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Home

# Monitoring Machines and Plants with Network Cameras

SIMATIC WinCC V7.4 / SIMATIC WinCC Professional

<https://support.industry.siemens.com/cs/ww/en/view/58074046>

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# 1 Task

## Introduction

From the point of view of production and security, it is very useful for many areas of industry and production plants to monitor the plant by means of a network camera.

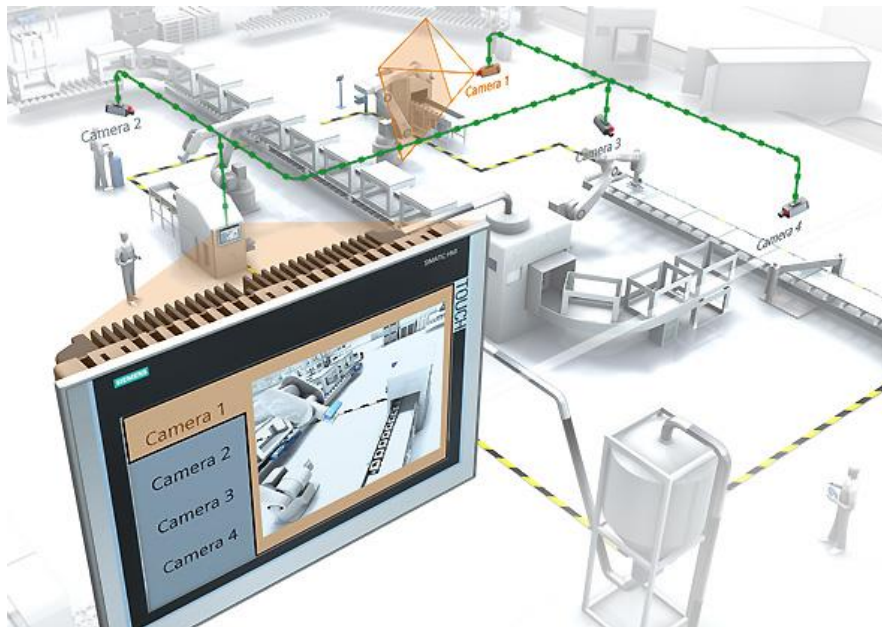
Monitoring via network cameras is especially useful in places where it is difficult for the operator to see the plant or where local conditions require the presence of the operator in the direct vicinity of the machines.

Another application case is the monitoring of several plant parts from one central location. The operator can quickly respond to a possible cause of malfunction and bring the respective tool on the way to the machine to eliminate the fault, e.g. a work piece being jammed in the machine.

## Overview of the automation task

The figure below provides an overview of the automation task:

Figure 1-1



## Description of the automation task

A large plant is monitored by several network cameras.

It shall be possible to monitor each part of the plant by means of a separate Runtime image in WinCC.

The figure shows an example of the setup.

The "images" of different network cameras are to be called via buttons. In the example shown, "plant part 1" is monitored by "camera 1" and output via the HMI operator panel.

## 2 Solution

### Overview

In SIMATIC WinCC und WinCC Professional, the Web Control is available for displaying the camera streams. By means of this camera control, images from a connected network camera can be output.

#### Note

In WinCC V7.4, the control is named "WebBrowser Control".  
In WinCC V14 SP1, the control is named "HTML Browser".

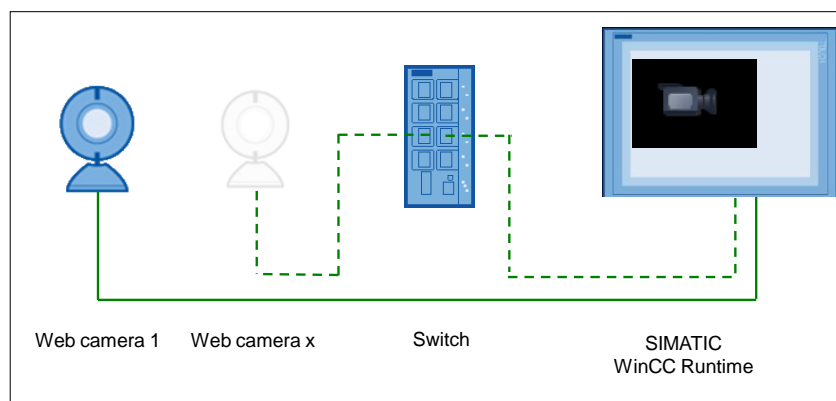
In this document, both are referred to as Web Control.

### 2.1 Solution overview

#### Schematic layout

The figure below shows a schematic overview of the most important components of the solution:

Figure 2-1



- Network camera
- Switch (optional)
- SIMATIC WinCC or WinCC Professional (TIA Portal)

#### Configuration

All network cameras are integrated in an Ethernet network. The switch is used to connect the individual Ethernet nodes to the network (optional).

The camera image is output via WinCC Runtime and the "Web browser" control.

The image of one network camera each can be output via the control.

#### Advantage

The advantage of using a network camera is that this camera can be integrated into a network at any point. Cameras with USB cabling have the disadvantage of not being able to bridge long distances.

### Hardware requirements of the network cameras

The network camera used supports one of the video formats listed below:

- H264
- MPEG4
- MJPEG

In this context, refer to the technical documents of your network camera.

**Note**

It cannot be guaranteed that every network camera available on the market can be used, since the technical prerequisites may differ depending on the manufacturer.

### Advantages

This application offers the following advantages:

- Easy integration of the control to output the camera image in WinCC Runtime.
- The size of the camera image in the Runtime can be freely selected.
- It is possible to use network cameras of different manufacturers.

**Note**

The Web Control is not suitable for positioning purposes. Depending on the camera configuration, delays in image transmission might occur.

### Topics not covered by this application

This application does not include a description of

- the network cameras used with regard to optional setting possibilities. Only settings that are relevant for this application are described.
- the WinCC version used. This document describes only the steps necessary for the application.

### Assumed knowledge

Basic knowledge on how to work with and how to operate SIMATIC WinCC and the camera used is assumed.

## 2.2 Hardware and software components

The application has been created using the following components:

### Hardware components

Table 2-1

Component	Qty	Article number	Note
Computer	1		
Scalance X208	1	6GK5208-0BA10-2AA3	The use of a “switch” is optional. The network camera can also be directly connected to the PC.

### Standard software components

Table 2-2

Component	Qty	Article number	Note
SIMATIC WinCC V7.4 SP1	1	6AV63.1-....7-4...	
SIMATIC WinCC Professional V14 SP1	1	6AV2103-0AA04-0AA5	
Network camera configuration software			By default, most network cameras have a web interface via which the camera can be configured. Alternatively: Some network camera manufacturers provide proprietary software for the configuration of their cameras. For this purpose, refer to the information provided by the manufacturer.

## Network cameras

The following cameras have been tested when creating this application example:

- Axis P1365 Mk II
- ABUS IR HD 720p
- TRENDnet TV-IP310PI
- LevelOne FCS-5059
- D-Link DCS-7513
- AXIS 207MW
- TP-Link TL-SC3171G

The table below shows an overview of which camera can display a live stream with which software / Web Control.

Table 2-3

Camera	WinCC V7.4	WinCC V7.4 SP1	WinCC Professional V14	WinCC Professional V14 SP1
AXIS P1365 Mk II	Yes	Yes	Yes	Yes
TRENDnet TV-IP310PI	Yes	Yes	Yes	Yes
Levelone FCS-5059	Yes	Yes	Yes	Yes
D-Link DCS-7513	No	No	No	No
ABUS IR HD 720p	Yes	No	Yes	Yes
AXIS 207MW	Yes	Yes	Yes	Yes
TP-Link TL-SC3171G	Yes	Yes	No	Yes

Yes = live stream with camera plugin in RT is possible

No = live stream with camera plugin in RT is not possible



## 3 Configuration and Settings

### 3.1 Preparatory measures for configuration

#### IP address used

Before you start with the configuration, determine the IP addresses of the individual hardware components.

The following table lists the IP address used for the application.

Table 3-1

Device	IP address / subnet
Network camera TRENDDnet TV-IP310PI	172.16.39.67 255.255.0.0

#### Passwords used for the cameras

In order to make settings via the web browser of the network cameras, you usually have to be registered.

If the password or the IP address of the camera is not known, the network camera has to be reset to factory settings. For this purpose, refer to the manual of the respective network camera.

**Note**

Before commissioning, change the manufacturer-specific password.

### 3.2 Configuration examples of different network cameras

In order to achieve the best possible image quality, you usually have to try several settings (making changes in resolution, image rate and bit rate etc.).

A general recommendation cannot be given here. Also refer to the information given in the manufacturer's manual for this purpose.

**Note**

The cameras used have not been specifically tested for the system. They have only been successfully used with the Web Control and serve as a reference point for camera selection.

Please note that displaying of the camera image via the Web Control can be delayed. This behavior of the camera depends on the respective manufacturer. For this purpose, refer to the information given in the manual of the camera manufacturer.

#### 3.2.1 Installing the software for operating the AXIS P1365 Mk II webcam

Download the "AXIS Media Control" software from the website of the webcam manufacturer in order to be able to display the live stream of the webcam via the Internet Explorer or the "HTML browser" control. Install the software on the configuration computer.

The "AXIS Camera Management" software is required for the first commissioning of the webcam, but also for service purposes. You can download the tool from the manufacturer's website.

<https://www.axis.com/de/en/products/axis-camera-management>

#### 3.2.2 Installing the software for operating the ABUS IR HD 720p webcam

When starting the webcam, you will be prompted to enter a user and a password. After having logged on and having connected to the webcam for the first time, it is checked whether the ActiveX control element is installed on the system. If it is not installed yet and you are connected to the Internet, you will be directed to a website where you can download the ActiveX control element.

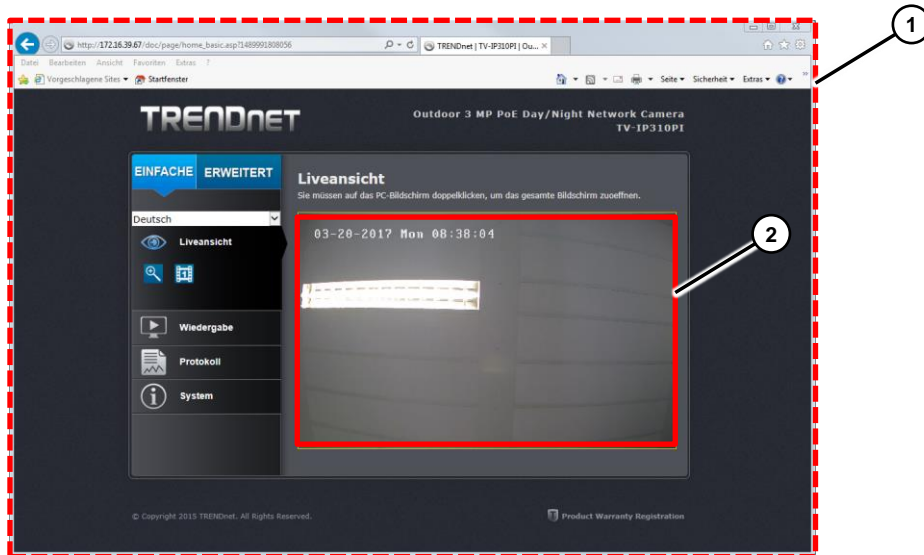
#### 3.2.3 Installing the software for operating the TRENDnet TV-IP310PI webcam

Connecting to the webcam for the first time, it is checked whether the ActiveX control element is installed on the system. If it is not installed yet and you are connected to the Internet, you will be directed to a website where you can download the ActiveX control element.

### 3.3 Configuring a WinCC image with Web Control

This chapter describes how the example project has been configured.

Figure 3-1



- (1) Browser size with menu and settings
- (2) Stream. Only this area is displayed in the screen window.

#### 3.3.1 Web Control default

1. Open a new or an existing WinCC image in the Graphics Designer.
2. Drag the WebBrowser Control into the WinCC image.
3. Enter the URL of your network camera under "MyPage" in the properties of the control.
4. Start Runtime. In Runtime, the menu and the live stream of the camera are displayed as shown in (1).

#### Advantages

- Fast and easy integration of a camera
- Particularly suited for testing and setting the camera
- With WinCC Professional, operation can be disabled in the settings of the control.

#### Disadvantages

- Requires much space with the menu in the WinCC image
- Access to Windows via the camera menu depending on the camera model
- Access to URL

### 3.3.2 Web Control adapted

1. Open a new or an existing WinCC image in the Graphics Designer.
2. Drag the WebBrowser Control into the WinCC image.
3. To ensure that later in Runtime only the live stream of the camera can be seen, the control must be larger than the WinCC image. For the camera from the example project, the sizes are as follows:
  - WinCC image: 640x400
  - WebBrowser Control: 1270x1030To ensure that the stream is visible, change the position of the control in the image as follows:
  - Position X -441
  - Position Y -242
4. Start Runtime. In Runtime, only the live stream of the camera is displayed as shown in (2).

**Note**

The correct position of the Web Control in the smaller WinCC image has been ensured by manually moving and testing in Runtime. The positions have to be determined separately for each camera model.

#### Advantages

- Only live stream in Runtime
- No access to URL or address line
- Double-click the stream to display it in full-screen mode.

#### Disadvantages

- Time-consuming positioning of the control
- Each model requires a new positioning

## 4 Operating the Application

### Overview

The application includes two example configurations for the following products.

- WinCC V7.4 SP1
- WinCC Professional (TIA Portal) V14 SP1

The settings made refer to the following network camera used in the application:

- TRENDnet TV-IP310PI

The purpose of the configuration is to get an idea of how the various settings concerning

- Resolution of the network camera
- Integration of the camera in the Web Control

are displayed in WinCC Runtime.

### Note

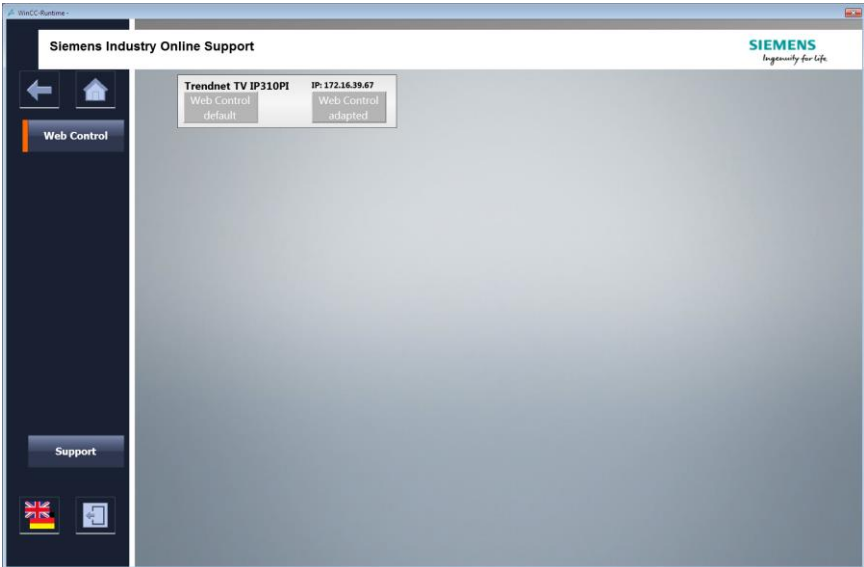
In the example configurations, the Web Control of the camera has been positioned in a screen window in such a way that only the “live stream” is visible in the screen window itself. Menu items such as Settings, Playback, System,... are “hidden”, as they are located outside the “screen window”.

Thus, it is not possible in WinCC to modify settings or to access Windows and other websites via the camera menu.

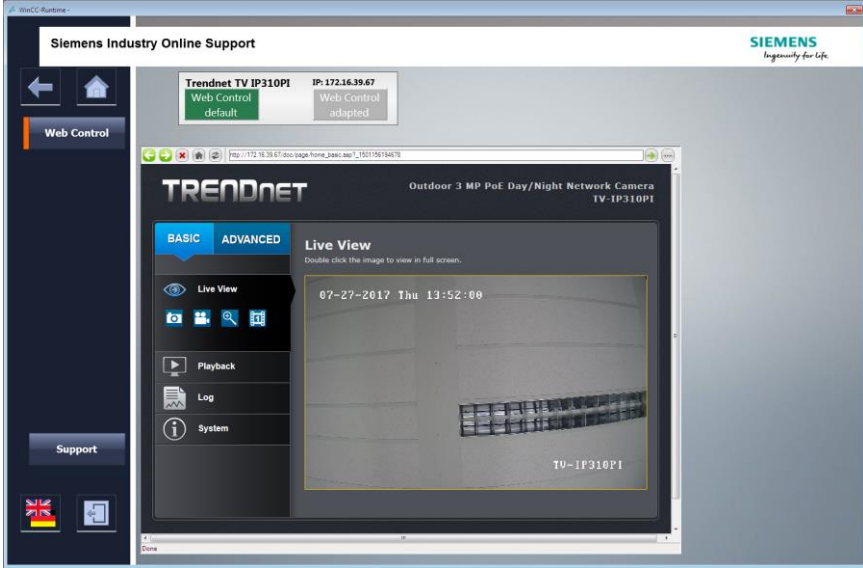

## 4.1 WinCC V7.4 SP1

### Operation

Table 4-1

No.	Action
1.	<p><b>Opening the project</b></p> <p>Unzip the downloaded project “58074046_Demo_WinCC_V74SP1” and open it in the WinCC Explorer.</p>
2.	<p><b>Starting Runtime</b></p> <p>When starting Runtime, the following screen is displayed.</p>  <p>The screenshot shows a web browser window titled "WinCC Runtime". The main content area displays "Siemens Industry Online Support" with the Siemens logo. Below this, there are two columns of information: "Trendnet TV IP310PI" with "Web Control default" and "IP: 172.16.39.67" with "Web Control adapted". A "Web Control" button is visible on the left side, and a "Support" button is at the bottom. There are also flags for the UK and Germany, and a document icon.</p>

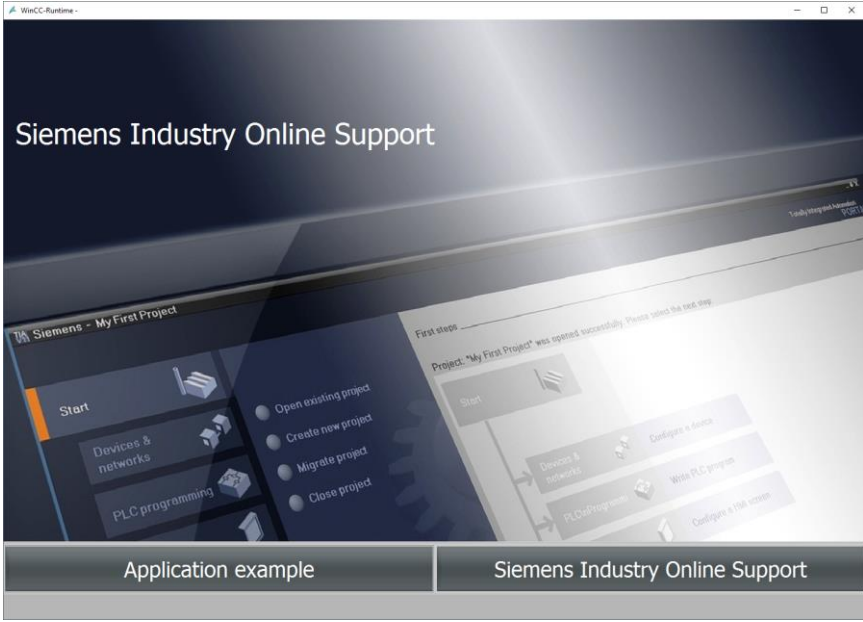



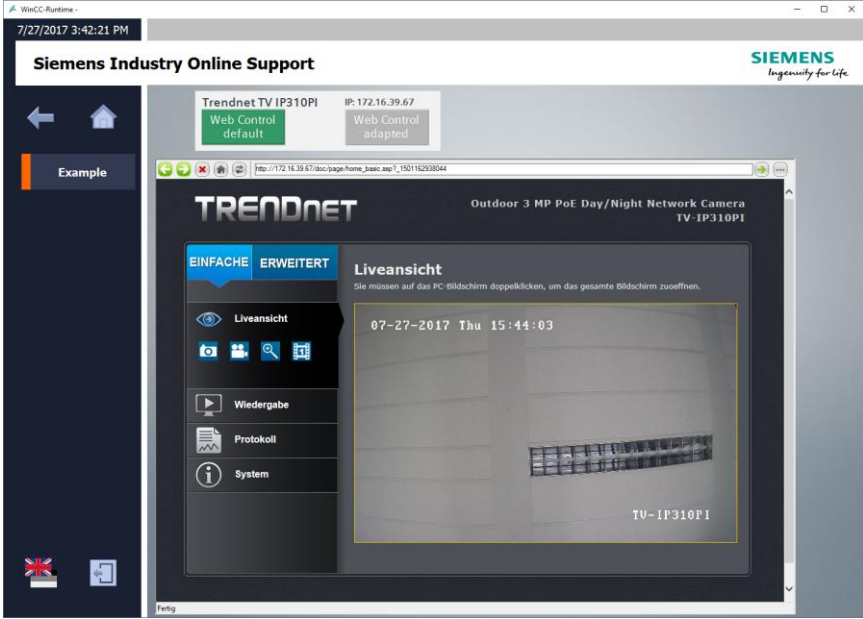
No.	Action
3.	<p><b>Button "Web Control default"</b></p> <p>Click the "Web Control default" button to display the Web Control. In the Web Control, the IP address of the camera is entered as URL. In the control, the live stream and the menu of the camera are displayed.</p> 
4.	<p><b>Button "Web Control adapted"</b></p> <p>Click the "Web Control adapted" button to display the screen window. In this screen window, a Web Control with the URL of the camera is displayed as well. However, the size of the screen window is limited to the size of the live stream of the camera (see above). Thus, only the live stream of the camera is visible.</p> 

## 4.2 WinCC Professional V14 SP1


### Operation

Table 4-2

No.	Action
1.	<p><b>Opening the project</b></p> <p>Unzip the downloaded project "58074046_Demo_WinCC_V14SP1" and open it in the TIA Portal.</p>
2.	<p><b>Starting Runtime</b></p> <p>In TIA Portal, click the "Start simulation" button to start the Runtime.</p>  <p>The screenshot shows the WinCC Runtime window. At the top, it says "Siemens Industry Online Support". Below that, there's a navigation pane on the left with "Start", "Devices &amp; networks", and "PLC programming". The main area displays "First steps" with a message: "Project 'My First Project' was opened successfully. Please select the next step." Below this are several buttons: "Start", "Open existing project", "Create new project", "Migrate project", and "Close project". At the bottom of the screenshot, there are two labels: "Application example" and "Siemens Industry Online Support".</p>

No.	Action
3.	<p><b>Application example</b></p> <p>Click the "Application Example" button to display the following image.</p> 
4.	<p><b>Button "Web Control default"</b></p> <p>Click the "Web Control default" button to display the Web Control. In the Web Control, the IP address of the camera is entered as URL. In the control, the live stream and the menu of the camera are displayed.</p> 

## 4 Operating the Application

No.	Action
5.	<p><b>Button "Web Control adapted"</b></p> <p>Click the "Web Control adapted" button to display the screen window. In this screen window, a Web Control with the URL of the camera is displayed as well. However, the size of the screen window is limited to the size of the live stream of the camera (see above). Thus, only the live stream of the camera is visible.</p> 

## 5 General Notes

**Note**

For more information concerning resolution, settings, screen mode etc., please refer to the following application example:  
Monitoring Machines and Plants with Network Cameras and SIMATIC HMI Comfort Panels  
<https://support.industry.siemens.com/cs/ww/en/view/62383298>

### Passwords used

The password used or the URL for the output of the image of the network camera is stored unencrypted in the configuration files of the operator panel and on the configuration PC.

Due to the openness of the password, no default password or no password for high access levels should be used (RT Admin, administrator of Windows domain, admin password of the camera etc.).

The password used should only entitle to watch the live stream.

### Modifying settings of the network camera

If you make any changes to the settings of the network camera, you should disconnect the network connection between the network camera and the operator panel before. Depending on the network camera used, otherwise undefined states for the output of the camera image might occur.

### Bad image quality / update

If updating of the image is too slow, try to increase the frame rate (fps) of the network camera.

If the image tends to have "clusters" (large pixels / bad color gradient), try to increase the "bit rate" (kbit/s).

Try several settings in order to determine the best possible image quality.

**Note:**

A slight delay cannot be avoided when displaying the camera image via the WinCC Runtime.

If you change the resolution, only a section of the image is displayed.

### Interruption of the Ethernet connection

If the connection between the network camera and the operator panel is interrupted during operation, the image of the camera will be output as a still image via the Web Control.

**No** message will be output announcing that the connection has been interrupted!

If the connection between the network camera and the Runtime is re-established, the image displayed in the Runtime will be updated automatically.

### Interruption of the power supply

If the power supply of the network camera is interrupted during operation, the image of the camera will be output in black via the Web Control.

**No** message will be output announcing that the power supply of the network camera has failed!

If the power supply is restored within a period of approx. 15 minutes, the image displayed on the operator panel will be updated automatically.

If the power supply is not restored within 15 minutes, the screen with the VLC control has to be updated by calling the image again.

### Connection monitoring / voltage monitoring

Some network cameras are provided with configurable outputs via which certain signals/modes of the camera can be output. For this, refer to the information given in the manufacturer's manuals.

### Alternative VLC players

#### NOTE

Install the 32-bit version of the VLC player to integrate the VLC ActiveX control into WinCC.

After installation of the VLC player, you can add the VLC control to your WinCC screen and connect it to the stream of the camera.

To do this, enter the URL of the network camera in the WinCC interface of the WinCC Control under "MRL" in the following scheme.

*Protocol :/username:password@IP\_adress\_camera:por /videostream*

**example** (TP-Link TL-SC3171G Kamera):

**http://admin:admin@192.168.1.136:80/video.mp4**

**rtsp://admin:admin@192.168.1.136:554/video.mp4**

#### NOTE

The specification of user name and password in the "MRL path" is required for the VLC ActiveX plugin in WinCC.

Statically assign the "MRL path" to the WinCC interface, a dynamic assignment via a WinCC tag is not permitted.

### Precautions

The functions and solutions described in this entry are mainly limited to the realization of the automation task. Please take into account furthermore that corresponding protective measures have to be taken in the context of Industrial Security when connecting your equipment to other parts of the plant, the enterprise network or the Internet. Further information can be found in entry ID 50203404.

<https://support.industry.siemens.com/cs/ww/en/view/50203404>



## 6 Appendix

### 6.1 Service and support

#### Industry Online Support

Do you have any questions or need assistance?

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The Industry Online Support is the central address for information about our products, solutions and services.

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- Retrofitting and modernization services
- Service programs and contracts

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[support.industry.siemens.com/cs/sc](https://support.industry.siemens.com/cs/sc)

#### Industry Online Support app

You will receive optimum support wherever you are with the "Siemens Industry Online Support" app. The app is available for iOS and Android:

[support.industry.siemens.com/cs/ww/en/sc/2067](https://support.industry.siemens.com/cs/ww/en/sc/2067)

## 6.2 Industry Mall



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[mall.industry.siemens.com](https://mall.industry.siemens.com)

## 6.3 Links & Literature

Table 6-1

	Topic
\1\	Siemens Industry Online Support <a href="https://support.industry.siemens.com">https://support.industry.siemens.com</a>
\2\	Download page of the entry <a href="https://support.industry.siemens.com/cs/ww/en/view/58074046">https://support.industry.siemens.com/cs/ww/en/view/58074046</a>
\3\	VLC player (32 bit) <a href="http://www.videolan.org/index.es.html">http://www.videolan.org/index.es.html</a>
\4\	Axis camera <a href="https://www.axis.com/de/en/products/axis-camera-management">https://www.axis.com/de/en/products/axis-camera-management</a>
\5\	ABUS IR HD 720p <a href="https://www.abus.com/ger/Archiv/Videoueberwachung/Ueberwachungskameras/IR-HD-720p-Netzwerk-Aussen-Kamera">https://www.abus.com/ger/Archiv/Videoueberwachung/Ueberwachungskameras/IR-HD-720p-Netzwerk-Aussen-Kamera</a>
\6\	TRENDnet TV IP 310P <a href="https://www.trendnet.com/langge/products/ip-cameras/tv-ip310pi">https://www.trendnet.com/langge/products/ip-cameras/tv-ip310pi</a>
\7\	Level one FCS-5059 <a href="http://de.level1.com/">http://de.level1.com/</a>
\8\	D-Link DCS-7513 <a href="http://www.dlink.com/de/de/support/product/dcs-7513-outdoor-full-hd-wdr-poe-day-night-fixed-bullet-camera-with-ir-led">http://www.dlink.com/de/de/support/product/dcs-7513-outdoor-full-hd-wdr-poe-day-night-fixed-bullet-camera-with-ir-led</a>
\9\	AXIS 207MW <a href="https://www.axis.com/de/en/products/axis-207mw">https://www.axis.com/de/en/products/axis-207mw</a>
\10\	TP-Link TL-SC3171G <a href="http://www.tp-link.de/download/TL-SC3171G_V1.html">http://www.tp-link.de/download/TL-SC3171G_V1.html</a>
\11\	Monitoring Machines and Plants with Network Cameras and SIMATIC HMI Comfort Panels <a href="https://support.industry.siemens.com/cs/ww/en/view/62383298">https://support.industry.siemens.com/cs/ww/en/view/62383298</a>

## 6.4 Change documentation

Table 6-2

Version	Date	Modifications
V1.0	06/2012	First version
V2.0	09/2017	Revision for WinCC V7.4 SP1 and WinCC Professional V14 SP1
V2.0	10/2022	Adaption VLC