

Manual – TrueView People Counter™, embedded for Axis IP Cameras

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Table of Contents

Document history	1
Overview.....	1
Installation.....	3
Configuring TrueView People Counter™.....	6
Live view.....	8
Statistics.....	9
Cognimatics POS data format.....	11
Axis Camera Station integration.....	12
HTTP API.....	13
Troubleshooting.....	19
Appendix.....	20

Document history

June 19, 2007, 1.00	Initial version
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September 15, 2007, 1.01	Support for 207W
December 4, 2007, 1.10	Support Axis 209FD-R and moving counting line
May 30, 2008, 1.16	Web Report and updated images
Mar 25, 2009, 1.30	Major updates for v1.30 release

Overview

TrueView People Counter™ is a fully embedded software module for Axis IP cameras, intended for shops and other environments where you need to count people. TrueView People Counter™ offers an unbeaten solution for people counting with features such as

- 1) **Embedded people counter** – fully embedded into Axis IP camera. TrueView People Counter™ is a powerful stand-alone people counter directly in your Axis camera. Requiring no dedicated computer, all counting is done automatically in the camera.
- 2) **IP technology** –Using IP technology it offers a cost efficient, infinitely scalable, easy-to-install and flexible system for automatic people counting, with a superior accuracy.
- 3) **Maintenance** – Maintain your people counter remotely over IP, set and check parameters, and stream video.
- 4) **Web reporting** – automatically export counting data to TrueView Web Report™ or directly to an SQL database through the TrueView Report Daemon™.
- 5) **Bi-directional counting** – the module simultaneously differentiates and counts people moving upwards and downwards in the camera’s field of view.
- 6) **Statistics** – Built in graphs in the camera web interface.

Easy to set up, with this software you can instantly monitor your customer traffic. Integrated with your network, it supports your staff planning and entrance management. With the TrueView People Counter™ you may collect data such as customer flows, trend analyses, evaluation of advertising and promotions and enhance your strategic marketing decisions through effective monitoring of customer traffic. Improve your network video surveillance system with new cost-efficient analytics.

There are several ways to use the data from the People Counter:

- View real-time counting data and compare it with sales statistics directly on the camera through a web browser.

- View graphs of historical data directly on the camera.
- Download data through an open API.
- Use TrueView Report™, which is a powerful statistical software package that lets you manage and monitor historical data conveniently.

Historical data is available on the camera up to one month and is updated every 15 minutes. The data is stored in 15 minutes bins representing the in and out counts for the 15 minutes periods.

Installation

If TrueView People Counter™ software module is not already installed from your vendor it must be installed manually in your Axis camera.

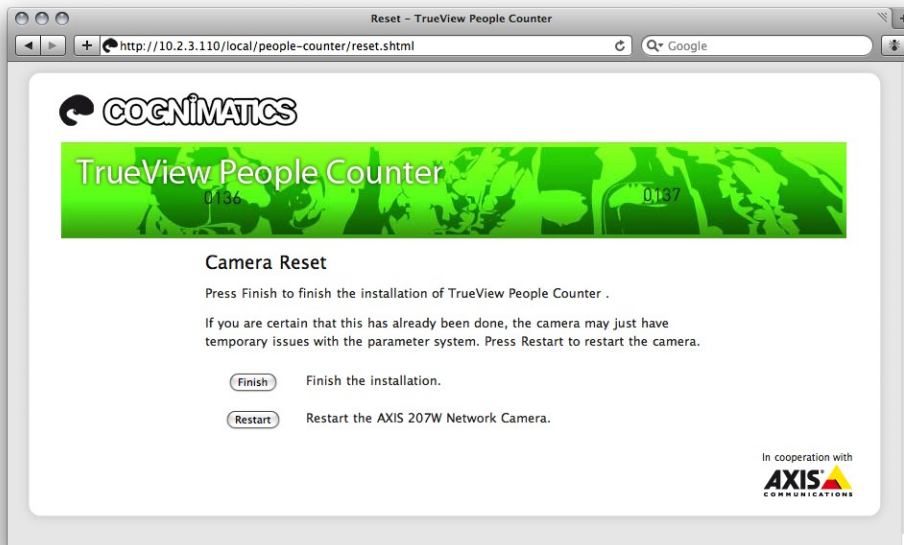
- 1) Make sure you have one of the supported AXIS IP cameras and that you have the correct corresponding software module of TrueView People Counter™. The supported cameras and the corresponding software modules are listed in Appendix A.
- 2) Install the camera on your network, start it up and point your web browser to it. Supported web browsers are Firefox 3, Internet Explorer 7 & 8 and Safari 3 & 4.
- 3) Upload the TrueView People Counter™ firmware by clicking **Setup** -> **System Options** -> **Maintenance**. Under the section **Upgrade Server**, specify the path to the TrueView People Counter™ firmware file or use the **Browse** button. Click on the **Upgrade** button. After installation the camera will restart.

Note that the user name and password will be reset to their respective default values: 'root' and 'pass'.

The screenshot shows the web interface for an Axis 212 PTZ Network Camera. The main heading is "Server Maintenance". On the left, there is a navigation menu with categories like "Basic Configuration", "Video & Image", "Audio", "Live View Config", "PTZ Configuration", "Event Configuration", "System Options" (with sub-items: Security, Date & Time, Network, Ports & Devices, LED, Maintenance, Support, Advanced), and "About". The "Maintenance" section is currently selected. The main content area is divided into several sections: "Maintain Server" with buttons for "Restart" (Restart the AXIS 212 PTZ Network Camera.), "Restore" (Resets all parameters, except the IP parameters, to the original factory settings.), and "Default" (Resets all parameters to the original factory settings.); "Upgrade Server" with a text input for "Specify the firmware to upgrade to:", a "Bläddra..." button, and an "Upgrade" button; a "Note" stating: "Do not disconnect power to the unit during the upgrade. The unit restarts automatically after the upgrade has completed. (1-10 minutes.)"; "Backup" with a "Backup" button; and "Restore" with a text input for "Specify the backup file to use:", a "Bläddra..." button, and a "Restore" button.

Axis 212PTZ maintenance page

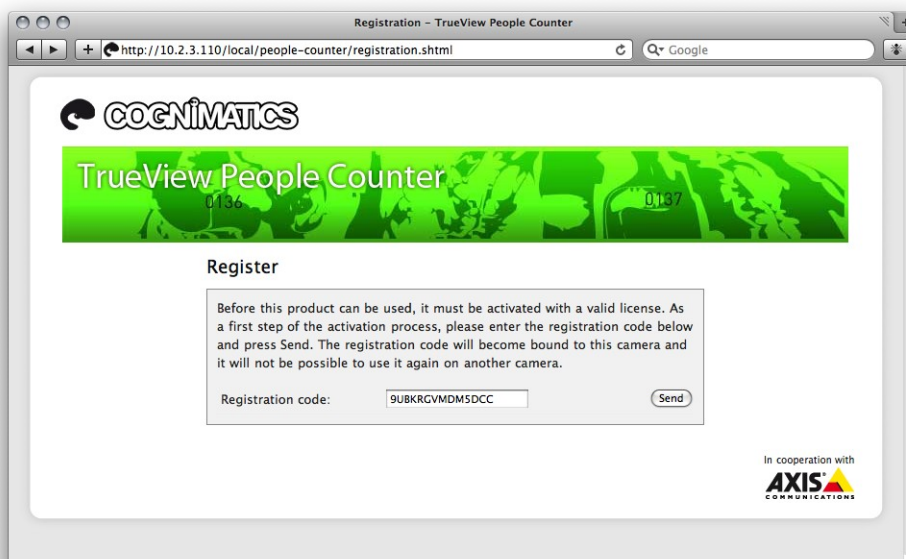
- 4) Reload the camera in the web browser.
- 5) Click the **Finish** button to complete the installation and reset all parameters to the original factory settings. After this, the camera will restart again.



Reset page

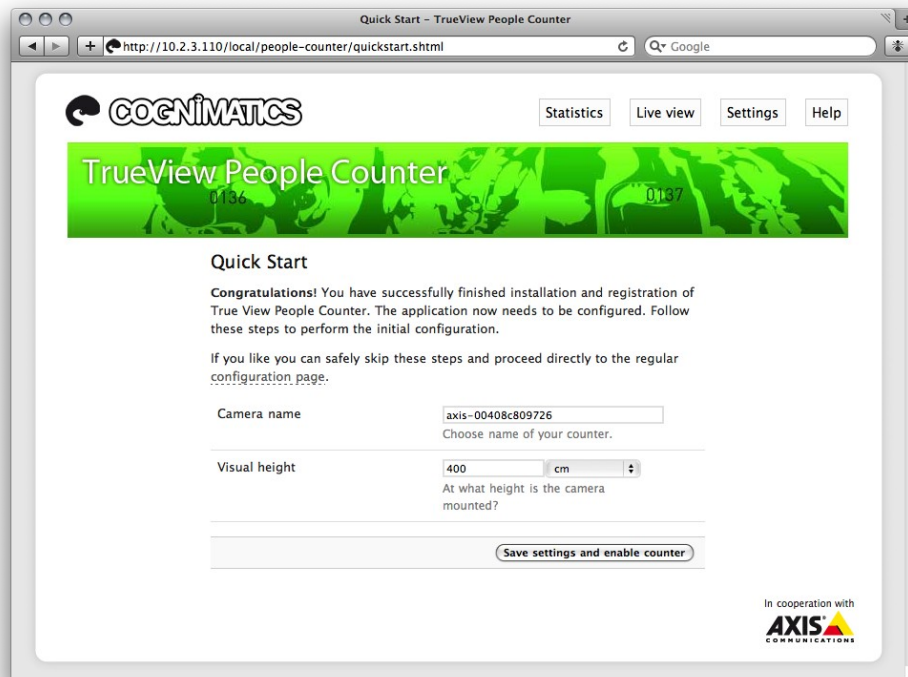
- 6) Reload the camera in the web browser.
- 7) Click the **TrueView People Counter** link to get to the People Counter interface. The first time you do this, you will be asked to enter your license code. Enter your license code and follow the instructions. The software will attempt to activate the license automatically by connecting to a registration server. If the server cannot be reached you will be asked to activate the license on a computer with internet access. When the license activation is complete the camera is ready to be used for counting.

Note that your software license is for one camera only. You can not install the software to another camera without a new registration key.



Registration page

- 8) When the registration is done you'll be redirected to a Quick start page where you can manage the essential settings for the counter to work. You can find these settings in the Settings page as well so if you are used to work with TrueView People Counter™ you can safely skip this step.
- 9) When you update any setting it will take a while for the counter to calibrate, sometimes up to ten minutes. You can see if the counter is working by navigate to the Live view page and walk in the Counting zone.

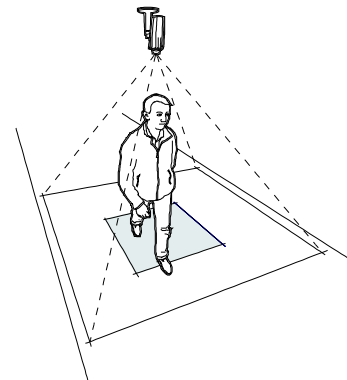


Quick start page

Configuring TrueView People Counter™

To ensure accurate counting of persons passing the camera, the TrueView People Counter™ must be calibrated before use.

The people counter settings are divided into five categories: *General*, *Counting zone*, *Start-stop time*, *POS data* and *Web Report*. If you are using a camera with zoom capabilities, there is also a sixth tab *Zoom*. The final tab, *Axis*, links to some Axis camera settings for convenience.



The camera should be mounted facing straight down.

For the basic setup, go to the *General* tab. Here you can toggle the counter status, name the counter and set the basic parameters.

- 1) Place the camera in the ceiling facing straight down according to the drawing above. The camera should be at least 300 cm above the floor.
- 2) Verify that Counter status is set to Enabled. Adjust the position of the camera so that the red line runs from left to right where you want people to be counted when passing. Make sure that no doors or other moving items are crossing the count line. Avoid having too strong light and shadows in the camera view.
- 3) Enter the name of the camera or location the TrueView People Counter™ is viewing. Note that all cameras used for people counting need to have unique names.
- 4) Input the camera's visual height above the floor and select the proper height unit. This is normally the actual height over the floor but may differ from this value due to e.g. lighting conditions. It is recommended that the visual height is at least 300 cm.
- 5) If the camera can use different lenses, verify that the lens setting corresponds to the lens currently mounted on the camera.
- 6) Set the direction through the camera view, in which people are to be counted as going in when passing underneath the camera.
- 7) If you have several counters on your network you can enter them in the **Additional counters** field, on the form `http://<user>:<password>@<address>`. This will let you see statistics from all your counters on the statistics page. You can add up to nine additional counters. Make sure that all the counters are set to Enable on their respective Setting pages.

Counter status	Enabled	⬇
Camera name	Office	
Visual height	315	cm ⬇
Lens	2.5 mm ⬇	
Direction in	Up ⬇	
Additional counters	root:pass@10.2.3.110	⊖ ⊕
	root:pass@10.2.3.151	⊖ ⊕
	root:pass@10.2.3.252	⊖ ⊕
Submit		

Under the *Counting zone* tab you can adjust the area, in which counting will take place. The counting zone is indicated in the image by two blue lines and one red line. The red line is the virtual counting line and the blue lines show the extent of the counting area. To be counted, a person needs to walk through the entire zone, crossing both blue lines. You will notice that there are certain limitations on these values as well as the visual height setting. Note that the position of the red and blue lines over the video on the settings page are just an estimate of where the line will be. For the actual position, go to the live view page.

- 1) The *Line offset* moves the entire counting zone upwards or downwards. How much it can be moved will depend on the counting zone size.

Line offset	<input type="range"/>
Counting zone size	<input type="range"/>
Counting line interval:	<input type="range"/>

- 2) The *Counting zone size* slider sets the size of the counting area. How much it can be changed will depend on the visual height setting.
- 3) Use the *Counting line interval* setting to shorten/move the counting lines sidewise.

Under the *Start-stop time* tab you can disable the counter during certain hours.

- 1) Check the *Enable* checkbox to enable start and stop times.
- 2) Set the time interval, during which the people counter should be running.

Enable:	<input checked="" type="checkbox"/>
Time interval:	Start <input type="text" value="07:30"/> Stop <input type="text" value="18:15"/>

To display sales statistics from the POS system, go to the *POS data* tab. The connection to the POS system is described later on in this manual.

- 1) Enter the POS data address.
- 2) Select your currency.

POS data address:	<input type="text"/>
Currency:	<input type="text" value="EUR"/>

Apart from showing statistics in the camera interface and serving XML data, the people counter software can also push count data to the TrueView Web Report™ system. The settings for this are found under the *Web Report* tab.


- 1) Check the *Enable* checkbox to enable pushing data to TrueView Web Report.
- 2) Select the correct version of TrueView Web Report™ that you are going to access.
- 3) Enter the Web Report server address and your account credentials.
- 4) If the camera resides behind a proxy server, enter the proxy server address and credentials.

Enable:	<input checked="" type="checkbox"/>
URL:	<input type="text"/>
Version:	<input type="radio"/> Version 1 <input checked="" type="radio"/> Version 2
User name:	<input type="text"/>
Password:	<input type="text"/>
Proxy address:	<input type="text"/>
Proxy port:	<input type="text"/>
Proxy user name:	<input type="text"/>
Proxy password:	<input type="text"/>

If you have a camera with zoom capabilities you can also change it from the settings page by pressing the *Zoom* tab.

- 1) Move the slider to the wanted value. Note that you must disable the counter before doing this, this can be done by click on the link above the slider.

You must disable the counter before changing the zoom.

Zoom:	<input type="text"/> 
Make sure to press submit when you are satisfied with the zoom.	

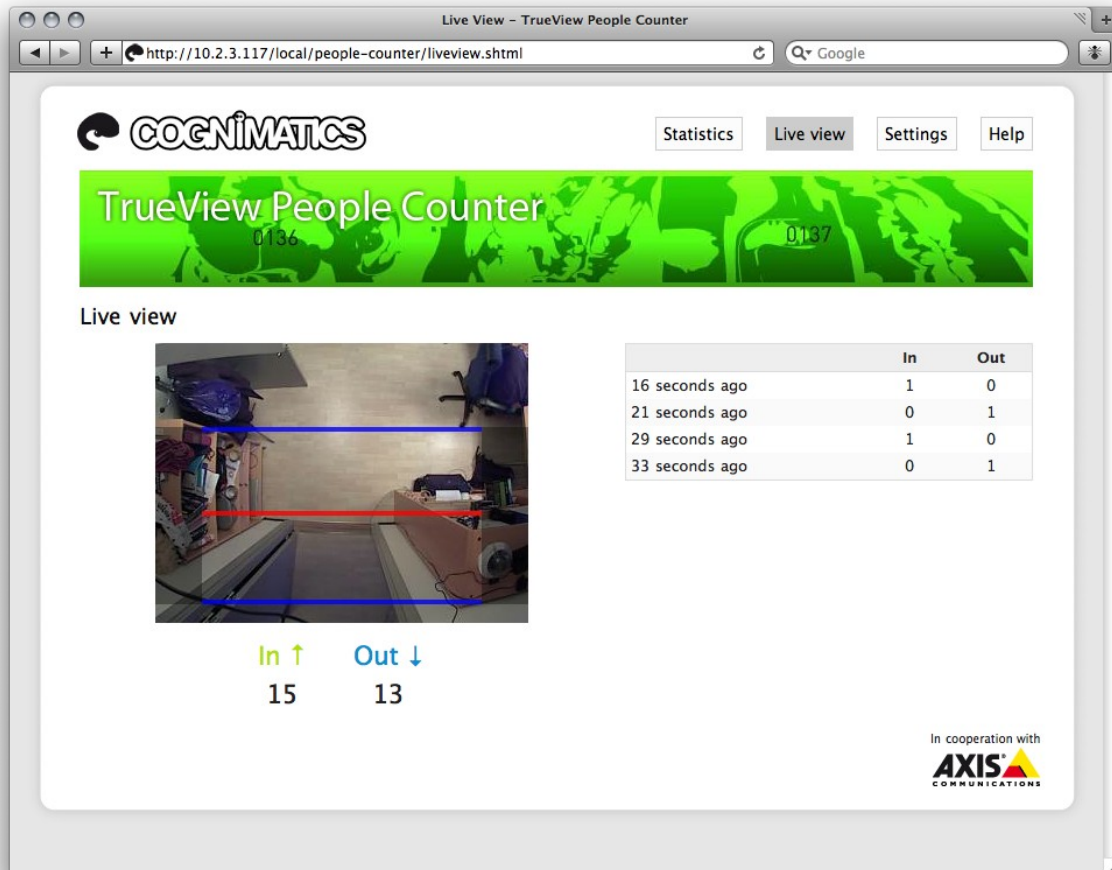
Note! Do not forget to press the Submit button when changes in settings are made, otherwise the settings won't be saved.

You can set the standard parameters of the AXIS camera by selecting one of **Users**, **TCP/IP** or **Time** from the *Axis* tab. See your AXIS camera manual for how to set the parameters. Do not use any camera built in functionality that may affect the counting accuracy. Do not set any other parameters than:

- a. Local time
- b. IP address
- c. Users

Live view

To see when TrueView People Counter™ is counting you go to the *Live view* page. This page can also be a great help when polishing the settings. To the right the latest counts are shown in a table.



The screenshot shows a web browser window titled "Live View - TrueView People Counter". The address bar displays "http://10.2.3.117/local/people-counter/liveview.shtml". The page features the COGNIMATICS logo and navigation buttons for "Statistics", "Live view", "Settings", and "Help". A green banner at the top contains the text "TrueView People Counter" and two counters showing "0136" and "0137". Below the banner, the "Live view" section includes a video feed of a hallway with red and blue detection lines. Underneath the video, the current counts are displayed as "In ↑ 15" and "Out ↓ 13". To the right of the video is a table showing recent counting events.

	In	Out
16 seconds ago	1	0
21 seconds ago	0	1
29 seconds ago	1	0
33 seconds ago	0	1

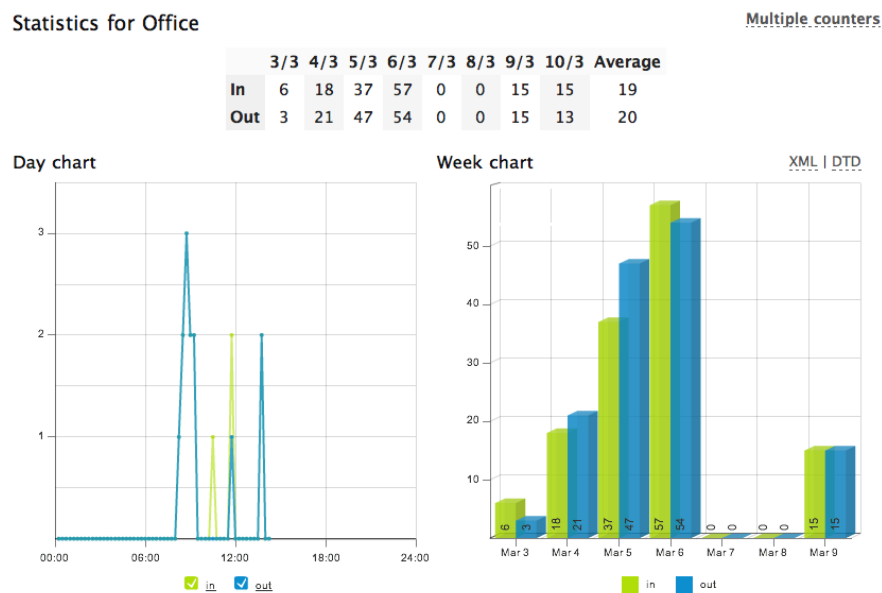
In cooperation with
AXIS
COMMUNICATIONS

Statistics

You can configure your TrueView People Counter™ in different ways to generate the statistics you require and also link in data from point of sales. This includes important measurements like **conversion rate** and **average basket**, which helps you optimize the performance of your shop. You can obtain statistics from your counters in three different ways.

- 1) **Real time data with graphs** – Real time people counter data linked with Point of Sales (POS). This data is updated in real time every five seconds. Using Cognimatics API you can link in point of sales data to generate important key figures like **conversion rate** and **average basket size**. Click on **Statistics** at the top left hand side of the page to see data updated in real time.

If no POS data file is specified in the settings the top table on the statistics page will contain in and out count for the latest week together with the average count. Beneath the table there are two charts. The left chart (*Day chart*) shows counts of the current day while the right chart (*Week chart*) shows values for the last week (not including the current day). When new data is



available the day chart will automatically be updated.

If POS data is specified the data table will contain different data:

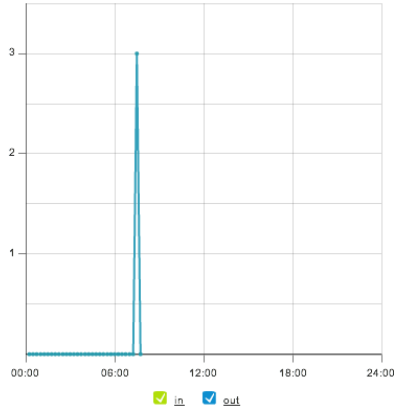
- a. **Visitors** – total number of visitors counted as going in by the units in your network
- b. **Buyers** – total number of transactions
- c. **Did not buy** – difference between Visitors and Buyers
- d. **Turnover** – sales in shop
- e. **Conversion rate** – the number of buyers divided by the number of visitors (Buyers/Visitors)
- f. **Average basket** – the size of the average purchases (Turnover/Visitors)

Statistics for Office

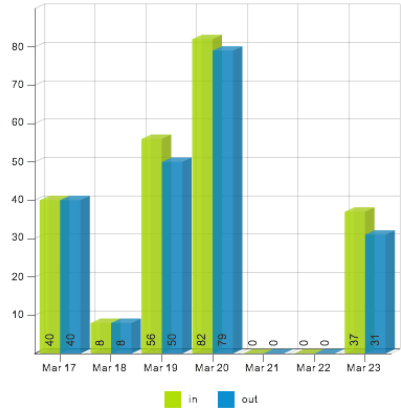
[Multiple counters](#)

	17/3	18/3	19/3	20/3	21/3	22/3	23/3	24/3	Average
Visitors	40	8	56	82	0	0	37	3	32
Buyers	18	4	29	22	0	0	26	3	14.57
Did not buy	22	4	27	60	0	0	11	0	8.86
Turnover	234	348	2494	176	0	0	780	137	595.57
Conversion rate	45%	50%	52%	27%	100%	100%	70%	100%	32%
Average basket	13.0	87.0	86.0	8.0	0.0	0.0	30.0	45.7	38.52

Day chart



Week chart



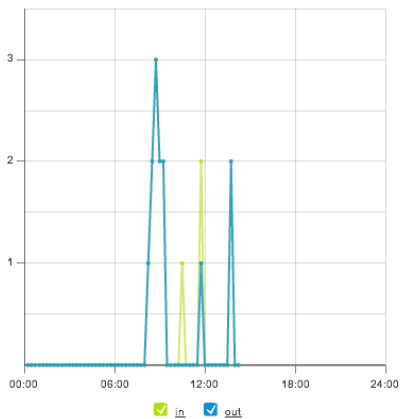
If additional counters is specified you'll see a link in the upper right corner with the text "Multiple counters". By clicking this link you'll see data from all counters that your counter can connect to. By clicking on a counter name you'll see its day and week charts.

Multiple counters

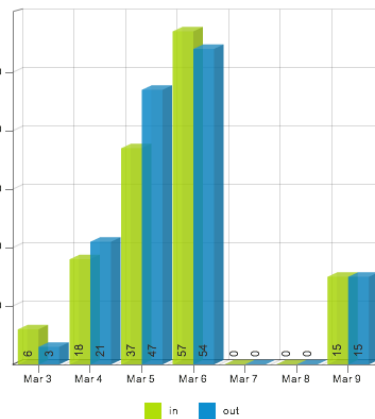
[Single counter](#)

Name	3/3		4/3		5/3		6/3		7/3		8/3		9/3		10/3	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Office	6	3	18	21	37	47	57	54	0	0	0	0	15	15	15	13
Entrance_3	24	22	24	25	12	13	54	54	12	42	32	29	12	14	0	0
Sum	30	25	42	46	49	60	111	108	12	42	32	29	27	29	15	13

Day chart



Week chart



- 2) **TrueView Report™** – Installing TrueView Report™ on your windows PC or TrueView Web Report™ on a web server lets you manage and view historical data conveniently. For more information about these statistical software packages we refer to their respective manuals.

At the bottom of the statistics page you can find data from TrueView People Counter in both .cnt and .xml format.

- 3) **HTTP API** – Download data in text format using the HTTP API described below.

Cognimatics POS data format

The POS data file specified in the settings must be on the **Cognimatics POS data format** for the counter to be able to interpret the data. The data format can handle up to eight days including the current day.

An example of the POS data format is the following:

```
{"data": [
  {"timestamp":1236084604,"buyers":5,"turnover":61},
  {"timestamp":1236171004,"buyers":15,"turnover":198},
  {"timestamp":1236257404,"buyers":31,"turnover":530},
  {"timestamp":1236343804,"buyers":46,"turnover":647},
  {"timestamp":1236430204,"buyers":0,"turnover":3},
  {"timestamp":1236516604,"buyers":0,"turnover":3},
  {"timestamp":1236603004,"buyers":6,"turnover":123},
  {"timestamp":1236689404,"buyers":12,"turnover":87}
]}
```

The data should be a JSON¹ array with the key “data”. Each row in the array should have the keys

- timestamp: a UNIX timestamp in the day
- buyers: number of persons who bought something that day
- turnover: the turnover that day

Note that if the current days' data is updated the People Counter will also show the changes in the interface.

An example of an POS-data file is available in the counter. Put

`http://<user>:<pass>@127.0.0.1/local/people-counter/random-pos.cgi` as POS data address on the Settings page for using this.

¹ For more information about the JSON format, see <http://www.json.org>.

Axis Camera Station integration

TrueView People Counter™ have pages suited customized for the Axis Camera Station software (ACS).

In a new window in ACS can a lightweight version of the People Counter interface be opened from the URL

`http://<servername>/local/people-counter/acs/.`

The default view is the Day chart. You can select the Week chart and Live view from the menu in the right lower corner.

The week chart can be chosen directly by giving the following URL:

`http://<servername>/local/people-counter/acs/index.shtml?type=chart&time=week`

Live view can be accessed by

`http://<servername>/local/people-counter/acs/index.shtml?type=liveview`

If the menu should be hidden pass clean as an URL option, i.e.

`http://<servername>/local/people-counter/acs/index.shtml?clean&type=liveview`

A lightweight settings page can be found at

`http://<servername>/local/people-counter/acs/settings.shtml`

For more precise instructions how to embed web pages in ACS please turn to its manual.

HTTP API

You can request and clear data in different ways.

- 1) **Request real time data:** Returns text file with counting data
- 2) **List available data:** Returns a list of available binary data files
- 3) **Request DTD file:** Returns a DTD file describing the format of the XML data
- 4) **Request XML data:** Returns an XML file containing historical data
- 5) **Clear local counting data**
- 6) **Live view information:** Returns information about the placement of the lines in Live view

1) Real time data

Method: GET

Syntax:

```
http://<servername>/local/people-counter/live_sum.js
```

Return:

```
{
  "name": "<cameraName>",
  "timestamp": <timestamp>,
  "in": <in>,
  "out": <out>
}
```

where <cameraName> is

the name of the camera

and <timestamp> is

the UNIX timestamp of the latest count

and <in> is

the number of people passing in until now today

and <out> is

the number of people passing out until now today.

Example: Request real time data from TrueView People Counter™.

```
http://myserver/local/people-counter/live_sum.js
```

Return:

```
{
  "name": "Entrance south",
  "timestamp": 1236769334,
  "in": 3,
  "out": 2
}
```

2) List all available .cnt data files.

Method: GET

Syntax:

```
http://<servername>/local/lscnt.cgi?plain
```

Return:

```
{
  "timestamp":"1237294947",
  "files":["xx.cnt", [..] "xx.cnt"]}
}
```

where <timestamp> is
the time set in the camera

and <files> is
an array of available .cnt files sort in write date descending order.

Example: List all data files available in TrueView People Counter™.

```
http://myserver/local/lscnt.cgi?plain
```

Return:

```
{"timestamp":"1237294947","files":["17.cnt","16.cnt"]}
```

3) Download .cnt data files

Method: GET

Syntax:

```
http://<servername>/local/getcnt.cgi?[day=<day>|all]
```

Return:

This script returns a Cognimatics proprietary binary data file, to be used in TrueView Report™.

Example: Request historical data for the 12th of the current month.

```
http://myserver/local/getcnt.cgi?day=12
```

Example: Request all available historical data.

```
http://myserver/local/getcnt.cgi?day=all
```

4) DTD file

Method: GET

Syntax:

```
http://<servername>/local/people-counter/appdata.dtd
```

Return:

```
<?xml version="1.0"?>

<!-- A countdata element contains at least one typedesc element and a -->
<!-- number of cntset elements. A typedesc element contains a number of -->
<!-- type elements, each having a unique id attribute and a string -->
<!-- value describing the data type. A cntset element has three -->
<!-- attributes for the name of the counter, the data set start time -->
<!-- and the save interval delta. The starttime is given in seconds -->
<!-- since the epoch, delta is given in seconds. A cntset contains a -->
<!-- number of cntgroup elements, each in turn containing a number of -->
<!-- cnt elements carrying data for one save interval. A cnt element -->
<!-- has one attribute describing the data type id and a value that -->
<!-- gives the actual count. -->
<!-- -->
<!-- This specification can be used for event driven data collection as -->
<!-- well as time driven. In that case, each cntgroup should be given a -->
<!-- timestamp. With timestamps in the cntgroup elements, the cntset -->
<!-- starttime and delta may be ignored (but must still be included). -->

<!ELEMENT countdata (typedesc+) (cntset*)>
  <!ATTLIST countdata
    version CDATA #IMPLIED>

<!ELEMENT typedesc (type?)>

  <!ELEMENT type (CDATA)>
  <!ATTLIST type
    typeid ID #REQUIRED>

<!ELEMENT cntset (cntgroup*)>
  <!ATTLIST cntset
    name CDATA #REQUIRED
    starttime CDATA #REQUIRED
    delta CDATA #REQUIRED>

<!ELEMENT cntgroup (cnt*)>
  <!ATTLIST cntgroup
    timestamp CDATA #IMPLIED>

  <!ELEMENT cnt (CDATA)>
  <!ATTLIST cnt
    typeid IDREF #REQUIRED>
```

5) XML file

5-1) Predefined XML

Method: GET

Syntax:

```
http://<servername>/local/people-counter/appdata.xml
```

Note! There may be multiple sets in the file.

5-2) Custom XML

Method: GET

Syntax:

```
http://<servername>/local/getxml.cgi?[day=<day>|all]
```

Return:

If `all` or no arguments are given, all available data files are converted to XML and returned. Otherwise, the data for each day specified in the argument list is converted to XML and returned.

Example: Request the historical data for the 6th of the current month.

```
http://<servername>/local/getxml.cgi?day=06
```

Example: Request all available historical data.

```
http://<servername>/local/getxml.cgi?day=all
```

6) Clear local counting data.

Method: GET

Syntax:

```
http://<servername>/local/people-counter/rmcnt.cgi
```

7) Live view information

Method: GET

Syntax:

```
http://<servername>/local/people-counter/lvinfo.js
```

Return:

```
{
  "left":<left>,
  "right":<right>,
  "top":<top>,
  "middle":<middle>,
  "bottom":<bottom>
}
```

where <left> and <right> is

the x coordinates in pixels for start and stop for the blue lines in Live view

and <top> and <bottom> is

the y coordinates in pixels for the two blue lines in Live view

and <middle> is

the placement of the red line in the y direction in pixels.

Example: Request Live view information form TrueView People Counter™.

```
http://<servername>/local/people-counter/live_sum.js
```

Return:

```
{
  "left":56,
  "right":296,
  "top":88,
  "middle":136,
  "bottom":224
}
```

Troubleshooting

The video does not show in Live view

Make sure no one else is watching the video and click reload in your web browser. In the Axis 207 only one viewer is allowed while Axis 209 and 212 supports a few more viewers at the same time. If you are using Internet Explorer an additional Active X plugin must be installed, the browser will prompt you with a notification if it isn't.

The software asks for registration code every time

Reset to factory default after installation and restart the camera.

The software prompts me with a warning saying that the framerate is too low

- If the scene is too dark, the Axis camera does not deliver enough frames per second for the People Counter to work. The scene must have a lightning with at least 80 lux.
- When streaming video from the camera make sure to open only one stream at a time and to stream in 320x240 MJPEG format.

The setting page does not show the parameter values

Reset to factory default after installation and restart the camera.

The software does not upload to TrueView Web Report

Go to `http://<servername>/local/people-counter/showlogs.cgi` in your web browser and look at `wupload.log` to see if the error can help you. Note that some times it can take up to half an hour for the software to upload data to TrueView Web Report.

The software does not count

Make sure you reset to factory default after installation and restart the camera. Make sure the scene is well lit. People Counter only works when the scene has at least 80 lux.

The software does not count after changing parameters

After changing the parameters the software may need to run up to 10 minutes before the counting accuracy is at optimum.

The software does not count correctly

- Make sure people are passing the entire counting zone crossing both blue lines – not passing out to the left or to the right.
- If the software counts too many – lower the visual height.
- If the software counts too few – increase the visual height.

I still can't get the software to count

If you've followed all of the advices above and still can't get the software to work please contact the Cognimatics support team at `support@cognimatics.com`. Don't forget to send the archive with logs and other generated from the page `http://<servername>/local/people-counter/genlogs.cgi`.

Appendix

The following camera models are currently supported

Camera model	Software module
Axis 212PTZ	tvlcAxis212_xx.bin
Axis 207W	tvlcAxis207W_xx.bin
Axis 209FD-R	tvlcAxis209FD-R_xx.bin

xx is the version number of the software module.