ZKTeco

# ZK-LPR Car ID
# S.I. Guidance

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# History:

| Date | Creator | Details |
|---|---|---|
| 20.03.2020 | Luis Rodríguez | Initial Document |
| 25.03.2020 | Samuel Muñoz | Audit |

# 1. Scope of the document

ZKTeco (ZK-LPR Car ID) is a powerful LPR application developed, embedded in the cameras.

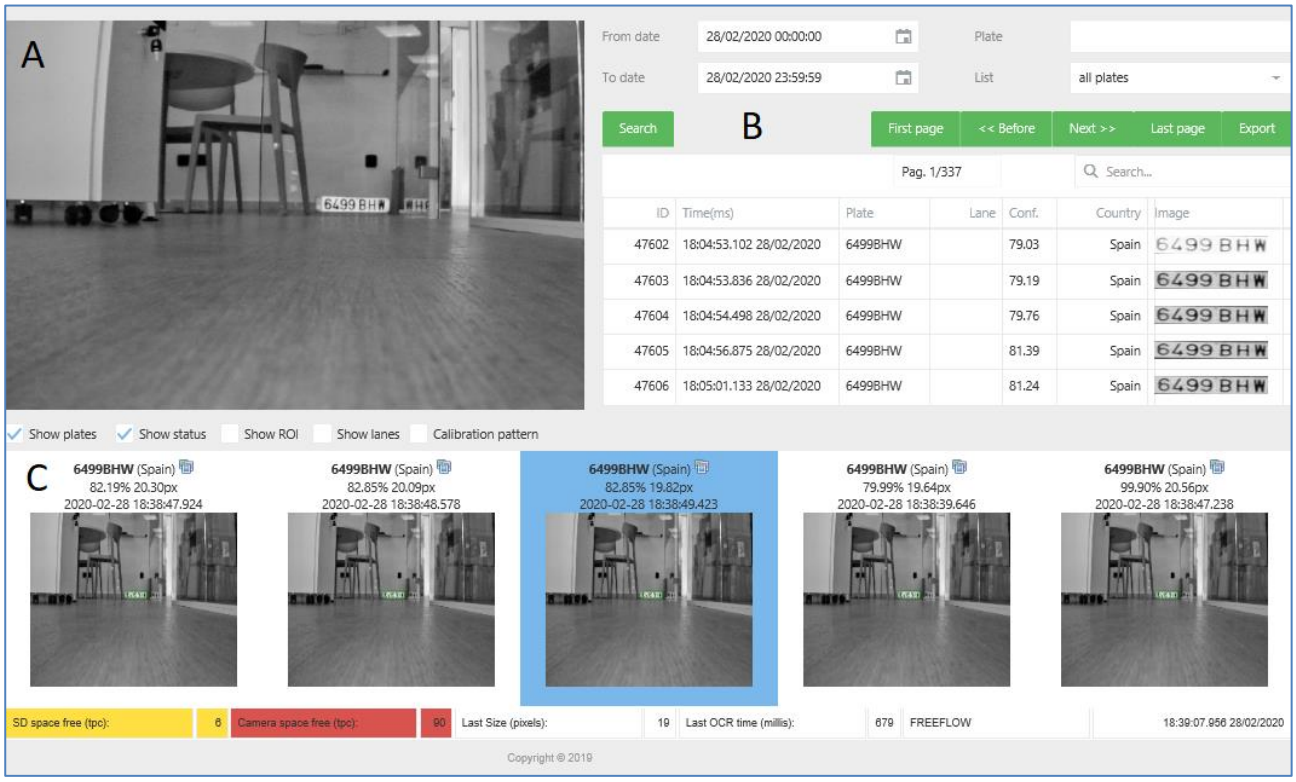
ZKTeco is the all in one product to plug and play, ready to read plates just out of the box. It Includes an interface web application that allows you to manage different scenarios, avoiding extra hardware and software installations.

**This guidance shows System Integrators (SI) how to deal with the different interfaces supported (3rd party integration – Action for List)**

# 2. ZK-LPR Overview

## 2.1. Main

The top of the screen has a tab menu, it is marked with a red rectangle is the MENU toolbar with all the available options.



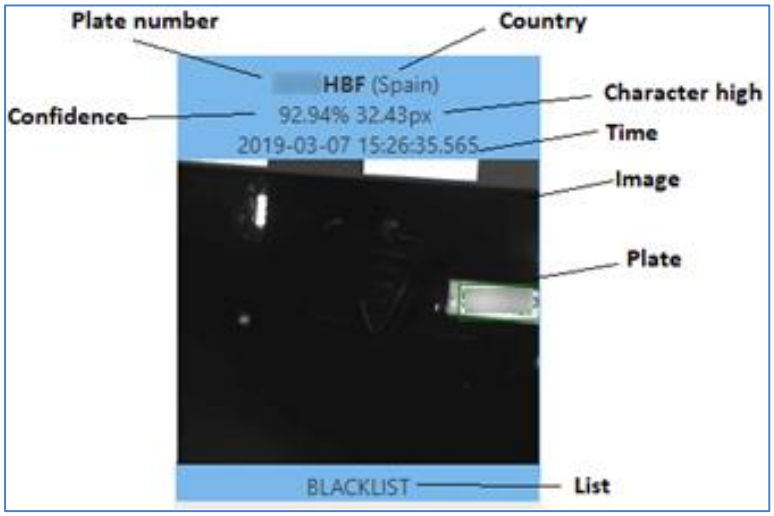

The Main tab shows the cameras live view. (this tab is divided into 3 different areas) We have divided it into 3 parts: The Monitor Panel, The Results Panel and the Info Panel.

**Monitor Panel**: Live image what the camera is streaming.

Under the live there is three checks:

Show ROI: Checking you can see a red square indicating the ROI (Region of interest) defined in the parameters, this area is the only section of the image where engine will try to find plates.

**Results Panel**: Shows the latest results, we highlight the last result with a Blue outline. The results will provide:

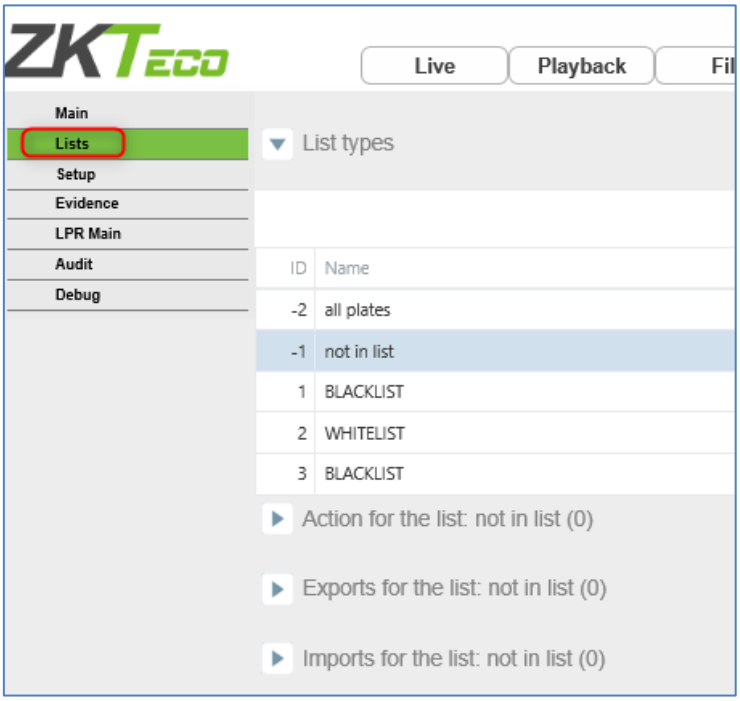



- ID
- TIME
- PLATE
- LANE
- CONFIDENCE
- COUNTRY
- IMAGE

## 2.2. List Tab

In this tab you can create lists, a list is a group of license plates that will trigger an action, ZKTeco allows you perform different actions to any list.

By default, there are 4 lists created, ALL PLATES, NOT IN LIST, BLACKLIST, and WHITELIST. You can edit, delete or add more lists.




In the lists tab we have the following options:

*List*: Will show all the lists created

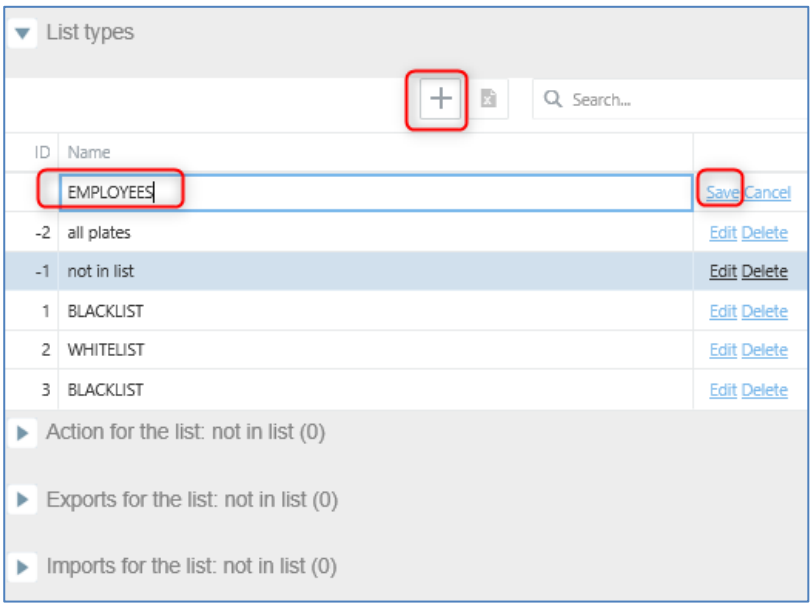
*Action:* Will show all the actions created by list.

*Export:* Allows you export a single list or if all plates are selected it will create a unique file with all the licenses plates that belong to that list.

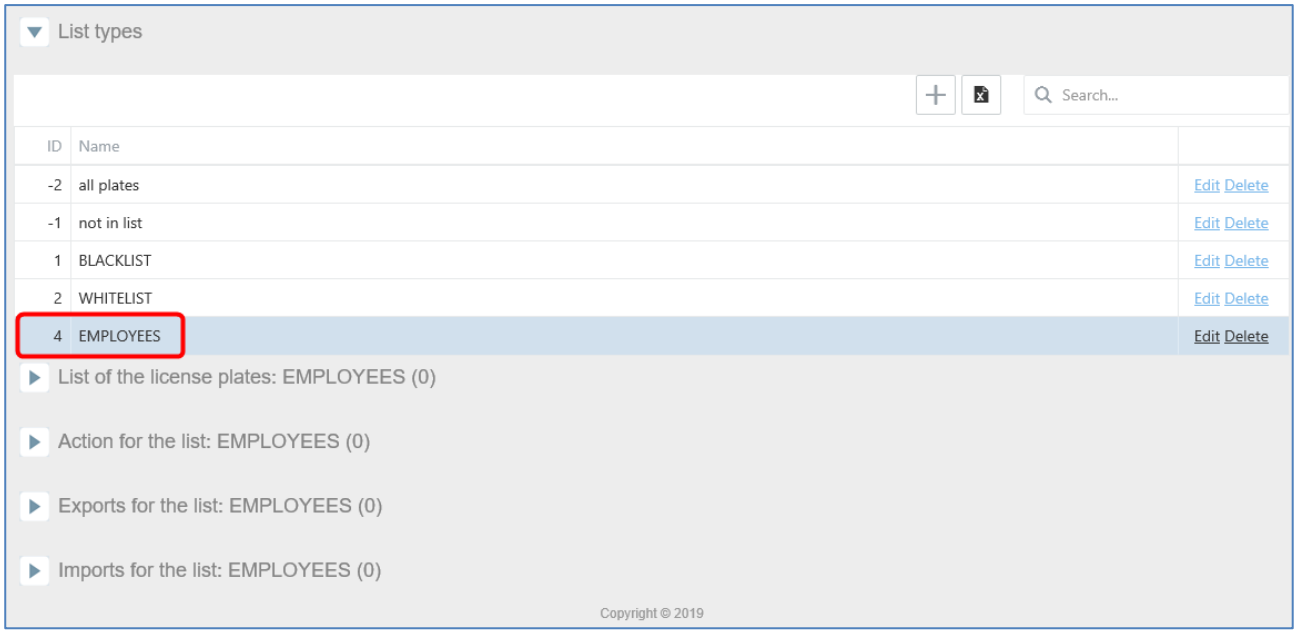
*Import:* Allows you import a single list or if all plates are selected it will create a unique file with all the licenses plates that belong to that list.

Let's create a new list and call it “EMPLOYEES”

Click on the “+” button, text the list name and click on “Save”.

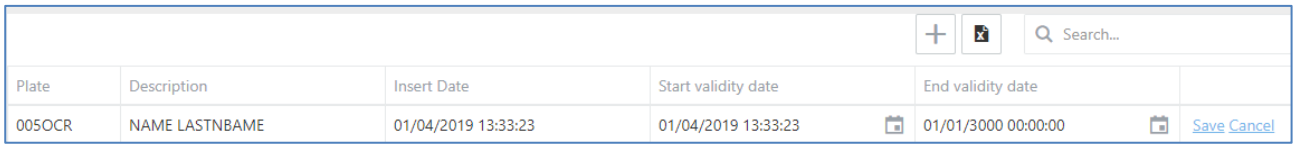


Now we are going to configure an action for this list, in other words, what we expect to happen if we read a license plate.
Click on “EMPLOYEES” list to see the options.

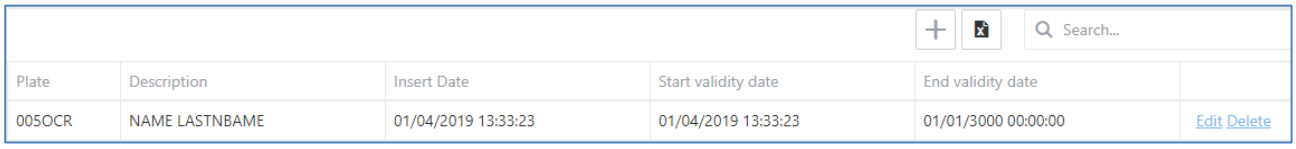



**List of the license plates:** EMPLOYEES

Add a new license plate, click on the “+” button and fill in the grid.




To edit or delete a license plate in that list, just click on the plate and then:




*In case if the system works in trigger mode and we want to execute a no plate action, we have to add NO_PLATE to the list.

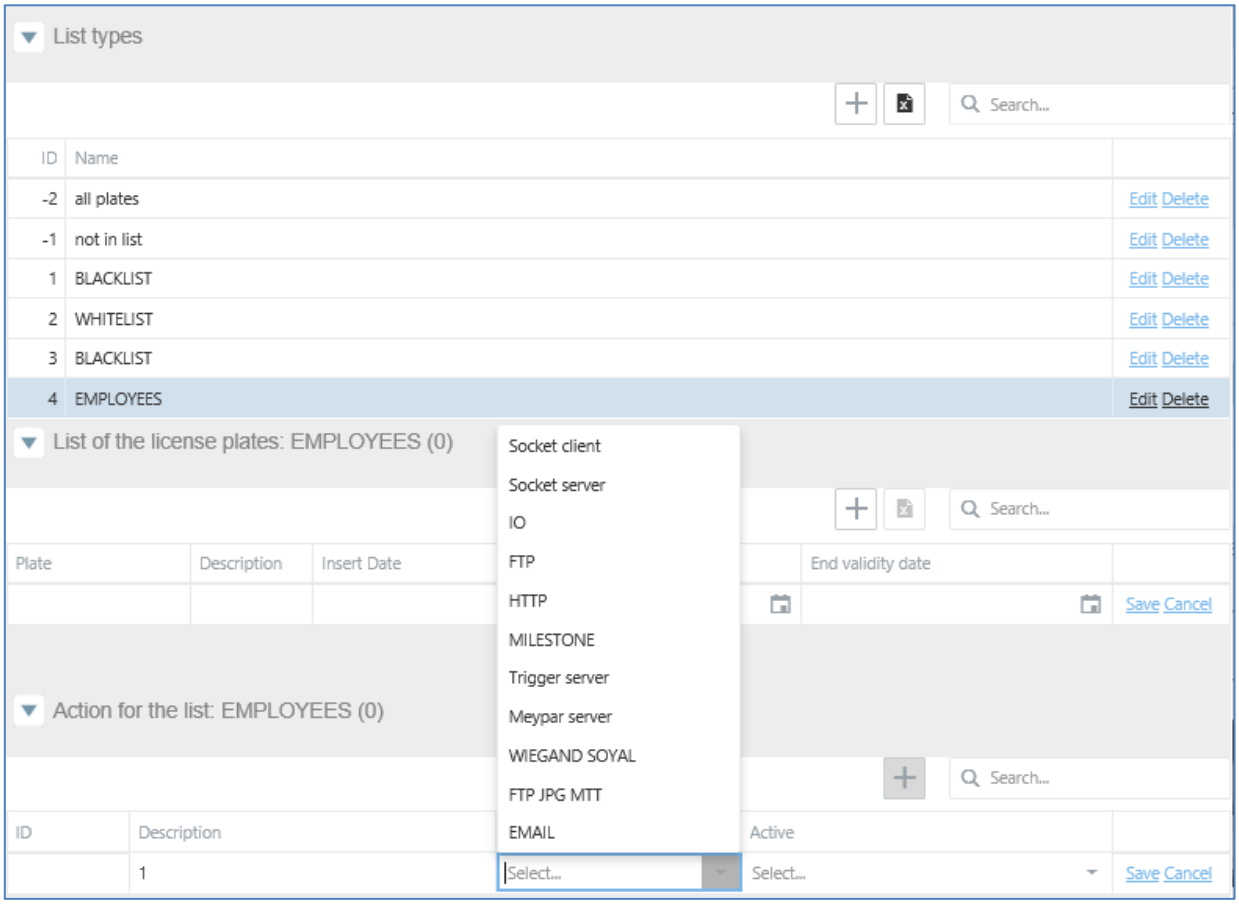
# 3. 3RD PARTY INTEGRATION (Action for the list)

**Action for the list:** Here are all the actions we can configure for each list.

- **IO**: Enable inbound and outbound digital signals in the camera.
- **WIEGAND SOYAL:** send a signal to Wiegand middleware board (Same action than Wiegand).
- **HTTP**: send a request using this protocol to a server.
- **FTP**: store the results in an FTP server.
- **FTP JPG MTT**: the functionality it's the same one realized with FTP, with a few differences because with this one you can create a structure of subfolders, contains information like camera, year, month and day.
- **MILESTONE**: send an analytic event to Milestone VMS.
- **EMAIL:** send an email.
- **Socket Client**: Enable a socket connection to send messages as XML or JSON

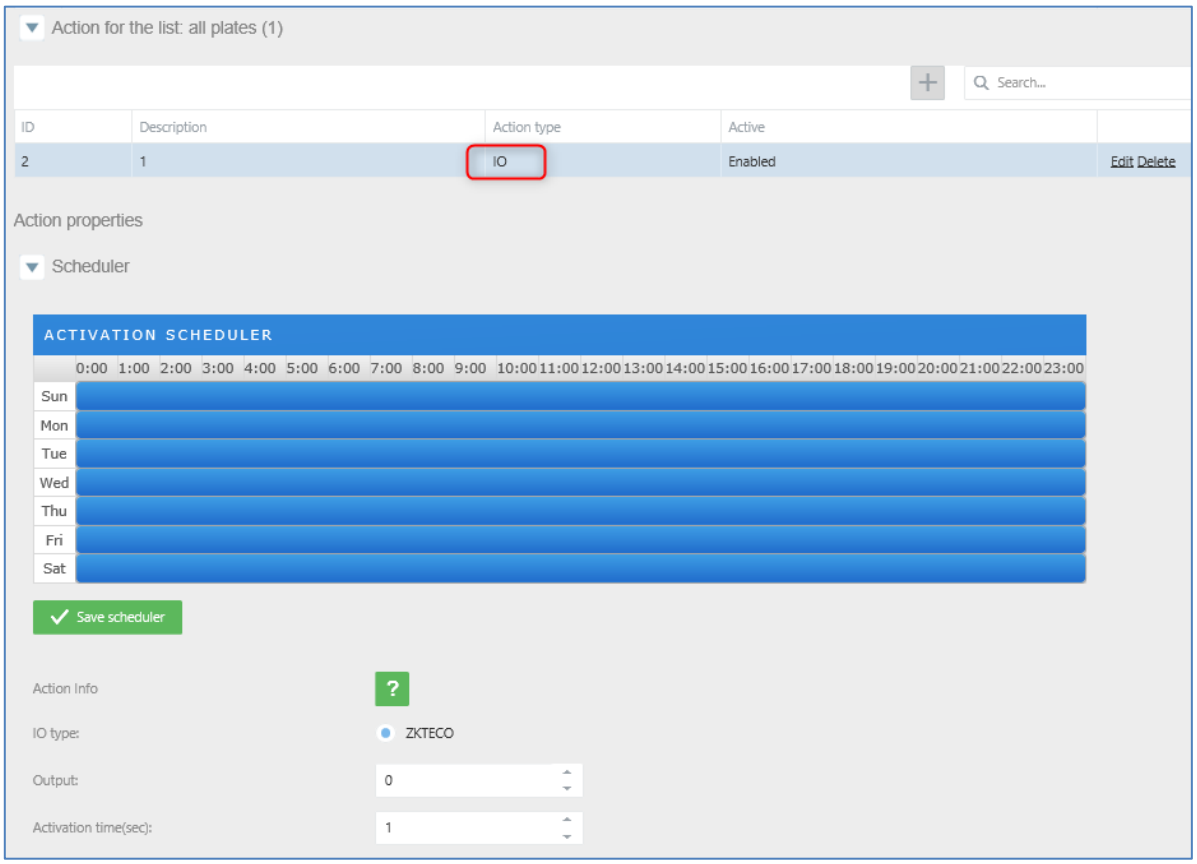
- **Socket Server**: Open a port in the camera to listen to hosts to send messages as XML or JSON.
- **Trigger Server**: Enable a port that sends the read response when a trigger message arrives.

A list can perform several actions, depending on the scenario and needs.
Having the Employees list selected, click on “Action for the list” and then click on the + button.



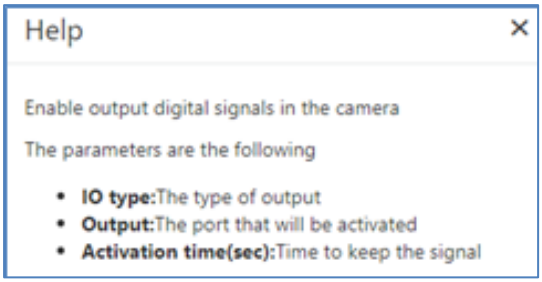
## 3.1. IO (aux. relay)

Configuring the action ***IO*** to open a gate for those plates that belong to the list EMPLOYEES. Click on “Action for the list” and add a new action pressing “+” and then select in “Action type = IO”




Set the scheduler as needed and click on “SAVE SCHEDULER”.

Click on for more information about how to configure.

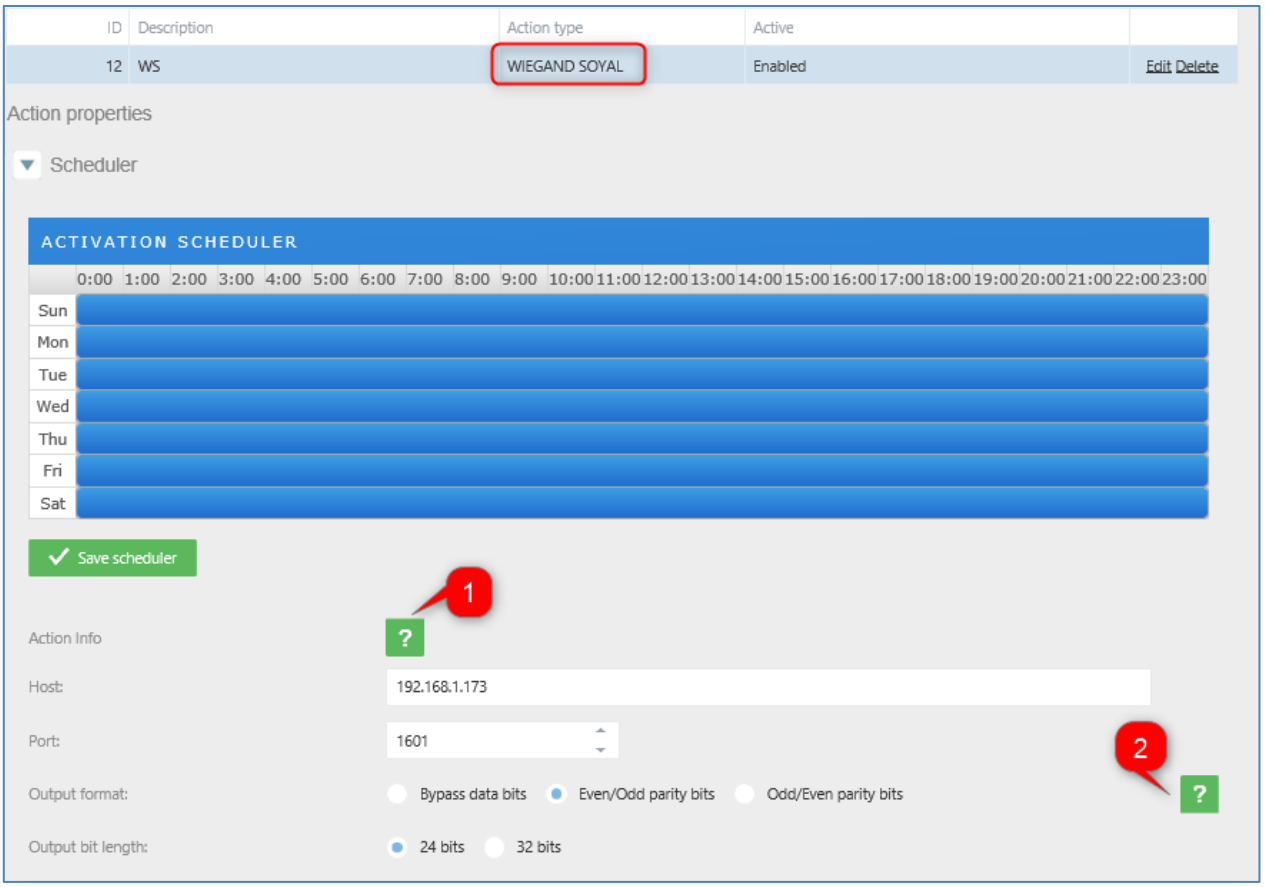



In this case, every time we read a license plate that is in the EMPLOYEES list, we send a signal to the camera I/O to open the gate.

## 3.2. Wiegand Soyal

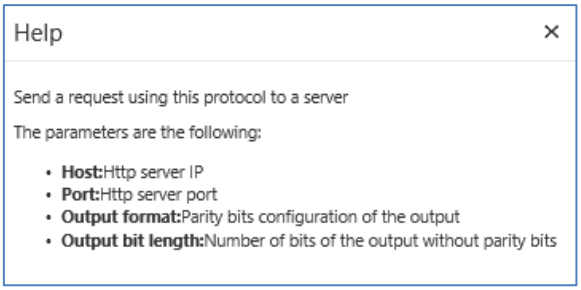
Configuring the action **WIEGAND SOYAL** to send analytic events to a Wiegand middleware board. Using the EMPLOYEES list, click on “Action for the list” and add a new action pressing “+” and then select in “Action type = WIEGAND”.

(Refer to ***ANEX. 2: Wiegand output*** for a detailed information)

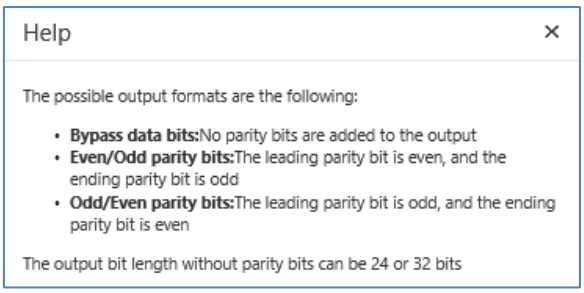



Set the scheduler as needed and click on “SAVE SCHEDULER”.

Click on for more information about how to configure.

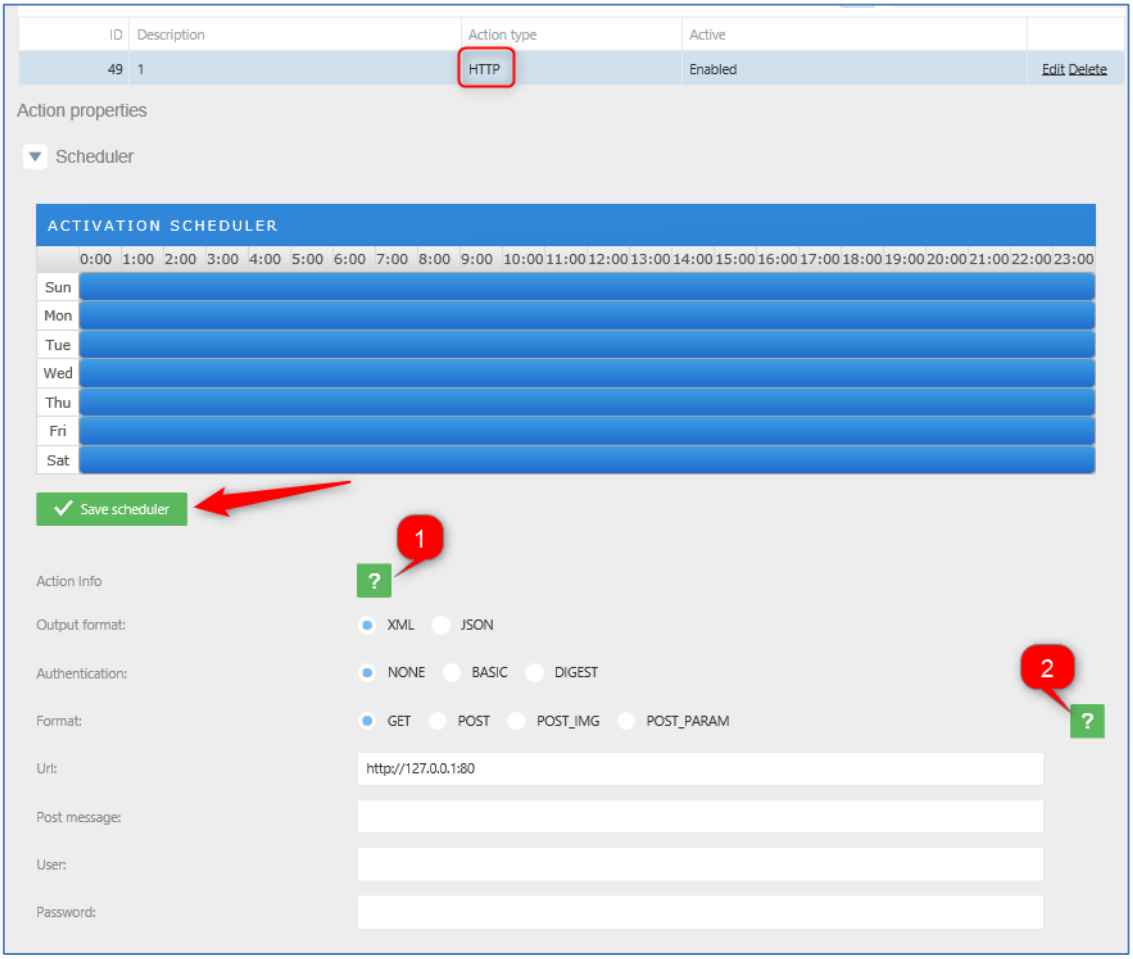


Click on for more information about format type.



## 3.3. HTTP

Configuring the action ***HTTP*** to send analytic events to a VMS. Using the EMPLOYEES list, click on "Action for the list" and add a new action pressing "+" and then select in "Action type = HTTP"




You can use wildcards in the "Url" param to include some information in the http petition:

#DTE# Time stamp of the image captured.

#IDCAM# Camera identifier

#PLT# Plate number

#CNF# Global confidence

#IDLAN# Lane identifier (1 or 2)

#IDLIST# List of list identifiers separated by []. [-1] not in list

Examples:

http://192.168.1.23:80?plate=#PLT#&time=#DTE#

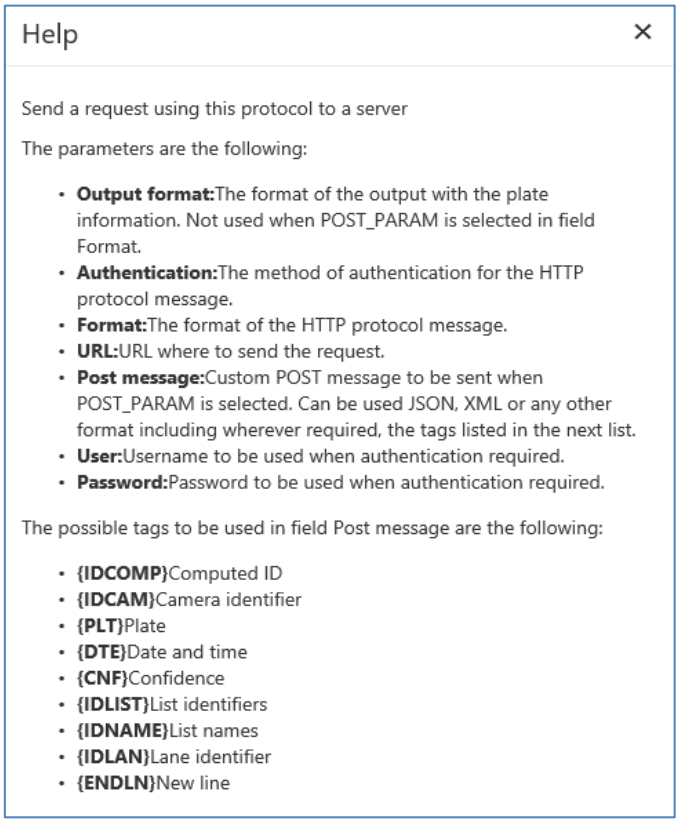
http://192.168.1.23:80?plate=0715GYC&time=2019-09-27T18:49:19.912

http://192.168.1.34:8090?plate=#PLT#&cam=#IDCAM#&time=#DTE#&conf=#CNF#&lane=#IDLAN#&list=#IDLIST#

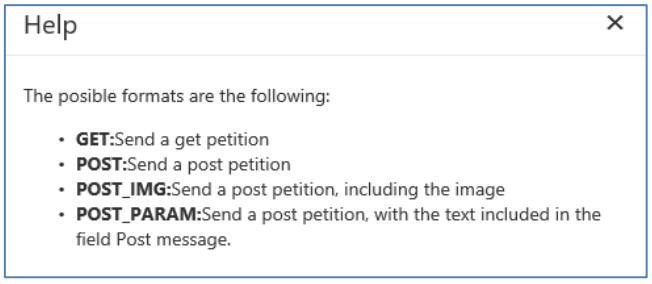
http://192.168.1.34:8090?plate=0715GYC&cam=1&time=2019-09-27T18:52:49.929&conf=99.90&lane=2&list=[-1]

Set the scheduler as needed and click on “SAVE SCHEDULER”.

Click on for more information about how to configure.

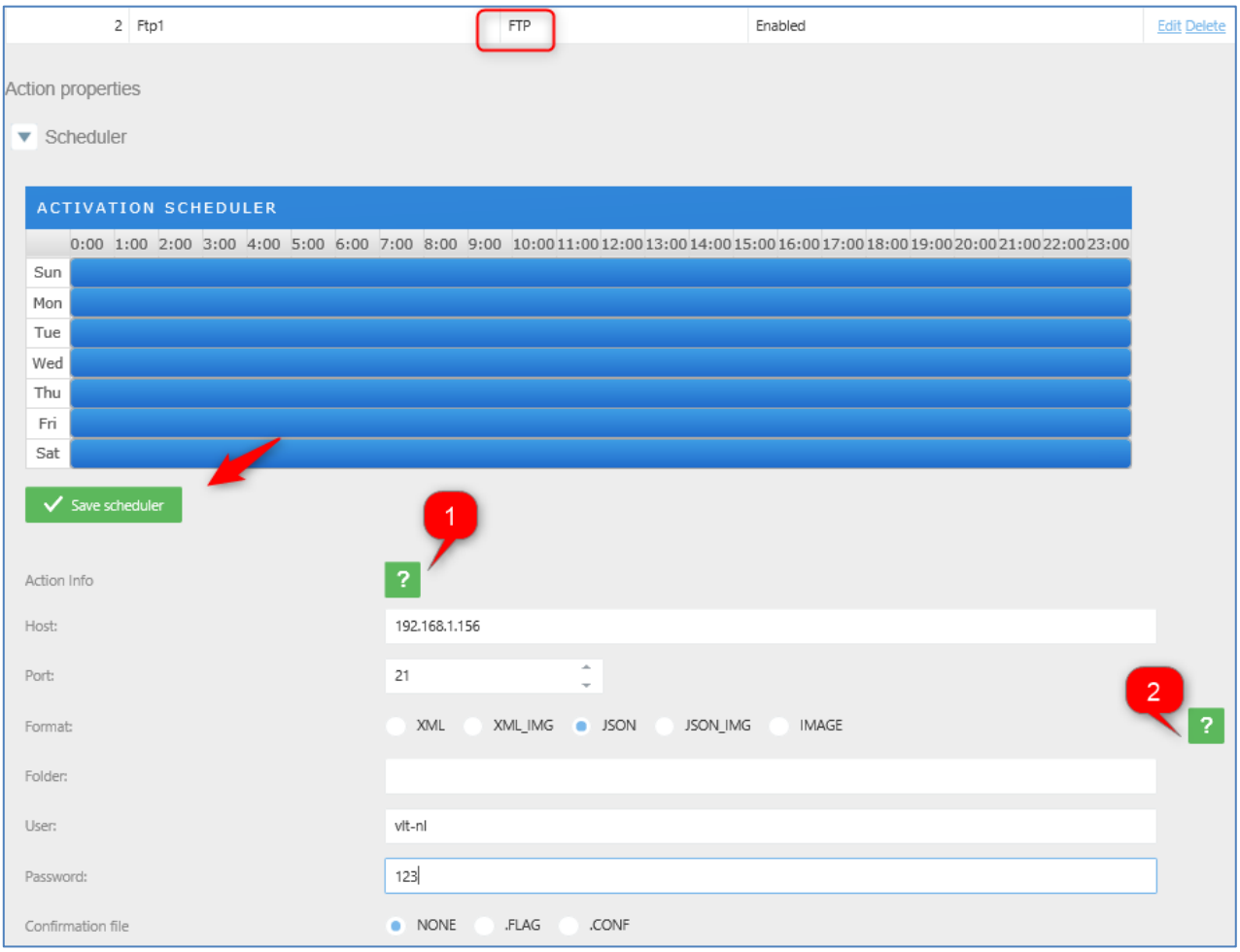



Click on for more information about format type.



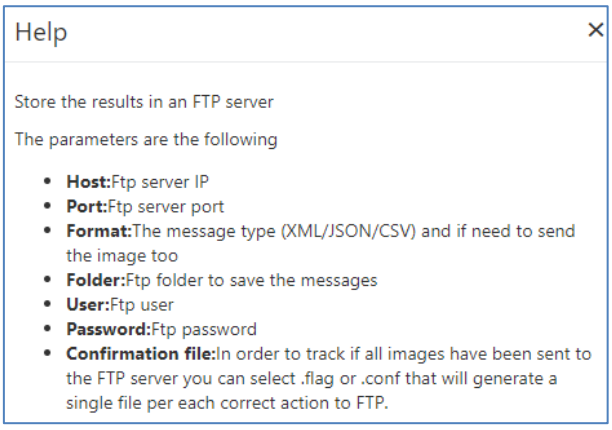
## 3.4. FTP

Configuring the action ***FTP*** to send an XML, JSON or image to an FTP server. Using the EMPLOYEES list, click on "Action for the list" and add a new action pressing "+" and then select in "Action type = FTP"



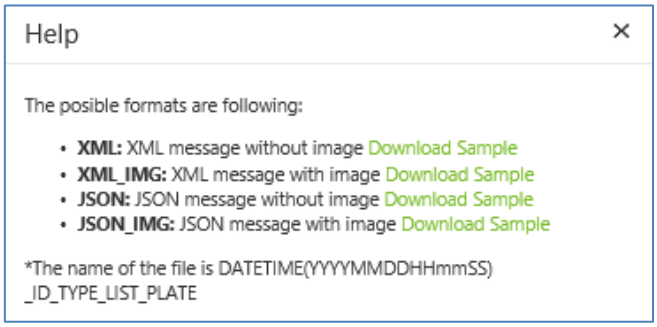

Set the scheduler as needed and click on "SAVE SCHEDULER".

Click on for more information about how to configure.



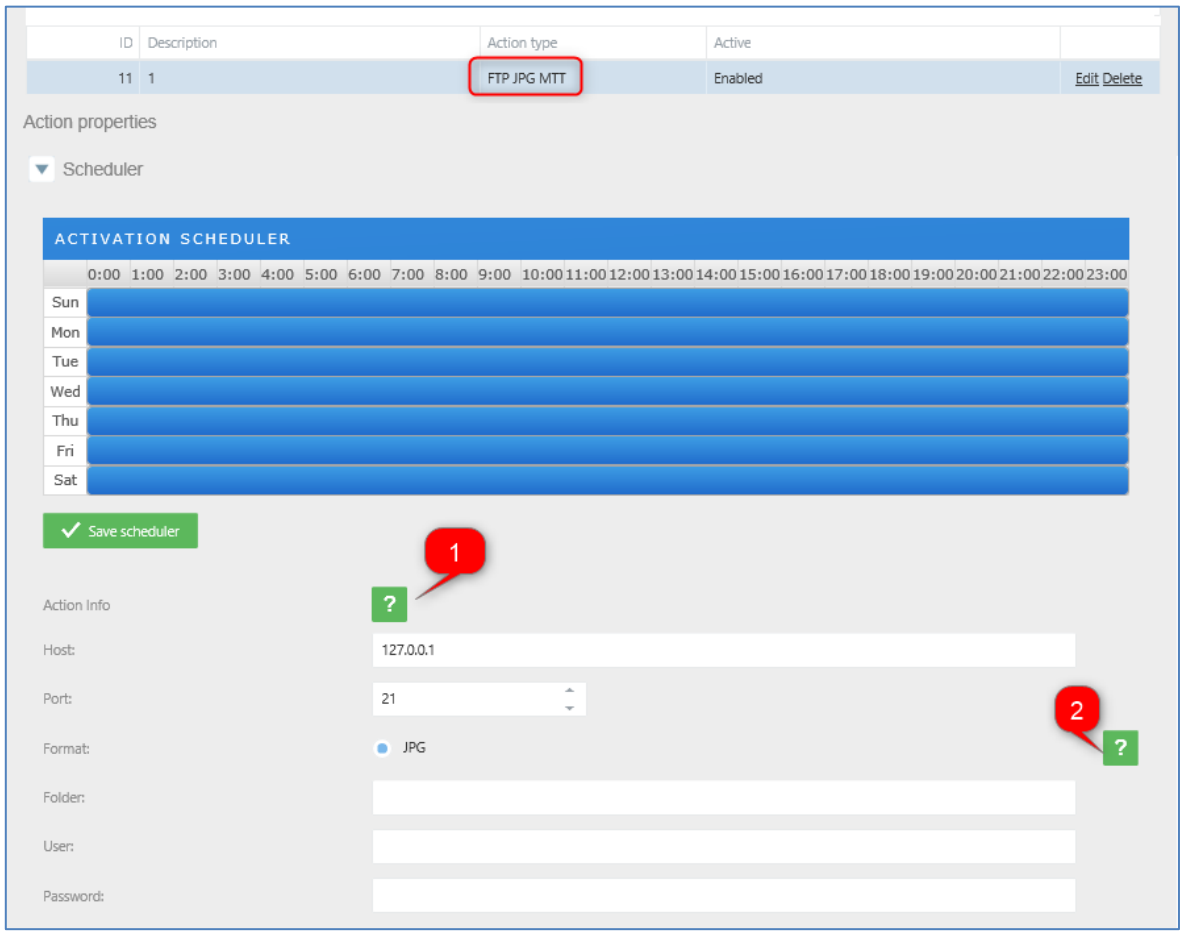
Select which message format you will use to send the information.

Click on for more information about format type.



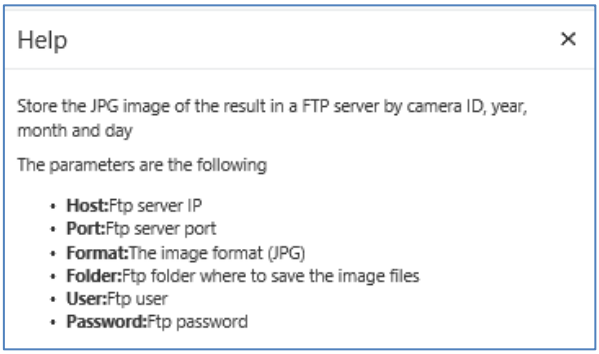
## 3.5. FTP JPG MTT

Configuring the action **FTP JPG MTT** using the EMPLOYEES list, click on “Action for the list” and add a new action pressing “+” and then select in “Action type = FTP JPG MTT”.

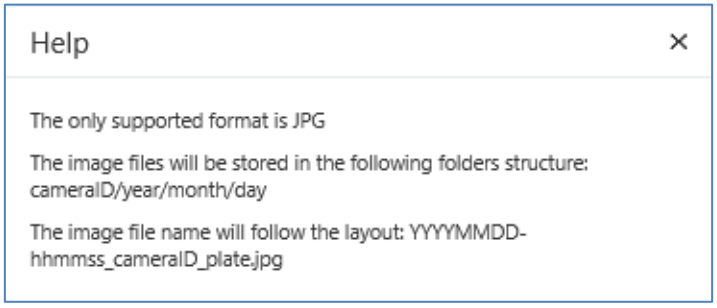



Set the scheduler as needed and click on “SAVE SCHEDULER”.

Click on for more information about how to configure.

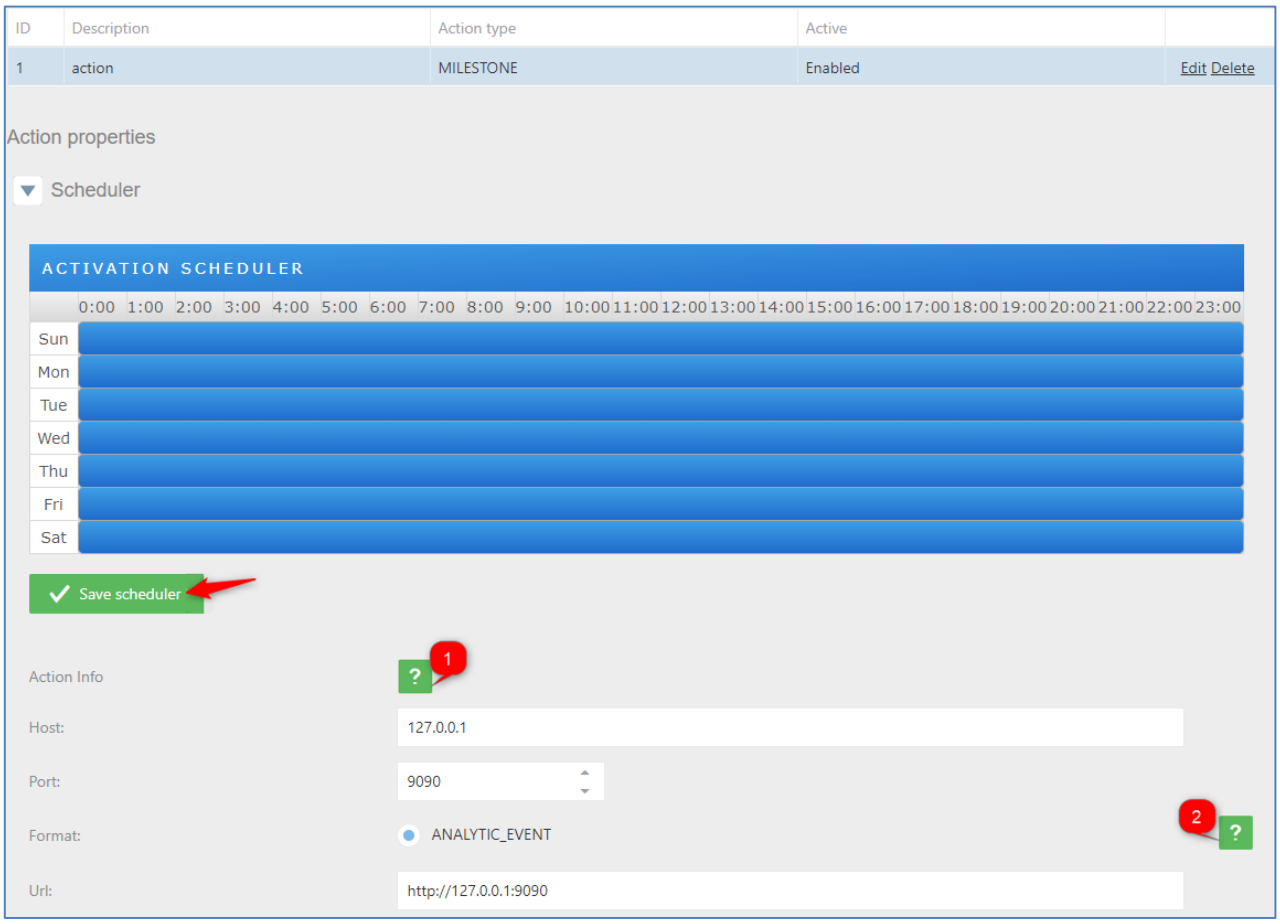


Click on for more information about format type.



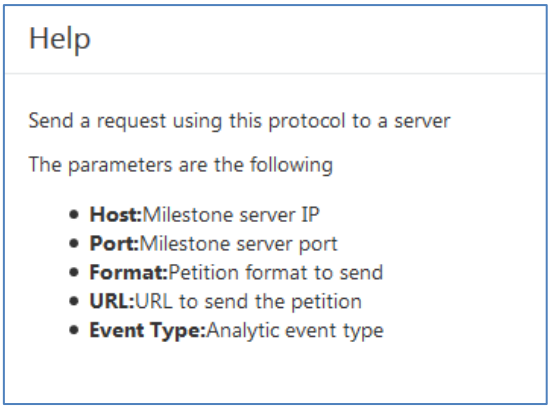
## 3.6. MILESTONE

Configuring the action ***MILESTONE*** to send analytic events to a Milestone VMS. Using the EMPLOYEES list, click on "Action for the list" and add a new action pressing "+" and then select in "Action type = MILESTONE".

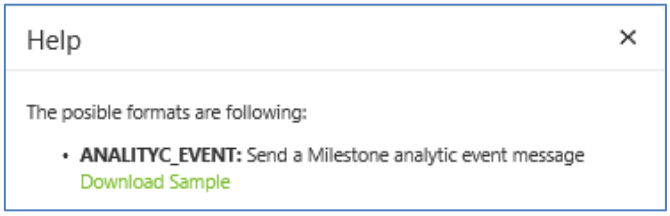



Set the scheduler as needed and click on "SAVE SCHEDULER".

Click on for more information about how to configure.

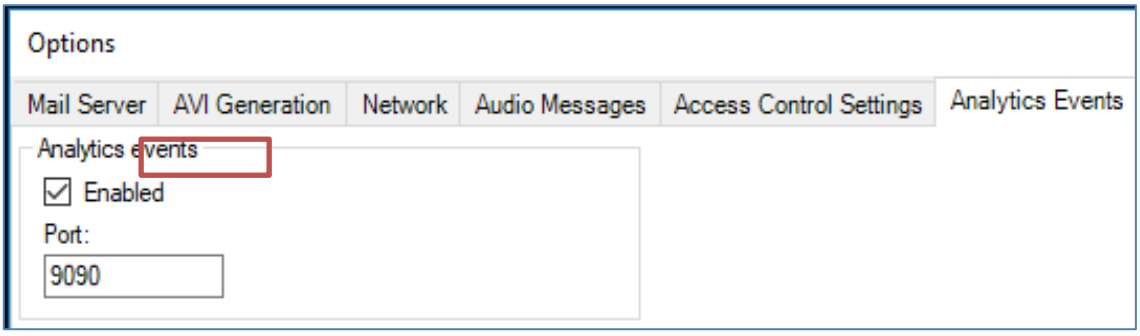


Click on for more information about format type.

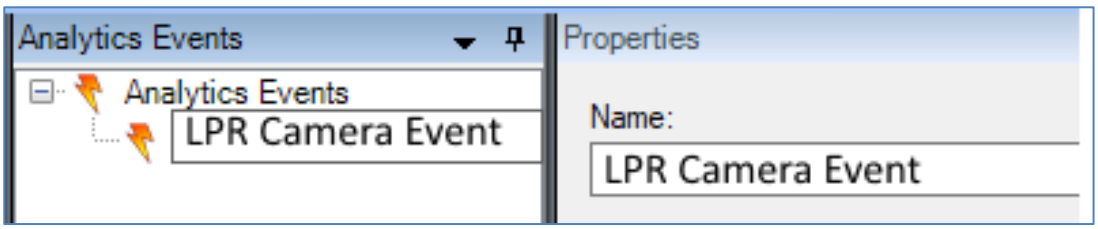



Once the Milestone action is configured, we need set up Milestone server to process our action. To do this, we follow the next steps:

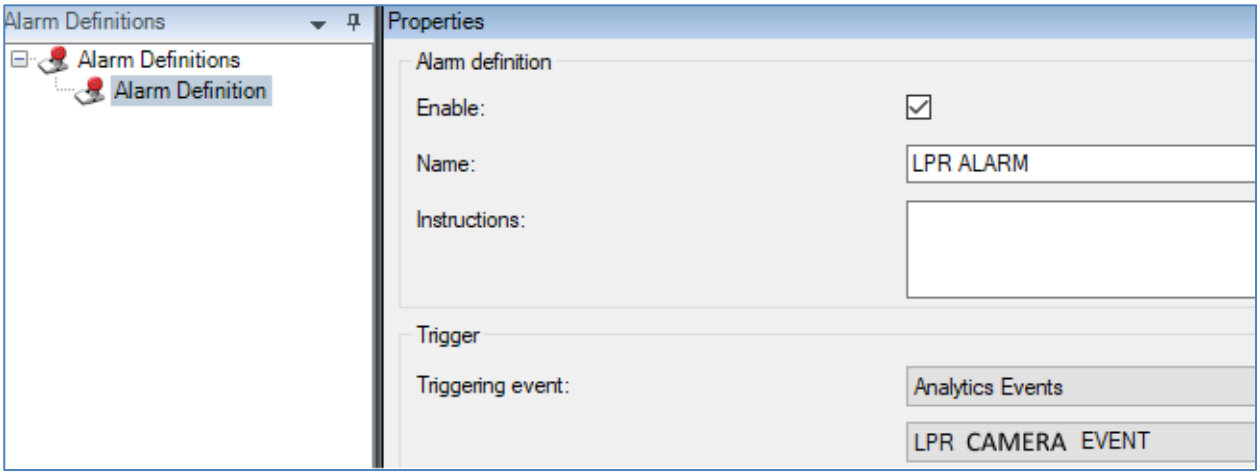
1- Enable analytic events.
   a. We click to Tool -> Options and select the “Analytics Event” tab. At this tab we will active the Analytics events.




2- Create the analytic event.
   a. We do a click at Rules and Events -> Analytics Events. And then right button to create a new analytic event. The name must be the same that defined at Event type of action.

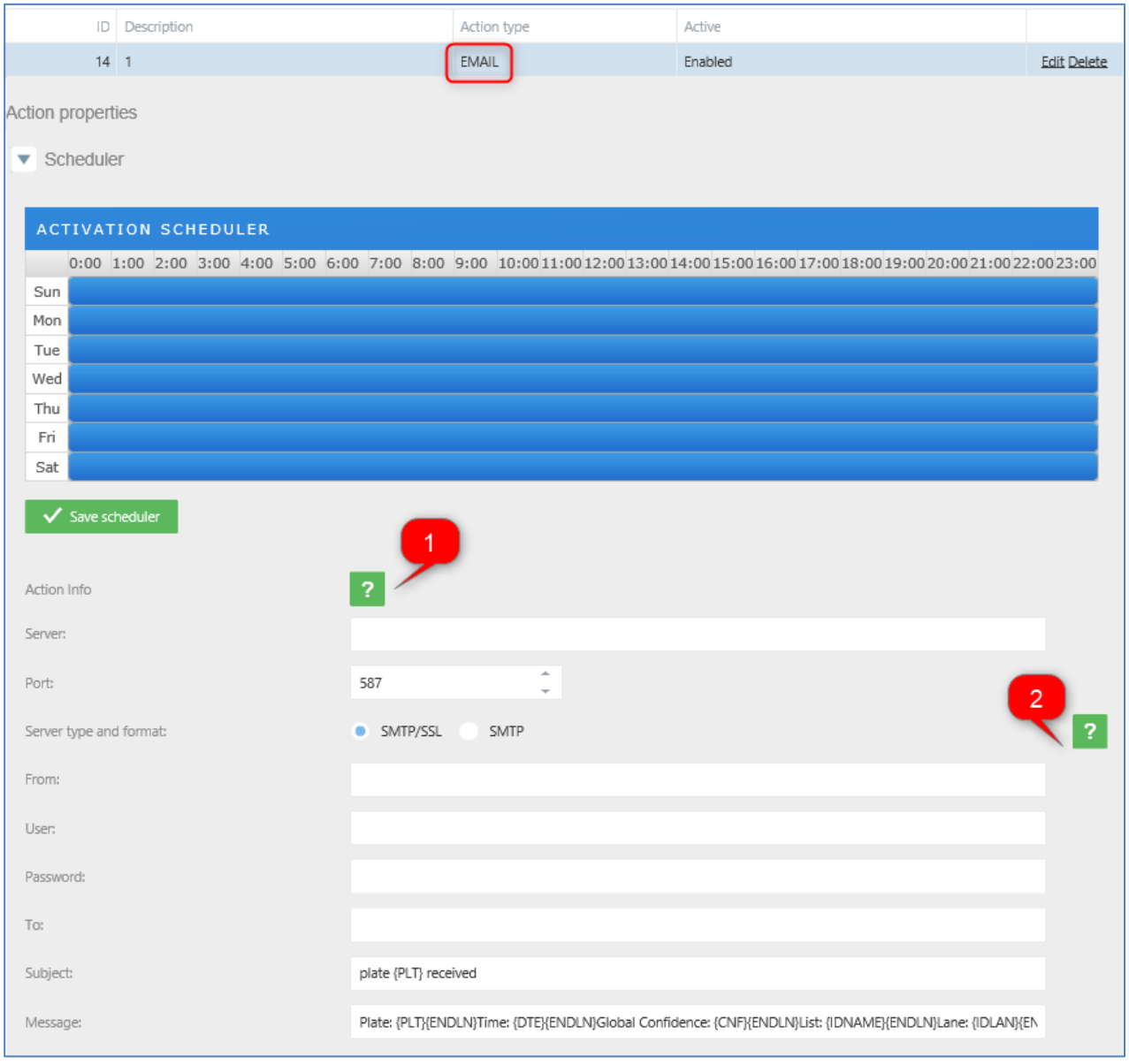


3- Create an alarm definition.
   a. We do a right click at Alarm definition and we create a new alarm definition on:
      i. Enable: This alarm is enabled at system
      ii. Name: The alarm name
      iii. Triggering event: We must select Analytic Events
      iv. Triggering event source: We must select the before created analytic event
      v. Source: We must select the camera at milestone system



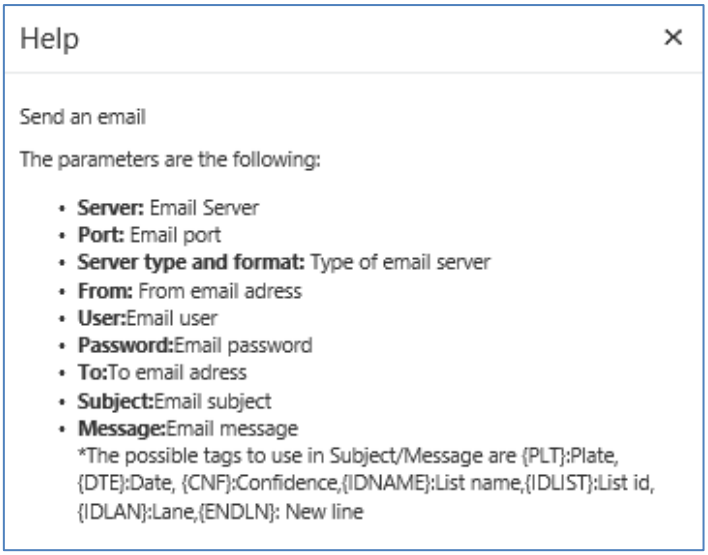
## 3.7. EMAIL

Configuring the action **EMAIL** to send messages, using the EMPLOYEES list, click on “Action for the list” and add a new action pressing “+” and then select in “Action type = EMAIL”.

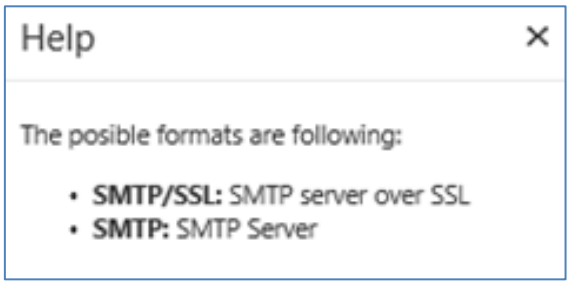



Set the scheduler as needed and click on “SAVE SCHEDULER”.

Click on for more information about how to configure.

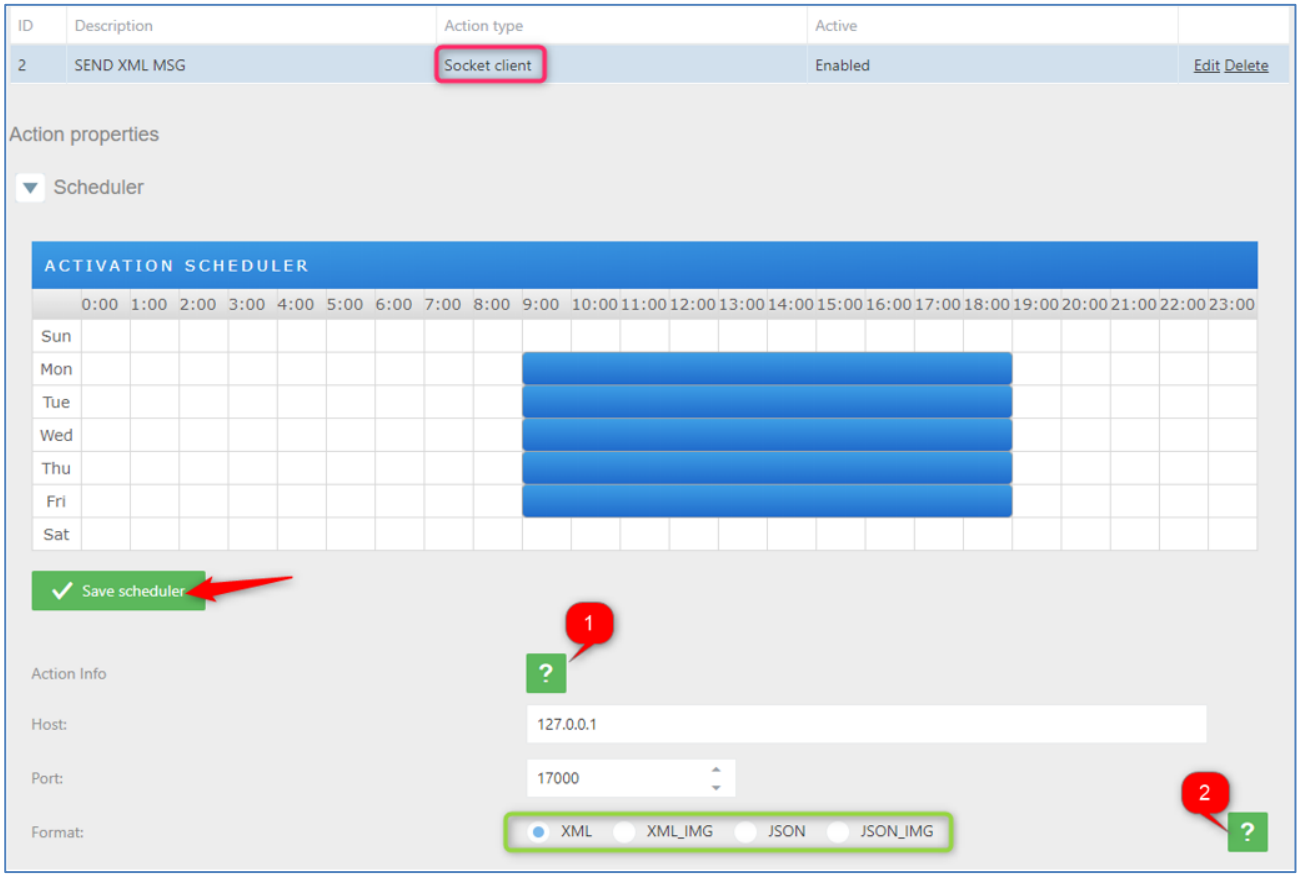



Click on for more information about format type.



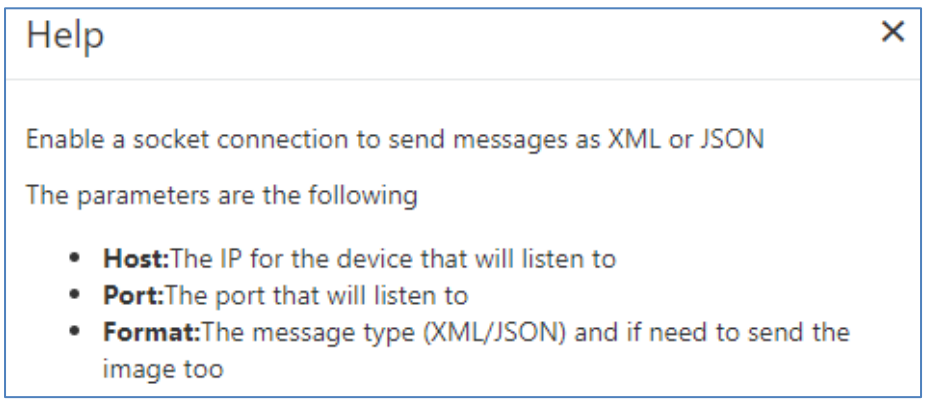
## 3.8. Socket client

Configuring the action ***Socket Client*** because you want to send the results to another device, using the EMPLOYEES list, click on "Action for the list" and add a new action pressing "+" and then select in "Action type = Socket Client".



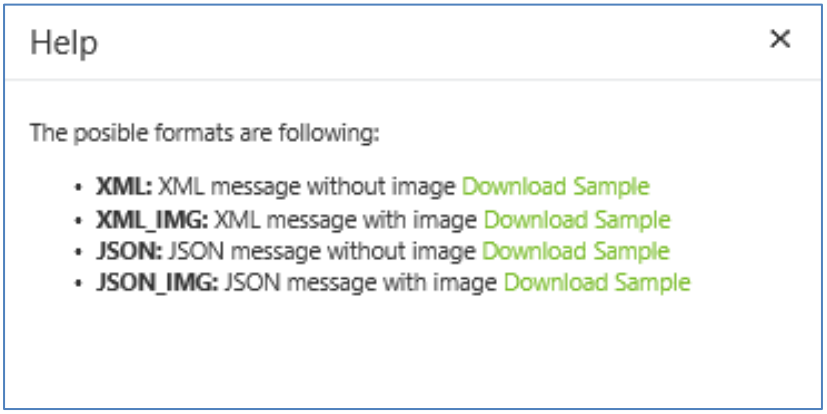

Set the scheduler as needed and click on "SAVE SCHEDULER".

Action Info: Click on for more information.



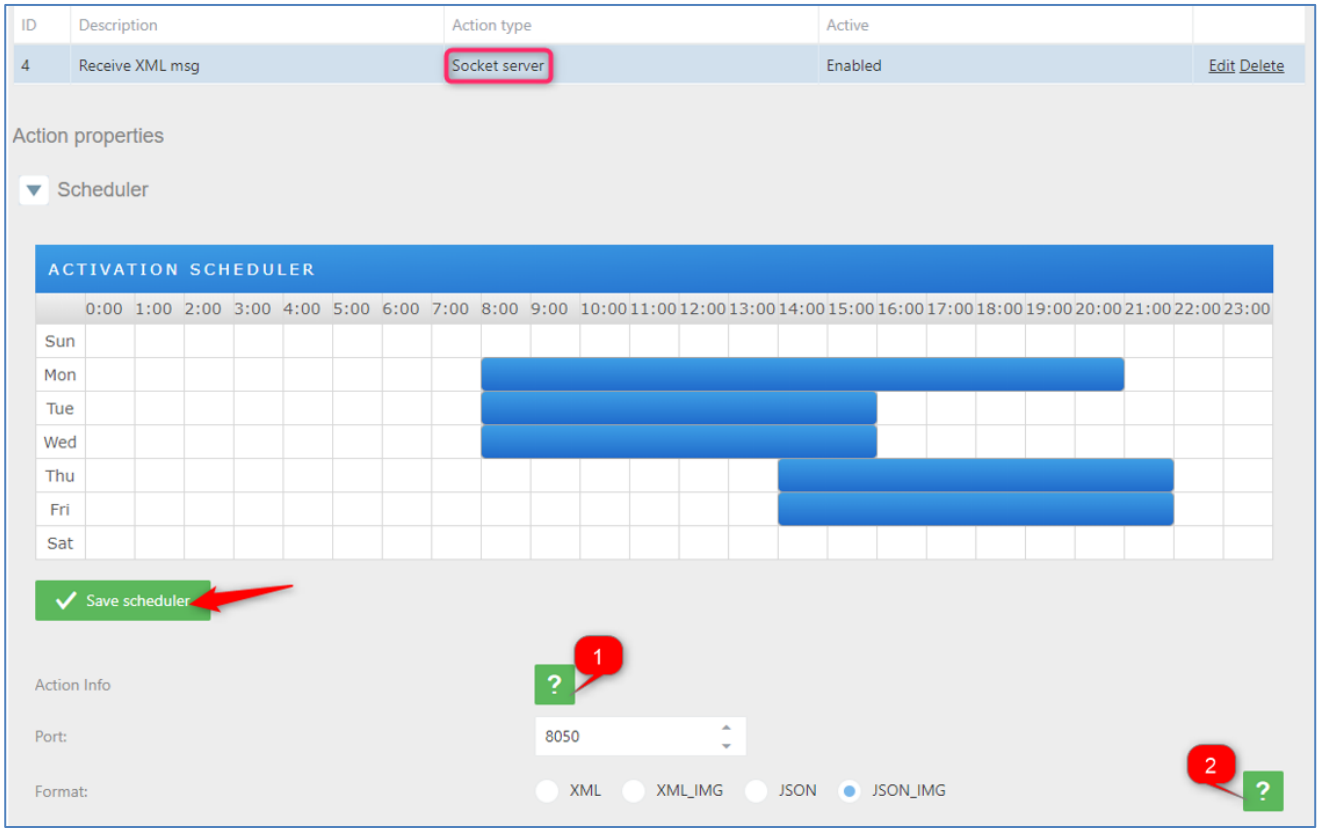

Select which message format you will use to send the information.

Click on for more information about format type.



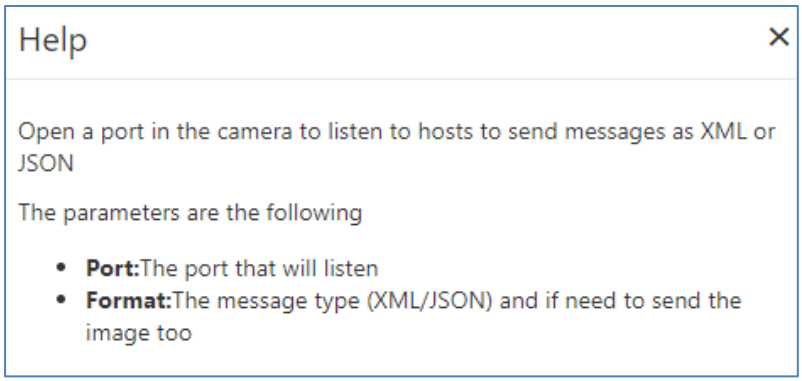
## 3.9. Socket server

Configuring the action ***Socket Server*** will use the camera to receive messages from other devices.

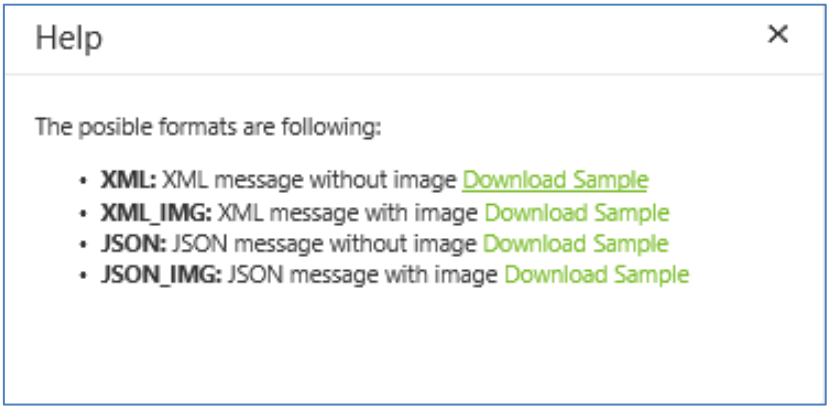



Set the scheduler as needed and click on “SAVE SCHEDULER”.

Action Info: Click on for more information.



Click on for more information about format type.



## 3.10. Trigger Server

Configuring the action **Trigger Server** will use the camera to receive triggers from other devices and send a message. Using the EMPLOYEES list, click on “Action for the list” and add a new action pressing “+” and then select in “Action type = Trigger Server”.

This mode is designed to work with trigger mode, the client connect to the server socket and send the message specified in the “Trigger mode”, received this message (another message is discarded) make a trigger to the camera an take a picture to process the engine. After engine processed send a message with the format specified in the “Format response”

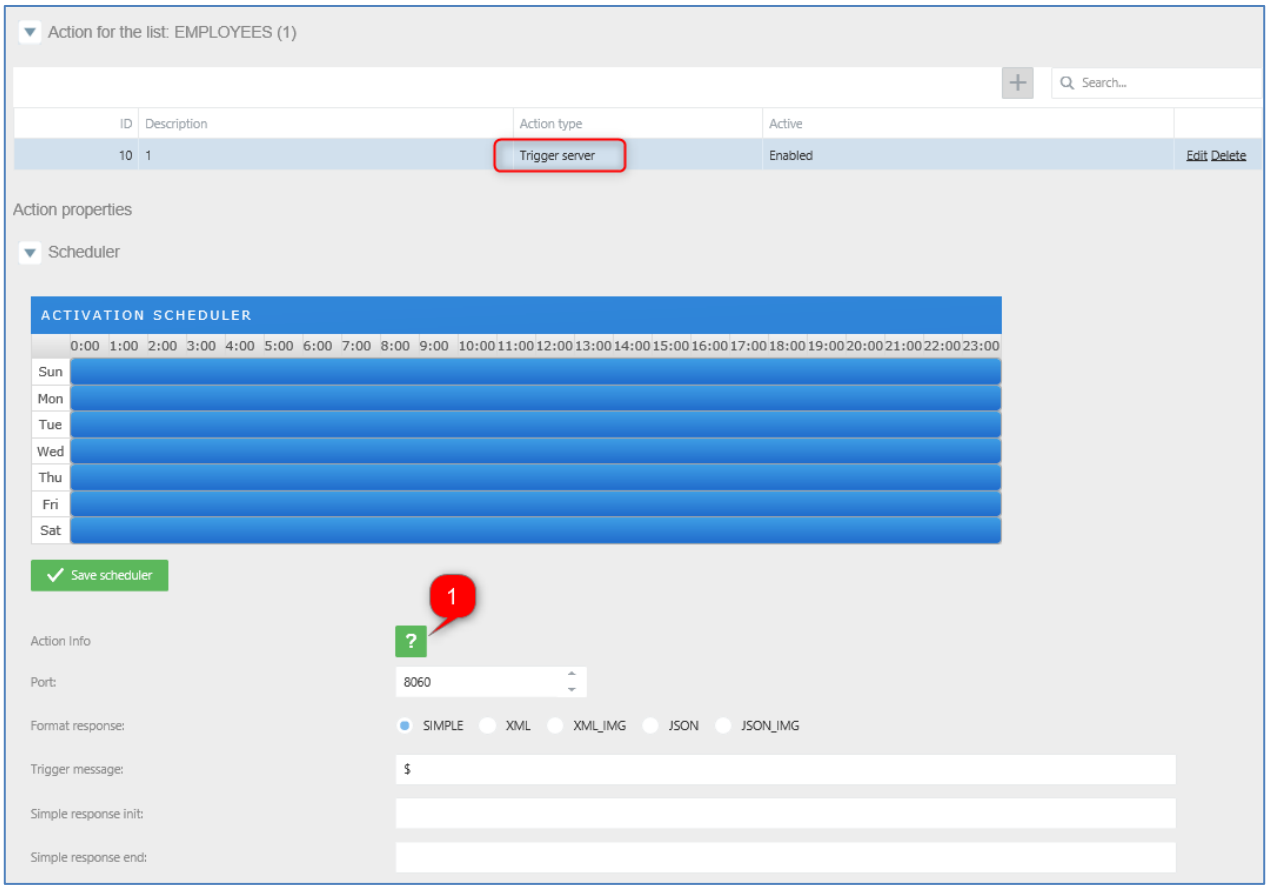
SIMPLE: Just the plate number

XML a message in format XML

XML_IMG a message in XML format including the image in base64 format

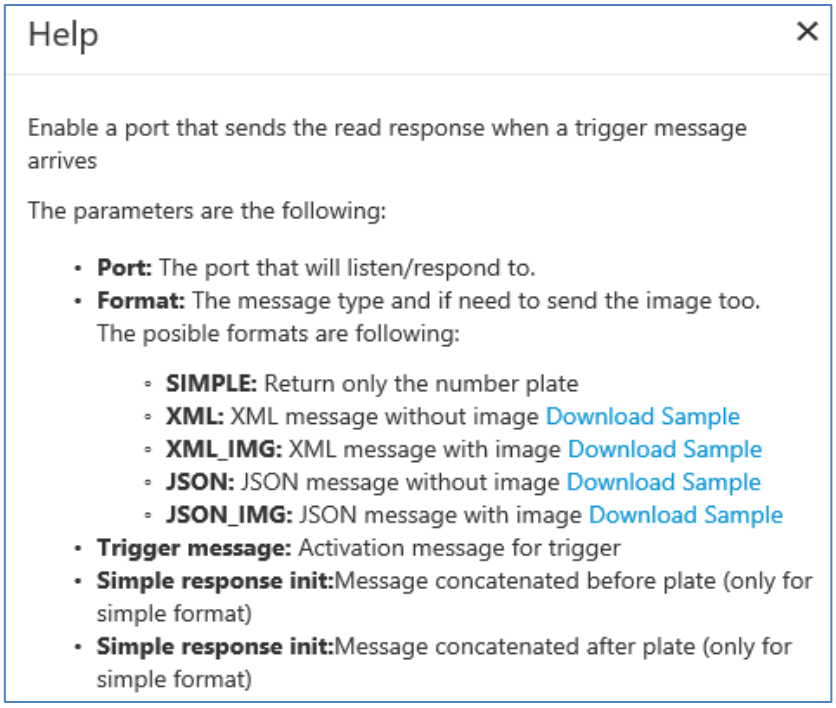
JSON a message in format JSON

JSON_IMG a message in JSON format including the image in base64 format




Set the scheduler as needed and click on “SAVE SCHEDULER”.

Click on for more information about how to configure.



# 4. ANEX. 1: Camera list synchronization

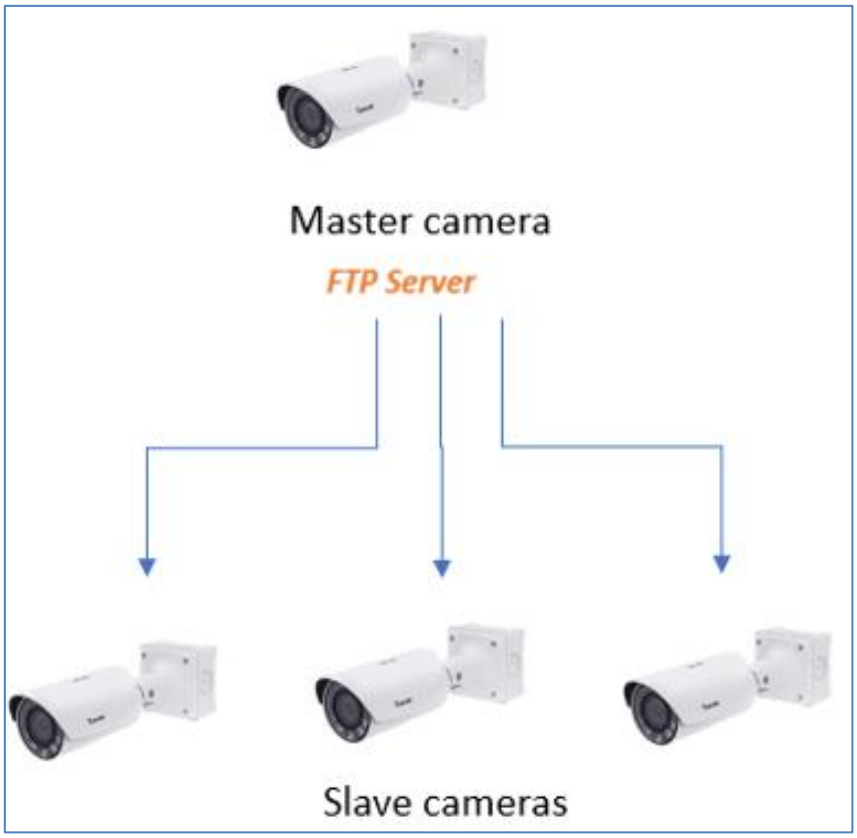
The ZKTeco system allows a list system synchronized.

One of the cameras works like a master and the other cameras works like a slave.
The master camera uploads the file with the list content and the slave cameras downloads the file.

All the list and elements must be modified in the master camera, the changes will be updated automatically in the slave following the next instructions to configure the master and the slaves.
There is no limit for the number of the cameras slave, the limit is on the FTP server, depends of the number of connections.
Can be synchronized all the lists or only one list.

## 4.1. Architecture 1

The camera is the FTP server. Must be activated (by default is disable the FTP server)



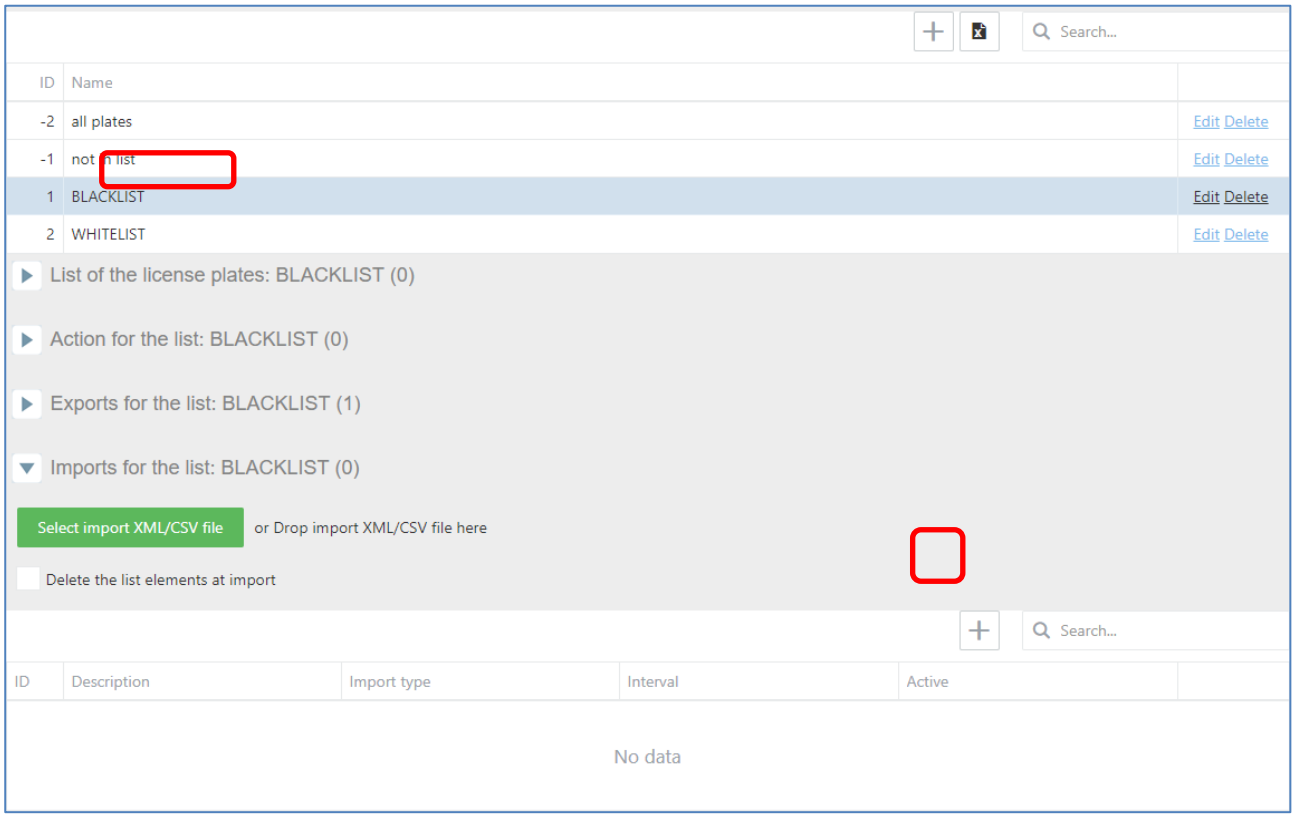
### 4.1.1. Master configuration

Activation FTP server will do by script.

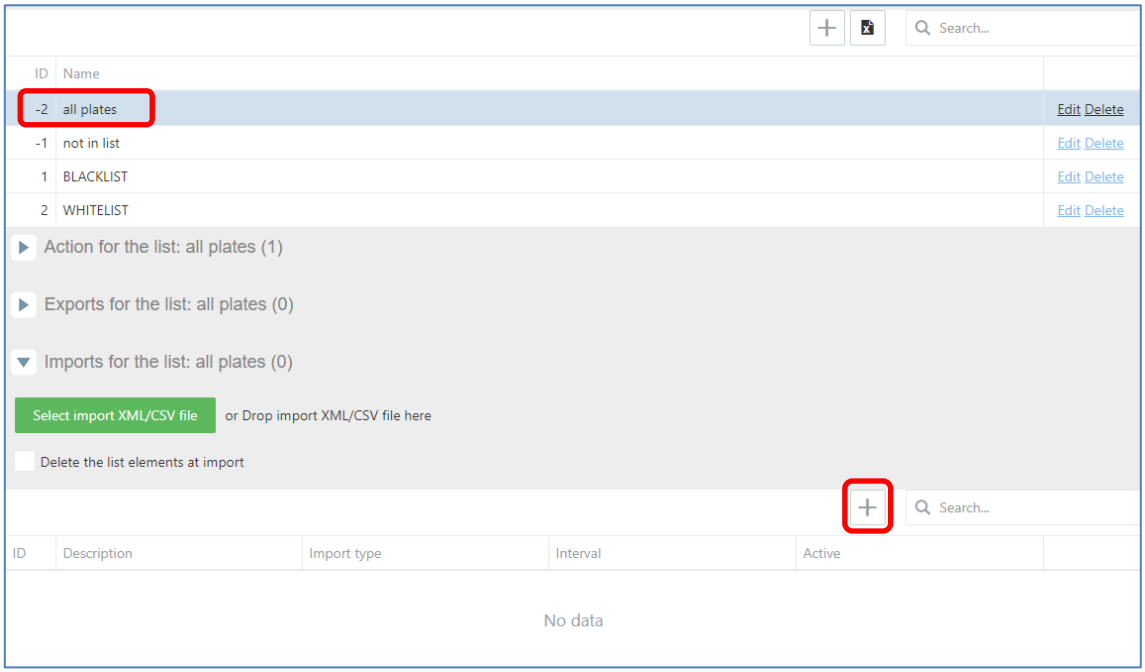
### 4.1.2. Slave configuration

Access to the List Tab.

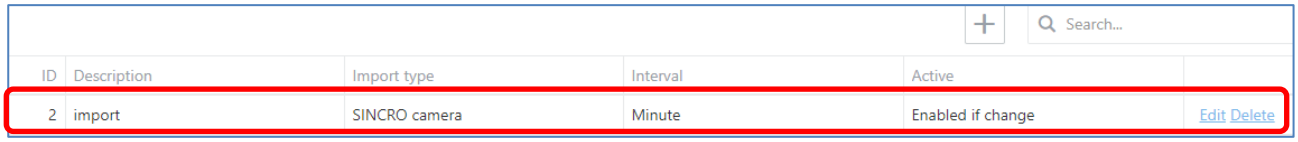
To configure only one list selects the list and make the import in the list.



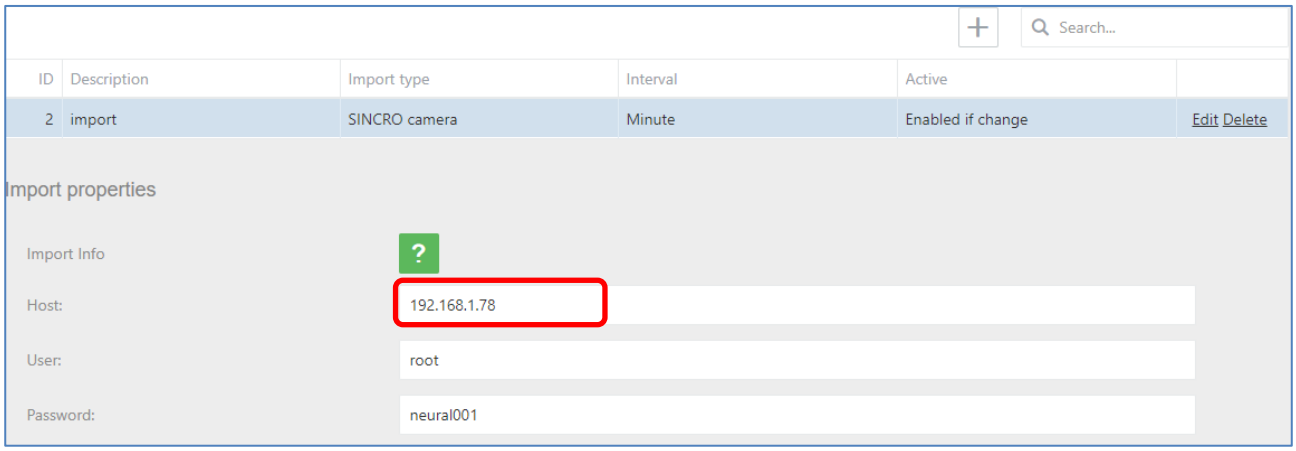
To configure all the list selects all plates.




Create an import each minute (or desirable time) the time enabled if change with the type SINCRO Camera and click Save.




Configure the master camera credentials.



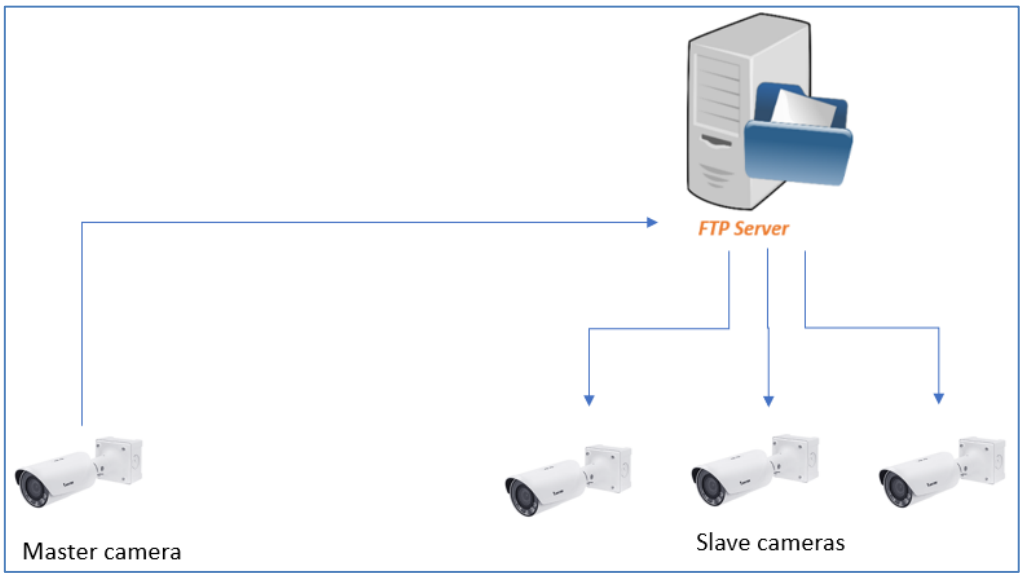

Host: Camera master IP

User: <empty>

Password: <empty>

## 4.2. Architecture 2

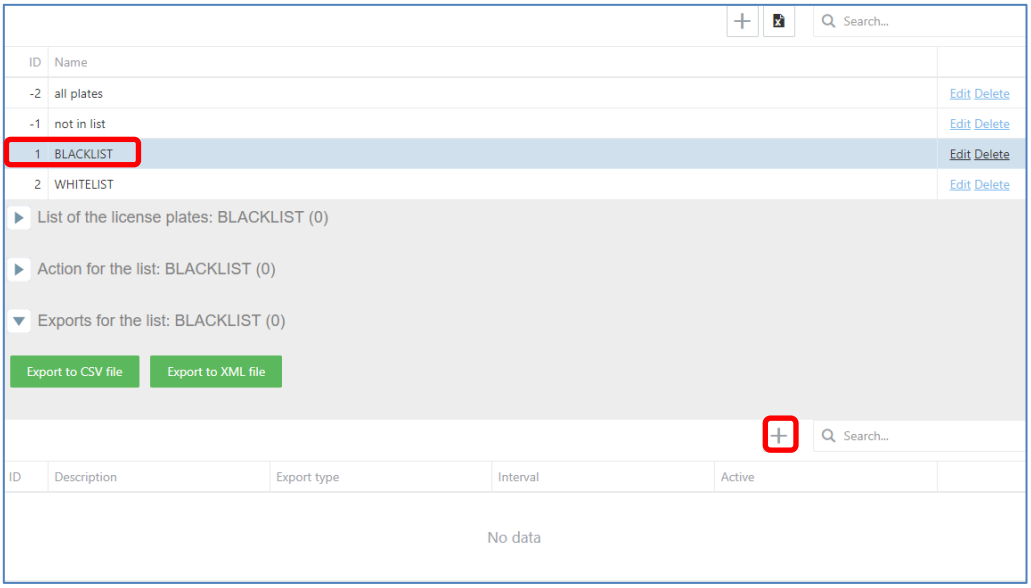
Using FTP server where store the list.



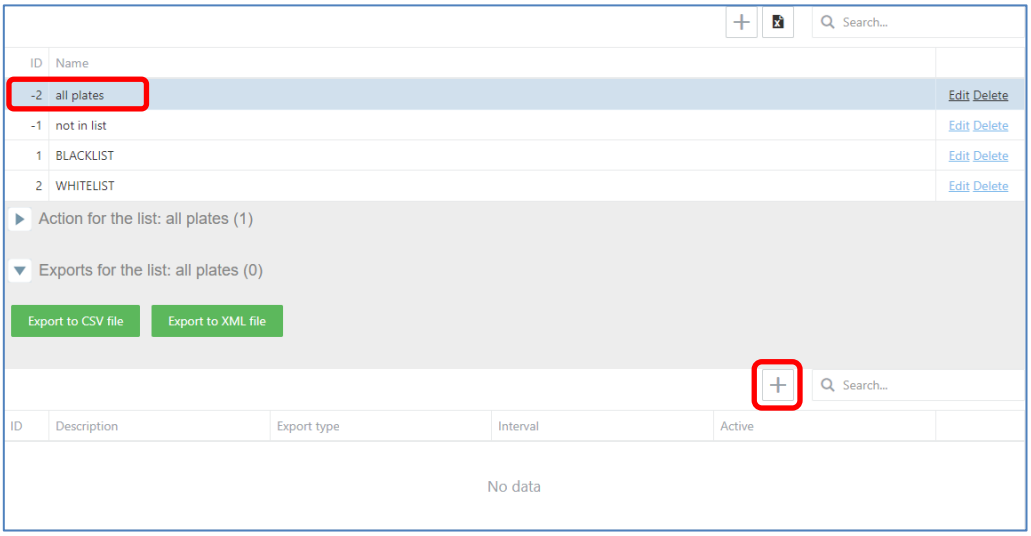

### 4.2.1. Master configuration

Access to the List Tab.

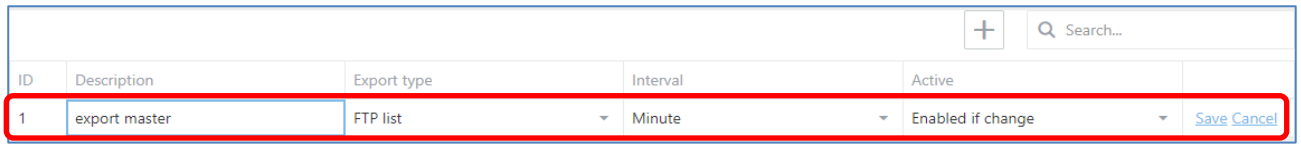
To configure only one list selects the list and make the export in the list.




To configure all the list selects all plates.

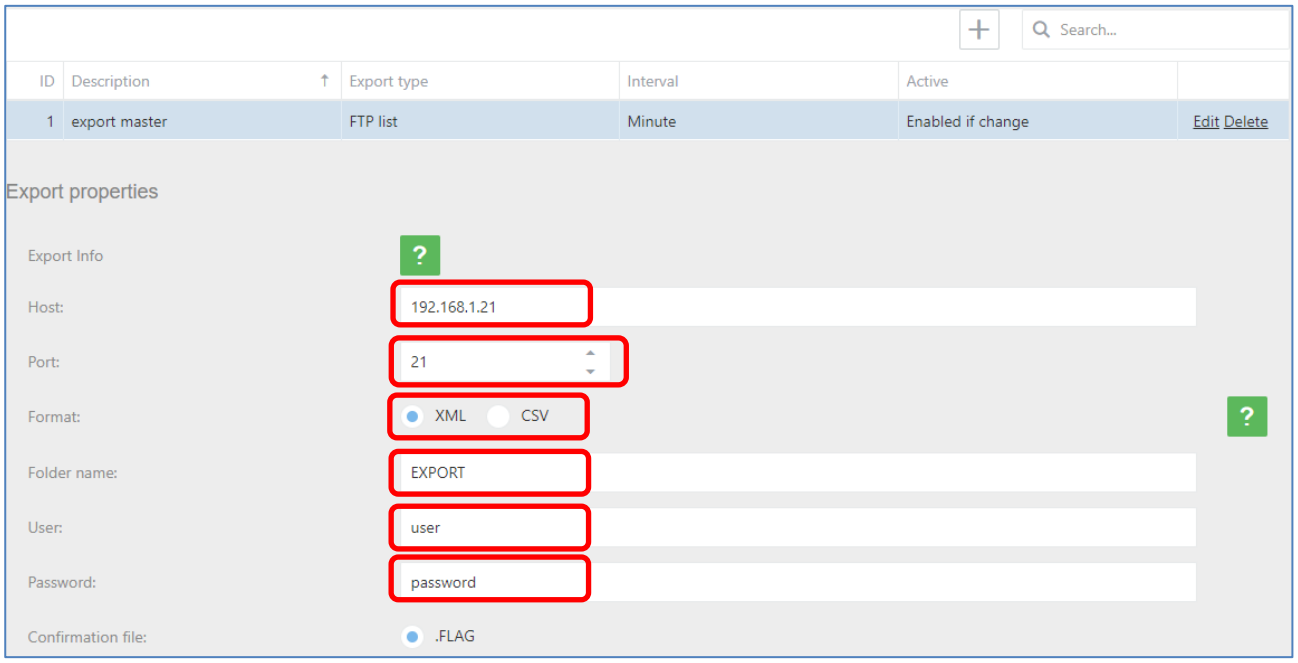



Create an export each minute enabled if change with the type FTP list and click Save.

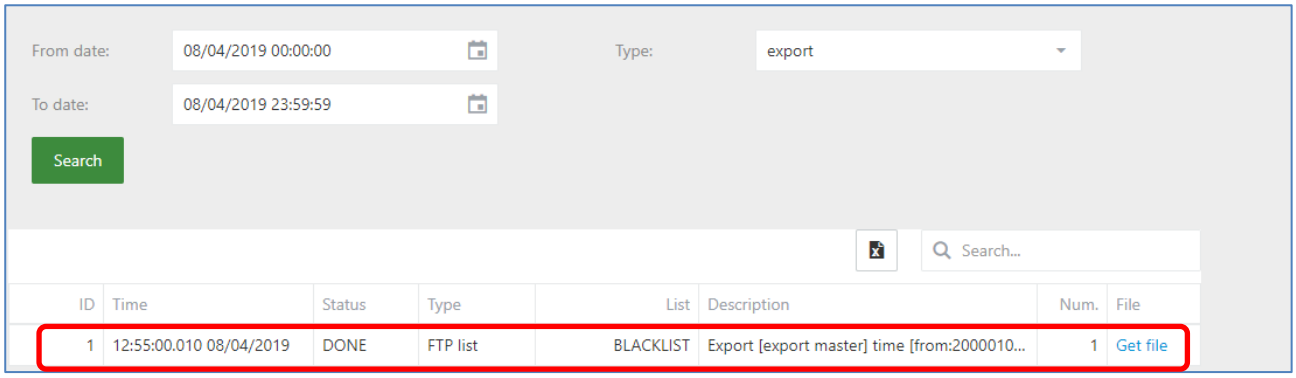



Configure the credentials of the FTP server and the format CSV or XML, can be the booth but must be the same in the slaves.

Just configured the camera master is sending the file to the FTP server.



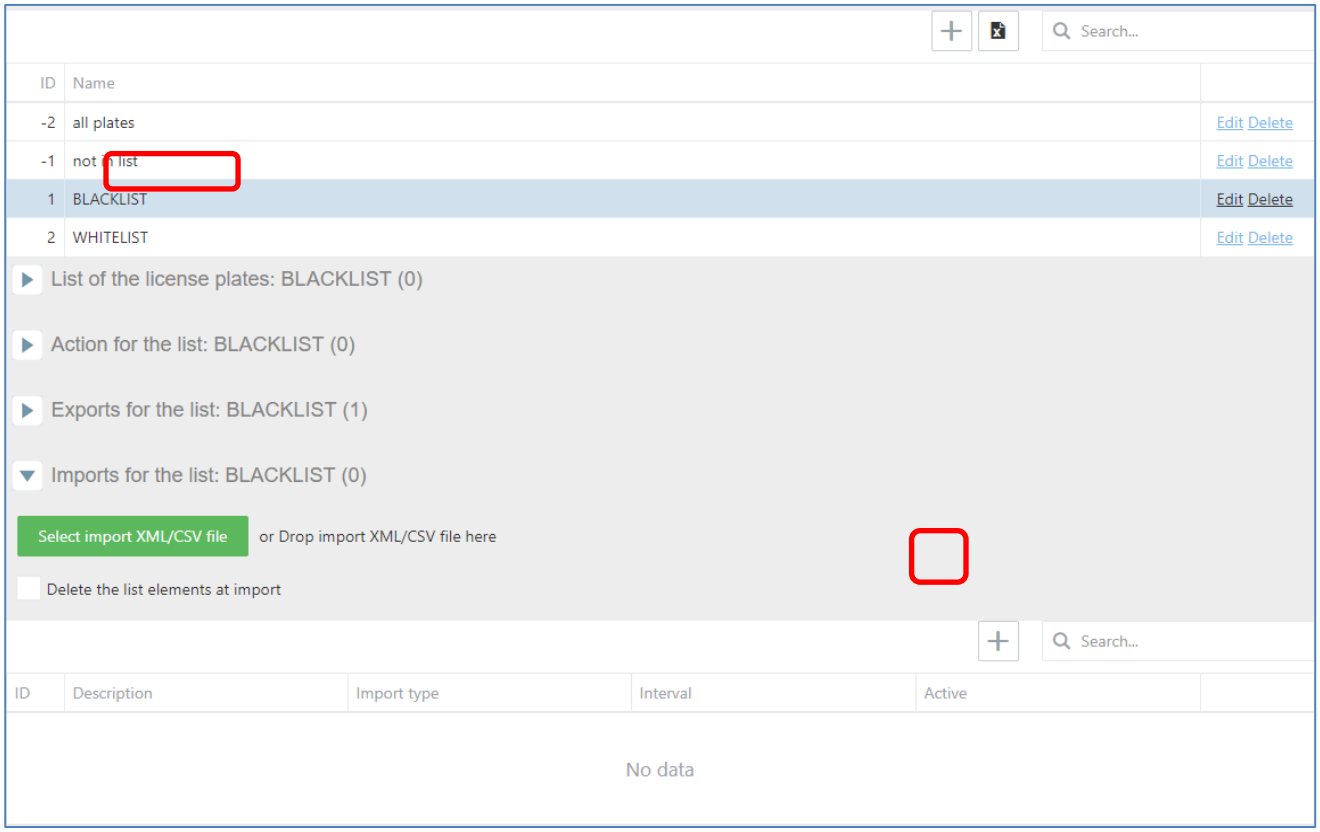
Can be checked in the Audit Tab.



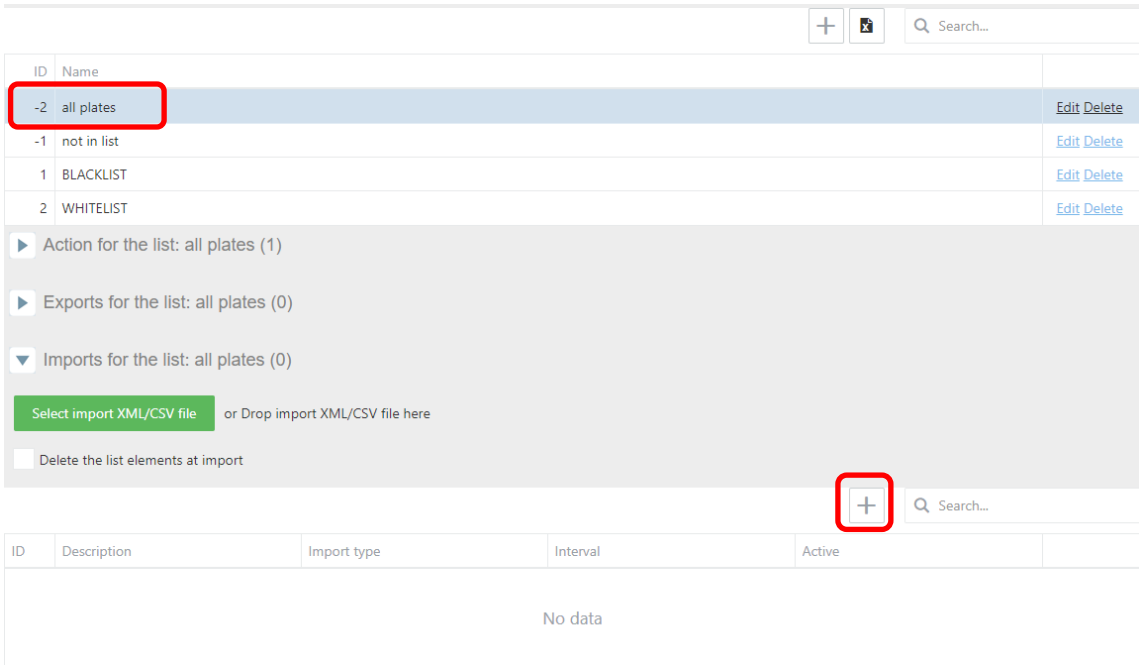

## 4.2.2. Slave configuration

Access to the List Tab.

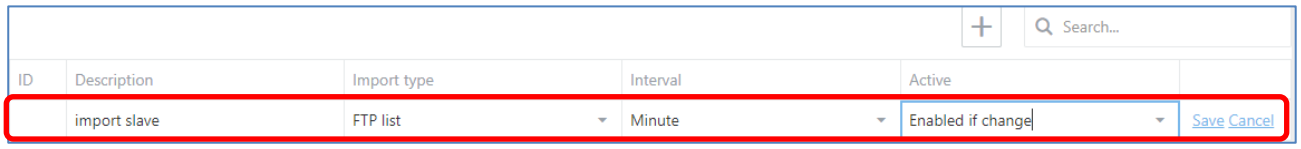
To configure only one list selects the list and make the import in the list.



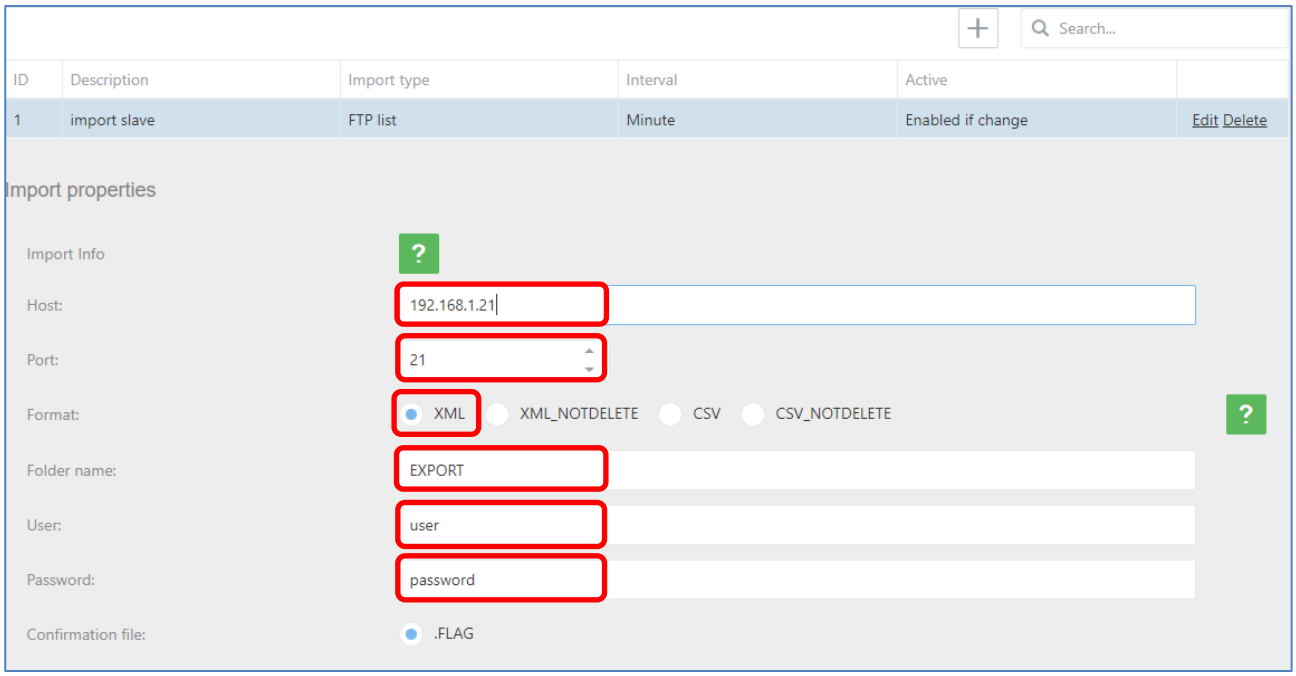

To configure all the list selects all plates.




Create an import each minute (or desirable time) the time enabled if change with the type FTP list and click Save.

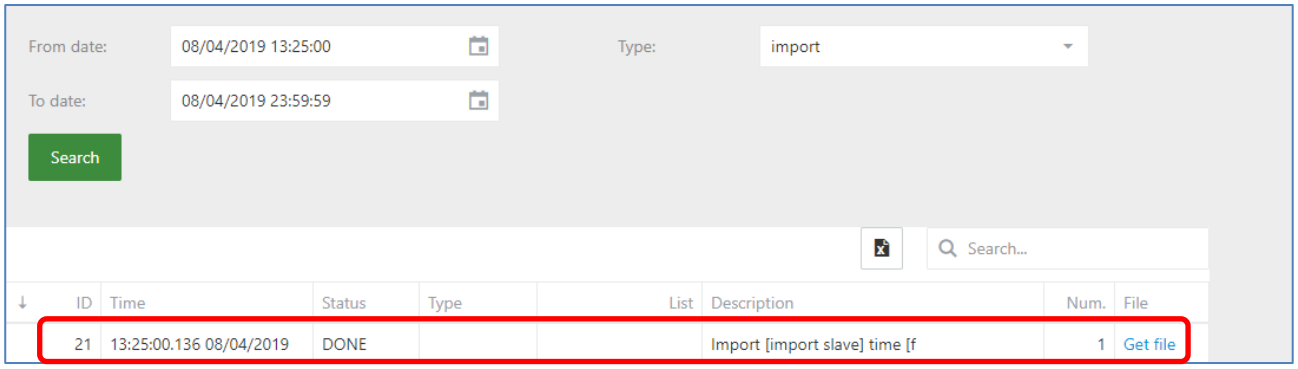



Configure the same credentials of the FTP server and the same format CSV or XML than the master configuration.



If the master selection type format is XML can be selected XML or XML_NOTDELETE, if your selection is XML all the elements not included in each file downloaded will be deleted.
Just configured the camera master is downloading the file from the FTP server.

Can be checked in the Audit Tab.

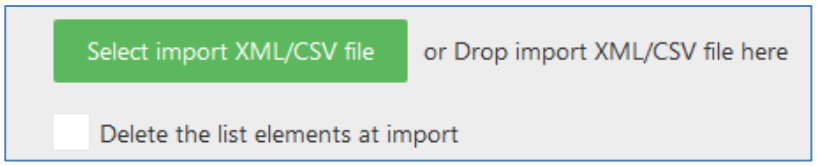


## 4.3. Import for the list

**Import for the list:** Here are all the automatic imports we can configure for each list.

- FTP list: Import the list to an FTP server
- SINCRO camera: Import the list from another camera

You can also import the list manually uploading an xml list file.




The format of the XML is the following:

---

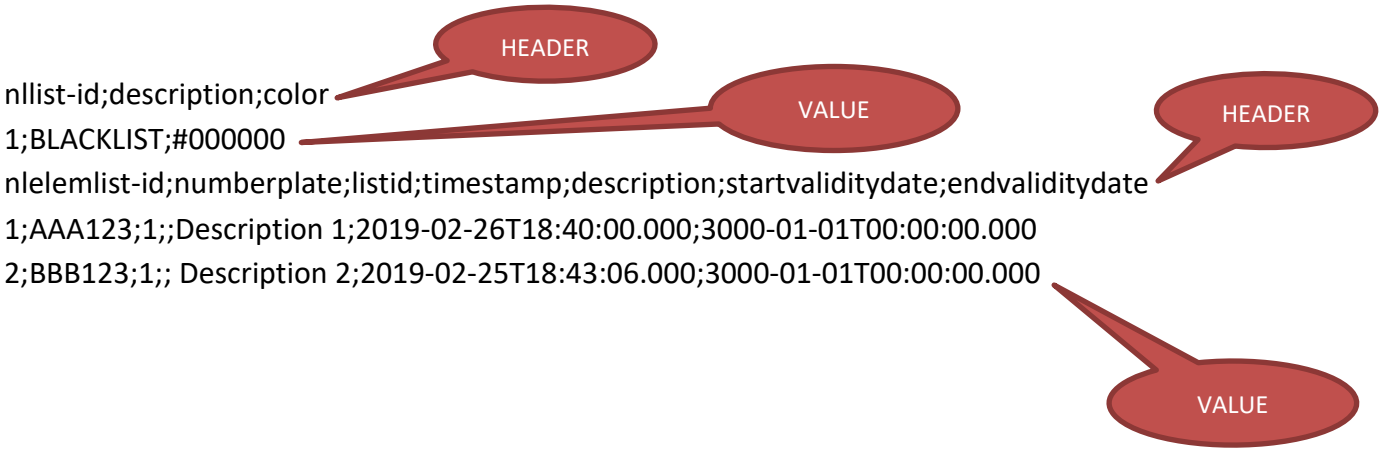
```
<?xml version = "1.0" encoding = "utf-8" ?>
<grouplist>
<nllists>
        <nllist id="3" sendserver="0" dateserver="" reserve="" description="EMPLOYEES" color=""/>
</nllists>
<nlelemlists>
<nlelemlist id="1" sendserver="0" dateserver="" reserve="" numberplate="AAA123" listid="3" timestamp=""
description="EMP 1" startvaliditydate="2000-01-01T00:00:00.000" endvaliditydate="3000-01-01T00:00:00.000"/>

<nlelemlist id="2" sendserver="0" dateserver="" reserve="" numberplate="BBB321" listid="3" timestamp=""
description="EMP 2" startvaliditydate="2000-01-01T00:00:00.000" endvaliditydate="3000-01-01T00:00:00.000"/>

</nlelemlists>
</grouplist>
```

---

- Grouplist: the main element of the xml
- Nllists: The group of type of lists
- Nlist: The list type element, on:
    - Id= Id of the list
    - Sendserver = Always 0
    - Dateserver= Always “”
    - Reserve = Always “”
    - Description= The name of the list
    - Color = Always “”
- Nlelemlists: the group of the elements of the list

- Nlelemlist: the element in list, on:
  - Id= Id of the element
  - Sendserver = Always 0
  - Dateserver= Always “”
  - Reserve = Always “”
  - Numberplate= Plate number of the element
  - Listid= Id of the list
  - Timestamp= Always “”
  - Description= Description of the plate number
  - Startvaliditydate= Start date of validity period
  - Endvaliditydate= End date of validity period

The format of CSV is the following:




The first block of HEADER-VALUE is the type of list which values are:

- nllist-id: Id of the list
- description: Description of the list
- color: Color of the list (NOT IN USE)

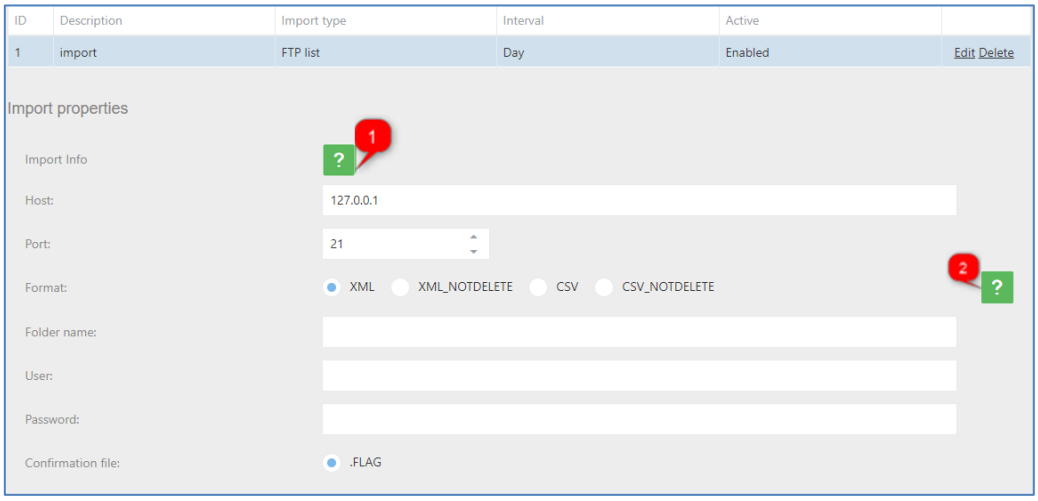
The second block of HEADER-VALUE are the elements of list which values are:

- nlelemlist-id: Id of the list element
- numberplate: Plate number
- listid: Id of list type
- timestamp: Always “”
- description: Description of the number plate.
- Startvaliditydate: Start validity date of the number plate.
- Endvaliditydate End validity date of the number plate.

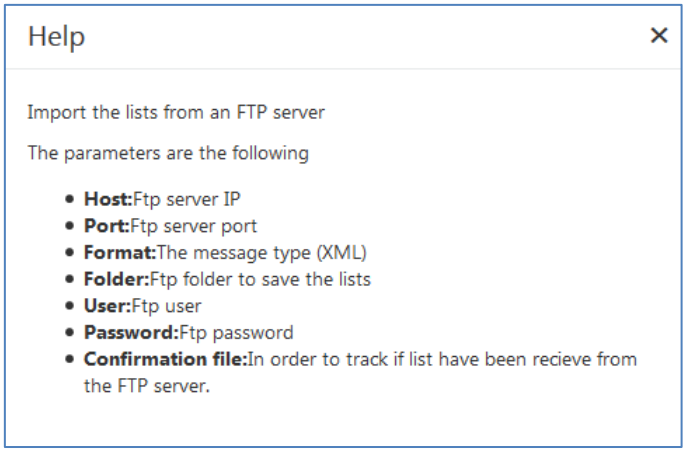
A list can perform several imports, depending on the scenario and needs.
Having the Employees list selected, click on “Imports for the list” and then click on the + button and define the type and interval. The interval can be set as:

- *Minute:* Will execute the task every minute.
- *Hour:* Will execute the task every hour.
- *Day:* Will execute the task once a day at 23:59:59.
- *Week:* Will execute the task once a week, every Monday at 00:00:00.
- *Month:* Will execute the task once a month, the first day of the month at 23:59:59.

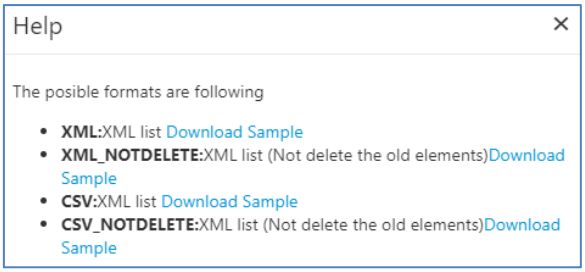
1. Configuring the import ***FTP list*** to import the list from an ftp result, using the EMPLOYEES list, click on “Import for the list” and add a new import pressing “+” and then select in “Import type = FTP list”.



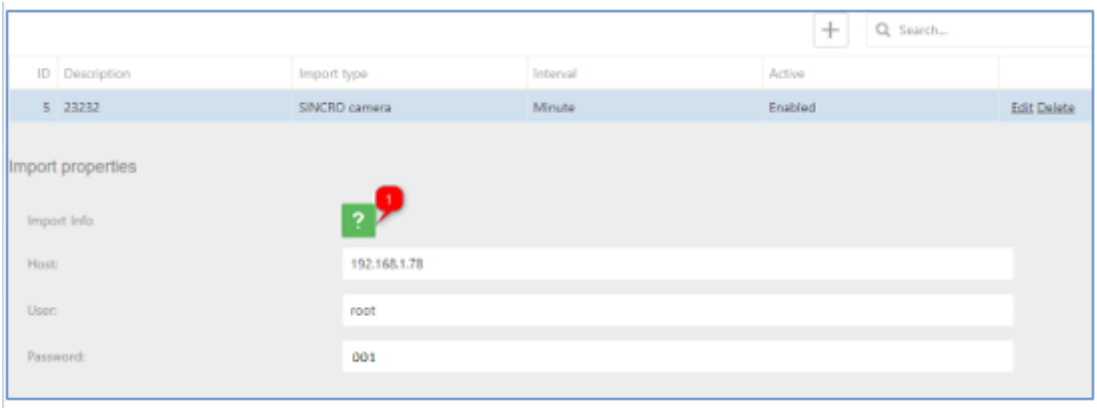

Click on for more information about how to configure.



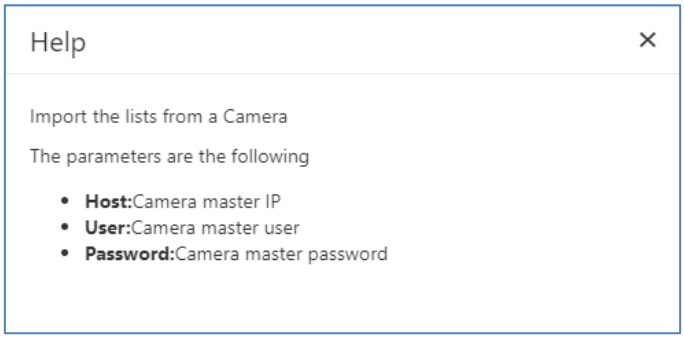
Click on for more information about format type.




2. Configuring the import ***SINCRO camera*** to import the list from another camera, using the EMPLOYEES list, click on "Import for the list" and add a new import pressing "+" and then select in "Import type = SINCRO Camera".




Click on for more information about how to configure.

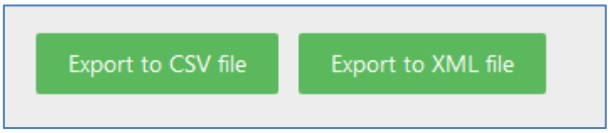


## 4.4. Exports for the list

**Exports for the list:** Here are all the automatic exports we can configure for each list.

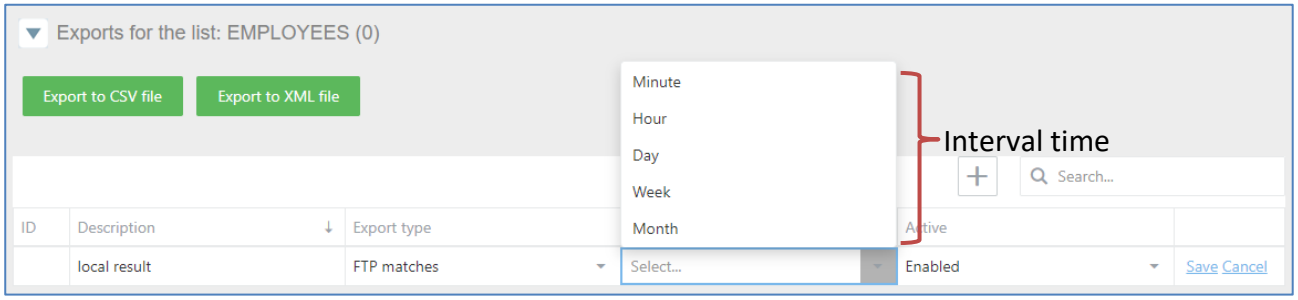
- Local matches: Exports the matches of the list locally
- FTP matches: Exports the matches of the to an FTP server
- Local list: Exports the list locally
- FTP list: Export the list to an FTP server

You can also download the selected list pressing the button “Export to XML file” or “Export to CSV file”

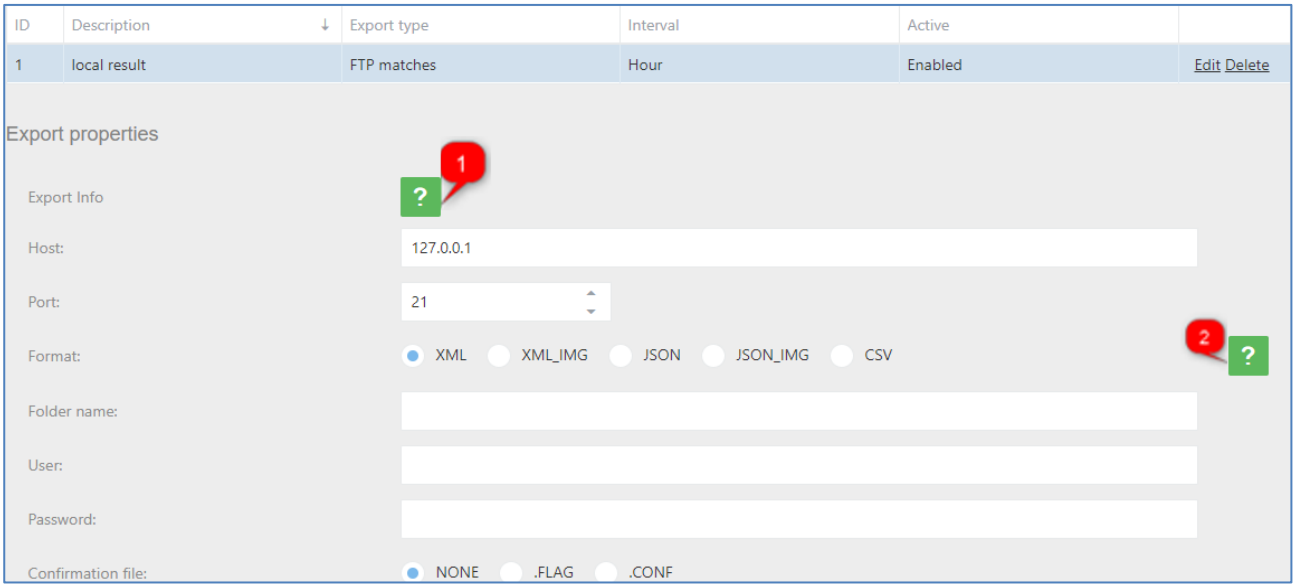



A list can perform several exports, depending on the scenario and needs.
Having the Employees list selected, click on “Exports for the list” and then click on the + button and define the type and interval. The interval can be set as:

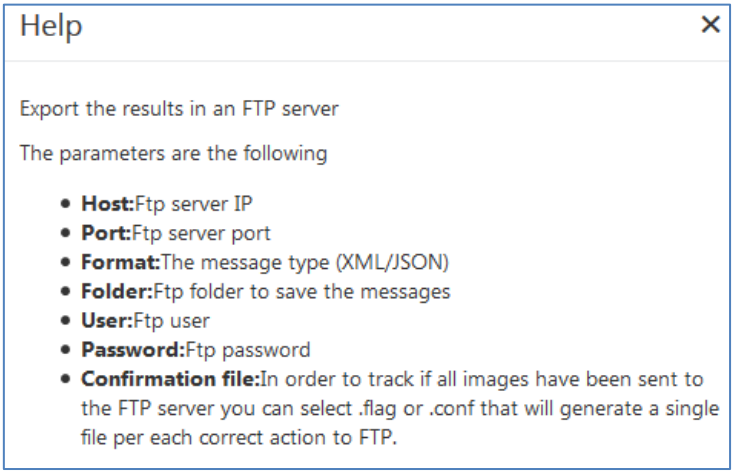
- *Minute:* Will execute the task every minute.
- *Hour:* Will execute the task every hour.
- *Day:* Will execute the task once a day at 23:59:59.
- *Week:* Will execute the task once a week, every Monday at 00:00:00.
- *Month:* Will execute the task once a month, the first day of the month at 23:59:59.



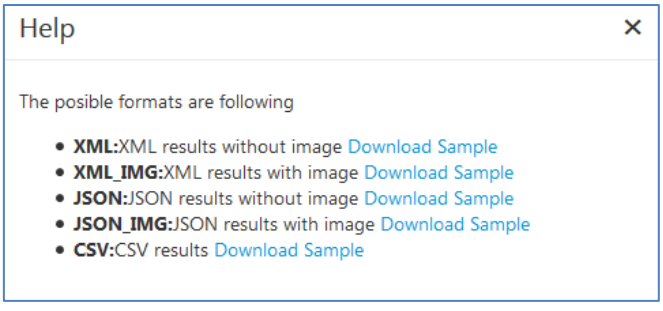
1. Configuring the export ***FTP matches*** to export the results to an ftp result, using the EMPLOYEES list, click on "Export for the list" and add a new export pressing "+" and then select in "Export type = FTP matches".



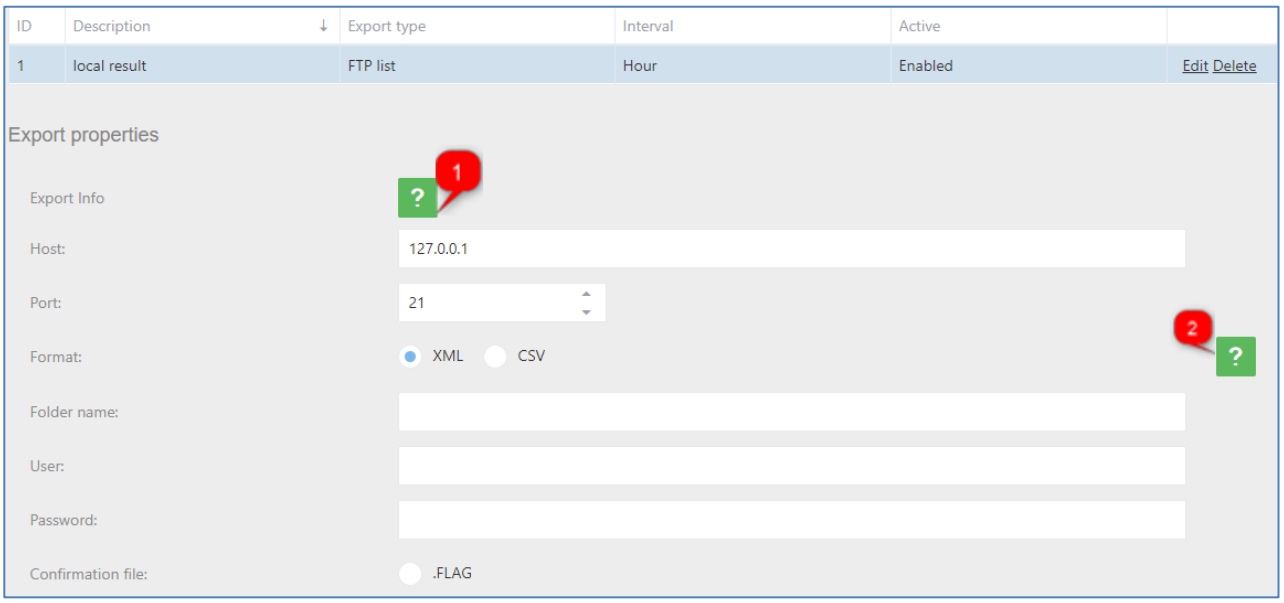

Click on for more information about how to configure.



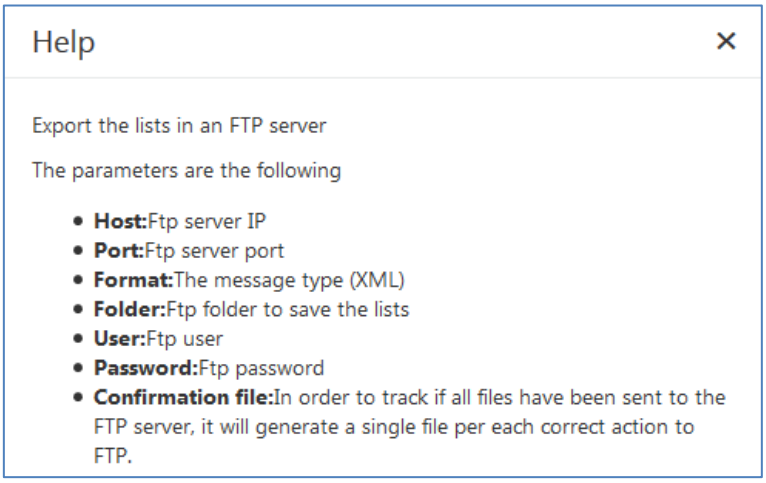

Click on for more information about format type.



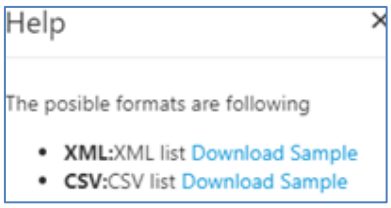
2. Configuring the export ***FTP lists*** to export the list locally, using the EMPLOYEES list, click on "Export for the list" and add a new export pressing "+" and then select in "Export type = FTP list".




Click on for more information about how to configure.

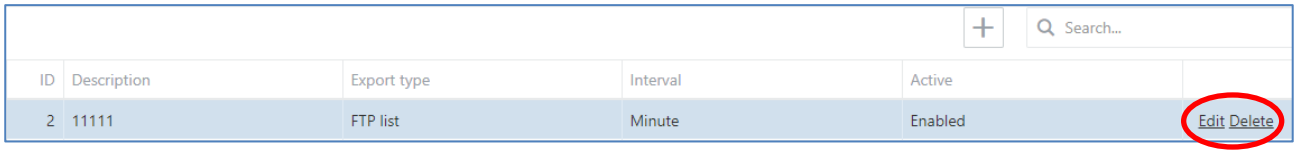



Click on for more information about format type.

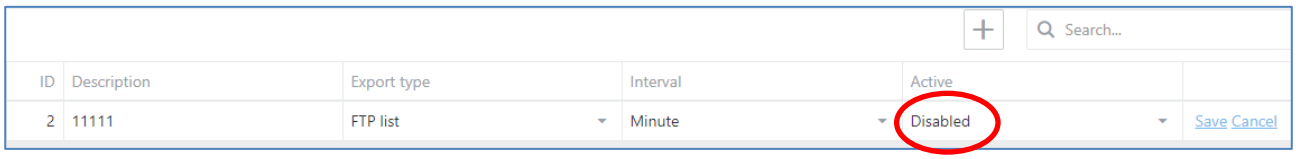


In case, you don't want to continue to use export in a list you are able to disable or delete the action.

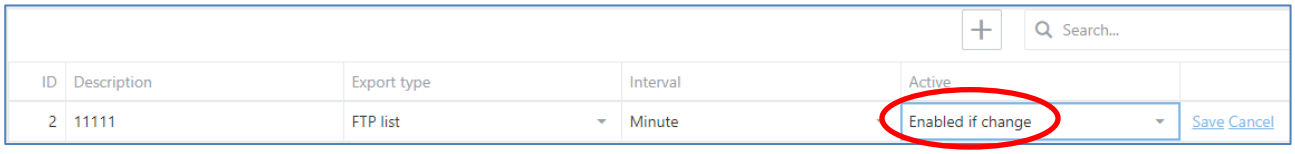
To delete click on the list, select the export and then click on delete option.



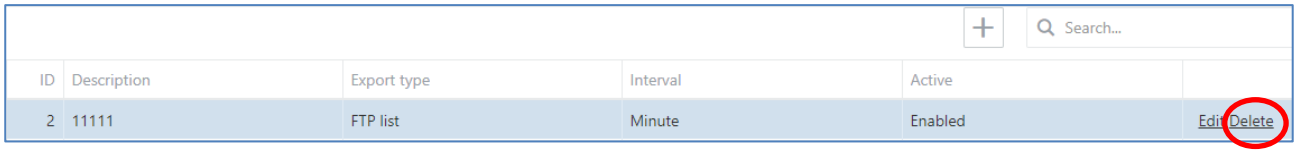

To disable click on the list, select the action and then click on edit option.
In *Active* change to *Disabled* and then click on Save.




After this change, the action disabled in case you need to use it later.
The "Enable if change" state, only do the export if the export type is "Local list" or "FTP list" and export the list only if exits any change.




To delete an action, click on the action and click on the DELETE button and then YES.



# 5. ANEX. 2: Wiegand output

This guide aims to describe the necessary steps to integrate the ZKTeco BL-852Q38A-LP cameras to any access control platform with Wiegand 26 interface.
The integration between both platforms allows LPR to serve as a "Reader" to any access controller with Wiegand 26 interface.

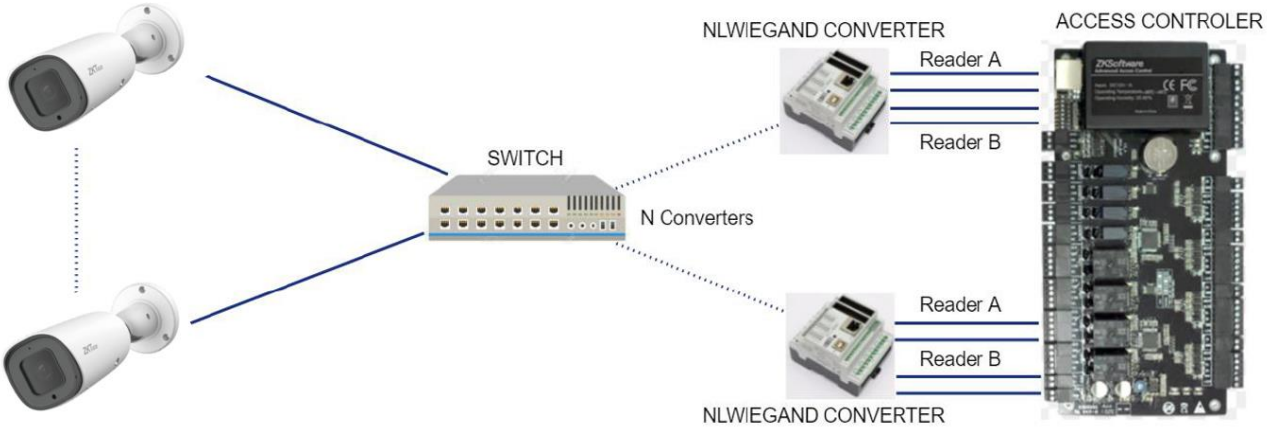
## 5.1. Requirements

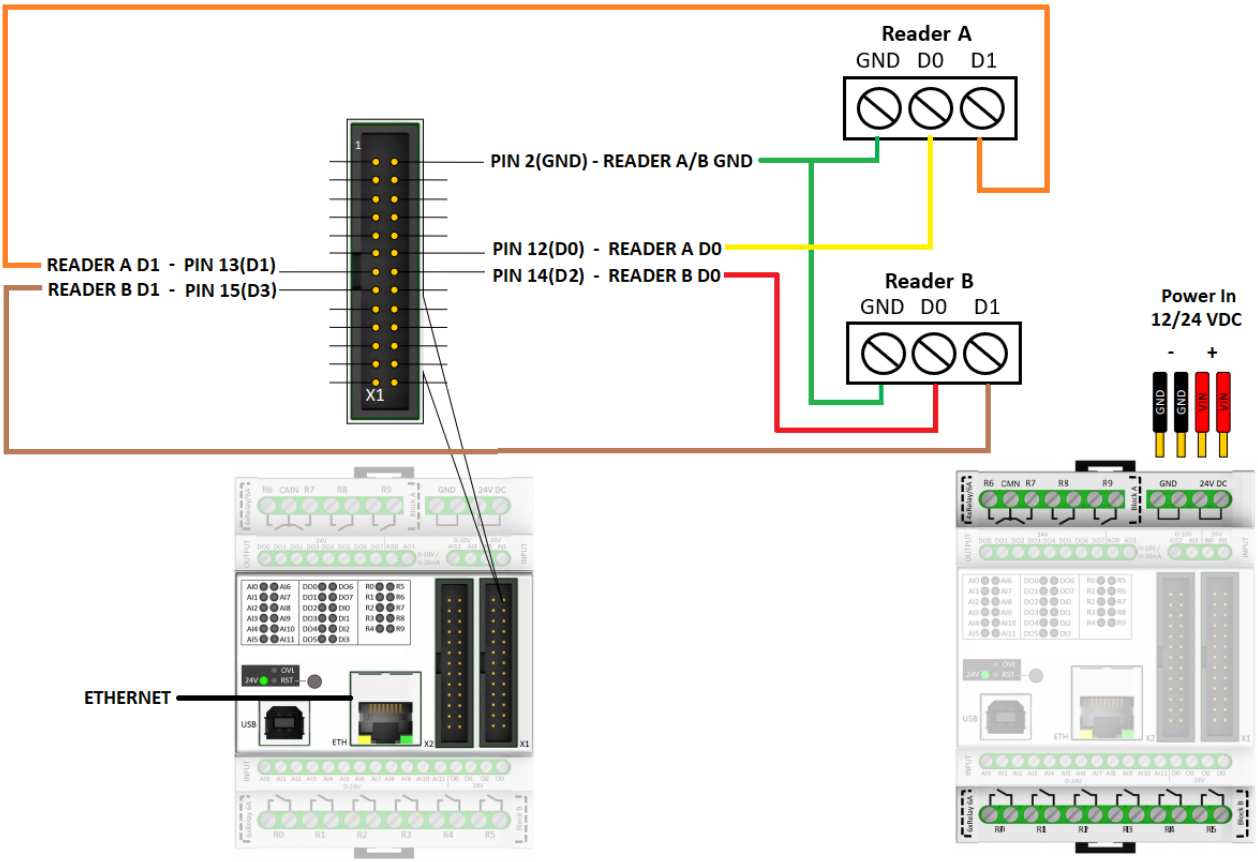
- ZKteco BL-852Q38A-LP camera
- NL2WIEGAND OEM CONVERTER OR NL2WIEGAND INDUSTRIAL CONVERTER.

## 5.2. Architecture

The cameras must be in the same logical network to command the NL2WIEGAND converters. Each camera will be able to command a single reader (A or B) of a NL2WIENGAND converter. In this way each converter can manage up to 2 READERS of the access controller.

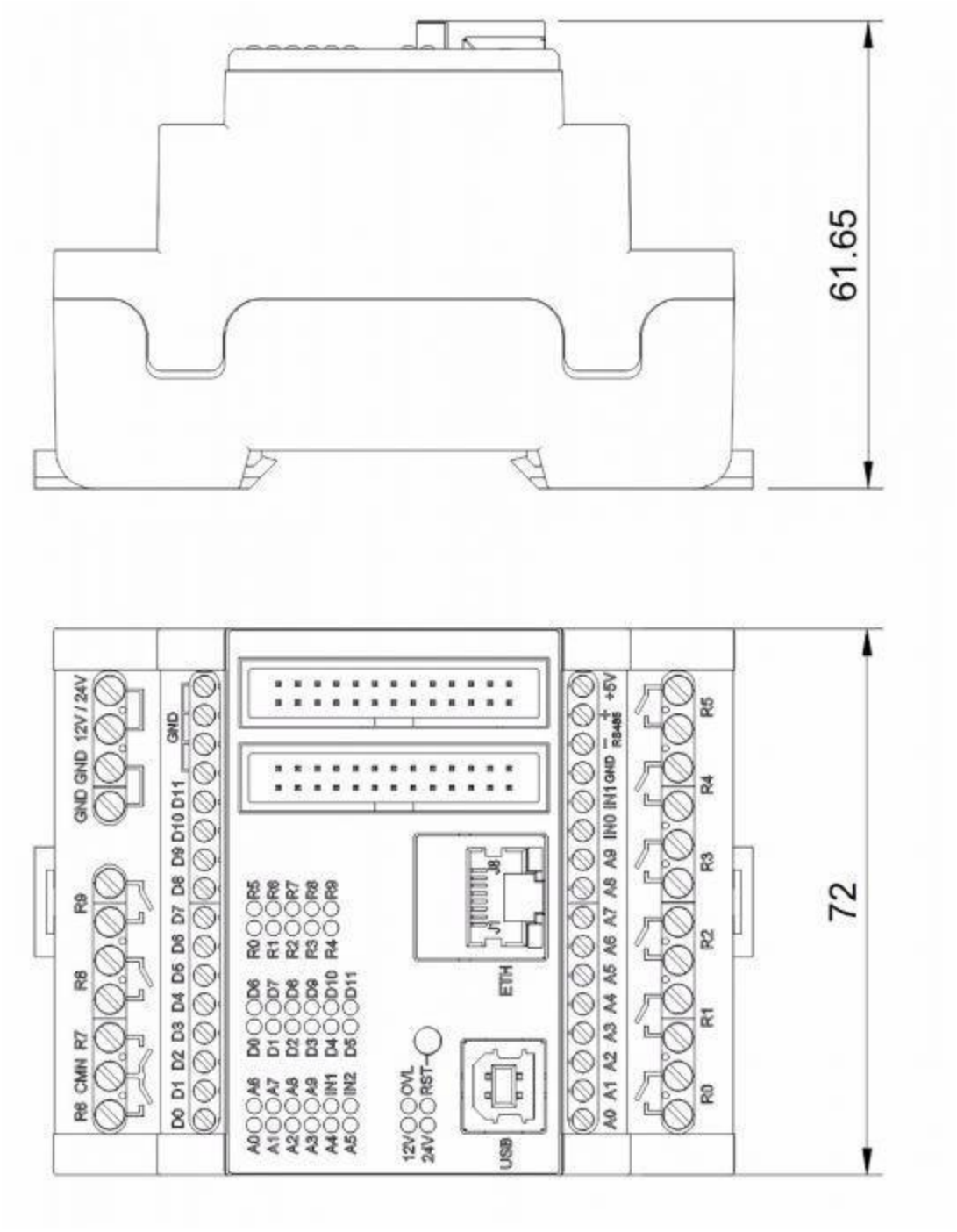
### 5.2.1. Industrial converter





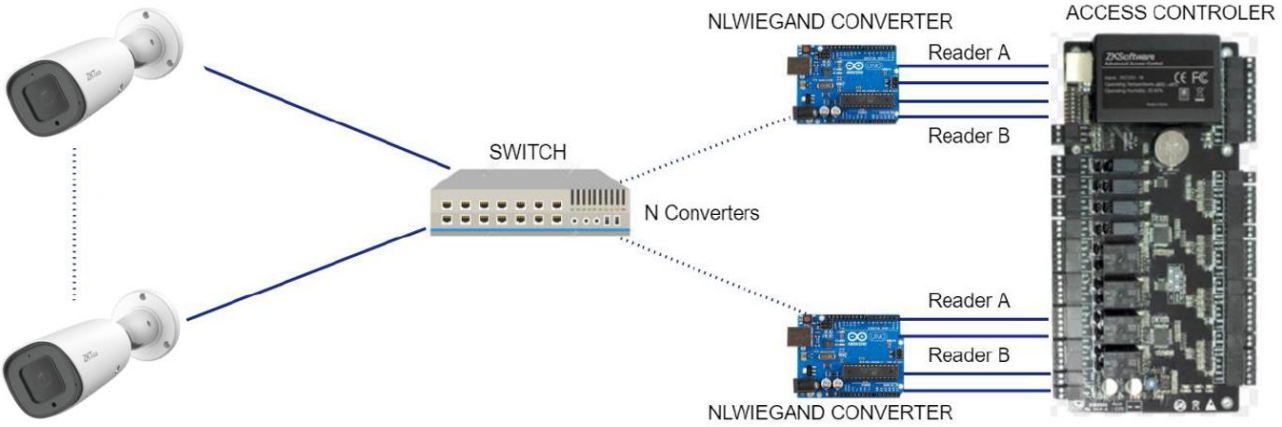

Technical specifications of the motherboard:

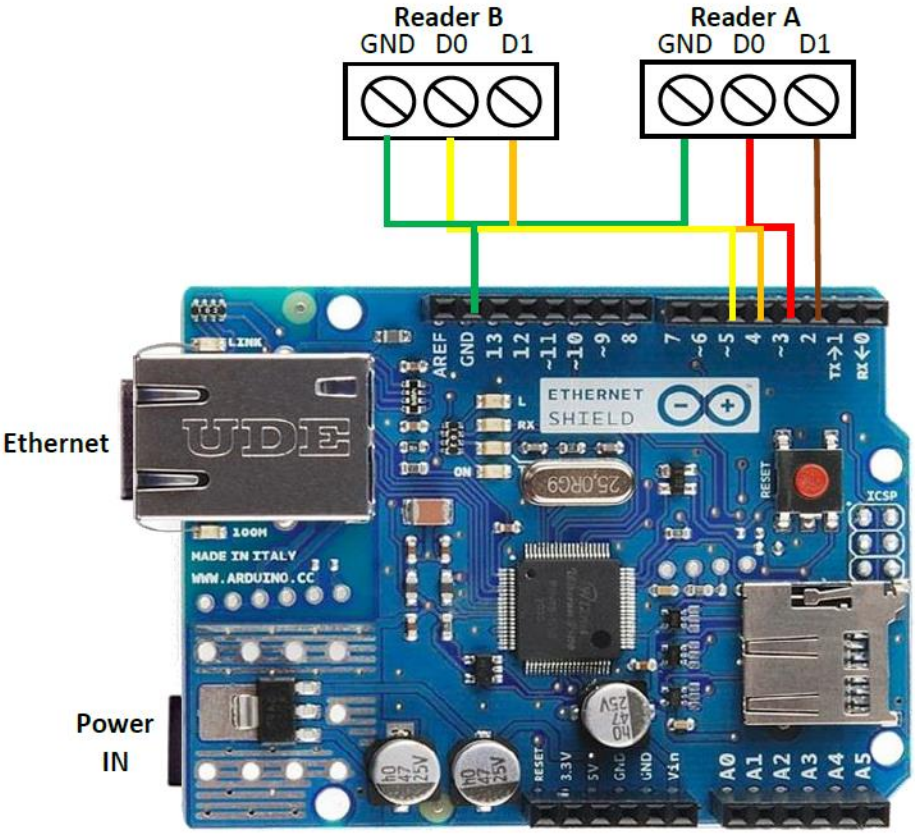
| | |
|---|---|
| **CPU Clock Speed** | 16 MHz |
| **Current Max** | 20 Ampere |
| **RTC support** | YES |
| **LAN Interface** | 1x |
| **SERIAL Interface** | 2x |
| **RS485 Interface** | 1x |
| **SPI Interface** | 1x |
| **I2C Interface** | 1x |
| **Digital Inputs** | 2x (IN0, IN1) |
| **Analog Inputs** | - |
| **Digital/Analog Inputs** | 10x (A0-A9) |
| **Digital Outputs** | 12x High Side Switch – 2A @12V or 24V (D0-D11) |
| **Relay Outputs** | 10x – 230V / 6A |
| **Analog Outputs** | 12x PWM (D0-D11) |




Weight 310 g
Dimentions 135 x 90 x 85 mm

## 5.2.2. OEM converter



Technical specifications of the motherboard:

| | |
|---|---|
| Operating Voltage | 5V |
| Input Voltage (recommended) | 7-12V |
| Input Voltage (limit) | 6-20V |
| Digital I/O Pins | 14 (of which 6 provide PWM output) |
| PWM Digital I/O Pins | 6 |
| Analog Input Pins | 6 |
| DC Current per I/O Pin | 20 mA |
| DC Current for 3.3V Pin | 50 mA |

**Converter methods :**

The converter has two preset methods, they are the “Set” method and the “Info” method. The info method is responsible for bringing the converter information while the set method allows us to modify it.

To use the info method, you must enter the following URL from a browser:
**http://[IP]/info**
The IP is configured as the source IP. This will return the configuration of the board, for example:

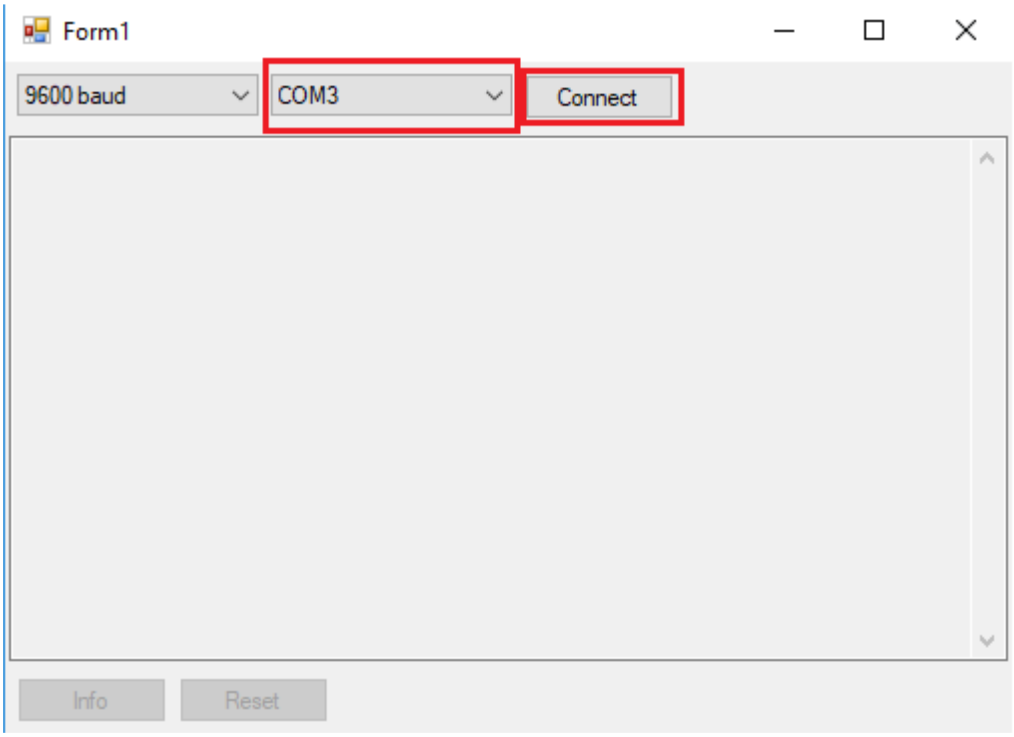
- MAC=de:ad:be:ef:fe:ed
- IP=192.168.1.254
- RIP=255.255.255.255
- GTW=192.168.1.1
- MASK=255.255.255.0
- WNG=26,13,0,13,13

In order to use the set method, the following URL must be entered:
**http://[IP]/set?[parametro]=[valor]**
You Will be able to configure the IP, RIP, Gateway and assign a network mask. In the case of IP, RIP, GTW and MASK they are 4 decimal numbers separated by points. In order for the changes to take effect, the plate must be restarted.

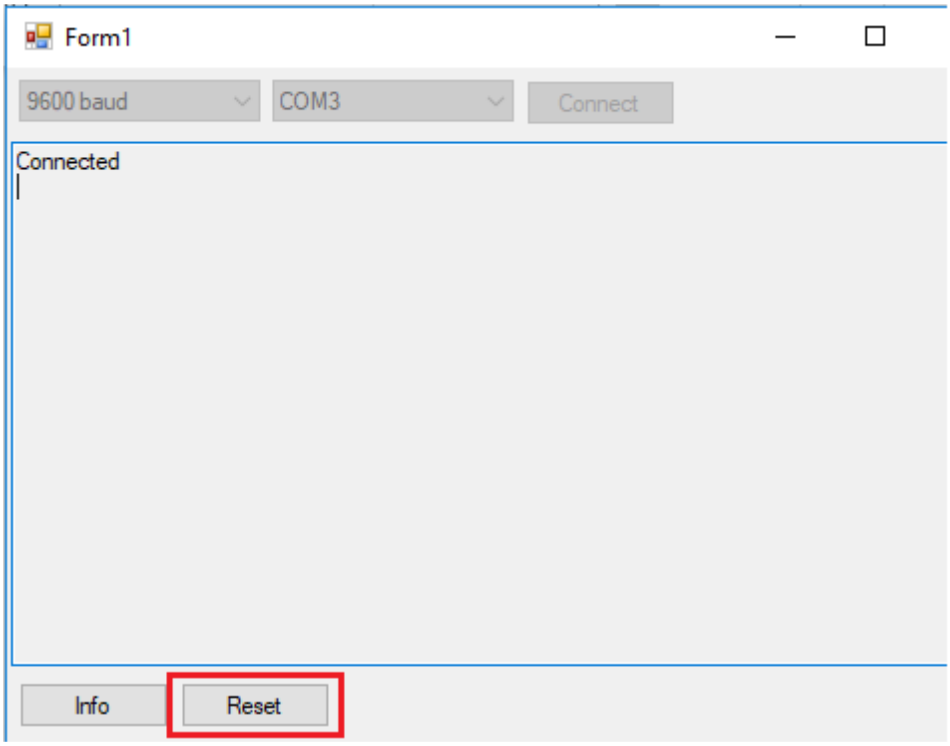
Examples:

- http://192.168.1.254/set?ip=192.168.1.11
- http://192.168.1.254/set?rip=192.168.1.100
- http://192.168.1.254/set?gtw=192.168.1.1
- http://192.168.1.254/set?mask=255.255.255.0

In case the converter breaks and you want to perform a factory reset. You must run AdminConverter.exe, select the COM to which the converter is connected and click on "connect".



You will see a confirmation message telling that the converter is connected and then click on reset.




The converter must be restarted for the changes to take effect.
The default values are:

- MAC = de:ad:be:ef:fe:ed
- IP = 192.168.1.254
- RIP = 255.255.255.255
- GTW = 192.168.1.1
- MASK = 255.255.255.0
- Wiegand bits = 26
- Wiegand even parity bits = 13
- Wiegand even parity bits start= 0
- Wiegand odd parity bits = 13
- Wiegand odd parity bits start= 13