

∴i-PRO

Operating Instructions

**Extension Software
(AI Occupancy Detection)**

Model No. **WV-XAE207W**



Before attempting to connect or operate this software,
please read these instructions carefully and save this manual for future use.

The model number is abbreviated in some descriptions in this manual.

Contents

Introduction.....	3
Preface.....	3
Features	3
Specifications	3
About the Operating Instructions.....	4
System requirements for a PC.....	4
Trademarks and registered trademarks	4
On open source software used.....	4
Copyright	4
Disclaimer of warranty	5
Limitation of liability	5
Before using this product	6
Operation flow	7
Install the Software	7
Necessary Setup	8
1. Open the setting screen.....	8
2. Basic settings (Basic tab).....	9
3. Connection Settings (Connection Settings tab).....	11
4. Advanced settings (Detail tab)	13
5. Demo screen.....	17
6. About the detection frame	19
Open Source Software.....	20

Introduction

Preface

The Extension Software WV-XAE207W (hereafter referred to as this product) is software for more conveniently using the network camera (option, hereafter referred to as the camera). By installing this product on the camera and registering the Registration key, Based on the setting conditions of the AI Occupancy Detection function, alarms can be notified to external systems such as WV-ASM300/WV-ASM300W (option) and WJ-NX series network recorders (option).

Important

- This product is necessary for each camera.
- See the URL below for information such as the models supported by this product, the software version, etc.
<https://i-pro.com/global/en/surveillance/training-support/support/technical-information>

Features

- This product can be integrated additionally into an existing i-PRO surveillance system.
(Only network cameras and this product are to be added.)
- This product notifies the specified notification destination of alarms when the set conditions are reached.
- This product sends the information about the number of people detected periodically to the specified transmission destination.
- This product has the following features.
 - ① The deep learning technology and our proprietary image processing technology can detect occupancy by detecting people.
 - ② You can detect occupancy with the camera alone just by installing this product on the camera.

Specifications

Occupancy detection method	To detect if the set number of people is exceeded continuously in the target area during the set time period.
Detectable angle of view	Depression angle 45° or less
Maximum count of people	40
Number of settable areas	Up to 4
Number of people detected	1-40 people/area
Detection time	1-600 sec/area
HTTP Connection Settings	4 transmission destinations; transmission interval: 1/5/10/15/30/60 sec; SSL supported
Installation location	Indoors (Including the under-eave area not exposed to direct sunlight)
Illuminance	50 lux or above (around the subject)

* See the URL below for "Body size" information.

<https://i-pro.com/global/en/surveillance/training-support/support/technical-information> <Control No.: C0320>

Introduction (continued)

About the Operating Instructions

This manual explains the method of installing this product in a camera, settings that need to be made before starting to operate this product, and the method of operation for using this product. Since this product is used after being installed on a camera, before using this product always be sure to also read the Operating Instructions of the camera with which this product is to be used.

Based on the specific model of a camera which is used, its screen may be different from the screen shown in this manual.

In this manual, a personal computer is referred to as a PC.

In this manual, WV-ASM300 and WV-ASM300W are referred to as WV-ASM300.

System requirements for a PC

For the requirements of PC which are used for settings refers to the Operating Instructions of a camera.

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- Internet Explorer, and Microsoft Edge are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
- Google Chrome are trademarks of Google LLC.
- Mozilla, and Firefox are trademarks of the Mozilla Foundation in the US and other countries.
- ONVIF is a trademark of ONVIF Inc.

On open source software used

- This product uses the open source software below.

Name of software	Name of license
cwebsocket	The MIT License
libjpeg-turbo	<ul style="list-style-type: none">• The IJG (Independent JPEG Group) License• The Modified (3-clause) BSD License• The zlib License

- For the corresponding license statement, see "Open Source Software" on page 20.

Copyright

Distributing, copying, disassembling, reverse compiling and reverse engineering of the software provided with this product are all expressly prohibited. In addition, exporting any software provided with this product violating export laws is prohibited.

Introduction (continued)

Disclaimer of warranty

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- (3) ANY PROBLEM, CONSEQUENTIAL INCONVENIENCE, OR LOSS OR DAMAGE, ARISING OUT OF THE SYSTEM COMBINED WITH THIRD PARTY DEVICES;
- (4) ANY CLAIM OR ACTION FOR DAMAGES BROUGHT BY ANY PERSON OR ORGANIZATION AS A PHOTOGRAPHED SUBJECT DUE TO VIOLATION OF PRIVACY CONCERNING A SURVEILLANCE CAMERA'S PICTURE OR SAVED DATA, FOR SOME REASON (INCLUDING USE WHEN USER AUTHENTICATION ON THE AUTHENTICATION SETTING SCREEN IS SET TO OFF), BECOMING PUBLIC OR BEING USED FOR ANY PURPOSE;
- (5) LOSS OF REGISTERED DATA CAUSED BY ANY FAILURE (INCLUDING INITIALIZATION OF THE PRODUCT DUE TO FORGOTTEN AUTHENTICATION INFORMATION SUCH AS A USER NAME AND PASSWORD).

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Before using this product

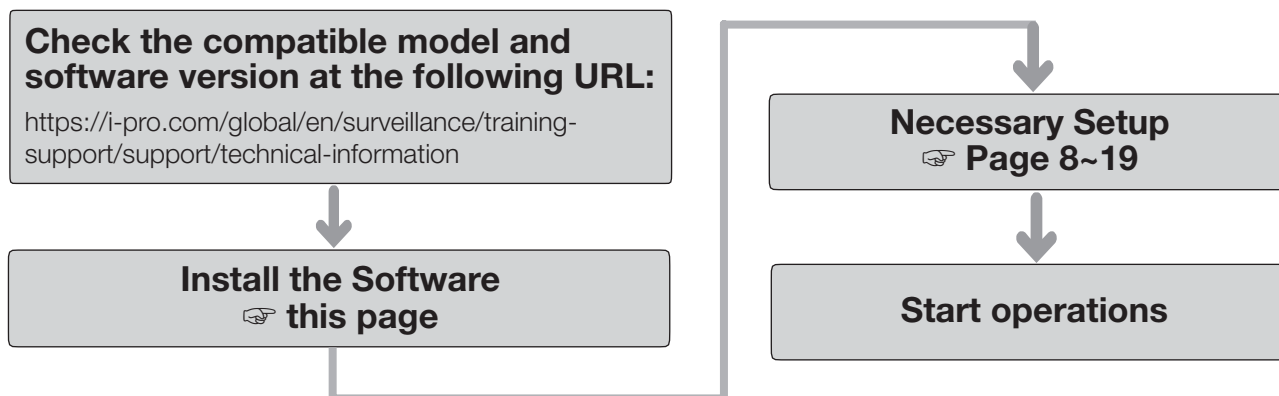
Occupancy may not be detected correctly in the following cases since it may be difficult to detect a person, or false detection may occur.

- The person is out of focus.
- The person is shaking.
- The person overexposed or washed out.
- Only 2/3 or less of the part above a person's shoulders is shown.
- The camera imaging angle is at a depression angle of 45° or above.
- Only a part of the person is shown in the privacy zone set from the "Setup" menu > "Image/Audio" > "Image quality" on the camera.
- The person is too close to the camera.
- The person is too small (size less than the specified shoulder width).
- It may detect to dolls and posters.
- It may not be possible to correctly detect a person lying down or falling down.

Other cautions are explained below.

- If the number of people shown in the camera exceeds 40, correct occupancy detection will not be possible since some of the people cannot be detected.
- AI Occupancy Detection Application supports "0° (Off)" and "180° (vertical rotation)" under "Image rotation" settings.
- Depending on the camera you are using, the transmission frame rate may be limited when using the AI Occupancy Detection application. Refer to the URL below for details.
<https://i-pro.com/global/en/surveillance/training-support/support/technical-information> <Control No.: C0103>
- When AI Occupancy Detection Application is running, if you change the camera's image mode or stream settings, the application will restart. If the setting screen or demo screen of AI Occupancy Detection Application is open, please reload it.
- If you have set a privacy zone, you cannot detect person within the privacy zone.
- The message ID of TCP alarm notification is "98" for Area 1, "99" for Area 2, "100" for Area 3, and "101" for Area 4.
- When using multiple TCP alarm notification simultaneously, if one TCP alarm notification is received after setting the "Alarm mask time" of the WJ-NX series network recorder, no other TCP alarm notification will be received during the "Alarm mask time".
- For TCP alarm notification settings, refer to 'TCP alarm notification' in the Operating Instructions of the camera.
- Use Mozilla Firefox, Google™ Chrome™ and Microsoft edge to display the setting screen or demo screen. Internet Explorer is not supported.
- The demo screen can be displayed on only one browser. It does not support simultaneous access by multiple browsers.
- If the data encryption is set to "On", the demo screen image will not be displayed.
- The detection frame is not displayed when the setting screen is connected via HTTPS.
- The demo screen does not support HTTPS connection.
- When used simultaneously with other extension software functions, the position of the person may be significantly misaligned with the frame on the demo screen.
- Depending on various installation conditions and usage environment such as the brightness of the location and the movement of the subject, person may be difficult to detect, or it may not be detected, or it may malfunction. Please evaluate the installation location before installing.
- We shall not be liable for any inconvenience, damage or loss caused by setting the AI Occupancy Detection function or as a result thereof.
- Please read the Operating Instructions of your camera for the disclaimer, protection of personal information, trademarks and registered trademarks, and copyright.

Operation flow



Install the Software

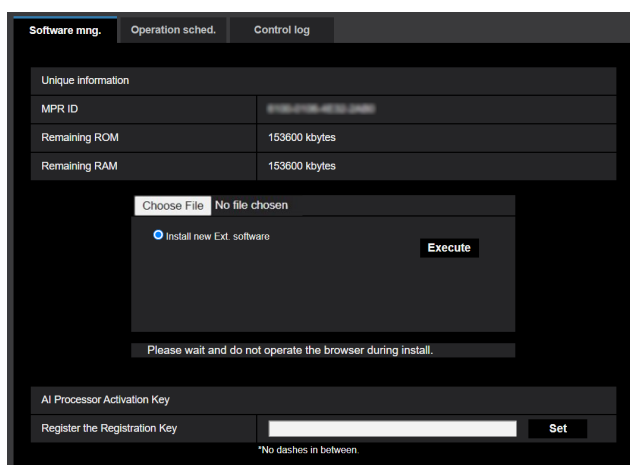
Follow the steps below to download this product and install it on your camera.

- (1) Access the following URL to download "AI Occupancy Detection" and save it onto the PC.
<https://i-pro.com/global/en/surveillance/training-support/documentation-database-list>

Important:

- A space cannot be used in the name of the saving directory.

- (2) Select the [Setup] - [Ext. software] - [Software mng.] tab of the camera.



Important:

- Check "Remaining ROM" and "Remaining RAM" of the camera. If disk space is insufficient, uninstall any other extension software already installed. For how to uninstall, refer to the "Operation settings" section in the Operating Instructions of the camera.

- (3) Click the [Browse...] button and designate the downloaded "AI Occupancy Detection".
- (4) Make sure that "Install new Ext. software" is selected and click the [Execute] button. Then the software installation will begin. When the installation is completed, "AI Occupancy Detection" will be added to the list of extended software and the "Software mng." screen. (The names may be partially omitted.)

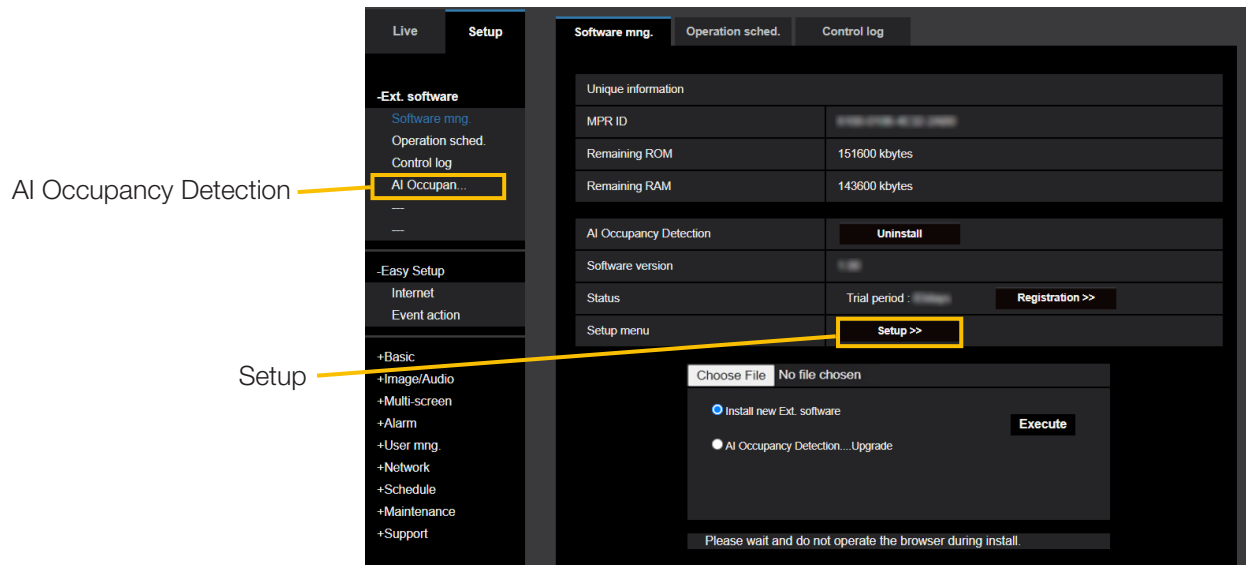
Important:

- Do not turn off the power of the camera when installing the software.
- Do not perform any operations until the installation is completed.

Necessary Setup

1. Open the setting screen

After installing the AI occupancy detection application, go to the "Setup" menu > the "Ext. software" page on the camera, where the "AI Occupancy Detection" menu is added to the "Software mng." tab.



Click the "AI Occupancy Detection" menu or [Setup] to open the "Occupancy Detection Function Settings" screen. Also, in order to open the "Occupancy Detection Function Settings" screen, it is necessary to register the schedule in advance from the "Ext. software" page > the "Operation sched." tab.

There are three tabs on the "Occupancy Detection Function Settings" screen: "Basic", "Connection Settings" and "Detail". The "Basic" tab is selected immediately after "Occupancy Detection Function Settings" is open.

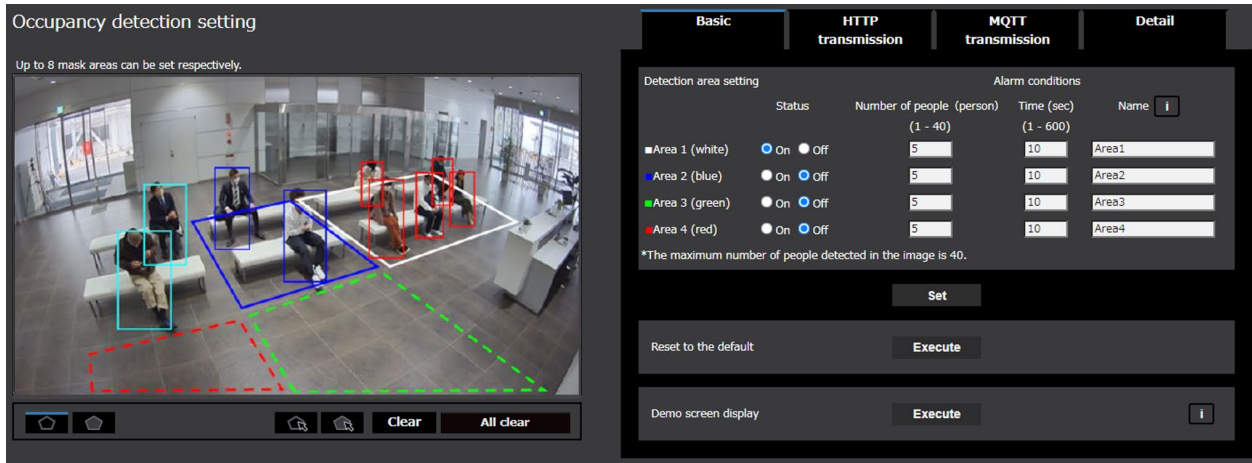
Note:

- Please use Mozilla Firefox, Google™ Chrome™ or Microsoft Edge to display the setting screen and the demo screen. Internet Explorer is not supported.

Necessary Setup (continued)

2. Basic settings (Basic tab)

On the Basic screen, you can set the detection area and alarm conditions (Number of people/Time). In addition, you can display to check the detection area frame and people detection frame on the camera image screen.



■ Camera image screen

[Image screen]

The set areas and the detected people are displayed in frames.

- Areas: After the areas are set, frames are displayed in the color of each area.
Area 1: White; Area 2: Blue; Area 3: Green; Area 4: Red.
- People detection (in red frames): The people in the area where an alarm has occurred are displayed in red frames.
- People detection (in blue frames): The people who have entered an area are displayed in blue frames.
- People detection (in light blue frames): The people who are not in any area are displayed in light blue frames.

Note

- When the demo screen is displayed, the people detection frame will not be displayed on the camera image screen.
- The people detection frame can be displayed on only one browser. It does not support simultaneous access by multiple browsers.
- Please reload the browser since detection frames are not displayed automatically even after the demo screen is closed.

■ Detection area setting

You can set up to 4 areas to detect. Alarm conditions (Number of people and Time) are set separately for each area. Alarms will be activated if the set number of people is exceeded continuously during the set time period.

[Area 1]-[Area 4]

You can set the area of a polygon (up to a hexadecagon) by specifying multiple vertices (up to 16 vertices) on the image. The areas can be set to overlap each other. Please set them in order from Area 1.

Default setting: Full screen for [Area 1];
no setting for [Area 2]/[Area 3]/[Area 4].

Note

- When a detection area (a polygon) is drawn, the area setting is completed by selecting the starting point in the end.
- To change a detection area, click the "Delete" button to delete it, and then set it again.
- The position of the detection frame is the center of the lower side of the people detection frame. Please set the detection area so that the position of this detection frame falls within the detection area. Refer to "About the detection frame" (→ Page 19) for details.

Necessary Setup (continued)

[Status]

Sets whether to enable occupancy detection in the area.

On: Occupancy detection is enabled. Frames are displayed in solid lines for areas with occupancy detection enabled.

Off: Occupancy detection is disabled. Frames are displayed in dashed lines for areas with occupancy detection disabled.

Default setting: [Area 1] On;
[Area 2]/[Area 3]/[Area 4] Off

[Alarm conditions] - [Number of people (person)]

Sets the number of people to activate alarms separately for each area.

Settable range: 1-40 (persons).

Default setting: 5

[Alarm conditions] - [Time (sec)]

Alarms will be activated if the set number of people for each area is exceeded continuously during the set time period.

Set this time period.

Settable range: 1-600 (sec).

Default setting: 10

Note

- The maximum number of people detected in the image is 40.
 - If the number of people in the image exceeds 40, correct occupancy detection will not be possible since some of the people cannot be detected.
 - For the method of counting the passage of time when the number of people detected is less than the number of people set in Alarm conditions, refer to "4. Advanced settings (Detail tab)".
-

Name

Set a name up to 20 characters for each area. The set detection area name will be displayed on the i-PRO Active Guard dashboard.

Default setting: Area 1~4

Unavailable characters: Half-width symbols "" "" "&"

[Set]

Click it to enable the detection area setting.

■ Reset to the default

[Execute]

Click it to restore the settings of the [Basic] tab, the [Connection Settings] tab and the [Detail] tab to their default settings.

■ Demo screen display

[Execute]

Click it to open the demo screen in a separate window. For details on how to open the demo screen, refer to "5. Open the demo screen."

[i]

When you hover the mouse cursor over the icon, the notes on the demo screen are displayed.

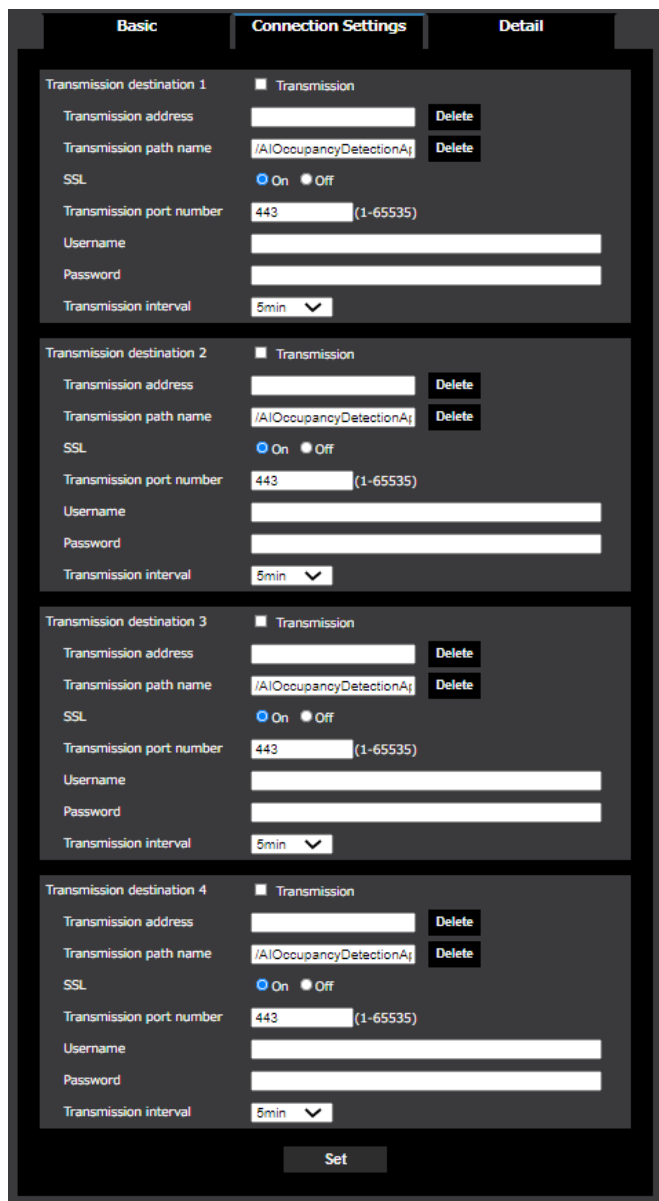
Note

- When the demo screen is executed, the detection frame will not be displayed on the setting screen.
 - JPEG (1) is displayed on the demo screen. We recommend a resolution setting of 1920×1080 or less for JPEG (1).
-

Necessary Setup (continued)

3. Connection Settings (Connection Settings tab)

Sets the transmission destination (1-4) and the transmission interval for sending occupancy information via HTTP.



■ Transmission destination 1/2/3/4

Occupancy information can be sent individually to up to 4 addresses.

The setting items for the four transmission destinations are the same.

[Transmission]

Check it to send information.

Default setting: Unchecked

[Transmission address]

Sets the IP address or host name of the HTTP server for transmission.

Maximum allowable number of characters: 63

Allowable characters: Half-width alphanumeric characters; half-width symbols [., [_], [-]

Default setting: a blank space

[Delete]

Click it to restore [Transmission address] to the blank state.

[Transmission path name]

Enter the path name of the transmission destination.

Maximum allowable number of characters: 128

Forbidden characters: Half-width symbols “””, “&”, “:”, “,”, “\”

Default setting: /AIOccupancyDetectionApp

[Delete]

Click it to restore [Transmission path name] to the blank state.

[SSL]

Selects whether to use SSL for transmission.

Default setting: On

[Transmission port number]

Sets the port number of the transmission destination.

Allowable port number: 1-65535

Default setting: 443

[Username]

Enter the user name for authentication with the transmission destination.

Allowable number of characters: 0-63

Forbidden characters: Half-width symbols “””, “&”, “:”, “,”, “\”

Default setting: a blank space

Necessary Setup (continued)

[Password]

Enter the password for authentication with the transmission destination.

Allowable number of characters: 0-63

Forbidden characters: Half-width symbols “” and “&”

Default setting: a blank space

[Transmission interval]

Select the time interval for transmission.

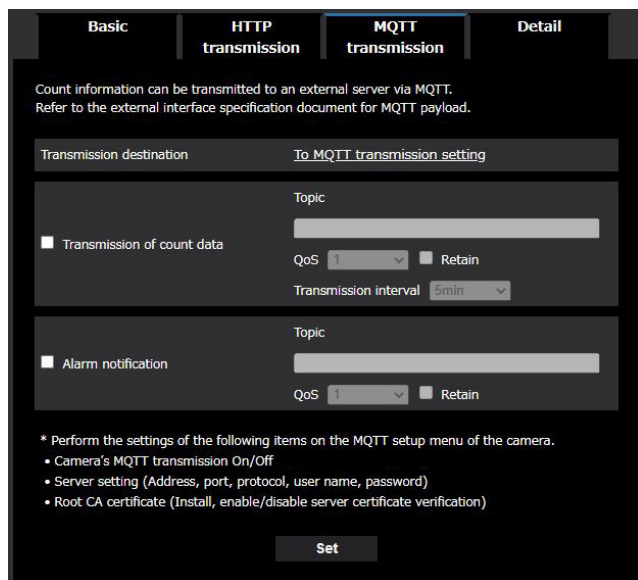
5sec, 10sec, 15sec, 1 min, 5 min, 10 min, 15 min,

30 min, 60 min

Default setting: 5 min

[Set]

Click it to enable the setting of transmission destination 1-4.



■ MQTT transmission

Set the transmission content and transmission interval for occupancy data transmission via MQTT.

[Transmission of count data]

Check the box to send count data.

Default setting: Unchecked

[Alarm notification]

Check the box to send alarms notification.

Default setting: Unchecked

[To MQTT transmission setting]

Click to display the MQTT setting screen of the camera.

[Topic]

Enter the name of the MQTT topic to be sent. Enter single-byte alphanumeric or symbols, up to 128 characters.

[QoS]

Select QoS level 0, 1, or 2. Communication quality is higher with 0<1<2.

0: Messages are delivered at most once with QoS0.

There is no guarantee that the message will reach the server.

1: Messages are delivered at least once with QoS1. It is assured that the message will reach its destination, but it may be duplicated.

2: Messages are delivered exactly once with QoS2. It is assured that the message will arrive only once, no more no less.

Default setting: 1

[Retain]

Check this box to have the last notified message stored on the MQTT server.

Default: Unchecked

[Transmission interval (Transmission of count data only)]

Select the time interval for transmission of count data.

5sec, 10sec, 15sec, 1 min, 5 min, 10 min, 15 min,

30 min, 60 min

Default: 5 min

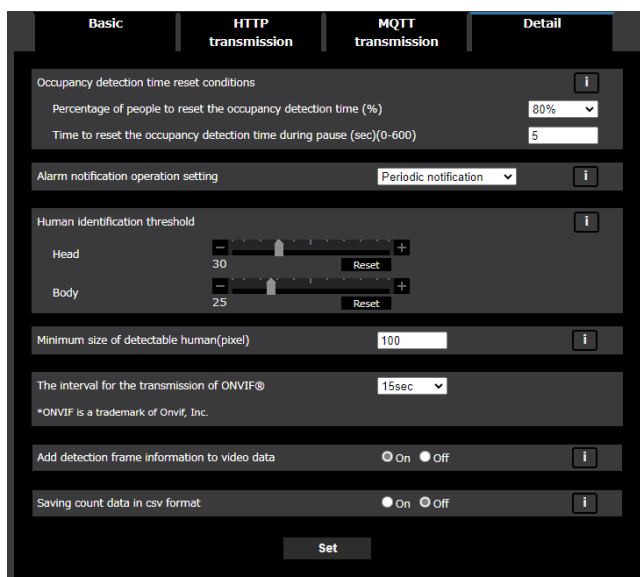
Note

- Please refer to the "AI Occupancy Detection I/F Specification" in the URL below for details on HTTP interval transmission and MQTT transmission.
<https://i-pro.com/global/en/surveillance/training-support/support/technical-information <C0319>>

Necessary Setup (continued)

4. Advanced settings (Detail tab)

Sets the condition to reset the alarm detection timer that measures "Time (sec)" in Alarm conditions on the "Basic" tab, and adjusts the alarm notification operation settings according to your environment.



■ Occupancy detection time reset conditions

When the number of people detected in the detection area is exceeded, the alarm detection timer is started; and when the timer reaches "Time (sec)" in "Alarm conditions", the alarm is detected. The alarm detection timer operates as follows.

- ① When [Alarm conditions] - [Number of people (person)] is exceeded: The alarm detection timer is started.
- ② When "Percentage of people to reset the occupancy detection time (%)" is exceeded and [Alarm conditions] - [Number of people (person)] is not reached: The alarm detection timer is paused.
- ③ When "Percentage of people to reset the occupancy detection time (%)" is not reached: The alarm detection timer is initialized.

Here, you can make settings related to the initialization of the alarm detection timer.

[Percentage of people to reset the occupancy detection time (%)]

Select the percentage of people to reset the occupancy detection time in "Time (sec)" of "Alarm conditions". If this percentage is not reached, the timer will be initialized. 50%, 60%, 70%, 80%, 90%, 100%

Default setting: 80%

[Time to reset the occupancy detection time during pause (sec)]

Set the time to stop the timer when the number of people detected exceeds "Percentage of people to reset the occupancy detection time (%)" but does not reach "Number of people (person)" in "Alarm conditions". If this time is exceeded, the timer will be initialized.

Allowable time: 0-600 (sec)

Default setting: 5 (sec)

■ Alarm notification operation setting

Set the notification operation when the "Number of people (person)" in "Alarm conditions" is exceeded continuously after the alarm is detected.

Periodic notification:

The alarm is notified at the time interval "Time (sec)" in "Alarm conditions".

Continuous notification:

The alarm is continuously notified at the time interval of "Alarm deactivation time" of the camera.

One-time notification:

The alarm is notified only the first time the alarm conditions of "Number of people (person)" and "Time (sec)" are met.

Default setting: Periodic notification

■ Human identification threshold

Set the threshold for identifying a person's head or body. The smaller the value, the easier it is for humans to be identified, but the greater the likelihood of false positives. Available setting: 1~99

Default setting: (head) 30, (body) 25

■ Minimum size of detectable human(pixel)

Input the minimum number of pixels (horizontal width) for detection. Exclude detection results that are less than the set number of pixels. Available settings may vary depending on the resolution. (E.g., 3840 for a 4K camera)

Available setting: 0~****

Default setting: 38

■ The interval for the transmission of ONVIF

Set the interval for the transmission of ONVIF.

5 s, 10 s, 15 s, 1 min

Default setting: 5 secs

Necessary Setup (continued)

■ Add detection frame information to video data

To add the detection frame information of this product to the stream additional information, set this setting to "On". When using multiple extension softwares at the same time, the size limit of the stream additional information that can be sent by the camera may be exceeded. In that case, set this setting to "Off".

Note that if this product is connected to a system that uses stream additional information, be careful to set it to "Off".

Default setting: On

■ Saving count data in csv format

To save count data in csv, set this setting to "On". For details, refer to the External Interface Specifications.

Default setting: Off

Note

- Count data will be stored for 2 years (732 days).
 - * In fact, data will be stored for a longer period of time than the above storage time. The excess storage time will depend on the camera's time zone setting (maximum 23 hours).
Example: If the time zone is +9.00
732 days + 9 hours
 - The count data immediately before the operation schedule is turned off may not be saved.
-

Note

- Adjust the reset conditions of the alarm detection timer according to your environment.
- Truncate the decimal point of (Percentage of people to reset the occupancy detection time (%)) × (Number of people (person) in Alarm conditions).
For example, if 12 people × 80% = 9.6 people, then it would be 9 people.
- Please refer to the following table and graph for the mechanism of the reset condition of the alarm detection timer.

This is the example for below conditions.

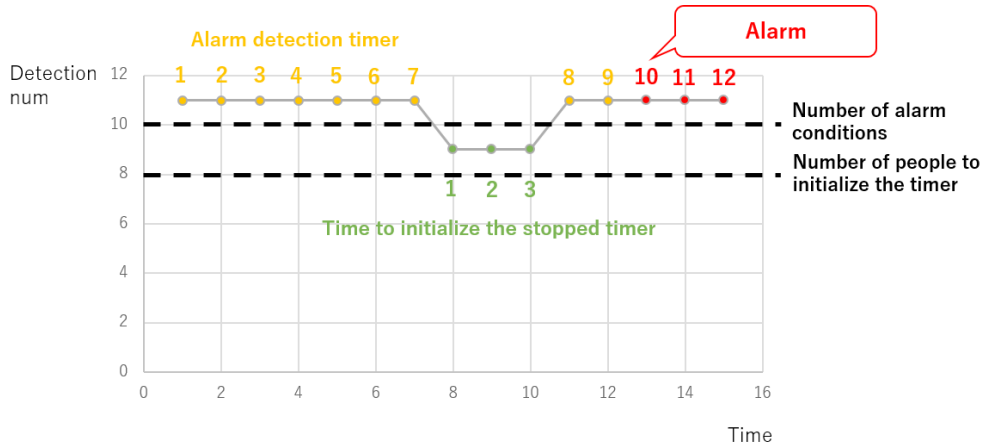
- Number of people to cause an alarm : 10 people
- Time to cause an alarm : 10 seconds
- Percentage of people to reset the occupancy detection time : 80%
- Time to reset the occupancy detection time during pause: 5 seconds

Necessary Setup (continued)

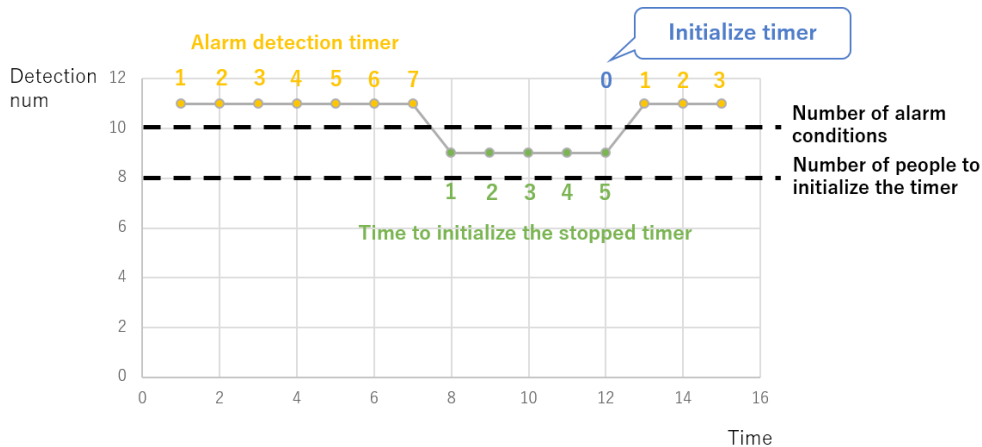
When the tenth person is detected, after ten seconds the alarm is triggered.

If the number of people detected drops down to eight or nine people, then the alarm will pause.

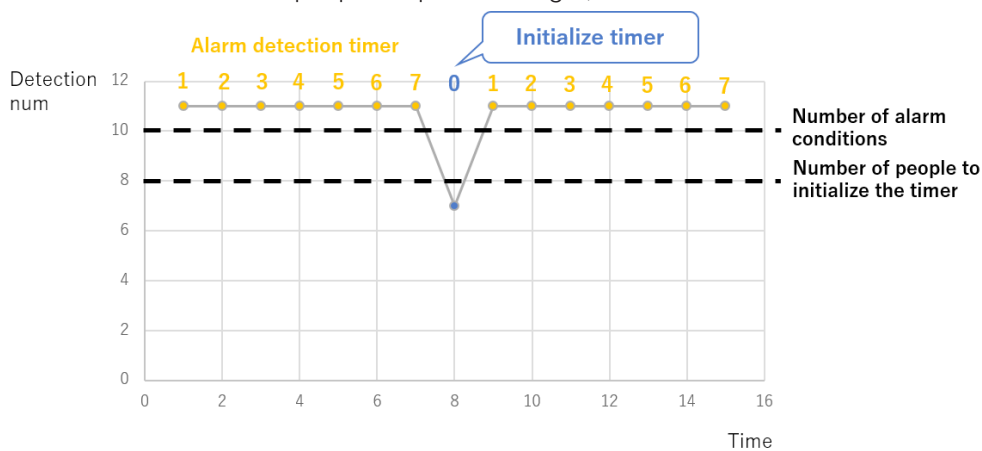
If the number moves back up to ten with the five seconds (reset time setting), then the alarm state continues.



If the number holds at eight or nine for more than five seconds (reset time setting) the alarm state ends.



If the number of detected people drops below eight, the alarm state ends.



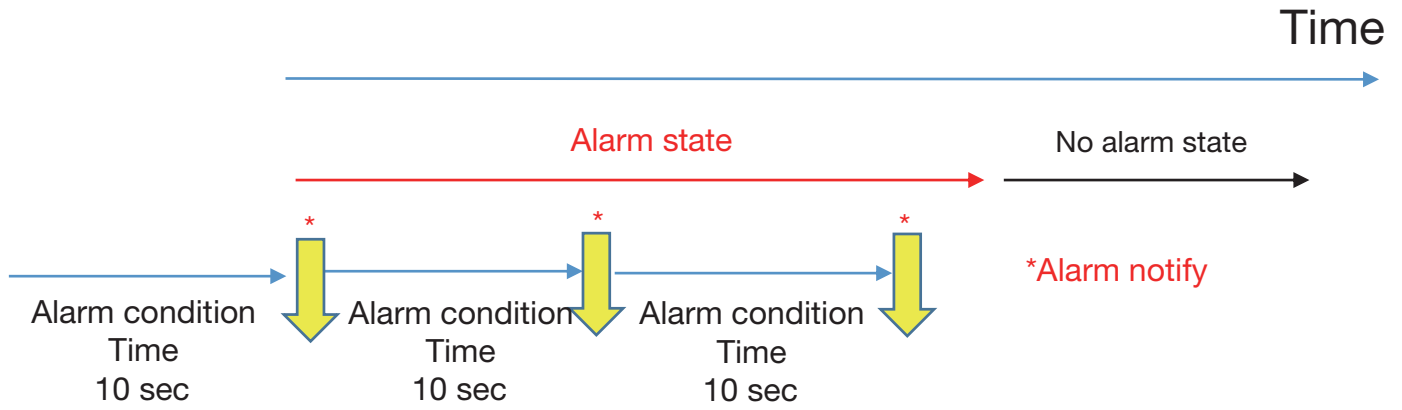
- Below is the difference in the notification operation between "Periodic notification" and "Continuous notification" in "Alarm notification operation setting".
- For periodic notification, if the "Time (sec)" of the alarm conditions is shorter than the "Alarm deactivation time" of the camera, the alarm may not be notified at the "Time (sec)" interval of the alarm conditions.

Necessary Setup (continued)

Alarm notification example

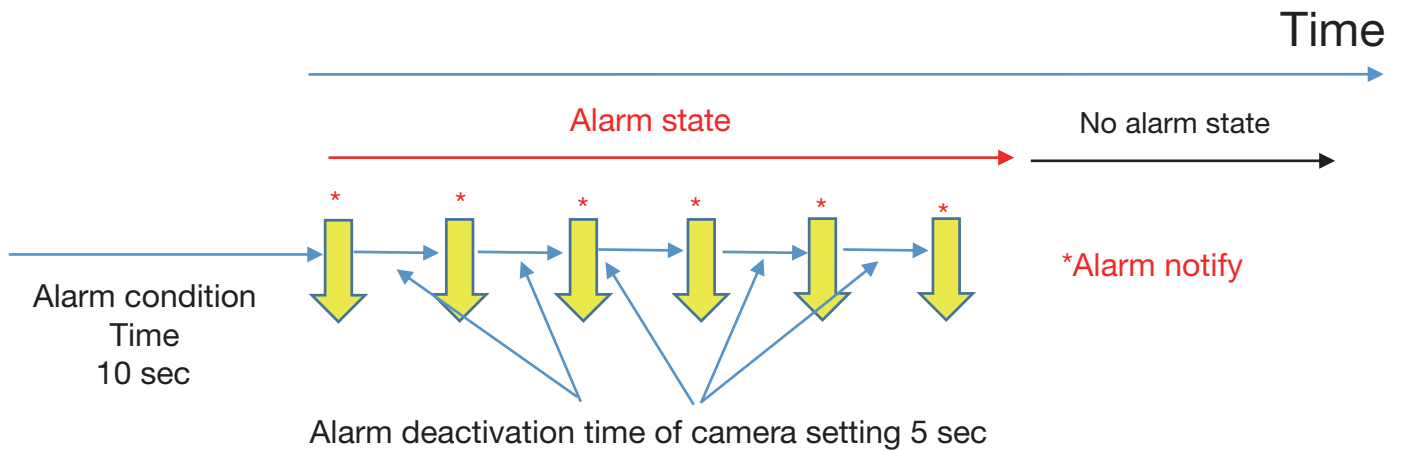
■ Periodic notification

(Ex. Time of alarm condition is 10(sec))



■ Continuous notification

(Ex. Alarm deactivation time of camera setting is 5(sec))



Necessary Setup (continued)

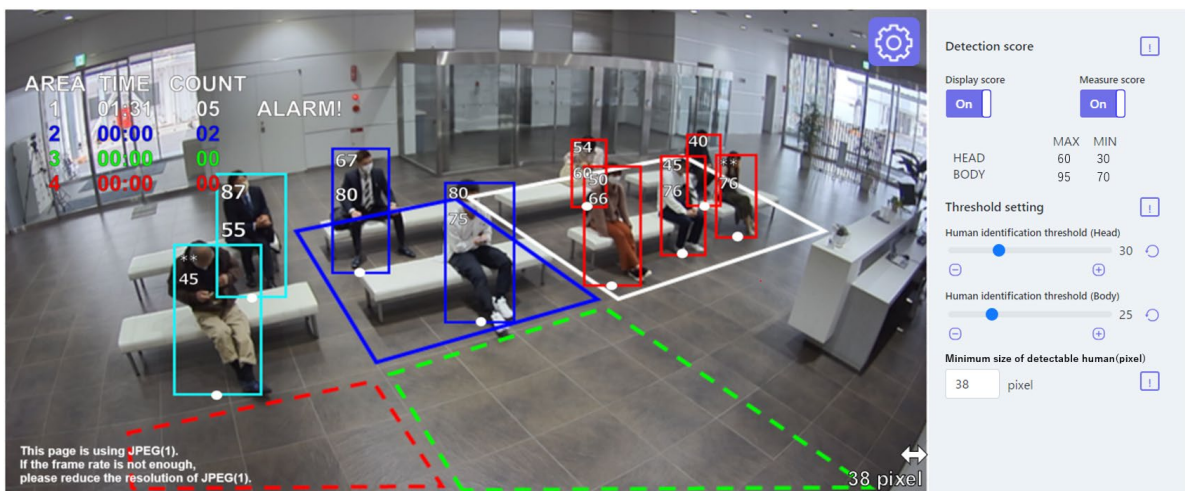
5. Demo screen

Click the "Execute" button on "Demo screen display" of the "Basic" tab to open the demo screen.

The detection area, the detection frame, the timer of each detection area, the number of people detected, and the alarm will be displayed.

Note:

- A JPEG (1) image is displayed on the demo screen. Please set the resolution for JPEG (1) to 1920×1080.



[Detection area]

The set detection area is displayed in color.

Area 1: White; Area 2: Blue; Area 3: Green; Area 4: Red.

Solid lines: Indicates an area set to "On".

Dashed lines: Indicates an area set to "Off".

[Detection frame]

A frame is displayed when a person is detected.

People detection (in red frames):

The people in the area where an alarm has occurred are displayed in red frames.

People detection (in blue frames):

The people who have entered an area are displayed in blue frames.

People detection (in light blue frames):

The people who are not in any area are displayed in light blue frames.

[White dot in the detection frame]

The white dot in the person detection frame shows the position of the person's feet.

[Area status] (Areas 1-4)

Time :Displays the time (timer) when the set number of people is exceeded.

Count :Displays the number of people detected.

Alarm! :Displayed when an alarm is detected.

[Settings] button

Click to display the [Display score] and [Measure score] toggle switch and threshold settings.

[Display score]

When the switch is "On", the head score (top) and body score (bottom) are displayed in the upper left corner of the detection frame.

If the detection score is below the threshold, "****" is displayed.

[Measure score]

When set to "On", measurement of the maximum and minimum detection score is started and the measurement result (MAX/MIN) will be displayed on the demo screen. When set to "Off," measurement is stopped.

Necessary Setup (continued)

Note

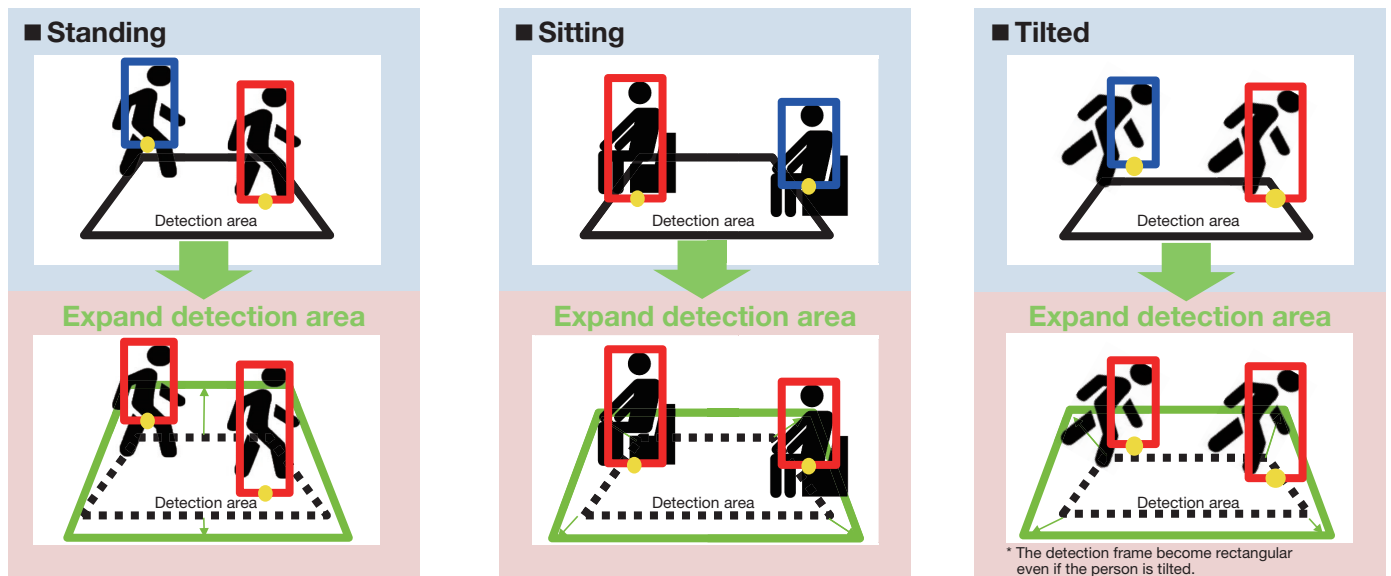
- Please use Mozilla Firefox, Google™ Chrome™ or Microsoft Edge to display the demo screen. Internet Explorer is not supported.
 - The demo screen can be displayed on only one browser. It does not support simultaneous access by multiple browsers.
 - If the data encryption is set to "On", the demo screen image will not be displayed.
 - When used simultaneously with other extension software functions, the position of the person may be significantly misaligned with the detection frame on the demo screen.
 - The demo screen is for demo purposes, thus not recommended for actual operation.
 - If Display score is set to "Off", Measure score cannot be set to "On".
-

Necessary Setup (continued)

6. About the detection frame

Please set a larger detection area since the display of the detection frame changes with the state of the person.

The position of the detection frame is the center of the lower side of the people detection frame. Please set the detection area so that the position of this detection frame falls within the detection area.



*The detection frame inside the detection area is shown in "red", and the detection frame outside the detection area is shown in "blue".

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