

People Flow Counting Site Survey and Commissioning Guide



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Revision History

Revision Date	Revision Version	Description	Author
2021-08-19	2.01	Document template and format adjusted, initial draft completed, review initiated	01203
2022-03-03	2.02	Algorithm upgraded, maximum coverage width updated, minimum pixel and occlusion requirements for detected targets updated	01203
2025-12-10	3.00	Related constraints optimized, installation scene examples added, etc.	11893, 03956
2026-8-10	3.1	Added introduction of the two modes of People Flow Counting	11893

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1 Site Survey

The People Flow Counting function can detect targets (head and shoulders of people) in the monitoring image in real time. Based on the smart rule line configuration, it records the number of people entered, people exited, and people present in real time. In Crowd Density Detection mode, when the number of people present exceeds the configured threshold, the camera can report an alarm and trigger related alarm actions.

It is typically applied at passageways or gates with heavy foot traffic, such as hospitals, shopping malls, stations, and airports.

1.1 Scene Requirements

1. Environmental Lighting Requirements

The environmental lighting must be even and stable, and the illuminance must be greater than 50 lux.

Avoid scenes with occlusion, shadow interference, strong reflection, or strong backlight. Such scenes can easily cause missed and false alarms.

2. Detected Target Requirements

Pedestrian lateral speed requirement: Normal walking speed.

When multiple detected targets are present at the same time, they must not occlude each other.

The foot traffic direction must be fixed. If the direction is not fixed, the foot traffic may run parallel to the rule line, resulting in missed detections.

3. Camera Resolution Requirements

Camera resolution of 2MP or above, aspect ratio 16:9, and pedestrian head and shoulder size of 32 × 64 pixels to 320 × 640 pixels are required.

Fisheye distortion, zoom, and thermal imaging modes are not supported.

4. Installation Requirements

The camera angle must not be nearly parallel to the pedestrian targets. In such scenes, the pedestrian target size is too large, affecting the detection performance and possibly causing missed detections.

Avoid lens occlusion, vibration, image blurring, defocus, and distortion.

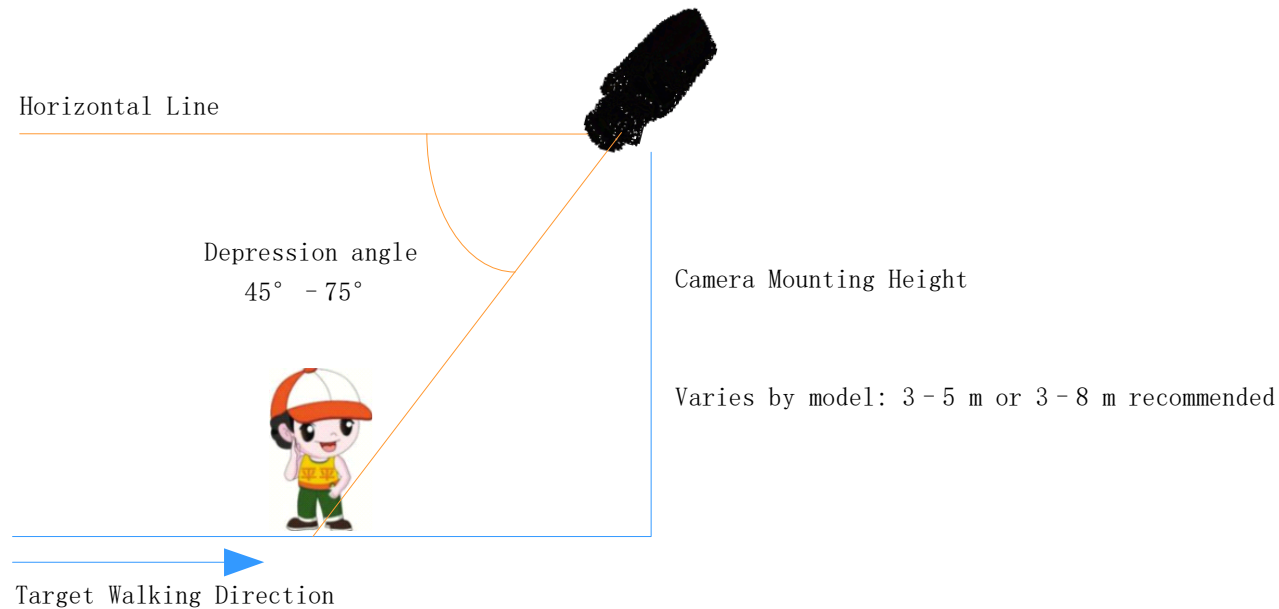
Model	Recommended Mounting Height	Recommended Coverage Width	Recommended Monitoring Distance	Depression Angle	Model Example
Models containing -VG or I	3–5 m	3–6 m, up to 12 m maximum	Monitoring area radius 10 m to 15 m	30° to 90°	IPC-B3A4-IR@PAK-IR3-F60-VG; IPC2A5I-IR6-AUF40-B-DT
Models containing -VD1, -VD2, -VH1, -VF	3–8 m	3–6 m, up to 25 m maximum	Monitoring area radius 10 m to 20 m		HIC26441-WH@X4-F40-VD1; HIC2641-WH@Z80-VH1

2 Installation

For installation methods, refer to the Quick Start document for the corresponding camera model.

2.1 Installation Notes

Installation illustration is as follows:



After the monitoring area is fixed, the camera monitoring area must not be moved or rotated.

If the foot traffic in the monitoring area is extremely dense and essentially stationary, the detection results will be affected. Such scenes should be avoided whenever possible.

2.2 Installation Scene Examples

2.2.1 Recommended Scenes for People Flow Counting

1. Top-Down View (Recommended)

Installation Requirements:

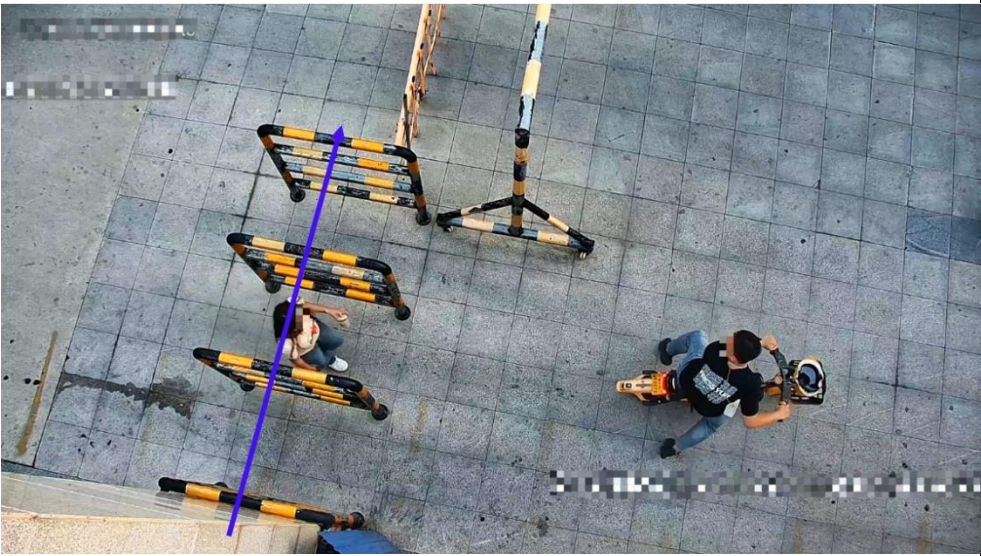
Mounting height approximately 3 m

The camera shoots vertically downward, and the foot traffic direction is perpendicular to the rule line

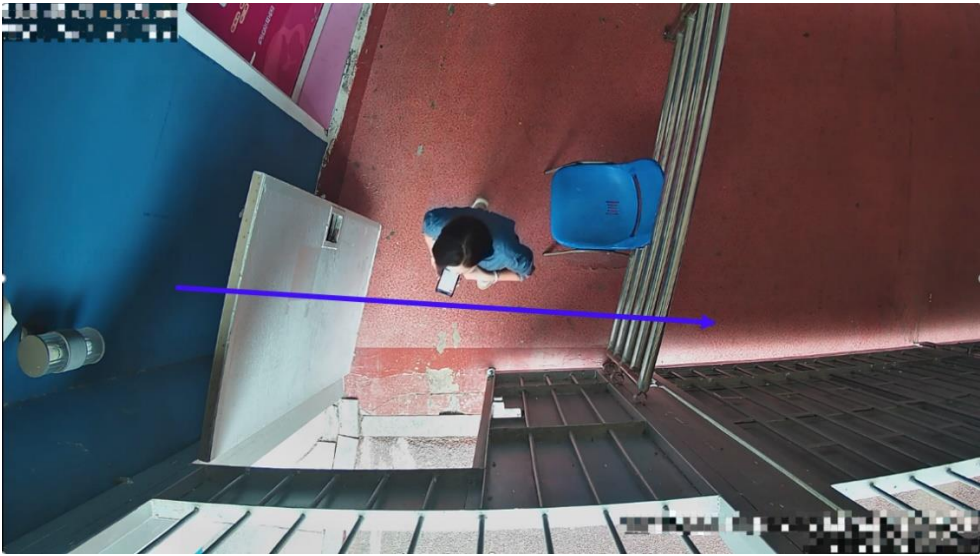
Sufficient lighting in the detection image

Pedestrians show complete head and shoulders, with no occlusion in the foot traffic direction

Outdoor Entrance/Exit



Indoor/Passageway



2. Angled View (Recommended)

Installation Requirements:

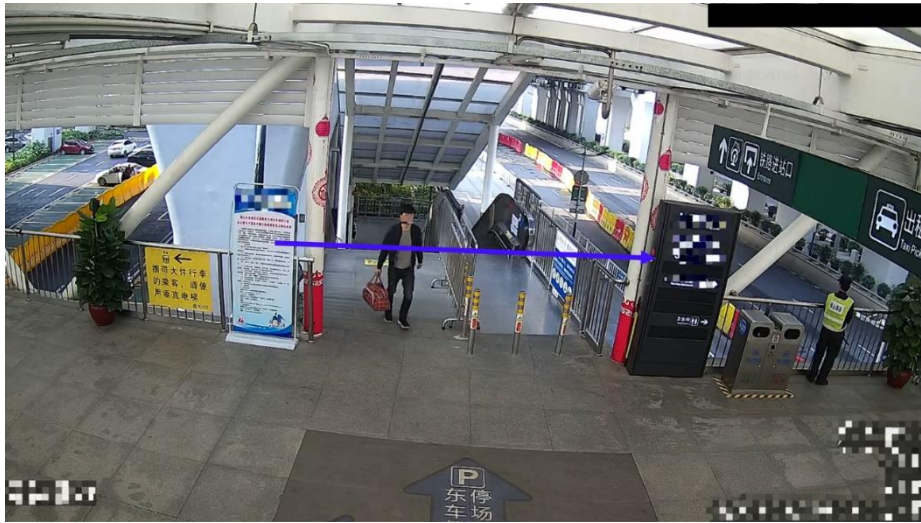
Mounting height 3–5 m

Camera depression angle 30° to 60°. The higher the camera, the larger the depression angle should be

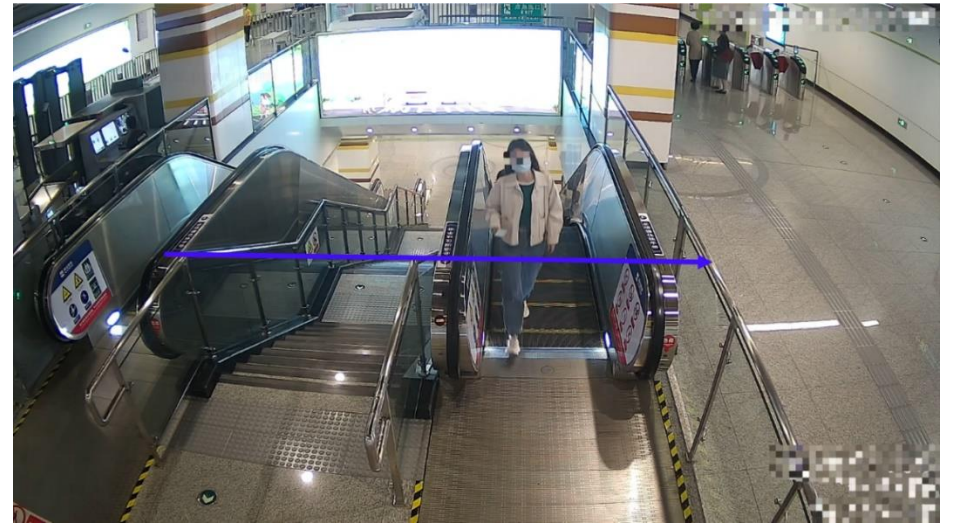
Sufficient lighting in the detection image

The camera faces the pedestrian direction, showing complete head and shoulders, with no occlusion in the foot traffic direction

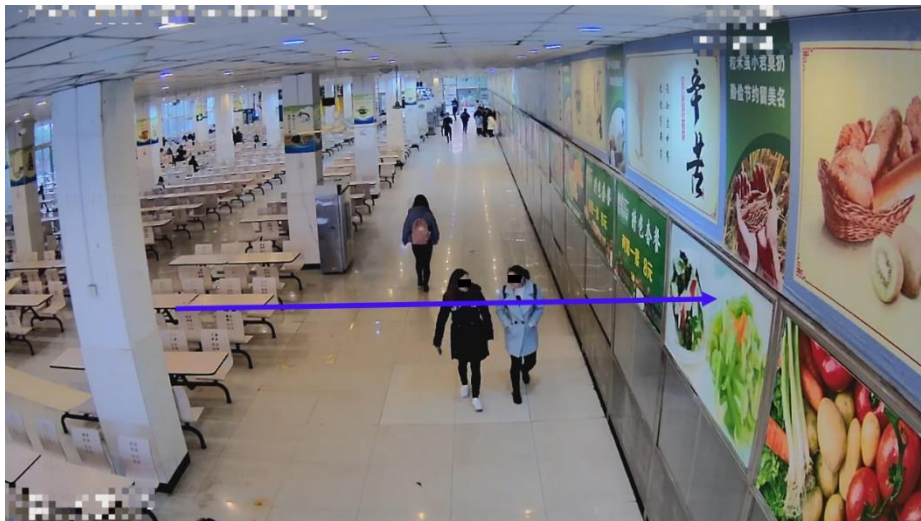
Station Passageway



Elevator/Staircase Entrance



Indoor Corridor



3. Side View (Use with Caution)

Installation Requirements:

Mounting height 3–5 m

Camera depression angle 30° to 60°. The higher the camera, the larger the depression angle should be

Sufficient lighting in the detection image

The camera is installed on the side of the foot traffic direction. Side view has higher requirements for the rule line. The rule line should be extended appropriately to both sides to ensure that the head and shoulders of the pedestrian intersect with the rule line when passing through, as shown by the blue line.

The green line is an incorrect example. When the pedestrian passes, the head and shoulders do not intersect with the rule line, resulting in missed detections. In addition, the side view angle can cause mutual occlusion between pedestrians, resulting in missed detections of occluded pedestrians.



2.2.2 Not Recommended Scenes for People Flow Counting

Level View

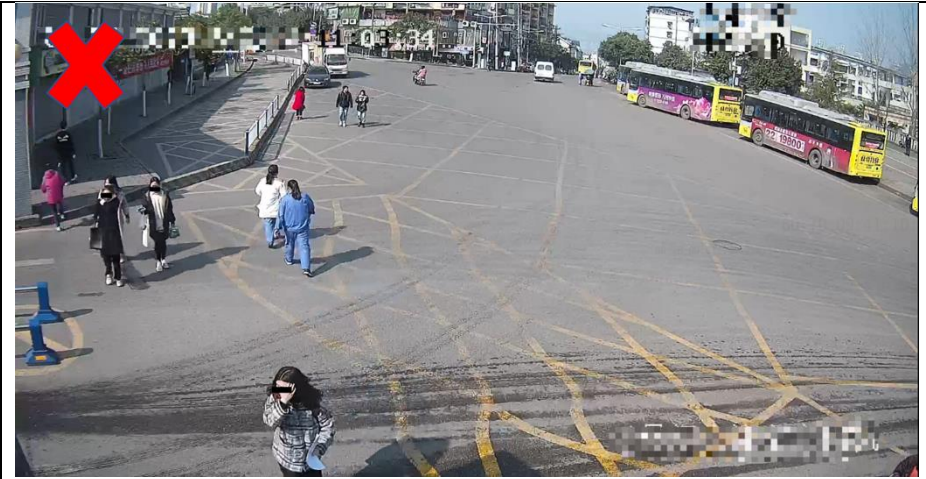
The camera is installed too low, and the camera angle of view is nearly parallel to the pedestrian targets. The pedestrian target size is too large, affecting the detection performance.

Improvement: Adjust the camera mounting height.

Unfixed Foot Traffic Direction

The foot traffic may run parallel to the rule line, which can easily cause missed detections.

Improvement: Adjust the installation position. For example, at this entrance/exit scene, only the incoming and outgoing foot traffic needs to be monitored. Adjusting the installation position above the entrance/exit is optimal.



Occlusion from Umbrellas on Rainy Days

Umbrellas occlude the head and shoulders, resulting in incomplete pedestrian features and affecting the detection performance.



2.2.3 Recommended Scenes for Crowd Density Detection

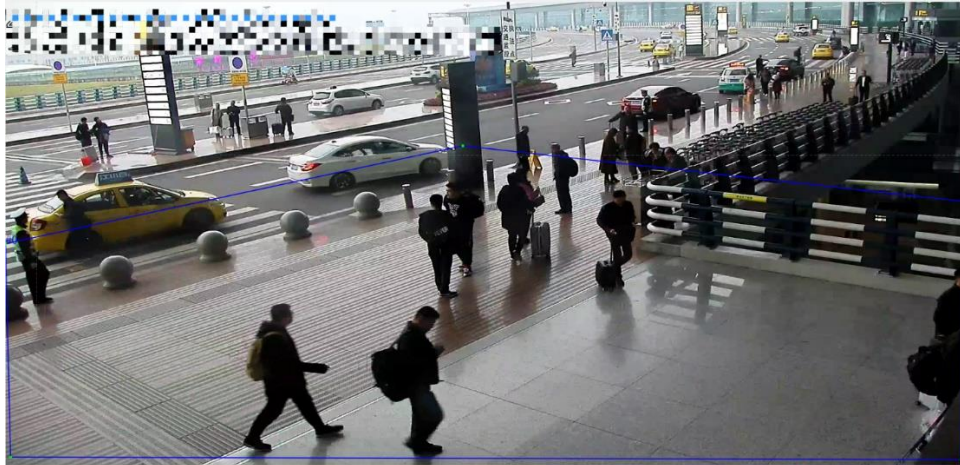
Open Space in Front of a Building

Inside a Campus or Scenic Area

Installation Requirements:

Mounting height 3 m to 8 m, depression angle 30° to 90°, monitoring distance 10 m to 20 m

The monitoring area must not exceed 80% of the image, and the monitoring area must not be smaller than 4 times the maximum target size



Installation Requirements:

Mounting height 3 m to 8 m, depression angle 30° to 90°, monitoring distance 10 m to 20 m

The monitoring area must not exceed 80% of the image, and the monitoring area must not be smaller than 4 times the maximum target size



2.2.4 Not Recommended Scenes for Crowd Density Detection

Level View

The camera is installed too low, and the camera angle of view is nearly parallel to the pedestrian targets. The pedestrian target size is too large, affecting the detection performance and possibly causing missed detections.

Improvement: Adjust the camera mounting height to ensure that the head and shoulder pixels remain stable. Pixels that are too large or too small will affect the detection performance.

Dimly Lit Scene

Scenes with reflection, backlight, or abnormal lighting, where the detection area flickers between bright and dark, resulting in missed and false alarms.

Improvement: Adjust the environmental lighting to make the light intensity consistent within the detection area, or move the installation position.



3 Commissioning

3.1 Adjust the Field of View

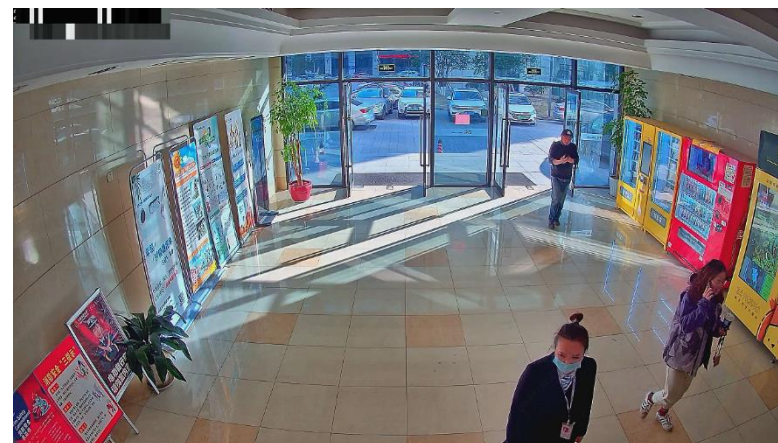
1. Adjust the Field of View

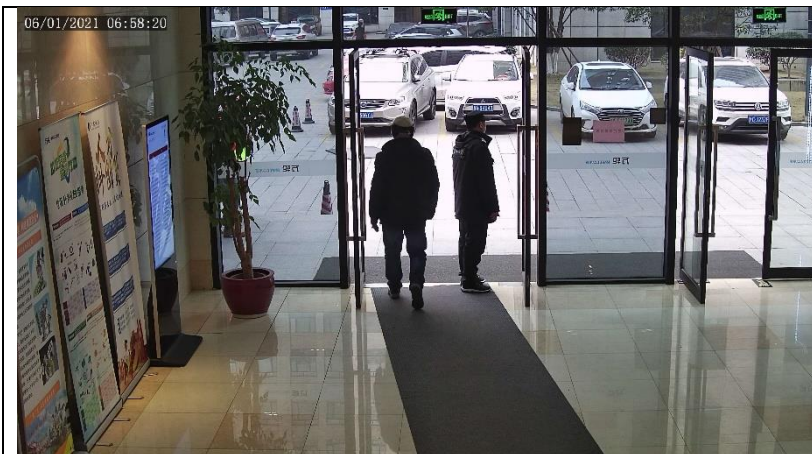
After the camera is installed, fine-tune the field of view to ensure that the scene is fully covered.

The installation tilt angle is recommended to be between 30° and 90°. Avoid side mounting with an excessive tilt angle.

Before adjustment: Small scene coverage, severe backlight

After adjustment: Moderate scene coverage, backlight issue improved





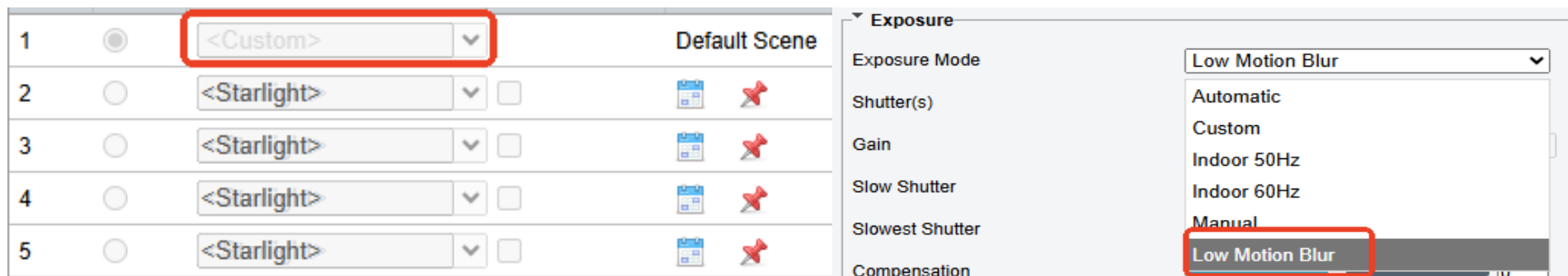
2. Confirm Target Pixels

(1) Target pixel requirements are as follows:

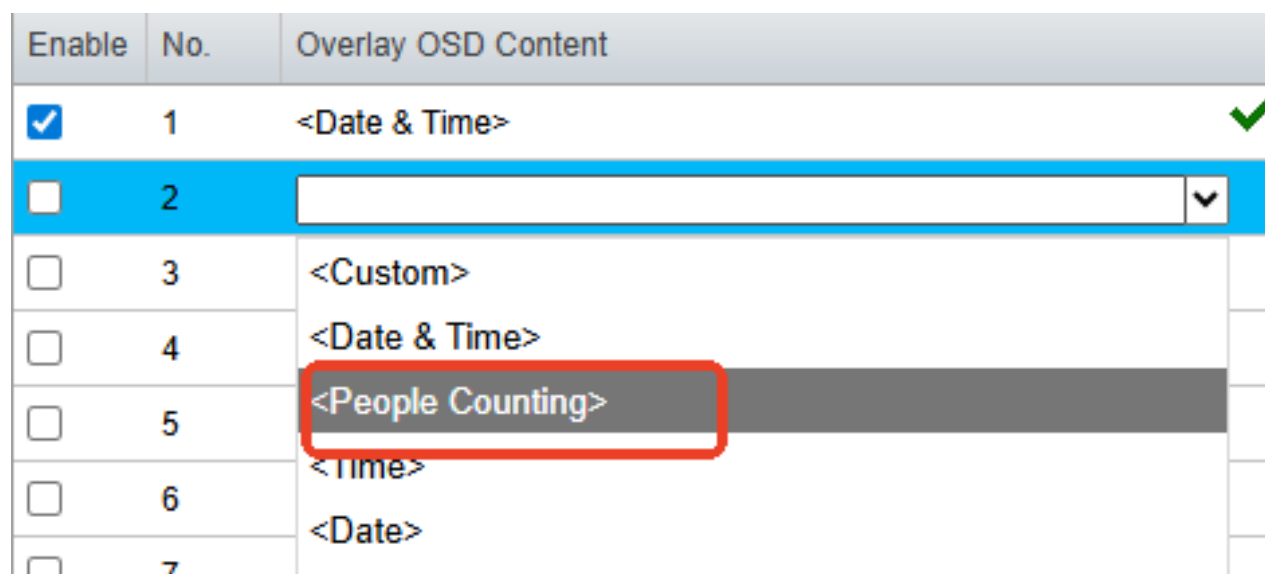
Model	Max. Resolution	Min. Head and Shoulders (Shoulder Width) Pixels
Models containing -VG or I	2MP	>65
	4MP	>90
	8MP	>130
Models containing -VD1, - VD2, -VH1, -VF	2MP	>32
	4MP	>45
	8MP	>64

3.2 Configure Image Parameters

(2) Log in to the camera web interface. On the Setup > Image > Image page, switch the current scene in Scene Settings to Common, set the Exposure Mode to Low Smear, and set the Shutter Time (s) to 1/100.

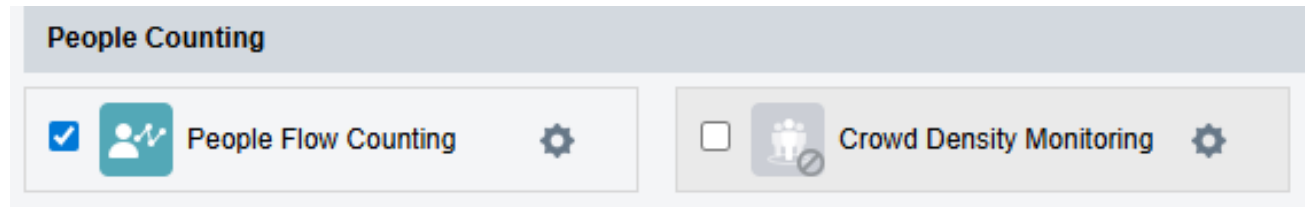


- (3) On the Setup > Image > OSD page, select People Counting from the Overlay OSD Content dropdown list to view the number of people entered and people exited in the live view in real time.



3.3 Configure People Flow Counting Parameters

- (1) Log in to the camera web interface. On the Setup > Smart Monitoring > Smart Function page, select People Flow Counting under People Counting to enable it.

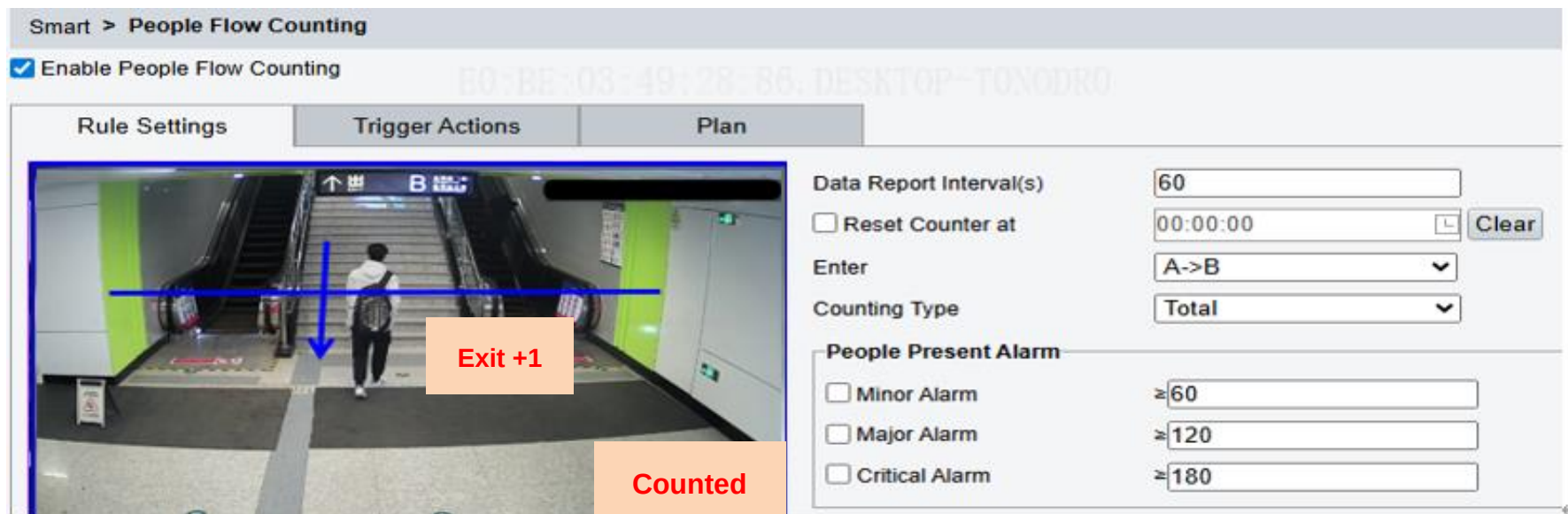


- (2) On the People Flow Counting rule settings page, adjust the detection rule line position and configure the parameters as needed. The camera records the number of people entered, people exited, and people present in real time based on the configured enter direction. When the People Present Alarm function is enabled and the number of people present exceeds the configured threshold, the camera can report an alarm and trigger related alarm actions.

Note that different detection area drawings produce different counting results:

- When the detection area is drawn full screen:

The People Flow Counting monitoring area is deployed full screen by default. Only one cross line rule line is supported. Draw the rule line near the entrance/exit. The rule line direction must be perpendicular to the foot traffic direction to ensure that the head and shoulders of the pedestrian target have a complete outline when crossing the rule line. When the head and shoulders of the pedestrian target cross the cross line rule line, the number of people entered and people exited is counted in real time. If the same target never leaves the image, it is counted only once, and subsequent tripwire crossings are not counted. Configuration example:



- When the detection area is not drawn full screen:

Modify the People Flow Counting monitoring area. When not full screen, only one cross line rule line is supported. Draw the rule line near the entrance/exit. The rule line direction must be perpendicular to the foot traffic direction to ensure that the head and shoulders of the pedestrian target have a complete outline when crossing the rule line. When the head and shoulders of the pedestrian target cross the cross line rule line and leave the monitoring area, the number of people entered and people exited is counted. If the same target never leaves the image, it is counted once for entry and once for exit, totaling 2 counts. Subsequent tripwire crossings are not counted. Configuration example:

Smart > People Flow Counting

☒ Enable People Flow Counting

Rule Settings Trigger Actions Plan

Video Feed: A hallway with a blue rectangular detection area and a horizontal blue line across it. A blue arrow points upwards from the line. A red 'Crossing' label is at the bottom right of the video.

Data Report Interval(s) 60

☐ Reset Counter at 00:00:00 Clear

Enter A->B

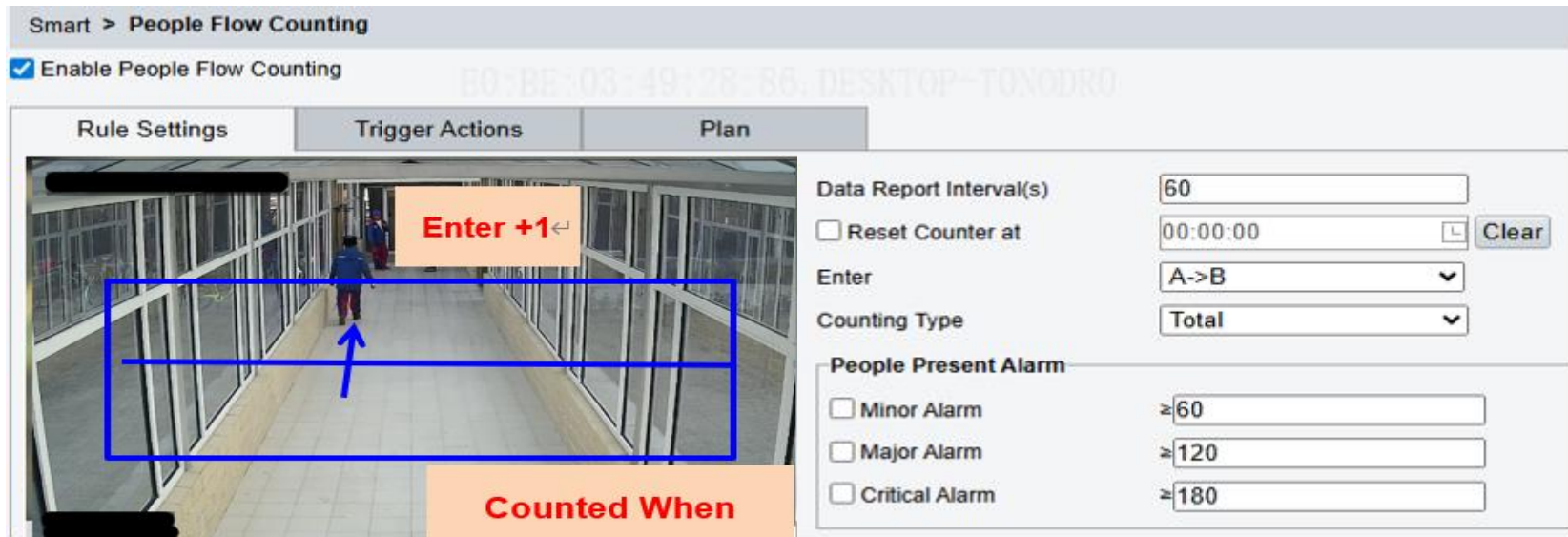
Counting Type Total

People Present Alarm

☐ Minor Alarm 60

☐ Major Alarm 120

☐ Critical Alarm 180



- (3) Report Interval (s): Indicates the minimum interval between two consecutive data uploads from the camera to the platform.
- (4) Reset Counter at: After it is enabled, the camera automatically resets the number of people entered, people exited, people present, and remaining allowed entries at the configured time.
- (5) Counting Type: When the People Present Alarm is not enabled, if it is set to Total, the People Counting OSD displays both the number of people entered and people exited; if set to People Entered, the People Counting OSD displays only the number of people entered; if set to People Exited, the People Counting OSD displays only the number of people exited.
- (6) People Present Alarm: When the People Present Alarm is enabled, the Counting Type configuration is grayed out and cannot be configured. The People Counting OSD displays the number of people entered, people exited, people present, and remaining allowed entries by default.
- (7) On the People Flow Counting Trigger Actions configuration page, configure the linkage items for different alarms as needed.

Smart > People Flow Counting

☒ Enable People Flow Counting

Rule Settings

Trigger Actions

Plan

No.	Trigger Actions	
1	People Present Minor Alarm	
2	People Present Major Alarm	
3	People Present Critical Alarm	

Edit-Trigger Actions-Pe...

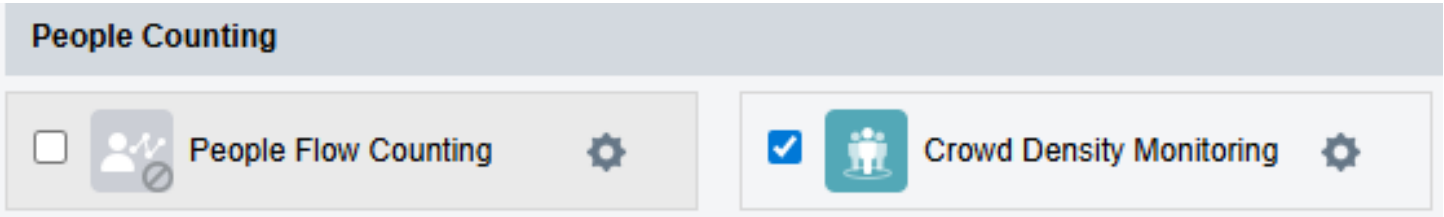


Alarm Output

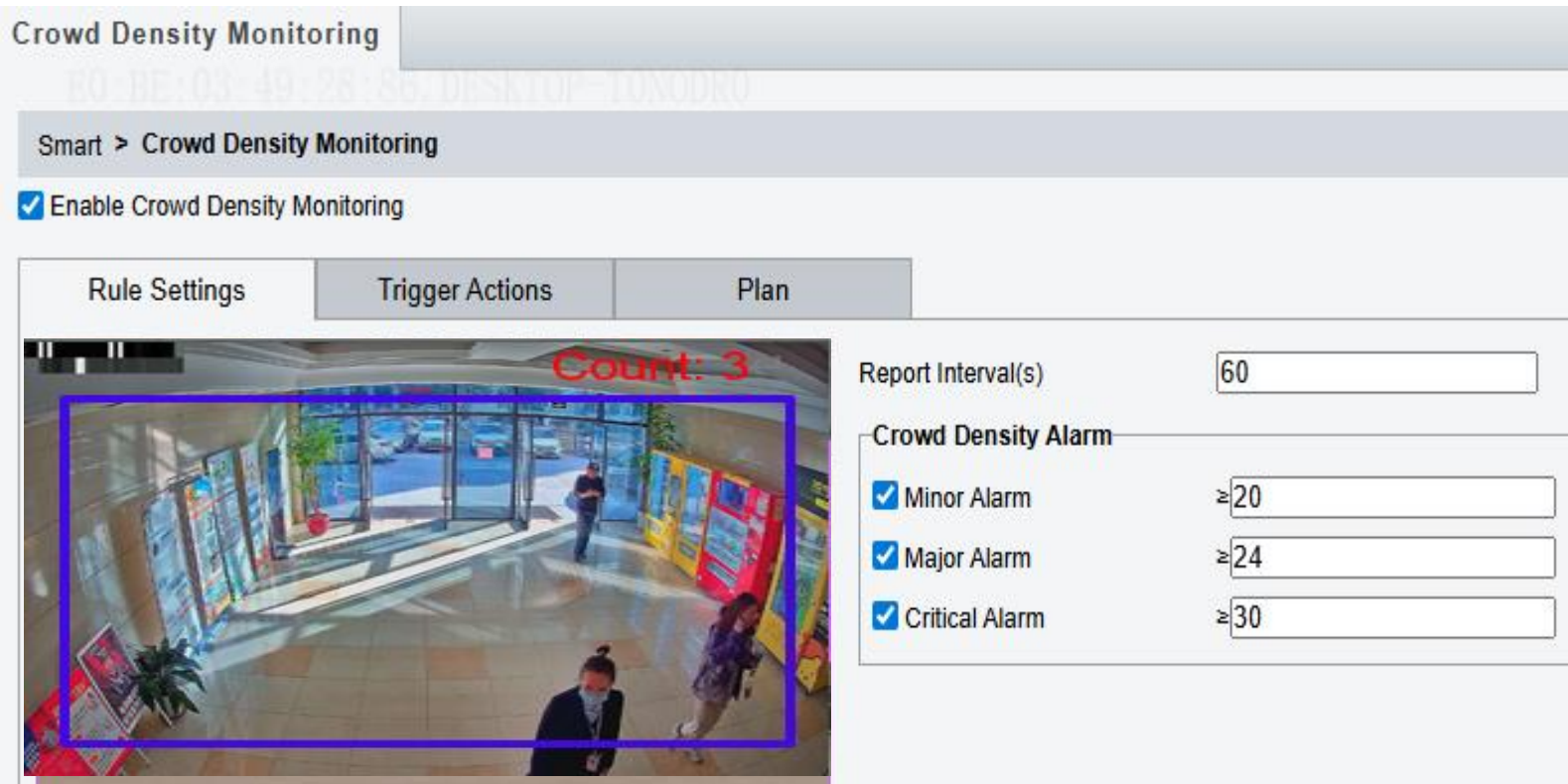
☐ A → 1

3.4 Configure Crowd Density Detection Parameters

- (1) Log in to the camera web interface. On the Setup > Smart Monitoring > Smart Function page, select Crowd Density Detection under People Counting to enable it.



- (2) On the Crowd Density Detection rule settings page, adjust the detection rule line position and configure the parameters as needed. The camera counts the number of people in the area in real time based on the configured rule area. When the Crowd Density Alarm function is enabled and the number of people present exceeds the configured threshold, the camera can report an alarm and trigger related alarm actions.

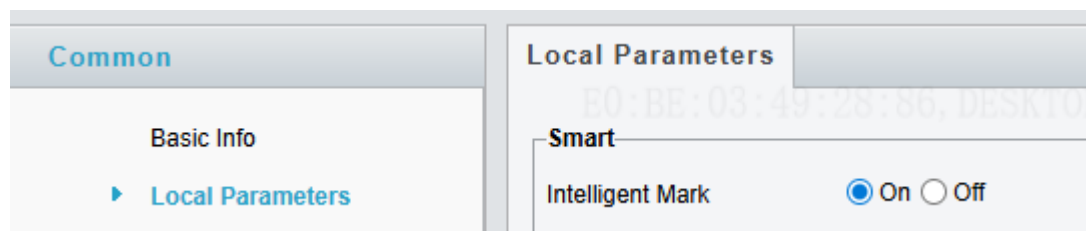


Report Interval (s): Indicates the minimum interval between two consecutive data uploads from the camera to the platform.

- (3) Crowd Density Alarm: When the Crowd Density Alarm is enabled, the alarm people count thresholds for minor, major, and critical alarms can be configured.
- (4) On the Crowd Density Trigger Actions configuration page, configure the linkage items for different alarms as needed. The configuration method is the same as that for People Counting.

3.5 Configure Local Parameters

Log in to the camera web interface. On the Setup > General > Local Parameters page, select Smart Marker under Smart Parameters to enable it, and click Save. The detection box information of the target can then be viewed in real time in the web live view.



4 Acceptance

Test Item	Result on Test Success	Troubleshooting on Test Failure
Head and shoulder pixel size of the target in the detection area	Head and shoulder pixels are not lower than the algorithm detection requirements	Adjust the lens zoom ratio or tilt angle appropriately to increase the target pixel size
Image Quality Confirmation	The live view image is clear with normal color reproduction	1、 If local blurring occurs, check whether the lens is dirty. If refocusing does not produce a clear image, it may be a lens flatness issue. If the near and far clarity differs, it may be caused by the depth of field of the scene. If the image has color cast, switch the white balance or saturation to confirm. For severe cases, collect information and report it to R&D for analysis. 2、 If the detected target is blurry, check whether the shutter speed is too slow, causing motion blur. If detail is insufficient, check whether the image parameters are normal.
Alarm Linkage	People Flow Counting alarm triggers linkage normally	If an issue occurs during the process, record a video and submit the diagnostic information to R&D for analysis.