

WAGO I/O SYSTEM

Connect Ethernet-Controller to TO-PASS web portal via GPRS-Router 761-520



Application note

A301001, English
Version 1.0.0

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Every conceivable measure has been taken to ensure the correctness and completeness of this documentation. However, as errors can never be fully excluded we would appreciate any information or ideas at any time.

We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally trademark or patent protected.

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1 Important comments

To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanation is carefully read and adhered to.

1.1 Legal principles

1.1.1 Copyright

This manual is copyrighted, together with all figures and illustrations contained therein. Any use of this manual which infringes the copyright provisions stipulated herein, is not permitted. Reproduction, translation and electronic and photo-technical archiving and amendments require the written consent of WAGO Kontakttechnik GmbH & Co. KG. Non-observance will entail the right of claims for damages.

1.1.2 Personnel qualification

The use of the product detailed in this manual is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. WAGO Kontakttechnik GmbH & Co. KG declines all liability resulting from improper action and damage to WAGO products and third party products due to non-observance of the information contained in this manual.

1.1.3 Intended use

For each individual application, the components supplied are to work with a dedicated hardware and software configuration. Modifications are only admitted within the framework of the possibilities documented in the manuals. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG.







Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.

1.2 Range of validity

This application note is based on the stated hardware and software of the specific manufacturer as well as the correspondent documentation. This application note is therefore only valid for the described installation.

New hardware and software versions may need to be handled differently. Please note the detailed description in the specific manuals.

1.3 Symbols

	Danger Always observe this information to protect persons from injury.
	Warning Always observe this information to prevent damage to the device.
	Attention Marginal conditions must always be observed to ensure smooth operation.
	ESD (Electrostatic Discharge) Warning of damage to the components by electrostatic discharge. Observe the precautionary measure for handling components at risk.
	Note Routines or advice for efficient use of the device and software optimisation.
	More information References to additional literature, manuals, data sheets and INTERNET pages

2 Description

2.1 General

This application note describes how to transfer data from a WAGO Ethernet Controller to a TO-PASS database by using the TO-PASS GPRS-Router 761-520.

The focus of this application note points to the configuration of the TO-PASS GPRS-Router and the programming of the WAGO Ethernet Controller for using it as a TO-PASS client.



To evaluate the data you have two options:

One option is to use the sample database www.to-pass.com. It is described in the manual m07610701000. The second way is to create your own database. This option is described in the application note a301100.

2.2 Required material

Manufacturer	Part-No.	Description
WAGO	761-520	TO-PASS GSM-Router
WAGO	750-871/-841	WAGO Ethernet Controller
		Ethernet cable RJ45
		PC with CoDeSys and WAGO Ethernet Settings
		GPRS-enabled SIM card

2.3 Applications and libraries

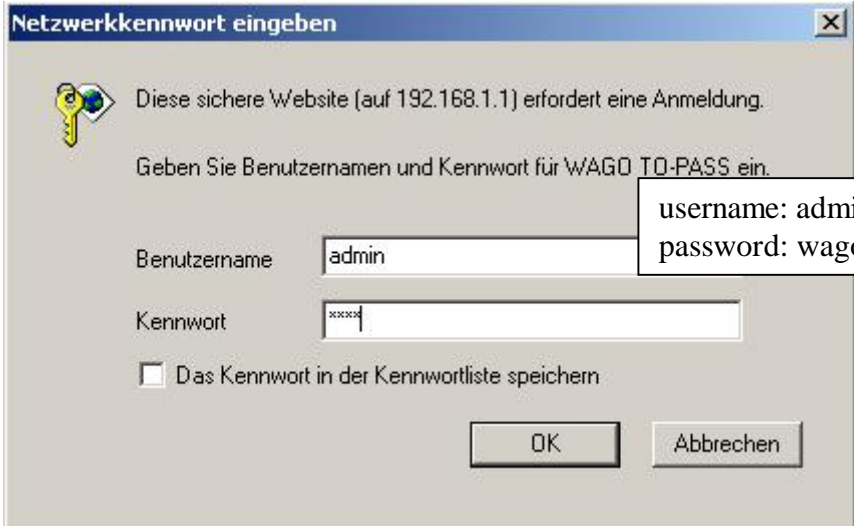
Name	Description
WagoLibToPass_01.lib	Library to use a Ethernet controller as a TO-PASS client
WagoLibEthernet_01.lib	“WagoLibToPass_01.lib” includes functions of this Library.
SysLibSockets.lib	“WagoLibToPass_01.lib” includes functions of this Library.
SysLibTime.lib	“WagoLibToPass_01.lib” includes functions of this Library.
SysLibRTC.lib	“WagoLibToPass_01.lib” includes functions of this Library.
761_520_ToPassClient_Example.pro	Example application including a visualisation

3 Configure router

Important: At the first start of the appliance do not put the SIM card into the Router. Otherwise the SIM card could be blocked by using the wrong PIN. If the PIN of your SIM card is deactivated, you can put it into the appliance directly.

To enter the configuration menu of the router, your pc has to be connected with the routers local network. Start the configuration menu by writing the IP address (192.168.1.1) of the router into the address line of your web-browser.

To enter the configuration menu type: <https://192.168.1.1>



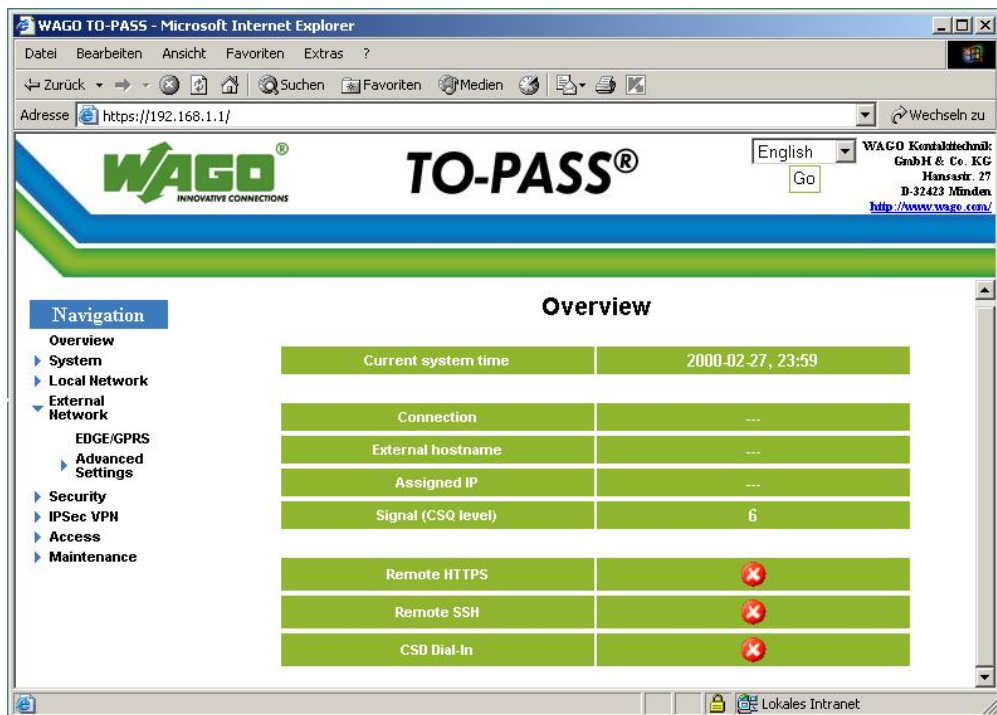
The screenshot shows a web browser dialog box titled "Netzwerkkenwort eingeben". The dialog contains the following text and fields:

- A warning icon (key) and text: "Diese sichere Website (auf 192.168.1.1) erfordert eine Anmeldung."
- Text: "Geben Sie Benutzernamen und Kennwort für WAGO TO-PASS ein."
- A text input field labeled "Benutzername" containing the text "admin".
- A text input field labeled "Kennwort" containing masked characters "xxxxx".
- A checkbox labeled "Das Kennwort in der Kennwortliste speichern" which is currently unchecked.
- Two buttons at the bottom: "OK" and "Abbrechen".

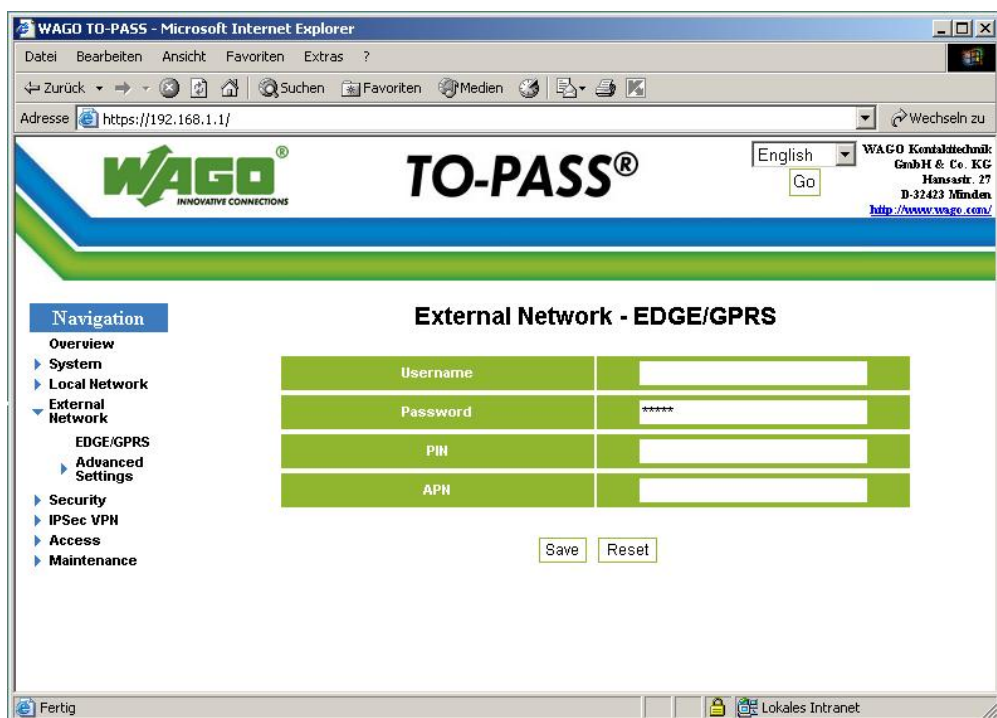
A callout box on the right side of the dialog contains the text: "username: admin" and "password: wago".

Later you can change username and password in the configuration menu at point "Access" → "Password".

After registering, you are in the summary window of your router.

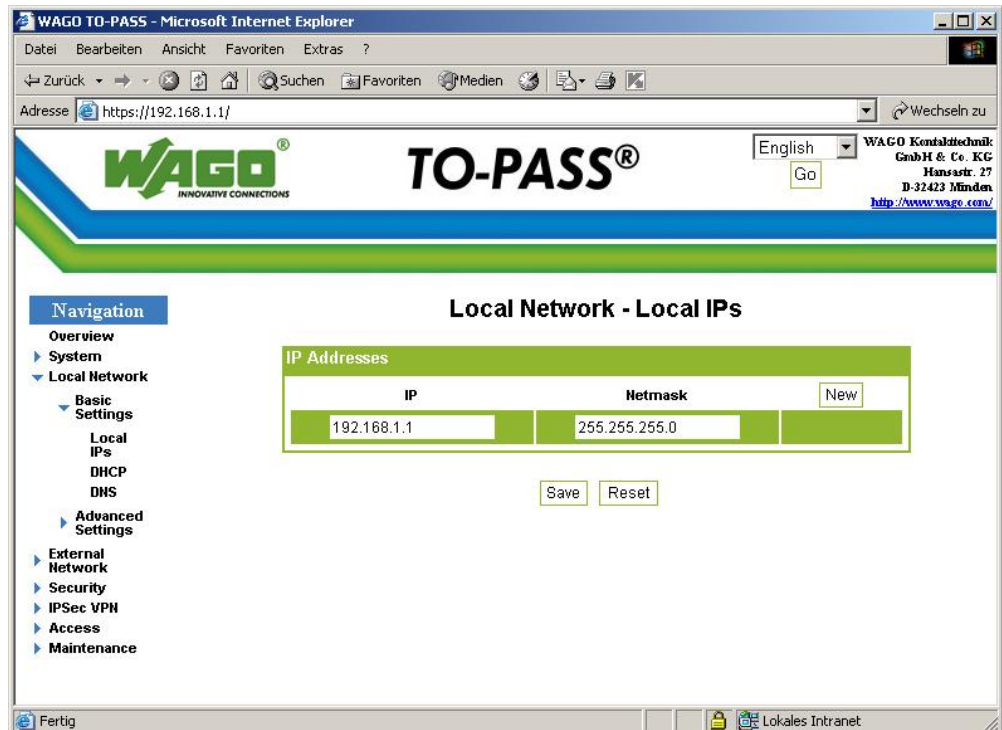


For the moment, no connection is available. If you use a SIM card with activated PIN, enter the PIN at the point “External Network” → “EDGE/GPRS”. Afterwards you have to restart the router to put the SIM card into the device. If the PIN of the used SIM card is deactivated, you can skip these steps.



3.1 Local Network

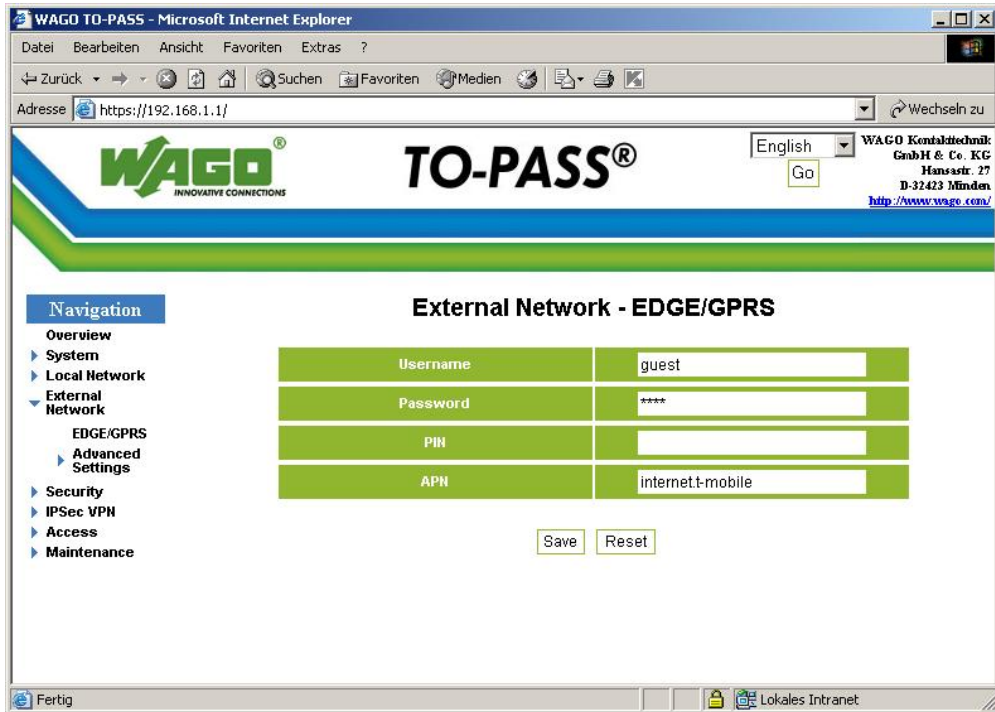
Under the point “Local Network” → “Basic Settings” → “Local IPs” you have the possibility to change the internal IP and the subnet mask of the router. You can define additional IPs under which the router is available in the local network.



The router is able to work as a DHCP-server to assign addresses automatically. This function is disabled in the described application. Therefore the other network devices of the routers local network (PC and WAGO Ethernet Controller) have constant IP-addresses.

3.2 External Network

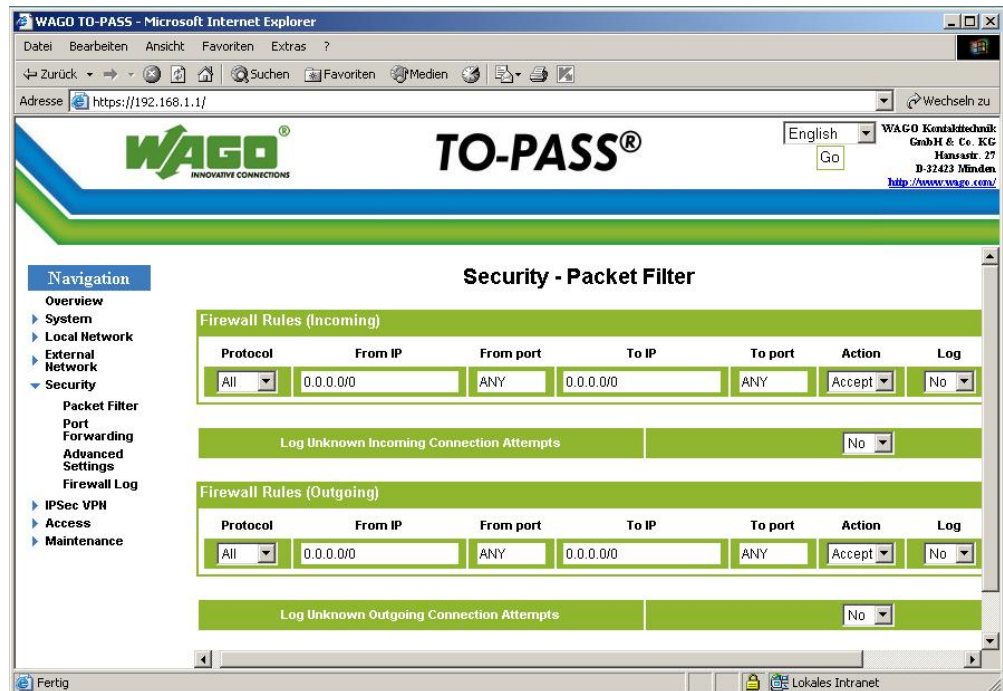
Under “External Network” → “EDGE/GPRS” you must enter the credentials of your SIM-card provider. These include username, password, PIN (already set) and APN (Access Point Name). The APN is the gateway from the GPRS-Network to the World Wide Web.



Examples for provider settings	
Username	Most providers don't use a username. In this case use "guest" as username.
Password	T-Mobile: T-D1 Vodafone: d2
APN	T-Mobile: internet.t-mobile Vodafone: web.vodafone.de

3.3 Security

Under “Security“ → “Packet Filter“ you can change the firewall-settings of your router.

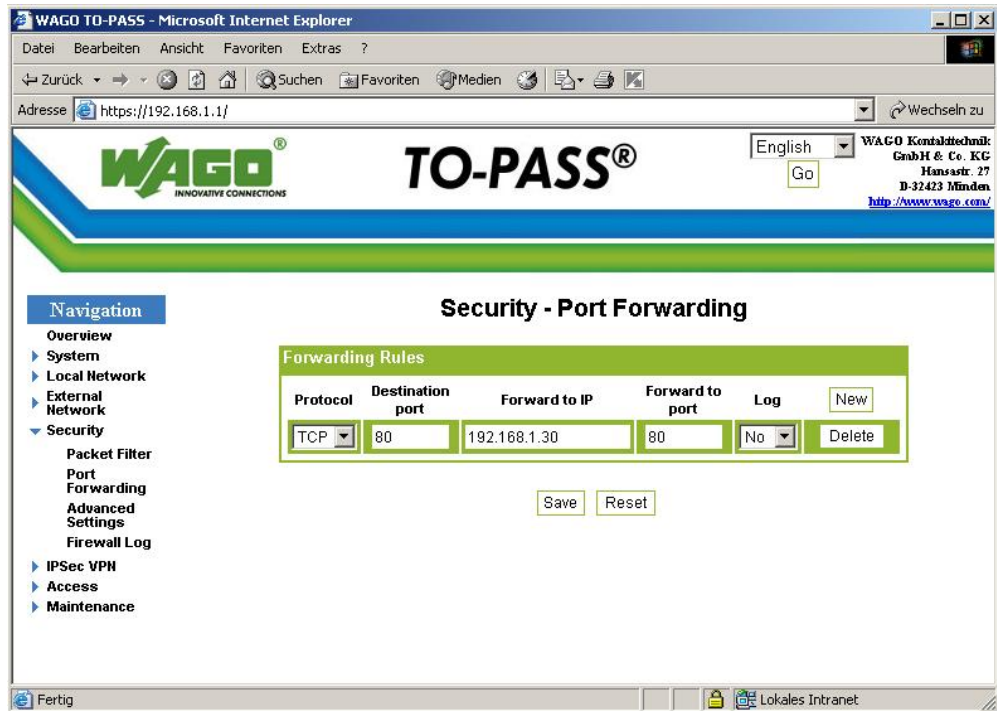


Incoming: With these settings you can set the rules for incoming IP-packets. Data source is the sender of the IP-packets. Aim of data is the IP-address of the local application (Ethernet Controller). If you choose “0.0.0.0/0” and “ANY”, data from any addresses can pass by. The firewall is deactivated.

Outgoing: With these settings you can set the rules for outgoing IP-packets. Data source is the local application. Aim of data is the Web-Portal. If you choose “0.0.0.0/0” and “ANY” data from any addresses can pass by. The firewall is deactivated.

The required ports are described on the next page.

Under point “Security” → “Port Forwarding” you have to decide, on which local network stations (IP, port) which incoming IP-packets will be diverted.



To communicate with a Web-Portal it is necessary to forward port 80 of the incoming data to port 80 of the local application.

3.4 Verifying the connection

To check the GPRS-connection of your router, change to the window “Overview”.

The screenshot shows the WAGO TO-PASS web interface in Microsoft Internet Explorer. The address bar shows <https://192.168.1.1/>. The page title is "WAGO TO-PASS - Microsoft Internet Explorer". The main content area is titled "Overview" and contains the following information:

Current system time	2000-02-27, 23:57
Connection	EDGE
External hostname	---
Assigned IP	172.22.19.0
Signal (CSQ level)	6
Remote HTTPS	✘
Remote SSH	✘
CSD Dial-In	✘

The navigation menu on the left includes: Overview, System, Local Network, External Network, Security (with sub-items: Packet Filter, Port Forwarding, Advanced Settings, Firewall Log), IPsec VPH, Access, and Maintenance.

The value “CSD Dial-In” should be greater than 11. In addition you can check the IP of your router in the external network.

4 Configure TO-PASS Client

4.1 TCP/IP preferences of the Ethernet Controller

Connect your PC and the Ethernet Controller via the programming interface of the Ethernet Controller. To change the necessary settings, open the program WAGO Ethernet Settings.



Now you can set the IP-address and the subnet mask of your Ethernet Controller in accordance with the settings of your local network. To connect to the World Wide Web, the controller uses the router (IP of the router) as gateway and DNS-server. After changing the described settings, save them with **[Write]** into your Ethernet Controller.

Whether the Ethernet Controller is connected with the local network, you can check with a “ping”.

4.2 Ethernet Controller as a TO-PASS Client

With the function block “TOPASS_ClientBasic” of the library “To-PASSLib_01.lib” it is possible to use a WAGO I/O Ethernet Controller as a TO-PASS Client.

Open the application „761-520_ToPassClient_Example.pro“. This example uses the function block which is specified above. The visualization of this application allows you to make all important adjustments.

Program:

The screenshot shows the CoDeSys software interface for a PLC program. The main window displays the following code:

```

0001 PROGRAM PLC_PRG
0002 VAR
0003   TO_PASS_CLIENT: TOPASS_ClientBasic;
0004   sIP: STRING(80) := 'www.to-pass.com';
0005   sSkript: STRING(80) := 'wago/savedataV21.php';
0006   sDeviceID: STRING(80) := 'test_001';
0007   xEnable: BOOL;
0008   xDataAvailable: BOOL;
0009   tIntervall: TIME := t#10m;
0010
0011   arAI: ARRAY [0..7] OF REAL;
0012   axDI: ARRAY [0..7] OF BOOL;
0013   arAnalogSw: ARRAY [0..7] OF REAL;

```

The function block call is shown as follows:

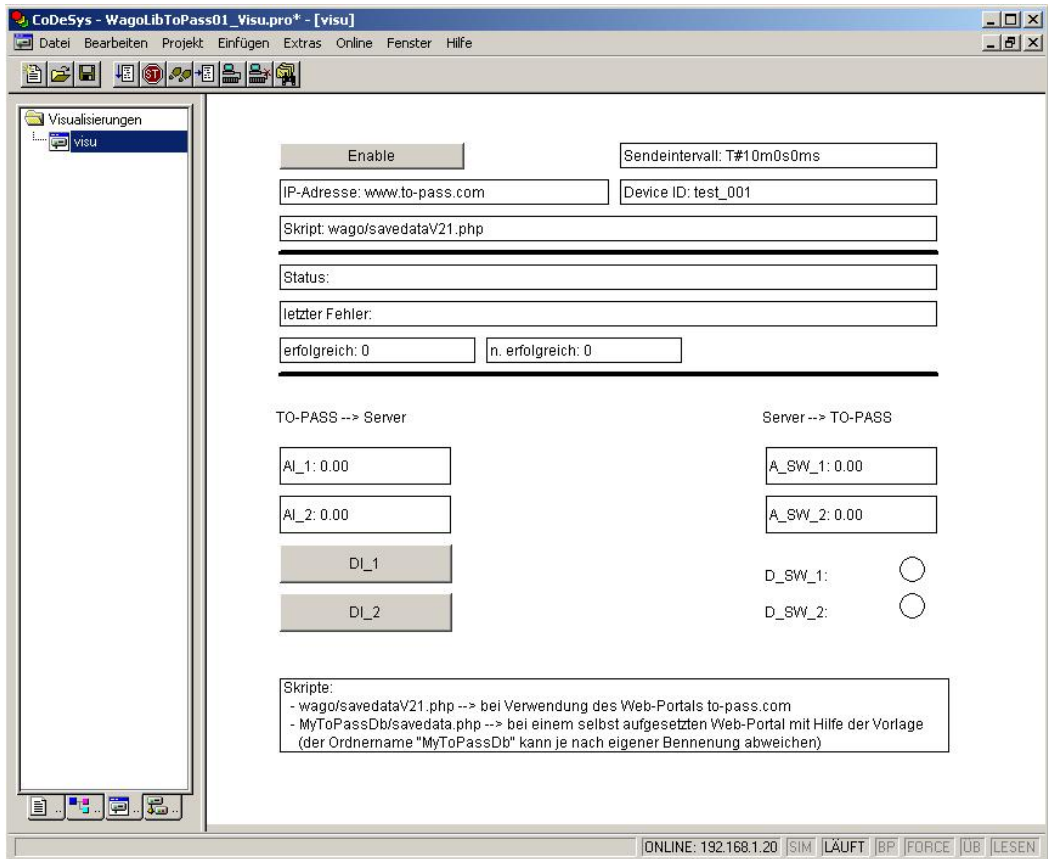
```

0001
      TO_PASS_CLIENT
      TOPASS_ClientBasic
      xEnable-xEnable
      sIP-sServer
      sSkript-sSkript
      sDeviceID-sDeviceID
      tIntervall-tCycleTime
      arAI-arAIValues
      axDI-axDIValues
      axDIAlarmFlags
      awModbusData
      pstTopassBuffer
      xDataAvailable-xResponseDataAvailable
      sStatus
      udiCountSuccess-udiOk
      udiCountFailed-udiNok
      dtLastSuccessful-dtLastOk
      dtLastError-dtLastNok
      dwLastError-dwLastErrorKey
      sLastError-sLastErrorText
      arAOValues-arAnalogSw
      axDOValues-axDigitalSw

```

The function block handles the communication between Ethernet Controller and Web-Portal and provides information about the actual connection.

In the visualization, you can vary two digital and two analog variables of the local application. Furthermore it shows the state of two digital and analog set points from the Web-Portal.



Settings of visualization	
Enable	Enables the function block “TOPASS_ClientBasic”
Sendeintervall	Repeat-interval of transmission
IP-Adresse/URL	Fill in the IP-address or URL of the used Web-Portal. By using the public Web-Portal: www.to-pass.com By using a custom Web-Portal: External IP of the web-servers router.
Device ID	Name of the TO-PASS Client
Skript	Used data script on the Web-Portal: <ul style="list-style-type: none"> - „wago/savedataM15.php“ (public Web-Portal www.to-pass.com without the possibility of using set points) - „wago/savedataV21.php“ (public Web-Portal www.to-pass.com with the possibility of using set points) - By using your own custom Web-Portal look at a301100.



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