TrueView Parking™ — Manual

embedded for Axis IP cameras

version 2.0

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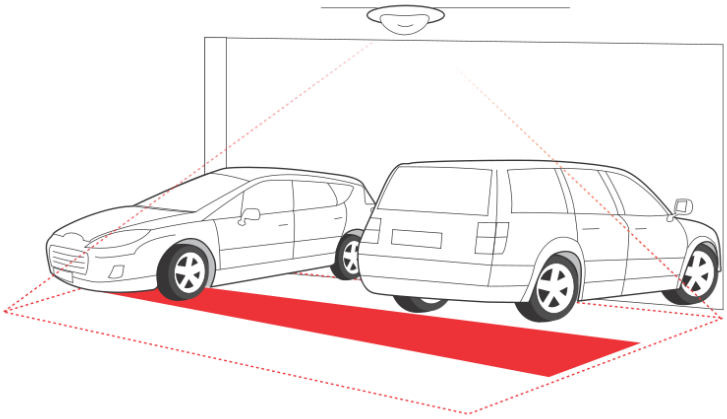
Convert camera to sensor

TrueView Parking™ is a product for counting and managing occupancy in parking garages. The software installs directly into Axis cameras, which are placed in the ceiling over entrances and exits and automatically counts vehicles to and from the facility. All counting is done locally on the camera. During normal operation only 100 % anonymous data and no video is leaving the camera, effectively converting the camera into a sensor. One sensor can be assigned to be master collecting and managing the traffic data from all other sensors in the system. The master sensor can also be configured to send the occupancy level directly to displays.



Place sensor in the ceiling over exit and entrance.

The entire solution is 100 % IP based, requires no auxiliary PC or PLC, no inductive loops, and no costly pavement work.

Easy to set up, TrueView Parking™ instantly lets you monitor your parking occupancy.The entire solution is 100 % IP based, requires no auxiliary PC or PLC, no inductive loops, and no costly pavement work. Installation can be done by local staff with basic network and surveillance camera experience.

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.

Mounting the camera

The camera should be mounted right above the point where vehicles should be counted and should be facing straight down.

Height and width

TrueView Parking™ allows a mounting height range from 250 cm to 500 cm. As a rule-of-thumb, one counter unit will cover a passage as wide as the camera mounting height. Depending on the camera model and lens focal length, both the height range and the covered width can vary.

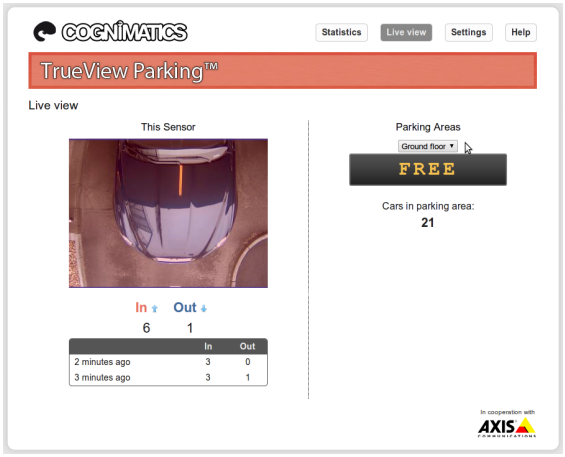
Positioning the camera

Adjust the position of the camera so that vehicles pass through the camera's view vertically. If you install TrueView Parking™ prior to mounting the camera, you can use the lines indicating the counting zone to guide you. The red line should run from left to right, across the path that vehicle will take when passing underneath the camera.

General guidelines

In order for the camera and, in effect, TrueView Parking™ to function properly, make sure that the lighting is sufficient. A minimum of 1 LUX in the scene is required.

If the passage is wider than what could be covered by a single camera, then two or more cameras are required. Note that, currently, it is required that two cars may not pass the counter in the same direction simultaneously. It is designed for use with single-lane traffic, and therefore one of these cars will be ignored.



Use the live view to guide you.

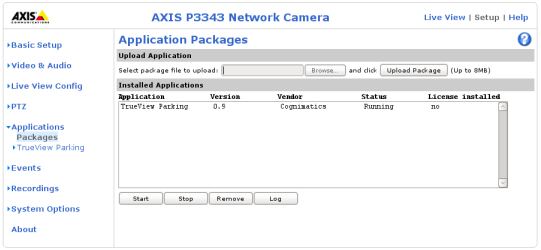
Installing the software

If TrueView Parking™ 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 Parking™. 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.x, Internet Explorer 7 & 8 and Safari 3 & 4.

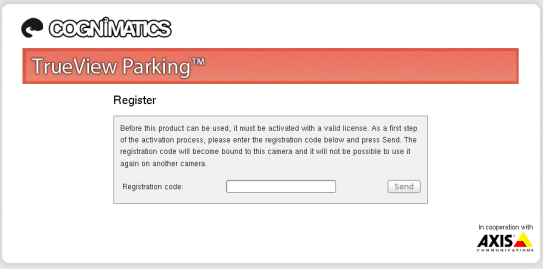
3. Upload the TrueView Parking™ installation file by clicking **Setup** -> **Applications**. Under the section *Select package file to upload* , specify the path to the TrueView Parking™ installation file file or use the **Browse** button. Click on the **Upload Package** button. Press **Start** to start the product.



Axis P3343-VE application package page

4. Click the **TrueView Parking™** link. 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. The application may then ask you to enter the password of the root user for the camera. This is to verify that the camera is fully zoomed out. When the license activation is complete and camera has been zoomed out, the camera has been converted into a sensor is ready to be used for counting.

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



Registration page.

5. When you update any setting it can sometime take up to ten minutes for the sensor to calibrate. You can see if the sensor is counting OK by navigate to the **Live view** page and view vehicles passing the counting zone.

Configuring TrueView Parking™

Note: To ensure accurate counting of vehicles passing the camera, TrueView Parking™ must be calibrated before use. This is done using the Visual height setting.

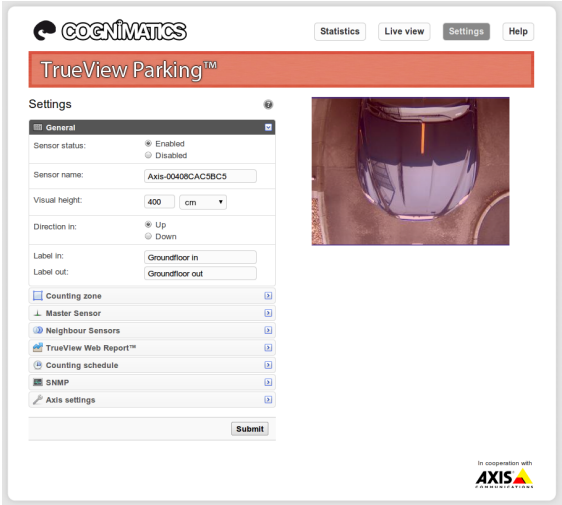
TrueView Parking™ settings are divided into three categories:

1. Basic/counting

2. Data/reporting

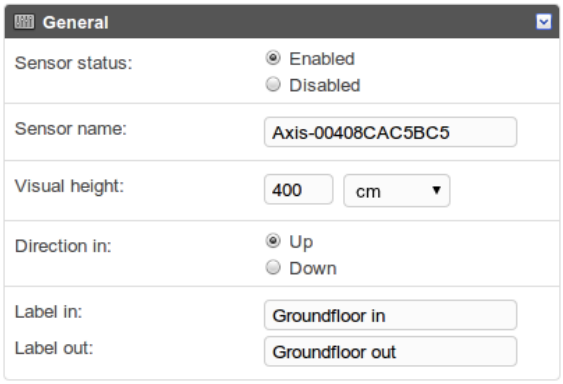
3. Connectivity

There are also direct links to some basic Axis camera settings for convenience.



Basic counting configuration

We will refer to a camera with TrueView Parking™ installed as one *sensor* from here on. For the basic setup, go to the *General* section. This is where one toggles the sensor status, name the sensor and set the most fundamental parameters.



1. Verify that **Sensor status** is set to Enabled.

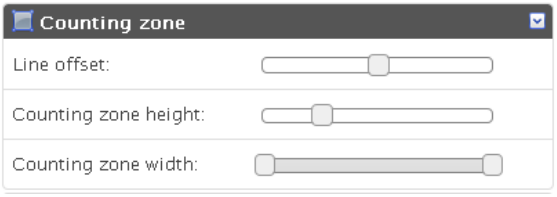
2. Enter the **name** of the sensor or location the TrueView Parking™ is viewing. Note that all sensors in your system need to have unique names.

3. Input the sensors'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 250 cm. If you are experiencing that you cannot fill in the actual height even though it is inside the interval 250cm to 500cm, you may have to decrease the counting zone height in the Counting zone settings below.

4. Set the **direction** through the sensor view, in which vehicles are to be counted as going in when passing underneath the sensor.

5. You may also enter **Label in** and **Label out** for the in and out respectively. This will be an aid in the later configuration of the parking areas. As an example one could fill in *Label out* as "Green park street" if cars can exit to Green park street here.

Select **Counting zone** section to adjust the area in which counting will take place. These settings are more limited if the sensor is mounted at a low height above the floor. The counting zone is indicated in the image by two blue lines and a red area. The red area is the virtual counting line and the blue lines show the extent of the counting zone. For proper counting, a vehicle needs to be visible within the entire zone. 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.



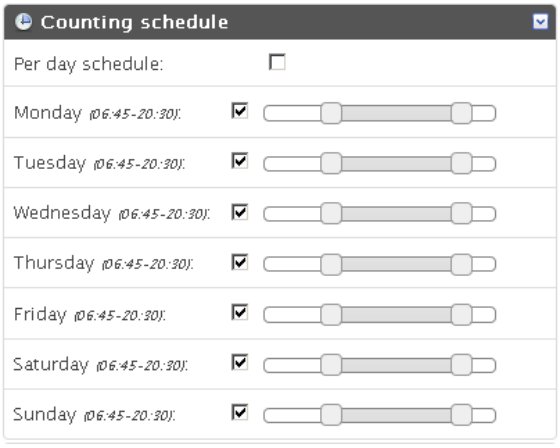
1. The *Line offset* moves the entire counting zone upwards or downwards. How much it can be moved will depend on the counting zone size.

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.

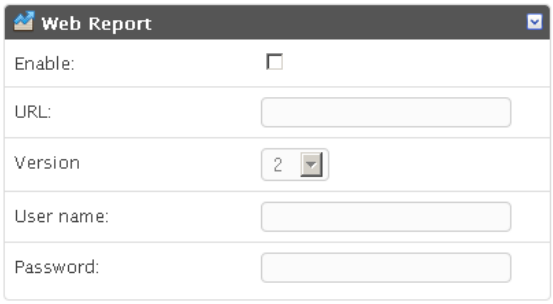
Note! Do not forget to press the Submit button when changes in settings are made, otherwise the settings will not be saved.

Select **Counting schedule** section to set start and stop times for the sensor each day of the week. By unchecking the **Per day** schedule box, changing the times for one day will affect all days. Unchecking a box by the sliders will disable counting for that particular day.



Data and reporting configuration

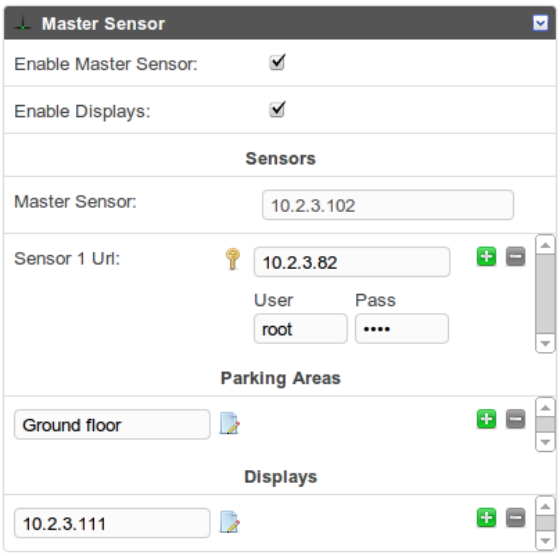
TrueView Parking™ can push count data to the TrueView Web Report™. The settings for this are found in the *Web Report* section.



1. Check the *Enable* check-box to enable pushing data to TrueView Web Report™.
2. Select the correct version of TrueView Web Report™ that will be accessed.
3. Enter the Web Report server address and your camera group account credentials.
4. If the sensor resides behind a proxy server, enter the proxy server address and credentials.

Connectivity configuration

To be able to compute the occupancy level of one or several parking areas and send the occupancy status to displays one sensor needs to be selected as a master sensor. It is recommended that you configure the settings (and press submit) in the general section for all sensors before doing this. In the master sensor select the *Master Sensor* section.



Enable master sensor

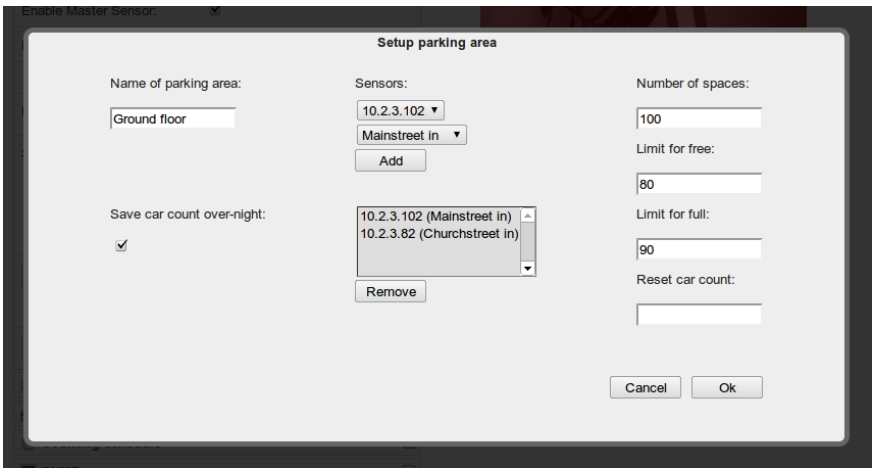
1. Check the *Enable Master Sensor* check-box.
2. Check the *Enable Displays* check-box if you will be using displays.
3. Under *Sensors*, add the URL and credentials (by clicking the key-icon) for all the additional sensors included in your system. After a few seconds the input-field should

turn green if the connection with this sensor is verified. Use the plus and minus sign to add and delete sensors.

4. Under *Parking Areas*, click the edit-icon to the right of the input-field to configure a new parking area. A parking area form will now pop-up.

   - Type in the name of your parking area, "Ground floor" as an example.
   - Check the *Save car count over-night* check-box if you have cars parked over-night in this area.
   - Under *Sensors* select a sensor to be included in the area. After that select the label which is considered to be the direction into this area and click the *Add* button. Repeat with all sensors involved for this specific area.
   - Enter how many parking spaces this area contains in the *Number of spaces* field.
   - Enter at which limit the parking area is considered to be free in the *Limit for free* field. When the number of cars in the area reaches down to this limit, an eventual display will show that this area is free.
   - Enter at which limit the parking area is considered to be full in the *Limit for full* field. This should exceed the limit for free.
   - Enter the actual number of cars occupying the area at this moment in the *Reset car count* field and click *Ok*. Do not forget to click *Submit* when you are done with your parking areas.

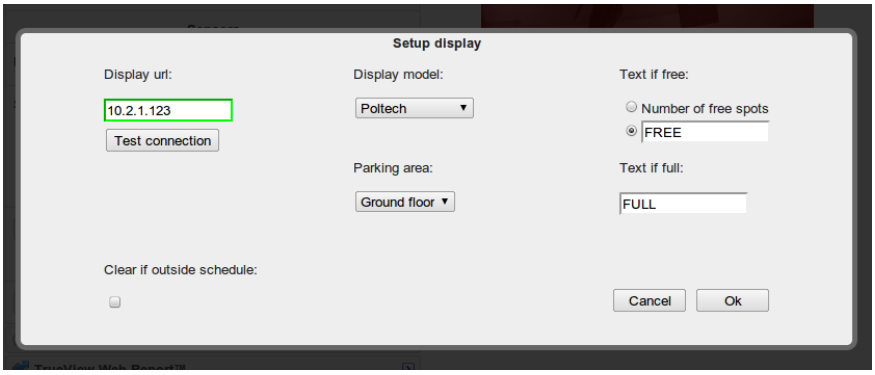
     Note! By manually entering the actual number of parked cars you can calibrate the system to correct occupancy level. It is good practise to do manual calibrations regularly.



Setup parking area

5. Under *Displays*, click the edit-icon to the right of the input-field to configure a new display. A display form will now pop-up.

- Enter the url to your display in the *Display url* field, choose the model of your display in the *Display model* field, click the *Test connection* button. The input field should turn green if a connection to the display is established.
- Check the *Clear if outside schedule* check-box if the display should be cleared when outside scheduling hours.
- Select which *Parking area* this display will show the occupancy of.
- Under *Text if free*, enter an optional text to be displayed when the area is free or choose to display the number of free spots.
- Under *Text if full*, enter an optional text to displayed when the area is full and click *Ok*.



Setup display

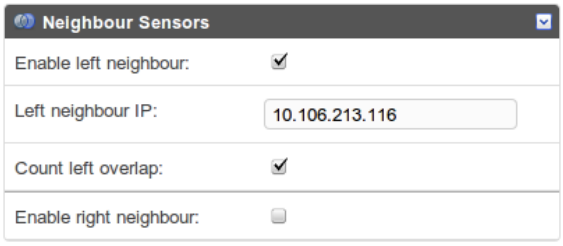
If two or more sensors are used to cover one entrance or exit, each sensor must be synced with its neighboring sensors. To setup this, go to the *Neighbour sensors* section and check one or both boxes enabling neighbours.

Note! You should only include one of these neighbours in the parking area configuration above.

Enable neighbour sensors

If the sensor has a neighbour to the right of the sensor view, then check the *Enable right neighbour* checkbox and enter the ip address to that sensor. Go through the same procedure on the other neighbouring sensors. Checking the overlap checkbox(es) will make one sensor keep track of the counts in one or both of its neighbours. That way either one can be queried for data and they will give the same result.

Right neighbour sensor



Left neighbour sensor

Axis settings

You can set the standard parameters of the AXIS camera by selecting one of **Users**, **TCP/IP** or **Date & Time** in the *Axis settings* section. See your AXIS camera manual for how to set the parameters. To assure the best counting performance, avoid using any camera built-in functionality that may affect the counting accuracy. Do not set any other parameters than:

a. Local time

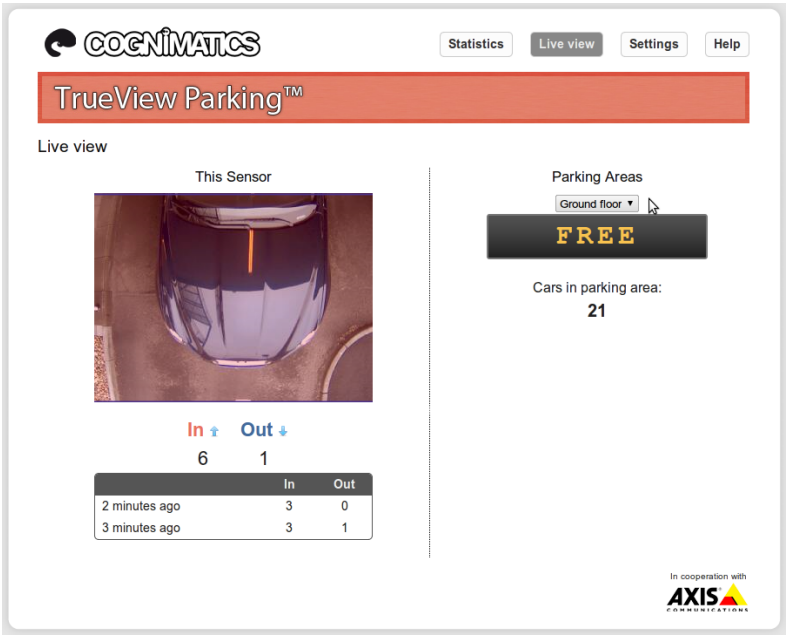
b. IP address

c. Users

Live view

To see when TrueView Parking™ is counting you go to the *Live view* page. This page can also be a great help when polishing the settings. To the left under the sensor image, the latest counts for this sensor are shown in a table.

If this sensor is configured as a master sensor, information about the parking area occupancy and current display texts are shown to the right. At the top right you select an area to view. If there is a display linked to this area, it will pop-up beneath the area selector. Under the display you will get the actual number of cars in the selected parking area.

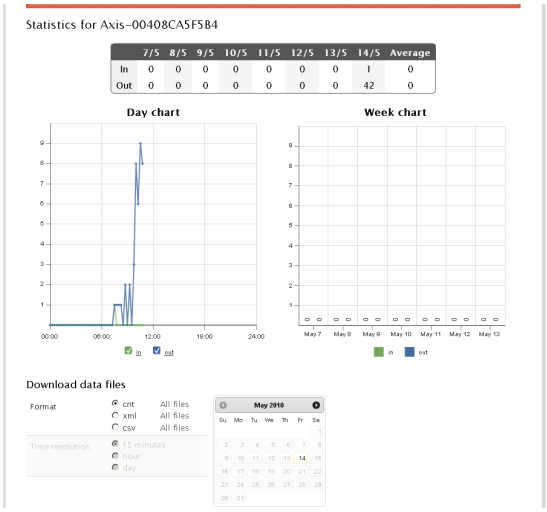


Statistics

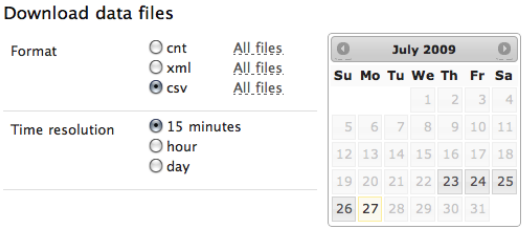
You can obtain statistics from your sensors in different ways. Select *Statistics* at the top of the page.

1. **Real time data with graphs** – This data is updated in real time every five seconds. At the top of the page there is a table showing traffic data for vehicles passing in and out during the last seven days.

   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.



Data files can be downloaded in cnt, xml or csv-format by selecting the format and click day you want the data for. For csv and xml different time resolutions can be chosen as well. If you want to download all files for a certain format just press the All files link.



2. **TrueView Web Report™** – Installing TrueView Web Report™ on a web server lets you manage and view historical data conveniently. For more information about this statistical software package we refer to its manual.

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

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

HTTP API

You can request and clear data in different ways.

1. **Request real time data**: Returns JSON file with real time counting data
2. **List available data**: Returns a list of days where data exists
3. **Download binary data**: Returns Cognimatics proprietary format
4. **Request CSV data**: Returns a file with comma-separated values
5. **Request XML data**: Returns an XML file containing historical data
6. **Clear local counting data**
7. **Live view information**: Returns information about the placement of the lines in Live view
8. **Group counter data**: Returns data for the group counters.
9. **Display information**: Returns information for the display.

1. Real time data

URL

```
http://<servername>/local/parking/.api?live-sum.json
```

Format
JSON

Method
GET

Return

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

`<counter-name>`
name of the counter

`<timestamp>`
time in the sensor in the format `YYYYMMDDhhmmss`

`<in>`
number of vehicles passing in until now today

`<out>`
number of vehicle passing out until now

Example
Request real time data from TrueView Parking™.

URL
`http://<servername>/local/parking/.api?live-sum.json`

Return

```
{
  "name":"Exit south",
  "timestamp":20100517132154,
  "in":2,
  "out":18
}
```

2. List all days where there exists counting data

URL
`http://<servername>/local/parking/.api?list-cnt.json`

Format
JSON

Method
GET

Return

```
{
  "timestamp":"<timestamp>",
  "days":["YYYYMMDD", [..] "YYYYMMDD"]}
}
```

`<timestamp>`
time in the sensor in the format `YYYYMMDDhhmmss`

`<days>`
an array of days where there exists

Example
List all days of data available in TrueView Parking™

URL
`http://<servername>/local/parking/.api?list-cnt.json`

Return

```
{
  "timestamp" : "20100513132513",
  "days":["20100510", "20100511", "20100513"]}
}
```

3. Download .cnt data files

URL
`http://<servername>/local/parking/.api?export-cnt&date=<date>`

where `<date>` can be

- a date of the form `YYYYMMDD`
- a date interval of the form `YYYYMMDD-YYYYMMDD`
- comma separated dates of the form `YYYYMMDD,[..],YYYYMMDD`
- `all` for all available data

Format
cnt

Method
GET

Return
This script returns a Cognimatics proprietary binary data file for the given date(s), to be used in TrueView Report™

Example
Request historical data for the 12th to the 15th of May 2010.

URL
`http://<servername>/local/parking/.api?export-cnt&date=20100512-20100515`

Example
Request all available historical data.

URL
`http://<servername>/local/parking/.api?export-cnt&date=all`

4. Request CSV data

URL
`http://<servername>/local/parking/.api?export-csv[&date=<date>][&res=<res>]`

where `<date>` can be

- a date of the form `YYYYMMDD`
- a date interval of the form `YYYYMMDD-YYYYMMDD`
- comma separated dates of the form `YYYYMMDD,[..],YYYYMMDD`
- `all` (default) for all available data

and `<res>` can be

- `15m` (default) for data in 15 minute bins
- `1h` for data in 1 hour bins
- `24h` for data in 1 day bins

Format
CSV

Method
GET

Return
This script returns data in plain text, comma-separated values. The format for each line can be defined on the settings page, described above.

Example
Request historical CSV data for the 12th and the 15th of May 2010 with 15 minute resolution.

URL

```
http://<servername>/local/parking/.api?export-
csv&date=20100512,20100515&res=15m
```

Example

Request historical data for all available days, with 24 hour resolution.

URL

```
http://<servername>/local/parking/.api?export-
csv&date=all&res=24h
```

5. Request XML data

URL

```
http://<servername>/local/parking/.api?export-
xml[&date=<date>][&res=<res>]
```

where `<date>` can be

- a date of the form `YYYYMMDD`
- a date interval of the form `YYYYMMDD-YYYYMMDD`
- comma separated dates of the form `YYYYMMDD,[..],YYYYMMDD`
- `all` (default) for all available data

and `<res>` can be

- `15m` (default) for data in 15 minute bins
- `1h` for data in 1 hour bins
- `24h` for data in 1 day bins

Format

CSV

Method

GET

Return

This script returns data in XML format. The DTD file can be found at `http://<servername>/parking/appdata.dtd`

Example

Request historical XML data for the 12th and the 15th of May 2010 with 15 minute resolution.

URL

```
http://<servername>/local/parking/.api?export-
xml&date=20100512,20100515&res=15m
```

6. Clear local counting data

URL
`http://<servername>/local/parking/.api?clear-data`

Format
text/plain

Method
GET

Return
`OK`

7. Live view information

URL
`http://<servername>/local/parking/.api?cntpos.json`

Format
JSON

Method
GET

Return
Information about the counting area.

```
{
  "width":<width>,
  "height":<height>,
  "left":<left>,
  "right":<right>,
  "top":<top>,
  "bottom":<bottom>,
  "yfirst":<yfirst>,
  "ylast":<ylast>,
  "radius":<radius>
}
```

`<width>`, `<height>`
dimension of the video stream

`<left>`, `<right>`
x coordinates in pixels for start and stop for the blue lines in Live view

`<top>`, `<bottom>`
y coordinates in pixels for the two blue lines in Live view

`<yfirst>`, `<ylast>`
: y coordinates in pixels for the top and bottom of the red counting area, disregarding curvature

`<radius>`
: radius in pixels describing the curvature of the red counting area, as measured in the center of the area on both axes, or 0 if the area is not curved.

Example

Request Live view information from TrueView Parking™.

URL

`http://<servername>/local/parking/.api?cntpos.json`

Response

```
{
  "width":320,
  "height":240,
  "left":0,
  "right":296,
  "top":88,
  "bottom":224,
  "middle":136,
  "yfirst":88,
  "ylast":152,
  "radius":0
}
```

8. Group counters data

URL

`http://<servername>/local/parking/.api?group-count.json`

Format

JSON

Method

GET

Return

```
[{
  "name":<name1>,
  "group-enabled":<group-enabled1>,
  "display-enabled":<display-enabled1>,
  "timestamp":<timestamp1>,
  "in":<in1>,
  "out":<out1>,
  "offset":<offset1>,
  "offset-timestamp":<offset-timestamp1>
```

```
},
{
  "name":<name2>,
  "group-enabled":<group-enabled2>,
  "display-enabled":<display-enabled2>,
  "timestamp":<timestamp2>,
  "in":<in2>,
  "out":<out2>,
  "offset":<offset2>,
  "offset-timestamp":<offset-timestamp2>
},
{
.
.
.
}]
```

`<name>`
: name of the parking area

`<group-enabled>`
: `true` if group counters is enabled, `false` otherwise

`<display-enabled>`
: `true` if display is enabled, `false` otherwise

`<timestamp>`
: sensor's UNIX timestamp if `<group-enabled>` is `true`, `0` otherwise

`<in>`
: number of vehicles in group passing in until now today

`<out>`
: number of vehicle in group passing out until now

`<offset>`
: offset to correct for the actual number of cars in the garage

`<offset-timestamp>`
: UNIX timestamp when the current offset was set

Example

Request group count data from TrueView Parking™.

URL

`http://<servername>/local/parking/.api?group-count.json`

Return

```
[{
  "name":"Ground floor",
  "group-enabled":true,
```

```
  "display-enabled":true,
  "timestamp":1274168157,
  "in":590,
  "out":531,
  "offset":4,
  "offset-timestamp":1274168101
}]
```

9. Display information

URL
`http://<servername>/local/parking/.api?display.json`

Format
JSON

Method
GET

Return

```
[{
  "enabled":<enabled1>,
  "url":<url1>,
  "area":<areaname1>,
  "text":<displaytext1>
},
{
  "enabled":<enabled2>,
  "url":"<url2>",
  "area":"<areaname2>",
  "text":"<displaytext2>"
},
{
.
.
.
}]
```

`<enabled>`
`true` if the display is enabled, `false` otherwise

`<url>`
url to the display

`<area>`
the parking area assigned to this display

`<text>`
current display text

Example

Request display information from TrueView Parking™.

URL

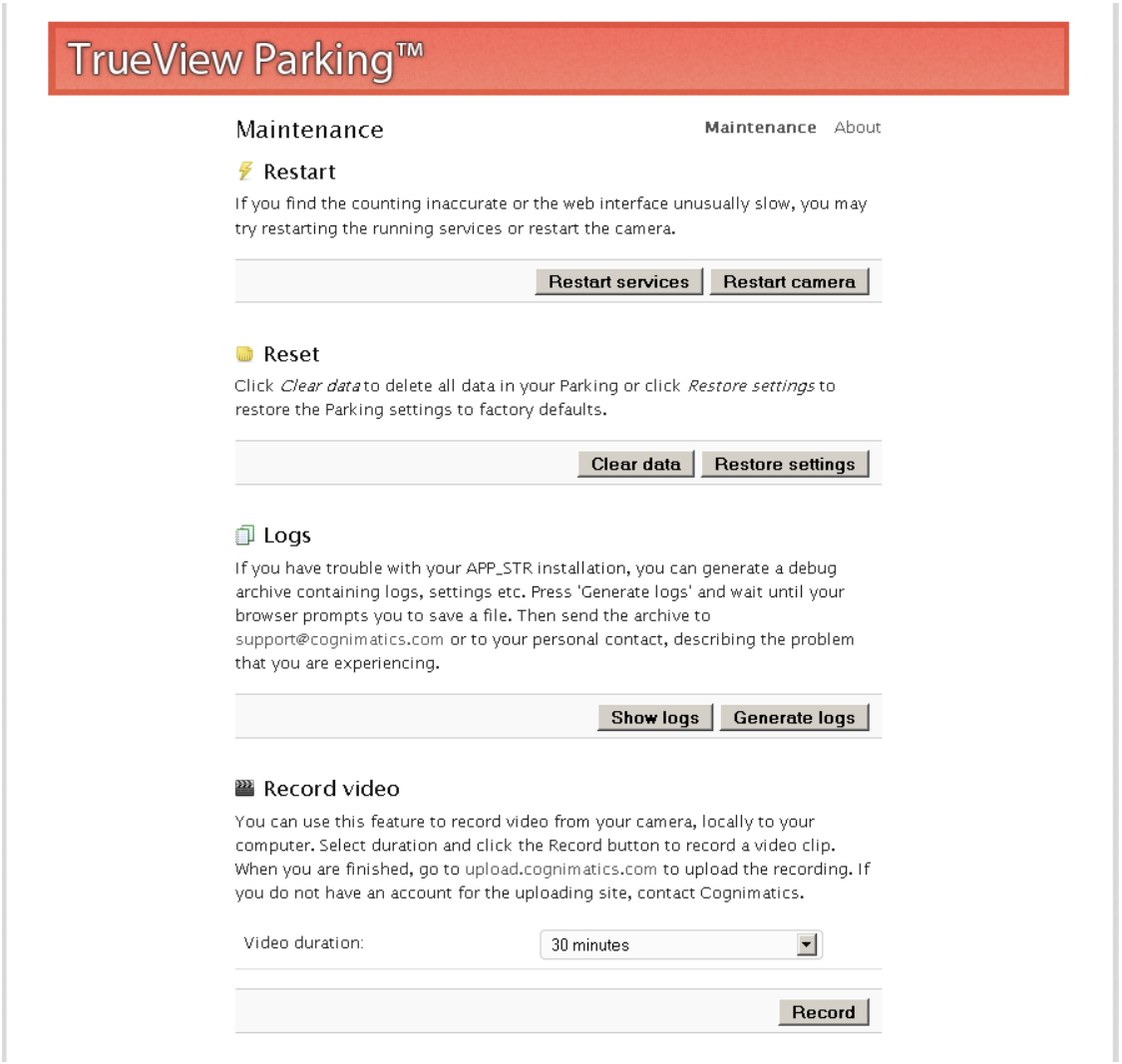
`http://<servername>/local/parking/.api?display.json`

Return

```
[{
  "enabled":true,
  "url":"10.2.3.111",
  "area":"Ground floor",
  "text":"FULL"
}]
```

Maintenance

On the *Maintenance* page (found under **Help** > **Maintenance**) there are several options for simplifying maintenance of TrueView Parking™.



1. **Restart** If you find the counting inaccurate or the web interface unusually slow, you may try restarting the running services or restart the sensor.

2. **Logs** If you have any trouble with your sensor you can send counter logs to Cognimatics. These can be generated by pressing the **Generate logs** button. After a while you will be prompted with a file you can save to your computer and send to `support@cognimatics.com`.

3. **Record video** You can use this feature to record video from your sensor, locally to your computer. Just select the desired duration of the video and press **Record**.

4. **Patch software** When minor modifications to the counter software is made they are usually released as patches that will be provided by Cognimatics. When you have such patch file you can use it by selecting the file in the form and press **Upload and patch**.

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. If you are using Internet Explorer a Flash player plug-in must be installed, the browser will probably prompt you with a notification if it is not.

The software prompts me with a warning saying that the frame rate is too low.

- If the scene is too dark, the Axis camera does not deliver enough frames per second for TrueView Parking™ to work. The scene must have a lightning with at least 1 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 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 vehicle 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 cannot get the software to count.

If you have followed the advice above and still cannot get the software to work, please contact the Cognimatics support team at `support@cognimatics.com`. Do not forget to send the archive with logs and other generated material from the page

`http://<servername>/local/parking/.api?generate-logs`.

A. Supported cameras

Table A.1. Supported cameras

Camera model	Software module
Axis P3343-VE 6mm	tvparkingAxisP3343ve_xx.bin

xx is the version number of the software module.

B. Display communication

Table B.1. Supported displays

Manufacturer	Model
Poltech	LDPH20/6
MessageMaker	AFO-10-16x64RG
MessageMaker	AFO-12.5-16x64RG
MessageMaker	AFO-16-16x64RG
MessageMaker	AFO-20-16x64RG

Table B.2. Valid characters

dec	char	dec	char	dec	char
32	Space	60	<	89	Y
33	!	61	=	90	Z
34	"	62	>	97	a
35	#	63	?	98	b
36	$	65	A	99	c
37	%	66	B	100	d
38	&	67	C	101	e
39	'	68	D	102	f
40	(	69	E	103	g
41	)	70	F	104	h
42	*	71	G	105	i
43	+	72	H	106	j
44	,	73	I	107	k

dec	char	dec	char	dec	char
45	-	74	J	108	l
46	.	75	K	109	m
47	/	76	L	110	n
48	0	77	M	111	o
49	1	78	N	112	p
50	2	79	O	113	q
51	3	80	P	114	r
52	4	81	Q	115	s
53	5	82	R	116	t
54	6	83	S	117	u
55	7	84	T	118	v
56	8	85	U	119	w
57	9	86	V	120	x
58	:	87	W	121	y
59	;	88	X	122	z

Poltech displays

The message that is sent to the displays consists of four parts: *initiation*, *length*, *text* and a *checksum*.

The message initiation consists of four bytes, and it is always the following sequence:

0x82	0x00	0x00	0x03

The length is section is the text length + 1 for the checksum. It is a 16-bit integer, with the most significant byte first:

MSB	LSB

The text that should be displayed consists of a sequence of characters and control sequences, described in the two tables below. The control sequences describe layout patterns for the display.

Finally, the checksum is taken as the sum of all characters in the text portion of the message modulo 256 and stored as an 8-bit integer.

Table B.3. Control sequences

hex	control
0x1C	wide

hex	control
0x0F	flash
0x02	center
0x09	jump
0x0B	up
0x0E	down
0x1D	blink
0x1E	open
0x1F	wipe
0x1B	freeze
0x10	pause
0x16	display time
0x15	display temperature

MessageMaker displays

Note: To prepare the display for recieving messages, set the ip-address of the display while connected with RS 232 using the Sigma 3000 software which should be provided. You also need to erase all messages and playlists. This is easiest done with the provided remote control or with Sigma 3000. Furthermore, we refer to the Jetfile II protocol for all the functionality of this display.