navigating busy streets, reversing in tight spaces, or driving in low-visibility conditions, the system offers real-time alerts to keep drivers informed at all times.

AI DRIVER ASSISTANCE CONFIGURATION MANUAL

USAGE: This surround view camera system is designed to help the driver safely detect people and/or objects, helping to avoid damage or injury. However, the driver must use and set the AI as best as they can understanding the uses and limitations.

- Always prioritize safety when reversing your vehicle. Never rely solely on the monitor; consistently check behind and around your vehicle as you would without the InView 360 System. Looking only at the monitor could lead to accidents or damage. Remember to back up slowly to ensure a safe maneuver.

- If you as the driver cannot clearly see out of the cameras, neither can the AI detection system. Clean dirty cameras whenever possible.

- No software is entirely free of errors. It's important to remember that the advanced AI driver functions are not a replacement for the driver's attentiveness.
- The InView 360 System is not intended for use during extensive backup maneuvers or backing into cross traffic or pedestrian walkways.

- Please, always remember, the area displayed by the InView 360 System is limited. It does not display the entire panorama that is behind you.

2. STANDARD CONFIGURATION

Item	Configuration	Amount
1	Electronic Control Unit (ECU)	1
2	FHD Fish-eye Camera	4
3	Remote Controller	1
4	Main Harness	1
5	8m Extension Cable for HD Camera	1
6	12m Extension Cable for HD Camera	2
7	18m Extension Cable for HD Camera	1
8	CAN BUS Extension Cable	1
9	CVBS Video Output Extension Cable	1
10	LAN Extension Cable	1
11	WiFi Antenna	1
12	GPS Antenna	1
13	VGA Video Output Extension Cable	1
14	Push Button	3
15	HRNS, Extension, Outrigger, 6m	1
16	HRNS, Extension, Driver View, 6m	1
17	HRNS, Extension, Event, 6m	1
18	CBL, V CTRL, Extension, 5.5m	1
19	CBL, Trigger Lne Flasher, 5.5m	1
20	HRNS, Video, 4 Pin to RCA	1
21	HRNS, Video Y Cable Adapter	1
22	CBL Power Line, Extension, 4.5m	1
23	Fuse, 5A, Waterproof, PVC 80P Red, inView 360° HD	1
24	PAD, 5° Wedge, Rubber, Black, inView 360° HD	12
25	PLT, Mounting Plate, Button, inView 360° HD	1

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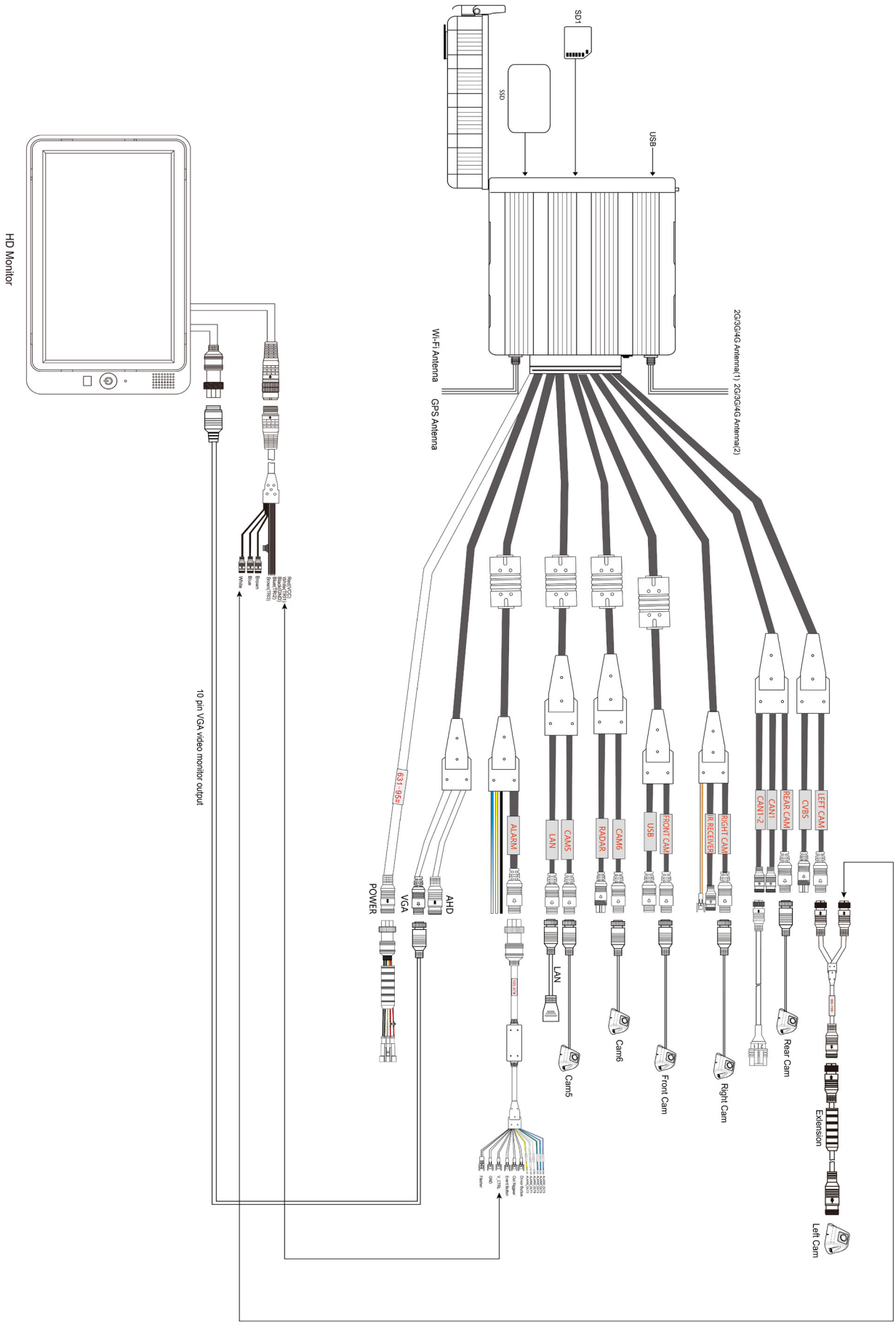
3. CONNECTION DIAGRAM



4. SPECIFICATION

System	
Operating Voltage	8 VDC to 32 VDC. Reverse polarity protection on power
Operating Temperature	-20°C to 70°C
Storage Temperature	-40°C to 85°C
Self-Diagnostics	On boot. LED indicators, on-screen indicators
Views:	Top View, 2D stitched around vehicle view / Front / Reverse / Left / Right
	Top view combined with one of the following views Front / Reverse / Left / Right
	Auto-switched based on external signal triggers: Left / Right / Reverse Signals
	Manual-switched with an external push button
	Instantaneous reverse view after engine ignition and reverse gear engaged
	Top View, combined with any side view or driver/ cargo view
Bulk Calibration	Supported
Trigger Signal Voltage	6 to 32 VDC
Video Download[1]	Via Wi-Fi
Configuration	Via IR, via Wi-Fi, via monitor (touch screen or mouse driven)
Video Recording	Supported; continuous
Frame Rate	1080p @30fps NTSC, @25fps PAL; all channels
Compression/Encoding	H.264
Storage[2]	Up to 4 SD cards in series; max capacity 256 GB for a total of 1TB max system storage.
Monitor	Supports 720p (CVBS) and /or 1080p (HD); touch screen capable
Video Streaming	RTSP support via ethernet
Vehicle Image Library	Editable
	Preloaded with 8 vehicle types

ECU	
Enclosure	Enclosure: die-cast aluminum ADC12; lockable / removable front cover (metal).
Video Outputs	1080p / CBVS, 2 ports
Video Inputs	Up to 6 camera inputs
Trigger Signals	Left / Right / Reverse / Panic (event marking), 6-32VDC @ 0.12 to 0.63 mA.
Camera Port Impedance	75 Ω
Video Output Port Impedance	75 Ω
GPS	<28mA @ 3.3V
Dimension	135 x 120 x 40 mm; 5.8 x 6.8 x1.5 in
IR Sensor	3m extension
Camera	
Enclosure	Die-cast aluminum ADC12 with a 304 stainless steel bracket; IP69K-rated
Dimensions	52 x 42 x 40 mm; 2.0 x 1.7 x 1.6 in (approximate)
Sensor	2.9 mega-pixel CMOS
Power	ECU-supplied
Voltage	12VDC @65 mA
Focal Length	2.8mm
Field of View (FOV)	190° (D)
SNR	>80dB
Other	
G-Sensor	Equipped; Built-In
GPS	External Receiver
Wi-Fi	External antenna; 802.11 b/g/n/ac
Language	English / French / German / Dutch
Units of Measure	Metric / Imperial
Ports	USB / RS232C / RS485 / Can Bus
Homologation	FCC / EMark / CE
Video Player	HD Player (native) - with routing information H.264 compliant - without routing information Recorded video selectable/filterable by event types

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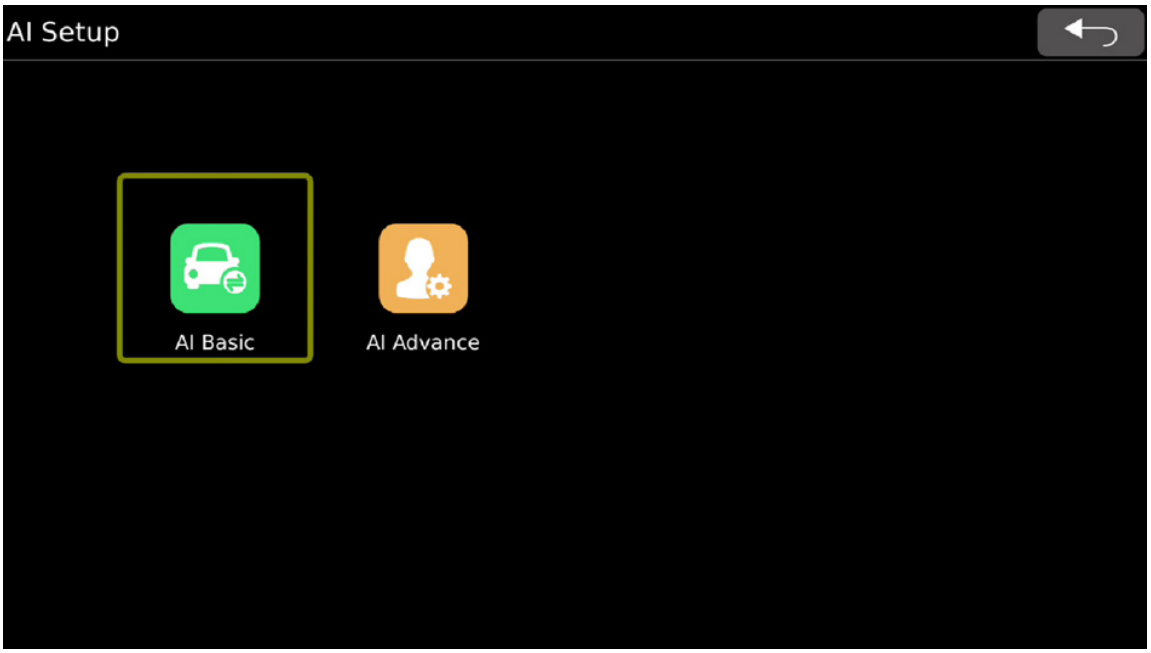
5.0 AI BASIC



There are two main menus under AI Setup:

- AI Basic Settings
- AI Advanced Settings

The AI Basic menu allows for configuration of:

- **FCW** – Forward Collision Warning: This system uses sensors to monitor the traffic ahead and alert the driver of a potential collision with a vehicle or obstacle, enabling proactive measures to be taken to avoid an accident.
- **BSD** – Blind Spot Detection: This feature detects vehicles in the driver's blind spots and provides visual or audible alerts to enhance awareness and prevent potential collisions during lane changes.
- **LDW** – Lane Departure Warning: The system monitors lane markings and warns the driver when the vehicle begins to drift out of its lane without signaling, helping to maintain proper lane position.
- **DMS** – Driver Monitor System: This functionality evaluates the driver's behavior and attentiveness, providing alerts if signs of drowsiness or distraction are detected, thereby promoting safer driving habits.
- **R151/R159** – Blind Spot Information System (BSIS) (EU): This system delivers information about vehicles in the blind spot zone, typically by using radar sensors to enhance the driver's awareness and improve safety during lane changes and merging.

Units can be changed between Metric and US Standard.

Depending on the function, speed can be used to enable or disable the audio and visual alerts.

- Low Speed: Low speed threshold setting. When the speed is lower than this value, BSD is turned on; when the speed is higher than this, FCW is turned on.
- High Speed: High speed threshold setting. LDW is turned on when the speed is higher than this value.

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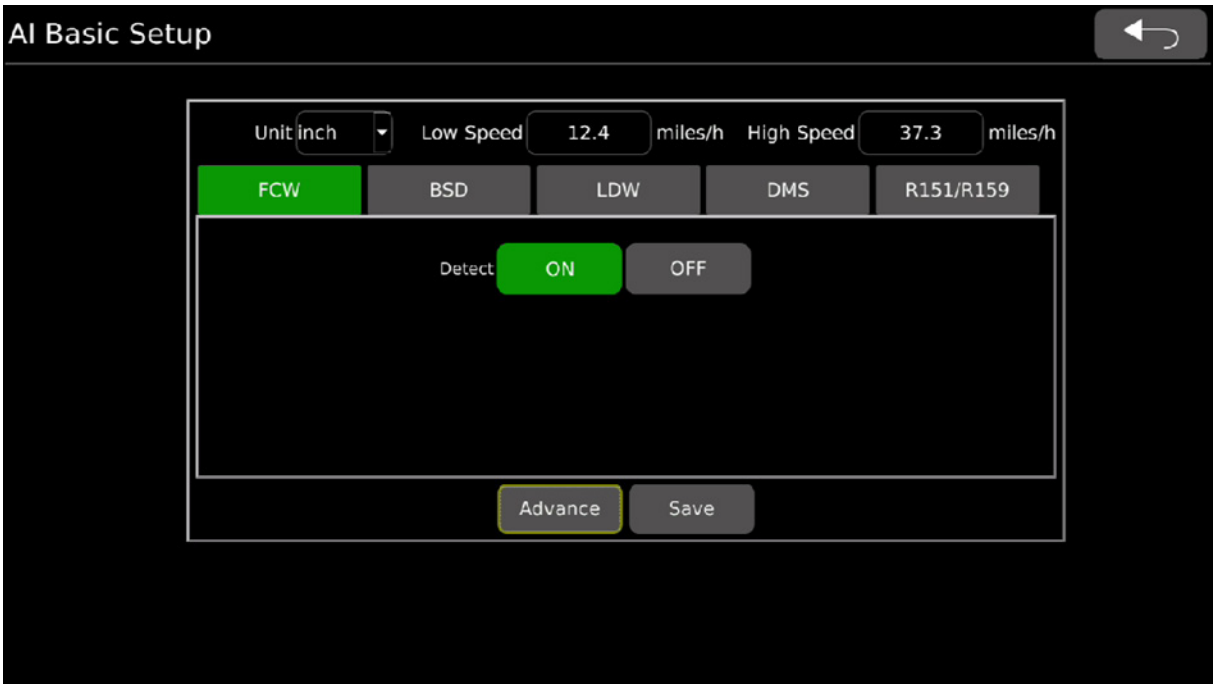
5.1 FORWARD COLLISION WARNING - FCW

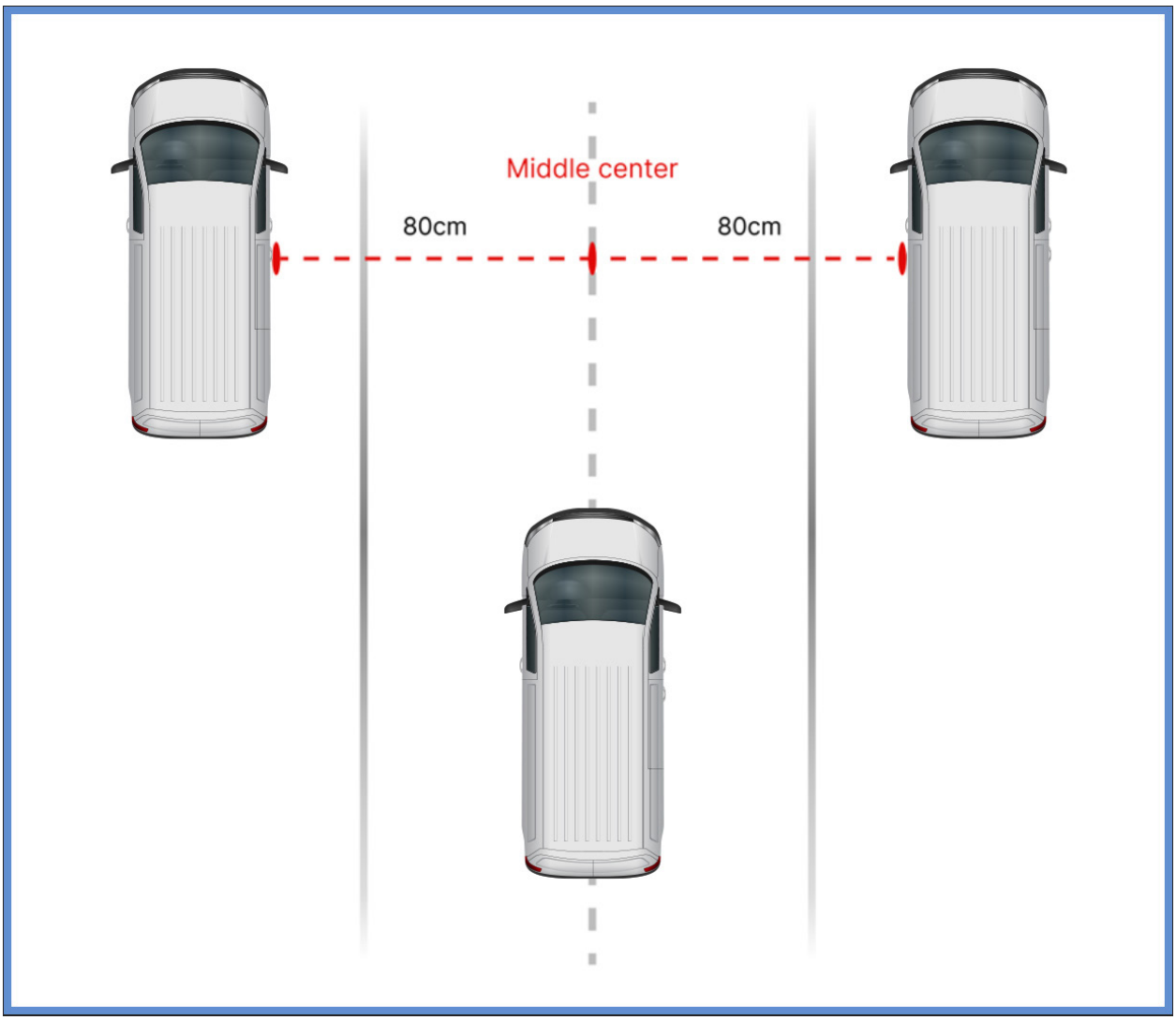


Detect Switch: Enable or Disable the Forward Collision Warning system. Default is ON

Click "**Advance**" to adjust the relevant configuration:

Alarm Time: This setting defines the duration of the trigger alert to the driver, with a default of 800ms. The alarm will activate when the calculated distance to the vehicle ahead is less than or equal to the set value. The distance is calculated using the formula: Distance to the Vehicle Ahead ÷ GPS speed.

Filter Distance: Determines the lane width of the detection zone in front of the vehicle, as measured from the centerline. The default value is 31.5 inches (80cm), for a total lane detection width of 63 inches. The system focuses on this lane width directly in front of the vehicle and excludes lanes on the left and right sides that exceed the specified distance.



Filter Width: This setting defines the filter width, with a default value of 47 inches (120cm). Vehicles with a width smaller than this value will be ignored.

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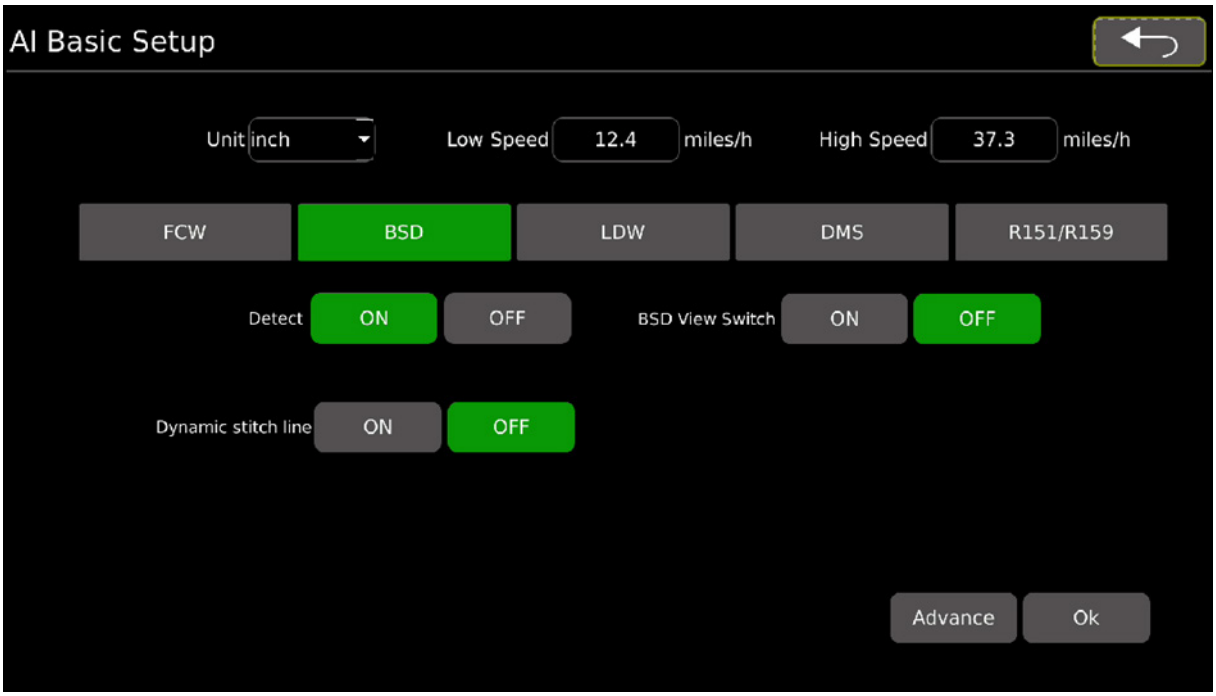
5.2 BLIND SPOT DETECTION - BSD



- Detect: Enable or Disable the Blind Spot Detection function on all channels.
- BSD View Switch: Enable or Disable the Automatic View Switching functionality. (For example: auto show channel 3 if a pedestrian is detected on that channel within the detection zone.)
- Dynamic Line Switch: Enable or Disable the Dynamic Stitching feature. When
- enabled, the system will temporarily break the 360 blending when a pedestrian is near the corners of the vehicle to reduce the chance of being hidden.

Click Advance to modify the relevant configuration:

- **Filter Height**: Pedestrians below this height will not be highlighted. 39 inches (100CM) is the default setting.
- **Filter Width**: Pedestrians narrower than this width will not be highlighted. 12 inches (30CM) is the default setting.
- Lower Confidence: Specifies the minimum system confidence threshold for pedestrian and/or vehicle detection.
- Select Camera: Choose the camera to be used for detection.
- Detect Switch: Enables or disables the BSD detection function for the selected camera.

Detection Zone Adjustments:

Width and Length are defined from the camera's perspective, looking away from the vehicle.

- **Red Zone Width & Length**: Configures the red detection zone overlay.
- **Yellow Zone Width & Length**: Configures the yellow detection zone.
- **Filter W:** Defines the width of the detection zone next to vehicle.
- **Filter H**: Defines the distance away from the vehicle.

NOTE:

When adjusting the red and yellow overlay settings, CAM 5 and CAM6 will also need to be adjusted to match CH3 and CH4 (Left and Right). This is necessary even if these extra camera ports are unused.

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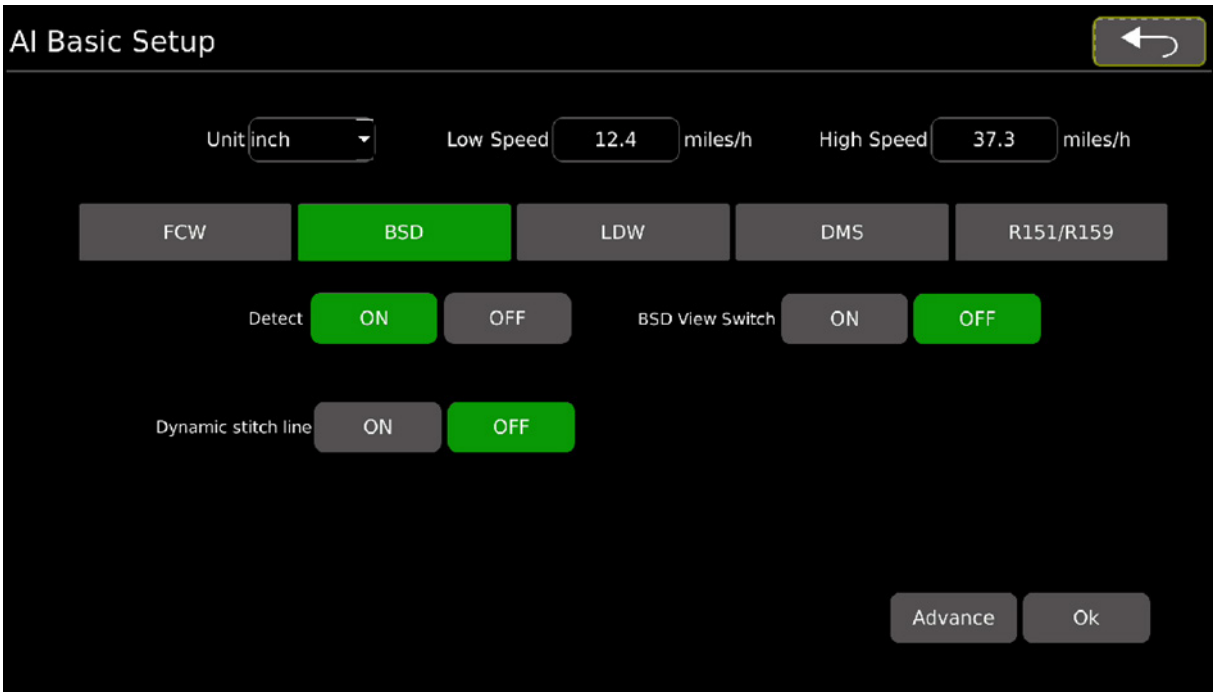
5.3 LANE DEPARTURE WARNING – LDW



- **Detect Switch**: Toggle to enable or disable the track deviation detection.
- **LDW OSD (on screen display)**: Toggle to switch the view for the side display.
- **Speed Control**: Enable or disable the speed control function. When set to "ON," the algorithm activates once the vehicle speed exceeds the specified threshold.

- **Lane Length (Filter_HL):**
  - This setting helps the system decide which lanes to monitor based on how long they are. Only lanes that are longer than a certain minimum length will be considered. Short lanes that quickly end are ignored.
- **Lane Width (Filter_HL):**
  This setting helps the system decide which lanes to monitor based on how wide they are. Only lanes that are a certain minimum width will be considered. Narrow lanes below this width are ignored.
- **Vehicle Offset Distance (Filter_DP):**
  This controls how far your vehicle can drift from the center of the lane before the warning system is activated. If you move too far out of your lane, the system will alert you.
- **Maximum Lane Width (Filter_SA):**
  This is the maximum width of the lane the system will monitor. If a lane is wider than this setting, it will be ignored by the system.
- **Minimum Lane Width (Filter_SI):**
  This sets the minimum width of a lane that the system will watch. If a lane is too narrow, the system won't alert you if you leave it.
- **Maximum Width of Two Lanes (Filter_DA):**
  This setting defines the maximum combined width of two adjacent lanes. If the total width of two lanes is wider than this setting, the system will ignore them.
- **Minimum Width of Two Lanes (Filter_DI):**
  This controls the minimum combined width of two lanes that the system will monitor. If two lanes are too narrow together, they won't be monitored.
- **Sudden Steering Changes (Filter_HA):**
  If your steering angle changes too sharply in a short amount of time, this setting prevents the system from triggering false alarms. It helps to ignore sudden, sharp movements that aren't actual lane departures.

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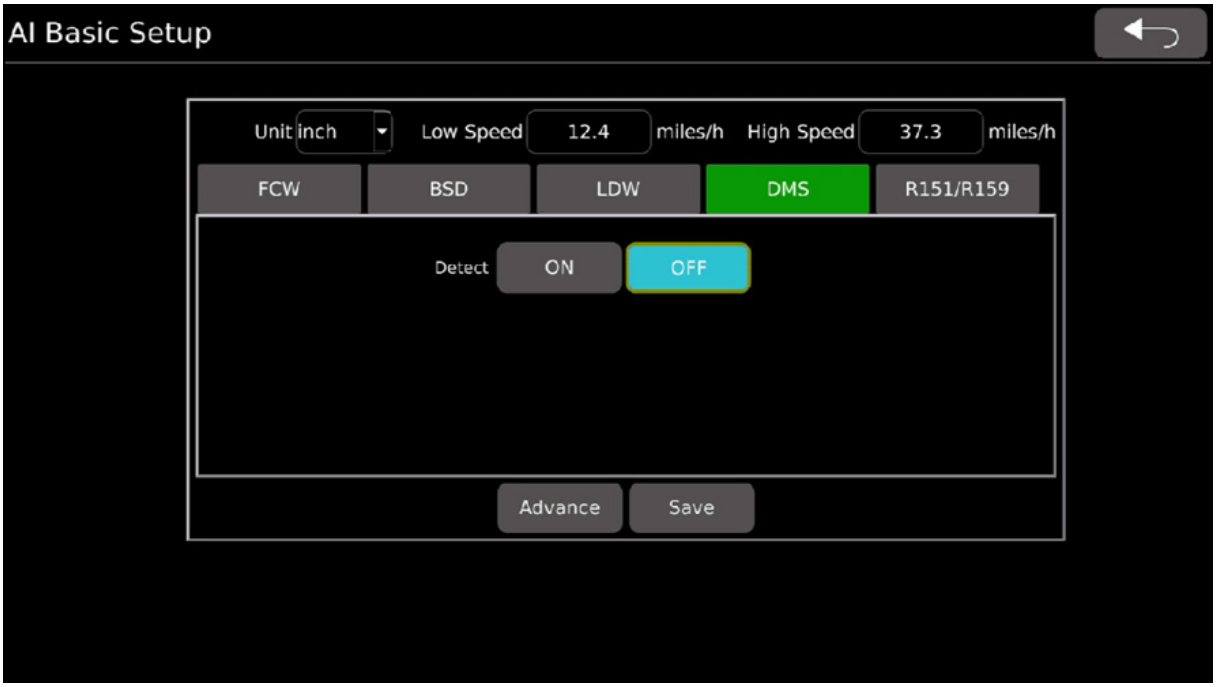
5.4 DRIVER MONITORING SYSTEM – DMS



Feature is currently not supported.

5.5 R151/R159 BLIND SPOT INFORMATION SYSTEM FOR THE EU - BSIS

Click Advance to modify the relevant configuration:

R151:

- **FrontAreaX**: The distance extending forward from the front of the vehicle.
- **FrontAreaY**: The width extending to the right side of the vehicle.
- **CenterAreaX**: The distance extending backward from the front of the vehicle.
- **CenterAreaY**: The width extending to the right side of the vehicle, relative to the center.
- **BackAreaX**: The distance extending backward from the front of the vehicle.
- **BackArea**Y: The width extending to the right side of the vehicle, near the rear.
- **FrontSpeedlimit**: The speed of objects or vehicles approaching from the front right area of the vehicle.
- **RightSpeedlimit**: The speed of objects or vehicles moving from the back right area of the vehicle.
- **D1 (Alarm Filter Area)**: The area within a certain distance (D1) in front of the vehicle is designated as the alarm area, while the area beyond this distance is the warning area.
- **D2 (Alarm Filter Area)**: The area within a certain distance (D2) behind the front of the vehicle is the alarm area, while the area beyond this distance is the early warning area.

R151:

- **W0**: Width of the warning area in front of the vehicle
- **H0**: Length of the warning area in front of the vehicle
- **W1**: Width of the warning area in front of the vehicle
- **H1**: Length of the warning area in front of the vehicle

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6.0 AI ADVANCE

Several settings relating to the performance and detection settings of the AI system can be found within this menu. Under normal operation there is no need to adjust any of the settings within this menu. Please exercise caution when adjusting any variables and perform a safe and controlled functionality test afterwards to ensure proper performance.

- **Fake Speed**: Virtual speed setting. This value takes effect when there is no GPS speed available. This is intended to be used for testing purposes only.
- **Debug OSD**: Debug On-Screen Detection switch, including BSD and FCW. This will enable a technical overlay and display information such pedestrian detection confidence percentages, lane lines, etc. This is intended for troubleshooting and debugging only.
- **Net Type**: Network type. 480 and 608. Modifications to this setting are not recommended.
- **Detect Mode**: AI detection mode is divided into Show, Precision, Auto, and R151/R159. The default mode is Auto.
  - **Show & R151/R159**: Only detect pedestrians
  - **Precision**: Blind Spot Detection
  - **Auto mode**: Blind Spot Detection + Forward Collision Warning
- **Detect Target**: Blind Spot Detection type
  - Both Pedestrians & Vehicles
  - Pedestrians Only
  - Vehicles Only

6.1 DETECT MODE - SHOW

This mode is for non-calibrated systems or used for simulation calibration and is intended for use when demonstrating the system only.

- Select Camera: Select the detection camera
- Alarm Enable: On/Off Switch
- Color Show: On Screen Display switch
- Green: Safe Distance
- Yellow: Warning
- Red: Danger

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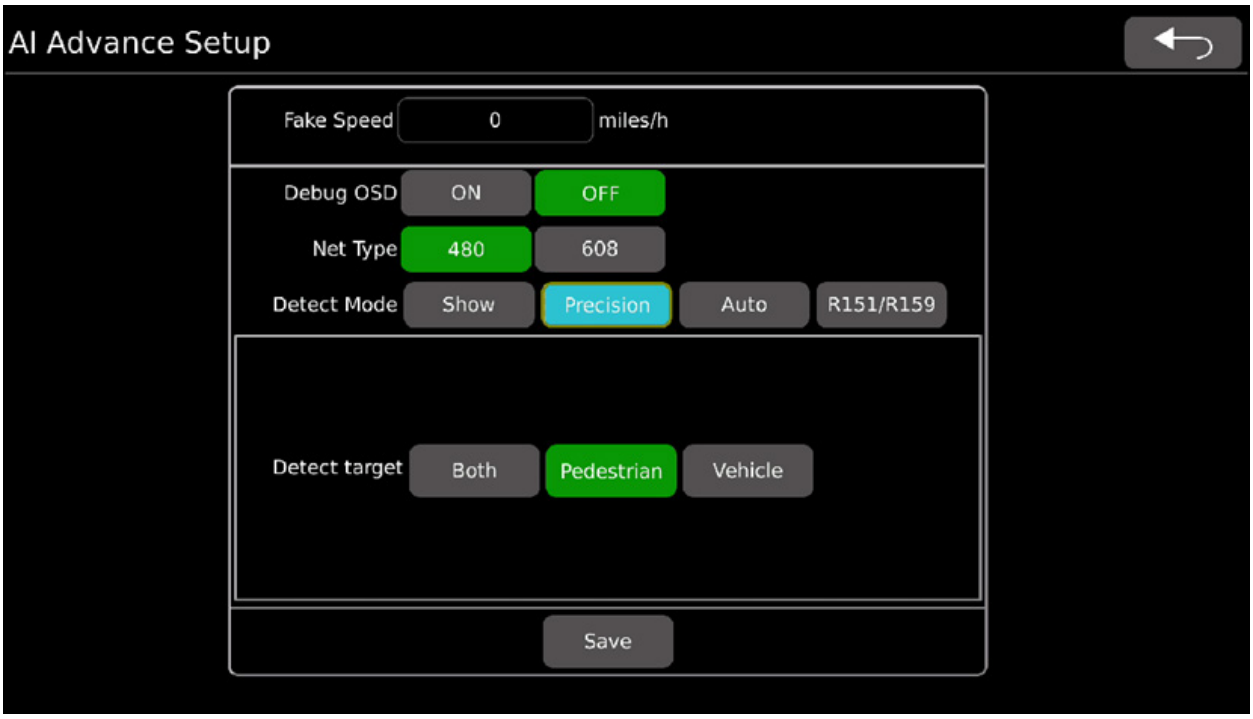
6.2 DETECT MODE - PRECISION

This mode is used after calibration. This is only used for BSD detection.



6.3 DETECT MODE – AUTO

This mode is activated after calibration for enhanced Blind Spot Detection (BSD) + Forward Collision Warnings (FCW) detection.

FCW can only be active in this mode. When the vehicle's current GPS speed is below the Low Speed setting in AI Basic, the system will prioritize the BSD detection. Once the GPS speed exceeds the "Low Speed" threshold, the front camera automatically switches to FCW detection mode, while the other cameras continue with BSD detection.

6.4 DETECT MODE - R151/R59

This mode is a specialization detection mode for European regulations R151 & R159.

Enable Type: Both, R151, R159

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7. TROUBLESHOOTING

Issue	Recommended Steps
System is not detecting pedestrians.	1. Check and ensure the BSD function is enabled. 2. Check Lower Confidence %, Filter H and Filter W settings.
System is detecting random objects (vehicle side mirrors, handicap signs, etc)	Decrease the Lower Confidence % so the system will apply stricter object filtering.

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