USER MANUAL

Z-KEY

MODBUS ETHERNET SERIAL GATEWAY

AND SERIAL DEVICE SERVER

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31/03/2015	01	Added Export tag setup Webserver function, added Seneca discovery and Easy Z-KEY utilities.
08/04/2015	02	Added Glossary. Added Z-modem protocol issue through internet Minor fix
14/07/2015	03	Added support for 7 bits Uarts (from SW004100_105)
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02/10/2018	09	Added Modbus Register -LAST_LOOP_TIME_COM1 -LAST_LOOP_TIME_COM2 In the extended diagnostic

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Seneca Z-KEY

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1. Glossary

- *Modbus RTU*

An open protocol for the serial communications developed by Modicon Inc. (AEG Schneider Automation International S.A.S.). Simple and robust, it has since become a de facto standard communication protocol.

For more info http://www.modbus.org/specs.php

- *MODBUS TCP-IP*

The Modbus RTU protocol with a TCP interface that runs on Ethernet.

For more info http://www.modbus.org/specs.php

- *MODBUS BRIDGE*

A device that translates, in real time, from Modbus TCP-IP ethernet protocol to Modbus RTU serial protocol.

- *MODBUS GATEWAY*

A device that translate Modbus TCP-IP protocol to Modbus RTU protocol using a buffered memory (called shared memory). The shared memory can be accessed by multiple devices through Modbus TCP-IP, Modbus RTU, Webservers etc… but must be configured. The Modbus Gateways are used for speed-up and for simplify a Modbus network.

- *SERIAL DEVICE SERVER (REMOTE COM PORT)*

A device that enables devices with an RS-232, RS-422 or RS-485 serial interface to connect to an IP network. This makes it possible to use Ethernet in place of serial cables, minimizing workstation clutter and also allowing serial devices to be placed far away from the computers with which they are used. A Serial device server is virtually transparent to the serial protocol.

- *MODBUS RTU MASTER-SLAVE*

The Master is connected with one or more slaves, the slave waits for an incoming register(s) request from the master. Only one master is allowed, for overcome this limitation you must use a Modbus gateway.

- *MODBUS TCP-IP CLIENT-SERVER*

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The Client (called Master in Modbus RTU) establishes a connection with the Server (called Slave in Modbus RTU). The Server waits for an incoming connection from the Client. Once a connection is established, the Server then responds to the registers queries from the Client.

- *WEBSERVER*

A software that store, process and deliver web pages to clients. Clients web can be PCs, Smartphones, Tablets with a browser (Chrome, Internet Explorer, Firefox etc…).

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2. Introduction

Z-KEY is a serial device server, a Modbus TCP-IP to Modbus RTU Gateway and a Modbus TCP-IP to Modbus RTU Bridge, into one product.

Two independent serial ports (one RS485 and a RS232/RS485 configurable port), a Fast Ethernet 10-100MBits and an USB port are available.

The USB port can be used also like a communication port supporting the Modbus RTU protocol for configuration purpose.

An internal Webserver is also available for configuration and real time values view, a custom webserver con be loaded into a microSD card (not supplied).

Z-Key is configurable in 5 different modes:

- ***Bridge Modbus TCP-IP to Modbus RTU***
- ***Gateway with shared memory Modbus TCP-IP to Modbus RTU***
- ***Gateway with shared memory Modbus TCP-IP to Modbus RTU (1 port slave and 1 port Master)***
- ***Gateway with shared memory Modbus TCP-IP to Modbus RTU (2 ports slaves)***
- ***Remote Serial COM port***

2.1. Features

- *Fast Ethernet port (10-100 Mbit/s)*
- *Support for Transparent Remote Serial Port, Modbus Gateway, Modbus Bridge*
- *Multiprotocol Gateway, Bridge support: Modbus TCP-IP server protocol (by the fast Ethernet), Modbus RTU master/slave independent configurable on the NR 2 serial ports (NR 1 RS485, and NR 1 RS232/RS485).*
- *Transparent Ethernet to serial connection with Seneca Ethernet to serial driver connection, no protocol dependent.*
- *Internal webserver for complete configuration*
- *Up to 8 simultaneous client Modbus TCP-IP supported (Bridge or Gateway mode)*
- *Up to 10 simultaneous server Modbus TCP-IP supported (Gateway mode)*
- *Gateway mode: up to 500 Modbus TAG (up to 1000 Modbus registers)*
- *Export/Import Tags setup from Webserver*
- *Export/Import Tags setup to Excel™ template*
- *USB port for changing IP address configuration*
- *Customizable embedded Webserver with CGI support on microSD card*
- *Configurable by Webserver or by USB (Easy setup software)*
- *Replica of the Modbus registers on TCP-IP protocol, Modbus RTU*
- *Baud rate for Modbus RTU: from 1200 baud up to 115200 baud*
- *1500 Vac galvanic isolation between power supply and communication*
- *Quick installation on DIN 46277 rail*
- *Removable screw terminals with section of 2.5 mm2*
- *Firmware update by internal Webserver, FTP server or microSD card*

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2.2. General Specification

GENERAL SPECIFICATIONS	
Power supply	19.. 28 Vac (50..60 Hz), 11.. 40Vdc
maximum power consumption	1,2 W
Isolation	1500 Vac
ETHERNET	
Ethernet	10 - 100 Mbit/s
Protocol	Modbus TCP-IP
Max connection length	100 m
Connection	RJ 45 on frontal
RS485 COMMUNICATION PORTS	
Number	2
Port #1	IDC10 connector (Modbus RTU Master or slave port)
Port #2	Screw terminals 10-11-12 (Modbus RTU Master or slave port)
Baudrate	1200..115200 configurable
Baudrate	1200..115200 configurable
ENVIRONMENTAL CONDITIONS	
Temperature	-20 °C.. +50 °C
Humidity	30 ..90% a 40 °C no condensing
Storage temperature	-25..+85 °C
BOX	
Dimensions	100 x 17,5 x 111 mm
Box; protection degree	Black, PA6, IP20
CONNECTORS	
	IDC 10 for Seneca bus Removable terminals, pitch 5,08 mm Micro USB Ethernet RJ45
STANDARDS	
EN 61000-6-4/ 2007	Emission, industrial environmental
EN 61000-6-2/ 2005	Immunity, industrial environmental
EN 61010-1/ 2001	Safety

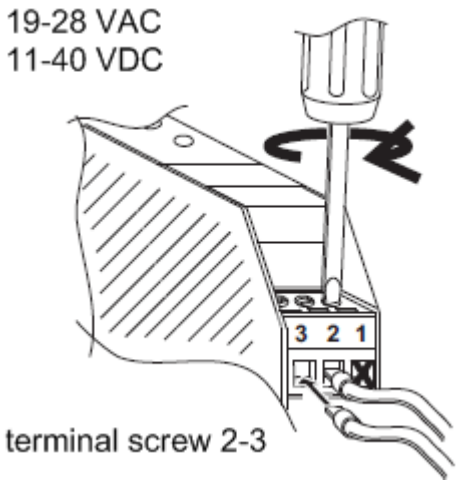
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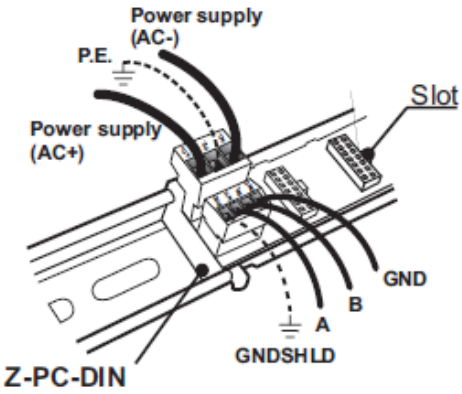
3. Electrical Connections

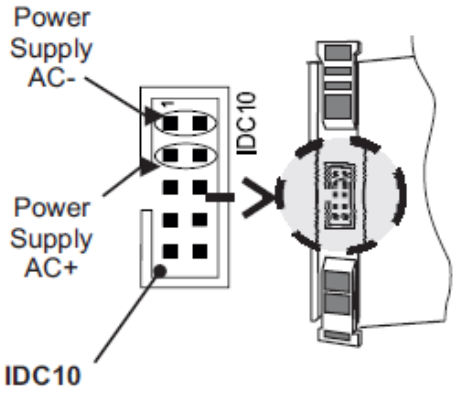
For more info please refer to the Installation manual, downloadable from www.seneca.it in the Z-KEY section.

3.1. Terminal Positions

For power ON Z-KEY, connect the screw terminal 2-3 or use the Seneca BUS for connect the IDC10 connector:







The RS485#1 is available from the IDC10 connector

The RS485/RS232 port #2 is available from the screw terminals 10-11-12:

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RS485	SW2=OFF
10 GND 11 A (+) 12 B (-)	Connection for RS485 communication. Note: the indication of RS485 connection polarity is not standard, it may be inverted on some devices.

RS232	SW2=ON
10 GND 11 RX 12 TX	Connection for RS232 communication. RS232 interface is fully configurable.

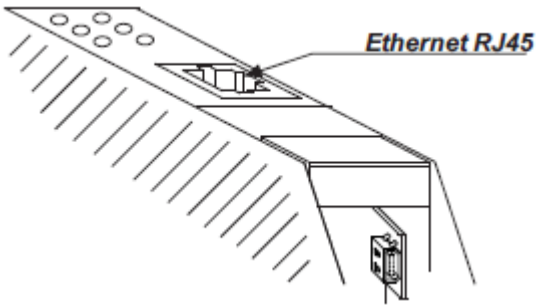
For configure port 2 in RS485 mode set the SW2 to OFF:



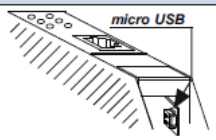
For configure port 2 in RS232 mode set the SW2 to ON:



Note: before to insert the cable into RJ45 connector, remove the protection rubber:

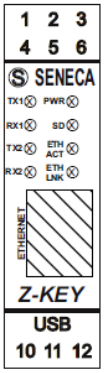


Micro USB port for a PC connection:

micro USB *port (front panel)*	
	USB micro port for an additional serial connection.

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4. Debug Leds



LED	STATE	MEANING
TX1	FLASHING	Data transmission on RS485 port #1
RX1	FLASHING	Data reception on RS485 port #1
TX2	FLASHING	Data transmission on RS485/RS232 port #2
RX2	FLASHING	Data reception on RS485/RS485 port #2
PWR	ON	Z-KEY is POWERED ON
SD	FLASHING	ACCESSING TO THE SD CARD
ETH TRF	FLASHING	Data traffic on Ethernet port
ETH LINK	ON	Ethernet port connected

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5. Default (Factory) Configuration

The default (factory) configuration is:

IP STATIC: 192.168.90.101

Gateway: 192.168.90.1

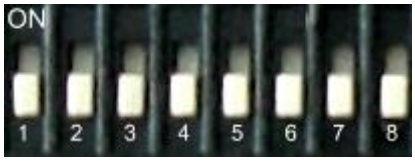
Mode: Modbus RTU Bridge on port 1 and port 2

For return to the default configuration:

1) *Switch off Z-KEY*
2) *Move to "ON" all the dip switched:*



3) *Switch ON Z-KEY*
4) *Wait 10 seconds*
5) *Switch OFF Z-KEY*
6) *Switch OFF all the dip switches:*



Now Z-KEY is loaded with the default configuration.

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6. Ethernet communication

The Z-KEY include a fast Ethernet port (10-100Mbit), the TCP-IP integrated protocol supports:

-Static IP address or DHCP

-Gateway support

-Modbus TCP-IP server protocol (support up to 8 Modbus TCP-IP client at the same time)

-Webserver (with user / password protection)

-FTP server (with user / password protection)

The default configuration for the Ethernet port is:

- *Static IP address 192.168.90.101*
- *Gateway 192.168.90.1*

WARNING!

BEFORE CONNECT Z-KEY ON THE NETWORK BE SURE THAT THE IP ADDRESS 192.168.90.101 IT'S NOT USED BY ANOTHER ETHERNET DEVICE!

WARNING!

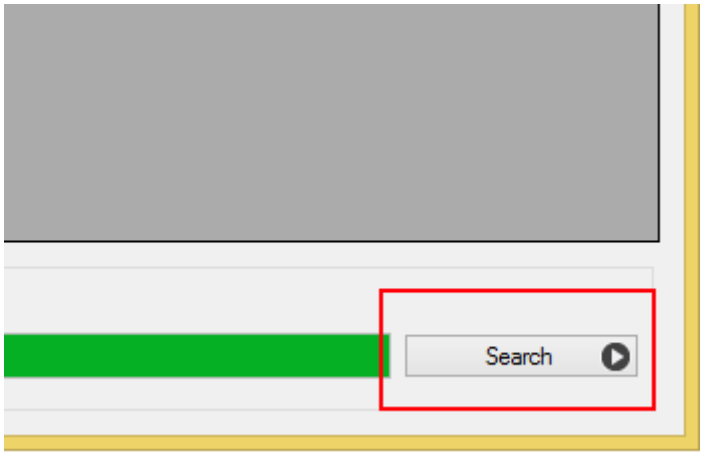
DON'T CONNECT MORE THAN 1 Z-KEY WITH THE DEFAULT IP ADDRESS ON THE NETWORK! IF YOU NEED TO CONNECT MORE THAN ONE Z-KEY IN A NETWORK SIMULTANEOUSLY REFERS TO THE CHAPTER 12.

6.1. Searching Z-KEY devices in a network with the Seneca Discovery Utility

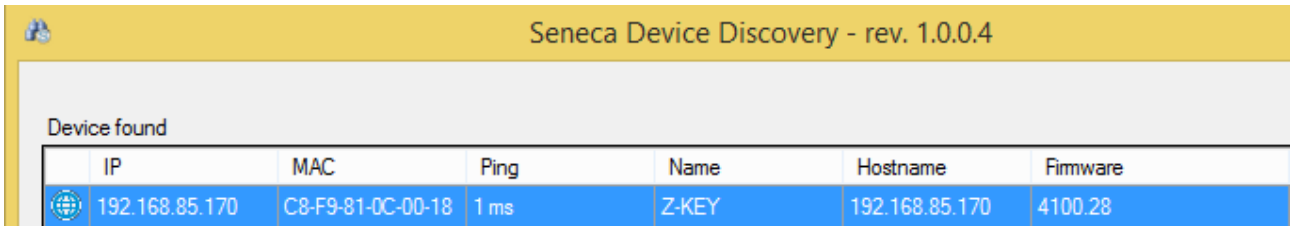
From the seneca website (www.seneca.it) in the Z-KEY section you can freely download the Seneca Discovery Utility for obtain the actual Z-KEYs ip addresses in your network.

Click on Search for start the discovery process:

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A list of devices found will be displayed:



6.2. Changing the IP address from the USB port

From the seneca website (www.seneca.it) in the Z-KEY section you can freely download the Seneca Easy Setup software.

The Z-KEY section launch the EASY Z-KEY Utility for changing or obtaining the Z-KEY actual IP:

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Connect Z-KEY to a PC with a standard micro USB cable, power up the Z-KEY and Click on “TEST” to obtain the actual IP address:

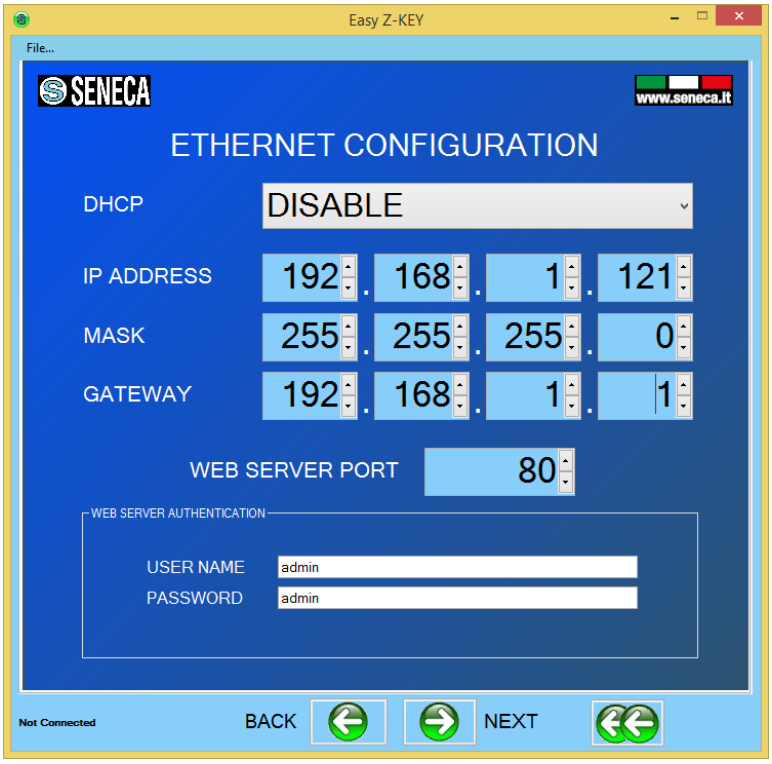


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For changing the actual IP configuration return to the home page and click on “CONFIGURATION”:



Than click on “Automatic Search”, read the configuration from the Z-KEY than modify the actual configuration with the new parameters:



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Then click on “send configuration to Z-KEY” button:



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7. The embedded Webserver

The Z-KEY include a Webserver for setup or for view the real time TAGs value.

For Access to the internal webserver type in a browser:

For firmware revision newer than 119:

http://192.168.90.101

for firmware revision older than 119:

http://192.168.90.101/maintenance/index.html

where 192.168.90.101 is the default ip address.

The webserver can be protected by a user name and a password.

If you are using Internet explorer 9 (or newer) you must enable the compatibility mode (see the arrow below):



The Z-KEY Embedded Webserver works with the following browser:

-Internet explorer

-Firefox

-Chrome

-Android

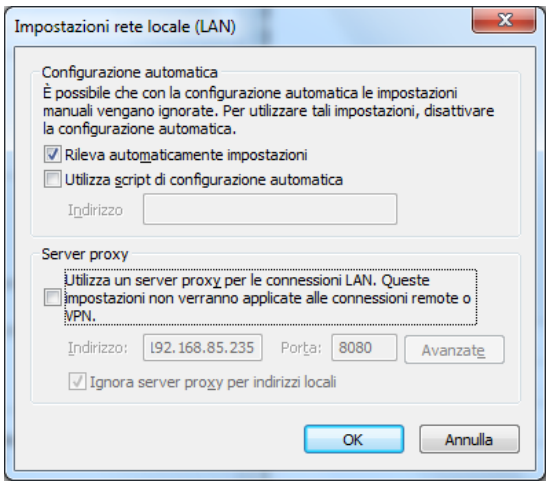
-Iphone/Ipad

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7.1. LAN connection to the webserver

For connect an Ethernet device to the Z-KEY Webserver you must have the two Ip addresses compatible.

Also you must disable the flag on the proxy server configuration into the browser:



For example if the Z-KEY address is 192.168.90.101 with subnet mask 255.255.255.0 the other device must have the ip starting with 192.168.90, so for example 192.168.90.102 can works.

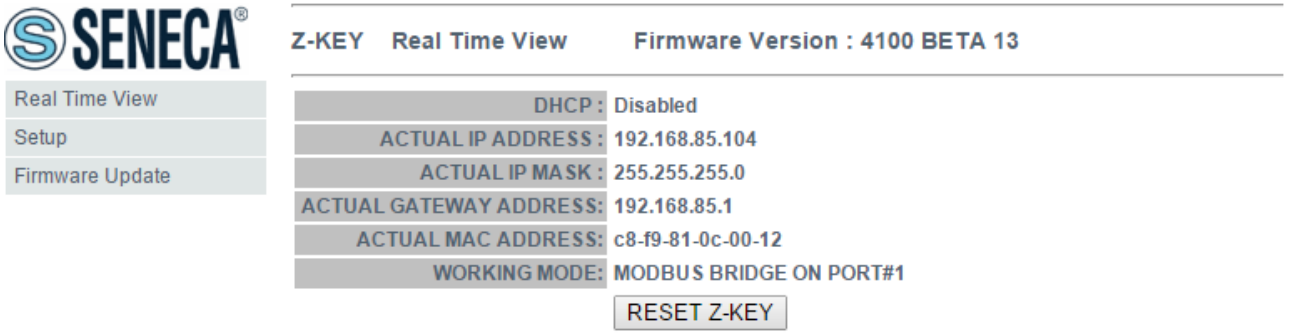
The Z-KEY ethernet device support the auto-switching mode so it's possible to connect an Ethernet device point to point without the need of a Router or Switch.

For connect a WiFi device to the Z-KEY Webserver you need a Wifi access point or a WiFi router, in the case of a WiFi Router into the Z-KEY configuration set the Gateway IP equals to the Router IP.

If the ip configuration it's made correctly the webserver appear:

http://192.168.90.101

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8. Modbus RTU and Modbus TCP-IP protocol

The Modbus protocols supported by the Z-KEY are:

Modbus RTU Master

Modbus RTU Slave

Modbus TCP-IP Server

Modbus TCP-IP Client

for more information about this protocols please refer to Modbus specification website:

http://www.modbus.org/specs.php

For using the USB Port you must install the USB driver first (see chapter 17)

8.1. Modbus function code supported

The following Modbus functions are supported:

Read Coils (function 1)

Read Discrete Inputs (function 2)

Read Holding Register (function 3)

Read Input Registers (function 4)

Write Single Coil (function 5)

Write Single Register (function 6)

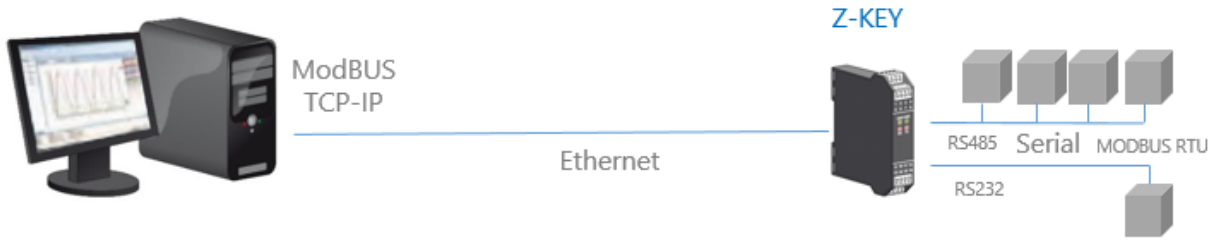
Write Multiple registers (function 16)

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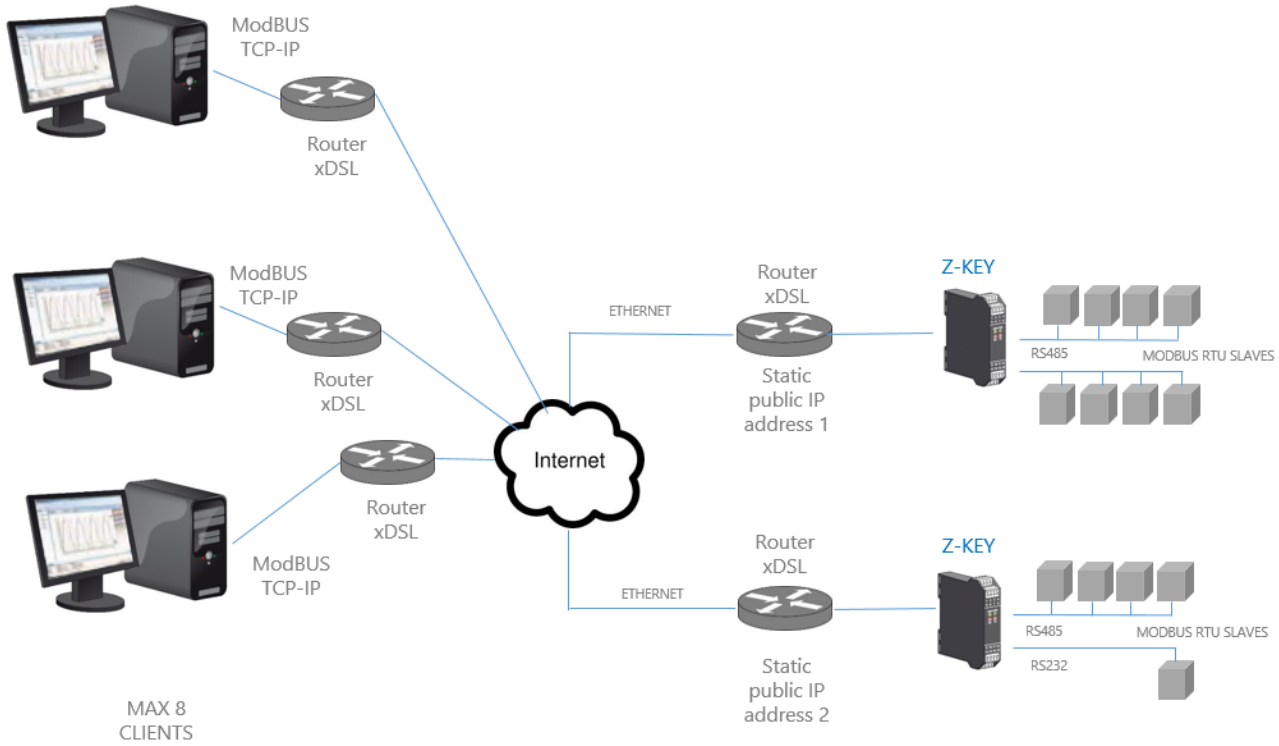
9. Bridge Modbus TCP-IP to Modbus RTU

In this scenario a Modbus TCP-IP master is connected with ethernet to Z-KEY, one or more Modbus RTU slaves (for example the Z-PC Seneca Series) are connected to the RS232/RS485 serial ports.

A typical LAN connection is represented into this figure:



Also a remote communication through internet with multiple clients is possible:



For internet communication the Routers connected to the Z-KEY must have a static ip address (or a DDNS service activated).
A Maximum of 8 simultaneous Modbus TCP-IP clients is supported.

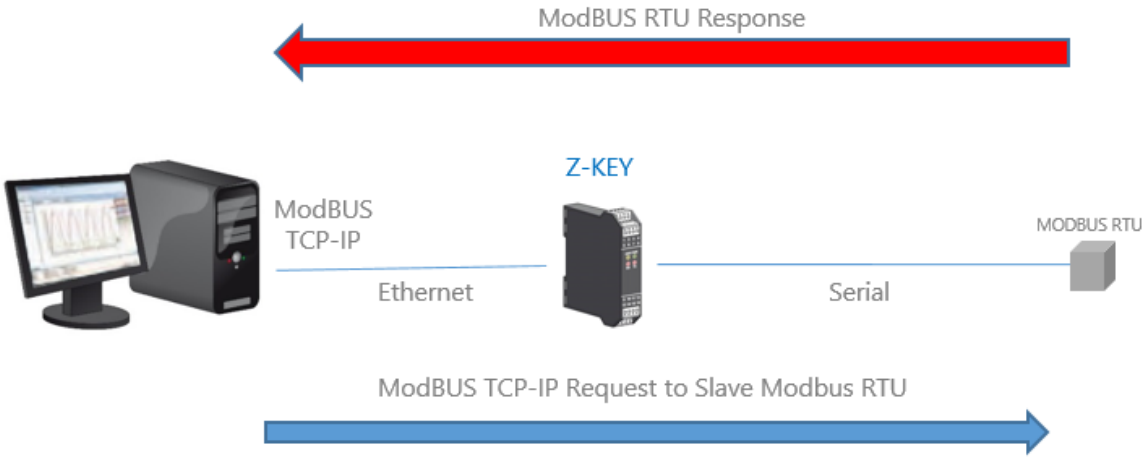
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9.1. How it works

The Bridge Modbus TCP-IP to Modbus RTU is the simplest way to communicate with Modbus RTU slaves by an ethernet connection.

There is no need to configure which registers must be requested because the conversion from Ethernet to serial is executed in real time.

Only the serial configuration must be made (baud rate, parity etc…).



The Master (client) Modbus TCP-IP request a modbus register by ethernet, then the Z-KEY convert the request to the serial Modbus RTU slave, the Modbus RTU response is also retranslated in Modbus TCP to the Master.

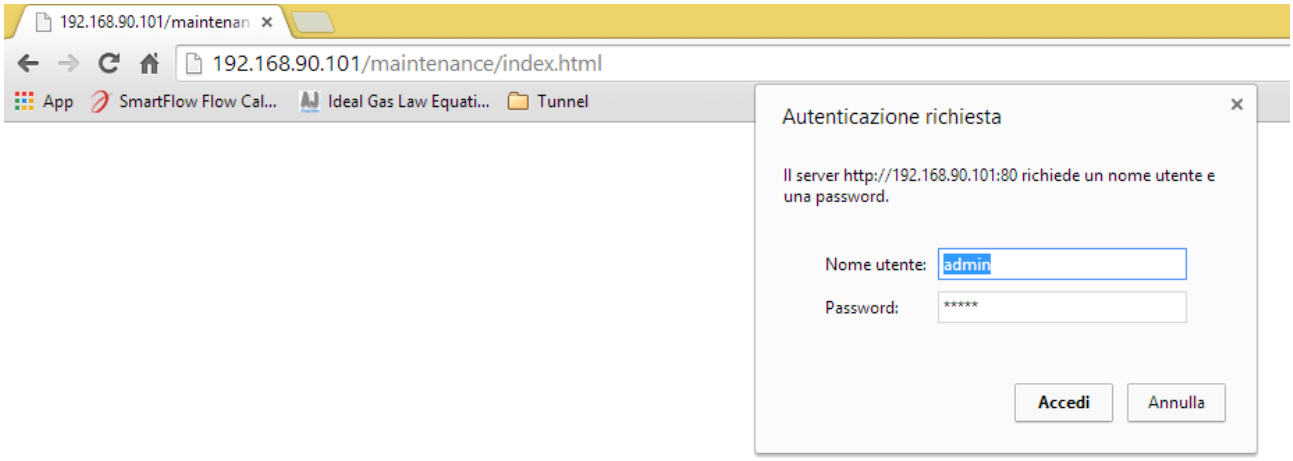
CAUTION!

It's not possible to connect two Modbus RTU slaves with the same Modbus address, if you need to connect 2 Modbus RTU slaves with the same Modbus address (not configurable) you must use 2 Z-KEYs.

9.2. Modbus Bridge Webserver configuration

Connect to the webserver by entering the ip address, by default:

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http://192.168.90.101

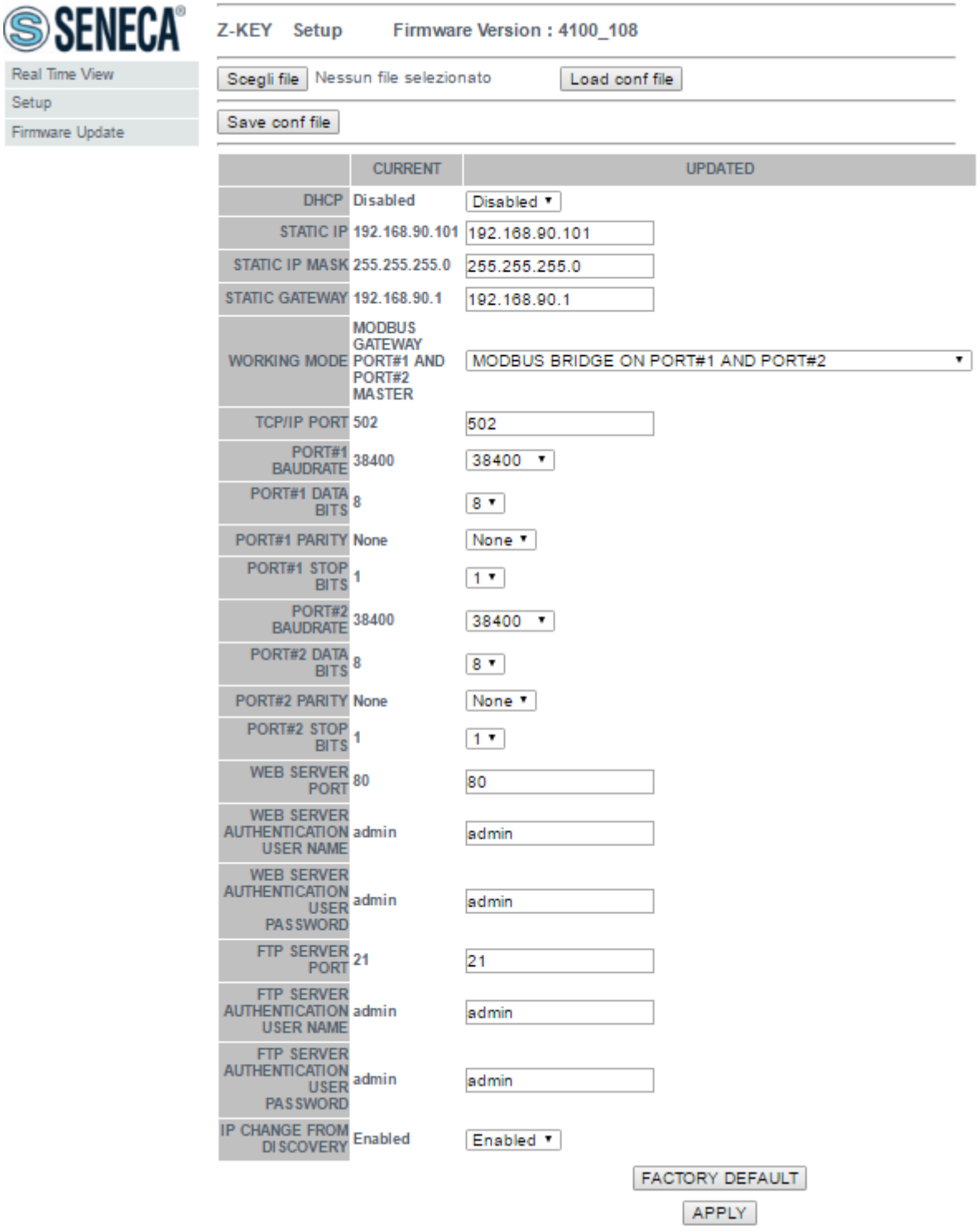
Enter the user name and password, by default:

User: admin

Password: admin

Now the Webserver can be used for configuring the Z-KEY module, all parameters are visible clicking on “Setup” button to the left of the screen:

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On the first column represents the parameter name, the second column (current) it's the current parameter value. The last column can be used for changing the current configuration.

When a configuration it's made you must confirm with "APPLY", then the new configuration became operative.

If you need to reset to the default parameters click on "FACTORY DEFAULT" button.

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The parameters are explained below:

DHCP

Disable: A static Ip address is used

Enable: The IP address, the IP-Mask and the Gateway address are obtained from the DHCP server.

The Z-KEY IP address can be read from the USB port with the Easy Setup test configuration , or with the Seneca Discovery utility (see the Z-KEY section on seneca web site for download).

STATIC IP ADDRESS

Static IP address when DHCP is Disable

STATIC IP MASK

mask when DHCP is Disable

STATIC GATEWAY

Gateway address when DHCP is Disable

WORKING MODE

Select the Modbus Bridge working mode, for Modbus Bridge you can select which serial port use.

Modbus Bridge on port#1: the packets are routed only to serial port 1 (no packets are routed to serial port 2)

Modbus Bridge on port#2: the packets are routed only to serial port 2 (no packets are routed to serial port 1)

Modbus Bridge on port#1 and port#2: the packets are routed to serial port1 and serial port2 (***Note that in this case all the slaves modbus addresses must be different!***)

TCP/IP PORT

TCP-IP port for Modbus TCP-IP Server protocol (Max 8 clients)

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PORT #n BAUDRATE

Used to Set the port baudrate

PORT #n BITS

Used to Set the number of bits for the serial communication.

PORT #n PARITY

Used to Set the port parity (None, Odd or even)

PORT #n STOP BITS

Used to Set the port parity (1 or 2; note that if the parity is set, only 1 bit can be used)

PORT #n TIMEOUT

Used to Set the timeout on Modbus Master mode before making a new call

WEB SERVER PORT

Used to Set the TCP-IP port for the Webserver

WEB SERVER AUTHENTICATION USER NAME

Used to Set the User Name for accessing the Webserver (if User Name and Password are leave empty no authentication is require for webserver access)

WEB SERVER AUTHENTICATION USER PASSWORD

Used to Set the Password for accessing the Webserver (if User Name and Password are leave empty no authentication is require for webserver access)

FTP SERVER PORT

Used to Set the TCP-IP port for the FTP Server

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FTP SERVER AUTHENTICATION USER NAME

Used to Set the User Name for accessing the FTP Server (if User Name and Password are leave empty no authentication is require for webserver access)

FTP SERVER AUTHENTICATION USER PASSWORD

Used to Set the Password for accessing the FTP server (if User Name and Password are leave empty no authentication is require for ftp access)

IP CHANGE FROM DISCOVERY

Used to Set if a user is allowed to change IP configuration from the software "Seneca Discovery Device"

WARNING!

REMEMBER ALWAYS TO CONFIGURE THE WEBSERVER AND FTP AUTHENTICATION USER NAME AND PASSWORD FOR RESTRICT THE ACCESS TO THE FTP AND THE WEBSERVER. IF YOU LEAVE THE TWO PARAMETERS TEXT BOXES BLANK NO AUTHENTICATION IT'S REQUIRED FOR ACCESS.

WARNING!

WHEN USE THE MODBUS BRIDGE MODE, REMEMBER THAT ALL THE MODBUS SLAVES MUST HAVE A DIFFERENT ADDRESS!

CAUTION!

If you are using Internet explorer 9 (or newer) you must enable the compatibility mode (see the arrow below):



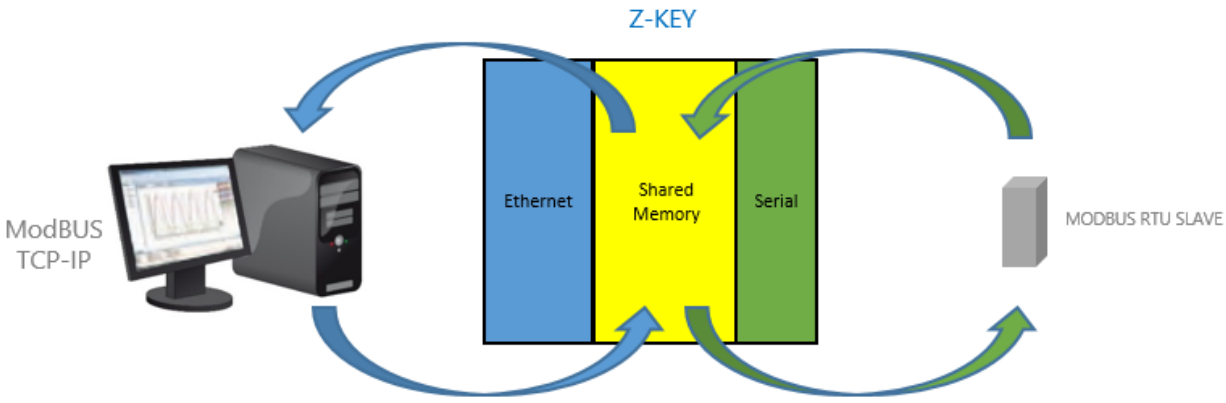
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10. Gateway With Shared Memory

Into a Modbus Bus bus it's essential to read as fast as possible the registers from the various Modbus Slave devices.

The Z-KEY can be configured with up to 500 tag (1 tag = 1 variable that can be composed by one or two Modbus registers), these values are stored into the Z-KEY shared memory that can be accessed from Ethernet and/or from Serials.

The Shared Memory is refreshed as fast as possible by the serial communication, so when a register is required from the Ethernet port, the values are read directly from the Shared memory without the needed of waiting the Slave response time:



Another benefit is that the Shared memory can be accessed also from the web using the Z-KEY embedded webserver.

Multiple Slaves can also be converted into a unique Modbus address, this makes much easier to develop software from the ethernet side.

PLCs can also benefit the access to a unique slave address for use with the standard Modbus TCP-IP libraries (linked to a unique modbus address).

A unique slave address is needful when there is a big slaves number, in this case using Z-KEY in gateway mode will reduce drastically the bus polling time and the number of slaves can grow using more than one Z-KEY.

From the revision firmware 4100_108 the gateway can automatically optimize the Modbus request by using a multiple register request. With this optimization the bus speed increases drastically.

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From the revision firmware 4100_114 are also supported TAGs from Modbus TCP-IP Servers (up to 10 Modbus TCP-IP servers are supported).

From the revision firmware 4100_119 when a Modbus RTU device has generated a timeout error for speed up the acquisition loop the device is quarantined for a configurable time.

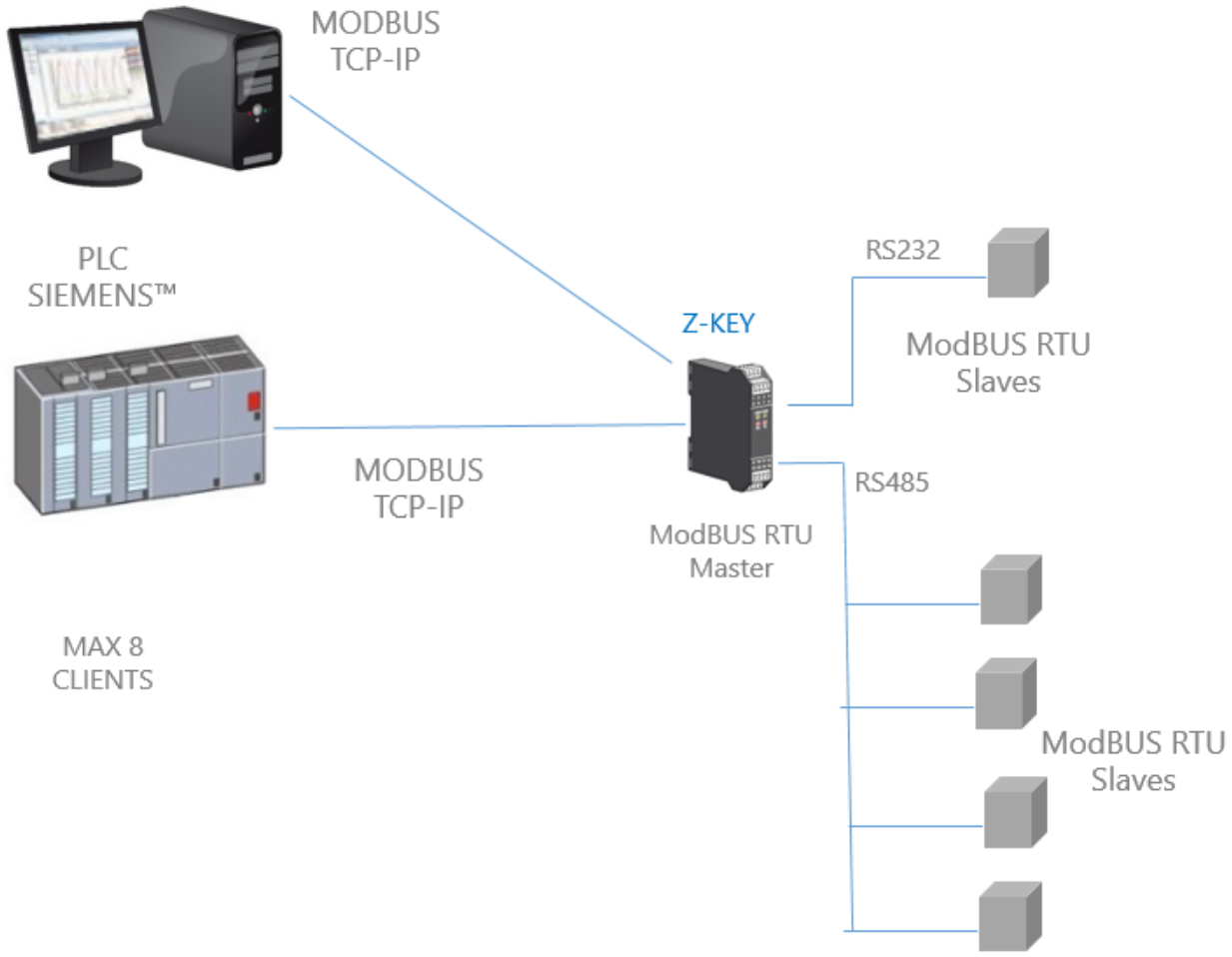
10.1. Gateway with shared memory Modbus TCP-IP / Modbus RTU (Port 1 and Port 2 Modbus Master)

In this scenario a Modbus TCP-IP master is connected with ethernet to Z-KEY, one or more Modbus RTU slaves (for example the Z-PC Seneca Series) are connected to the RS232/RS485 serial ports.

The Z-Key configured in Gateway is used for optimizing the Network performance and Modbus TCP-IP PLC software. Also PLCs like Siemens™ can be connected with Modbus RTU slaves by using the free standard Modbus TCP-IP library without the need of a customization.

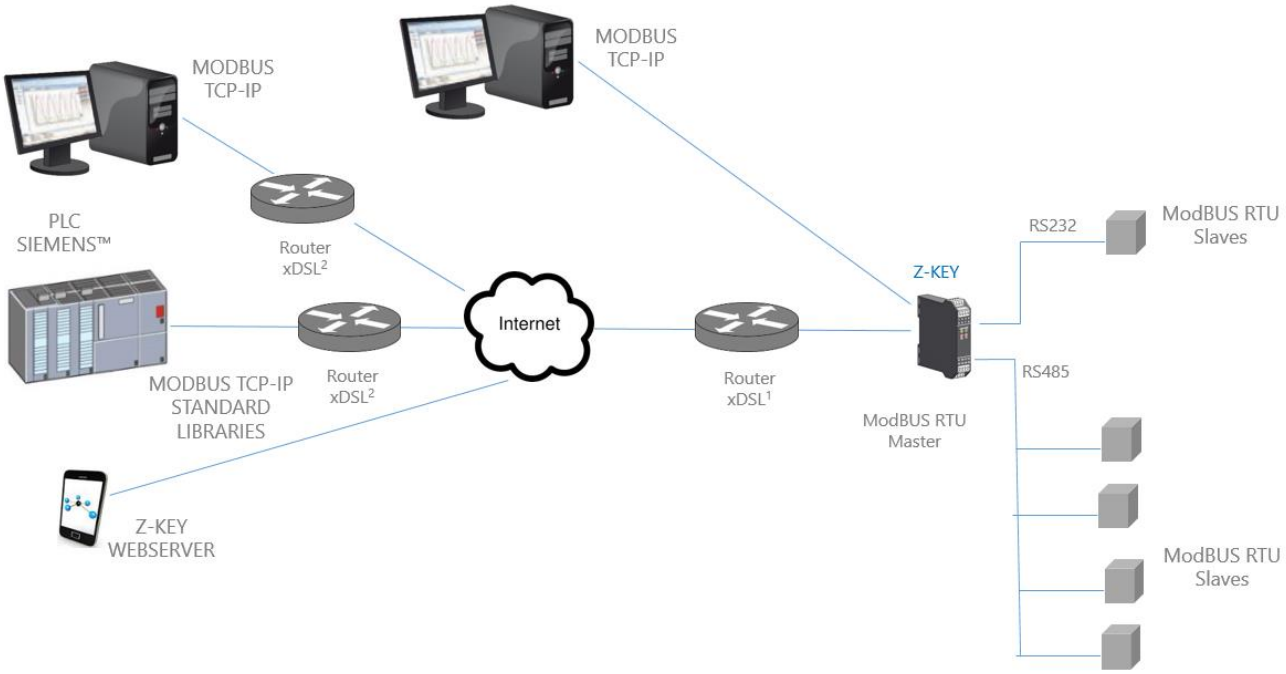
A typical LAN connection is represented into this figure:

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Also a remote communication through internet with multiple clients is possible, with the gateway configuration the tags are visible through the internal webserver:

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For internet communication the Routers connected to the Z-KEY must have a static ip address (or a DDNS service activated).

A Maximum of 8 simultaneous Modbus TCP-IP clients is supported.

10.2. Gateway with shared memory Modbus TCP-IP / Modbus RTU (1 port Master and 1 port Slave)

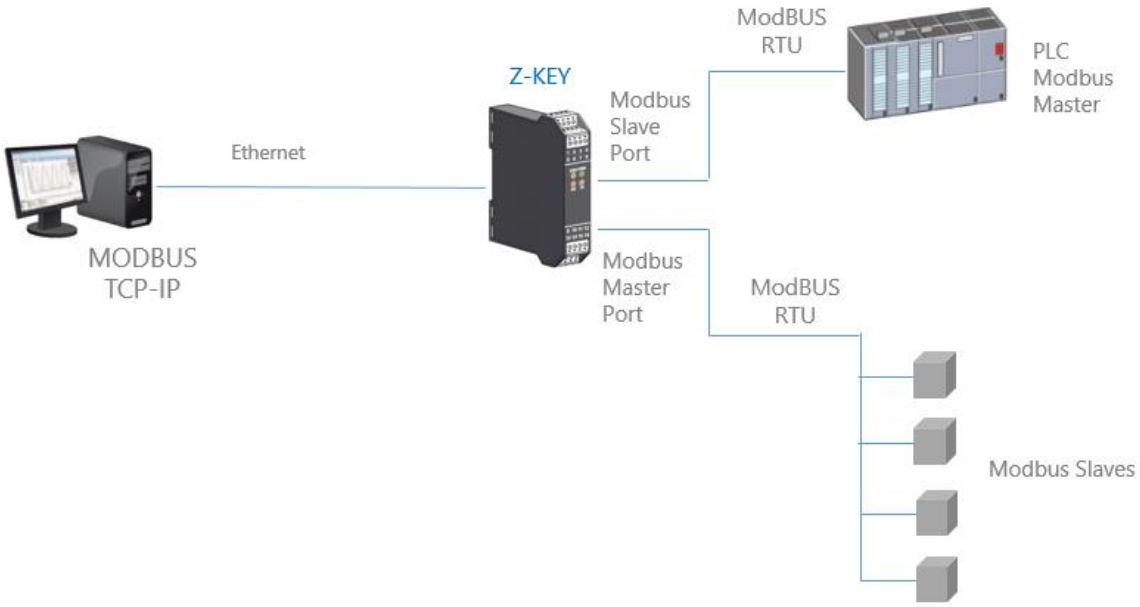
In this scenario a Modbus TCP-IP master is connected with ethernet to Z-KEY, one PLC with only the Modbus Master protocol is connected to the Z-KEY Modbus slave port. By this port the Modbus RTU Slaves (connected to the Z-KEY Modbus Master port) values are available for the PLC.

Also the PLC can write to the Modbus Slaves registers.

Through the ethernet the Registers written from the Z-KEY Modbus Slave Port or read from the the Modbus Slave Port are available.

A typical LAN connection is represented into this figure:

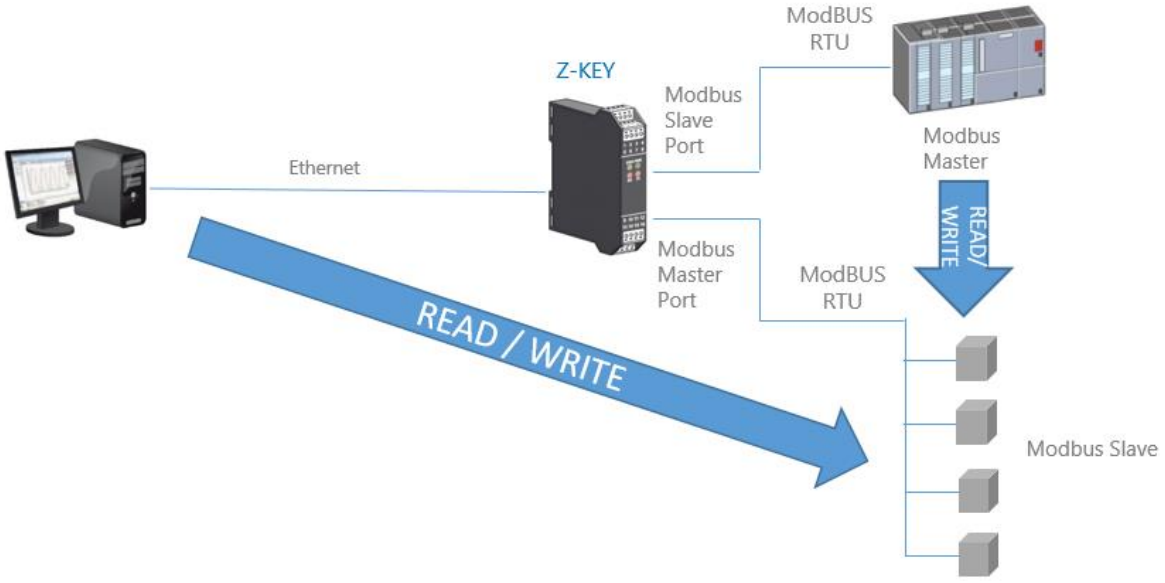
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10.2.1. How it works

A lot of PLCs have the limitation that only the Modbus Master protocol is implemented. When values from the Modbus Slaves must be read/write from the PLC and also from a SCADA/Datalogger, the Z-KEY can be configured with one serial port in modbus slave (connected to the PLC modbus master port) and the other in modbus master (connected to the modbus slaves).

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This feature is possible using the internal Z-KEY shared memory.

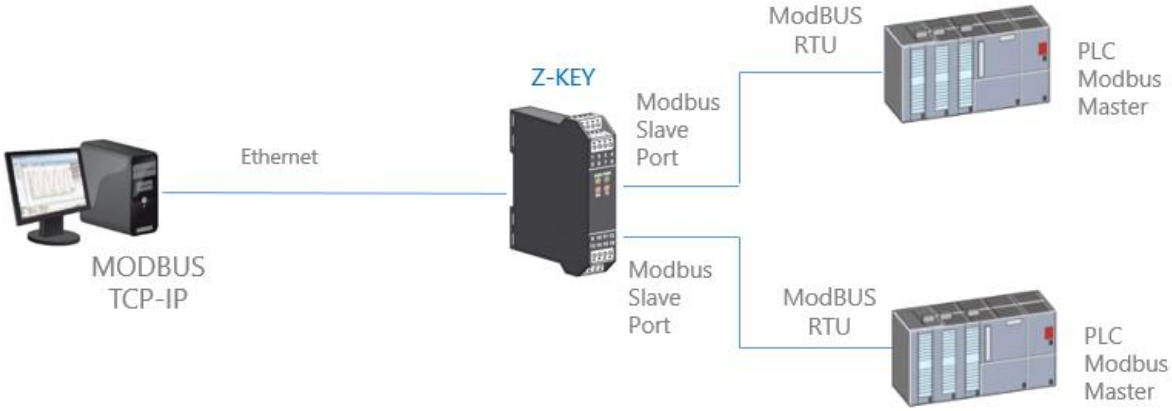
The PLC Modbus Master and the Ethernet client(s) writes/reads the Z-KEY shared memory registers, the Z-KEY maintain refreshed the shared memory with the Modbus Slaves.

10.3. Gateway with shared memory Modbus TCP-IP / Modbus RTU (2 port Slaves)

In this scenario a Modbus TCP-IP master is connected with ethernet to Z-KEY, Two PLCs with only the Modbus Master protocol are connected to the Z-KEY Modbus slave ports. By this ports the PLC can communicate with each other.

A typical LAN connection is represented into this figure:

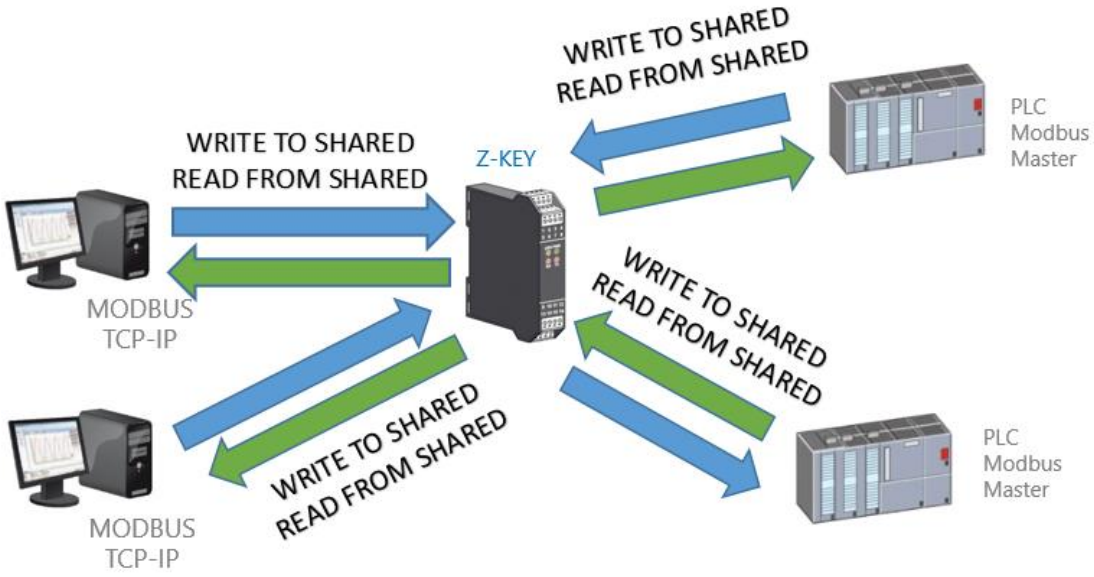
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10.3.1. How it works

A lot of PLCs have the limitation that only the Modbus Master protocol is implemented. When values from the Modbus Slaves must be shared with another PLC/SCADA/DATALOGGER etc.. the Z-KEY can be configured in Gateway mode with the 2 ports in Modbus Slave.

In this way the two PLCs and the Ethernet Clients can freely write/read the Z-KEY Shadow memory for data sharing:

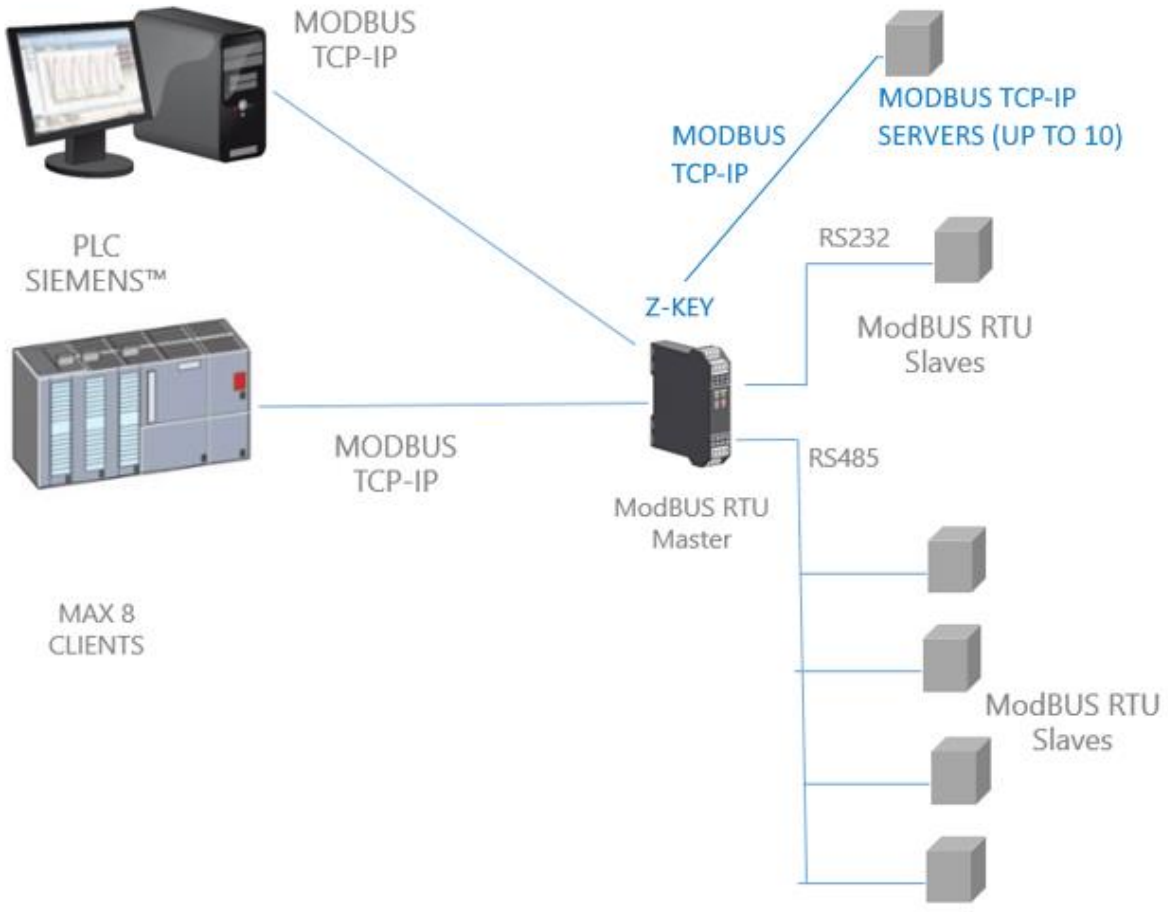


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The Z-KEY shared memory can be freely read and written from Ethernet or/and from the serial ports. The Shared memory registers must be defined before with the setup TAG section.

10.4. Gateway with shared memory Modbus TCP-IP / Modbus MIX RTU-TCP-IP

From firmware revision 114 Z-KEY in Gateway Mode can also be connected to up to 10 Modbus TCP-IP Server:

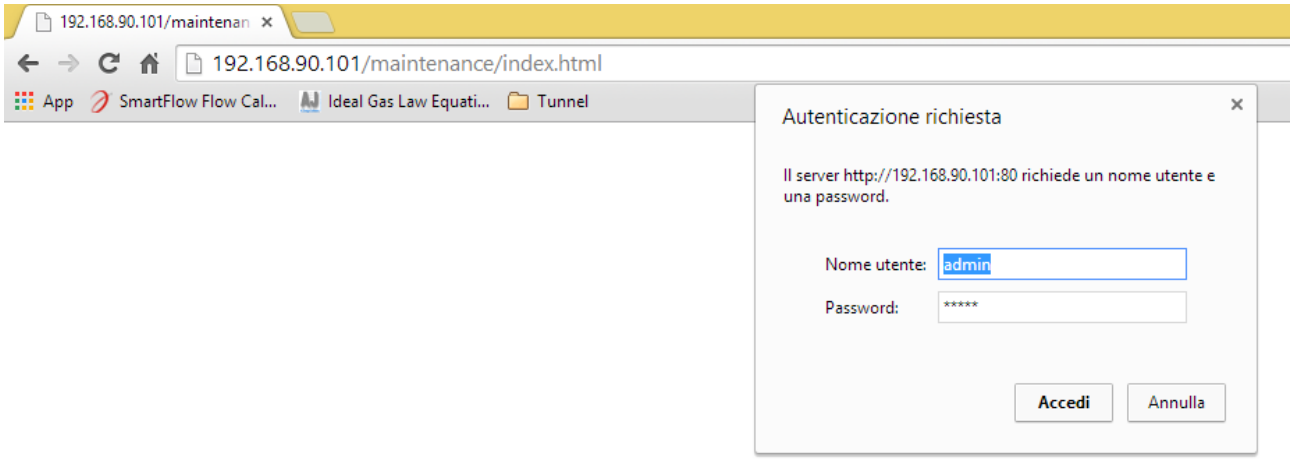


Up to 10 Modbus TCP-IP Servers are supported.

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10.5. Modbus Gateway with shared memory configuration

Connect to the webserver by entering the ip address, by default:



http://192.168.90.101

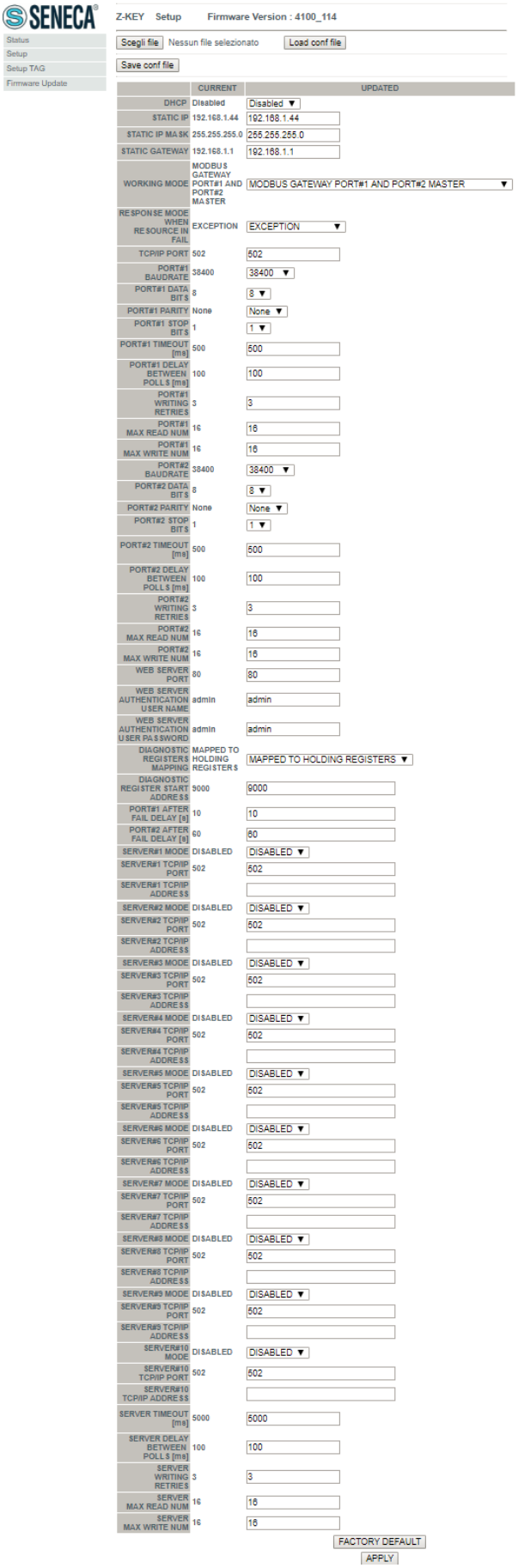
Enter the user name and password, by default:

User: admin

Password: admin

Now the Webserver can be used for configuring the Z-KEY module, all parameters are visible clicking on “Setup” button to the left of the screen:

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SENECA

Status
Setup
Setup TAG
Firmware Update

Z-KEY Setup Firmware Version : 4100_114

Scegli file | Nessun file selezionato | Load conf file

Save conf file

	CURRENT	UPDATED
DHCP	Disabled	Disabled
STATIC IP	192.168.1.44	192.168.1.44
STATIC IP MASK	255.255.255.0	255.255.255.0
STATIC GATEWAY	192.168.1.1	192.168.1.1
WORKING MODE	MODBUS GATEWAY PORT#1 AND PORT#2 MASTER	MODBUS GATEWAY PORT#1 AND PORT#2 MASTER
RESPONSE MODE WHEN RESOURCE IN FAIL	EXCEPTION	EXCEPTION
TCP/IP PORT	502	502
PORT#1 BAUDRATE	38400	38400
PORT#1 DATA BITS	8	8
PORT#1 PARITY	None	None
PORT#1 STOP BITS	1	1
PORT#1 TIMEOUT [ms]	500	500
PORT#1 DELAY BETWEEN POLLS [ms]	100	100
PORT#1 WRITING RETRIES	3	3
PORT#1 MAX READ NUM	16	16
PORT#1 MAX WRITE NUM	16	16
PORT#2 BAUDRATE	38400	38400
PORT#2 DATA BITS	8	8
PORT#2 PARITY	None	None
PORT#2 STOP BITS	1	1
PORT#2 TIMEOUT [ms]	500	500
PORT#2 DELAY BETWEEN POLLS [ms]	100	100
PORT#2 WRITING RETRIES	3	3
PORT#2 MAX READ NUM	16	16
PORT#2 MAX WRITE NUM	16	16
WEB SERVER PORT	80	80
WEB SERVER AUTHENTICATION USER NAME	admin	admin
WEB SERVER AUTHENTICATION USER PASSWORD	admin	admin
DIAGNOSTIC REGISTERS MAPPING	MAPPED TO HOLDING REGISTERS	MAPPED TO HOLDING REGISTERS
DIAGNOSTIC REGISTER START ADDRESS	9000	9000
PORT#1 AFTER FAIL DELAY [s]	10	10
PORT#2 AFTER FAIL DELAY [s]	60	60
SERVER#1 MODE	DISABLED	DISABLED
SERVER#1 TCP/IP PORT	502	502
SERVER#1 TCP/IP ADDRESS		
SERVER#2 MODE	DISABLED	DISABLED
SERVER#2 TCP/IP PORT	502	502
SERVER#2 TCP/IP ADDRESS		
SERVER#3 MODE	DISABLED	DISABLED
SERVER#3 TCP/IP PORT	502	502
SERVER#3 TCP/IP ADDRESS		
SERVER#4 MODE	DISABLED	DISABLED
SERVER#4 TCP/IP PORT	502	502
SERVER#4 TCP/IP ADDRESS		
SERVER#5 MODE	DISABLED	DISABLED
SERVER#5 TCP/IP PORT	502	502
SERVER#5 TCP/IP ADDRESS		
SERVER#6 MODE	DISABLED	DISABLED
SERVER#6 TCP/IP PORT	502	502
SERVER#6 TCP/IP ADDRESS		
SERVER#7 MODE	DISABLED	DISABLED
SERVER#7 TCP/IP PORT	502	502
SERVER#7 TCP/IP ADDRESS		
SERVER#8 MODE	DISABLED	DISABLED
SERVER#8 TCP/IP PORT	502	502
SERVER#8 TCP/IP ADDRESS		
SERVER#9 MODE	DISABLED	DISABLED
SERVER#9 TCP/IP PORT	502	502
SERVER#9 TCP/IP ADDRESS		
SERVER#10 MODE	DISABLED	DISABLED
SERVER#10 TCP/IP PORT	502	502
SERVER#10 TCP/IP ADDRESS		
SERVER TIMEOUT [ms]	5000	5000
SERVER DELAY BETWEEN POLLS [ms]	100	100
SERVER WRITING RETRIES	3	3
SERVER MAX READ NUM	16	16
SERVER MAX WRITE NUM	16	16

FACTORY DEFAULT

APPLY

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On the first column represents the parameter name, the second column (current) it's the current parameter value. The last column can be used for changing the current configuration.

When a configuration it's made you must confirm with "APPLY", then the new configuration became operative.

If you need to reset to the default parameters click on "FACTORY DEFAULT" button.

In this page you can save and load a previous configuration (a configuration is made of Configuration and Tags configuration).

The parameters are explained below:

DHCP

Disable: A static Ip address is used

Enable: The IP address, the IP-Mask and the Gateway address are obtained from the DHCP server.

The Z-KEY IP address can be read from the USB port with the Easy Setup test configuration, or with the Seneca Discovery utility (see the Z-KEY section on seneca web site for download).

STATIC IP ADDRESS

Static IP address when DHCP is Disable

STATIC IP MASK

mask when DHCP is Disable

STATIC GATEWAY

Gateway address when DHCP is Disable

WORKING MODE

Select the Modbus Gateway port1 and port2 Master working mode.

RESPONSE MODE

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Select which type of response do you want when a Modbus slave don't respond to a modbus request. You can select from

Last value read (the value is freezed to the last value read)

Exception (Z-KEY exception response)

Max (the value is filled with the highest possible value)

Min (the value is filled with the lowest possible value)

Zero (the value is filled with 0)

TCP/IP PORT

TCP-IP port for Modbus TCP-IP Server protocol (Max 8 clients)

PORT #n BAUDRATE

Used to Set the port baudrate

PORT #n BITS

Used to Set the number of bits for the serial communication.

PORT #n PARITY

Used to Set the port parity (None, Odd or even)

PORT #n STOP BITS

Used to Set the port parity (1 or 2; note that if the parity is set, only 1 bit can be used)

PORT #n TIMEOUT

Used to Set the timeout on Modbus Master mode before making a new call

PORT #n DELAY BETWEEN POLLS

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Used to Set the delay between two Modbus Master request

PORT #n WRITING RETRIES

Used to Set the retries to write a Modbus register into the Modbus Master mode

PORT #n MAX WRITE NUM

Used to Set the maximum number of registers that can be written with the Modbus function "Write Multiple Registers" or "Write Multiple Coils".

PORT #n MAX READ NUM

Used to Set the maximum number of registers that can be read with the Modbus function "Read Multiple Registers" or "Read Multiple Coils".

WEB SERVER PORT

Used to Set the TCP-IP port for the Webserver

WEB SERVER AUTHENTICATION USER NAME

Used to Set the User Name for accessing the Webserver (if User Name and Password are leave empty no authentication is require for webserver access)

WEB SERVER AUTHENTICATION USER PASSWORD

Used to Set the Password for accessing the Webserver (if User Name and Password are leave empty no authentication is require for webserver access)

DIAGNOSTIC REGISTER MAPPING

Used for Set what type of registers from Holding or Input to use for publish the diagnostic registers

DIAGNOSTIC REGISTER START ADDRESS

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Used for Set the start address for the diagnostic registers (default 9000 -> 49001 in case of holding registers or 39001 in case of input registers)

PORT #n AFTER FAIL DELAY

Used to Set the number of seconds to pause the queries of a device. This pause time is used after the device has not answered for 3 consecutive times.

MODBUS TCP-IP CLIENT

Enable or not the Modbus TCP-IP client loop in addition to the serial master, Z-KEY can connect to a maximum of 10 Modbus TCP-IP servers.

MODBUS TCP-IP SERVER #n

Enable or not the connection with the Modbus TCP-IP #n

SERVER #n TCP-IP PORT

Used to Set the TCP-IP server #n port

SERVER #n TCP-IP ADDRESS

Used to Set the TCP-IP server #n address

MODBUS TCP-IP CLIENT TIMEOUT

Used to Set the TCP-IP connect timeout for the Modbus TCP-IP client task.

FTP SERVER PORT

Used to Set the TCP-IP port for the FTP Server

FTP SERVER AUTHENTICATION USER NAME

Used to Set the User Name for accessing the FTP Server (if User Name and Password are leave empty no authentication is require for webserver access)

FTP SERVER AUTHENTICATION USER PASSWORD

Used to Set the Password for accessing the FTP server (if User Name and Password are leave empty no authentication is require for ftp access)

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IP CHANGE FROM DISCOVERY

Used to Set if a user is allowed to change IP configuration from the software "Seneca Discovery Device"

WARNING!

REMEMBER ALWAYS TO CONFIGURE THE WEBSERVER AND FTP AUTHENTICATION USER NAME AND PASSWORD FOR RESTRICT THE ACCESS TO THE FTP AND THE WEBSERVER. IF YOU LEAVE THE TWO PARAMETERS TEXT BOXES BLANK NO AUTHENTICATION IT'S REQUIRED FOR ACCESS.

CAUTION!

If you are using Internet explorer 9 (or newer) you must enable the compatibility mode (see the arrow below):



10.6. Simplified Tags Diagnostic

The tags diagnostic is available only in Modbus Gateway with shared memory mode.
The tags diagnostic is viewable also from Modbus RTU/ Modbus TCP.
The Diagnostic Address is configurable the default Start Modbus Register is 49001 (offset 9000).

Each bit represent a tag with the following means:

1 = TAG OK
0 = TAG FAIL

The least significative bit is the tag nr 1 status
The next is the tag nr 2 status and so on…

For example:

49001	0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1
49002	0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1

Means: TAG 1, TAG 4, TAG17, TAG 18 , TAG 19, TAG 20 OK, others in FAIL.
At startup all the tags are in fail status (all to 0).

10.7. Extended Tags Diagnostic

The tags diagnostic is available only in Modbus Gateway with shared memory mode.
When a tag is in error state is possible to have more info abou this tag using the extended diagnostic.

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The extended diagnostic reserve 1 byte for 1 tag (so, because 500 tags is the limit, there are 500 bytes = 250 Modbus registers for the extended diagnostic).
This diagnostic is located at the end of the simplified diagnostic (default start address 49033, offset 32).
Each Modbus Register contain 2 tags, for example:

49033 TAG02_TAG01
49034 TAG04_TAG03
…
49282 TAG500_TAG499
49283 LAST_LOOP_TIME_COM1 [x1 ms]
49284 LAST_LOOP_TIME_COM2 [x1 ms]

The byte means is:

0 TAG OK
1 TIMEOUT: The tag response is a timeout but is polled again
2 DELAYED: Too much fails, the tag polling is delayed (the tag will be polled after the “Fail delay” configured)
3 EXCEPTION: Modbus exception response but is polled again
4 CRC ERROR: Modbus CRC exception response but is polled again

For example:

49033 0x0000
49034 0x0002

Means that:
TAG 1 and 2 are OK
TAG 03 is in Delayed status (2)
TAG 4 is OK

LAST_LOOP_TIME_COMx is a register that holds the last serial loop time x10 ms so, for example:

49283 25
49284 42

Means that the COM1 loop was 250ms, COM2 loop was 420ms

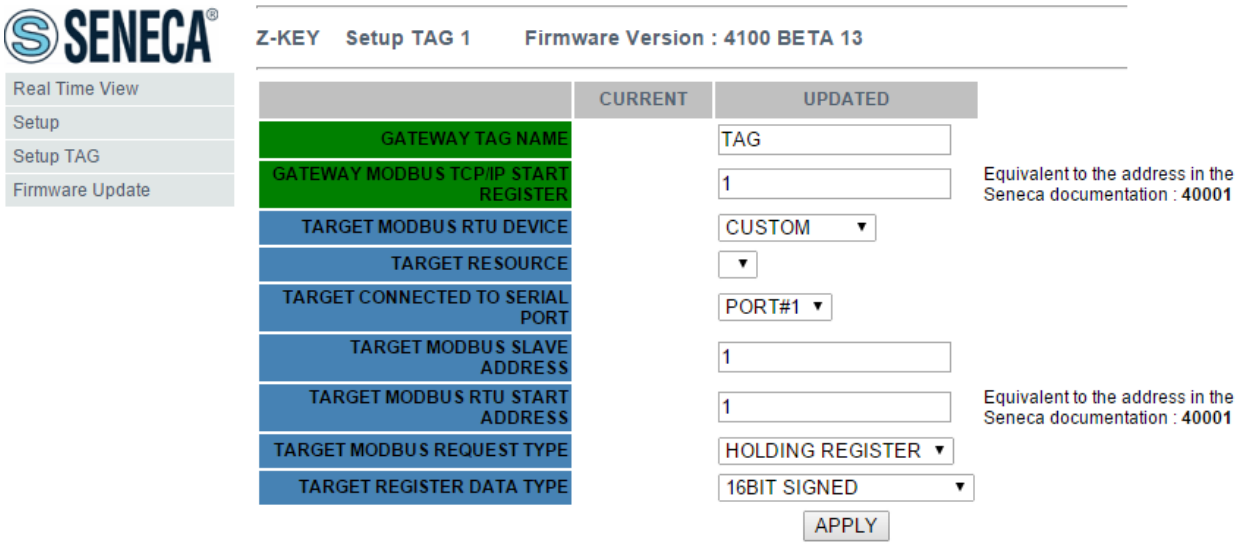
10.8. Modbus Gateway Tags Setup, export and import

The Z-KEY in Modbus Gateway mode needs to configure the Tags to put into the internal shared memory.

From the Webserver click on “Setup TAGs” button to the left menu:

Now you can ADD, Modify, Delete or move one tag. When you modify or add a tag a new page appear:

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Gateway Tag Name

Set the Tag name to show in the Webserver realtime view.

Gateway Modbus TCP-IP Start Register

Set the address where the tag is placed in shared memory for access from Modbus TCP-IP.

Target Modbus RTU Device

Select the Modbus RTU slave model from the Seneca database or select “custom” if you don’t use a Seneca Modbus RTU slave.

Target Resource

If you are using a Seneca Modbus RTU Slave select the resource name from the Seneca database.

Target Connected to serial port

Select at which Z-KEY serial port is connected the modbus rtu slave device.

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Target Modbus RTU Slave Station Address

Select the Device Modbus Station Address (also named Modbus node address).

Target Modbus RTU start register

Select the Modbus RTU slave start register TAG

Modbus Request Type

Select the Modbus Register Request type from:

Coil

Discrete Input

Holding Register

Input Register

Data Type

Select the TAG variable type from:

16 BITS UNSIGNED: 1 modbus register, from 0 to 65535

16 BITS SIGNED: 1 modbus register, from -32768 to +32767

32 BITS UNSIGNED MSW : 2 modbus registers with the lower address Modbus register that hold the Most Significant Word, from 0 to 4294967295

32 BITS UNSIGNED LSW : 2 modbus registers with the lower address Modbus register that hold the Less Significant Word, from 0 to 4294967295

32 BITS SIGNED MSW : 2 modbus registers with the lower address Modbus register that hold the Most Significant Word, from -2147483648 to +2147483647

32 BITS SIGNED LSW : 2 modbus registers with the lower address Modbus register that hold the Less Significant Word, from -2147483648 to +2147483647

FLOAT MSW : 2 modbus registers with the lower address Modbus register that hold the Most Significant Word, Floating point single precision (IEEE 758-2008)

FLOAT LSW : 2 modbus registers with the lower address Modbus register that hold the Less Significant Word, Floating point single precision (IEEE 758-2008)

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BIT : 1 Boolean coil or Discrete input register

this field is automatically filled if you have select a Seneca Device into the "Device" field.

WARNING!

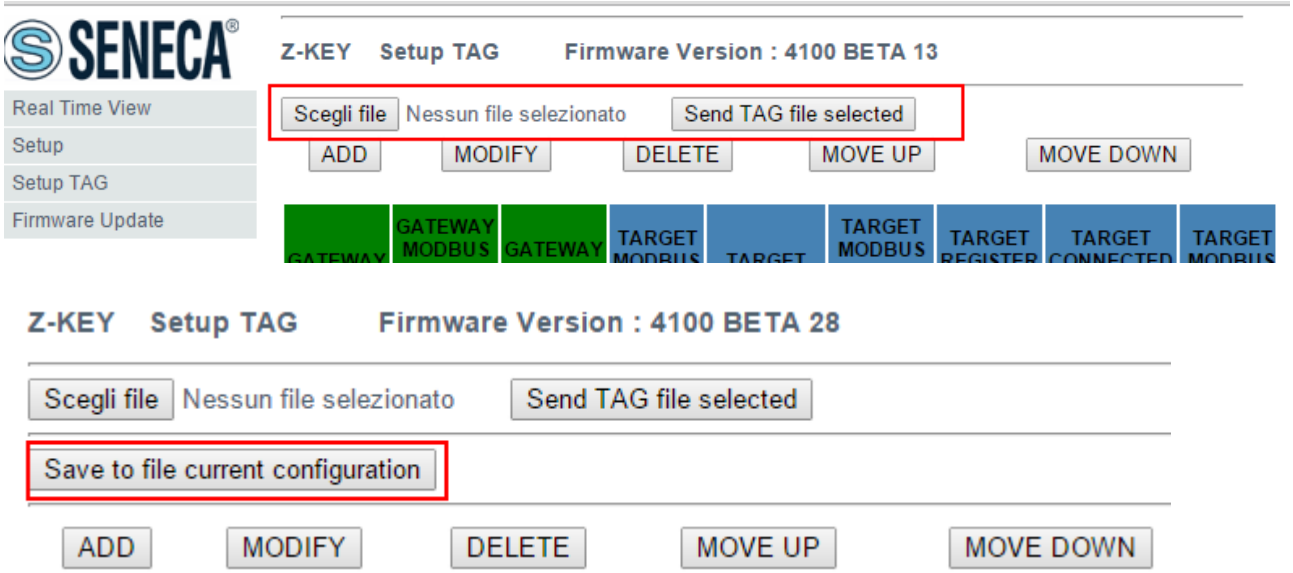
All 32 bits values are stored into 2 consecutive registers, for example:

TAG Totalizer 1 in unsigned 32 bits MSW type is stored into registers 40016 and 40017:

The most significant word is the register 40016, the less significant word is the 40017.

So the 32bits value is obtained by the following relation: $Totalizer1=Reg(40017)+(Reg(40016)\times 2^{16})=Reg(40017)+(Reg(40016)\times 65536)$

The Tags setup can be imported/exported from/to a ".cgi" file:



Note that a .cgi file can be also imported/exported from/to the Z-KEY Excel template.

10.9. Modbus Gateway Real Time view

Where the TAG are setup it's possible to view in real time the communication from the webserver.

The real time view will show the TCP-IP configuration and the TAGS info.

The Tags info include: The TAG Name, the Gateway TAG Modbus Address, the Tag value and the TAG status
OK = OK TAG status
FAIL_TO = Timeout Reading the TAG
DELAYED = Too much fails, the tag polling is delayed (the tag will be polled after the "Fail delay" configured)

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EXC = Modbus exception response

10.10. Using the Microsoft Excel ™ template for Tags setup

Preparing the Tag configuration can be a frustrating operation if it's made with the webserver so a Microsoft Excel™ Template is available for create a .bin file to import to the Z-KEY.

This operation drastically speed up the TAG configuration.

The template can be freely downloaded from the Seneca website into the Z-KEY section.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	MODBUS TCP/IP			SERIAL MODBUS RTU					Export CGI file...		SENECA		
2	TAG NR	GATEWAY TAG NAME	GATEWAY MODBUS TCP/IP REGISTER ADDRESS	TARGET MODBUS RTU REGISTER TYPE	TARGET MODBUS RTU DATA TYPE	TARGET CONNECTED TO SERIAL PORT NR	TARGET MODBUS RTU START REGISTER	TARGET MODBUS RTU SLAVE ADDRESS	Import CGI file...		SENECA Z-KEY TAGS TEMPLATE FOR GATEWAY MODE. E		
3	1	TAG1	1	HOLDING REGISTER	UINT16	#1	3	2					
4	2	TAG2	2	HOLDING REGISTER	UINT16	#1	4	2					
5	3	TAG3	3	HOLDING REGISTER	UINT16	#1	5	2					
6	4	TAG4	5	HOLDING REGISTER	UINT16	#1	6	2					
7	5	TAG5	7	HOLDING REGISTER	UINT16	#1	7	2					
8	6	TAG6	8	HOLDING REGISTER	UINT16	#1	8	2					
9	7	TAG7	9	HOLDING REGISTER	UINT16	#1	9	2					
10	8	TAG8	10	HOLDING REGISTER	UINT16	#1	10	2					
11	9	TAG9	1	COIL	BIT	#1	1	3					
12	10	TAG10	2	COIL	BIT	#1	2	3					
13	11	TAG11	3	COIL	BIT	#1	3	3					
14	12	TAG12	4	COIL	BIT	#1	4	3					
15	13	TAG13	5	COIL	BIT	#1	5	3					
16	14	TAG14	6	COIL	BIT	#1	6	3					
17	15	TAG15	7	COIL	BIT	#1	7	3					
18	16	TAG16	8	COIL	BIT	#1	8	3					
19	17	TAG17	14	HOLDING REGISTER	INT16	#1	13	4					
20	18	TAG18	15	HOLDING REGISTER	INT16	#1	14	4					
21	19	TAG19	16	HOLDING REGISTER	INT16	#1	15	4					
22	20	TAG20	17	HOLDING REGISTER	INT16	#1	16	4					
23	21	TAG21	1	DISCRETE INPUT	BIT	#1	1	5					
24	22	TAG22	2	DISCRETE INPUT	BIT	#1	2	5					
25	23	TAG23	3	DISCRETE INPUT	BIT	#1	3	5					

TAG NR
The tag index from 1 to 500

Gateway Tag Name
Enter the Tag mnemonic name

Gateway Modbus TCP-IP Register Address
Enter the TAG register address that will be accessed from TCP-IP (also from serial port if slave mode is configured). For Seneca Modbus Standard address 1 holding register is equivalent to 40001, address 2 to 40002 etc… .

Target Modus RTU REGISTER TYPE

Select the register type from the combobox list

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Target Modus RTU DATA TYPE

Select the target modbus rtu register type

Target Connected to serial port NR

Select the serial port where the slave modbus is connected to

Target Modbus RTU Start Register

Enter the Modbus Slave start register (if holding register 1=40001 etc…)

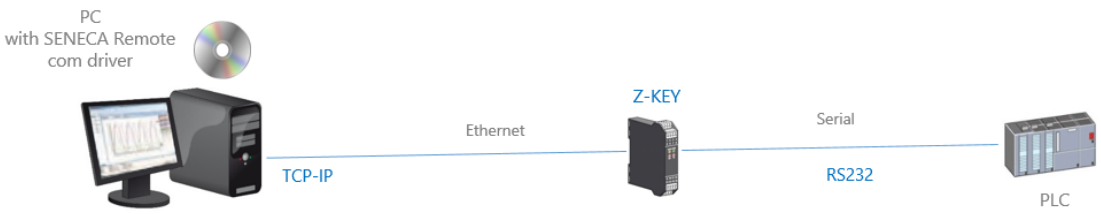
Target Modbus RTU Slave Address

Enter the Modbus RTU Slave Station address

The setup can be exported from Excel to a .cgi file (for to be imported in the webserver) or imported from a .cgi file (exported from the webserver).

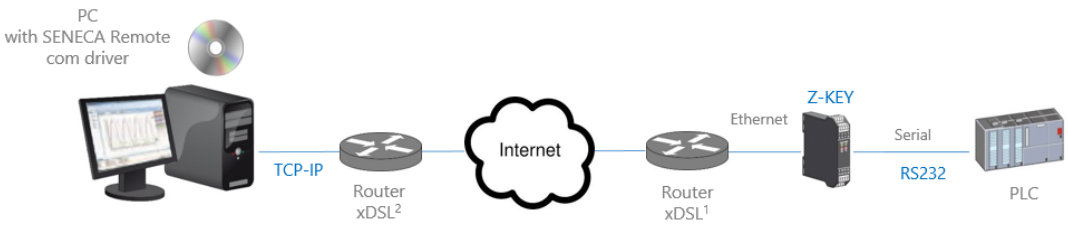
11. Remote Serial Com Port

In this scenario a Serial device must be connected to a PC but the device is too far away from the PC.
The Z-Key can be used for extend the serial port using the ethernet connection:



Also a connection through internet can be made (typically for remote maintenance of machines, PLC etc…):

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For internet communication the Router connected to the Z-KEY must have a static ip address.

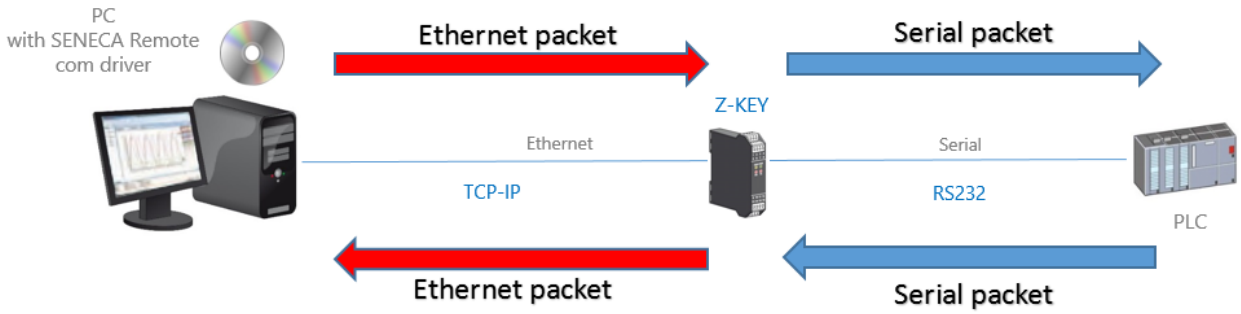
NOTE:
Z-KEY, in Remote serial com port mode, supports one PC connection at a time.

NOTE:
For using the ZModem serial protocol with Z-KEY through internet, remember to activate the protocol crash recovery option.

11.1. How it works

If a PC program has only the serial port support but you need to exit from the ethernet you can install the Serial to Ethernet driver freely supplied by Seneca.

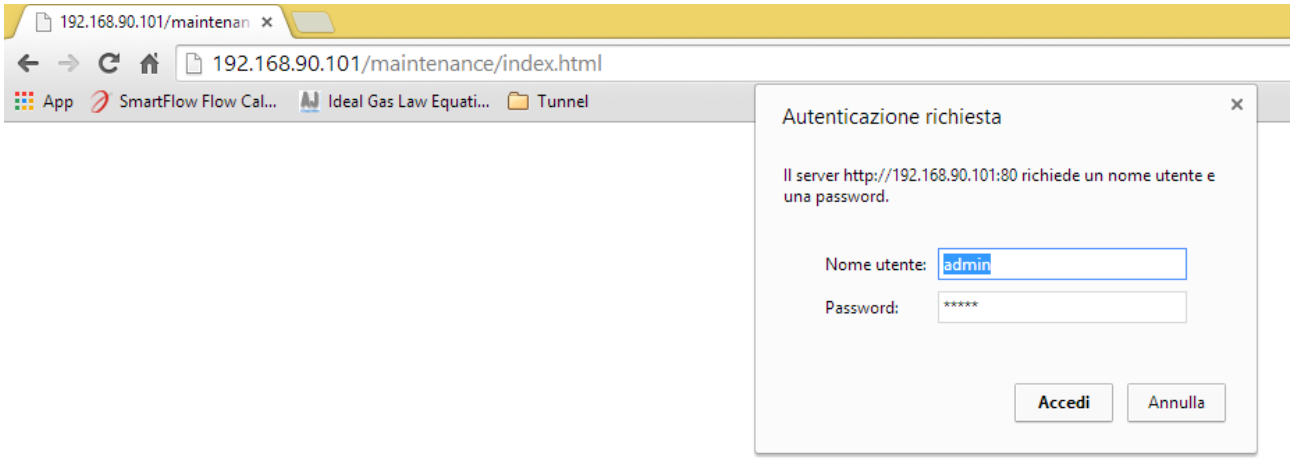
With this driver installed a couple of virtual serial port is created, using these serial ports from a pc software the serial traffic will pass through ethernet. After that the Z-KEY will convert the ethernet traffic to serial through the real serial port, also Z-KEY will reconvert to ethernet the serial communication responses.



11.2. Remote Serial Com Port Webserver configuration

Connect to the webserver by entering the ip address, by default:

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http://192.168.90.101/maintenance/index.html

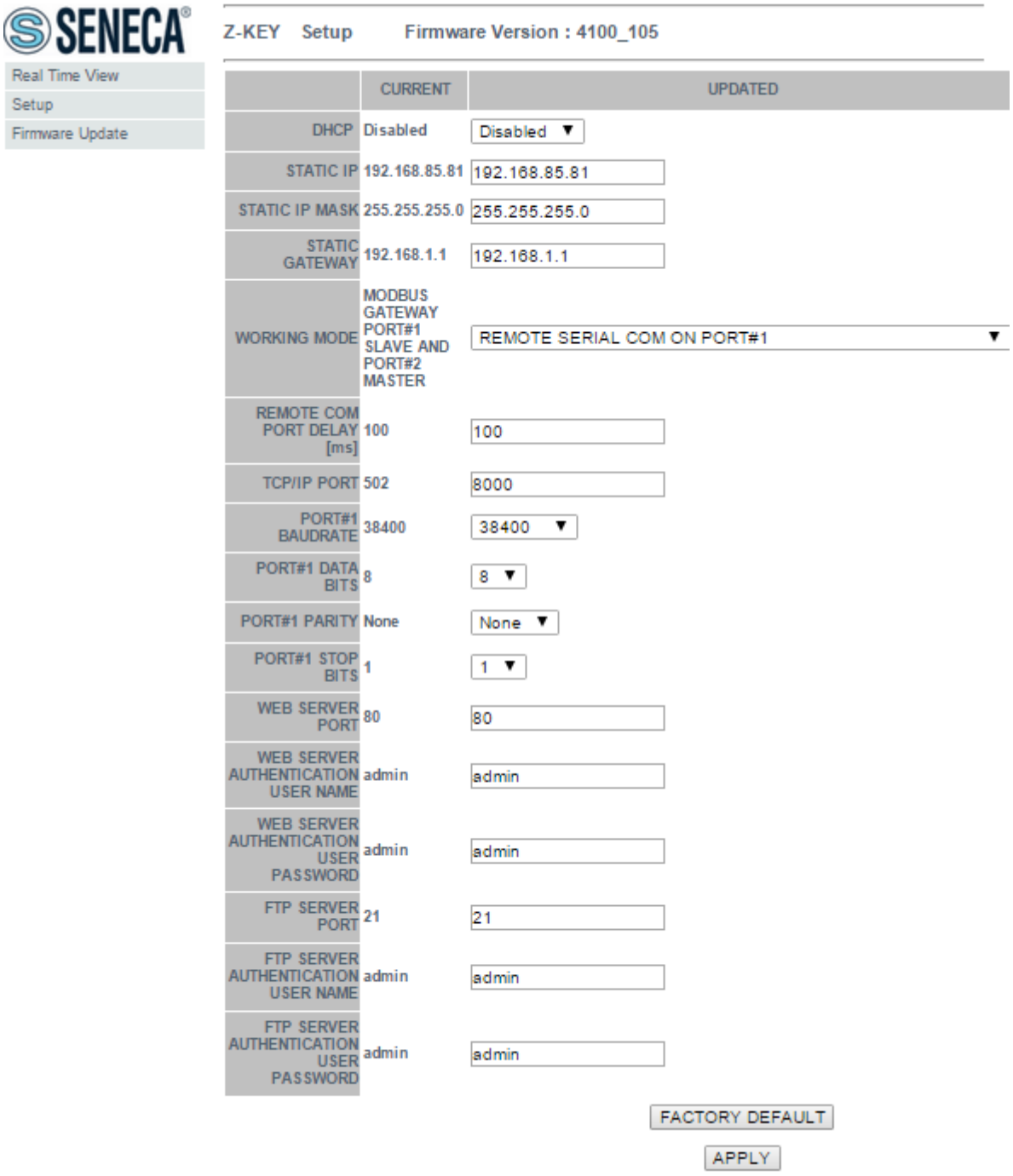
Enter the user name and password, by default:

User: admin

Password: admin

Now the Webserver can be used for configuring the Z-KEY module, all parameters are visible clicking on “Setup” button to the left of the screen:

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The first column represents the parameter name, the second column (current) it's the current parameter value. The last column can be used for changing the current configuration.

When a configuration it's made you must confirm with "APPLY", then the new configuration became operative.

If you need to reset to the default parameters click on "FACTORY DEFAULT" button.

The parameters are explained below:

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DHCP

Disable: A static Ip address is used

Enable: The IP address, the IP-Mask and the Gateway address are obtained from the DHCP server.

The Z-KEY IP address can be read from the USB port with the Easy Setup test configuration, or with the Seneca Discovery utility (see the Z-KEY section on seneca web site for download).

STATIC IP ADDRESS

Static IP address when DHCP is Disable

STATIC IP MASK

mask when DHCP is Disable

STATIC GATEWAY

Gateway address when DHCP is Disable

WORKING MODE

Select the Remote COM Port working mode, select which serial port to use (remember that only port #2 can be configured in RS232 mode).

TCP/IP PORT

TCP-IP port for Remote com port mode (default port 8000)

REMOTE COM PORT DELAY

Enter the silence time after which the serial packet is sent to the Ethernet. Can be that this value must be adjusted for your specific application if you encounter communication errors.

PORT #n BAUDRATE

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Used to Set the port baudrate

PORT #n BITS

Used to Set the number of bits for the serial communication.

PORT #n PARITY

Used to Set the port parity (None, Odd or even)

PORT #n RS485 STOP BITS

Used to Set the port parity (1 or 2; note that if the parity is set, only 1 bit can be used)

WEB SERVER PORT

Used to Set the TCP-IP port for the Webserver

WEB SERVER AUTHENTICATION USER NAME

Used to Set the User Name for accessing the Webserver (if User Name and Password are leave empty no authentication is require for webserver access)

WEB SERVER AUTHENTICATION USER PASSWORD

Used to Set the Password for accessing the Webserver (if User Name and Password are leave empty no authentication is require for webserver access)

FTP SERVER PORT

Used to Set the TCP-IP port for the FTP Server

FTP SERVER AUTHENTICATION USER NAME

Used to Set the User Name for accessing the FTP Server (if User Name and Password are leave empty no authentication is require for webserver access)

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FTP SERVER AUTHENTICATION USER PASSWORD

Used to Set the Password for accessing the FTP server (if User Name and Password are leave empty no authentication is require for ftp access)

WARNING!

REMEMBER ALWAYS TO CONFIGURE THE WEBSERVER AND FTP AUTHENTICATION USER NAME AND PASSWORD FOR RESTRICT THE ACCESS TO THE FTP AND THE WEBSERVER. IF YOU LEAVE THE TWO PARAMETERS TEXT BOXES BLANK NO AUTHENTICATION IT'S REQUIRED FOR ACCESS.

CAUTION!

If you are using Internet explorer 9 (or newer) you must enable the compatibility mode (see the arrow below):



11.3. Seneca Serial to Ethernet Connect

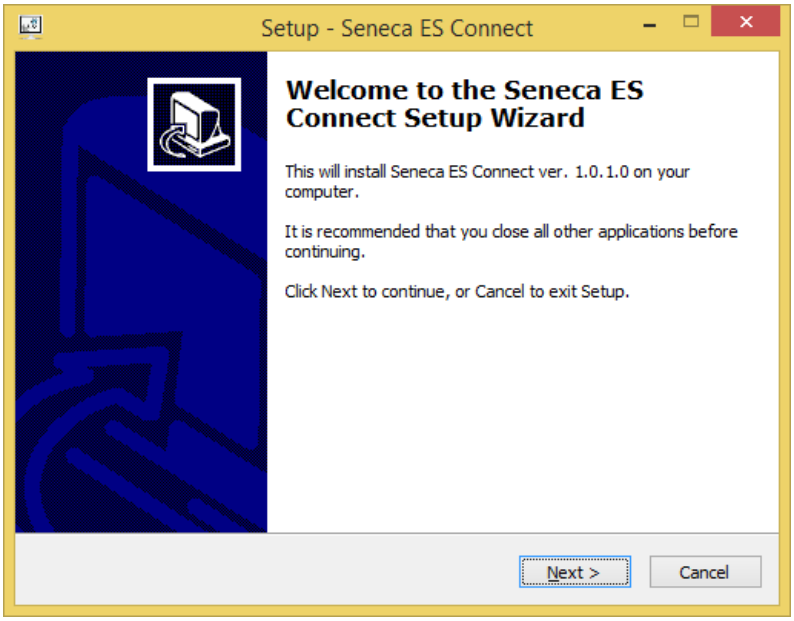
For using Z-KEY in remote serial com port mode you need to install in a PC the Seneca Serial to Ethernet Connect software.

11.3.1. Installing Seneca Serial to Ethernet Connect driver

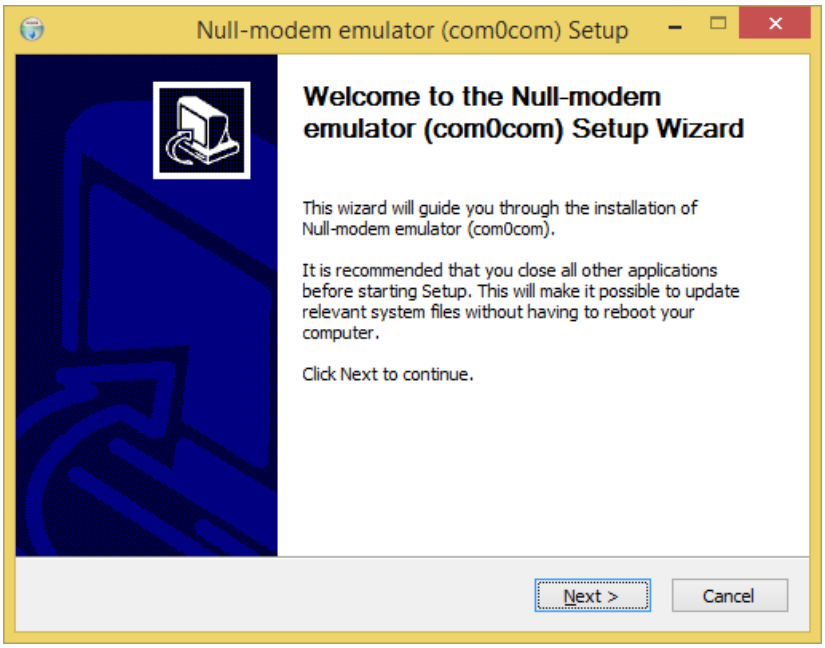
Seneca Ethernet to Serial Connect runs on windows vista™, windows 7™, windows 8.1™ and windows 10™.

Double click the installer:

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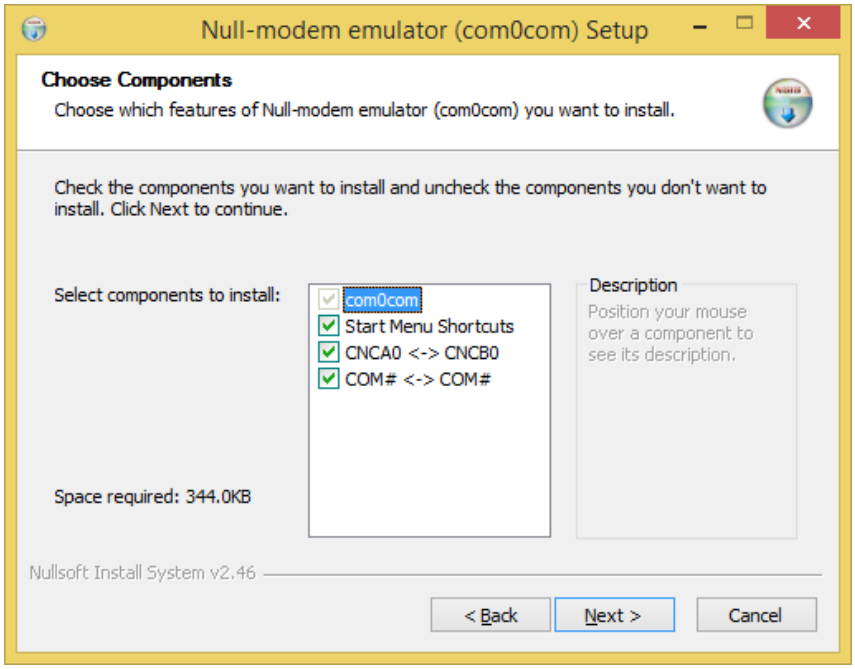


After that the com0com driver will be installed:



Select the CNCA0<->CNCB0 and the COM#<->COM# virtual port names:

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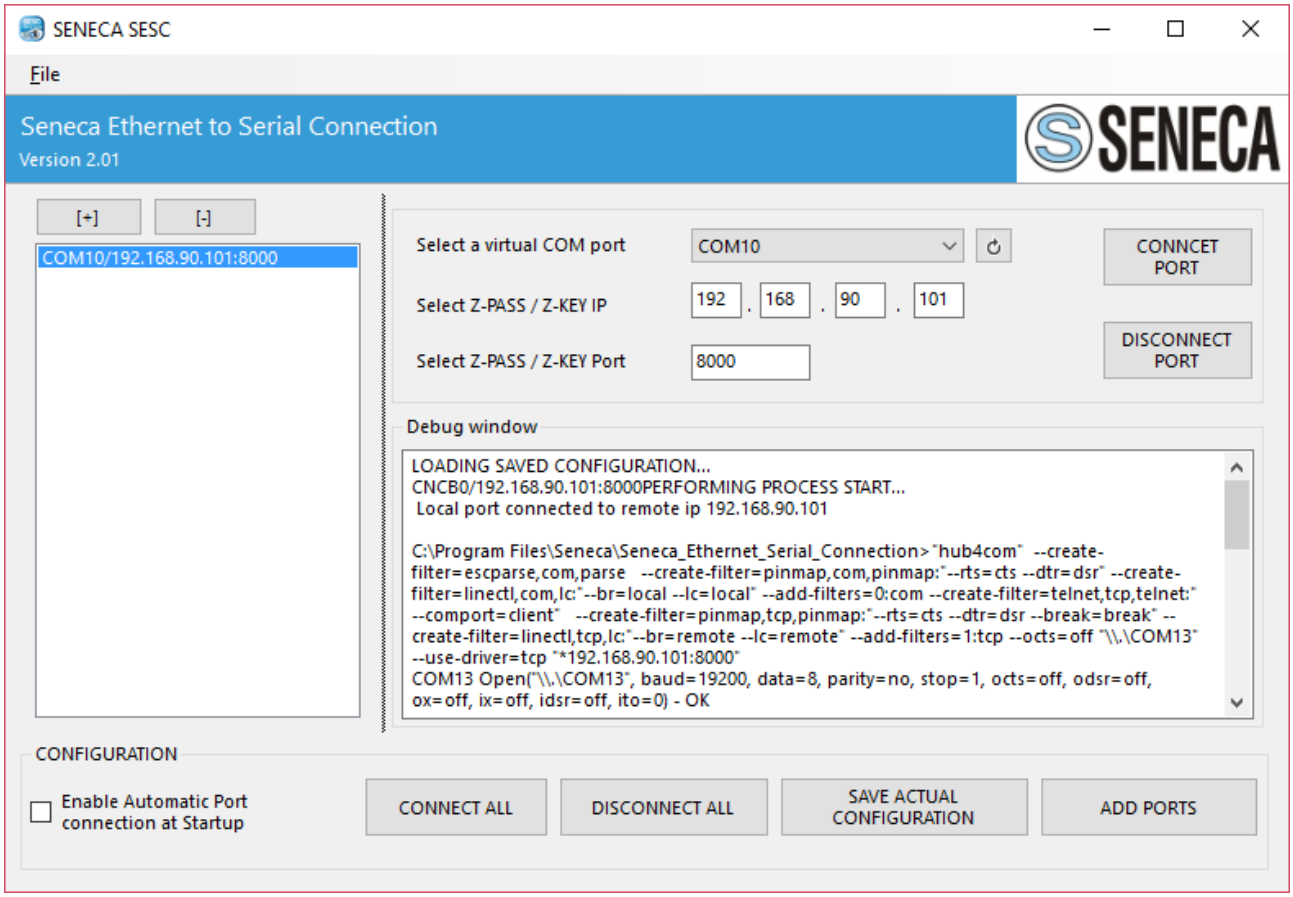


Now Click on Finish

11.3.2. Select the Com port for Seneca Serial to Ethernet Connect

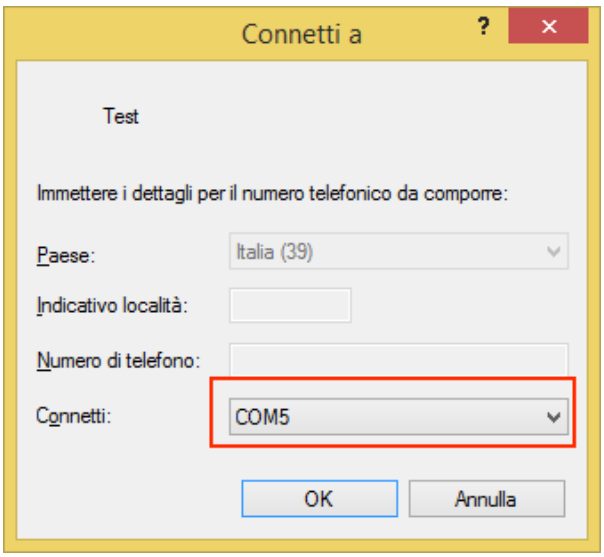
We connect the COM10 to the Seneca ES Connector:

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Note that Seneca SESC can connect more than one serial device at the same time (but you need more than one Z-KEY).

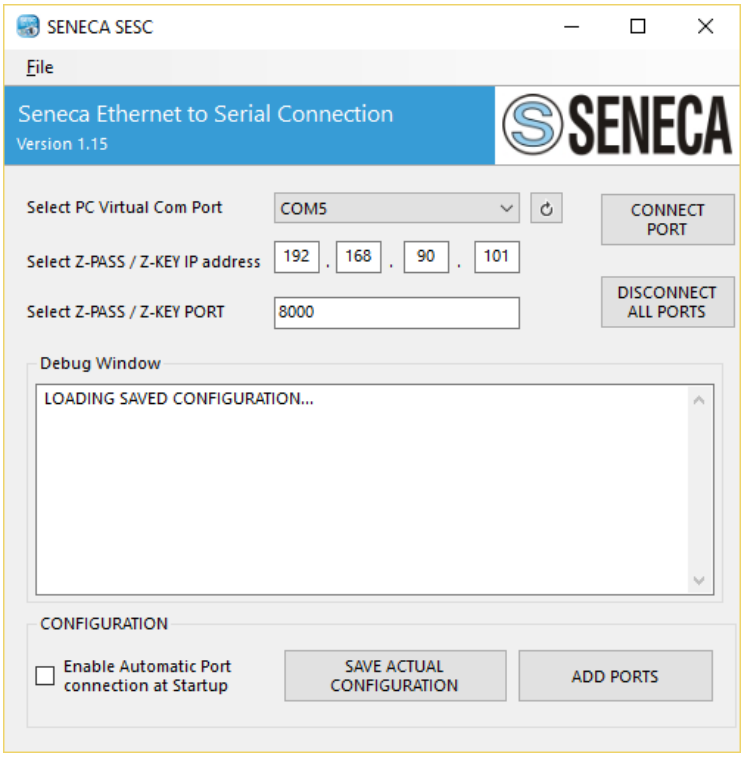
Now use the same COM5 (for example in a terminal software):



The COM5 is now connected to Z-KEY by the TCP port 8000:

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11.3.3. Configuring Seneca Serial to Ethernet Connect



- *Select the Virtual COM Port*
- *Select the Z-KEY IP address (default 192.168.90.101).*
- *Select the TCP-IP port (default 8000).*

Then click on “Connect PORT”.

If you need to connect another serial com to another Z-KEY configure the new com port and the new IP addess then click on “Connect Port”.

For disconnect all Ports click on “Disconnect All Ports”.

For automatically connect the PC at startup save the configuration and enable the “Automatic Port Connection at Startup” flag.

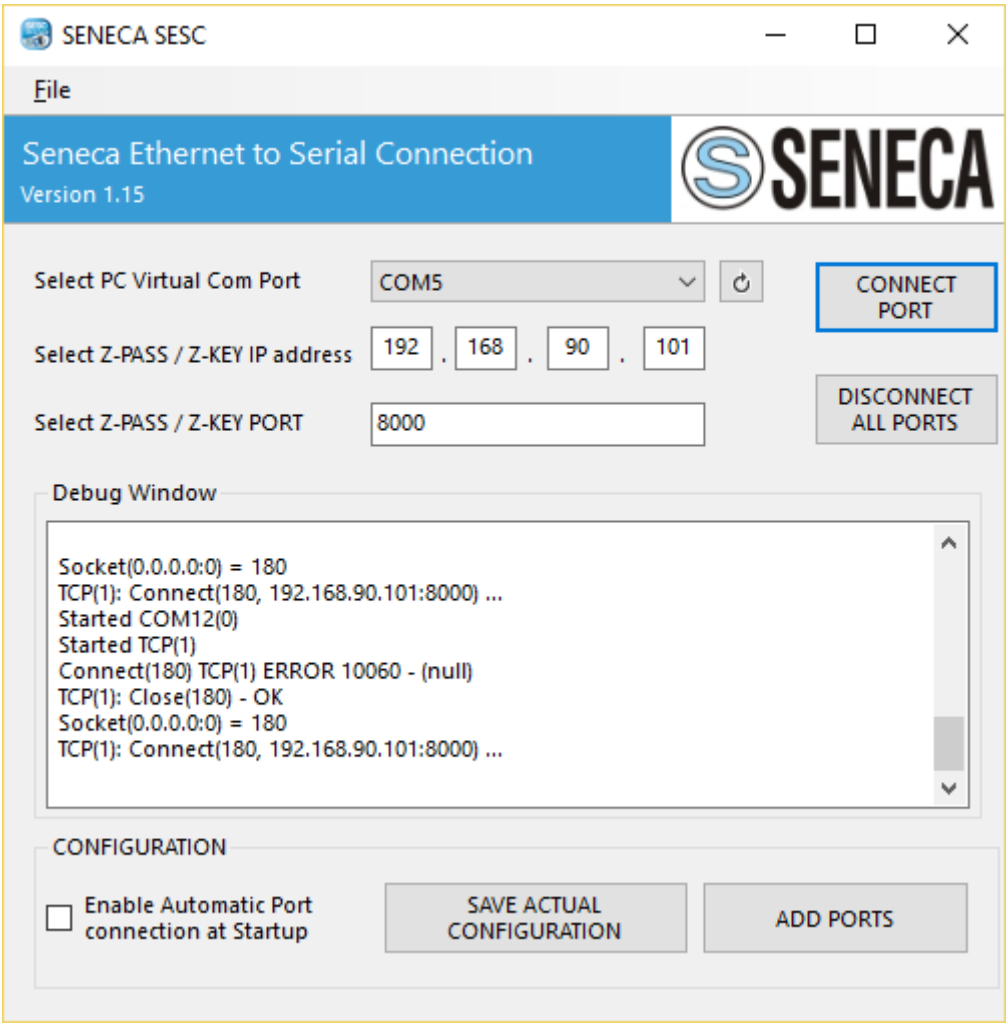
11.3.4. Debugging the Connection

Before click on “Connect Port” you can select to open a Debug Window for verify the connection configuration:

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Then click on “Connect Port”:

If you see “Connect Error” like here:



Check the configuration (Z-KEY ip address and port).

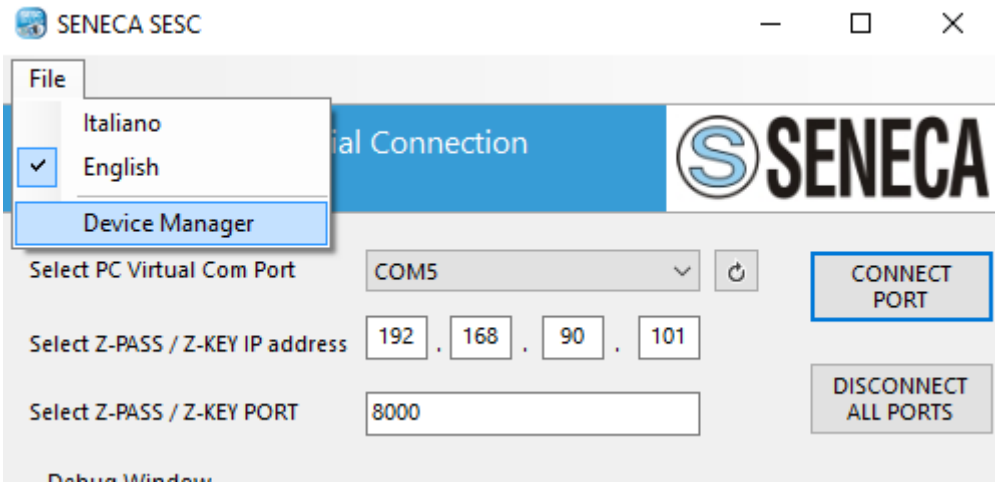
11.3.5. Changing the COM port number

Old software can use only a little range of COM ports, so you may need to change the virtual COM number.

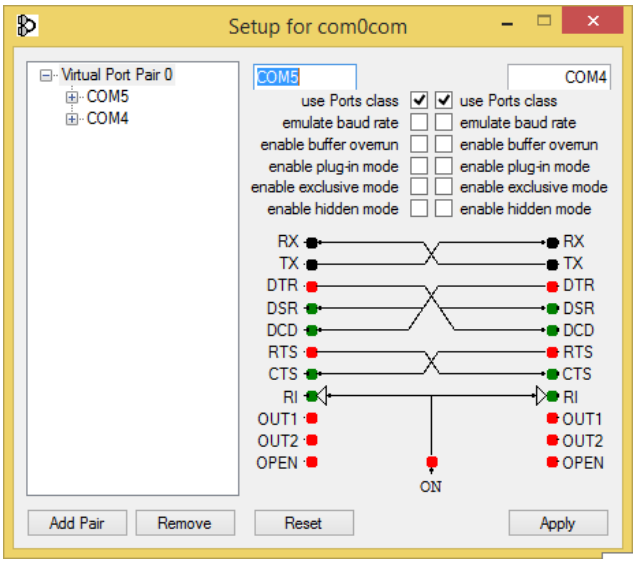
In Our case the COM pair created is COM4 / COM5 but we want to change to COM2 / COM3:

Click on “Device Manager” Button:

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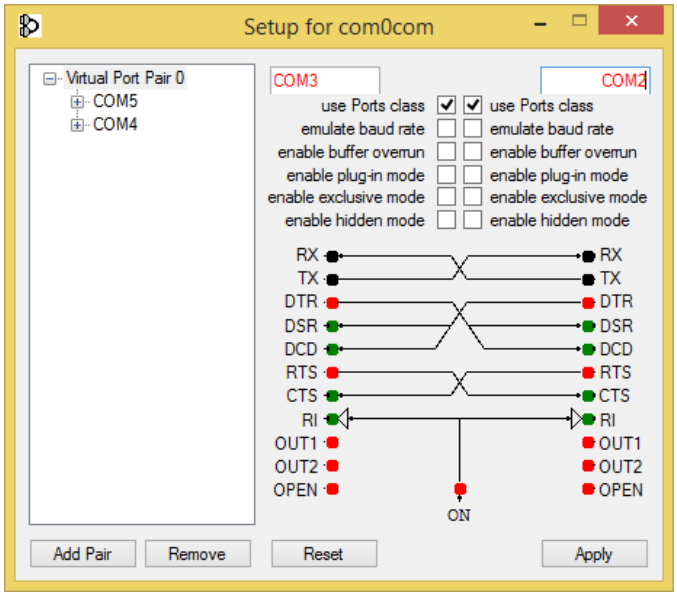


The com0com setup window will open:

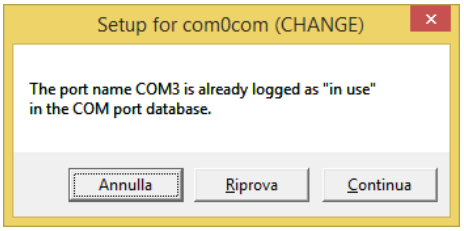


Now change COM5 to COM3 and COM4 to COM2 Then click “Apply”:

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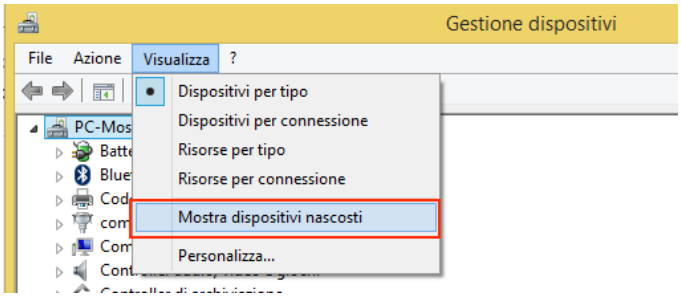


Sometimes the COM can be marked as “in use”:



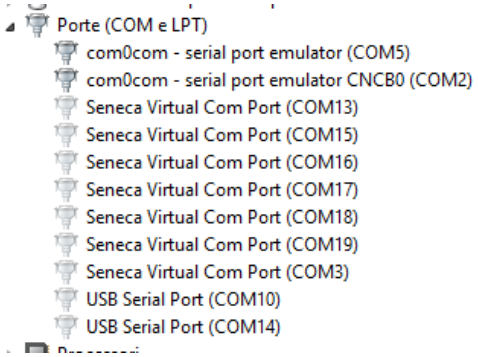
If you need to use this COM number Click on “Continue”, then go to the device manager.

We must uncheck the “in use” flag by uninstalling the port. Because the port now is not connected click on “Show hidden peripherals”:



Now all the Ports that are not in use are displayed in transparent (also our COM3):

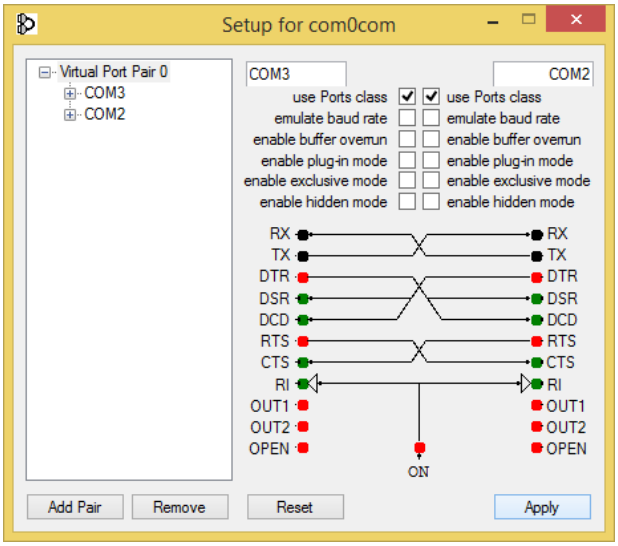
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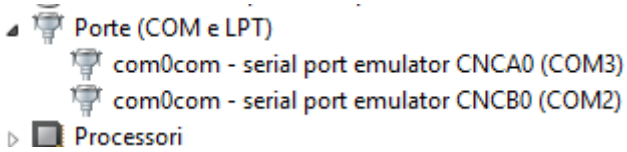
Now select the COM3 port and click on “Uninstall”:



Now the COM3 is free and we can use it on the com0com setup:



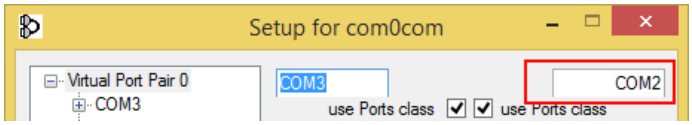
Then Click on “Apply”, Now the COM3, COM2 pair is created:



WARNING!

Seneca to ethernet connector use always the right port in the com0com Setup (in our case COM2)

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12. INSTALLING MULTIPLE Z-KEY IN A NETWORK USING THE "DHCP FAIL MODE"

From firmware revision 119, Z-KEY configured with the DHCP can switch to a unique fail ip address after 30 seconds without a DHCP server response.

This fail address is

169.254.x.y

where x.y are numbers obtained from the unique MAC address.

In this way if you force to DHCP all the devices you can install it to the network also if there isn't a DHCP server active.

After 30 seconds you can launch the tool "Seneca Discovery Device" and force the IP address that you prefer to all the devices.

13. THE CUSTOM WEBSERVER

A custom webserver can be loaded into a microSD card, copy the html pages to the /web directory.

From firmware revision 119 or newer you can lunch the custom webserver by typing:

http://192.168.90.101/sd/index.html

where 192.168.90.101 is the default ip address.

Demo templates can be freely downloaded from:

http://www.seneca.it/products/z-key

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14. ACCESSING THE Z-KEY FROM INTERNET

Using a static public ip address it's possible to configure the router for accessing Z-KEY from internet.

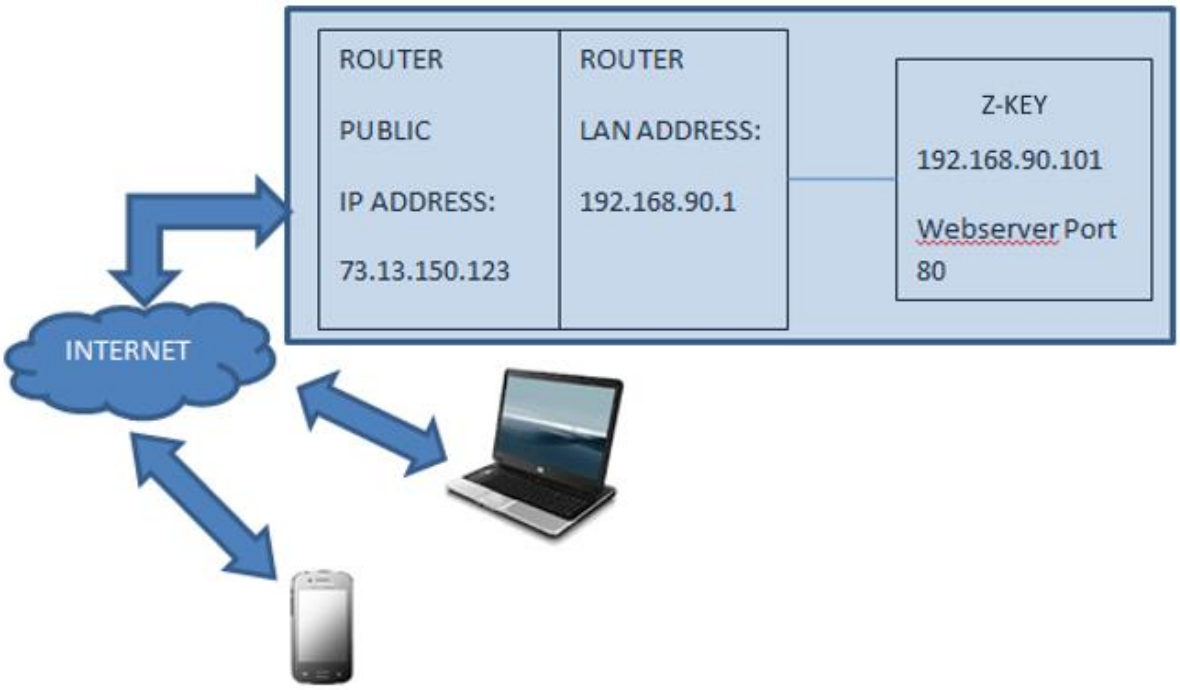
This operation it's known as "Virtual server "or "Port forwarding" refers to your Router documentation for more info.

The Ip address of your internet connection must have a static public ip address, if your public ip address isn't static you can obtain-it by using a Dynamic DNS like Dyndns (http://dyn.com/).

Take a look to this example:

The Router IP address is 192.168.1.1 and the Z-KEY device address is 192.168.1.101 with the Webserver on port 80.

For example the Router Public IP address is 73.13.150.123.



Now we must open the port 80 on the router and forwarding it to the IP 192.168.90.101:

So the configuration on the router must be:

IP ADDRESS	PRIVATE PORT	PUBLIC PORT	PROTOCOL
192.168.1.101	80	8080	UDP/TCP

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With this Virtual Server entry, all Internet traffic on Port 8080 with ip address 73.13.150.123 will be redirected to Z-KEY webserver on port 80 at IP Address 192.168.1.101.

So for accessing to the Z-KEY Webserver using a browser you must enter

http://73.13.150.123/maintenance/index.html:8080

A similar configuration can be used for Modbus TCP-IP access:

IP ADDRESS	PRIVATE PORT	PUBLIC PORT	PROTOCOL
192.168.1.101	502	502	UDP/TCP

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15. THE KIT-USB

The KIT-USB can be obtained from Seneca (can be bought also from the E-commerce Website www.seneca.it)

The kit contain:

- *A CD with the Easy Setup software (that contain the USB drivers)*
- *A standard mini USB Cable*
- *A standard micro USB Cable*

The Easy Setup software can also be freely downloaded from the website: www.seneca.it

16. THE RS232 DB9 CABLE

The RS232 DB9 CABLE can be obtained from Seneca (can be bought also from the E-commerce Website www.seneca.it) for connection between Z-KEY to a DB9 RS232 device.

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17. WINDOWS USB DRIVERS INSTALLATION

The drivers are compatible with the following operating systems:

Windows xp (32 bits)

Windows xp (64 bits)

Windows 7 (32 bits)

Windows 7 (64 bits)

Windows 8 (32 bits) (*)

Windows 8 (64 bits) (*)

Windows 8.1 (32 bits) (*)

Windows 8.1 (64 bits) (*)

Windows 10 (32 bits) (*)

Windows 10 (64 bits) (*)

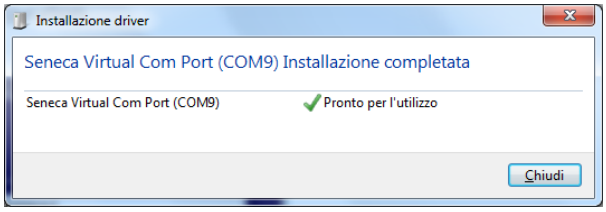
(*) = From software Easy Setup revision 3.53 or newer.

For installing the USB drivers follow this procedure:

- *Install the Easy Setup software from the USB KIT CD (see chapter 15) or from the Seneca website*
- *At the end of the installation confirm the USB drivers installation, click on "install the driver software":*
- *Power up the Z-KEY and connect the USB to the PC, the new hardware it's detected:*



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Now the device it’s connected to the PC.

The operation is performed only the first time that you connect the device.

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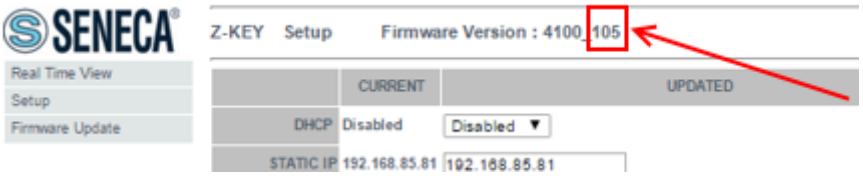
18. Firmware Update

Z-Key support the firmware update from webserver, FTP server and microSD card.

Last firmware can be downloaded from:

http://www.seneca.it/products/z-key

You can verify the new firmware revision in the webserver upper corner (in the example the revision is 105):



18.1. Firmware Update from Webserver

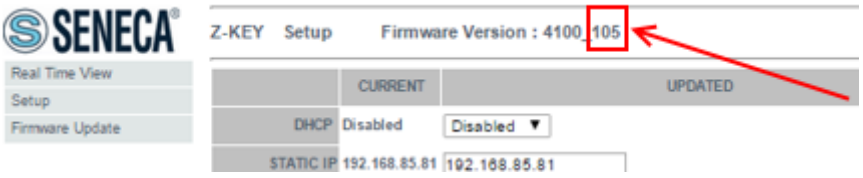
For update the Z-KEY firmware go to the Firmware Update section on the Webserver, select the firmware then click on “Send new firmware update selected”.

At the end of the file transfer the Z-KEY will switch ON all the red leds and start to program the firmware to the internal flash (takes about 30 seconds). At the end the Z-KEY will reboot with the new firmware.

WARNING!

Don’t power down the Z-KEY when the update firmware procedure is started!

You can verify the new firmware revision in the webserver upper corner (in the example the revision is 105):



18.2. Firmware Update from FTP server

For update the Z-KEY firmware from FTP server you must insert a microSD card formatted with fat16 or fat32 filesystem.

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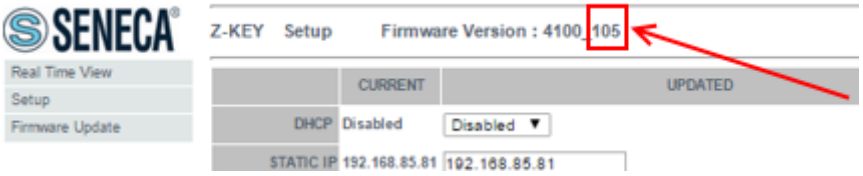
Copy the file “zkey.bin” with the new firmware to the root.

At the end of the file transfer the Z-KEY will switch ON all the red leds and start to program the firmware to the internal flash (takes about 30 seconds). At the end the Z-KEY will reboot with the new firmware.

WARNING!

Don’t power down the Z-KEY when the update firmware procedure is started!

You can verify the new firmware revision in the webserver upper corner (in the example the revision is 105):

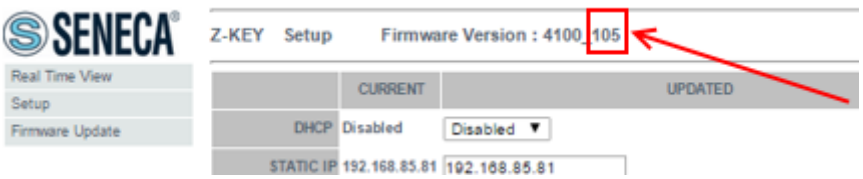


18.3. Firmware Update from microSD card

For updating the firmware from the microSD card follow the procedure:

- *Switch OFF Z-KEY*
- *Copy in the microSD root the “zkey.bin” firmware file*
- *Insert the microSD card in the Z-KEY*
- *Switch ON Z-KEY*
- *Now the Z-KEY will switch ON all the red leds and starts to program the firmware to the internal flash (takes about 30 seconds). At the end, the Z-KEY will reboot with the new firmware.*
- *The file “zkey.bin” will be automatically deleted from the microSD card*

You can verify the new firmware revision in the webserver upper corner (in the example the revision is 105):



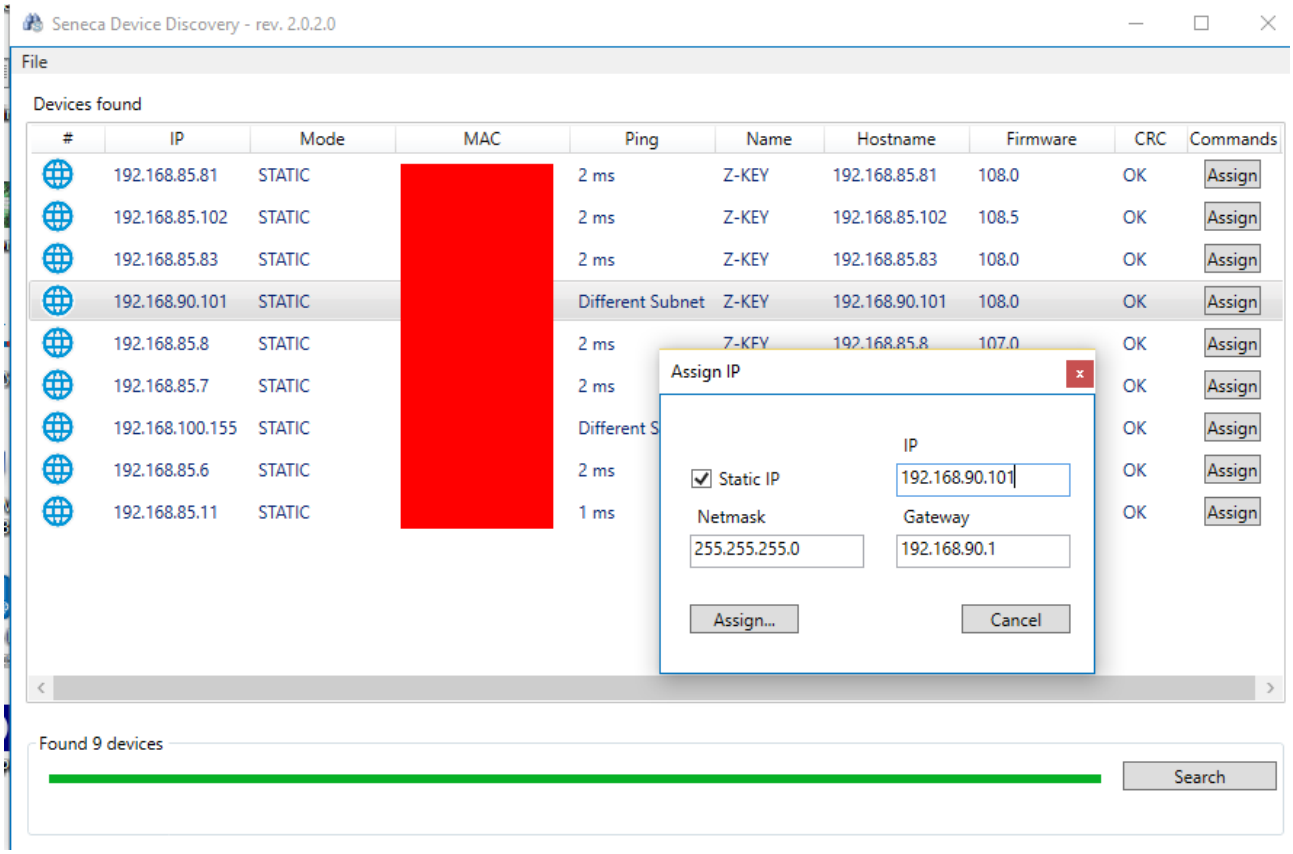
19. Seneca Discovery Device

The Seneca Discovery Device Tool is available for free from:

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http://www.seneca.it/products/z-key

With this Tool you can search Z-KEY devices (and others Seneca Device) and change the actual IP configuration also if your PC has a different subnet.



WARNING!

For Security Reasons you can disable the IP change functionality from the Webserver "Setup" page.

20. Easy Setup APP for Android

Using an OTG Cable and an Android Device With OTG capability you can use Easy Setup App for change the IP configuration directly from the USB connector.

For more info go to the ANDROID APP ON Google play and search for the "Seneca Easy Setup APP" icon EASY Setup.

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The OTG Cable can be buy directly from www.seneca.it :



CU-A-MICRO-OTG

Micro USB OTG adapter cable - USB Type A Female.

21. CGI (common gateway interface) command

When Z-KEY is configured in Gateway mode it's possible to read tags values using CGI (Common Gateway Interface) line commands.

The cgi syntax is (where 192.168.90.101 is the Z-KEY ip address and N is the TAG page to read):

http://192.168.90.101/index.cgi?page=N

N can be from 1 to 10, every page contain 50 tag values.

For example for obtain the first 50 tags the cgi can be:

http://192.168.90.101/index.cgi?page=1

the response is:

NAME: RTU name

FW: Firmware revision

DHCP: activated or not

IP: Actual IP address

NET: Network mask

GW: Gateway address.

MAC: MAC address.

MODE_NR: the actual mode:

0 = "MODBUS BRIDGE ON PORT#1"

1 ="MODBUS BRIDGE ON PORT#2",

2 = "MODBUS BRIDGE ON PORT#1 AND PORT#2"

3 = "MODBUS GATEWAY PORT#1 AND PORT#2 MASTER"

4 = "MODBUS GATEWAY PORT#1 MASTER AND PORT#2 SLAVE"

5 = "MODBUS GATEWAY PORT#1 SLAVE AND PORT#2 MASTER"

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6 = “MODBUS GATEWAY PORT#1 AND PORT#2 SLAVE"

7 = "REMOTE SERIAL COM ON PORT#1"

8 = "REMOTE SERIAL COM ON PORT#2"

ELEMENTS NUMBER: Tags number in this call.

After this begin the Tag values:

TAGNAME: Tag name

TAGADDRESS: Tag Modbus address

TAGFORMAT: Data format

TAGVALUE: Tag value

TAGSTATUS: FAIL or OK

For example a response is:

Z-KEY

4100

Disabled

192.168.85.104

255.255.255.0

192.168.85.1

c8-f9-81-0c-00-26

3

50

TAG1

40001

UINT16

50

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OK

TAG2

40002

UINT16

1000

OK

TAG3

40003

UINT16

50

OK

TAG4

40005

UINT16

0

OK

TAG5

40007

UINT16

40

FAIL

TAG6

40008

UINT16

0

OK

[...]

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40057

FP LSW

0.000000

FAIL

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