

360 Panoramic Navigation Integrated Unit Debugging Tutorial

Specific Principles for Camera Installation:

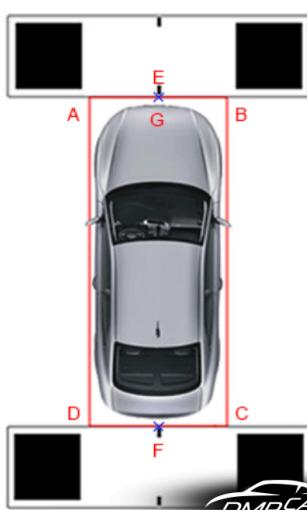
1. The front and rear cameras should be installed as centrally and as high as possible, minimizing the height difference between the four cameras. The recommended angle is approximately 30 degrees downward from horizontal. The minimum installation height from the ground must not be less than 40 cm.
2. The glass surface of the front and rear cameras should be flush with the protruding parts of the front and rear vehicle body. Avoid recessing the lens into the body, as this increases the blind spot.
3. The vertical tilt angle for the left and right cameras should be greater than 25° and less than 45°.
4. The left and right cameras should be installed on the flat middle part under the rearview mirrors, and they should be symmetrical on the left and right sides. The installation point should be flush with the protruding surface of the front fender.

As shown in the figure, the areas indicated by the yellow arrows: if positioned too outward, it affects appearance; if too inward, it enlarges the view blind spot.



5. After installing the four cameras, the installer can adjust the camera positions and angles using the quad-split image to achieve optimal angles. To improve stitching quality, ensure that when each of the four cameras captures a single image during calibration, the image is centered on the screen and the dark corners are evenly distributed around the edges.
6. Side-view cameras should be installed pointing vertically downward, or installed with a 30-degree outward tilt.

Debugging Instructions:



1. One 7.5-meter tape measure.
2. Lay out the calibration cloths. Align the center points of the front and rear cloths with the centerline of the vehicle body. Secure them so they are not blown askew by the wind. The edges of the front and rear calibration cloths should be approximately 30 cm from the front bumper and rear bumper, respectively.
3. Use the quad-split view in the 360 software's stitching debug menu to confirm whether the cameras are installed correctly and the calibration cloths are placed reasonably.

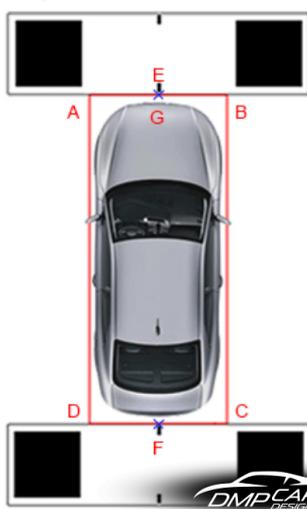


- A. Ensure that the left and right view images on the head unit match the actual left and right side mirrors (check the distribution of the front, rear, left, and right mirrors in the image below, and have a person move around to confirm).
- B. Ensure that the front part of the vehicle shown in the left and right mirrors is aligned (the yellow arrow below indicates the front of the vehicle).
- C. Ensure that both the front and rear portions of the left and right cameras can capture the sides of the vehicle body, and that the vehicle body sides appear parallel. Ensure the left and right views can fully see the calibration cloths (front and rear), and that the front and rear cloths are symmetrically distributed in the image.
- D. Ensure that the front and rear camera images are not upside down or tilted. In the left and right camera images, the vehicle body should be positioned at the bottom of the frame.
- E. Ensure there are no obvious shadows, water stains, or debris on the calibration cloths, and that the black and white areas are distinct.

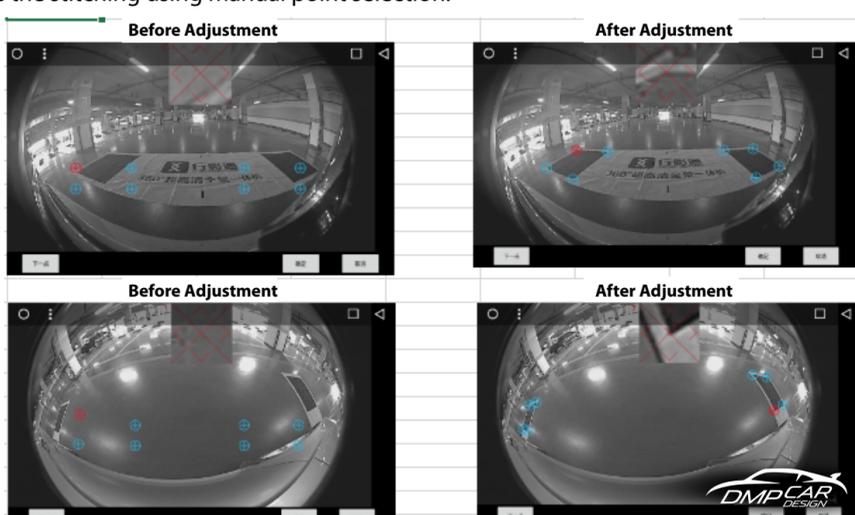
[Image description: Quad-split view showing left/right/front/rear camera feeds with annotations.]

4. Using the tape measure, align it with the specified positions on the calibration cloths, measure and record the following three data points:

AD = Distance between the inner edges of the front and rear cloths
 AB = Distance between the left and right cameras
 EG = Front offset



5. Enter the calibration settings (Password: 4321).
6. Panoramic Calibration:
 - A. Input the corresponding camera lens specifications.
 - B. Input the front offset distance, left-right distance (unit: mm).
 - C. Input vehicle model keywords, and select the best matching stitching option for the current vehicle from the suggested list.
 - D. Select Auto Stitching, wait approximately 30 seconds. Upon successful stitching prompt, the system is ready for normal use.
7. To prevent data loss, save the stitched data (Project Settings -> Export Parameters, save to the unit).
8. In case automatic stitching fails, you can use the manual calibration button next to the auto button to complete the stitching using manual point selection.



9. As shown in the image above, directly click on the red cross point or the "Next Point" button to switch points. Drag points to roughly position them. Use the magnifier window to drag and fine-tune the corresponding point positions. Once all points are precisely aligned, click "Confirm" to proceed to point selection for the next image.