



7-inch High-Performance Thermal Car Camera System User Manual





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I. Introduction

In recent years, with the rapid development of artificial intelligence (AI) and autonomous driving technologies, numerous driver assistance systems have emerged in the market. These innovative technologies enhance driving comfort and safety without interfering with the driver's operation.

A core function of most driver assistance systems is to alert drivers to potential hazards in advance, thereby helping avoid traffic accidents.

Our newly launched 5-inch Thermal Car Camera System (hereinafter referred to as the "Car Camera System") is designed to meet such needs.

Without this Car Camera System, drivers often struggle to clearly see distant pedestrians at night, especially on poorly lit roads, when facing oncoming high beams, or in rainy, foggy, and hazy conditions. This significantly increases the risk of collisions with vulnerable road users (pedestrians, cyclists, motorcyclists, electric vehicle riders, tricyclists, animals, etc.), potentially leading to irreversible losses.

Equipped with our Car Camera System, the vehicle can capture far-infrared thermal radiation emitted by pedestrians, vehicles, and animals via a thermal imaging camera. The system generates video images based on thermal radiation intensity, greatly expanding the driver's field of view. Integrated with advanced AI recognition for pedestrians, vehicles, and animals, the system provides early warnings, enabling drivers to navigate complex nighttime road conditions safely and avoid potential dangers.



As shown in the figure above, the Car Camera System clearly displays pedestrians and road conditions invisible to the naked eye, highlighting pedestrians in red to indicate collision risks. It also triggers audible alerts, giving drivers ample reaction time to mitigate nighttime traffic accidents.

II. Welcome

Thank you for choosing our Automotive Car Camera System.

This product is a cutting-edge driver assistance solution designed for the automotive aftermarket, tailored for nighttime and adverse weather driving. It integrates advanced stabilization, sensor, and image processing technologies, as well as high-efficiency multi-thread deep learning AI recognition algorithms.

Featuring an uncooled infrared detector and a low-power, high-performance AI System-on-Chip (SoC), the system delivers imaging capabilities including zero-light visibility, anti-glare, smoke/fog/haze penetration. The 5-inch display unit integrates intelligent detection for pedestrians, animals, and vehicles, plus collision avoidance alarms, significantly enhancing nighttime driving safety. The all-in-one display and algorithm design simplifies installation.

Please read and retain this manual carefully before installation and use. We hope this product meets your needs and serves you reliably long-term.

Our company reserves the final right of interpretation for any inconsistencies between product functions/operations and this manual due to software/hardware upgrades.



III. Precautions

- Thermal imaging technology is widely used in military and aerospace applications. This product is intended for civilian driver assistance only. Comply with national laws and regulations; do not use it for illegal purposes.
- Operating temperature: -30°C to 70°C. Use only within the specified temperature range.
- Camera: IP67 waterproof rating; 5-inch main unit: IP66 waterproof rating.
- The lens is coated with an anti-reflective film to optimize imaging quality. Do not touch the lens directly—fingerprints and acidic residues may damage the coating. Clean only with a dedicated lens cloth or eyeglass cloth.
- Do not expose the lens directly to intense light sources (e.g., the sun, high-power lasers, welding machines) for extended periods, as this may damage precision optical components.
- Thermal imaging generates images based on surface temperature differences. As ambient temperature rises, image contrast decreases, and temperature differences between humans and the environment narrow—this is normal and does not indicate a malfunction.
- The thermal imaging camera features automatic shutter calibration to maintain high-quality images. Brief image freezes (~100ms) during shutter operation are normal.
- The camera is equipped with a high-strength protective window and automatic heating for defrosting/icing removal in low temperatures. If the window is damaged by severe impact, contact an authorized repair center immediately to avoid internal component damage.



IV. Driver's Responsibility

- The Car Camera System only provides driving and warning assistance. The driver bears full responsibility for all driving operations.
- The Car Camera System is a driving aid and cannot address all traffic, weather, and road conditions.
- Always use the system only when it is safe to do so.
- Our company assumes no liability for any losses arising from improper use of the system or image recognition errors.

V. Features

- **Easy Installation:** Miniaturized camera design.
- **High Integration:** All-in-one design combining high-performance algorithm module and 5-inch display module.
- **Pedestrian Recognition:** Detects pedestrians 80–100m away (ambient temperature: $23\pm5^{\circ}\text{C}$).
- **Animal Recognition:** Detects animals over 1.7m tall up to 60m away.
- **Vehicle Recognition:** Detects vehicles up to 200m away.
- **Adjustable AI Sensitivity:** Customizable detection sensitivity.
- **Touchscreen Support:** Intuitive touch operation.
- **Pseudo-Color Switching:** 7 modes—White Hot, Black Hot, Iron Red, Warm Hot, Rainbow, Lava, Red Hot.
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- **Multi-Language Support:** 10 languages—Simplified/Traditional Chinese, English, French, Russian, Korean, Arabic, Spanish, German, Portuguese.
- **Long-Range Night Vision:** Detects road conditions 300–500m ahead in complete darkness.
- **Glare Suppression:** Unaffected by high beams/strong light glare, ensuring safe driving assistance.
- **Penetration Capability:** Effectively penetrates fog, dense fog, smoke, haze, and glare for clear imaging.
- **Zoned Warning:** 3-level customizable warning zones.
- **Warning Output:** 3.3V warning signal level output (synchronized with audible alerts).
- **Video Recording:** Supports USB flash drive recording.
- **Customizable Boot Video:** Personalized startup video.
- **Customizable Interface Logo:** Brandable interface logo.
- **Customizable Warning Voice:** Personalized alert voice.

VI. Product Components



5–7-inch Main Unit (integrated algorithm module)



Thermal Car Camera



5m Extension Cable



Main Unit Mounting Bracket



Camera Mounting Bracket



Power Supply

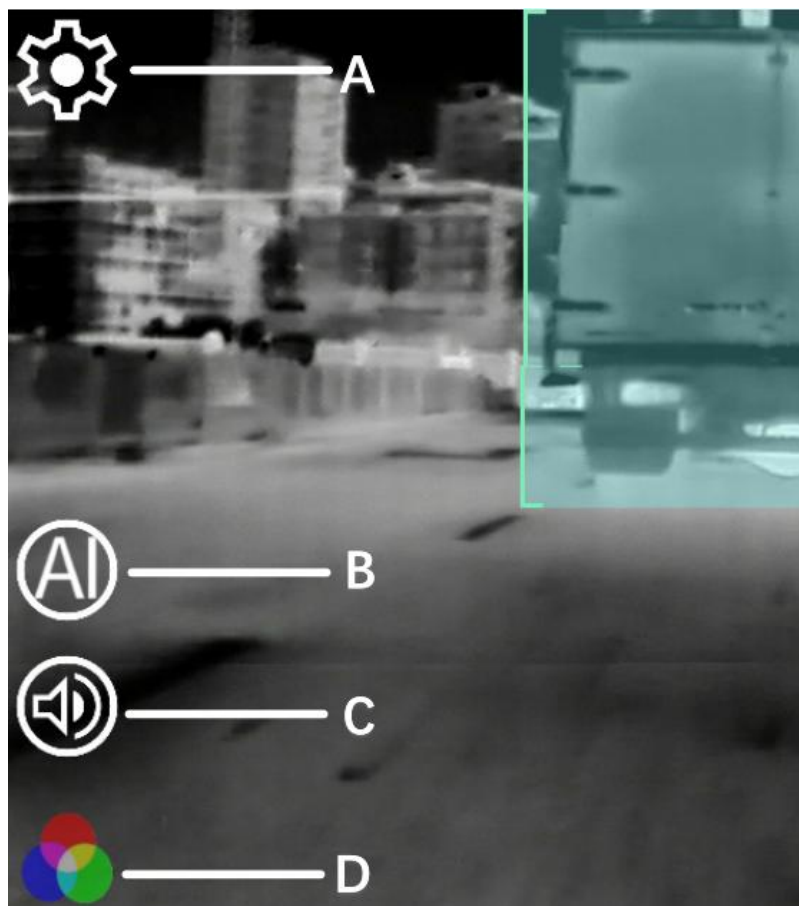
Key Notes

1. Main unit supports 9–24V wide voltage (power module: 9–32V input, 12V output).
2. Camera is installed externally (typically in the front grille).
3. Main unit is installed in a suitable position inside the vehicle.
4. A voltage stabilizer is mandatory; connect the red positive wire of the stabilizer to ACC.

5. Wrap the camera-cable interface with waterproof tape for enhanced waterproofing.
6. Warning parameters can be adjusted via the touchscreen.
7. Accessories may vary by camera resolution, but installation and operation remain consistent.
8. Main unit outputs a 3.3V warning signal—non-professionals should not connect loads.

VII. User Interface

- Home Screen



Tap icons to access settings.

A. Settings Menu

Tap to enter system configuration.

 Back

 English 

 Per Warn

Near



 Veh Warn

Near



 Anim Warn

Near



 Volume

50%



 Brightness

50%



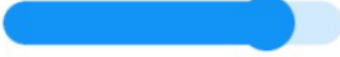
 Contrast

50%



 Per Recog Sens

80%



 Veh Recog Sens

80%



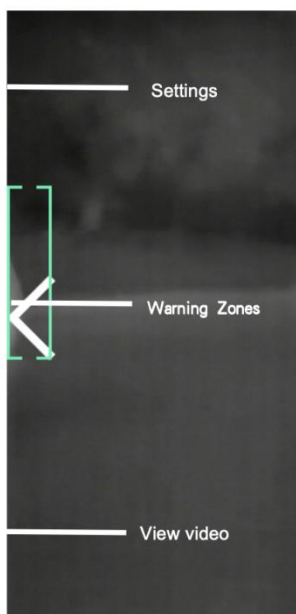
 Anim Recog Sens

80%



 Reset

 Version XY-V160-M6324



Click to enter the settings menu  and operate as follows.

Simplified Chinese: Switchable between 10 languages: Simplified Chinese, Traditional Chinese, English, Russian, Arabic, German, French, Japanese, Korean, and Portuguese.

Pedestrian/Vehicle/Animal Alert: Four options available: Near / Medium / Far / Off.

Near: Alert only for the red warning zone.

Medium: Alert for the yellow and red zones.

Far: Alert for all three zones (red, yellow, blue).

Alert urgency varies by zone.

Volume: Adjust the alert volume.

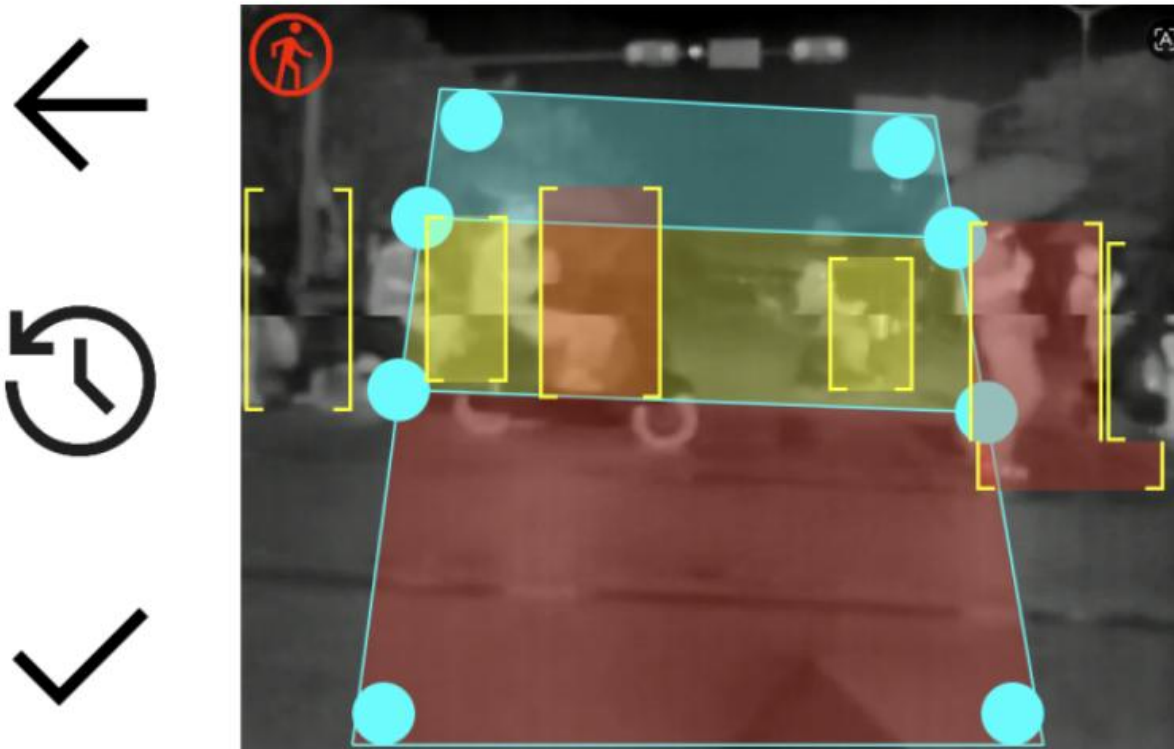
Brightness: Adjust screen brightness.

Contrast: Adjust the contrast of the thermal image.

Pedestrian/Vehicle/Animal Detection Sensitivity: A higher value increases detection range but raises the risk of false detection; a lower value does the opposite.

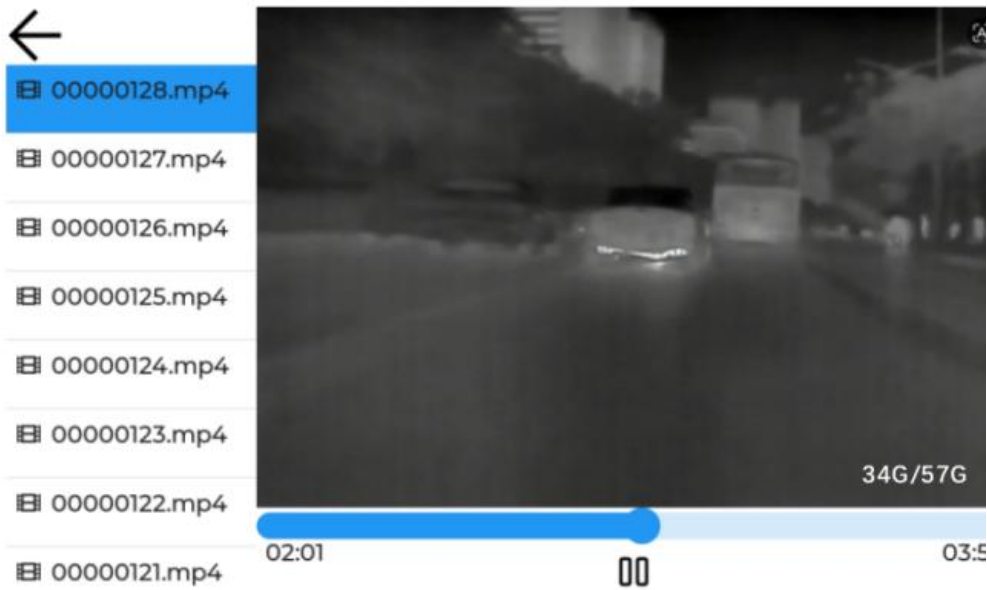
Restore Defaults: Reset the system to factory default parameters.

- Click to enter the warning zone settings  and operate as follows.



Drag the circles freely to adjust the warning zones, then click  Save Settings to confirm.  icon restores the default settings. Tap Back  when finished.

- Click Recordings to view videos  and operate as follows:



Note: 34G/57G indicates (used capacity / total capacity) of the USB flash drive.

B. Disable AI Function



After tapping this icon, it changes to  indicate that all AI functions are disabled. Detection boxes on the screen will disappear, and the warning horn will not activate.

C. Mute Warning Horn



After tapping this icon, it changes to  indicate that the audible warning is disabled, while the detection boxes on the screen remain visible.

D. Pseudo-Color Switching

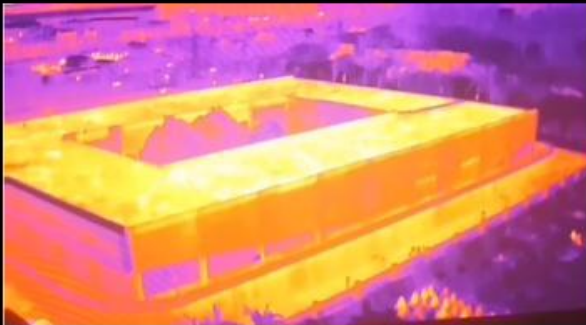
Tap the icon to cycle the thermal image from White Hot (default) through Black Hot, Iron Red, Warm Hot, Rainbow, Lava, and Red Hot.



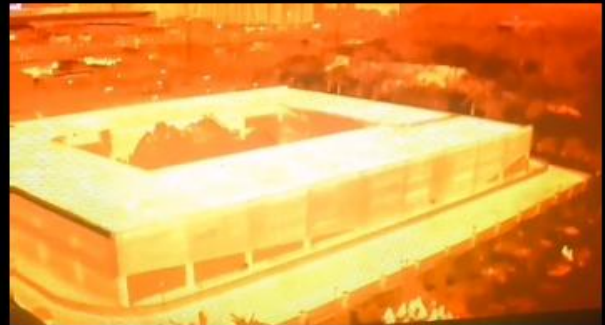
White Hot



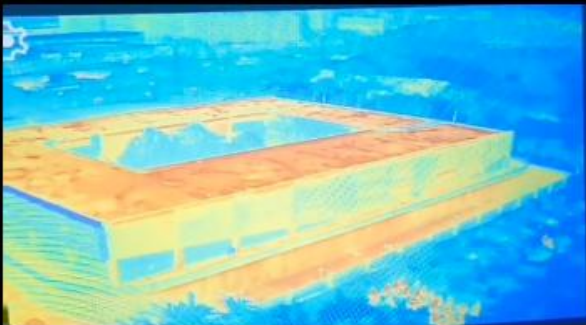
Black Hot



Iron Red



Warm Hot



Rainbow



Lava



Red Hot (threshold adjustable)

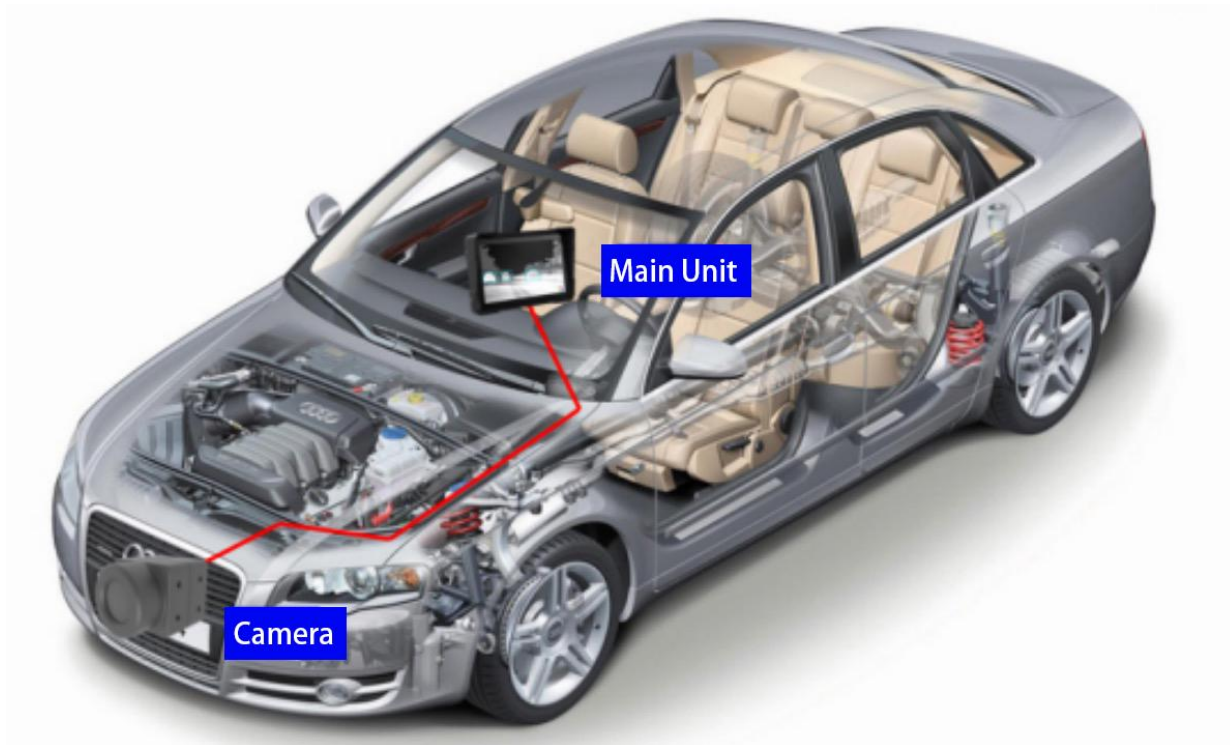
In addition, if the icon  appears, you can adjust the thermal

image contrast; tap  to restore the default contrast.

VIII. Installation

Disclaimer: This product is precision equipment. Proper installation is critical to performance. Installation must be performed at a professional auto repair shop.

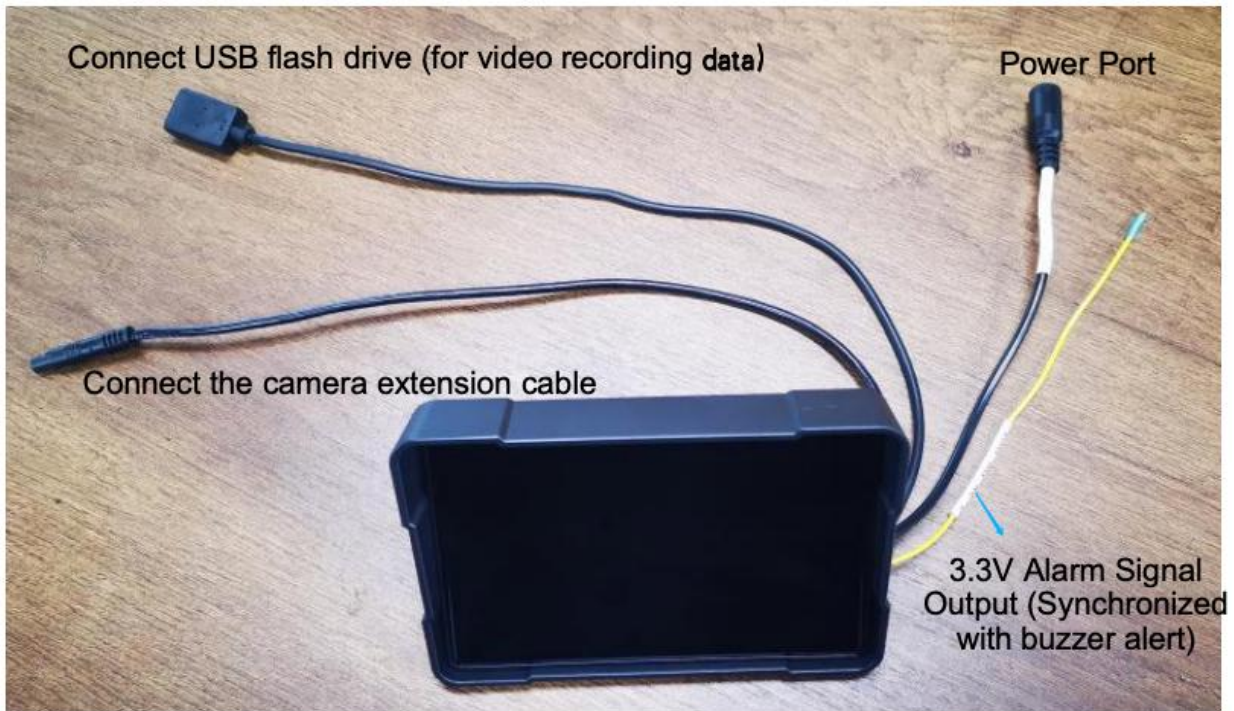
Step 1: System Layout



- Camera: Mounted in the front grille via a bracket.
- Cables: Routed from the engine bay to the driver's compartment console.
- Main Unit: Installed in a convenient position inside the vehicle.



Step 2: Main Unit Connections



Connection Diagram

- The main unit only needs to be connected to the regulated power cable and the camera extension cable.
- The main unit can be affixed to the dashboard with a bracket, depending on the vehicle model.
- The 3.3 V alarm output line is for signal output only. It is recommended to connect it to a relay; connecting it to a load is prohibited.

Step 3: Camera Mounting Position

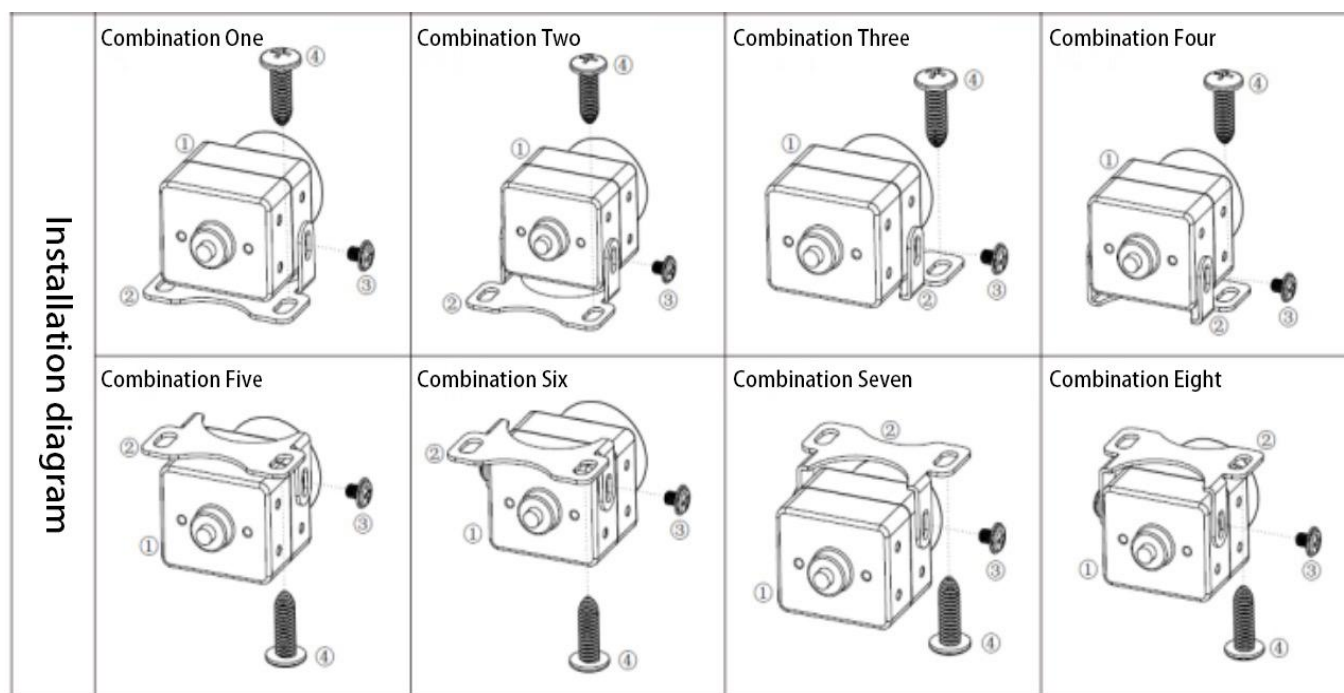


- Since far-infrared thermal radiation cannot penetrate glass, the camera must be installed outside the vehicle, inside the front grille of the bumper.
- Preferred mounting: Upper section of the front bumper (Area 1).
- If the air intake in Area 1 is too small for installation, or the area is fully enclosed (e.g., in pure electric vehicles), install the camera in Area 2, the lower section of the front bumper.
- This installation method applies to all passenger vehicles and commercial vehicles.
- The camera does not need to be centered; position it close to the center according to the specific vehicle model.

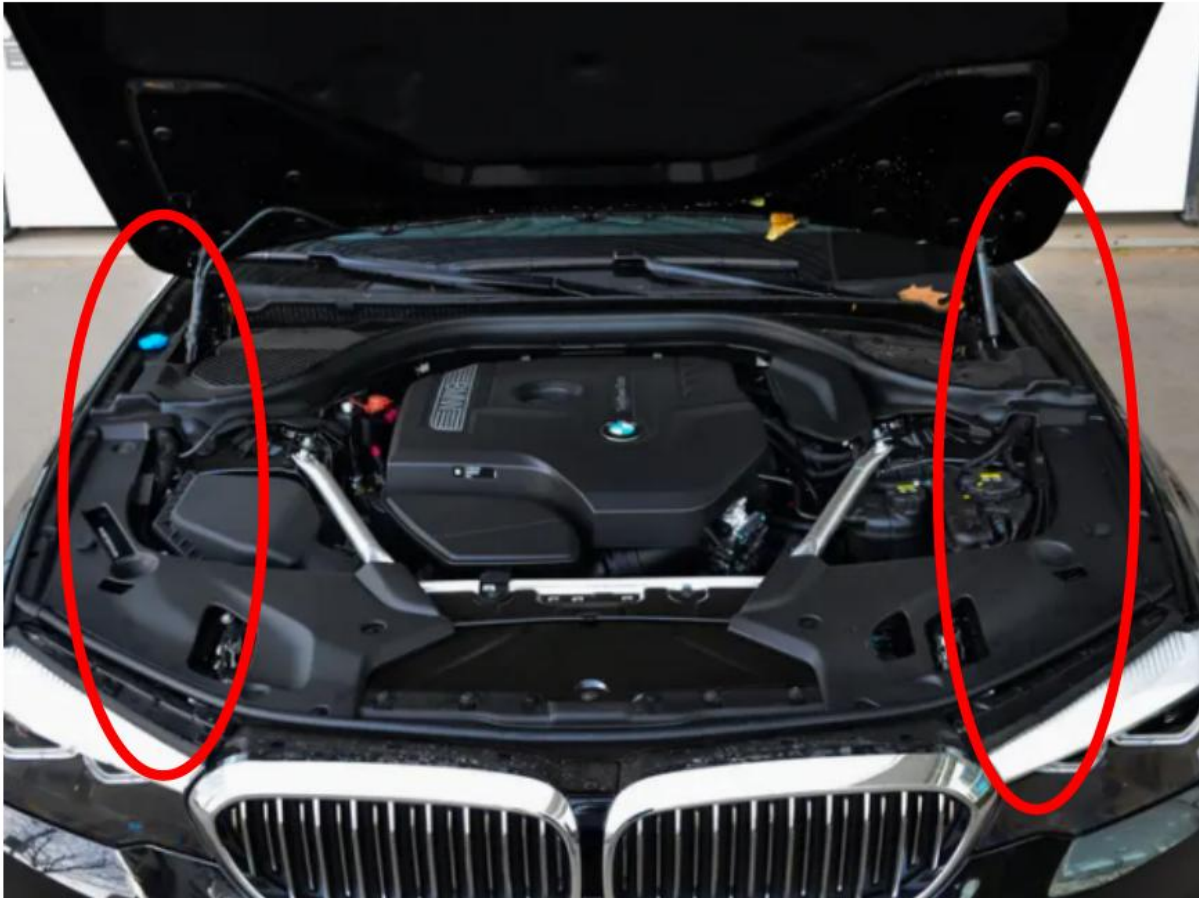
Step 4: Camera Installation



- This product comes with a universal bracket designed for various scenarios and vehicle models, enabling quick installation on most vehicles.
- The camera has 8 reserved mounting screw holes, allowing different installation methods to suit various vehicle models.



Step 5: Camera Wiring Installation



- Route cables along both sides of the engine compartment and lead wires into the cab under the A-pillar.
- Wiring access to the cab is feasible for all vehicle models.
- The matched cables are auto-grade, high-low temperature resistant, anti-aging and double-shielded for safe use.
- Keep cables away from engine casing, run alongside original vehicle wiring and secure with cable ties.
- Connect the 5-meter extension cord to the camera port of the main unit to finish connection.

Step 6: ACC Power Connection Installation



- The accessory includes a 9-32V input & 12V output vehicle voltage stabilizer with built-in fuse.
- Connect the red wire to ACC line and black wire to ground.
- ACC power cuts off automatically after vehicle locking with no battery drain.
- The 3.3V high-level alarm output shall not be connected with extra wires or loads by non-professionals.
- Plug the DC male connector of power module into the DC female port of main unit to power on the device.

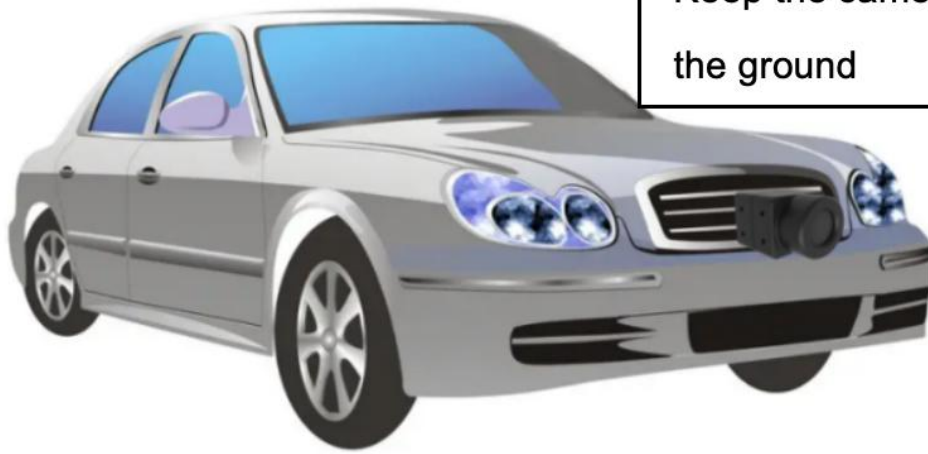


Step 7: System Startup

- After finishing above steps, connect wires as Step 2 and conceal cables properly.
- The system starts automatically once vehicle power is switched on.
- First boot takes about 10 seconds including thermal camera preheating.
- Startup is complete when thermal image displays on the main unit.



Step 8: Camera Angle Adjustment & Debugging



Keep the camera parallel to the ground



Keep the horizon line centered on the screen

- Keep the camera parallel to the ground regardless of mounting height, and ensure vertical viewing angle.
- After proper installation, the horizon line shall be roughly in the center of the screen.
- Fasten the bracket with self-tapping screws after adjustment.