USER MANUAL

Z-PASS1

Z-PASS2

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UNI EN ISO 9001

CERTIFICATE
Nr. 9115.SENE

To use the product safely and effectively, read carefully the following instructions before use. The product must be used only for the use for which it was designed and built. Any other use must be considered with full responsibility of the user. The installation, programmation and set-up is allowed only for authorized operators; these ones must be people physically and intellectually suitable. Set up must be performed only after a correct installation and the user must perform every operation described in the installation manual carefully. Seneca is not considered liable of failure, breakdown, accident caused for ignorance or failure to apply the indicated requirements. Seneca is not considered liable of any unauthorized changes. Seneca reserves the right to modify the device, for any commercial or construction requirements, without the obligation to promptly update the reference manuals.

Seneca Z-PC Line modules: **Z-PASS1, Z-PASS2**

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1 Preliminary information / Informazioni preliminari

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ATTENZIONE!

IN NESSUN CASO SENECA O I SUOI FORNITORI SARANNO RITENUTI RESPONSABILI PER EVENTUALI PERDITE DI DATI ENTRATE O PROFITTI, O PER CAUSE INDIRETTE, CONSEQUENZIALI O INCIDENTALI, PER CAUSE (COMPRESA LA NEGLIGENZA), DERIVANTI O COLLEGATE ALL' USO O ALL' INCAPACITÀ DI USARE Z-PASS1/Z-PASS2, ANCHE SE SENECA È STATA AVVISATA DELLA POSSIBILITÀ DI TALI DANNI.

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SENECA SRL PUO' MODIFICARE IL CONTENUTO DI QUESTO MANUALE IN QUALUNQUE MOMENTO E SENZA PREAVVISO AL FINE DI CORREGGERE, ESTENDERE O INTEGRARE FUNZIONALITA' E CARATTERISTICHE DEL PRODOTTO.

Date	Revision	Notes
07/03/2019	22 (FW rel. SW003900_250)	-Added chapter “Timer Configuration” -Added paragraphs under “Rule Management” for new logic features
20/03/2019	23 (FW rel. SW003900_251)	- Paragraph “Rule Management”: added “Bitmask” condition and “Set Bits” action - Paragraphs “Alarm Configuration”, “Message Configuration”: added info about export/import to/from csv file - Paragraph “Configuration Management”: added type of configuration to be saved
09/04/2019	24 (FW rel. SW003900_260)	-Added chapter “OPC-UA protocol” -Added paragraph “OPC-UA Server Cconfiguration”
23/07/2019	25 (FW rel. SW003900_270)	-Added chapter “MQTT client protocol” -Changed Chapters order for new webserver menu
26/07/2019	26 (FW rel. SW003900_280)	-Added OPC-UA server Security Policy -Added MQTT client protocol chapter info
27/08/2019	27 (FW rel. SW003900_290)	-Added the new option “Retain” in Tag Creation/Modification
05/11/2019	28 (FW rel. SW003900_292)	-Max Modbus TCP-IP servers from 10 to 25 -Added NAT 1:1 feature -Added Static Route feature
19/12/2019	29 (FW rel. SW003900_293)	Added new 64 bits Tags in chapter “Tag Creation/Modification”
19/12/2019	30	Added info about OPC-UA Server namespace-id
30/03/2020	31 (FW rel. SW003900_295)	Added “User” account
23/09/2020	32 (FW rel SW003900_299)	Added “Datalogger on Trigger” new feature Added “Serial Trace” new feature Added “SMS command “OVPN ON” and “OVPN OFF” Added new parameter MQTT “Sleep Timeout”
25/01/2021	33	Added new command “CLEAN LOGS” (From FW rel 313) Added info on how to send commands from MQTT to the device Added info on how to write a command from MQTT to the device Removed all references to old Z-PASS models
06/04/2021	34	Removed missing hyperlinks

2 CHARACTERISTICS

2.1 RTU Models characteristics

MODEM:

ZPASS2-S-4GWW (Rev. C3x):	**LTE-TDD B34/B38/B39/B40/B41** **LTE-FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13 B18/ B19/B20/B25/B26/B28/B66** **UMTS/HSPA+ B1/B2/B4/B5/B6/B8/B19** **GSM/GPRS/EDGE 850/900/1800/1900MHz**
ZPASS2-4GWW (Rev. C3x):	**LTE-TDD B34/B38/B39/B40/B41** **LTE-FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13 B18/ B19/B20/B25/B26/B28/B66** **UMTS/HSPA+ B1/B2/B4/B5/B6/B8/B19** **GSM/GPRS/EDGE 850/900/1800/1900MHz**

3 Firmware Licensing Terms

3.1 Firmware with Open Source GPL

The Z-PASS firmware contains Open Source software under GPL. According to Section 3b of GPL, we offer you the source code. You can obtain the source code with licensing terms of the Open Source software from Seneca s.r.l. on request. Send your request to support@seneca.it with the subject "Open Source Z-PASS ".

4 Upgrading the firmware by USB pen

Z-PASS firmware can be upgraded by means of a USB pen; a pen drive formatted with FAT32 file-system is needed.

The procedure is the following:

1) download the FW file from one of the following links:

   http://www.seneca.it/products/z-pass1
   http://www.seneca.it/products/z-pass2

   the downloaded file is a .zip file; extract the FW file from it;
   the FW file shall have a name like the following:

   SW003900_xxx.bin

2) copy the file into the root of the USB pen
3) switch off the Z-PASS
4) insert the USB pen into the USB#1 port
5) switch on the Z-PASS; the upgrade procedure will take some minutes to be completed; during this time, the Z-PASS MUST NOT be switched off; during the procedure, the Z-PASS will be rebooted several times; also, during the procedure, several LEDS will blink simultaneously[1]
6) the upgrade procedure is ended when only the LED “RUN” is blinking[2]
7) remove the USB pen

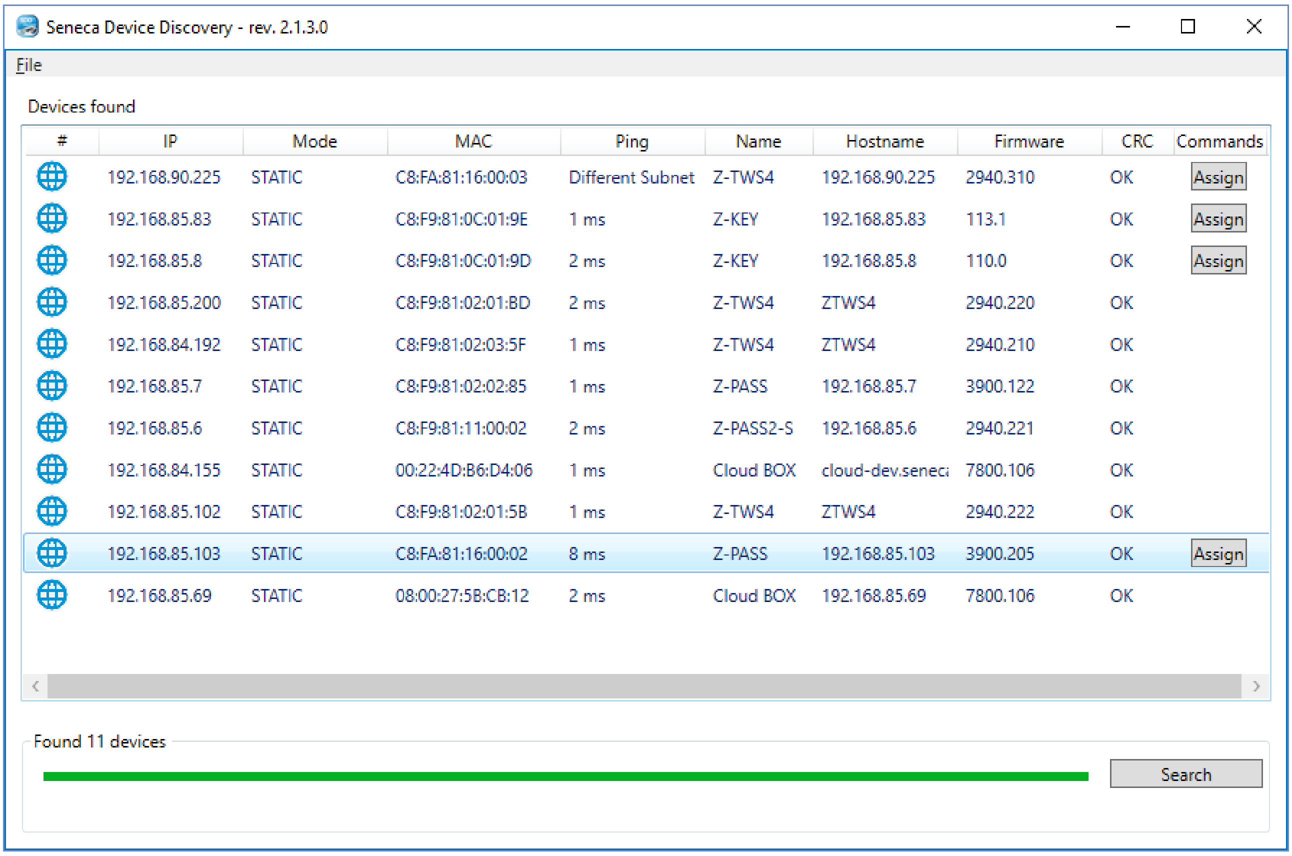
5 Discovering the Z-PASS IP address

Z-PASS devices come out of the factory with the default IP address 192.168.90.101, on the Ethernet (LAN) network interface.

If this address is changed, *and forgotten*, it can be retrieved using the “Seneca Device Discovery” application (SDD), as shown in the following figure:

[1] This applies only to products with HW revisions IO and R01; in details: for IO HW revision, all LEDs will blink simultaneously, except for Power, LAN/WAN, COM and modem LEDs; for R01 HW revision, RUN, VPN and SERV LEDs will blink.

[2] Also SERV and VPN LEDs might blink, depending on the Device configuration and status.

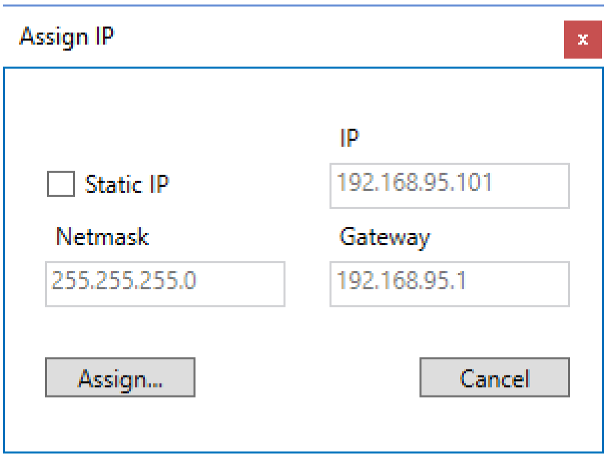


#	IP	Mode	MAC	Ping	Name	Hostname	Firmware	CRC	Commands
	192.168.90.225	STATIC	C8:FA:81:16:00:03	Different Subnet	Z-TWS4	192.168.90.225	2940.310	OK	Assign
	192.168.85.83	STATIC	C8:F9:81:0C:01:9E	1 ms	Z-KEY	192.168.85.83	113.1	OK	Assign
	192.168.85.8	STATIC	C8:F9:81:0C:01:9D	2 ms	Z-KEY	192.168.85.8	110.0	OK	Assign
	192.168.85.200	STATIC	C8:F9:81:02:01:BD	2 ms	Z-TWS4	ZTWS4	2940.220	OK	
	192.168.84.192	STATIC	C8:F9:81:02:03:5F	1 ms	Z-TWS4	ZTWS4	2940.210	OK	
	192.168.85.7	STATIC	C8:F9:81:02:02:85	1 ms	Z-PASS	192.168.85.7	3900.122	OK	
	192.168.85.6	STATIC	C8:F9:81:11:00:02	2 ms	Z-PASS2-S	192.168.85.6	2940.221	OK	
	192.168.84.155	STATIC	00:22:4D:B6:D4:06	1 ms	Cloud BOX	cloud-dev.senec	7800.106	OK	
	192.168.85.102	STATIC	C8:F9:81:02:01:5B	1 ms	Z-TWS4	ZTWS4	2940.222	OK	
	192.168.85.103	STATIC	C8:FA:81:16:00:02	8 ms	Z-PASS	192.168.85.103	3900.205	OK	Assign
	192.168.85.69	STATIC	08:00:27:5B:CB:12	2 ms	Cloud BOX	192.168.85.69	7800.106	OK	

Found 11 devices

This application shows the IP address, MAC address, FW version and some other useful information, for every Z-PASS device (and other Seneca products) found in the LAN.

Moreover, by clicking on the “Assign” button, it is possible to change the network configuration parameters of a device, as shown in the following figure:



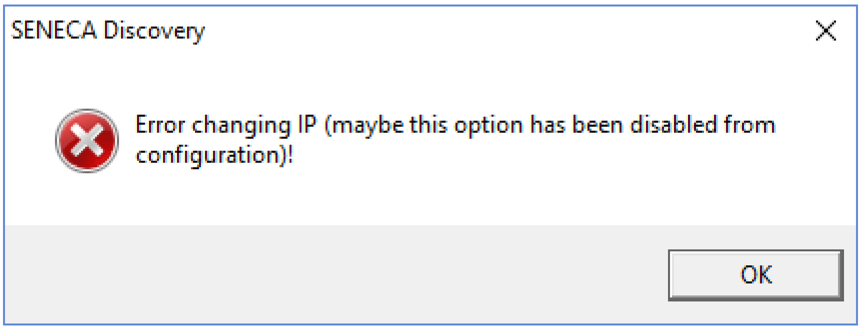
□ Static IP

IP: 192.168.95.101

Netmask: 255.255.255.0

Gateway: 192.168.95.1

For security reasons, this feature can be disabled on the device (see paragraph 21.1.2); in this case, the following error message is shown, after clicking on the “Assign” button”.



Error changing IP (maybe this option has been disabled from configuration)!

The SDD can be easily installed by running the installer program available at the following link:

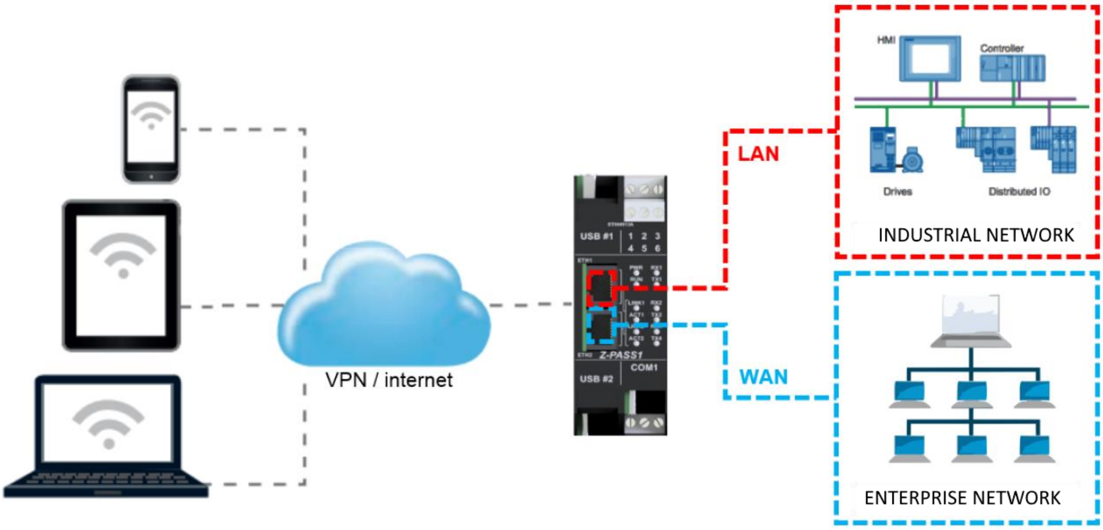
http://www.seneca.it/products/sdd

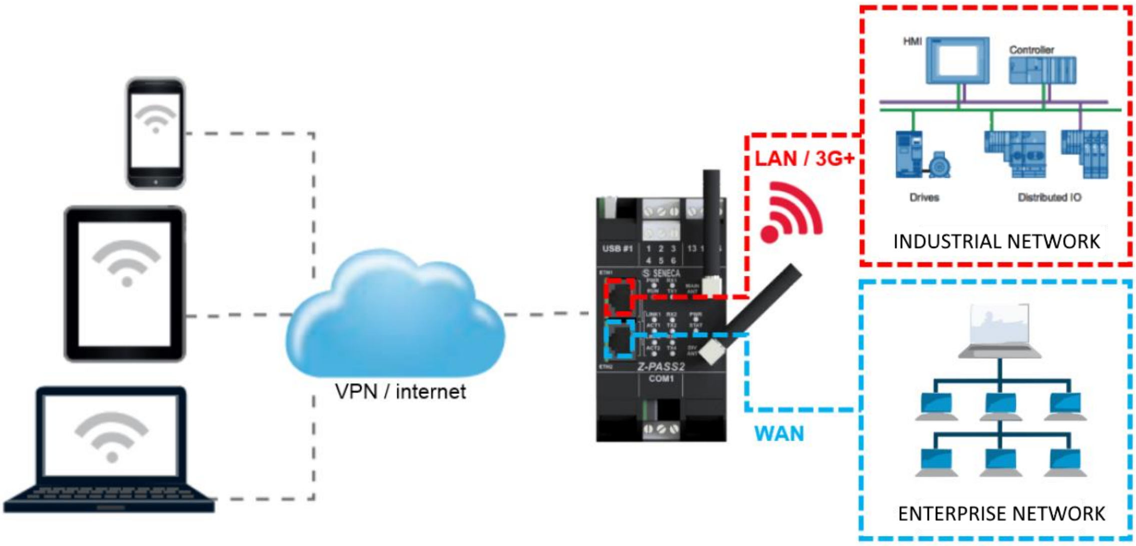
NOTE:
- when Z-PASS is working in "Switch" mode, the IP Address shown by the SDD is the same regardless of the Ethernet port which the PC running the SDD is connected to;
- when Z-PASS is working in "LAN/WAN" mode, the IP Address shown by the SDD is the LAN IP Address when the PC is connected to the LAN port, the WAN IP Address when the PC is connected to the WAN port; moreover, the network configuration parameter changes apply to the relevant port.

6 Ethernet Mode

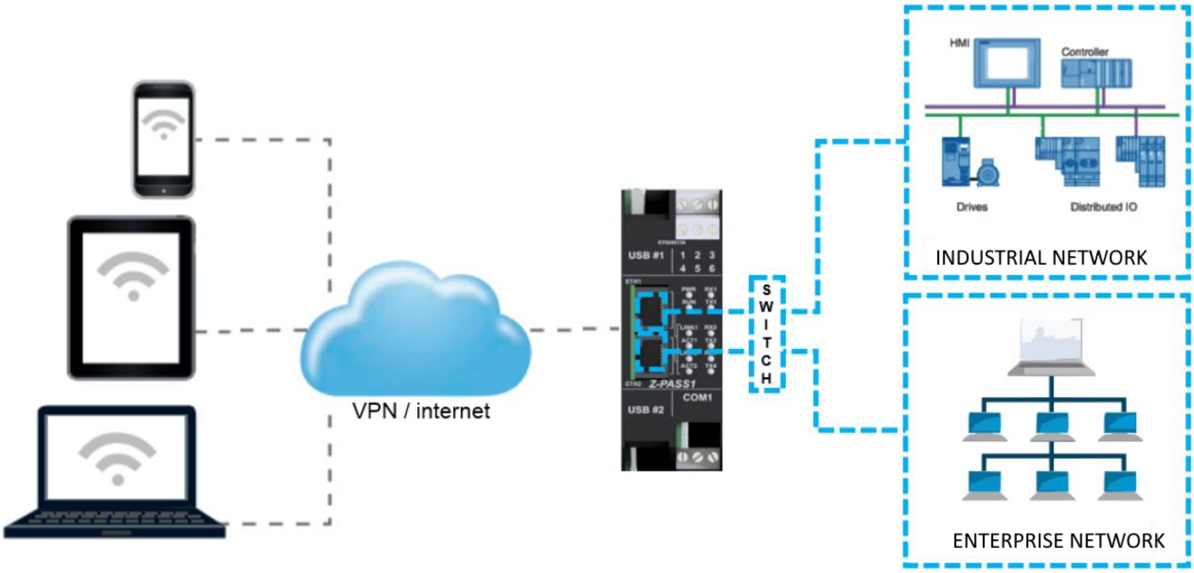
In Z-PASS products, the two available Ethernet ports can be configured as two fully separated network interfaces ("LAN" and "WAN") or, as in the older versions, they can work as ports of an Ethernet switch; the user can choose between the "LAN/WAN" mode and the "Switch" mode, by means of a new configuration parameter ("Ethernet Mode") (see paragraph 21.1.2).

The "LAN/WAN" mode is needed when the "industrial" network connected to the LAN interface (comprising e.g. HMI and PLC devices) shall be separated from the "enterprise" network connected to the WAN interface (comprising enterprise PCs and servers); when the Z-PASS is remotely accessed through the WAN interface, only devices connected to the LAN interface can be reached, while access to machines lying in the enterprise network is forbidden; this is depicted in the following two figures.





When this separation is not needed or when the Internet access is achieved only through the mobile (3G+) interface, the “Switch” mode still lets the Z-PASS to be used as an Ethernet switch, as shown in the following figure.



7 Modbus Ethernet to Serial Gateway

Z-PASS can be configured to run as a Modbus Ethernet to Serial Gateway: Modbus TCP requests received from the Ethernet interface (but also from the PPP [Mobile Network] and VPN interfaces) are converted into Modbus RTU requests and sent to the serial interface; in the same way, the Modbus RTU responses received from the serial interface are converted to Modbus TCP responses and sent back to the source network interface.

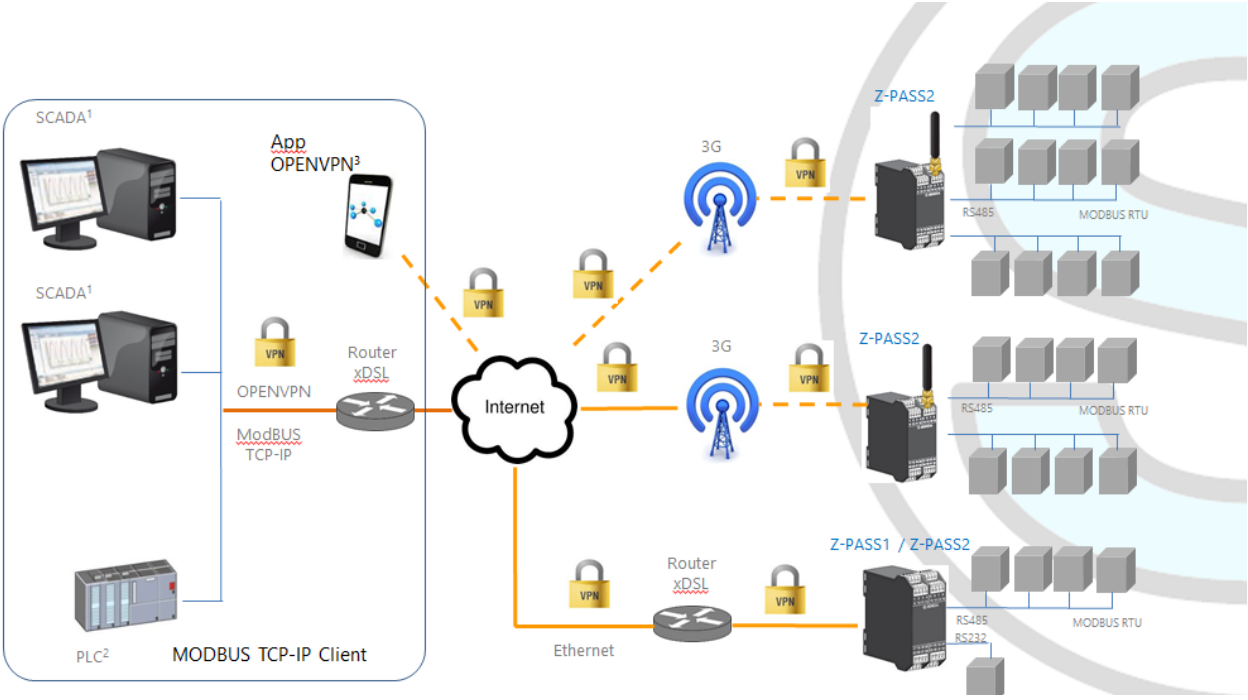
A Modbus Ethernet to Serial Gateway instance can be activated for each of the three available serial ports: COM1 (RS232/RS485), COM2 (RS485) and COM4 (RS485); each one can receive the Modbus TCP requests on a different TCP port (e.g.: 501, 502, 503).

Another possible configuration is to run a Modbus Ethernet to Serial Gateway instance, receiving Modbus TCP requests on a single TCP port (e.g.: 502) and handling two or all the three serial ports. In this case, Modbus RTU requests are simultaneously sent to all the configured ports; obviously, in this configuration, each slave module on the two or three buses shall have a distinct Modbus address;

Each Modbus Ethernet to Serial Gateway instance can support up to 32 simultaneous TCP connections.

The TCP connection can be established over a VPN tunnel, as shown in the following figure.

A detailed description of the Modbus Ethernet to Serial Gateway configuration can be found in 21.1.6.1 paragraph.



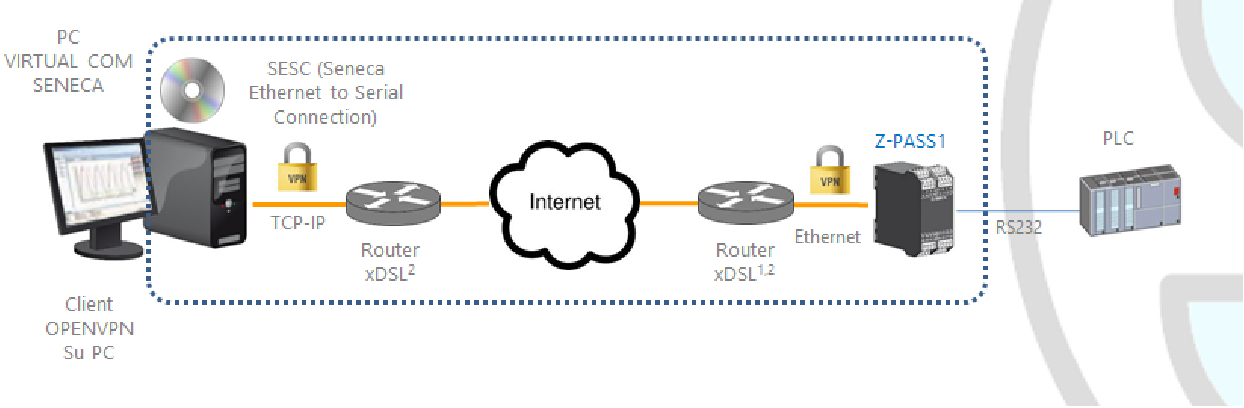
8 Transparent Gateway

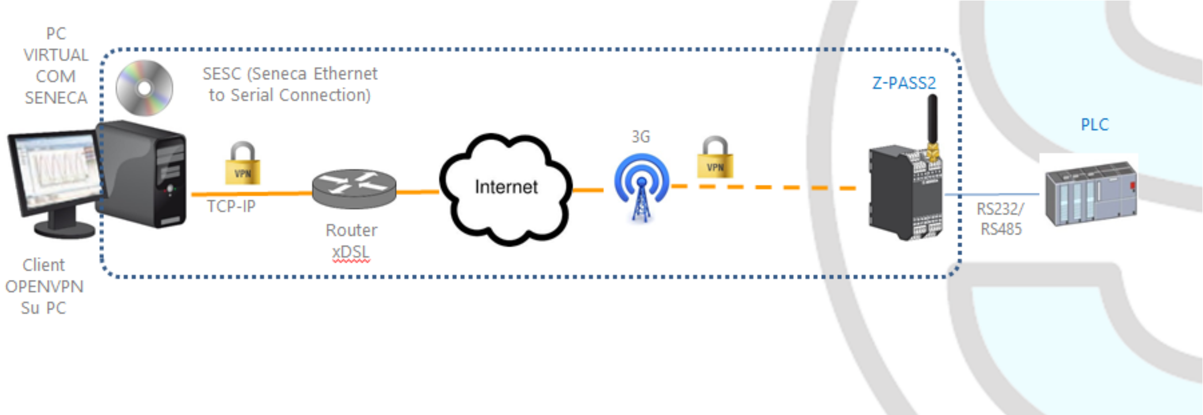
As an alternative to Modbus Ethernet to Serial Gateway, Z-PASS can be configured to run as a "Transparent Gateway". The big difference between these two modes is that, while the first works just with the Modbus protocol, the second could virtually be applied to any serial protocol that can be transported over the TCP/IP stack.
As a Transparent Gateway, Z-PASS provides the following operating modes:

- Virtual COM (with RFC 2217 support)
- Serial Tunnel Point-to-Point on TCP
- Serial Tunnel Point-to-Point on UDP
- Serial Tunnel Point-to-Multipoint on UDP

Each mode will be fully described in a specific paragraph below.

8.1 Virtual COM (with RFC 2217)





The Virtual COM functionality lets to a PC Application, which transmits data only over a serial line, to communicate with a remote serial device, using Ethernet/Internet; in other word, through a Z-PASS, a PC and a serial device, placed in sites distant from each other, can communicate as they are directly connected.

In this mode, data sent over the LAN or WAN network, are received by the Z-PASS and sent to the serial port; response packets follow the reverse path.

RFC 2217 defines some features that let the PC remotely set the properties (baud rate, data bits, stop bits and parity) of the Z-PASS serial port; so, when the Virtual COM operating mode is selected for one port, the port is reconfigured regardless of the previous settings and the values configured by means of the “Serial Ports” web page are overwritten.

To let the Virtual COM work, an utility called “Seneca Ethernet to Serial Connection” shall be installed on the PC; this is explained in details in 8.1.1 paragraph.

The TCP connection can be established over a VPN tunnel, as shown in the figures at the beginning of the paragraph.

Once the connection is established, a program using the virtual COM port will transmit data to the Z-PASS serial port; for example, Modbus RTU requests sent by a Modbus Master program will reach Modbus slave devices connected to the COM2 RS485 bus.

A particular notice shall be given about the “Data Packing Interval” parameter, that can be set when Virtual COM operating mode is selected: this parameter lets you define the time interval, in milliseconds, used by Z-PASS as a criterion to pack the data bytes received from the serial port before sending them to the network; in other words, when Z-PASS does not receive any more bytes from the serial port for the given time interval, it packs the received bytes and send them over the established TCP connection; the optimal value to be set for this parameter depends on the protocol that is transparently routed from the TCP/IP network to the serial line and vice versa.

WARNING!

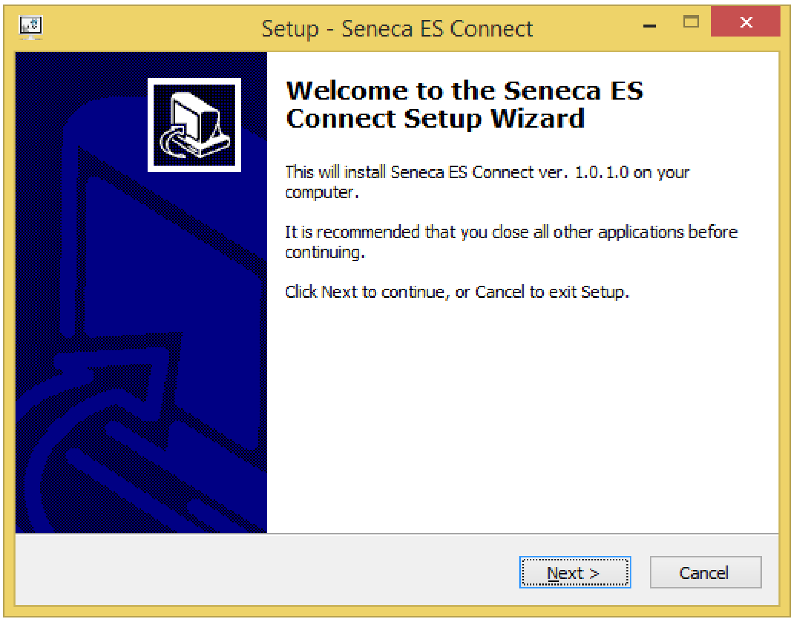
In the Virtual COM operating mode, just one connection is accepted for a given serial port.

8.1.1 Seneca Serial to Ethernet Connect

8.1.1.1 Installing Seneca Serial to Ethernet Connect driver

Seneca Ethernet to Serial Connect runs on Windows Vista™, Windows 7™ and Windows 8.1™.

Double click the installer:



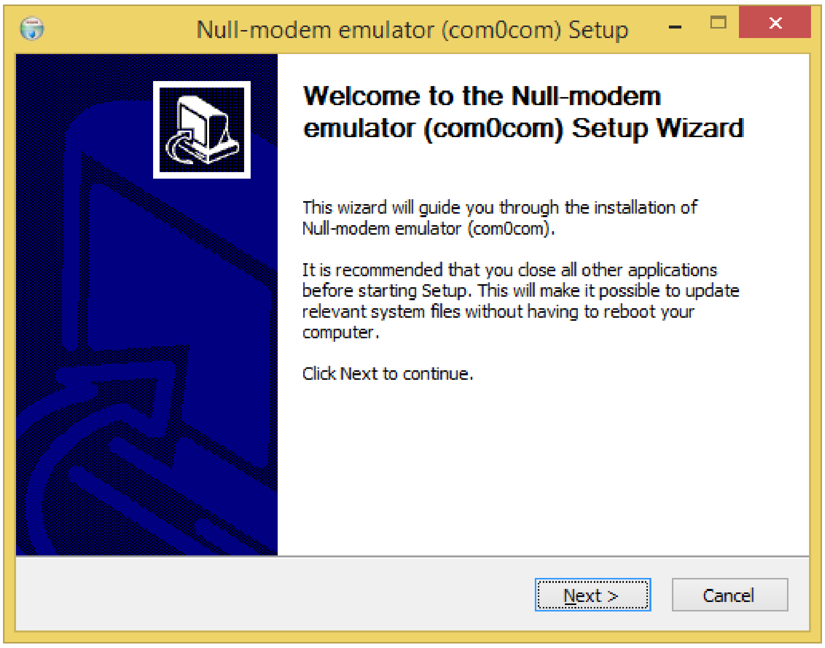
Welcome to the Seneca ES Connect Setup Wizard

This will install Seneca ES Connect ver. 1.0.1.0 on your computer.

It is recommended that you close all other applications before continuing.

Click Next to continue, or Cancel to exit Setup.

After that, the com0com driver will be installed:



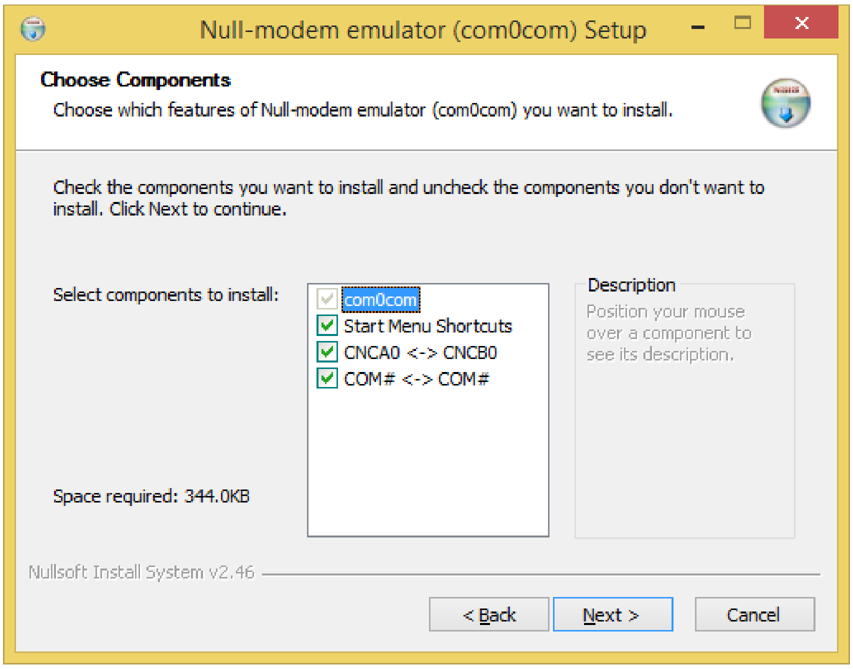
Welcome to the Null-modem emulator (com0com) Setup Wizard

This wizard will guide you through the installation of Null-modem emulator (com0com).

It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.

Click Next to continue.

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



Choose Components

Choose which features of Null-modem emulator (com0com) you want to install.

Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.

Select components to install:

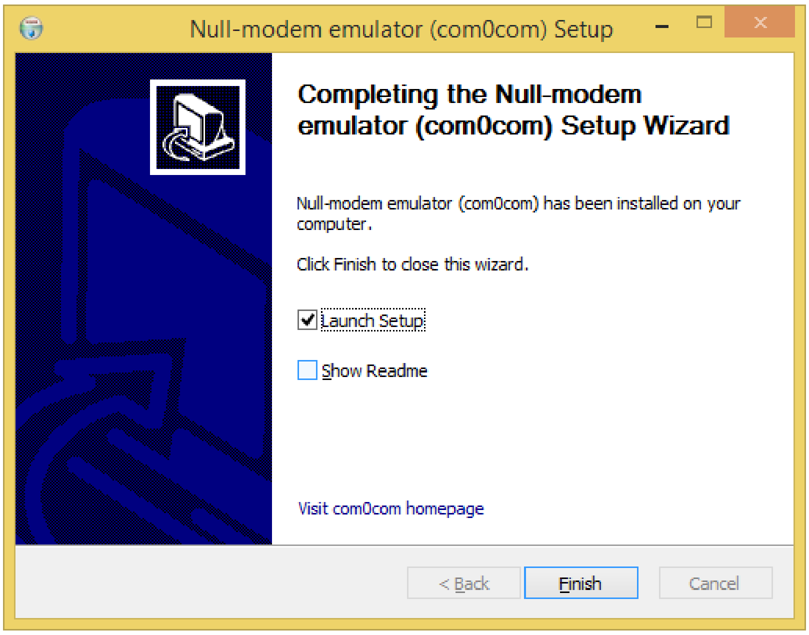
☑ com0com
☑ Start Menu Shortcuts
☑ CNCA0 <-> CNCB0
☑ COM# <-> COM#

Description

Position your mouse over a component to see its description.

Space required: 344.0KB

Now Click on “Launch Setup”:



Null-modem emulator (com0com) Setup

Completing the Null-modem emulator (com0com) Setup Wizard

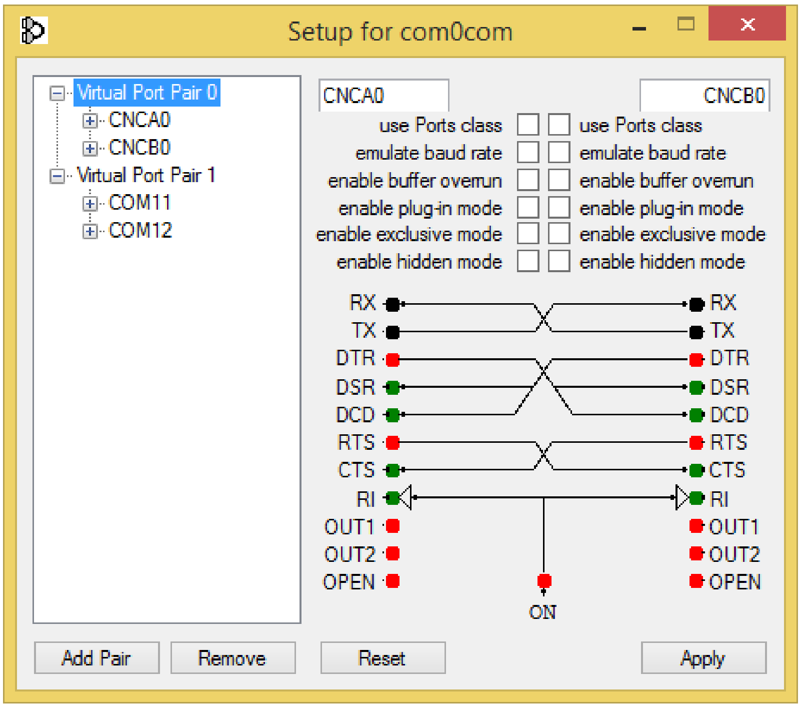
Null-modem emulator (com0com) has been installed on your computer.

Click Finish to close this wizard.

☑ Launch Setup

☐ Show Readme

Press Finish, the com0com setup will open:



Setup for com0com

- Virtual Port Pair 0
  - CNCA0
  - CNCB0
- Virtual Port Pair 1
  - COM11
  - COM12

CNCA0			CNCB0
use Ports class	☐	☐	use Ports class
emulate baud rate	☐	☐	emulate baud rate
enable buffer overrun	☐	☐	enable buffer overrun
enable plug-in mode	☐	☐	enable plug-in mode
enable exclusive mode	☐	☐	enable exclusive mode
enable hidden mode	☐	☐	enable hidden mode

We have installed two pairs of Virtual Ports:

CNCA0, CNCB0

and also:

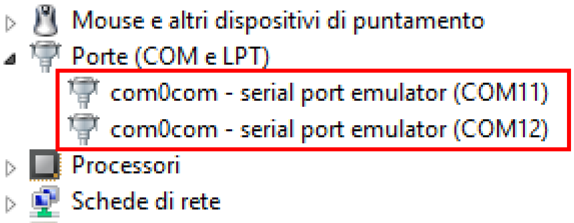
COM11, COM12 (note that in your system the com# can be different).

The first pair can be used in software that support the CNCA names, the other in software that support only the Ports class.

If you need to add more virtual ports, press the “Add Pair” button, then select if you need or not a port class.

Confirm the driver installation with “Apply”.

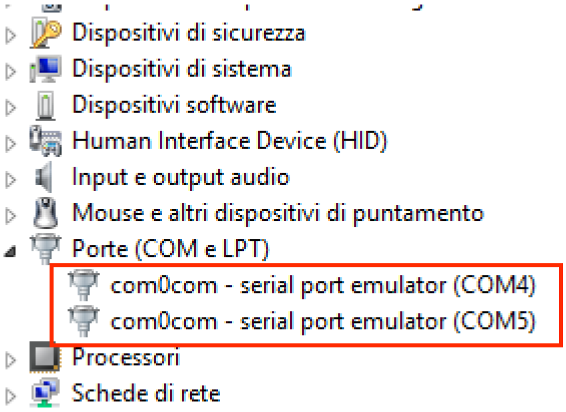
The serial port emulator couple COM11-COM12 will be available:



- Mouse e altri dispositivi di puntamento
- Porte (COM e LPT)
  - com0com - serial port emulator (COM11)
  - com0com - serial port emulator (COM12)
- Processori
- Schede di rete

8.1.1.2 Select the COM port for Seneca Serial to Ethernet Connect

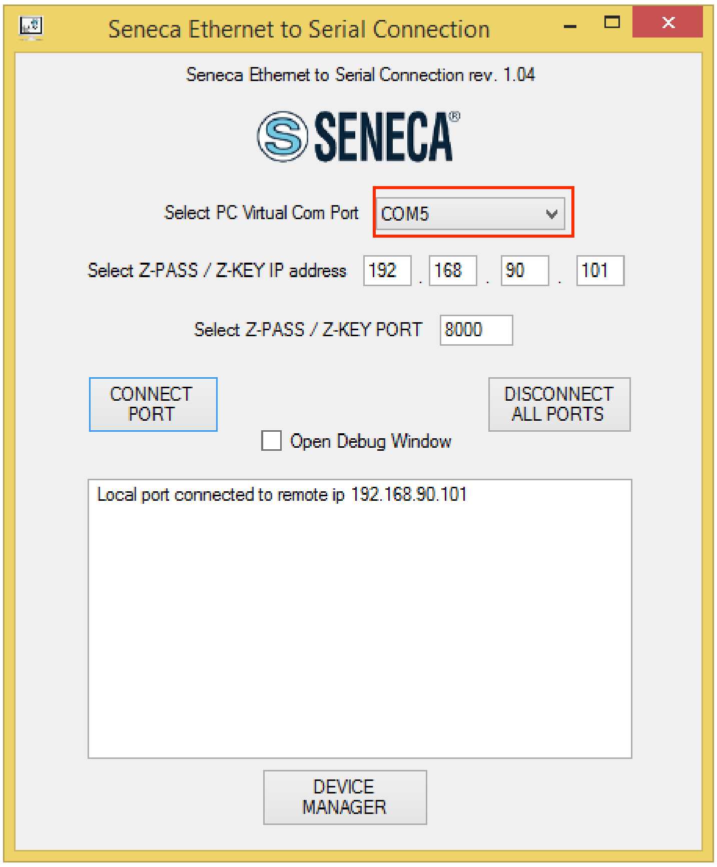
The driver installation will use the first 2 serial ports that are free (in our case the driver has created the COM4 and COM5 pair):



- Dispositivi di sicurezza
- Dispositivi di sistema
- Dispositivi software
- Human Interface Device (HID)
- Input e output audio
- Mouse e altri dispositivi di puntamento
- Porte (COM e LPT)
  - com0com - serial port emulator (COM4)
  - com0com - serial port emulator (COM5)
- Processori
- Schede di rete

The Ethernet to Serial Connection software will use only one port (the right port in the com0com setup), only the com0com ports will be displayed.

We connect the COM5 to the Seneca ES Connector:



Seneca Ethernet to Serial Connection rev. 1.04

Select PC Virtual Com Port COM5

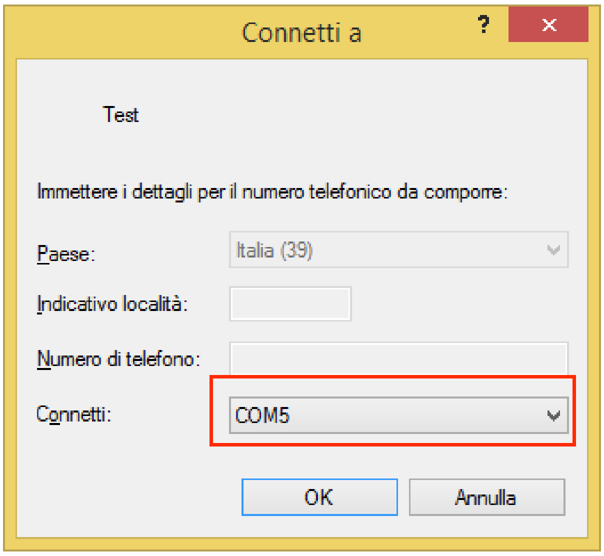
Select Z-PASS / Z-KEY IP address 192 . 168 . 90 . 101

Select Z-PASS / Z-KEY PORT 8000

□ Open Debug Window

Local port connected to remote ip 192.168.90.101

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



Test

Immettere i dettagli per il numero telefonico da comporre:

Paese: Italia (39)

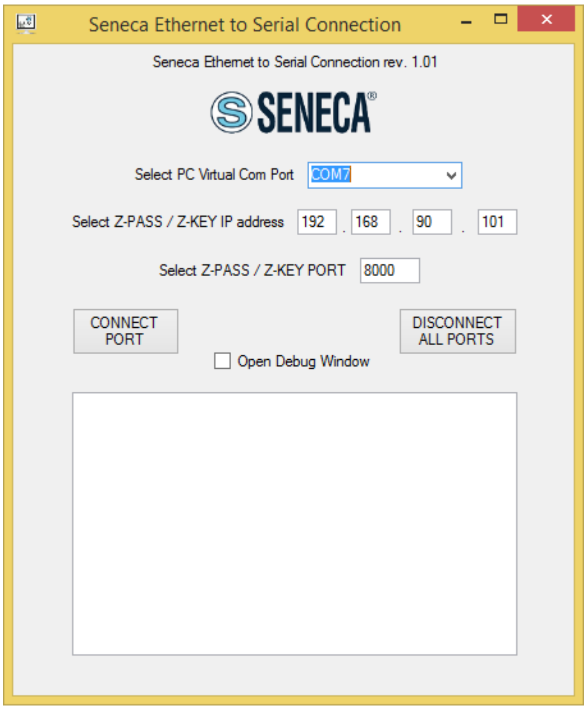
Indicativo località:

Numero di telefono:

Connetti: COM5

The COM5 is now connected to Z-PASS, on the TCP port 8000:

8.1.1.3 Configuring Seneca Serial to Ethernet Connect



Seneca Ethernet to Serial Connection

Seneca Ethernet to Serial Connection rev. 1.01

Select PC Virtual Com Port: COM7

Select Z-PASS / Z-KEY IP address: 192 . 168 . 90 . 101

Select Z-PASS / Z-KEY PORT: 8000

□ Open Debug Window

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

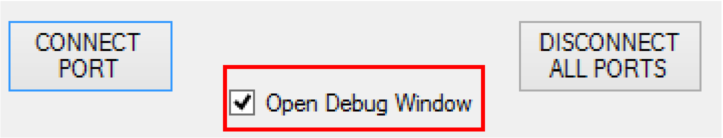
Then click on “CONNECT PORT”.

If you need to connect another serial com to another Z-PASS, configure the new com port and the new IP address, then click on “CONNECT PORT”.

To disconnect all ports, click on “DISCONNECT ALL PORTS”.

8.1.1.4 Debugging the Connection

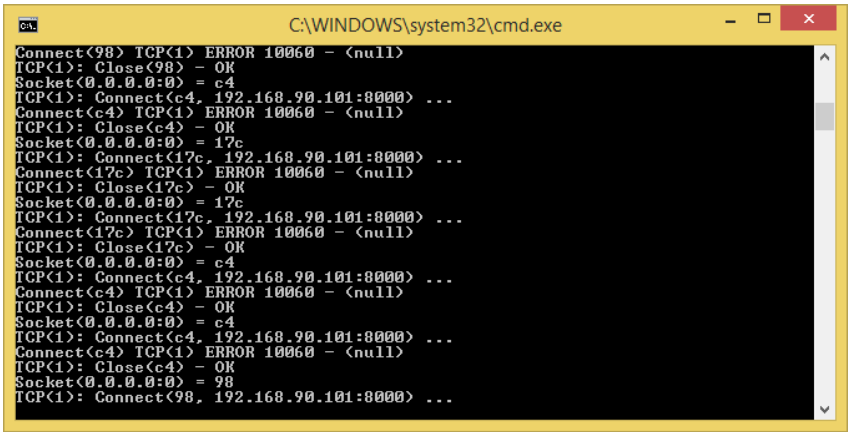
Before clicking on “CONNECT PORT”, you can choose to open a debug window to verify the connection:



☑ Open Debug Window

Then click on “CONNECT PORT”:

If you see “Connect Error” like here:



C:\WINDOWS\system32\cmd.exe

```
Connect(98) TCP(1) ERROR 10060 - (null)
TCP(1): Close(98) - OK
Socket(0.0.0.0:0) = c4
TCP(1): Connect(c4, 192.168.90.101:8000) ...
Connect(c4) TCP(1) ERROR 10060 - (null)
TCP(1): Close(c4) - OK
Socket(0.0.0.0:0) = 17c
TCP(1): Connect(17c, 192.168.90.101:8000) ...
Connect(17c) TCP(1) ERROR 10060 - (null)
TCP(1): Close(17c) - OK
Socket(0.0.0.0:0) = 17c
TCP(1): Connect(17c, 192.168.90.101:8000) ...
Connect(17c) TCP(1) ERROR 10060 - (null)
TCP(1): Close(17c) - OK
Socket(0.0.0.0:0) = c4
TCP(1): Connect(c4, 192.168.90.101:8000) ...
Connect(c4) TCP(1) ERROR 10060 - (null)
TCP(1): Close(c4) - OK
Socket(0.0.0.0:0) = c4
TCP(1): Connect(c4, 192.168.90.101:8000) ...
Connect(c4) TCP(1) ERROR 10060 - (null)
TCP(1): Close(c4) - OK
Socket(0.0.0.0:0) = 98
TCP(1): Connect(98, 192.168.90.101:8000) ...
```

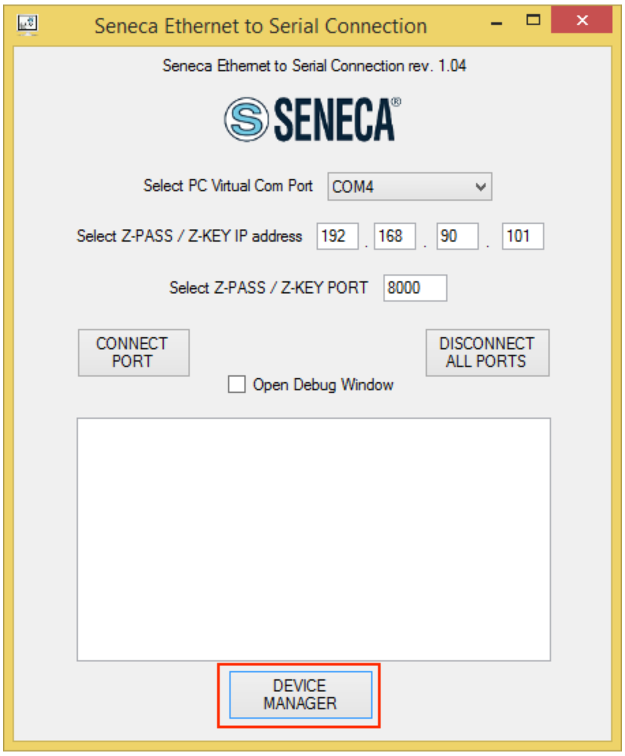
check the configuration (Z-PASS IP address and TCP port).

8.1.1.5 Changing the COM port number

Old software applications 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 it to COM2/COM3:

Click on “DEVICE MANAGER” button:



Seneca Ethernet to Serial Connection

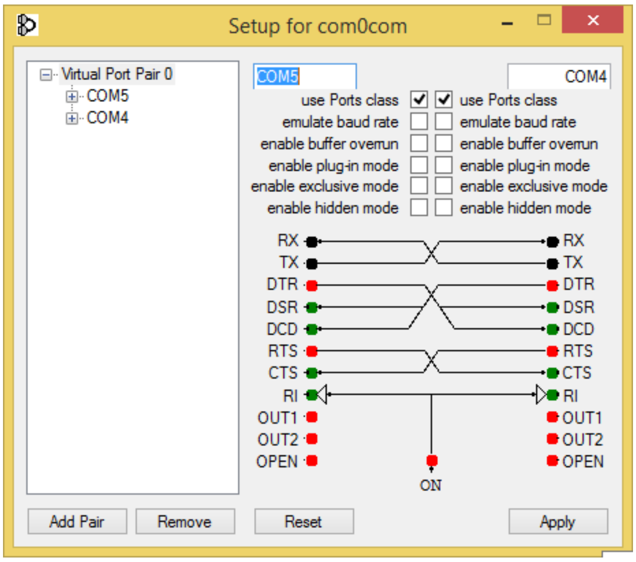
Seneca Ethernet to Serial Connection rev. 1.04

Select PC Virtual Com Port: COM4

Select Z-PASS / Z-KEY IP address: 192 . 168 . 90 . 101

Select Z-PASS / Z-KEY PORT: 8000

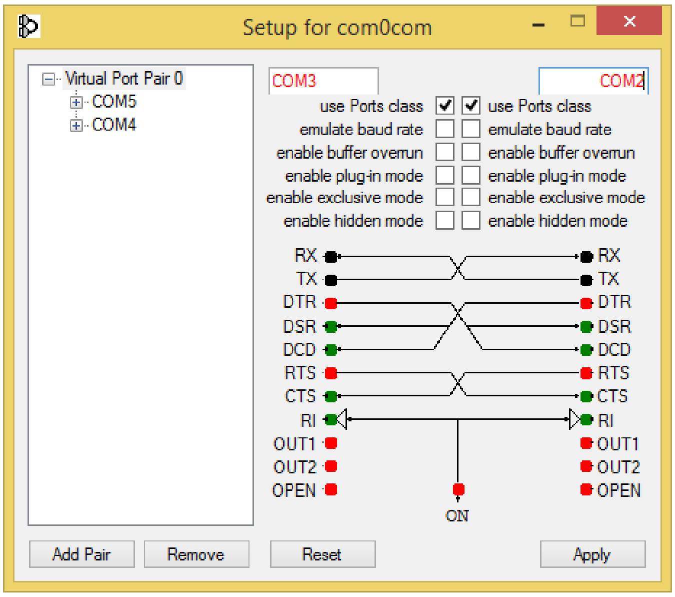
The com0com setup window will open:



Virtual Port Pair 0
- COM5
- COM4

COM5			COM4
use Ports class	☑	☑	use Ports class
emulate baud rate	□	□	emulate baud rate
enable buffer overrun	□	□	enable buffer overrun
enable plug-in mode	□	□	enable plug-in mode
enable exclusive mode	□	□	enable exclusive mode
enable hidden mode	□	□	enable hidden mode

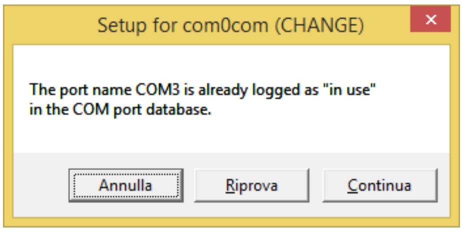
Now change COM5 to COM3 and COM4 to COM2, then click “Apply”:



Virtual Port Pair 0
- COM5
- COM4

COM3			COM2
use Ports class	☑	☑	use Ports class
emulate baud rate	□	□	emulate baud rate
enable buffer overrun	□	□	enable buffer overrun
enable plug-in mode	□	□	enable plug-in mode
enable exclusive mode	□	□	enable exclusive mode
enable hidden mode	□	□	enable hidden mode

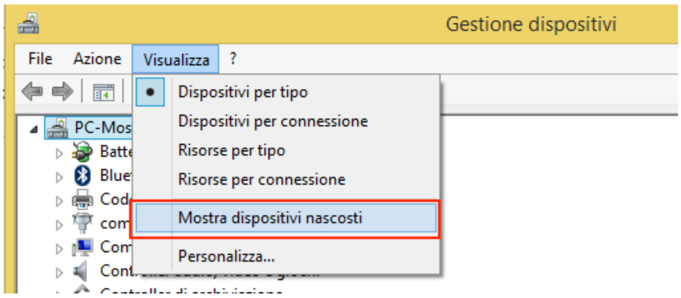
Sometimes the COM can be marked as “in use”:



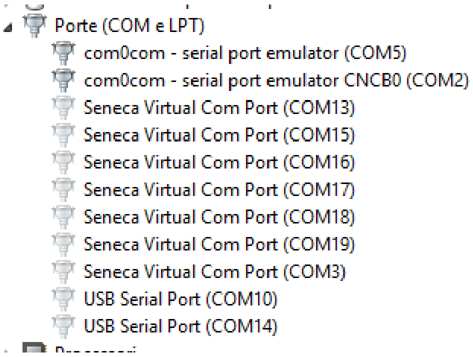
The port name COM3 is already logged as "in use" in the COM port database.

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

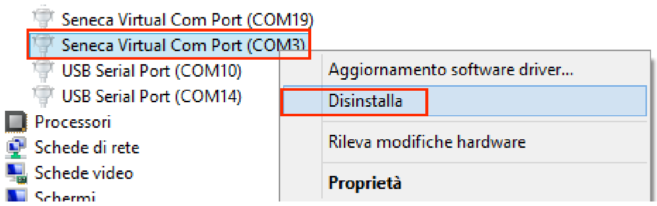
We must uncheck the “in use” flag by uninstalling the port. Since the port is not connected, click on “Show hidden peripherals”:



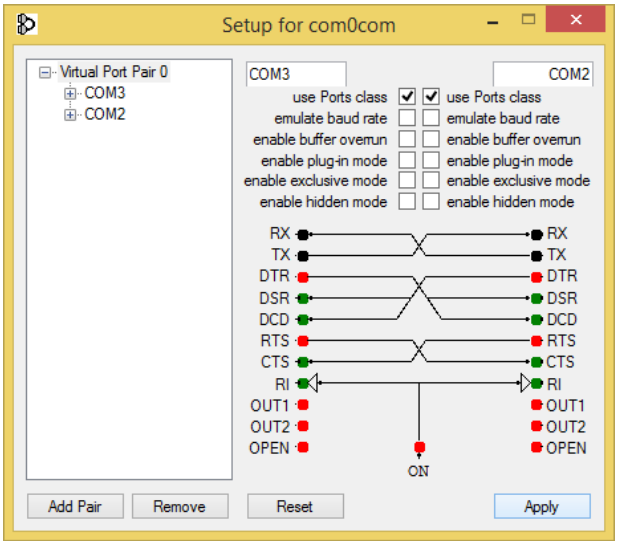
Now all the ports that are not in use are displayed in transparent (also our COM3):


Porte (COM e LPT)
com0com - serial port emulator (COM5)
com0com - serial port emulator CNCB0 (COM2)
Seneca Virtual Com Port (COM13)
Seneca Virtual Com Port (COM15)
Seneca Virtual Com Port (COM16)
Seneca Virtual Com Port (COM17)
Seneca Virtual Com Port (COM18)
Seneca Virtual Com Port (COM19)
Seneca Virtual Com Port (COM3)
USB Serial Port (COM10)
USB Serial Port (COM14)

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


Seneca Virtual Com Port (COM19)
Seneca Virtual Com Port (COM3)
USB Serial Port (COM10)
USB Serial Port (COM14)
Processori
Schede di rete
Schede video
Schermi
Aggiornamento software driver...
Disinstalla
Rileva modifiche hardware
Proprietà

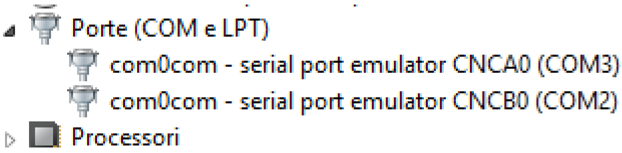
Now the COM3 is free and we can use it on the com0com setup:



COM3 | COM2

use Ports class ☑	☑ use Ports class
emulate baud rate □	□ emulate baud rate
enable buffer overrun □	□ enable buffer overrun
enable plug-in mode □	□ enable plug-in mode
enable exclusive mode □	□ enable exclusive mode
enable hidden mode □	□ enable hidden mode

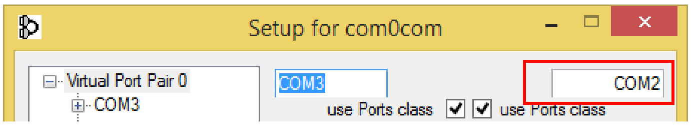
Finally click on “Apply”, now the COM3/COM2 pair is created:



Porte (COM e LPT)
com0com - serial port emulator CNCA0 (COM3)
com0com - serial port emulator CNCB0 (COM2)
Processori

WARNING!

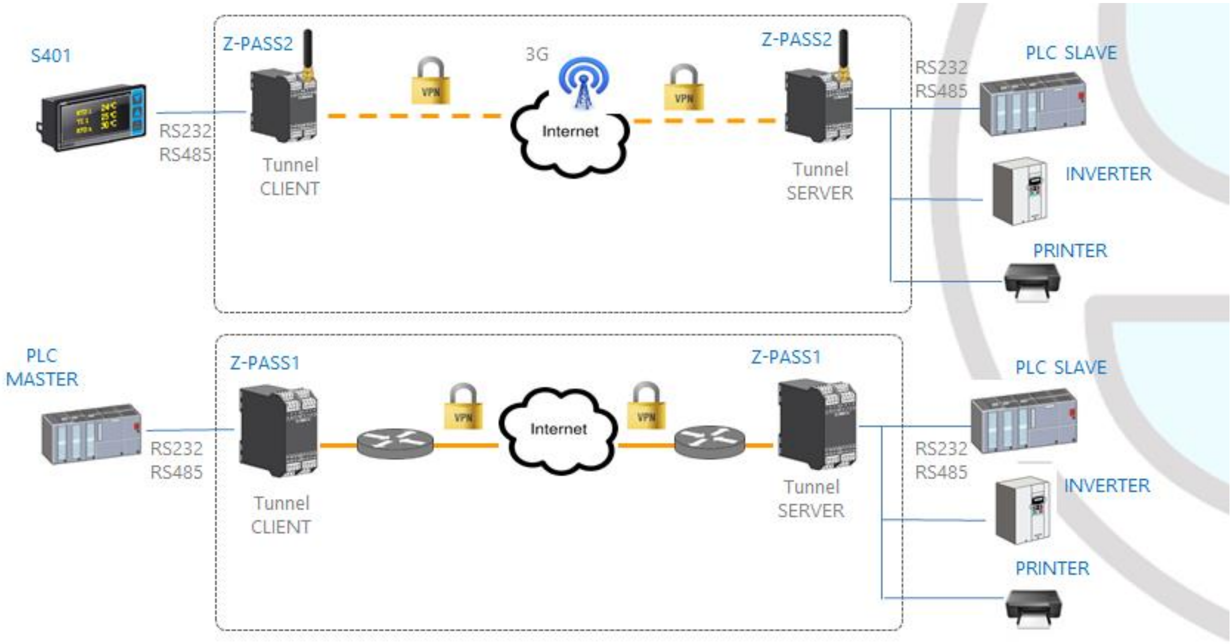
Seneca Serial to Ethernet connector always uses the right port in the com0com setup (in our case COM2).



COM3 | COM2

use Ports class ☑ ☑ use Ports class

8.2 Serial Tunnel Point-to-Point on TCP



The Serial Tunnel Point-to-Point allows to extend a serial connection between two serial devices that support the same serial protocol by a TCP/UDP connection.

In TCP operating mode, one Z-PASS is defined as the “Master” and another Z-PASS is the “Slave”: the first is a Tunnel Client, which receives data from the serial line and sends them to an outgoing TCP connection, while the second is a Tunnel Server, which receives data from an incoming TCP connection and sends them to the serial line; in this mode a “tunnel” is established between the two serial ports.

In configuration phase, on the Master it is necessary to set the Destination IP Address and the Destination Port that defines the outgoing TCP connection; on the Slave, you have to set the Listen Port on which the incoming TCP connection is accepted.

The tunnel can be established through the LAN (Ethernet) or through the WAN (Mobile Network), also exploiting VPN connectivity.

WARNING!

In the Serial Tunnel Point-to-Point on TCP operating mode, just one connection is accepted for a given serial port.

8.3 Serial Tunnel Point-to-Point on UDP

The Serial Tunnel Point-to-Point on UDP operating mode is much like that on TCP.

The only difference is that no TCP connection is established and serial data are transported by UDP packets.

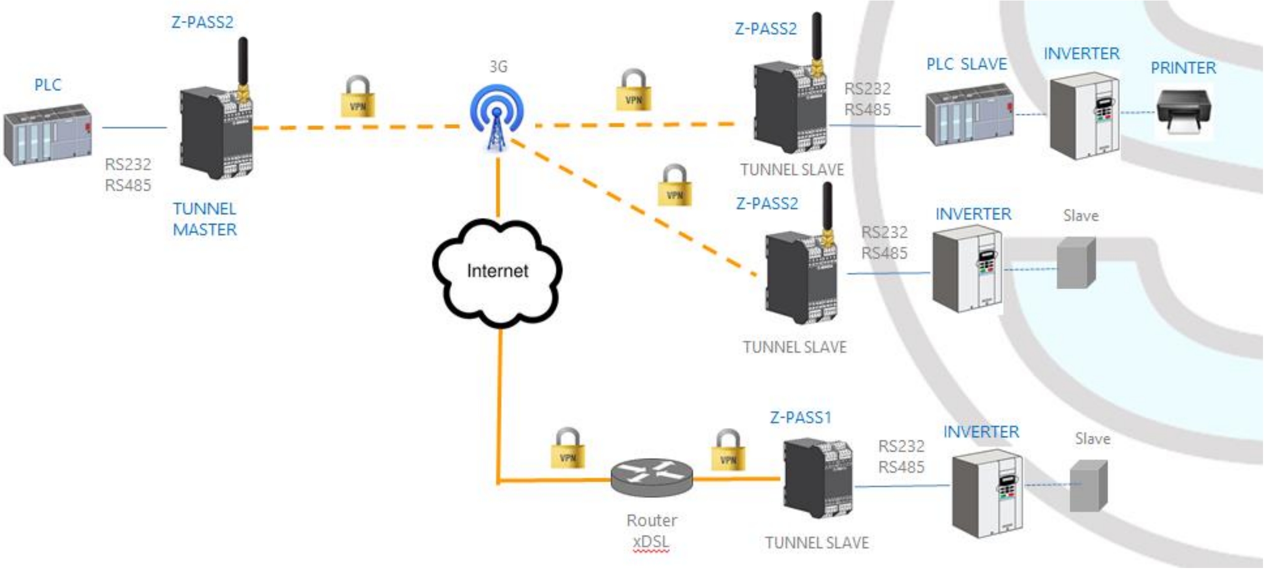
The configuration parameters are the same as those for the serial tunnel on TCP.

Also in this case, the tunnel can be established through the LAN (Ethernet) or through the WAN (Mobile Network), also exploiting VPN connectivity.

WARNING!

In the Serial Tunnel Point-to-Point on UDP operating mode, just one connection is accepted for a given serial port.

8.4 Serial Tunnel Point-to-Multipoint



The Serial Tunnel Point-to-Multipoint allows to create a tunnel with a master and more than one slave; on the master side, the data received from the serial line are sent to all the slaves, by means of *multicast* transmission mode, in UDP packets.

To let the multicast work, the master and the slaves shall be part of the same *multicast group*, so there is a “Multicast Group” parameter that shall be properly set; furthermore, for the Master Configuration have to be defined “Destination Port” and “Multicast Interface” parameters, the latter shall be set to select the network interface that allows to send the packets; for the slave configuration, “Listen Port” and “Multicast Interface” are requested; the latter shall be set to select the network interface which allows to receive the packets.

The tunnel can be established through the LAN (Ethernet) or through the VPN (Ethernet or 3G based).

WARNING!

In the Serial Tunnel Point-to-Multipoint operating mode, just one connection is accepted for a given serial port.

9 Modbus Shared Memory Gateway

Z-PASS can be configured to run as a Modbus Shared Memory Gateway: in this mode, a set of configured tags are periodically and continuously read from Modbus RTU Slaves or Modbus TCP Servers; these values are always available in a shared memory, readable via Modbus TCP/RTU.

Z-PASS Modbus Shared Memory Gateway supports up to 2000 tags and up to 32 Modbus TCP Client simultaneously.

In the Z-PASS Modbus Shared Memory Gateway, a Modbus TCP/IP Server (or slave) is always running on a configured TCP port.

As for Modbus Ethernet to Serial Gateway functionality (see chapter 7), the Modbus TCP requests can be forwarded through the Ethernet interface or through the Mobile/VPN interface.

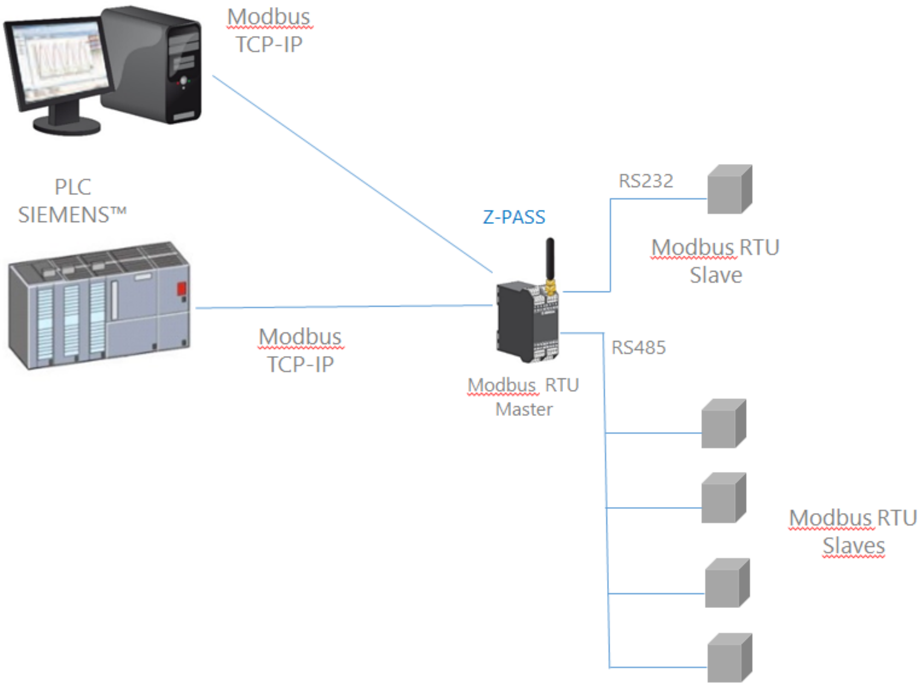
For each of the three available serial ports (COM1, COM2, COM4), the kind of “Task” can be defined: a serial port can be configured as a Modbus RTU Master or Modbus RTU Slave or not running at all.

In this manner, a number of possible combinations are available, to a maximum of three Modbus RTU Masters or three Modbus RTU Slaves; normally, a combination of the two will be chosen, for example: Modbus RTU Slave on COM1 and Modbus RTU Masters on COM2,COM4.

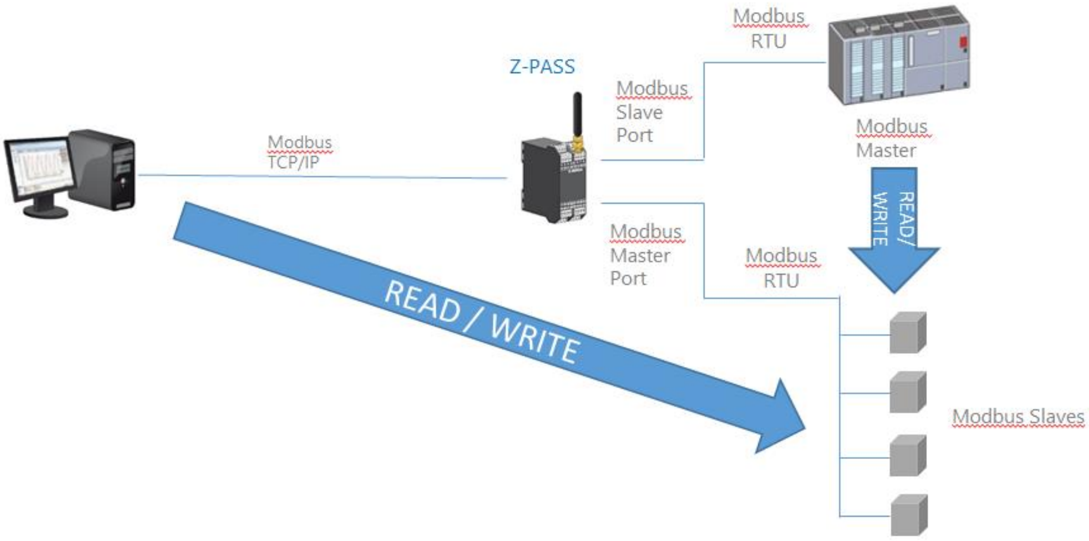
Furthermore, tags can be read from/written to up to 25 Modbus TCP Servers.

Finally, some tags can be defined which are related to “embedded” digital I/Os and to GPS information (only for Z-PASS2).

In the following pictures, some typical scenarios are shown.



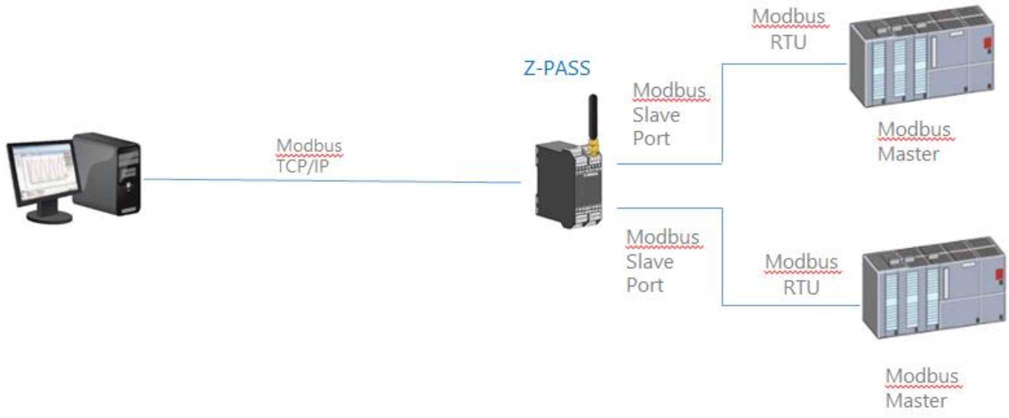
In the above picture, two serial ports (RS232 – COM1, RS485 – COM2) are configured as Modbus RTU Master.



In this case, one serial port (e.g. COM1) is configured as Modbus Slave and another (e.g. COM2) is configured as Modbus Master.

When some measures acquired from the Modbus Slaves must be available for a PLC, which supports only Modbus Master protocol, and also for a SCADA/Datalogger, the Z-PASS can be configured with one serial port defined as Modbus Slave (connected to the PLC) and another in Modbus Master (connected to the Modbus Slaves bus).

The PLC Modbus RTU Master and the Modbus TCP client(s) write/read the Z-PASS shared memory registers, while the Z-PASS Modbus Shared Memory Gateway keeps the shared memory aligned with the Modbus Slaves registers.



In the above picture, two serial ports (e.g. COM2 and COM4) are configured as Modbus Slave and connected to a PLC Modbus Master port; so, the two PLCs and the Modbus TCP Client can write/read the Z-PASS shared memory to share data among them.

The Z-PASS Modbus Shared Memory Gateway provides some interesting features as explained in the following.

Besides “classic” gateway behavior, tags can be configured to work in “Bridge” mode; this mode allows to acquire tag values from the serial side only when the gateway receives Modbus TCP/RTU Requests for those tags; this can be very useful when using RTU devices with “Fail safe” outputs[3], as explained in details in 21.3.1 paragraph.

Z-PASS Modbus Shared Memory Gateway performs requests optimization, inserting as many tags as possible in a single read/write request; the maximum number of registers in a request can be set

[3] This feature is available in many Seneca products.

independently for each serial port/TCP Server and for read and write operations; this option can be useful to connect RTU devices which support different maximum number of registers on different serial ports.

Tag configuration can be created using a Microsoft Excel™ Template provided by Seneca (see paragraph 21.3.2.4); this can largely reduce configuration time, particularly when a large number of tags shall be configured.

10 Data Logger

When Modbus Shared Memory Gateway functionality is enabled, Z-PASS can act as a “Data Logger”: Modbus Shared Memory Gateway tag values are periodically stored into files (called “log files”), which can then be transferred.

Tags can be associated to up to four Data Logger Groups, which can have different sample periods and transfer periods.

Three “transfer” methods are currently supported; log files can be:

- copied to the SD card;
- transferred to an FTP server;
- sent to one or more email addresses, as an attachment.

One or more of the above methods can be enabled.

Log files are stored in the Z-PASS (flash) memory so, if one of the active transfer methods should temporarily fail, they can be successfully transferred later; for each data logger group, this internal log file “cache” can contain up to the limit which is reached first between the following two:

- 1000 log files
- (about) 100000/(number of enabled groups) samples (that is log file lines)

When the limit is reached, the log file “rotation” occurs, that is the oldest files are overwritten by the new ones.

Log files are standard “csv” files, which can be processed by Excel™ or other PC software.

Each log file has an “header” line containing:

- the “INDEX” string (optional)
- the “TYPE” string (optional)
- the “TIMESTAMP” string
- the tag names

The following lines contain:

- a progressive line index (optional)
- the “LOG” string (optional)

- the timestamp value
- the tag values

Here is a portion of a log file:

```
INDEX;TYPE;TIMESTAMP;ZPASS_DI;ZPASS_DO;ZPASS_DI_1;ZPASS_DI_2;ZPASS_DI_3;ZPASS_DI_4;ZPASS_DO_1;ZPASS_
DO_2;ZPASS_DO_3;ZPASS_DO_4;GPS_ERROR;GPS_HOUR;GPS_MINUTE;GPS_SECOND;GPS_DAY;GPS_MONTH;GPS_YEAR;GPS_L
ATITUDE;GPS_LONGITUDE;GPS_HDOP;GPS_ALTITUDE;GPS_COG;GPS_SPEED_KM;GPS_SPEED_KN;GPS_FIX;GPS_NUM_SAT;SH
M_TAG1;ZPASS2_105_TAG1;ZPASS2_106_TAG1;ZPASS2_106_TAG2
1;LOG;29/05/2018
09:49:00;0;0;0;0;0;0;0;0;0;0;0;7;48;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;5;0;32767;14;
11.5
2;LOG;29/05/2018
09:49:05;0;0;0;0;0;0;0;0;0;0;0;7;48;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;5;0;32767;14;
11.5
3;LOG;29/05/2018
09:49:10;0;0;0;0;0;0;0;0;0;0;0;7;48;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;5;0;32767;14;
11.5
4;LOG;29/05/2018
09:49:15;0;0;0;0;0;0;0;0;0;0;0;7;48;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;5;0;32767;14;
11.5
5;LOG;29/05/2018
09:49:20;0;0;0;0;0;0;0;0;0;0;0;7;48;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;5;0;32767;14;
11.5
6;LOG;29/05/2018
09:49:25;0;0;0;0;0;0;0;0;0;0;0;7;48;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;5;0;32767;14;
11.5
7;LOG;29/05/2018
09:49:30;0;0;0;0;0;0;0;0;0;0;0;7;48;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;5;0;32767;14;
11.5
8;LOG;29/05/2018
09:49:35;0;0;0;0;0;0;0;0;0;0;0;7;48;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;5;0;32767;14;
11.5
9;LOG;29/05/2018
09:49:40;0;0;0;0;0;0;0;0;0;0;0;7;49;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;4;0;32767;14;
11.5
10;LOG;29/05/2018
09:49:45;0;0;0;0;0;0;0;0;0;0;0;7;49;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;4;0;32767;14;
11.5
11;LOG;29/05/2018
09:49:50;0;0;0;0;0;0;0;0;0;0;0;7;49;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;4;0;32767;14;
11.5
12;LOG;29/05/2018
09:49:55;0;0;0;0;0;0;0;0;0;0;0;7;49;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;4;0;32767;14;
11.5
13;LOG;29/05/2018
09:50:00;0;0;0;0;0;0;0;0;0;0;0;7;49;31;29;5;18;45.37417;11.94554;1.5;12.7;249.56;0;0;2;4;0;32767;14;
11.5
```

If for a tag the actual value is not available (for example, if the tag corresponds to a register of a Modbus Station which is not responding to Modbus requests), the value written in the corresponding field of the log file can be (see 21.3.2.1 paragraph):

- the string "ERR!", if the "ERROR MODE" parameter for that tag is set to "LAST VALUE"
- the value defined in the "ERROR VALUE" parameter, if the "ERROR MODE" parameter for that tag is set to "ERROR VALUE"

Please note that any time a configuration change is made that affects the Data Logger functionality (from one of the pages in the "Data Logger" section), the following procedure is executed:

- the Data Logger processes are stopped
- the internal log file cache is cleaned
- the Data Logger processes are restarted

10.1 HTTP POST protocol

Z-PASS Data Logger is compatible with Seneca Cloud Box product[4], by means of the HTTP POST Communication protocol developed by Seneca.

This protocol features a set of HTTP POST (RESTFUL) APIs; the related documentation can be provided by Seneca to customers who wish to develop their own server-side software; for information, please contact Seneca Service & Support at support@seneca.it.

The HTTP POST protocol can be enabled along with the other transfer methods (SD, FTP, EMAIL); however, when the HTTP POST protocol is enabled, the following changes apply to the Data Logger behavior:

- only one logging group can be enabled;
- the sampling period shall be a multiple of 30 seconds;
- each sample is sent to the server (namely, the Cloud Box) in a *LOG* message, carried by an HTTP POST request.

The Seneca HTTP POST protocol also lets the server perform the following actions on the Z-PASS:

- setting the values of one or more tags
- restarting the device
- saving the device configuration on the server FTP site
- loading the device configuration from the server FTP site
- starting the FW Upgrade; the FW file is downloaded from the server FTP site
- starting the VPN Box functionality
- stopping the VPN Box functionality

There is an internal cache also for LOG messages sent via HTTP POST requests, used to store log messages while it's not possible to send them to the server; <u>this cache can contain up to 3000 messages</u>.

11 Alarms and Logic Rules

The device can be configured with a maximum of 2000 logic rules.

A logic rule is based on the following basic concept:

[4] For information about "Cloud Box" product, please see Seneca web site (www.seneca.it).

IF CONDITION(s)   THEN ACTION(s)   ELSE ACTION(s)

The “Then Action” is executed if the “If Condition” is true.

The “Else Action” is executed if the “If Condition” is false.

The “If Condition” can also be configured as an alarm.

A full set of parameters are available to define alarm behavior, as given in “Alarm Configuration” page (see paragraph 21.4.1); the whole alarm status can be viewed in “Alarm Summary” page (see paragraph 21.4.2) and the alarm history can be retrieved in “Alarm History” page (see paragraph 21.4.3).

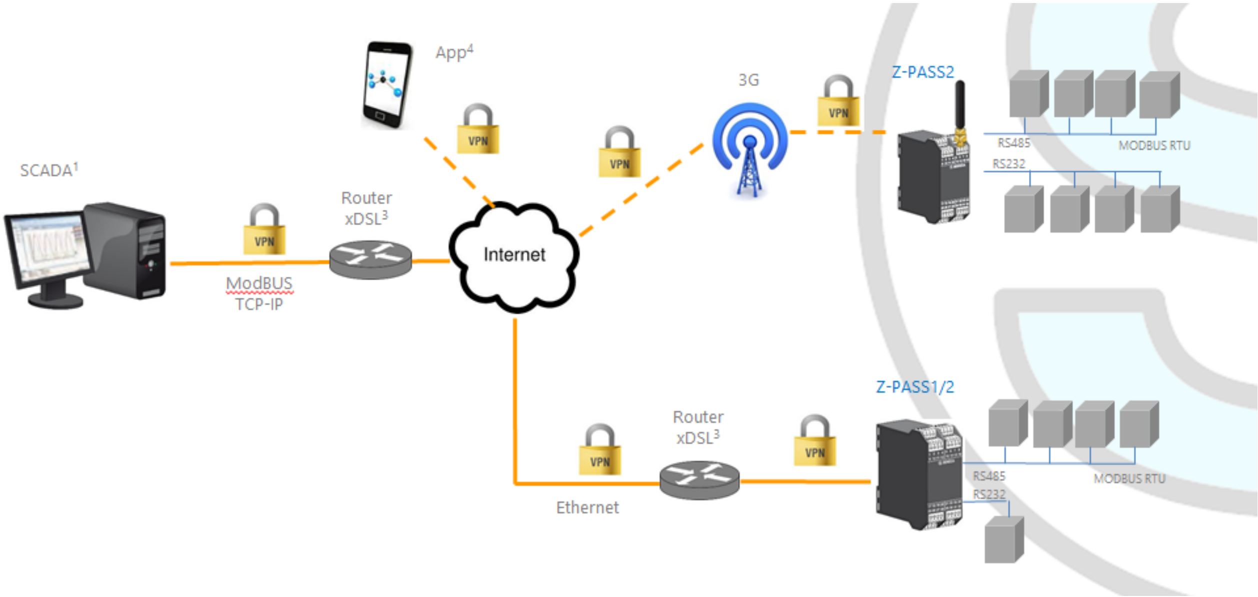
Furthermore, in the “Tag View” page, the “ALARM” and “ANALOG DANGER ALARM” columns show the current alarm status for each tag (see paragraph 21.3.2.4).

The Actions can be used for sending a SMS, EMAIL or HTTP POST;
In each rule can be configured:

- up to three logic conditions (based on alarm states) can be combined in an OR logic expression;
- up to three actions (sending alarms) can be executed.

For more info see chapter 21.6

12 VPN



Z-PASS supports the standard OpenVPN protocol.

The main advantages that come from using a VPN are:

- secure connections, since transported data are encrypted;

- the ability to establish connections without interfering with the corporate LAN;
- no need to have a static/public IP address on the WAN side;
- remote configurability by a built-in Web Server.

Two “VPN modes“ are available, named “OpenVPN” and “VPN Box”, respectively.

The “OpenVPN” mode can be used when the Z-PASS shall be installed in an already existing VPN. In this case, an OpenVPN server shall be available and the configuration, certificate and key files for the Z-PASS client shall be provided by the VPN administrator; the files can be uploaded to the Z-PASS using the “VPN configuration” page of Z-PASS Web Server.

If the VPN infrastructure does not exist yet, the advisable choice is to adopt the “VPN Box” solution, developed by Seneca. The “VPN Box” is an hardware appliance (or a virtual machine) which lets the user easily setup two alternative kinds of VPN:

- “Single LAN” VPN
- “Point-to-Point” VPN

In the “Single LAN” VPN, all devices and PCs (and associated local subnets) configured into VPN are always connected in the same network. In this scenario any PC Client can connect to any device (Z-PASS) and to other machines which lie in the Z-PASS LAN, but also any device/machine can connect to any other remote device/machine which belongs to the same VPN network. This VPN architecture puts some constraints on the device sub-networks definition, in fact all VPN clients must have a different IP address and different local LAN, to avoid conflicts. The software named “VPN BOX Manager” configures VPN BOX and will help you to avoid errors defining local subnet.

In the “Point-to-Point” VPN, a client PC, in a given moment, can perform a single connection, on demand, to only one device (Z-PASS) (and to machines which lie in the Z-PASS LAN) at time. Furthermore, devices can’t communicate each other also if they belong to the same VPN. The advantage of this architecture is that the same sub-network can be used in all sites. Point to point mode makes it possible to define user groups and manage them. This VPN modality must be configured on “VPN Box” by VPN BOX Manager.

There are two kinds of “Point-to-Point” VPN:

- routing Layer 3 VPN
- bridging Layer 2 VPN

In “Routing Layer 3 VPN”, only IP (Layer 3) packets are transported over the VPN tunnel and a new virtual LAN is created with a network subnet which must be different from the LAN subnets of the server and clients.

Conversely, in “Bridging Layer 2 VPN”, all Ethernet frames are transported over the VPN tunnel and the clients are inserted in the server LAN.

Each of the two kinds has benefits and drawbacks:

<u>Layer 2 benefits/drawbacks</u>:

- ➢ can transport any network protocol
- ➢ broadcast traffic (e.g.: DHCP) is transported

- ➢ causes much more traffic overhead on the VPN tunnel

Layer 3 benefits/drawbacks:

- ➢ can transport only IP traffic
- ➢ broadcast traffic (e.g.: DHCP) is not transported
- ➢ lower traffic overhead, transports only traffic which is destined for the VPN clients

The “VPN Box” is supplied with two Windows applications:

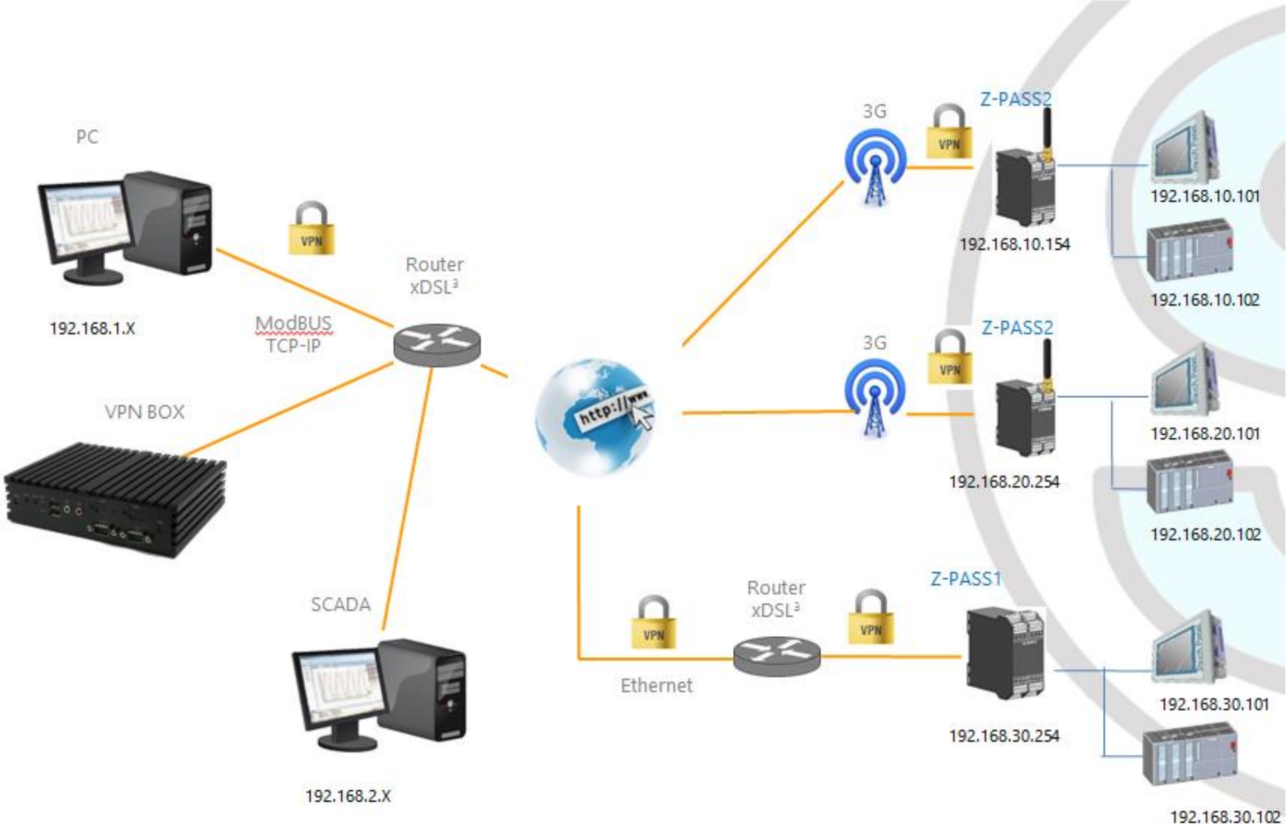
- the “VPN Box Manager”, which allows to configure the VPN[5] mode on the VPN Box and manage the devices
- the “VPN Client Communicator”, which lets the user connect the PC to the network (in the “Single LAN” case) or to a specific device (in the “Point-to-Point” case)

A detailed description of “VPN Box” can be found in the “VPN Box User Manual”.

A detailed description of Z-PASS VPN configuration parameters is given in 21.1.7 paragraph.

The following two sub-paragraphs give some more info about the two kinds of VPN.

12.1 “Single LAN” VPN



[5] Only one of the two kinds of VPN can be configured on a given VPN Box.

The above figure gives an example of a “Single LAN” VPN.

The client PC (with IP address 192.168.1.X) can connect, just as an example, to the first Z-PASS2 by using its 192.168.10.154 IP address and to the PLC in the Z-PASS LAN by using its local IP address 192.168.10.102.

Also, two devices which lie in two different LANs of the same VPN network (e.g.: 192.168.10.101 and 192.168.20.102) can connect to each other, again using their local IP addresses.

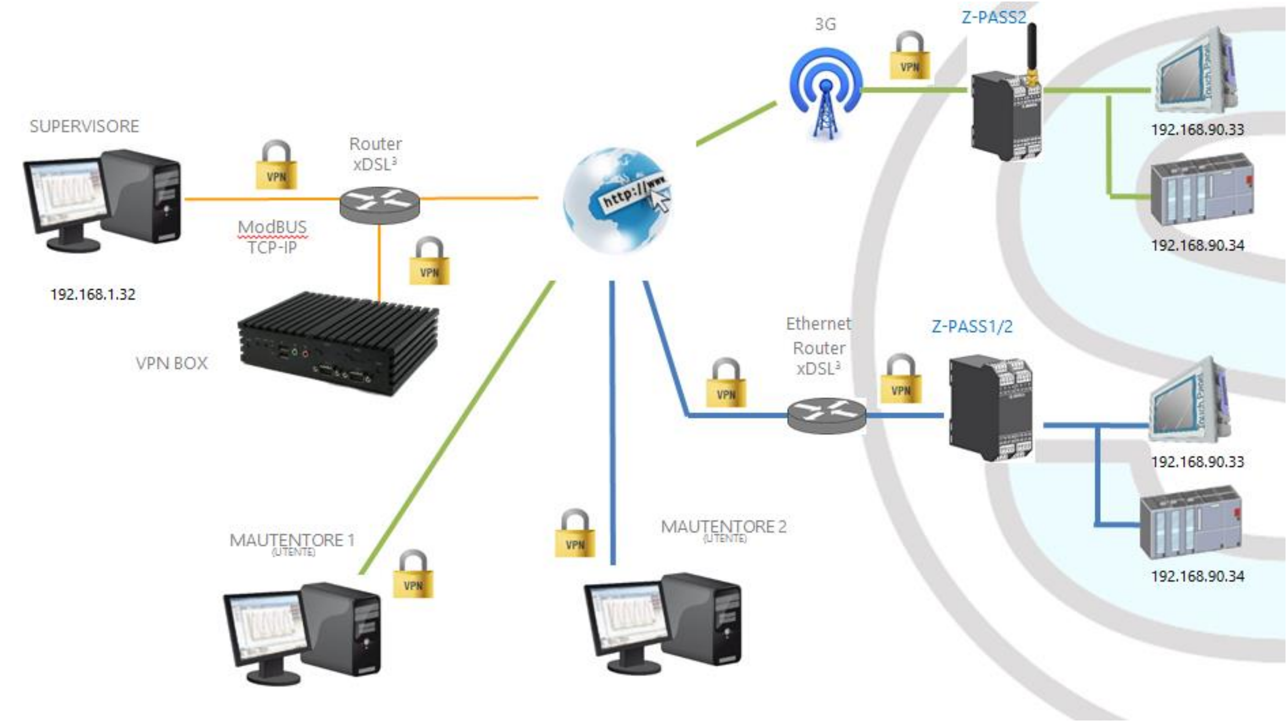
To let this scenario work correctly, an essential rule must always be followed: the Z-PASS LANs and the PC LAN shall have different and not colliding subnets; so, in the above figure, the following subnets allocation has been depicted:

PC LAN	192.168.1.0/24
SCADA LAN	192.168.2.0/24
Z-PASS2 LAN	192.168.10.0/24
Z-PASS2 LAN	192.168.20.0/24
Z-PASS1 LAN	192.168.30.0/24

The “VPN Box Manager” application guides you in the configuration task, checking that no subnet/IP address conflict is present in the network.

If subnet/conflicts cannot be avoided, using a “Single LAN” VPN is still possible if local IP addresses are not used; devices can be reached by means of their VPN IP addresses and machines beyond them can be reached by configuring some “port forwarding” rules on the Device Router (see 21.1.8 paragraph).

12.2 “Point-to-Point” VPN



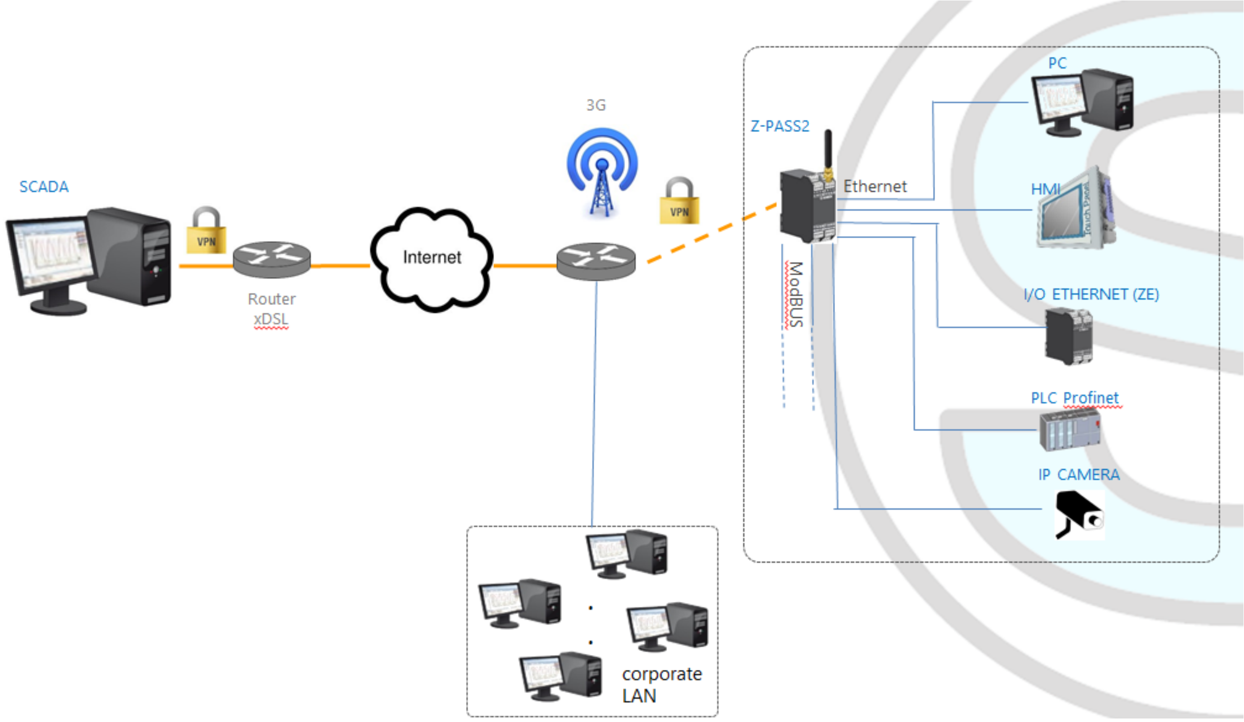
The above figure gives an example of a "Point-to-Point" VPN.

In this scenario a PC (acting as a VPN Client) can connect, on demand, to only one Z-PASS and its subnet, using local IP addresses. Since the client "sees" just one Z-PASS (and attached devices) at time, the same subnet configuration can be assigned to different sites, without creating conflicts.

For this kind of VPN, the "VPN Box Manager" application lets define group of users that can connect only to assigned devices.

The "VPN Client Communicator" application retrieves the list of devices which are available for the logged user; then the user can select one device on the list and connect to it.

13 Router



As already told before, "Router" functionality routes packets between the LAN (Ethernet) interface and the WAN (Mobile Network) interface; so, this functionality specially makes sense when a mobile connection is active, which needs the availability of a 3G modem (true for Z-PASS2).

More specifically, an important feature of the Router is what is known as "IP forwarding"; this means that when Z-PASS receives a packet not targeted for it, it does not discard the packet but forwards it to its actual destination; when a packet is routed from the LAN to the WAN, Z-PASS also performs what is known as "IP masquerading", meaning that the original source IP address is replaced with the IP address of the WAN (PPP) interface.

Another important feature is the availability of a DNS server/forwarder, which can resolve names either by itself or querying the external configured DNS server.

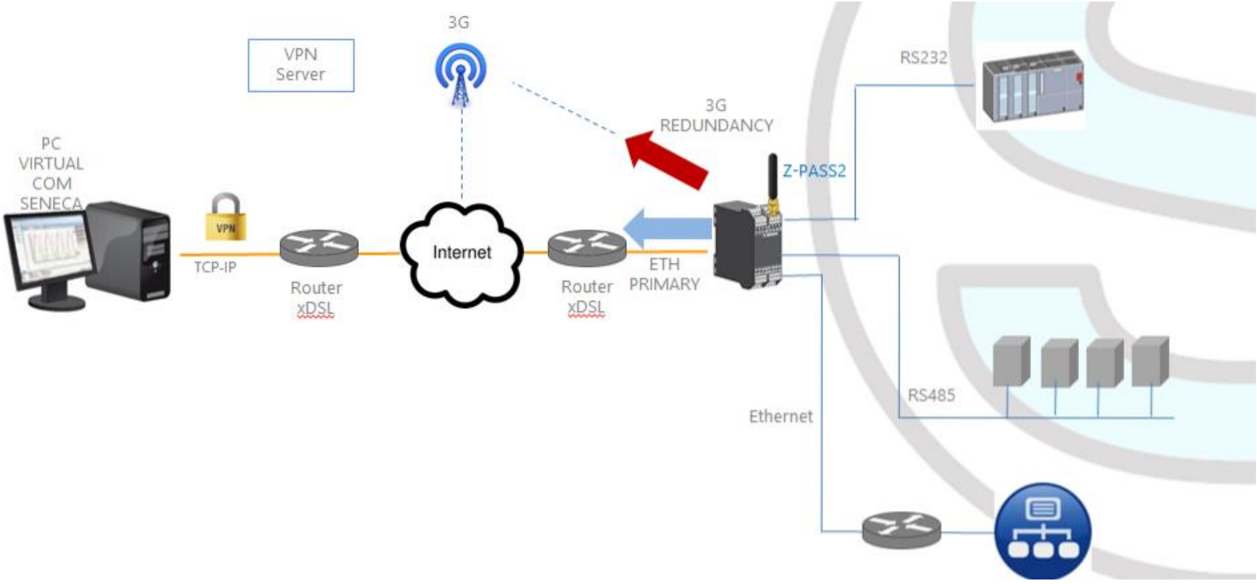
Also, a DHCP server is available which assigns IP addresses to clients connected on the Z-PASS LAN; here, you can configure the range of addresses used by the server and the lease time.

There is also the possibility to define up to five “Port Forwarding” rules or “Virtual Servers”; using these rules, you can, for example, redirect packets received from a TCP or UDP port to another Z-PASS port or to another machine, with a different IP address, on the same or another port.

As an alternative to using “Port Forwarding” rules, Router + VPN functionalities allow the use of local addresses, as shown in the previous chapter; in the router configuration, a flag is given to enable this feature.

A detailed description of the Router configuration can be found in 21.1.8 paragraph.

14 Network Redundancy



“Network Redundancy” is a functionality than can be enabled on Z-PASS2 devices, where a 3G modem is available.

This functionality is aimed at switching the network interface used to access the Internet from the Ethernet (“primary” interface) to the Mobile/3G (“secondary” interface), when Internet access through the primary interface becomes unavailable; when access through the primary interface become available again, the network interface is switched back to Ethernet.

The parameters provided to configure Network Redundancy are explained in paragraph 21.1.2 “Network and Services”.

15 Remote Connection Disable

Z-PASS1 and Z-PASS2 products provide a dedicated digital input and a dedicated digital output to control and monitor remote connection to the device.

In details:

- when "Remote Connection Disable" digital input is set to HIGH state, remote connection to the device is disabled; conversely, when "Remote Connection Disable" digital input is set to LOW state, remote connection to the device is enabled; "Remote Connection Disable" digital input state is reported by the "RCD" LED;
- "Remote Connection Active" digital output is set to HIGH state when the device is remotely accessed (VPN connection is active); it is set to LOW state when VPN connection is not active.

Four levels of security can be configured to disable remote connection:

- Level 1 ("VPN Connection"): VPN connections are disabled in any VPN mode (VPN Box Point-to-Point, VPN Box Single LAN, OpenVPN), but VPN Box Service is still running, so the device can still be monitored on VPN Box Manager;
- Level 2 ("VPN Service"): VPN Box Service is disabled, but the device can still access the Internet and send/receive SMSs;
- Level 3 ("Internet Connection"): any Internet access is disabled, but the device can still send/receive SMSs;
- Level 4 ("SMS Service"): modem is off, so SMSs can't be sent/received.

See "Digital I/O Configuration" paragraph to learn how to set the desired security level.

16 Auto-APN

The Auto-APN feature lets the Z-PASS establish mobile data connections without requiring the user to configure APN data[6] for the SIM in use.

This is accomplished by using the SIM IMSI and, possibly, some other data available on the SIM, to select the proper APN record in an internal DB[7], containing APN records for all mobile operators in the world.

In some particular cases, however, when a "custom APN" shall be used, the Auto-APN feature can be disabled, setting the "APN Mode" parameter to "Manual", in the "Mobile Network" page (see paragraph 21.2).

[6] APN data are: APN, Username, Password and Authentication Type.

[7] This DB is updated to the one used in the last Android O.S. version.

17 HTTP POST Communication protocol

The communication between RTU and Cloud takes place on HTTP protocol by a POST-type call. The representation of the call is REST (REpresentational State Transfer) where data are configured as those of a classical web FORM but via JSON (JavaScript Object Notation). For more info on the HTTP POST Communication Protocol refers to "Seneca HTTP POST Communication Protocol" (you can request the document from support@seneca.it).

18 OPC Unified Architecture (OPC-UA) server protocol

OPC Unified Architecture (OPC-UA) is a standardized machine to machine communication protocol for industrial 4.0 automation developed by the OPC Foundation.

OPC-UA is a vendor-independent communication protocol and it's based on the client-server principle.

Z-PASS devices support the OPC-UA server protocol also with security policy.

In particular, Z-PASS OPC-UA server "exports" the Modbus Shared Memory Gateway tags; so, using an OPC-UA Client software, you can read/write the tags by means of the OPC-UA protocol

19 MQTT client protocol

The MQTT is the most used protocol for IOT applications:

"MQTT stands for MQ Telemetry Transport. It is a publish/subscribe, extremely simple and lightweight messaging protocol, designed for constrained devices and low-bandwidth, high-latency or unreliable networks. The design principles are to minimise network bandwidth and device resource requirements whilst also attempting to ensure reliability and some degree of assurance of delivery. These principles also turn out to make the protocol ideal of the emerging "machine-to-machine" (M2M) or "Internet of Things" world of connected devices, and for mobile applications where bandwidth and battery power are at a premium".

For more info on MQTT protocol see http://mqtt.org/

The MQTT version supported by the Z-PASS1/2 is the 3.1.1

20 SMS Commands

On Z-PASS devices, a number of features can be controlled by means of "SMS commands"; such features include setting up a mobile data (PPP) connection, activating the VPN Box functionality, setting a digital output etc.

SMS Commands can be sent by phone numbers that are present in the Z-PASS Phonebook as "admin" or "manager" users; as an alternative, any phone number can send an SMS command, provided that the command contains a "password"; <u>the password is made by the last four digits of the Z-PASS modem IMEI</u>; so the command will have the following format (there must be a blank character between the "password" and the command text):

```
<last four IMEI digits> <command text>
```

Example:

```
6172 PPP ON
```

Please note that the command text can be written in any letter case, all uppercase, all lowercase or a mix between the two.

Any SMS command received from a number that is not recognized as an "admin" or "manager" user and does not contain the password will be discarded; as an option, these messages and all messages that are not recognized as valid commands can be "relayed" to the "admin" user (see paragraph 21.6.2).

Example:

```
PPP ON RELAYED
```

SMS commands substantially fall into two categories:

- "set" commands which execute an action
- "get" commands which ask for some information

While "get" commands always have an answer, "set commands" can be given an answer ("acknowledge") or not, depending on a configuration parameter (see paragraph 21.6.2).

Any response to a command, both "set" or "get", will contain the original message text, plus a result string, which can be:

"EXECUTING"
meaning that the command has been correctly processed; the "ING" form is used to tell that the procedure started by the command might not be completed yet

"FAILED"
meaning that the command could not be processed or something failed; in this case, an error string is present giving the failure reason

Examples:

```
PPP ON EXECUTING (100.70.179.88)

PPP ON FAILED (System PPP ON)
```

Obviously, the response to a “get” command also contains the requested info, if the command has been successfully processed.

Example:

```
GET DIN EXECUTING (1,0,0,0)
```

Finally, the whole SMS commands functionality can be disabled, if not needed, by means of a configuration parameter (see paragraph 21.6.2).

Obviously, SMS commands are available only in Z-PASS2 product (for all HW revisions), where a GSM model is available.

In the following paragraphs, the full list of supported commands is given along with the corresponding responses.

20.1 PPP ON

This command can be used to setup the mobile data (PPP) connection; the connection is setup using system configuration parameters (APN Mode, APN, Auth Type etc.).

If the command is successfully processed, the response contains the IP address assigned to the PPP network interface.

This command is rejected in the following case:

- if “Remote Connection Disable” (RCD) digital input is HIGH and “Security Level/Service Disable” parameter is set to “Internet Connection”, the command will fail with the "Security Level error” error.

Also, if the connection setup procedure is not completed after a timeout (currently fixed to 30 seconds), the command will fail with the “Timeout error” error.

Please note that this command that does not enable the mobile data connection in a persistent way, so if the Z-PASS is restarted, the mobile data (PPP) connection is not re-established.

Example:

```
→     PPP ON
←     PPP ON EXECUTING (100.70.179.88)
```

20.2 PPP OFF

This command can be used to drop down the mobile data (PPP) connection setup by a previous “PPP ON” command.

Please note that this command that does not disable the mobile data connection in a persistent way, so if the Z-PASS is restarted, the mobile data (PPP) connection is re-established.

This command is never rejected.

Example:

```
→     PPP OFF
←     PPP OFF EXECUTING
```

20.3 PPP IP

This command can be used to get the IP address assigned to the mobile data (PPP) connection; if the PPP connection is not active, the "dummy" IP address (0.0.0.0) will be given.

This command is never rejected.

Example:

```
→     PPP IP
←     PPP IP EXECUTING (100.70.179.88)
```

20.4 PPP CNF

This command can be used to change the value of the system configuration parameters related to the mobile data (PPP) connection; the changes are persistent.

The command shall have the following format, where parameter values shall be separated by a blank character:

```
PPP CNF <APN mode> <APN> <Authentication Type> <Username> <Password> <PPP Connection
Testing IP Address>
```

Please note that all the parameters shall be present, in the above order; no parameter can be left empty.

For the meaning of these parameters, please see 21.2 paragraph.

<APN> and <Authentication Type> are numeric fields with the following values.

```
APN Mode
0:    Automatic
1:    Manual

Authentication Type
0:    None
1:    CHAP/PAP
2:    CHAP only
3:    PAP only
```

This command is rejected in the following case:

- if any of the command parameters is missing or invalid, the command will fail with the "Command parameter error".

Example:

```
→     PPP CNF 0 mobile.vodafone.it 0 user pass www.google.com
←     PPP CNF EXECUTING
```

20.5 VPN ON

This command can be used to activate the VPN Box functionality; the functionality is activated using system configuration parameters (Server, Password, Tag Name).

The command has two optional parameters, so its format is the following:

VPN ON [PPP] [NOFWL][8]

"PPP"
if this parameter is present, the mobile data (PPP) connection is setup (if it's not already active), before activating the VPN Box functionality

"NOFWL"
if this parameter is present, the "Mobile Network Firewall" is disabled, in the system configuration

This command is rejected in the following cases:

- if the "custom" VPN functionality is enabled in the system configuration (parameter "VPN/Enable" = ON, "VPN Mode" = "OpenVPN"), the command will fail with the "System VPN ON" error;
- if "Remote Connection Disable" (RCD) digital input is HIGH and "Security Level/Service Disable" parameter is set to "VPN Connection" or "VPN Service" or "Internet Connection", the command will fail with the "Security Level error" error.

Please note that this command that does not activate the VPN Box functionality in a persistent way, so if the Z-PASS is restarted, the functionality is not re-activated.

Examples:

```
→     VPN ON
←     VPN ON EXECUTING

→     VPN ON PPP
←     VPN ON PPP EXECUTING

→     VPN ON NOFWL
←     VPN ON NOFWL EXECUTING

→     VPN ON PPP NOFWL
←     VPN ON PPP NOFWL EXECUTING
```

[8] Square brackets tell that parameter is optional.

20.6 VPN OFF

This command can be used to deactivate the VPN Box functionality activated by a previous "VPN ON" command; it also drops down the mobile data (PPP) connection setup by a previous "VPN ON PPP" command or "PPP ON" command.

This command is never rejected.

Please note that this command that does not de-activate the VPN Box functionality in a persistent way, so if the Z-PASS is restarted, the functionality is re-activated.

Example:

```
→     VPN OFF
←     VPN OFF EXECUTING
```

20.7 VPN CNF

This command can be used to change the value of the system configuration parameters related to the VPN Box; the changes are persistent.

The command shall have the following format, where parameter values shall be separated by a blank character:

```
VPN CNF <Server> <Password> <Tag Name>
```

Please note that all the parameters shall be present, in the above order; no parameter can be left empty.

For the meaning of these parameters, please see 21.1.7.2 paragraph.

This command is rejected in the following case:

- if any of the command parameters is missing or invalid, the command will fail with the "Command parameter error".

Example:

```
→     VPN CNF myvpnbox.seneca.it myvpnbox zpass2-GSP
←     VPN CNF EXECUTING
```

20.8 FWL ON

This command can be used to enable the "Mobile Network Firewall" in the system configuration (parameter "Mobile Network Firewall/Enable" = ON).

This command is never rejected.

Example:

```
→     FWL ON
←     FWL ON EXECUTING
```

20.9 FWL OFF

This command can be used to disable the “Mobile Network Firewall” in the system configuration (parameter “Mobile Network Firewall/Enable” = OFF).

This command is never rejected.

Example:

```
→      FWL OFF
←      FWL OFF EXECUTING
```

20.10 GET DIN

This command can be used to get the status of one or all of the four digital inputs; if a digital input is not available (since it is used as an output)[9], the “0” value is given.

The command can have two formats:

`GET DIN<n>`	with <n>=1..4	get the status of a single digital input
`GET DIN`		get the status of all the digital inputs

This command is rejected in the following cases:

- if the command is received on a Z-PASS2, Z-PASS2-R01 device, which has no digital I/Os, the command will fail with the “Digital I/O not available” error;
- if the digital I/O number in the command is out of range (e.g.: 0 or 5), the command will fail with the “Command parameter error” error.

Examples:

```
→      GET DIN
←      GET DIN EXECUTING (1,0,0,0)

→      GET DIN1
←      GET DIN1 EXECUTING (1)

→      GET DIN2
←      GET DIN2 EXECUTING (0)
```

20.11 GET DOUT

This command can be used to get the status of one or all of the four digital outputs; if a digital output is not available (since it is used as an input)[10], the “0” value is given.

[9] This can be true for DI3 an DI4.

[10] This can be true for DO3 an DO4.

The command can have two formats:

`GET DOUT<n>`	with <n>=1..4	get the status of a single digital output
`GET DOUT`		get the status of all the digital outputs

This command is rejected in the following cases:

- if the command is received on a Z-PASS2, Z-PASS2-R01 device, which has no digital I/Os, the command will fail with the “Digital I/O not available” error;
- if the digital I/O number in the command is out of range (e.g.: 0 or 5), the command will fail with the “Command parameter error” error.

Examples:

```
→     GET DOUT
←     GET DOUT EXECUTING (0,1,0,0)

→     GET DOUT1
←     GET DOUT1 EXECUTING (0)

→     GET DOUT2
←     GET DOUT2 EXECUTING (1)
```

20.12 SET DOUT

This command can be used to set the status of one of the four digital outputs.

The command can have two formats:

`SET DOUT<n>.CLOSE`	with <n>=1..4	set the digital output to the HIGH state
`SET DOUT<n>.OPEN`	with <n>=1..4	set the digital output to the LOW state

This command is rejected in the following cases:

- if the command is received on a Z-PASS2, Z-PASS2-R01 device, which has no digital I/Os, the command will fail with the “Digital I/O not available” error;
- if the digital output is not configured as “General output” or the digital I/O is used as an input[11], the command will fail with the “Digital I/O mode error” error;
- if the digital I/O number in the command is out of range (e.g.: 0 or 5), the command will fail with the “Command parameter error” error;
- if the requested state is neither “.CLOSE”, nor “.OPEN”, the command will fail with the “Command parameter error” error.

Example:

```
→     SET DOUT2.CLOSE
```

[11] This can be true for DO3 and DO4.

```
←     SET DOUT2.CLOSE EXECUTING
```

20.13 SET PULSE

This command can be used to generate a pulse on one of the four digital outputs.

The command can have two formats:

`SET PULSE<n>.CLOSE <duration>` with <n>=1..4
to generate a LOW-HIGH-LOW pulse, with the HIGH state set for the number of seconds given by the <duration> parameter

`SET PULSE<n>.OPEN <duration>` with <n>=1..4
to generate a HIGH-LOW-HIGH pulse, with the LOW state set for the number of seconds given by the <duration> parameter

This command is rejected in the following cases:

- if the command is received on a Z-PASS2, Z-PASS2-R01 device, which has no digital I/Os, the command will fail with the “Digital I/O not available” error;
- if the digital output is not configured as “General output” or the digital I/O is used as an input[12], the command will fail with the “Digital I/O mode error” error;
- if the digital I/O number in the command is out of range (e.g.: 0 or 5), the command will fail with the “Command parameter error” error;
- if the requested state is neither “.CLOSE”, nor “.OPEN”, the command will fail with the “Command parameter error” error;
- if the <duration> parameter is missing or invalid, the command will fail with the “Command parameter error” error;
- if the “.CLOSE” parameter is given and the digital output is already in the HIGH state, the command will fail with the “No pulse generated” error;
- if the “.OPEN” parameter is given and the digital output is already in the LOW state, the command will fail with the “No pulse generated” error.

Example:

```
→     SET PULSE2.CLOSE 10
←     SET PULSE2.CLOSE 10 EXECUTING
```

20.14 SET USER.PHONE

This command can be used to insert a user with the specified telephone number, type and group list into the Phonebook; it can also be used to change the type and/or group list of an already existing user.

[12] This can be true for DO3 and DO4.

The command has the following format:

`SET USER.PHONE +<number> <type> <group list>,` with <type>=`ADM|MGR|USR`

Please note that the telephone number shall always be given in the "international format", so the initial '+' character shall always be present.

The "group list" is a list of non-negative integer numbers, separated by the "-" character, defining the groups which the user belongs to. Example of valid group lists are:

"1-2-3"
"1-4"
"1"
"0"

The "0" value means that the user is part of any group.

This command is rejected in the following cases:

- if the specified <number> already exists in the Phonebook, with the specified <type> and <group list>, the command will fail with the "Item already exists" error;
- if the <number> parameter is missing or invalid (including the case when the '+' character is missing), the command will fail with the "Command parameter error" error;
- if the <type> parameter is missing or invalid, the command will fail with the "Command parameter error" error;
- if the <group list> parameter is missing or invalid, the command will fail with the "Command parameter error" error.

Example:

```
→     SET USER.PHONE +390123456789 ADM 1-2-3
←     SET USER.PHONE +390123456789 ADM 1-2-3 EXECUTING
```

20.15 RESET PHONE

This command can be used to delete a user with the specified telephone number from the Phonebook.

The command has the following format:

```
RESET PHONE +<number>
```

Please note that the telephone number shall always be given in the "international format", so the initial '+' character shall always be present.

This command is rejected in the following cases:

- if the specified <number> does not exist in the Phonebook, the command will fail with the "Item does not exist" error;

- if the <number> parameter is missing or invalid (including the case when the '+' character is missing), the command will fail with the "Command parameter error" error.

Example:

```
→     RESET PHONE +390123456789
←     RESET PHONE +390123456789 EXECUTING
```

Please note that, <u>if the Phonebook user with the specified telephone number also has an email address, this will be deleted by the command too</u>.

20.16 SET USER.EMAIL

This command can be used to insert a user with the specified email address, type and group list into the Phonebook; it can also be used to change the type and/or group list of an already existing user.

The command has the following format:

`SET USER.EMAIL <email address> <type> <group list>`, with <type>=`ADM|MGR|USR`

The "group list" is a list of non-negative integer numbers, separated by the "-" character, defining the groups which the user belongs to. Example of valid group lists are:

"1-2-3"
"1-4"
"1"
"0"

The "0" value means that the user is part of any group.

This command is rejected in the following cases:

- if the specified <email address> already exists in the Phonebook, with the specified <type> and <group list>, the command will fail with the "Item already exists" error;
- if the <email address> parameter is missing or invalid, the command will fail with the "Command parameter error" error;
- if the <type> parameter is missing or invalid, the command will fail with the "Command parameter error" error;
- if the <group list> parameter is missing or invalid, the command will fail with the "Command parameter error" error.

Example:

```
→     SET USER.EMAIL admin@zpass.it ADM 1-2-3
←     SET USER.EMAIL admin@zpass.it ADM 1-2-3 EXECUTING
```

20.17 RESET EMAIL

This command can be used to delete a user with the specified email address from the Phonebook.

The command has the following format:

```
RESET EMAIL <email address>
```

This command is rejected in the following cases:

- if the specified <email address> does not exist in the Phonebook, the command will fail with the "Item does not exist" error;
- if the < email address > parameter is missing or invalid, the command will fail with the "Command parameter error" error.

Example:

```
→     RESET EMAIL admin@zpass.it
←     RESET EMAIL admin@zpass.it EXECUTING
```

Please note that, if the Phonebook user with the specified email address also has a telephone number, this will be deleted by the command too.

20.18 STATUS

This command can be used to get some status information from the device.

The status info given in the response has the following format:

```
Z-PASS2<hwrev>     <date>     <time>     RUNNING     <service     status>,<vpn     status>
<DI1>,<DI2>,<DO1>,<DO2>,<DIDO1>,<DIDO2>
```

where:

<hwrev>: "", "-R01", "-IO"
<date> is in the form "yyyy/mm/dd"
<hour> is in the form "hh:mm:ss"
<service status> reports the status of the "SERV" LED[13] ("OFF"|"ON"|"FAIL")
<vpn status> reports the status of the "VPN" LED ("OFF"|"ON"|"FAIL")
<DI1>,<DI2>,<DO1>,<DO2>,<DIDO1>,<DIDO2> status ("LO"|"HI") of the digital I/Os (only for Z-PASS2–IO)

This command is never rejected.

Example:

```
→     STATUS
←     STATUS  EXECUTING  (Z-PASS2-IO  2018/03/09  08:01:31  RUNNING  OFF,OFF
HI,LO,HI,LO,LO,LO)
```

[13] See Chapter "LEDs signaling".

20.19 GET GPS

This command can be used to get GPS location info from the device.

The response is given as an URL to Google Maps™:
https://www.google.com/maps/?q=<latitude>,<longitude>

This command is rejected in the following cases:

- if the command is received on a Z-PASS2, Z-PASS2-R01 device, which does not have a GPS module, the command will fail with the "GPS not available" error;
- If the GPS signal is not available, the command will fail with the "GPS not fixed" error.

Example:

```
→      GET GPS
←      GET GPS EXECUTING (https://www.google.com/maps/?q=45.3742,11.94557)
```

20.20 RESET

This command can be used to restart ("reboot") the device.

This command is never rejected.

Example:

```
→      RESET
←      RESET EXECUTING
```

20.21 GET TAG

This command can be used to get the value of a tag (see "Modbus Shared Memory Gateway" functionality in chapter 9).

The command has the following format:

```
GET TAG <tag name>
```

Please note that the "tag name" is case-sensitive; also note that this command assumes that each tag has a distinct name; if more tags exist with the same name, this command returns the value of the first tag found with the given name.

The value is given in the response with the following format:

```
<tag value>,VALID
```

or:

```
<tag value>,INVALID
```

The “INVALID” status may occur for tags with “GATEWAY MODE”=”GATEWAY”, when the last Modbus read request has failed.

This command is rejected in the following cases:

- if no serial port has “Gateway Mode”=”Modbus Shared Memory”, the command will fail with the “Modbus Gateway not active” error;
- if no tag is found with the given name, the command will fail with the “Tag does not exist” error;
- if the requested tag has “GATEWAY MODE”=”BRIDGE” and the Modbus read request fails, the command will fail with the “Tag operation failed” error.

Example:

```
→     GET TAG GPS_LONGITUDE
←     GET TAG GPS_LONGITUDE EXECUTING (11.94528,VALID)
```

20.22 SET TAG

This command can be used to set the value of a tag (see “Modbus Shared Memory Gateway” functionality in chapter 9).

The command has the following format:

```
SET TAG <tag name> <tag value>
```

Please note that the “tag name” is case-sensitive; also note that this command assumes that each tag has a distinct name; if more tags exist with the same name, this command tries to set the value of the first tag found with the given name.

For non-integer tag values, the decimal point character ‘.’ shall be used.

This command is rejected in the following cases:

- if no serial port has “Gateway Mode”=”Modbus Shared Memory”, the command will fail with the “Modbus Gateway not active” error;
- if no tag is found with the given name, the command will fail with the “Tag does not exist” error;
- if the given value does not fit the “Data Type” of the target tag (e.g. the “2” value for a “BOOL” tag), the command will fail with the “Invalid value for tag” error;
- if, for any reason, the write operation fails, the command will fail with the “Tag operation failed” error; this includes the following cases:
  - the Modbus write request fails, for “GATEWAY” or “BRIDGE” tags;
  - the tag value cannot be changed, since it is not a “General output”, for Digital I/Os (“EMBEDDED”) tags;
  - the tag value cannot be changed, since it is a “GPS info” (“EMBEDDED”) tag.

Example:

```
→     SET TAG ZPASS_DO 10
←     SET TAG ZPASS_DO 10 EXECUTING
```

20.23 OVPN ON

This command can be used to activate the standard OPEN VPN functionality; the functionality is activated using system configuration parameters (Server, Password, Tag Name).

Please note that this command that does not activate the OPEN VPN functionality in a persistent way, so if the Z-PASS is restarted, the functionality is not re-activated.

Examples:

```
→     VPN ON
```

20.24 OVPN OFF

This command can be used to deactivate the OPEN VPN functionality activated by a previous "OVPN ON" command.

Please note that this command that does not de-activate the OPEN VPN functionality in a persistent way, so if the Z-PASS is restarted, the functionality is re-activated.

Example:

```
→     OVPN OFF
```

20.25 CLEAN LOGS

This command will delete all logs.

20.26 Initial Configuration

This paragraph describes a possible procedure to configure a new Z-PASS device, starting from "factory default" situation.

Firstly, a SIM with PIN check disabled is needed; this SIM shall also be usable with Auto-APN feature (that is it should not require a private custom APN); obviously, the SIM shall support SMS service.

Since no user is present in the Phonebook yet, SMS commands shall be sent with the password, so the modem IMEI shall be known.

If the previous conditions are satisfied, only two commands are needed to let the device connect to the VPN Box; these are:

```
<password> VPN CFG <parameters>
<password> VPN ON PPP
```

Once these commands are successfully processed, the new device appears in the device list presented by the VPN Box Manager SW; after inserting the device in a user's group (in case of Point-to-Point VPN Box) or applying the device configuration (in case of Single-LAN VPN Box), the device will be reachable via the VPN, letting the user fully configure it.

21 Web Configuration Pages

Z-PASS can be fully configured by means of a set of web configuration pages.

To access Z-PASS configuration site, you have to connect the browser to the Z-PASS IP address on port 8080, e.g.:

http://192.168.90.101:8080

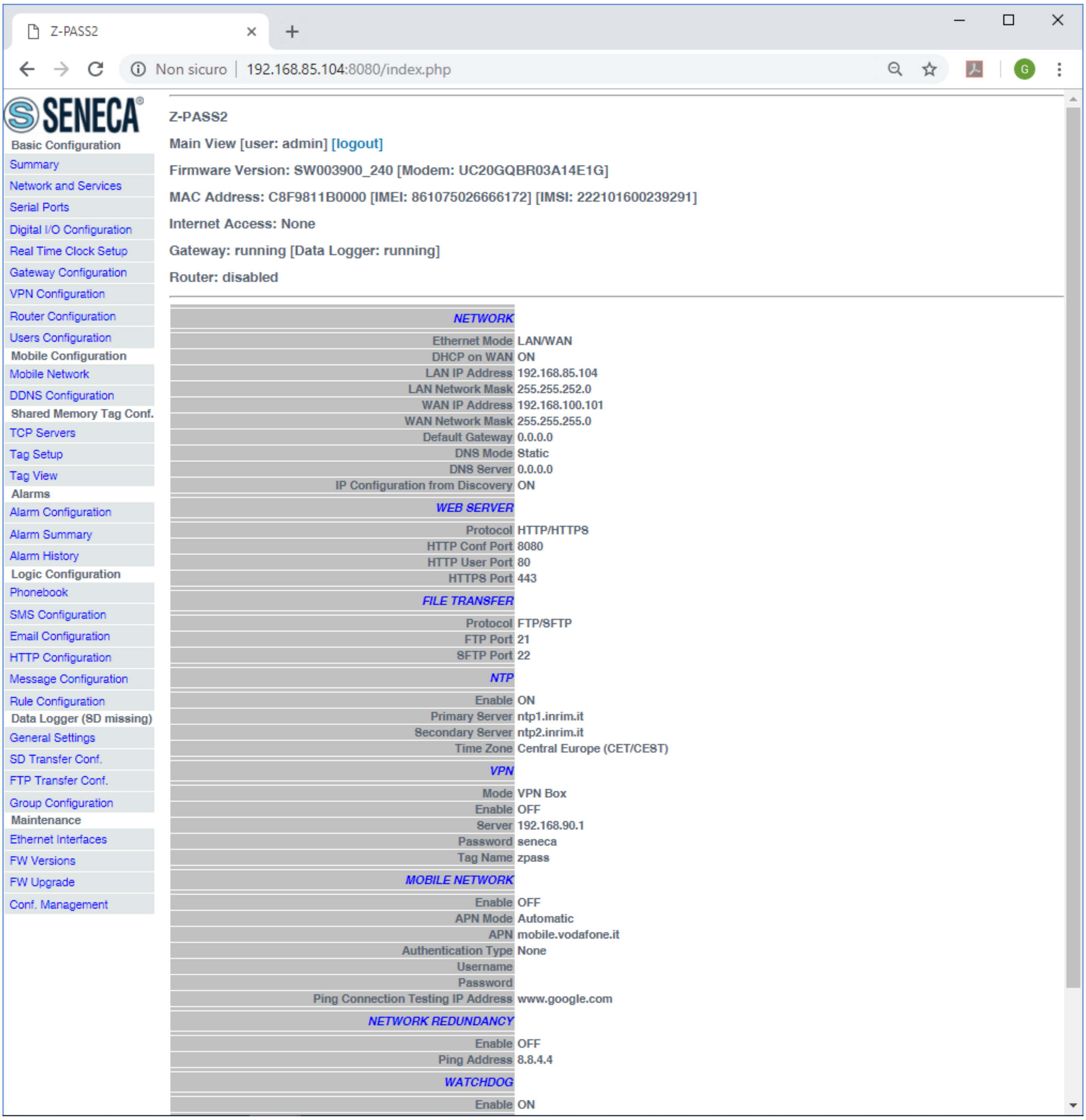
and, when asked, provide the following credentials (default values):

Username: admin
Password: admin

You come to the "Summary" page, described in the following paragraph.

21.1 Basic Configuration

21.1.1 Summary



Z-PASS2

Main View [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600239291]

Internet Access: None

Gateway: running [Data Logger: running]

Router: disabled

NETWORK	
Ethernet Mode	LAN/WAN
DHCP on WAN	ON
LAN IP Address	192.168.85.104
LAN Network Mask	255.255.252.0
WAN IP Address	192.168.100.101
WAN Network Mask	255.255.255.0
Default Gateway	0.0.0.0
DNS Mode	Static
DNS Server	0.0.0.0
IP Configuration from Discovery	ON
WEB SERVER	
Protocol	HTTP/HTTPS
HTTP Conf Port	8080
HTTP User Port	80
HTTPS Port	443
FILE TRANSFER	
Protocol	FTP/SFTP
FTP Port	21
SFTP Port	22
NTP	
Enable	ON
Primary Server	ntp1.inrim.it
Secondary Server	ntp2.inrim.it
Time Zone	Central Europe (CET/CEST)
VPN	
Mode	VPN Box
Enable	OFF
Server	192.168.90.1
Password	seneca
Tag Name	zpass
MOBILE NETWORK	
Enable	OFF
APN Mode	Automatic
APN	mobile.vodafone.it
Authentication Type	None
Username	
Password	
Ping Connection Testing IP Address	www.google.com
NETWORK REDUNDANCY	
Enable	OFF
Ping Address	8.8.4.4
WATCHDOG	
Enable	ON

In this page, main Z-PASS configuration parameters are shown, with their current values.

On the left side of the page, like in any other page, a menu is shown which lets you access all the configuration pages; the menu is divided in several sections:

- Basic Configuration
- Mobile Configuration (not available on Z-PASS1)

- Shared Memory Tag Configuration (when Gateway Mode is set to Modbus Shared Memory Gateway, see paragraph 21.1.4)
- Alarms
- Logic Configuration
- Data Logger
- Maintenance

Furthermore, in this like in any other page, the following information are shown:

- the page name
- the Z-PASS FW version along with the modem FW revision, for Z-PASS2
- the Z-PASS MAC address; the modem IMEI, for Z-PASS2; the SIM IMSI, for Z-PASS2, when a SIM is present
- the network interface used for Internet Access (i.e.: “Ethernet” or “Mobile”)
- the Modbus Ethernet to Serial/Transparent/Modbus Shared Memory Gateway status (i.e.: “running” or “stopped”) along with the Data Logger status (i.e.: “running” or “stopped”)
- the Router status (i.e.: “running” or “disabled”)

The currently logged user (e.g.: “admin”) and the “Logout” link are also present, near the page name.

In this page, two buttons are available:

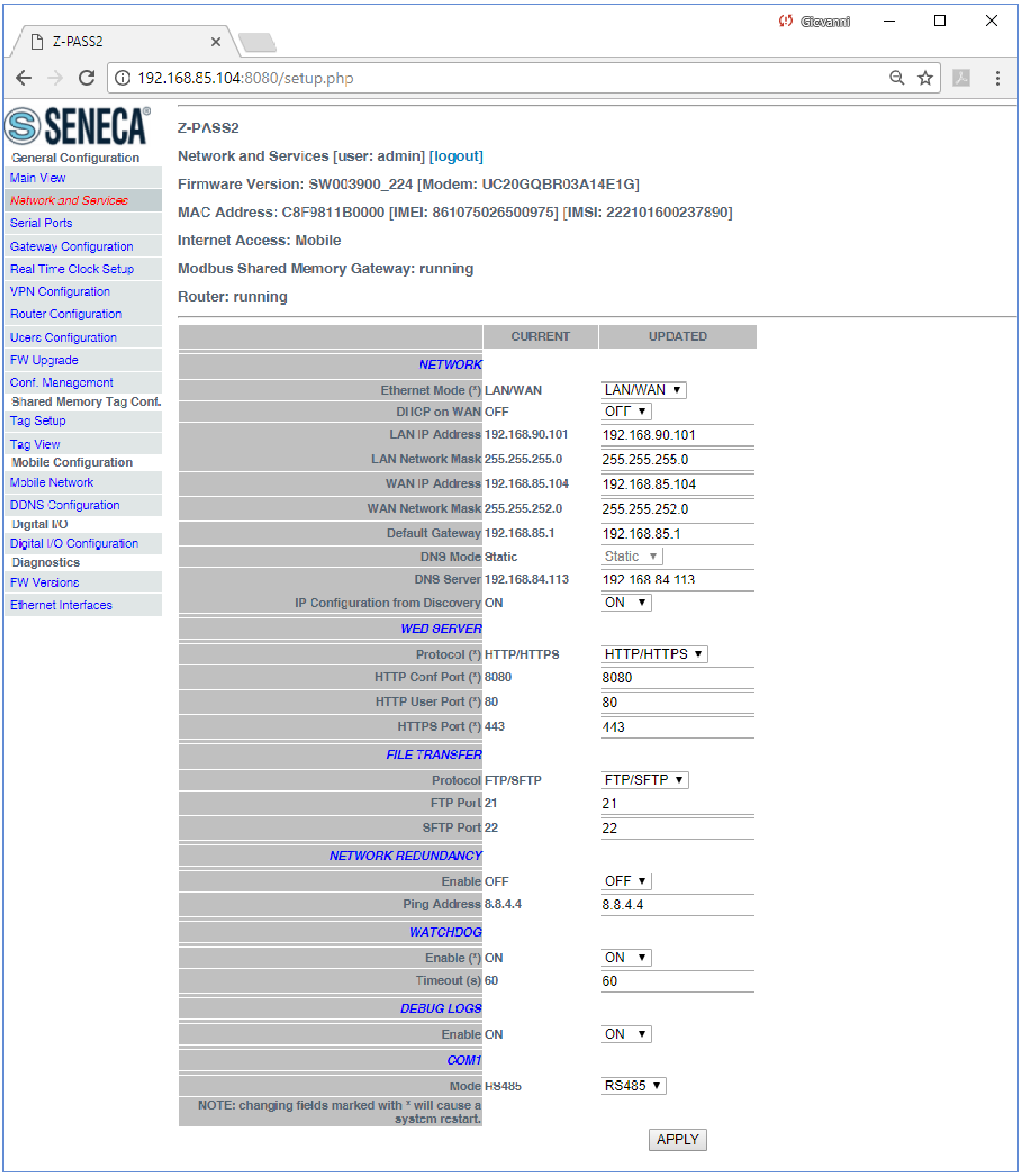
- “RESTART”, to perform Z-PASS reboot;
- “FACTORY DEFAULT”, to reset Z-PASS to its factory state.

Probably, the first parameters you need to change when setting up a new Z-PASS device are those related to its network configuration.

You can accomplish this in the “Network and Services” page, described in the following paragraph.

21.1.2 Network and Services

The parameters shown in this page slightly change, depending on the HW version of the product and, for new HW versions, on the selected “Ethernet Mode”; this is shown in the following figures.



Z-PASS2

Network and Services [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

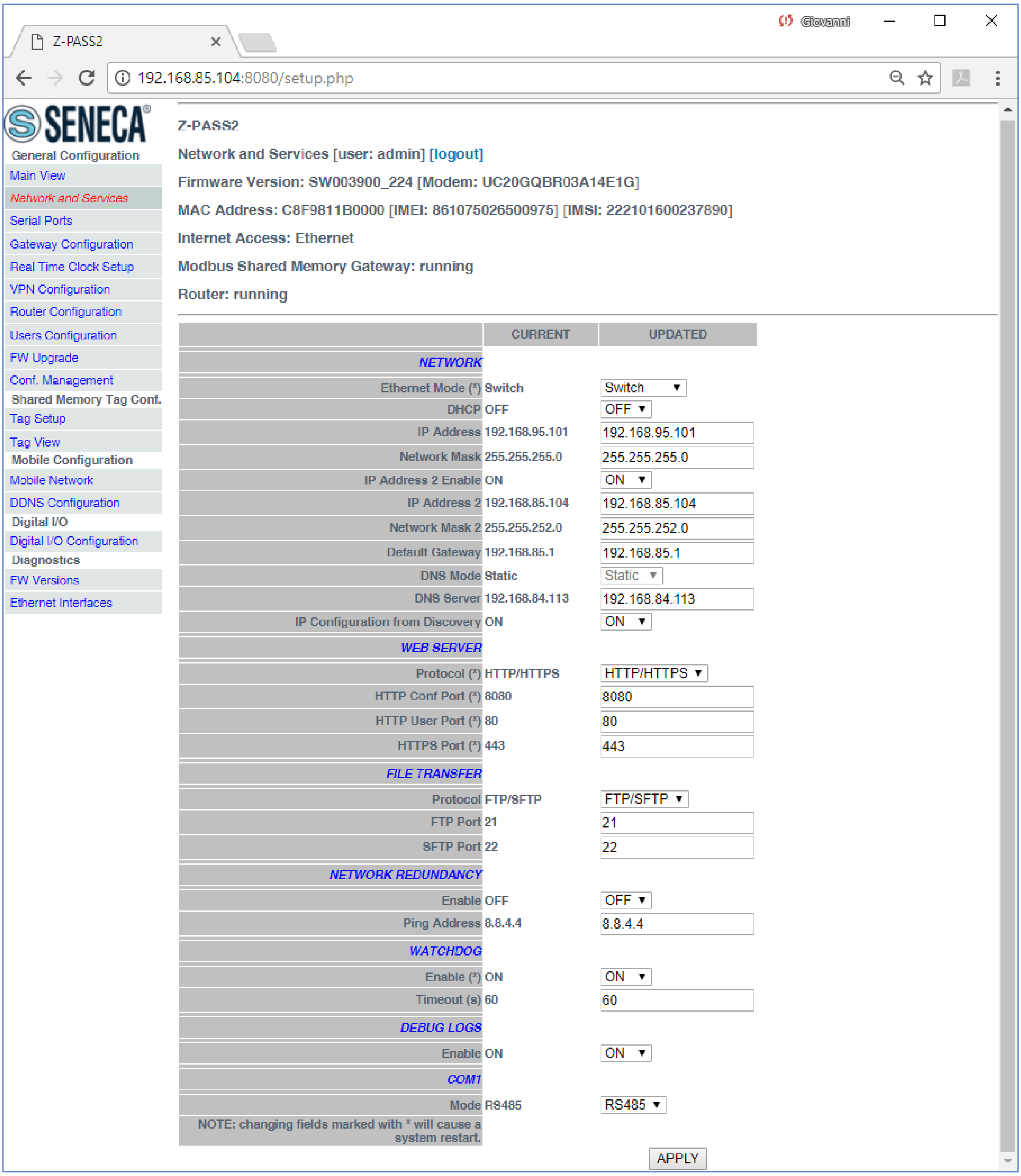
Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
NETWORK		
Ethernet Mode (*)	LAN/WAN	LAN/WAN ▾
DHCP on WAN	OFF	OFF ▾
LAN IP Address	192.168.90.101	192.168.90.101
LAN Network Mask	255.255.255.0	255.255.255.0
WAN IP Address	192.168.85.104	192.168.85.104
WAN Network Mask	255.255.252.0	255.255.252.0
Default Gateway	192.168.85.1	192.168.85.1
DNS Mode	Static	Static ▾
DNS Server	192.168.84.113	192.168.84.113
IP Configuration from Discovery	ON	ON ▾
WEB SERVER		
Protocol (*)	HTTP/HTTPS	HTTP/HTTPS ▾
HTTP Conf Port (*)	8080	8080
HTTP User Port (*)	80	80
HTTPS Port (*)	443	443
FILE TRANSFER		
Protocol	FTP/SFTP	FTP/SFTP ▾
FTP Port	21	21
SFTP Port	22	22
NETWORK REDUNDANCY		
Enable	OFF	OFF ▾
Ping Address	8.8.4.4	8.8.4.4
WATCHDOG		
Enable (*)	ON	ON ▾
Timeout (s)	60	60
DEBUG LOGS		
Enable	ON	ON ▾
COM1		
Mode	R8485	RS485 ▾
NOTE: changing fields marked with * will cause a system restart.		

The previous figure shows the “Network and Services” page for a Z-PASS2, when the “Ethernet Mode” parameter is set to “LAN/WAN”; it also applies to a Z-PASS1 in “LAN/WAN” mode.



Z-PASS2

Network and Services [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

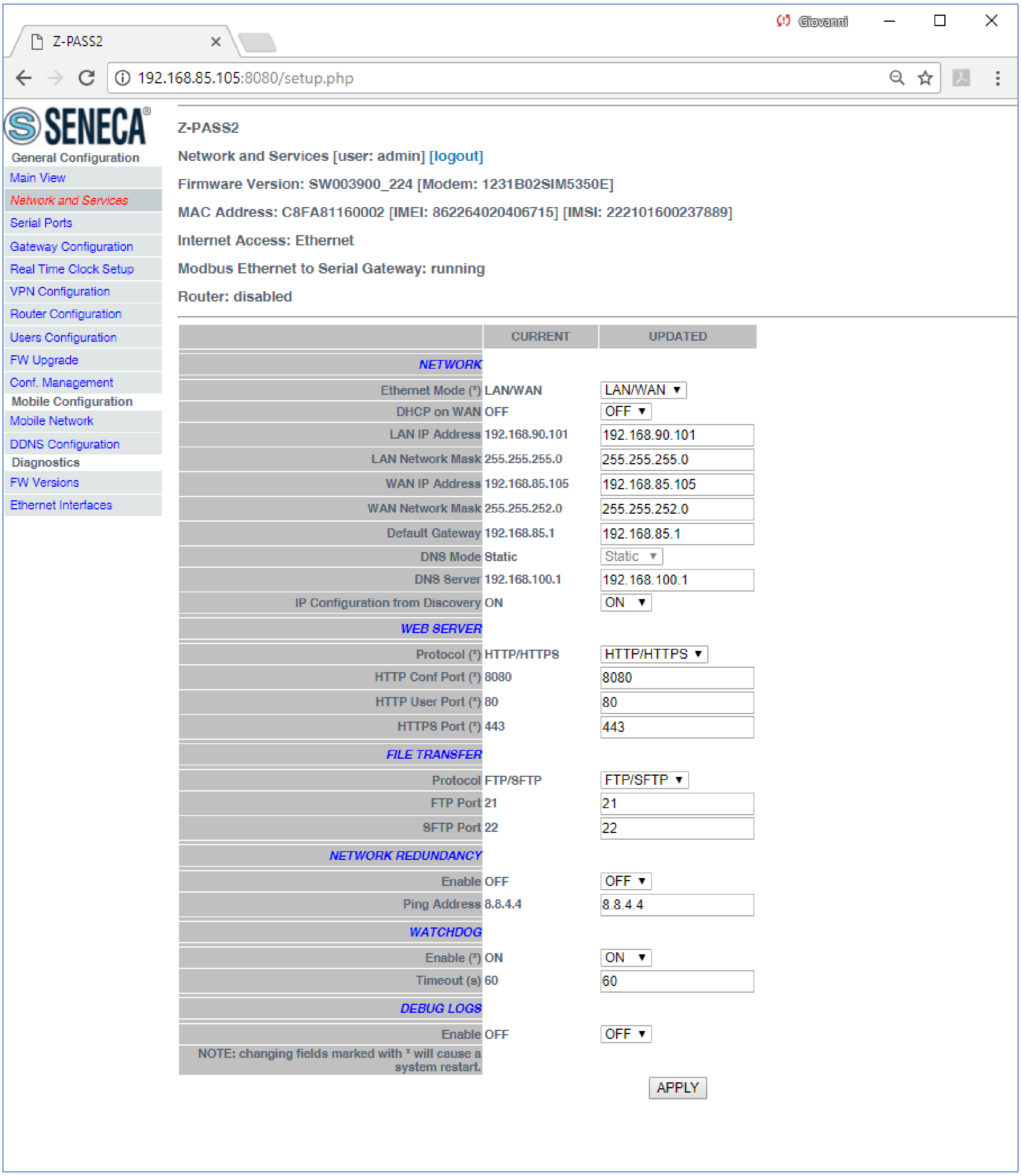
Internet Access: Ethernet

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
NETWORK		
Ethernet Mode (*)	Switch	Switch ▾
DHCP	OFF	OFF ▾
IP Address	192.168.95.101	192.168.95.101
Network Mask	255.255.255.0	255.255.255.0
IP Address 2 Enable	ON	ON ▾
IP Address 2	192.168.85.104	192.168.85.104
Network Mask 2	255.255.252.0	255.255.252.0
Default Gateway	192.168.85.1	192.168.85.1
DNS Mode	Static	Static ▾
DNS Server	192.168.84.113	192.168.84.113
IP Configuration from Discovery	ON	ON ▾
WEB SERVER		
Protocol (*)	HTTP/HTTPS	HTTP/HTTPS ▾
HTTP Conf Port (*)	8080	8080
HTTP User Port (*)	80	80
HTTPS Port (*)	443	443
FILE TRANSFER		
Protocol	FTP/SFTP	FTP/SFTP ▾
FTP Port	21	21
SFTP Port	22	22
NETWORK REDUNDANCY		
Enable	OFF	OFF ▾
Ping Address	8.8.4.4	8.8.4.4
WATCHDOG		
Enable (*)	ON	ON ▾
Timeout (s)	60	60
DEBUG LOGS		
Enable	ON	ON ▾
COM1		
Mode	RS485	RS485 ▾
NOTE: changing fields marked with * will cause a system restart.		

The previous figure shows the “Network and Services” page for a Z-PASS2, when the “Ethernet Mode” parameter is set to “Switch”; it also applies to a Z-PASS1 in “Switch” mode.



Z-PASS2

Network and Services [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: 1231B02SIM5350E]

MAC Address: C8FA81160002 [IMEI: 862264020406715] [IMSI: 222101600237889]

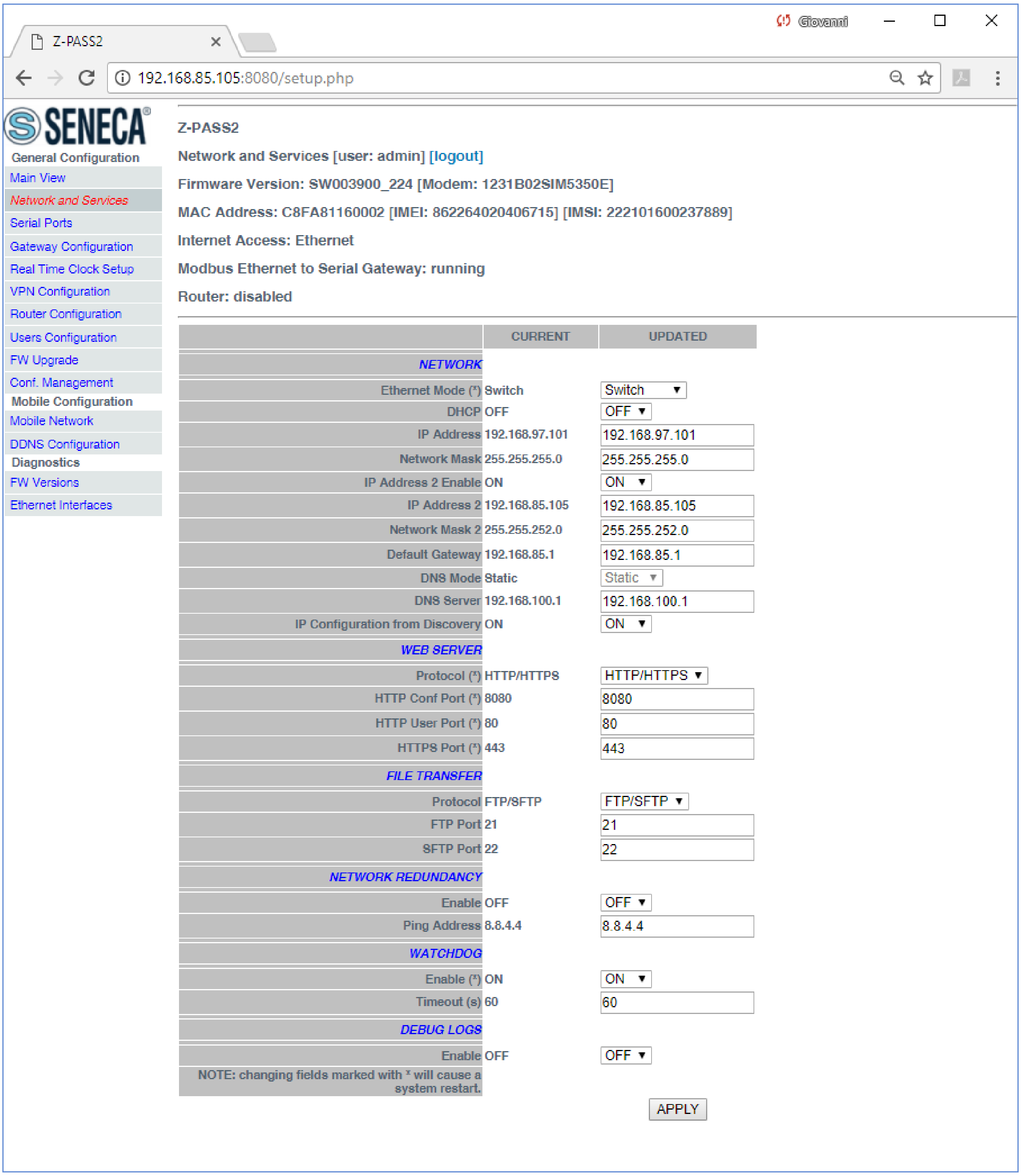
Internet Access: Ethernet

Modbus Ethernet to Serial Gateway: running

Router: disabled

	CURRENT	UPDATED
NETWORK		
Ethernet Mode (*)	LAN/WAN	LAN/WAN ▾
DHCP on WAN	OFF	OFF ▾
LAN IP Address	192.168.90.101	192.168.90.101
LAN Network Mask	255.255.255.0	255.255.255.0
WAN IP Address	192.168.85.105	192.168.85.105
WAN Network Mask	255.255.252.0	255.255.252.0
Default Gateway	192.168.85.1	192.168.85.1
DNS Mode	Static	Static ▾
DNS Server	192.168.100.1	192.168.100.1
IP Configuration from Discovery	ON	ON ▾
WEB SERVER		
Protocol (*)	HTTP/HTTPS	HTTP/HTTPS ▾
HTTP Conf Port (*)	8080	8080
HTTP User Port (*)	80	80
HTTPS Port (*)	443	443
FILE TRANSFER		
Protocol	FTP/SFTP	FTP/SFTP ▾
FTP Port	21	21
SFTP Port	22	22
NETWORK REDUNDANCY		
Enable	OFF	OFF ▾
Ping Address	8.8.4.4	8.8.4.4
WATCHDOG		
Enable (*)	ON	ON ▾
Timeout (s)	60	60
DEBUG LOGS		
Enable	OFF	OFF ▾
NOTE: changing fields marked with * will cause a system restart.		

The previous figure shows the “Network and Services” page for a Z-PASS2-R01, when the “Ethernet Mode” parameter is set to “LAN/WAN”; it also applies to a Z-PASS1-R01 in “LAN/WAN” mode.



Z-PASS2

Network and Services [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: 1231B02SIM5350E]

MAC Address: C8FA81160002 [IMEI: 862264020406715] [IMSI: 222101600237889]

Internet Access: Ethernet

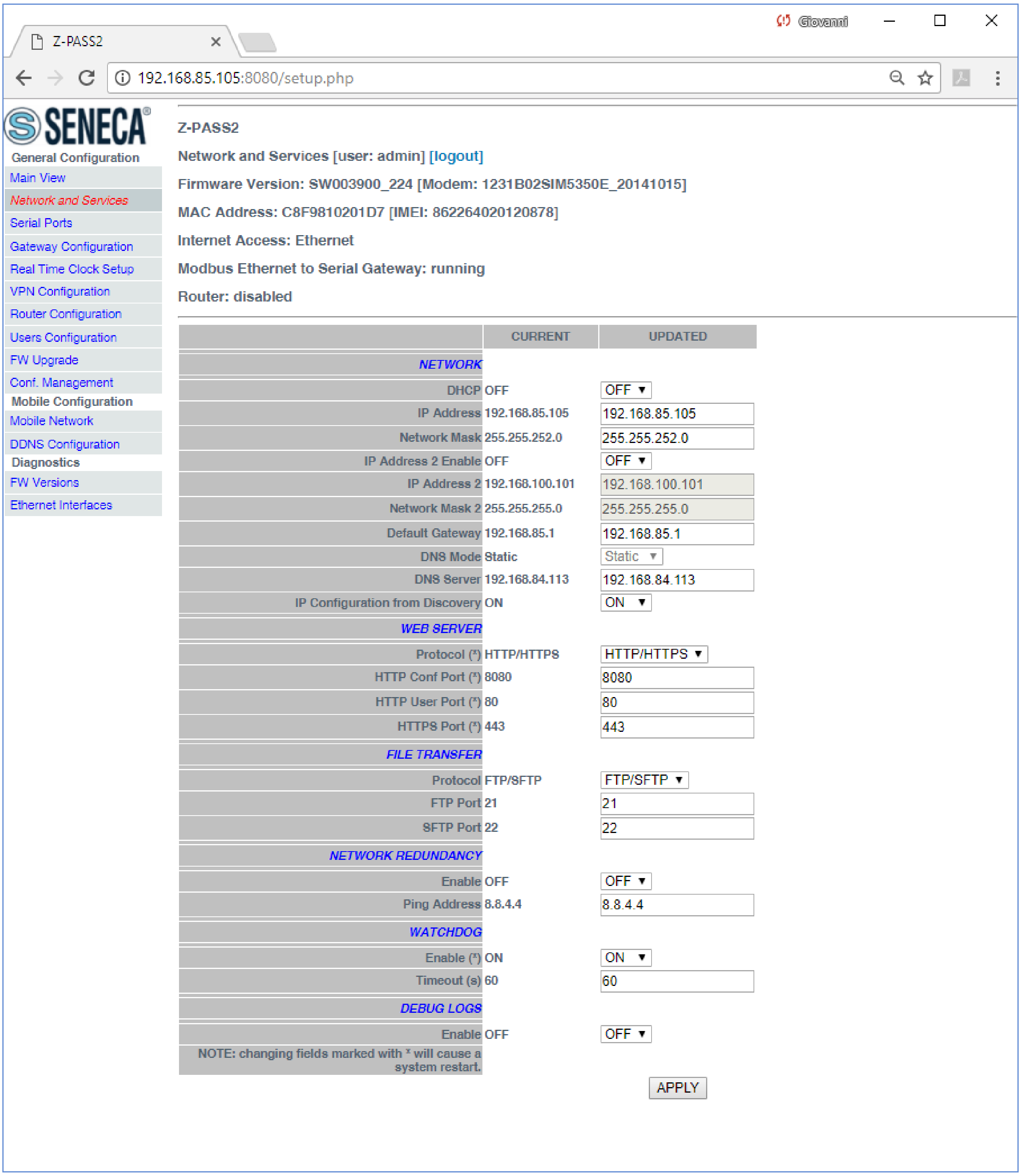
Modbus Ethernet to Serial Gateway: running

Router: disabled

	CURRENT	UPDATED
NETWORK		
Ethernet Mode (*)	Switch	Switch ▾
DHCP	OFF	OFF ▾
IP Address	192.168.97.101	192.168.97.101
Network Mask	255.255.255.0	255.255.255.0
IP Address 2 Enable	ON	ON ▾
IP Address 2	192.168.85.105	192.168.85.105
Network Mask 2	255.255.252.0	255.255.252.0
Default Gateway	192.168.85.1	192.168.85.1
DNS Mode	Static	Static ▾
DNS Server	192.168.100.1	192.168.100.1
IP Configuration from Discovery	ON	ON ▾
WEB SERVER		
Protocol (*)	HTTP/HTTPS	HTTP/HTTPS ▾
HTTP Conf Port (*)	8080	8080
HTTP User Port (*)	80	80
HTTPS Port (*)	443	443
FILE TRANSFER		
Protocol	FTP/SFTP	FTP/SFTP ▾
FTP Port	21	21
SFTP Port	22	22
NETWORK REDUNDANCY		
Enable	OFF	OFF ▾
Ping Address	8.8.4.4	8.8.4.4
WATCHDOG		
Enable (*)	ON	ON ▾
Timeout (s)	60	60
DEBUG LOGS		
Enable	OFF	OFF ▾
NOTE: changing fields marked with * will cause a system restart.		

APPLY

The previous figure shows the “Network and Services” page for a Z-PASS2-R01, when the “Ethernet Mode” parameter is set to “Switch”; it also applies to a Z-PASS1-R01 in “Switch” mode.



Z-PASS2

Network and Services [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: 1231B02SIM5350E_20141015]

MAC Address: C8F9810201D7 [IMEI: 862264020120878]

Internet Access: Ethernet

Modbus Ethernet to Serial Gateway: running

Router: disabled

	CURRENT	UPDATED
NETWORK		
DHCP	OFF	OFF ▾
IP Address	192.168.85.105	192.168.85.105
Network Mask	255.255.252.0	255.255.252.0
IP Address 2 Enable	OFF	OFF ▾
IP Address 2	192.168.100.101	192.168.100.101
Network Mask 2	255.255.255.0	255.255.255.0
Default Gateway	192.168.85.1	192.168.85.1
DNS Mode	Static	Static ▾
DNS Server	192.168.84.113	192.168.84.113
IP Configuration from Discovery	ON	ON ▾
WEB SERVER		
Protocol (*)	HTTP/HTTPS	HTTP/HTTPS ▾
HTTP Conf Port (*)	8080	8080
HTTP User Port (*)	80	80
HTTPS Port (*)	443	443
FILE TRANSFER		
Protocol	FTP/SFTP	FTP/SFTP ▾
FTP Port	21	21
SFTP Port	22	22
NETWORK REDUNDANCY		
Enable	OFF	OFF ▾
Ping Address	8.8.4.4	8.8.4.4
WATCHDOG		
Enable (*)	ON	ON ▾
Timeout (s)	60	60
DEBUG LOGS		
Enable	OFF	OFF ▾
NOTE: changing fields marked with * will cause a system restart.		

APPLY

The previous figure shows the "Network and Services" page for a Z-PASS2 (old version); it also applies to a Z-PASS1 (old version).

There is an important difference between the parameter values shown in this page and those shown in the "Summary" page: the former are configured values, whereas the latter are actual values.

To better explain this difference, let’s consider the case when the DHCP parameter is set to ON; in the “Network and Services” page, you may see the 192.168.90.101 default value for the “IP Address” parameter, whereas the “Summary” page shows the actual IP Address, assigned by the DHCP server.

In the following table, all configuration parameters available in this page are listed, with a short explanation and the parameter default value for each of them.

Field	Meaning	Default value
NETWORK/Ethernet Mode	This parameter determines if the two Ethernet ports work as two fully separated network interfaces (“LAN/WAN”) or as the ports of an Ethernet switch (“Switch”); depending on the value of this parameter, some other network parameters are hidden/shown or renamed as described below.	LAN/WAN
Ethernet Mode = “Switch”		
NETWORK/DHCP	Flag to enable/disable the DHCP functionality on the Ethernet interface.	OFF
NETWORK/IP Address	IP address of the Ethernet interface (disabled when “DHCP” is set to “ON”)	192.168.90.101
NETWORK/Network Mask	Network mask of the Ethernet interface (disabled when “DHCP” is set to “ON”)	255.255.255.0
NETWORK/IP Address 2 Enable	Flag to enable/disable the second IP address on the Ethernet interface. Note that the second IP address can be enabled also when the DHCP functionality is active.	OFF
NETWORK/IP Address 2	Second IP address of the Ethernet interface	192.168.100.101
NETWORK/Network Mask 2	Second network mask of the Ethernet interface	255.255.255.0
Ethernet Mode = “LAN/WAN”		
NETWORK/DHCP on WAN	Flag to enable/disable the DHCP functionality on the WAN Ethernet interface	ON
NETWORK/LAN IP Address	IP address of the LAN Ethernet interface	192.168.90.101
NETWORK/LAN Network Mask	Network mask of the LAN Ethernet interface	255.255.255.0
NETWORK/WAN IP Address	IP address of the WAN Ethernet interface (disabled when “DHCP on WAN” is set to “ON”)	192.168.100.101
NETWORK/WAN Network Mask	Network mask of the WAN Ethernet	255.255.255.0

	interface (disabled when “DHCP on WAN” is set to “ON”)	
NETWORK/Default Gateway	Default Gateway IP address (disabled when DHCP functionality is enabled). When “Ethernet Mode” is set to “LAN/WAN”, the Default Gateway shall be in the WAN subnet.	192.168.100.1 , for Z-PASS1-R0x and Z-PASS2-R0x (x=1,2) 192.168.90.1, for all other products
NETWORK/DNS Mode	Tells if the DNS Server shall be set statically (value: “Static”) or dinamically assigned by the DHCP Server (value: “DHCP”)	DHCP, for Z-PASS1-R0x and Z-PASS2-R0x (x=1,2) Static, for Z-PASS1 and Z-PASS2
NETWORK/DNS Server	DNS server IP address (disabled when DHCP functionality is enabled and DNS Mode = DHCP)	192.168.100.1 , for Z-PASS1-R0x and Z-PASS2-R0x (x=1,2) 192.168.90.1, for all other products
NETWORK/IP Configuration from Discovery	Flag to enable/disable the possibility of changing some of the network configuration parameters by means of the SDD application (see chapter 5)	ON
WEB SERVER/Protocol	Protocol used to access the web pages: HTTP/HTTPS, HTTPS, HTTP	HTTP/HTTPS
WEB SERVER/HTTP Conf Port	TCP port to access the configuration pages, using HTTP protocol. Please note that if this parameter is set to 80 (standard HTTP port), the web user site won’t be available anymore.	8080
WEB SERVER/HTTP User Port	TCP port to access the user pages, using HTTP protocol.	80
WEB SERVER/HTTPS Port	TCP port to access the configuration and user pages, using HTTPS protocol.	44
FILE TRANSFER/Protocol	Protocol used for File Transfer: FTP/SFTP, SFTP, FTP	FTP/SFTP
FTP Port	TCP Port for FTP protocol	21
SFTP Port	TCP Port for SFTP protocol	22
NETWORK REDUNDANCY/Enable	Flag to enable/disable the “Network Redundancy” functionality, that is using the Ethernet interface as the primary interface to access the Internet and the Mobile interface as the secondary interface, if the access through the primary interface becomes unavailable	OFF
NETWORK REDUNDANCY/Ping Address	IP Address used as ping destination to check if access to the Internet through	8.8.4.4

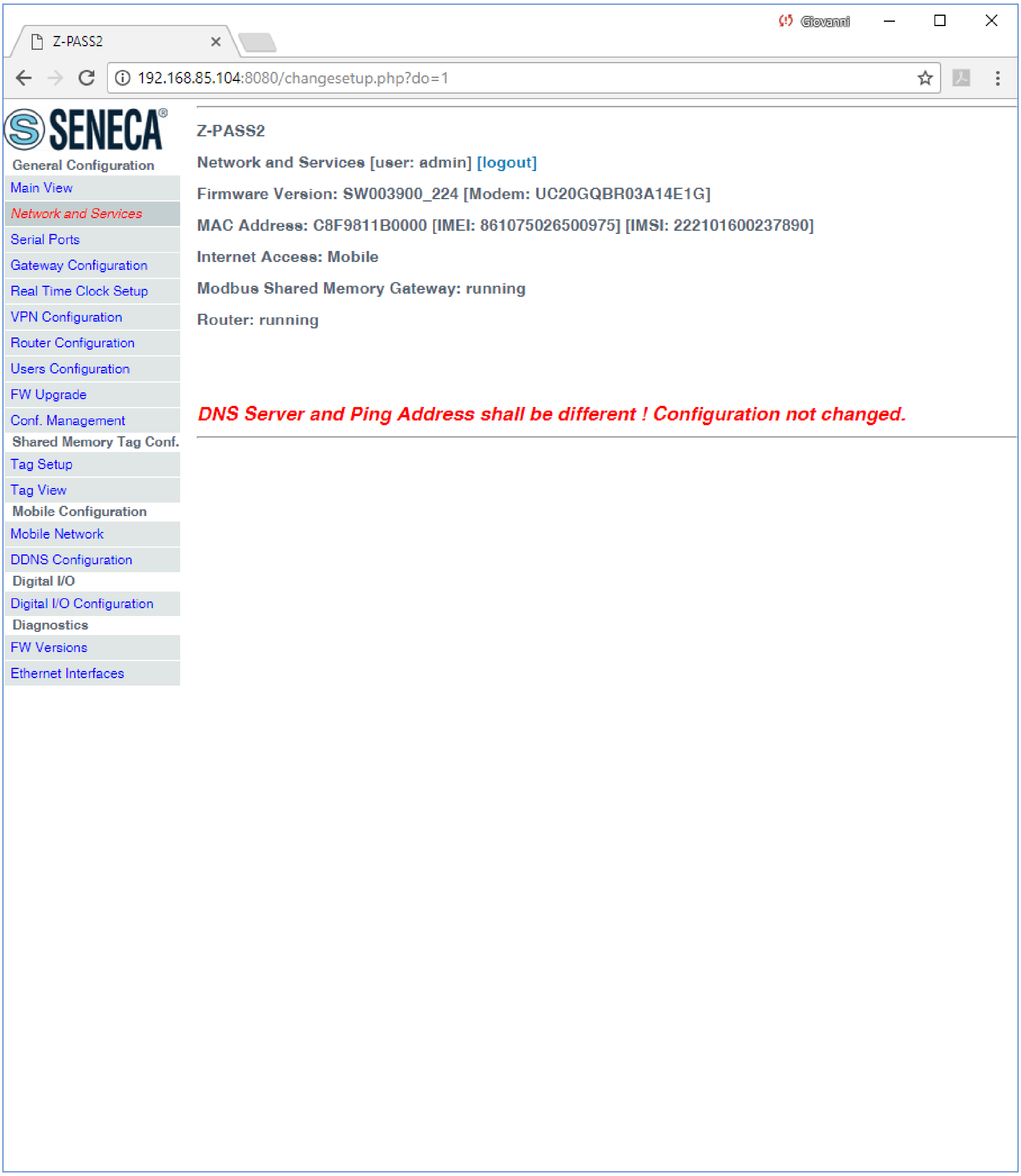
	the primary interface (Ethernet) is available. This address shall be different from the one set for "DNS Server" parameter, otherwise an error is shown (see figure below).	
WATCHDOG/Enable	Flag to enable/disable the watchdog functionality	ON
WATCHDOG/Timeout (s)	Watchdog timeout, in seconds; when watchdog is enabled, if it's not refreshed for this amount of seconds, the system will be rebooted. Possible values are in the range [30..3600].	60
DEBUG LOGS/Enable	Flag to enable/disable the debug logs	OFF
COM1/Mode	Operating mode of the COM1 serial port Possible values: RS485 | RS232	RS485

One note about the “DHCP” parameters:

- the “DHCP” parameter can be set to “ON” only if the “DHCP Server” parameter of the “Router Configuration” page is set to “OFF” (see paragraph 21.1.8).

In the “Network and Services” page, you can change any of the above parameters; to apply the changes, press the “APPLY” button; as warned by the note on the page, only for some parameters, the parameter change requires rebooting the Z-PASS; these parameters are:

- NETWORK/Ethernet Mode
- WEB SERVER/Port
- WATCHDOG/Enable, only when changing ON -> OFF
- DEBUG LOGS/Enable, only when changing ON -> OFF



Z-PASS2

Network and Services [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

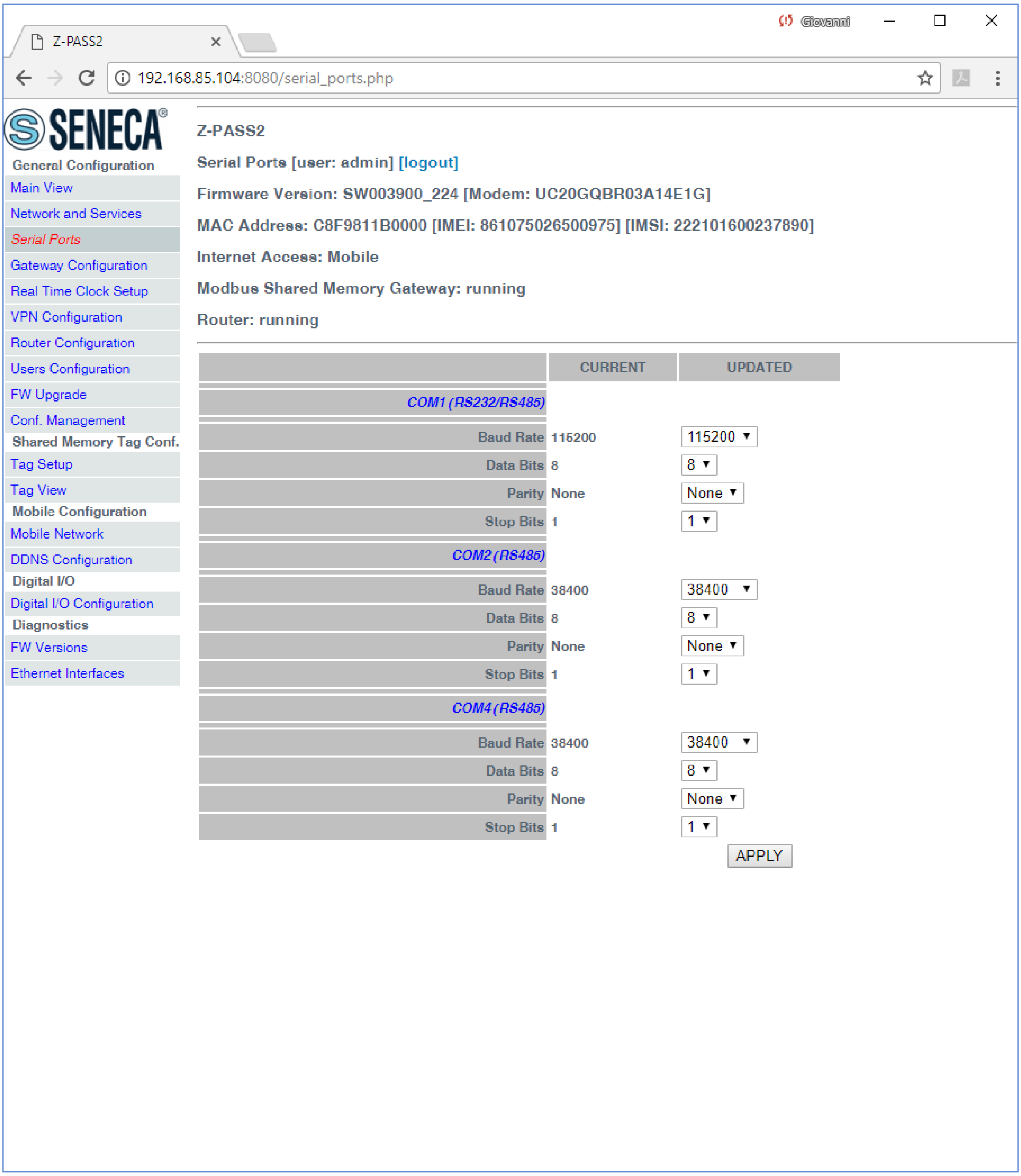
Modbus Shared Memory Gateway: running

Router: running

DNS Server and Ping Address shall be different ! Configuration not changed.

21.1.3 Serial Ports

By clicking on the “Serial Ports” link, in the “Basic Configuration” section, you come to the following page:



Z-PASS2

Serial Ports [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
COM1 (RS232/RS485)		
Baud Rate	115200	115200 ▼
Data Bits	8	8 ▼
Parity	None	None ▼
Stop Bits	1	1 ▼
COM2 (RS485)		
Baud Rate	38400	38400 ▼
Data Bits	8	8 ▼
Parity	None	None ▼
Stop Bits	1	1 ▼
COM4 (RS485)		
Baud Rate	38400	38400 ▼
Data Bits	8	8 ▼
Parity	None	None ▼
Stop Bits	1	1 ▼

This page is made up of three sections, corresponding to the three serial ports available in Z-PASS devices:

- COM1 RS232 or RS485[14]

[14] Depending on the position of the SW2 DIP switch.

COM2	RS485
COM4	RS485

For each serial port, the following configuration parameters are available:

Field	Meaning	Default value
Baud Rate	Baud rate (in bps); possible values are: 200 300 600 1200 2400 4800 9600 19200 38400 57600 115200	38400
Data Bits	Data bits; possible values are: 5/6/7/8	8
Parity	Parity; possible values are: None/Even/Odd	None
Stop Bits	Stop bits; possible values are: 1/2	1

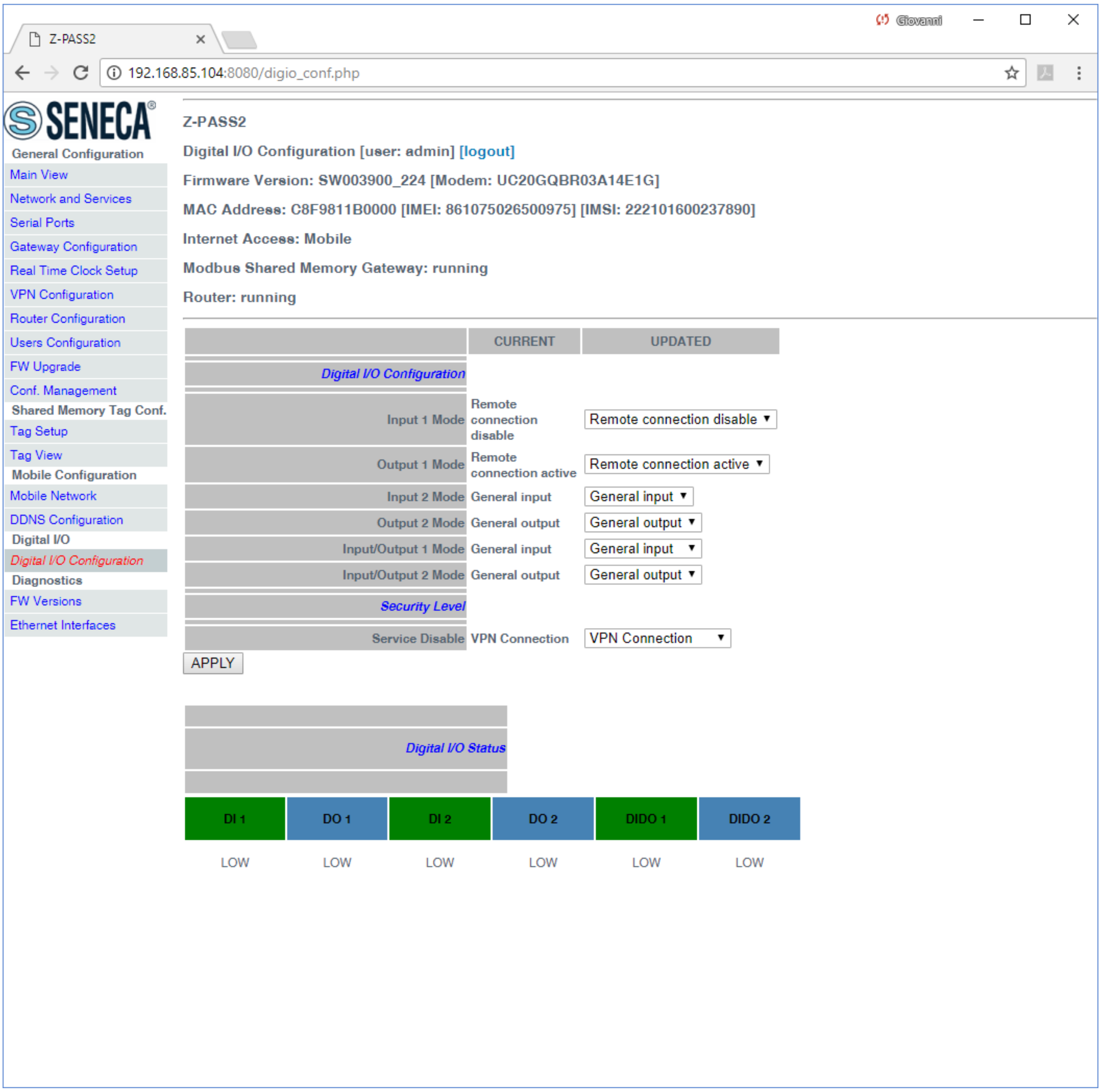
In the “Serial Ports” page, you can change any of the above parameters; to apply the changes, press the “APPLY” button.

Note that when you change the serial ports configuration, the Gateway services are automatically restarted, to actually apply the changes.

21.1.4 Digital I/O Configuration

By clicking on the “Digital I/O Configuration” link, in the “Basic Configuration” section, you come to the page described in the following sub-paragraphs; the page differs between Z-PASS1 and Z-PASS2:

21.1.4.1 Z-PASS2



Z-PASS2

Digital I/O Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
Digital I/O Configuration		
Input 1 Mode	Remote connection disable	Remote connection disable ▾
Output 1 Mode	Remote connection active	Remote connection active ▾
Input 2 Mode	General input	General input ▾
Output 2 Mode	General output	General output ▾
Input/Output 1 Mode	General input	General input ▾
Input/Output 2 Mode	General output	General output ▾
Security Level		
Service Disable	VPN Connection	VPN Connection ▾

Digital I/O Status

DI 1	DO 1	DI 2	DO 2	DIDO 1	DIDO 2
LOW	LOW	LOW	LOW	LOW	LOW

In this page, you can configure the operating modes of the Digital I/Os and the security level applied by the "Remote Connection Disable" feature (see chapter 15).

Field	Meaning	Default value
Input 1 Mode	This parameter represents the operating mode of the Digital Input 1 (DI 1). Since this is the digital input used for "Remote Connection Disable" feature, its value ("Remote connection disable")	Remote connection disable

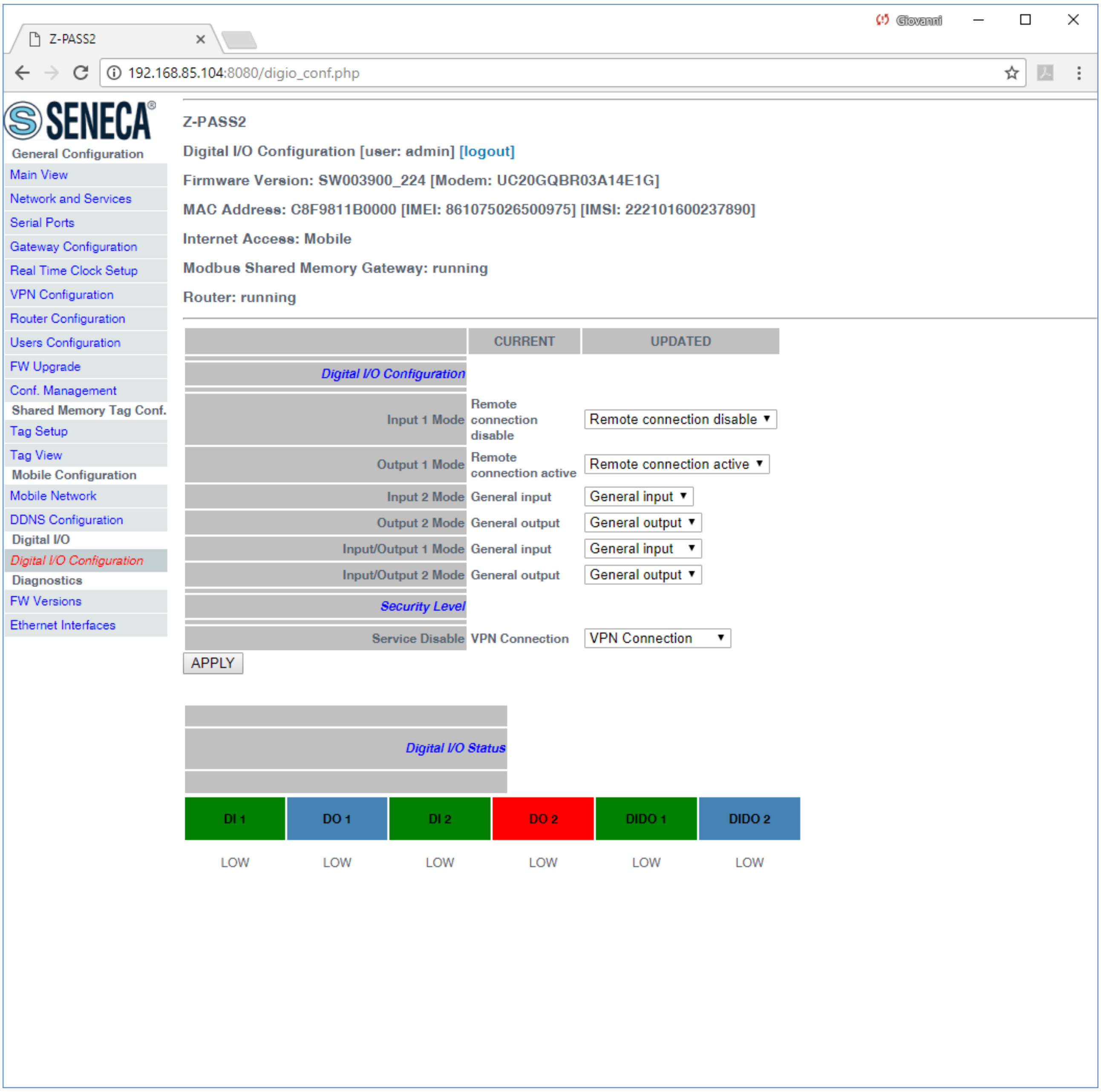
	cannot be changed.	
Output 1 Mode	This parameter represents the operating mode of the Digital Output 1 (DO 1). Since this is the digital output used to monitor remote connection, its value ("Remote connection active") cannot be changed.	Remote connection active
Input 2 Mode	This parameter represents the operating mode of the Digital Input 2 (DI 2). Possible modes are: "General input" | "Local alarm".	General input
Output 2 Mode	This parameter represents the operating mode of the Digital Output 2 (DO 2). Possible modes are: "General output" | "Remote toggle"[15].	General output
Input/Output 1 Mode	This parameter represents the operating mode of the Digital Input/Output 1 (first configurable digital I/O) (DIDO 1). Possible modes are: "General input" | "General output".	General input
Input/Output 2 Mode	This parameter represents the operating mode of the Digital Input/Output 2 (second configurable digital I/O) (DIDO 2). Possible modes are: "General input" | "General output".	General output
Service Disable	This parameter determines which access services are disabled when "Remote Connection Disable" digital input is HIGH. Possible values are: "VPN Connection" | "VPN Service" | "Internet Connection" | "SMS Service". See chapter 15, for a detailed description of these values.	VPN Connection

The "Digital I/O Status" section of the page gives the current status values ("LOW"/"HIGH") for each of the six available digital I/Os.

From this page, you can also change the status of the digital outputs working as "General Output"; the procedure is the following:

[15] "Remote toggle" function is still to be defined.

- when you move the mouse over one of the rectangles containing the digital I/O label (in the following figure, “DO 2”), the rectangle becomes red:



Z-PASS2

Digital I/O Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

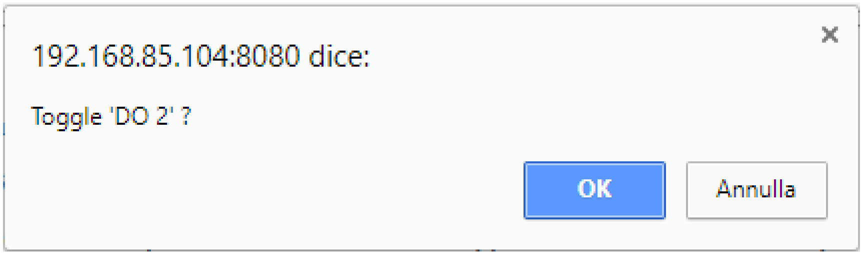
Router: running

	CURRENT	UPDATED
Digital I/O Configuration		
Input 1 Mode	Remote connection disable	Remote connection disable ▾
Output 1 Mode	Remote connection active	Remote connection active ▾
Input 2 Mode	General input	General input ▾
Output 2 Mode	General output	General output ▾
Input/Output 1 Mode	General input	General input ▾
Input/Output 2 Mode	General output	General output ▾
Security Level		
Service Disable	VPN Connection	VPN Connection ▾

Digital I/O Status

DI 1	DO 1	DI 2	DO 2	DIDO 1	DIDO 2
LOW	LOW	LOW	LOW	LOW	LOW

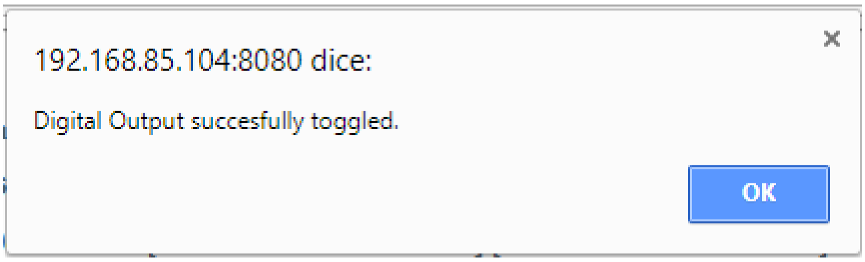
- when you click on the rectangle (only when I/O mode is “General Output”), a confirm pop-up is shown:



192.168.85.104:8080 dice:

Toggle 'DO 2' ?

- if you click on “Cancel” button, no action is performed; if you click on “OK” button, the digital output status is toggled and a new pop-up is shown:

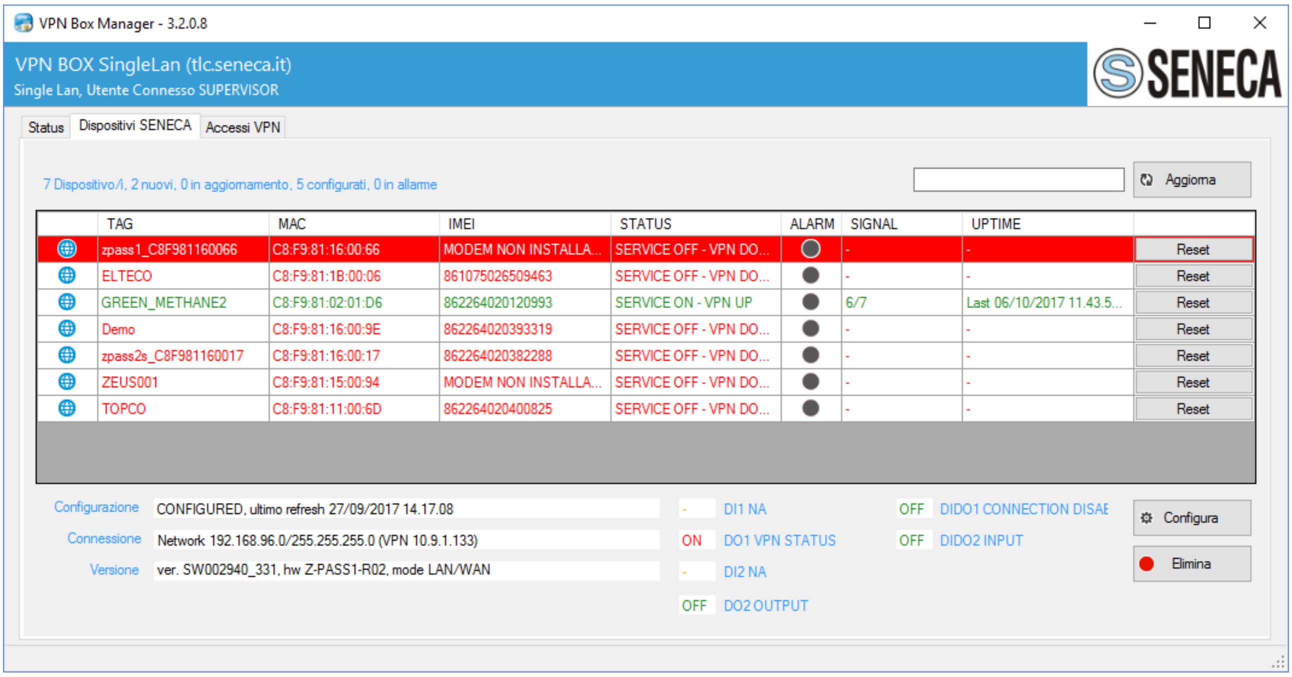


192.168.85.104:8080 dice:

Digital Output succesfully toggled.

Please note that the above procedure applies also to Z-PASS1.

The status of the digital input configured as “Local Alarm” is reported in the “ALARM” column in the “Devices” tab of the “Seneca VPN Box Manager” and “Seneca VPN Client Communicator” applications.



VPN Box Manager - 3.2.0.8

VPN BOX SingleLan (tlc.seneca.it)

Single Lan, Utente Connesso SUPERVISOR

7 Dispositivo/i, 2 nuovi, 0 in aggiornamento, 5 configurati, 0 in allarme

	TAG	MAC	IMEI	STATUS	ALARM	SIGNAL	UPTIME	
	zpass1_C8F981160066	C8:F9:81:16:00:66	MODEM NON INSTALLA...	SERVICE OFF - VPN DO...	●	-	-	Reset
	ELTECO	C8:F9:81:1B:00:06	861075026509463	SERVICE OFF - VPN DO...	●	-	-	Reset
	GREEN_METHANE2	C8:F9:81:02:01:D6	862264020120993	SERVICE ON - VPN UP	●	6/7	Last 06/10/2017 11.43.5...	Reset
	Demo	C8:F9:81:16:00:9E	862264020393319	SERVICE OFF - VPN DO...	●	-	-	Reset
	zpass2s_C8F981160017	C8:F9:81:16:00:17	862264020382288	SERVICE OFF - VPN DO...	●	-	-	Reset
	ZEUS001	C8:F9:81:15:00:94	MODEM NON INSTALLA...	SERVICE OFF - VPN DO...	●	-	-	Reset
	TOPCO	C8:F9:81:11:00:6D	862264020400825	SERVICE OFF - VPN DO...	●	-	-	Reset

Configurazione CONFIGURED, ultimo refresh 27/09/2017 14.17.08

Connessione Network 192.168.96.0/255.255.255.0 (VPN 10.9.1.133)

Versione ver. SW002940_331, hw Z-PASS1-R02, mode LAN/WAN

- DI1 NA

ON DO1 VPN STATUS

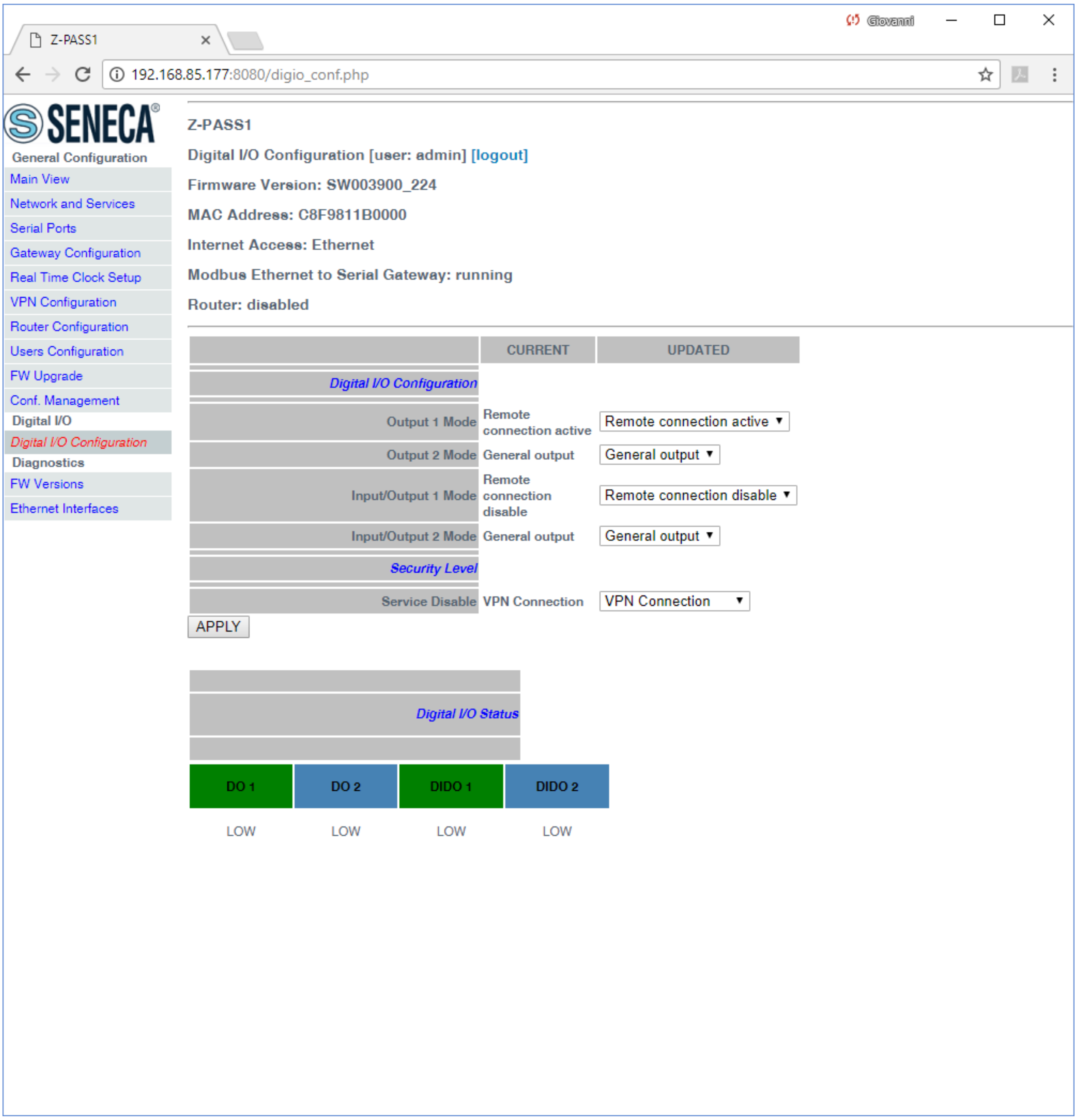
- DI2 NA

OFF DO2 OUTPUT

OFF DIDO1 CONNECTION DISAE

OFF DIDO2 INPUT

21.1.4.2 Z-PASS1



Z-PASS1

Digital I/O Configuration [user: admin] [logout]

Firmware Version: SW003900_224

MAC Address: C8F9811B0000

Internet Access: Ethernet

Modbus Ethernet to Serial Gateway: running

Router: disabled

	CURRENT	UPDATED
Digital I/O Configuration		
Output 1 Mode	Remote connection active	Remote connection active ▾
Output 2 Mode	General output	General output ▾
Input/Output 1 Mode	Remote connection disable	Remote connection disable ▾
Input/Output 2 Mode	General output	General output ▾
Security Level		
Service Disable	VPN Connection	VPN Connection ▾

Digital I/O Status

DO 1	DO 2	DIDO 1	DIDO 2
LOW	LOW	LOW	LOW

In this page, you can configure the operating modes of the Digital I/Os and the security level applied by the "Remote Connection Disable" feature (see chapter 15).

Field	Meaning	Default value
Output 1 Mode	This parameter represents the operating mode of the Digital Output 1 (DO 1). Since this is the digital output used to monitor remote connection, its value	Remote connection active

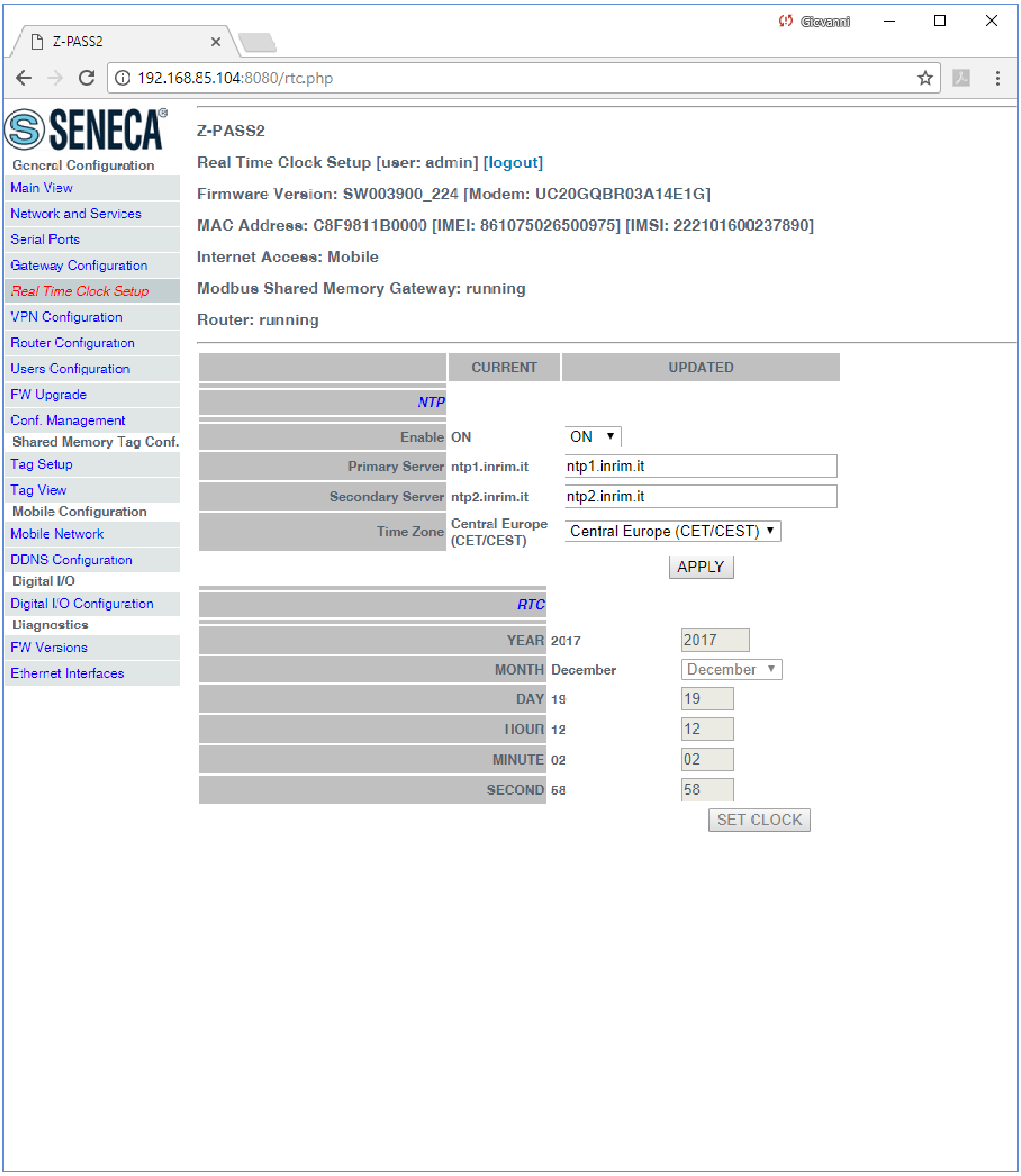
	(“Remote connection active”) cannot be changed.	
Output 2 Mode	This parameter represents the operating mode of the Digital Output 2 (DO 2). Possible modes are: “General output” | “Remote toggle”[16].	General output
Input/Output 1 Mode	This parameter represents the operating mode of the Digital Input/Output 1 (first configurable digital I/O) (DIDO 1). Since this is used as an input for “Remote Connection Disable” feature, its value (“Remote connection disable”) cannot be changed.	Remote connection disable
Input/Output 2 Mode	This parameter represents the operating mode of the Digital Input/Output 2 (second configurable digital I/O) (DIDO 2). Possible modes are: “General input” | “General output” | “Local alarm”.	General output
Service Disable	This parameter determines which access services are disabled when “Remote Connection Disable” digital input is HIGH. Possible values are: “VPN Connection” | “VPN Service” | “Internet Connection” | “SMS Service”. See chapter 15, for a detailed description of these values.	VPN Connection

The “Digital I/O Status” section of the page gives the current status values (“LOW”/”HIGH”) for each of the four available digital I/Os.

21.1.5 Real Time Clock Setup

By clicking on the “Real Time Clock Setup” link, in the “Basic Configuration” section, you come to the following page:

[16] “Remote toggle” function is still to be defined.



Z-PASS2

Real Time Clock Setup [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
NTP		
Enable	ON	ON ▾
Primary Server	ntp1.inrim.it	ntp1.inrim.it
Secondary Server	ntp2.inrim.it	ntp2.inrim.it
Time Zone	Central Europe (CET/CEST)	Central Europe (CET/CEST) ▾

RTC		
YEAR	2017	2017
MONTH	December	December ▾
DAY	19	19
HOUR	12	12
MINUTE	02	02
SECOND	58	58

This page is made up of two sections: “NTP” and “RTC”.

In the “NTP” section, you can change the parameters related to the Network Time Protocol and to the Time Zone, as listed in the following table:

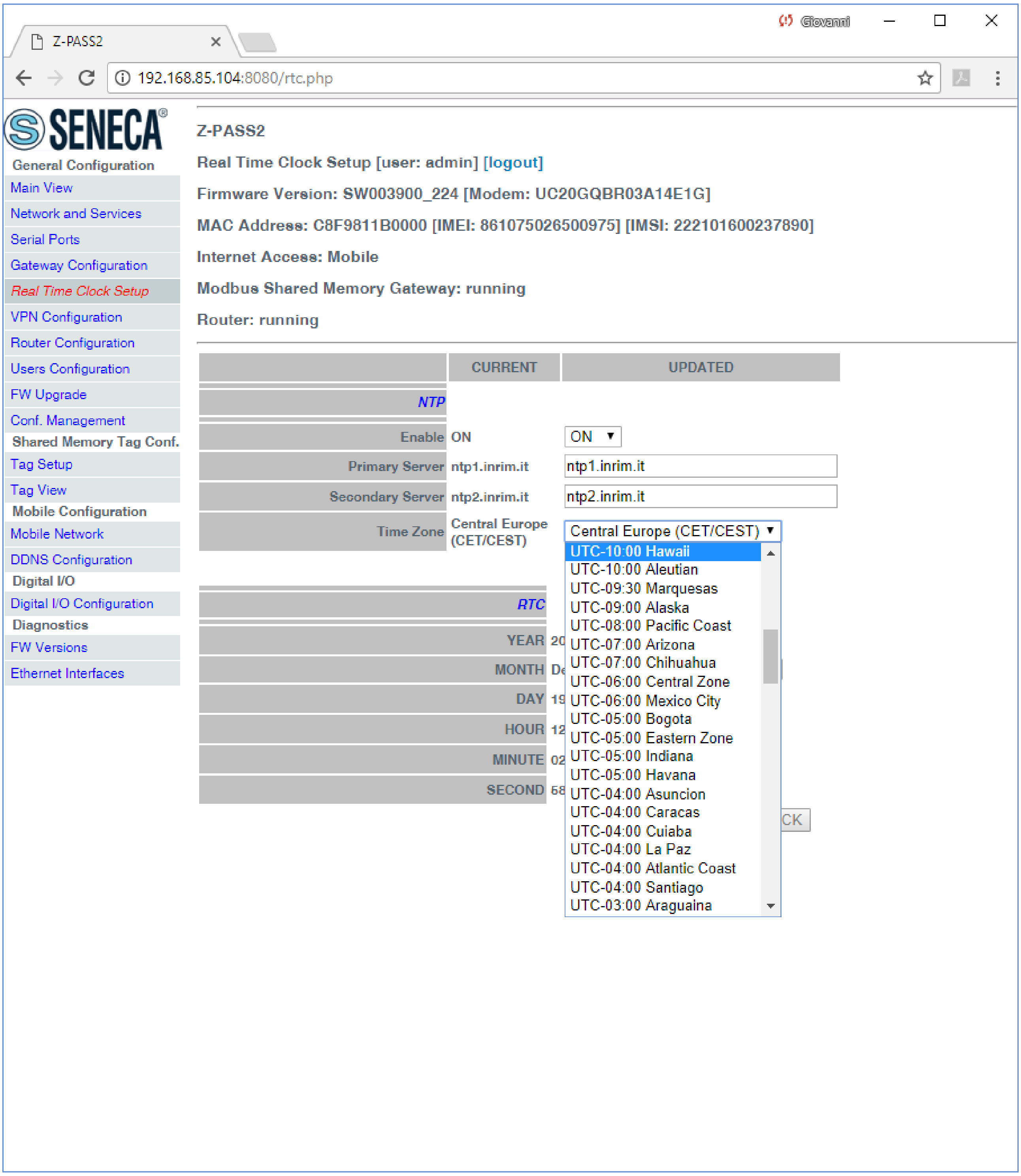
Field	Meaning	Default value

NTP/Enable	Flag to enable/disable time synchronization by means of NTP protocol	ON
NTP/Primary Server	IP address or FQDN[17] of the Primary NTP Server	ntp1.inrim.it
NTP/Secondary Server	IP address or FQDN of the Secondary NTP Server	ntp2.inrim.it
NTP/Time Zone	Time Zone	Central Europe (CET/CEST)

When the "Time Zone" parameter is set to "Central Europe (CET/CEST)" value, the Device automatically enables (CEST) / disables (CET) the "Daylight Saving Time" setting.

A large number of Time Zones are available, as partially shown in the following figure:

[17] FQDN: Fully Qualified Domain Name, e.g.: "pool.ntp.org".



Z-PASS2

Real Time Clock Setup [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

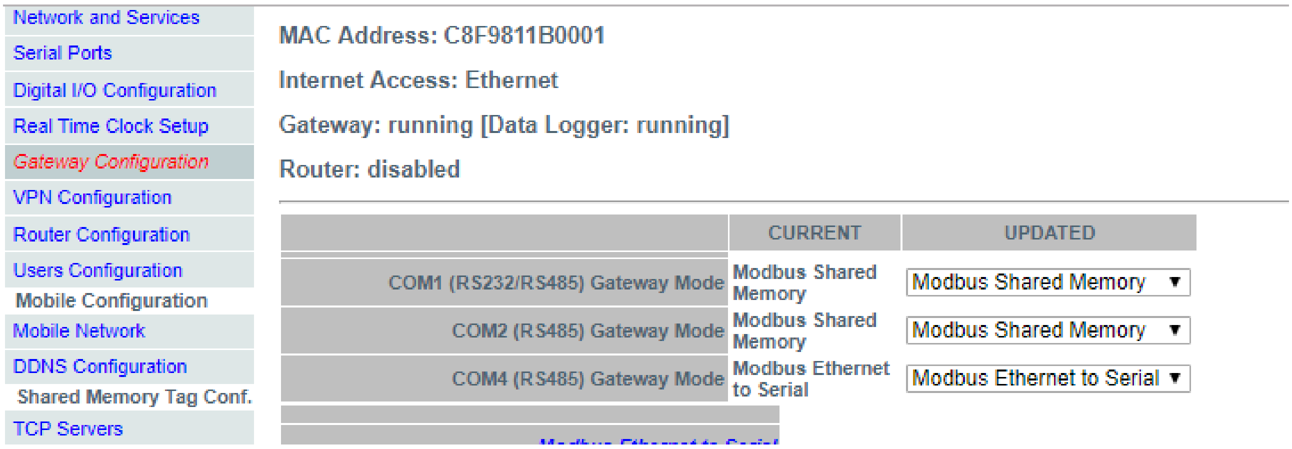
	CURRENT	UPDATED
NTP		
Enable	ON	ON
Primary Server	ntp1.inrim.it	ntp1.inrim.it
Secondary Server	ntp2.inrim.it	ntp2.inrim.it
Time Zone	Central Europe (CET/CEST)	Central Europe (CET/CEST)
RTC		
YEAR	20	
MONTH	De	
DAY	19	
HOUR	12	
MINUTE	02	
SECOND	58	

The “RTC” section of the page lets you manually change the Z-PASS date/time settings; since this makes sense only if NTP time synchronization is not enabled, when “NTP/Enable” parameter is “ON” the input fields and the “SET CLOCK” button are disabled and the parameters are only for viewing.

Instead, when “NTP/Enable” parameter is “OFF”, the input fields in the “NTP” section are still enabled; this lets you change and save the parameter values, even if they are not actually used.

21.1.6 Gateway Configuration

By clicking on the “Gateway Configuration” link, in the “Basic Configuration” section, you come to the following page:



- Network and Services
- Serial Ports
- Digital I/O Configuration
- Real Time Clock Setup
- Gateway Configuration
- VPN Configuration
- Router Configuration
- Users Configuration
- Mobile Configuration
- Mobile Network
- DDNS Configuration
- Shared Memory Tag Conf.
- TCP Servers

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: disabled

	CURRENT	UPDATED
COM1 (RS232/RS485) Gateway Mode	Modbus Shared Memory	Modbus Shared Memory ▼
COM2 (RS485) Gateway Mode	Modbus Shared Memory	Modbus Shared Memory ▼
COM4 (RS485) Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼

Modbus Ethernet to Serial

The first thing you have to do in this page is to select, for each serial port, the type of gateway bound to the port, by means of the corresponding “Gateway Mode” parameter; the possible modes are “Modbus Ethernet to Serial”, “Transparent” and “Modbus Shared Memory”.

The page is substantially made up of three sections, corresponding to the three serial ports available in Z-PASS devices.

The configuration parameters available in each of these sections depend on the selected mode, as described in the following sub-paragraphs.

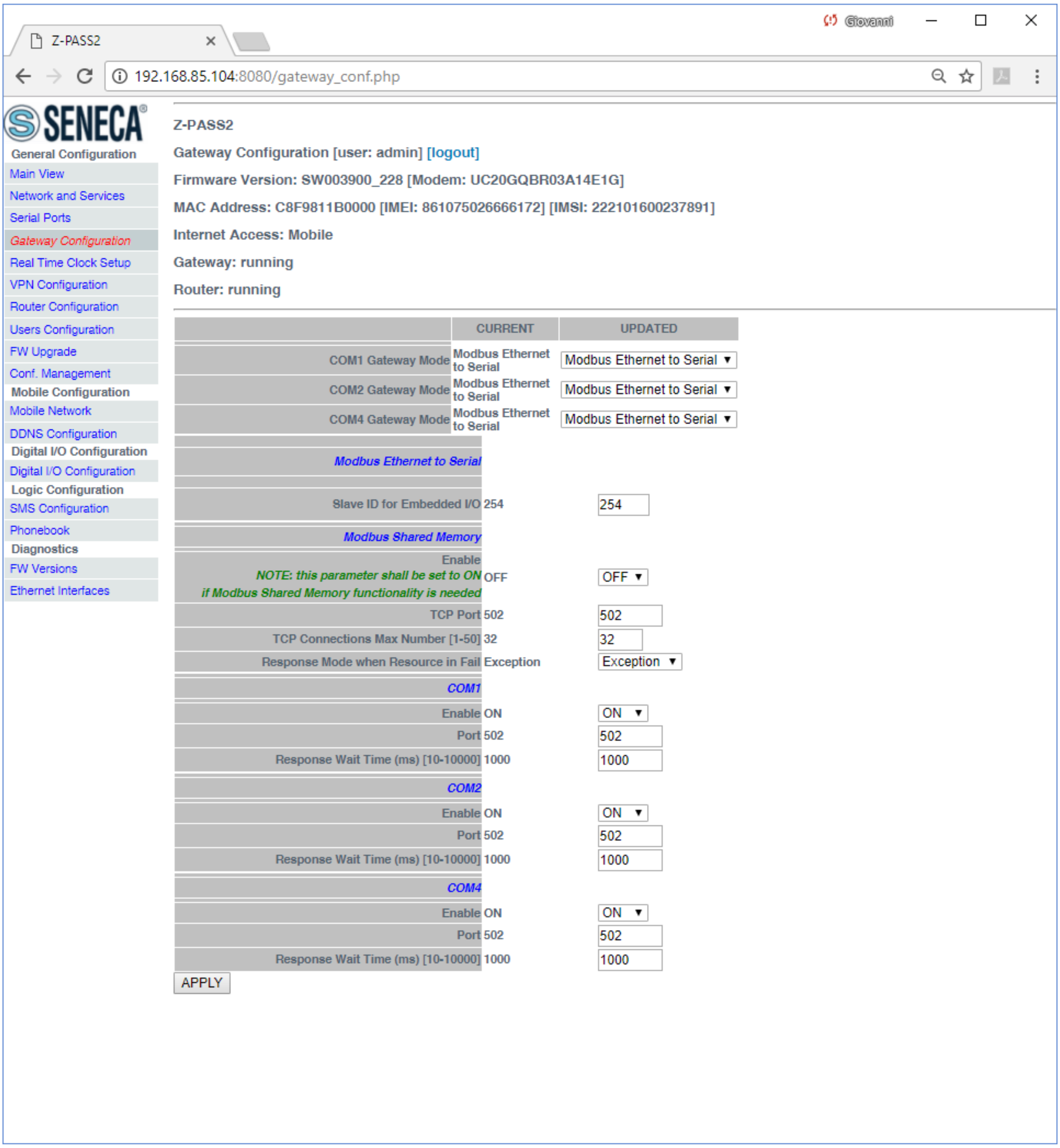
21.1.6.1 Modbus Ethernet to Serial Gateway

For each serial port with “Gateway Mode” = “Modbus Ethernet to Serial”, the following configuration parameters are available:

Field	Meaning	Default value
Enable	Flag to enable/disable the Modbus Ethernet to Serial Gateway functionality on the port	ON
Port	TCP port to access the Modbus Ethernet to Serial Gateway If three distinct values are set, three Modbus Ethernet to Serial Gateway instances are run, each handling a single serial port.	COM1: 501 COM2: 502 COM4: 503

	If the same port value is set for more than one serial port, the same Modbus Ethernet to Serial Gateway instance will handle two or three serial ports, that is the Modbus RTU requests will be simultaneously sent to the serial ports.	
Response Wait Time	Timeout on the reception of the Modbus RTU responses The value is in milliseconds; possible values are in the range [10 - 10000].	1000

The following screen-shots give some examples of Modbus Ethernet to Serial Gateway configurations.



Z-PASS2

Gateway Configuration [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

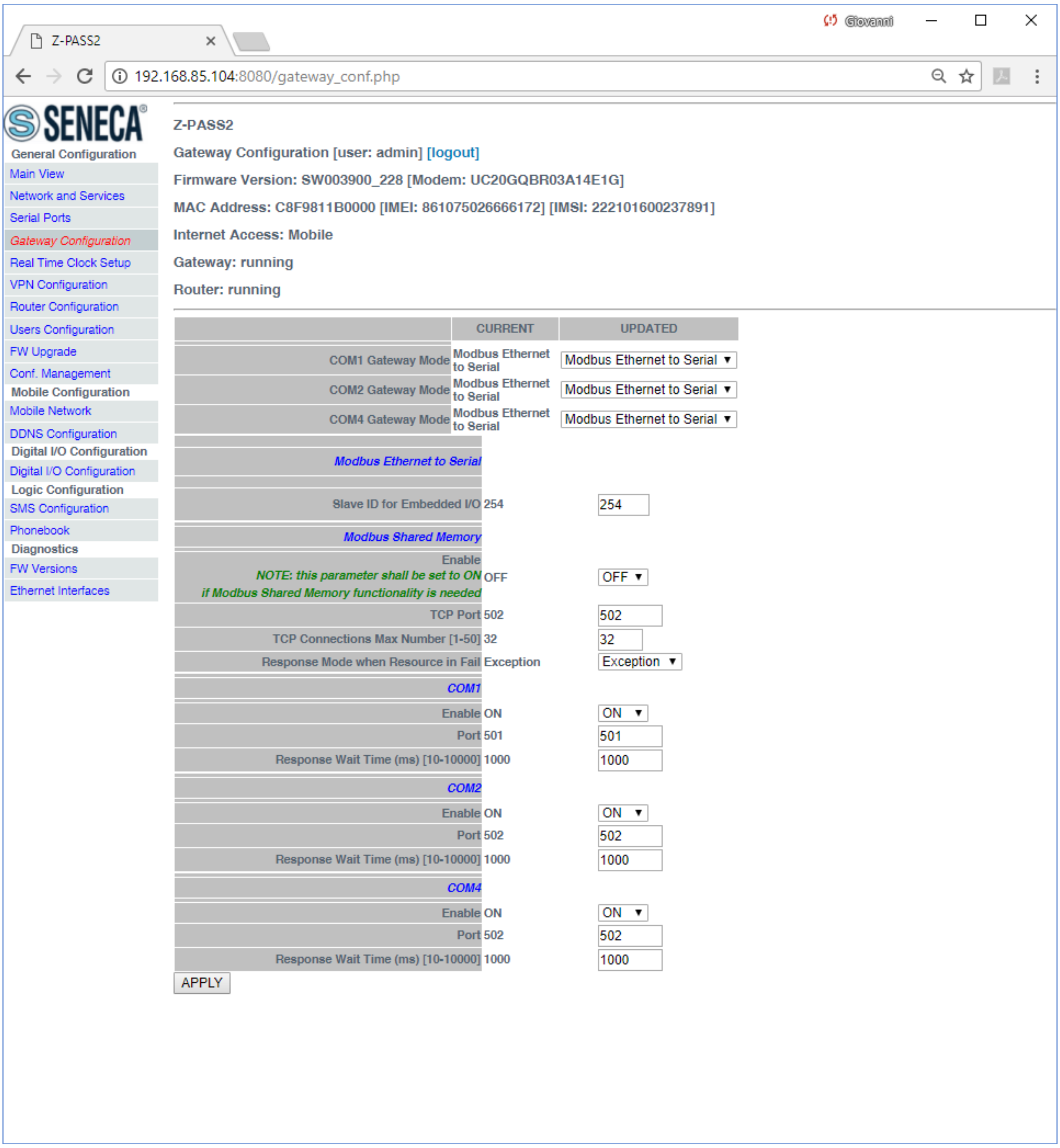
Internet Access: Mobile

Gateway: running

Router: running

	CURRENT	UPDATED
COM1 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
COM2 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
COM4 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
Modbus Ethernet to Serial		
Slave ID for Embedded I/O	254	254
Modbus Shared Memory		
Enable *NOTE: this parameter shall be set to ON if Modbus Shared Memory functionality is needed*	OFF	OFF ▼
TCP Port	502	502
TCP Connections Max Number [1-50]	32	32
Response Mode when Resource in Fail	Exception	Exception ▼
COM1		
Enable	ON	ON ▼
Port	502	502
Response Wait Time (ms) [10-10000]	1000	1000
COM2		
Enable	ON	ON ▼
Port	502	502
Response Wait Time (ms) [10-10000]	1000	1000
COM4		
Enable	ON	ON ▼
Port	502	502
Response Wait Time (ms) [10-10000]	1000	1000

In the above configuration, all the Modbus requests received on the 502 TCP port will be sent to all the three serial ports (COM1, COM2 and COM4); the communication parameters on the serial ports are those set in the "Serial Ports" page (see 21.1.3).



Z-PASS2

Gateway Configuration [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

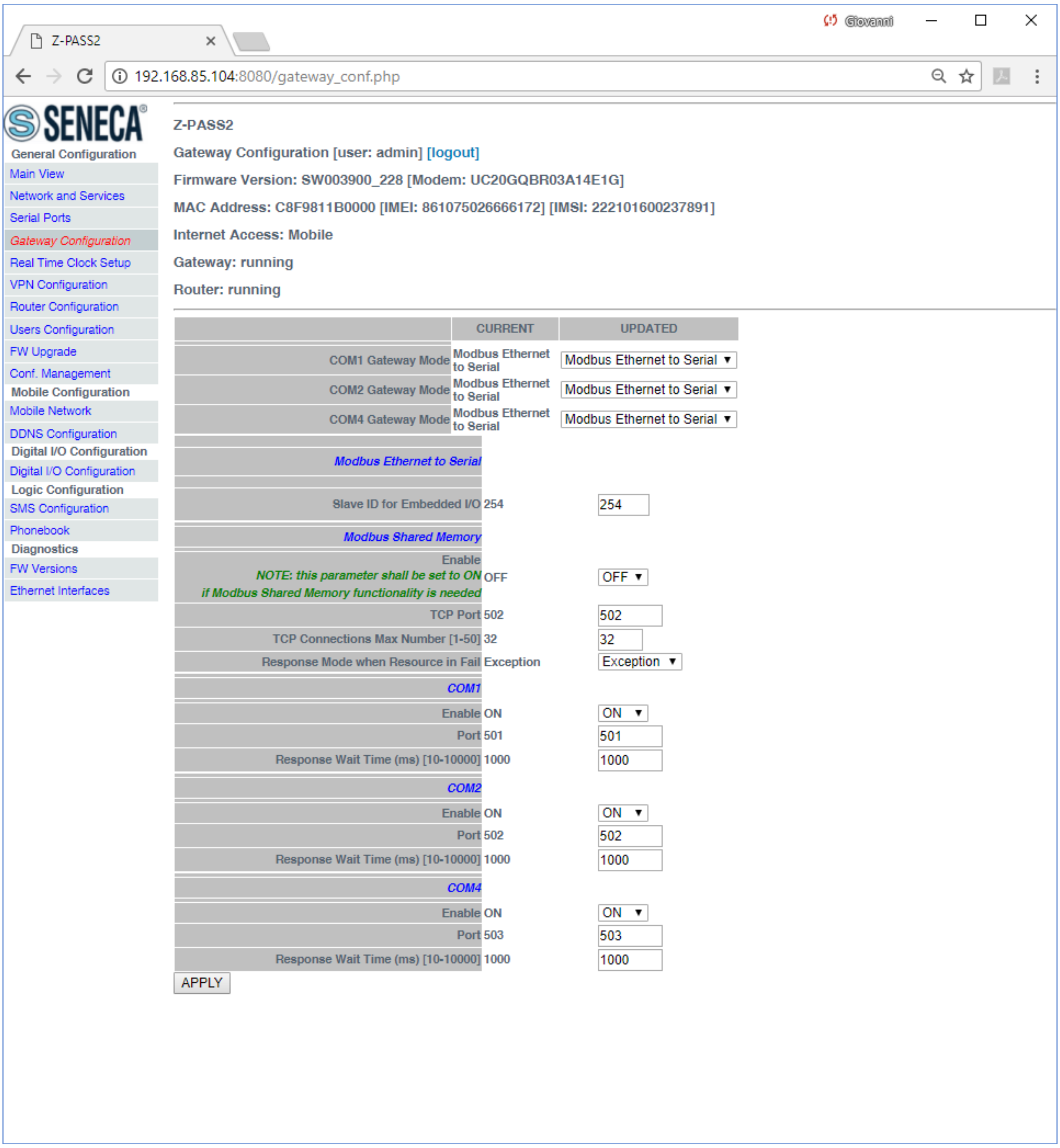
Internet Access: Mobile

Gateway: running

Router: running

	CURRENT	UPDATED
COM1 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
COM2 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
COM4 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
Modbus Ethernet to Serial		
Slave ID for Embedded I/O	254	254
Modbus Shared Memory		
Enable *NOTE: this parameter shall be set to ON if Modbus Shared Memory functionality is needed*	OFF	OFF ▼
TCP Port	502	502
TCP Connections Max Number [1-50]	32	32
Response Mode when Resource in Fail	Exception	Exception ▼
COM1		
Enable	ON	ON ▼
Port	501	501
Response Wait Time (ms) [10-10000]	1000	1000
COM2		
Enable	ON	ON ▼
Port	502	502
Response Wait Time (ms) [10-10000]	1000	1000
COM4		
Enable	ON	ON ▼
Port	502	502
Response Wait Time (ms) [10-10000]	1000	1000

In the above configuration, the Modbus requests received on the 501 TCP port will be sent to the COM1 port, while those received on the 502 TCP port will be sent to the COM2 and COM4 ports.



Z-PASS2

Gateway Configuration [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

Internet Access: Mobile

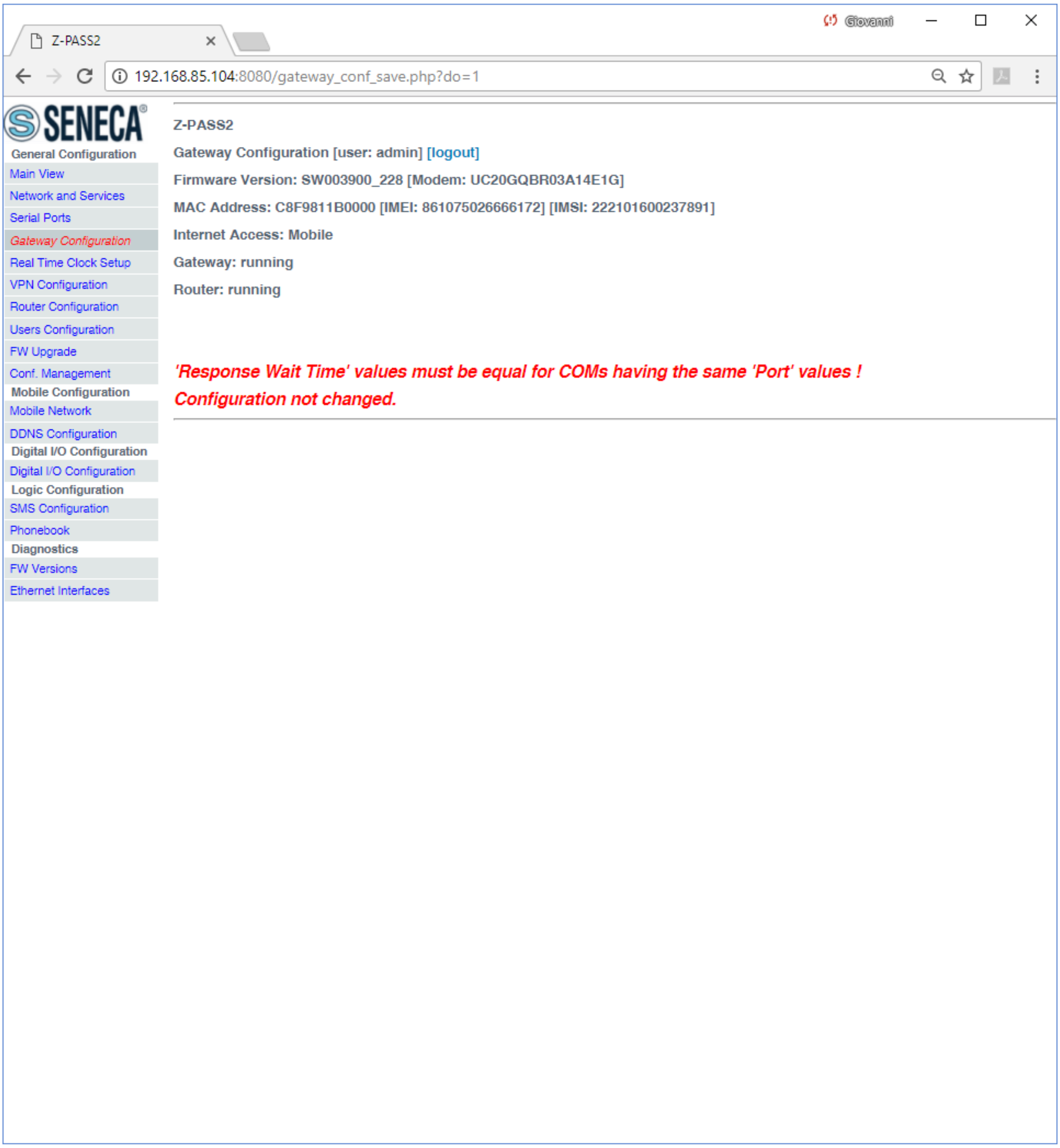
Gateway: running

Router: running

	CURRENT	UPDATED
COM1 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
COM2 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
COM4 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
Modbus Ethernet to Serial		
Slave ID for Embedded I/O	254	254
Modbus Shared Memory		
Enable *NOTE: this parameter shall be set to ON if Modbus Shared Memory functionality is needed*	OFF	OFF ▼
TCP Port	502	502
TCP Connections Max Number [1-50]	32	32
Response Mode when Resource in Fail	Exception	Exception ▼
COM1		
Enable	ON	ON ▼
Port	501	501
Response Wait Time (ms) [10-10000]	1000	1000
COM2		
Enable	ON	ON ▼
Port	502	502
Response Wait Time (ms) [10-10000]	1000	1000
COM4		
Enable	ON	ON ▼
Port	503	503
Response Wait Time (ms) [10-10000]	1000	1000

Finally, in the above configuration, each TCP port corresponds to a single serial port, that is Modbus requests received on a TCP port are sent to a single serial port.

Please note that if you set the same TCP port value for more than one serial port, the “Response Wait Time” values shall also be the same for those serial ports; otherwise, clicking on the “APPLY” button, the following error message is shown.



Z-PASS2

Gateway Configuration [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running

Router: running

'Response Wait Time' values must be equal for COMs having the same 'Port' values !

Configuration not changed.

21.1.6.1.1 Embedded I/O

As shown in the above figures, when at least one port has “Gateway Mode” = “Modbus Ethernet to Serial”, the “Gateway Configuration” page contains the following parameter:

Field	Meaning	Default value
Slave ID for Embedded I/O	Slave ID used to access the Modbus Registers corresponding to the	254

	"embedded" digital I/Os (for "IO" HW revision). In Z-PASS2, this id can also be used to access Modbus Registers containing GPS information. Possible values: [1..255].	

The Modbus Registers representing the Digital I/Os are given in the following table:

Data Type	**Digital I/Os**	**Address**
Holding Registers	Bit 0: DI1 (LSB) Bit 1: DI2 Bit 2: DI3 Bit 3: DI4	0 (40001)
Holding Registers	Bit 0: DO1 (LSB) Bit 1: DO2 Bit 2: DO3 Bit 3: DO4	0 (40002)
Discrete Inputs	DI1	0 (10001)
Discrete Inputs	DI2	1 (10002)
Discrete Inputs	DI3	2 (10003)
Discrete Inputs	DI4	3 (10004)
Coils	DO1	0
Coils	DO2	1
Coils	DO3	2
Coils	DO4	3

The mapping between DI1..DI4, DO1..DO4 and the Digital I/O names described in the "Digital I/O Configuration" paragraph is as follows:

DI1	DI 1
DI2	DI 2
DI3	DIDO 1, if input
DI4	DIDO 2, if input
DO1	DO 1
DO2	DO 2
DO3	DIDO 1, if output
DO4	DIDO 2, if output

If DIx or DOx is not available (e.g.: DI4, when DIDO 2 is configured as an output), the corresponding bit value is always 0.

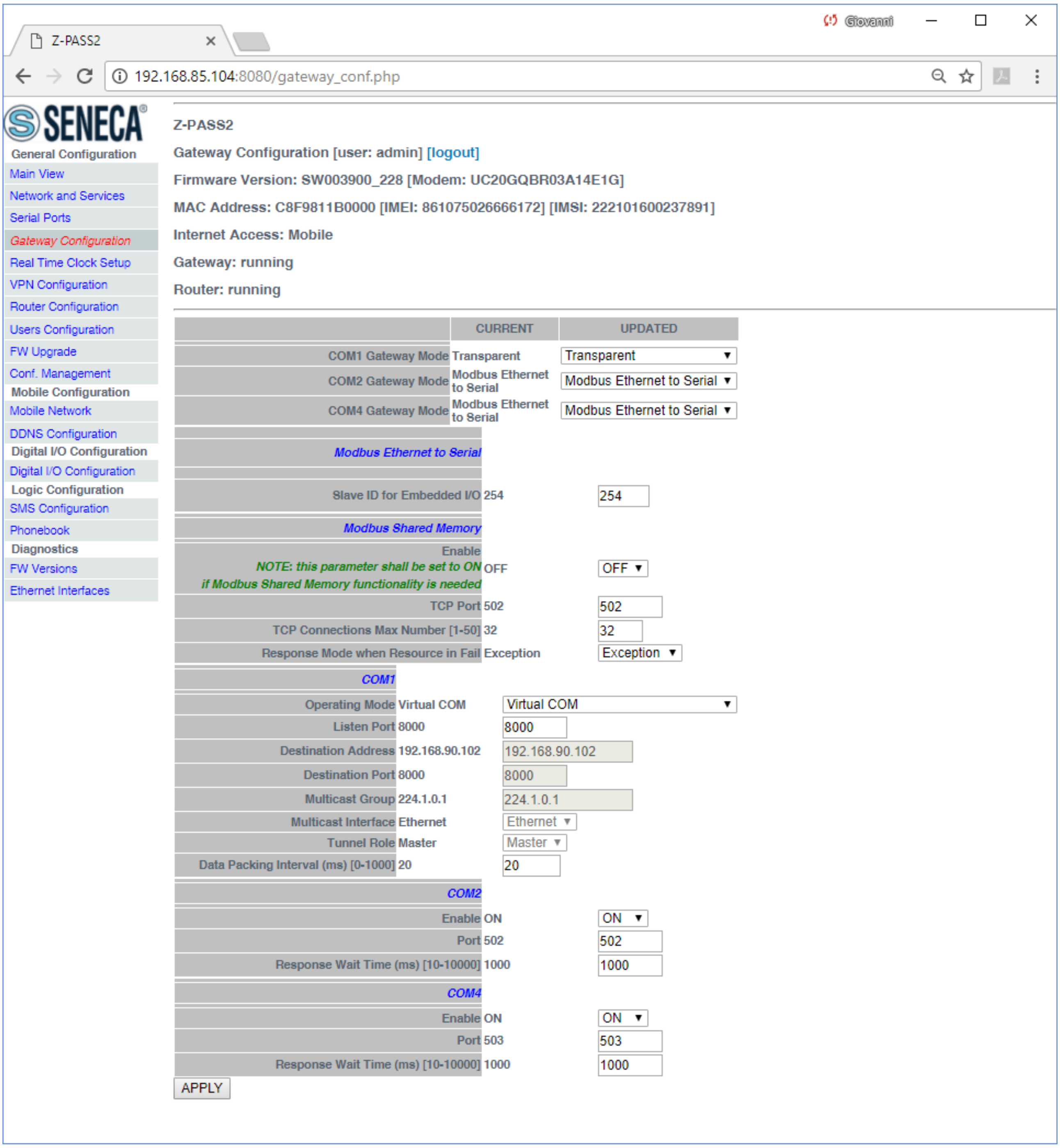
DOx can be actually set only if the corresponding Digital I/O Mode is "General Output" (see "Digital I/O Configuration" paragraph); otherwise, the write request will have no effect.

The Modbus Registers containing the GPS information are given in the following table (all Holding Registers):

Info	Address	Data Type
GPS_ERROR	9 (40010)	INT (0: OK, -1: Not fixed -2: Internal error)
GPS_UTC_HH	10 (40011)	UINT
GPS_UTC_MM	11 (40012)	UINT
GPS_UTC_SS	12 (40013)	UINT
GPS_DATE_DD	13 (40014)	UINT
GPS_DATE_MM	14 (40015)	UINT
GPS_DATE_YY	15 (40016)	UINT
GPS_LATITUDE	16 – 19 (40017 – 40020)	LREAL
GPS_LONGITUDE	20 – 23 (40021 – 40024)	LREAL
GPS_HDOP	24 – 27 (40025 – 40028)	LREAL
GPS_ALTITUDE	28 – 31 (40029 – 40032)	LREAL
GPS_COG	32 – 35 (40033 – 40036)	LREAL
GPS_SPEED_KM	36 – 39 (40037 – 40040)	LREAL
GPS_SPEED_KN	40 - 43 (40041 – 40044)	LREAL
GPS_FIX	44 (40045)	UINT
GPS_NSAT	45 (40046)	UINT

21.1.6.2 Transparent Gateway

Selecting “Transparent” as the gateway mode for one of the serial ports, e.g. “COM1”, the “Gateway Configuration” page will change to look like the one shown in the following figure:



Z-PASS2

Gateway Configuration [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running

Router: running

	CURRENT	UPDATED
COM1 Gateway Mode	Transparent	Transparent ▼
COM2 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
COM4 Gateway Mode	Modbus Ethernet to Serial	Modbus Ethernet to Serial ▼
Modbus Ethernet to Serial		
Slave ID for Embedded I/O	254	254
Modbus Shared Memory		
Enable *NOTE: this parameter shall be set to ON if Modbus Shared Memory functionality is needed*	OFF	OFF ▼
TCP Port	502	502
TCP Connections Max Number [1-50]	32	32
Response Mode when Resource in Fail	Exception	Exception ▼
COM1		
Operating Mode	Virtual COM	Virtual COM ▼
Listen Port	8000	8000
Destination Address	192.168.90.102	192.168.90.102
Destination Port	8000	8000
Multicast Group	224.1.0.1	224.1.0.1
Multicast Interface	Ethernet	Ethernet ▼
Tunnel Role	Master	Master ▼
Data Packing Interval (ms) [0-1000]	20	20
COM2		
Enable	ON	ON ▼
Port	502	502
Response Wait Time (ms) [10-10000]	1000	1000
COM4		
Enable	ON	ON ▼
Port	503	503
Response Wait Time (ms) [10-10000]	1000	1000

For each serial port with "Gateway Mode" = "Transparent", the available configuration parameters depend on the value of the "Operating Mode" parameter selected for the port.

The possible values for the "Operating Mode" parameter are:

- None (default value)
- Virtual COM
- Serial Tunnel Point-to-Point on TCP

- Serial Tunnel Point-to-Point on UDP
- Serial Tunnel Point-to-Multipoint

Furthermore, for the "Serial Tunnel" operating modes, the available parameters depend on the selected "Tunnel Role" (Master or Slave).

The following tables describe the relevant parameters for the various operating modes.

Virtual COM

Field	**Meaning**	**Default value**
Listen Port	TCP port to access the transparent gateway	COM1: 8000 COM2: 8001 COM4: 8002
Data Packing Interval	Time interval used as a criterion to pack data bytes received from the serial port, before sending them to the network; that is, if no byte is received for this time, available bytes are sent to the network. The value is in milliseconds; possible values are in the range [0 - 1000].	20

Serial Tunnel Point-to-Point on TCP (Slave)
Serial Tunnel Point-to-Point on UDP (Slave)

Field	**Meaning**	**Default value**
Listen Port	TCP/UDP port to access the transparent gateway	COM1: 8000 COM2: 8001 COM4: 8002

Serial Tunnel Point-to-Point on TCP (Master)
Serial Tunnel Point-to-Point on UDP (Master)

Field	**Meaning**	**Default value**
Destination Address	The IP Address which the transparent gateway will connect to	COM1: 192.168.90.102 COM2: 192.168.90.103 COM4: 192.168.90.104
Destination Port	The TCP/UDP port which the transparent gateway will connect to	COM1: 8000 COM2: 8001 COM4: 8002

Serial Tunnel Point-to-Multipoint (Master)

Field	**Meaning**	**Default value**
Destination Port	The UDP port which the packets will be sent to	COM1: 8000 COM2: 8001

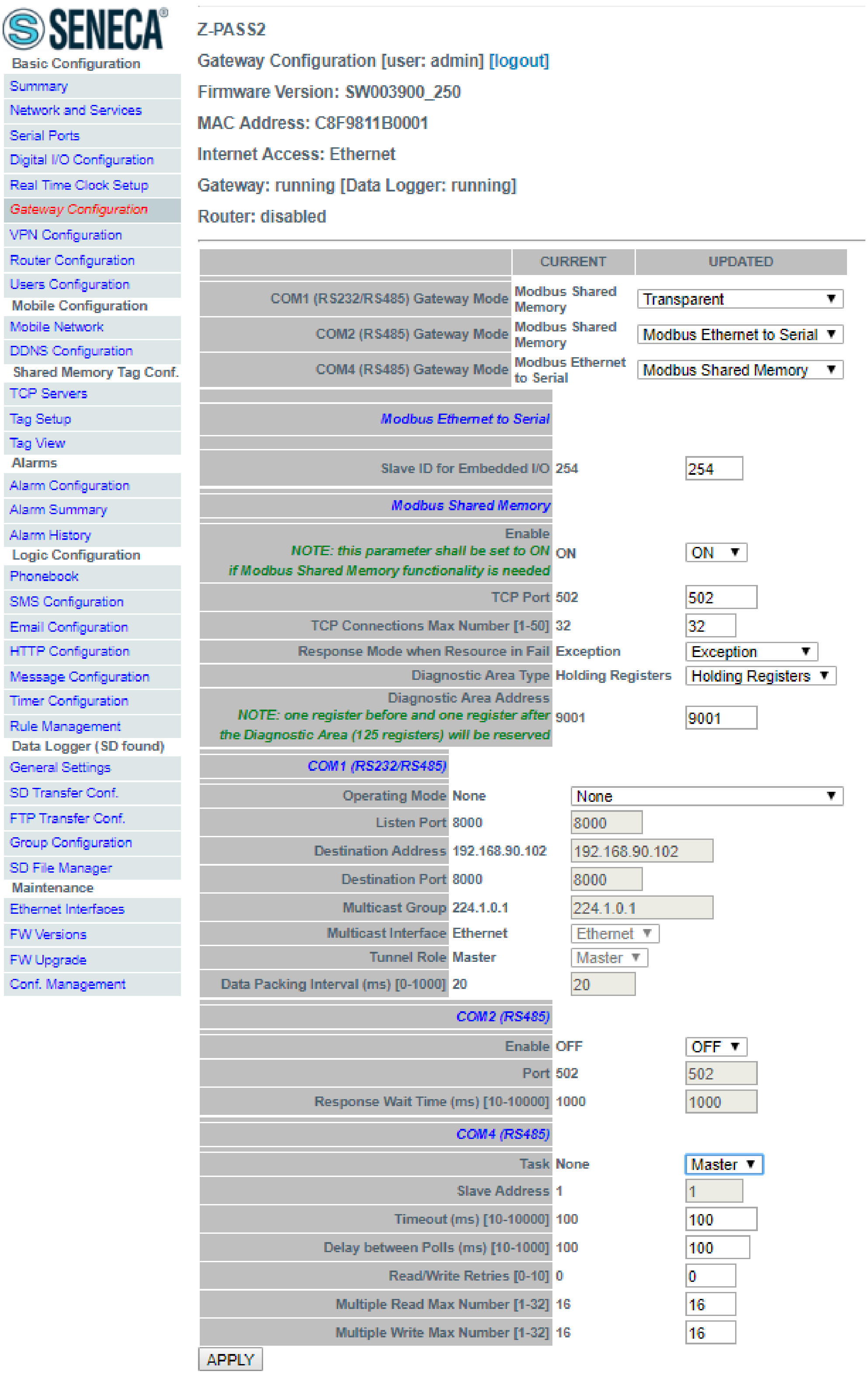
		COM4: 8002
Multicast Group	IP Address which identifies the Multicast Group	224.1.0.1
Multicast Interface	Network Interface which the UDP packets are sent to; possible values: Ethernet|VPN; “VPN” option is available only when VPN is active	Ethernet

Serial Tunnel Point-to-Multipoint (Slave)

Field	**Meaning**	**Default value**
Listen Port	The UDP port which the packets will be received from	COM1: 8000 COM2: 8001 COM4: 8002
Multicast Group	IP Address which identifies the Multicast Group	224.1.0.1
Multicast Interface	Network Interface which the UDP packets are received from; possible values: Ethernet|VPN; “VPN” option is available only when VPN is active	Ethernet

21.1.6.3 Modbus Shared Memory Gateway (Use for Datalogging and Logic Rules)

Selecting “Modbus Shared Memory” as the gateway mode for one of the serial ports, e.g. “COM4”, the “Gateway Configuration” page will change to look like the one shown in the following figure:



Z-PASS2

Gateway Configuration [user: admin] [logout]

Firmware Version: SW003900_250

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: disabled

	CURRENT	UPDATED
COM1 (RS232/RS485) Gateway Mode	Modbus Shared Memory	Transparent ▼
COM2 (RS485) Gateway Mode	Modbus Shared Memory	Modbus Ethernet to Serial ▼
COM4 (RS485) Gateway Mode	Modbus Ethernet to Serial	Modbus Shared Memory ▼
Modbus Ethernet to Serial		
Slave ID for Embedded I/O	254	254
Modbus Shared Memory		
Enable *NOTE: this parameter shall be set to ON if Modbus Shared Memory functionality is needed*	ON	ON ▼
TCP Port	502	502
TCP Connections Max Number [1-50]	32	32
Response Mode when Resource in Fail	Exception	Exception ▼
Diagnostic Area Type	Holding Registers	Holding Registers ▼
Diagnostic Area Address *NOTE: one register before and one register after the Diagnostic Area (125 registers) will be reserved*	9001	9001
COM1 (RS232/RS485)		
Operating Mode	None	None ▼
Listen Port	8000	8000
Destination Address	192.168.90.102	192.168.90.102
Destination Port	8000	8000
Multicast Group	224.1.0.1	224.1.0.1
Multicast Interface	Ethernet	Ethernet ▼
Tunnel Role	Master	Master ▼
Data Packing Interval (ms) [0-1000]	20	20
COM2 (RS485)		
Enable	OFF	OFF ▼
Port	502	502
Response Wait Time (ms) [10-10000]	1000	1000
COM4 (RS485)		
Task	None	Master ▼
Slave Address	1	1
Timeout (ms) [10-10000]	100	100
Delay between Polls (ms) [10-1000]	100	100
Read/Write Retries [0-10]	0	0
Multiple Read Max Number [1-32]	16	16
Multiple Write Max Number [1-32]	16	16

As shown in the previous figures, the "Gateway Configuration" page always contains the following parameters, related to the "Modbus Shared Memory Gateway" mode; these parameters are always shown since this functionality makes sense even when no serial port is assigned to it, that is using only Modbus TCP protocol.

Field	Meaning	Default value
Enable	This parameter enables/disables the Modbus Shared Memory Gateway service. It is important to note that, when this parameter is set to OFF, the service is not running even if some serial ports are assigned to it.	OFF
TCP Port	Listening port for the Modbus TCP server	502
TCP Connections Max Number [1-50]	Maximum number of TCP connections that can be accepted by the Modbus TCP server	32
Response Mode when Resource in Fail	This parameter defines how the response to a Modbus (read) request is built for a tag corresponding to a Modbus station which is not responding; when mode is "Tag error value", the value in the Modbus response is given according to the "Error Mode"/"Error Value" parameters in the tag definition; when mode is "Exception", the response contains an exception with the value 11 ("Gateway target device failed to respond").	Exception
Diagnostic Area Type	Select if the diagnostic are can be accessed by Holding or Input Modbus Registers.	
Diagnostic Area Address	The diagnostic area reserve a bit for each tag (125 registers): Bit value to 0 -> means Tag Reading Error (or tag not configured) Bit value to 1 -> means Tag Reading OK So if you need to check the fail status of the first 10 tags using the default Area (9001 Holding Registers) you must read the register 49001. For example if the regsiter value is: 0x3DB = 987 = 0000 0011 1101 1011 Tag 1 = OK	

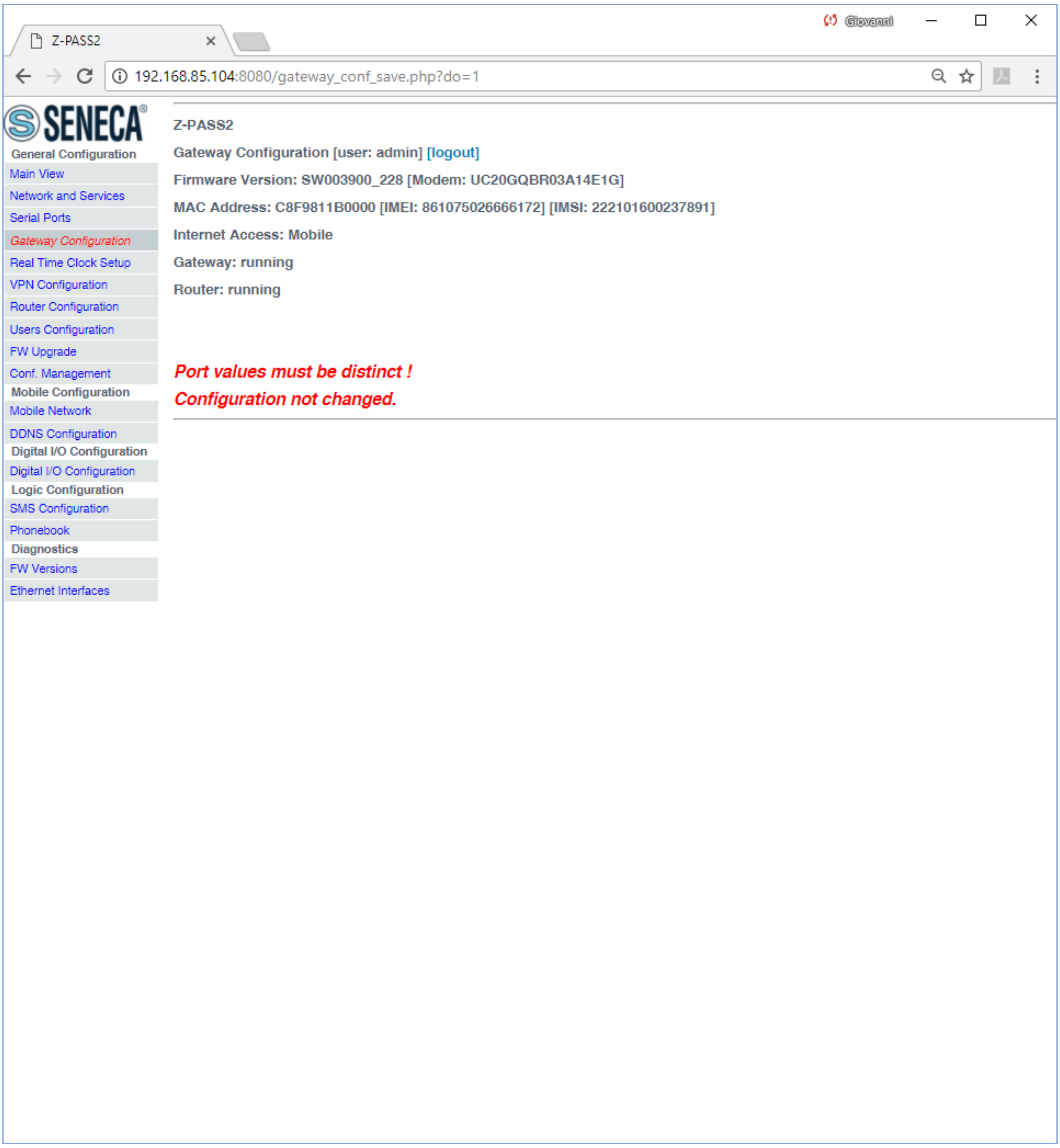
	Tag 2 = OK Tag 3 = FAIL Tag 4 = OK Tag 5 = OK Tag 6 = FAIL … Note that one register before and one register after the Diagnostic Area will be reserved (by default the register 49000 and 49126).	

Then, for each serial port with "Gateway Mode" = "Modbus Shared Memory", the parameters described in the following table are available.

Field	Meaning	Default value
Task	This parameter defines which Modbus Shared Memory Gateway task is running on the serial port; possibile values are: None, Master, Slave	None
Slave Address	Modbus Address for the RTU Slave; this is the only parameter available when Task=Slave	1
Timeout (ms) [10 – 10000]	Response timeout for Modbus RTU requests, in milliseconds (available only when Task=Master)	100
Delay between Polls (ms) [10 – 1000]	Interval between Modbus RTU requests, in milliseconds (available only when Task=Master)	100
Read/Write Retries [0 – 10]	Maximum number of retries for Modbus RTU requests; this always applies to write requests; for read requests, it applies only to tags with "Gateway Tag Mode"="BRIDGE" (see 21.3.2.1 paragraph)	0
Multiple Read Max Number [1 – 32]	Maximum number of Modbus registers that can be read in a single Modbus RTU request; this is used to reduce the number of read requests sent on the serial bus, thus performing optimization	16
Multiple Write Max Number [1 – 32]	Maximum number of Modbus registers that can be written in a single Modbus	16

	RTU request; this is used to reduce the number of write requests sent on the serial bus, thus performing optimization	

Please note that, if any of the configured TCP/UDP port values collide, the configuration is not applied and the following error message is shown:



Z-PASS2

Gateway Configuration [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running

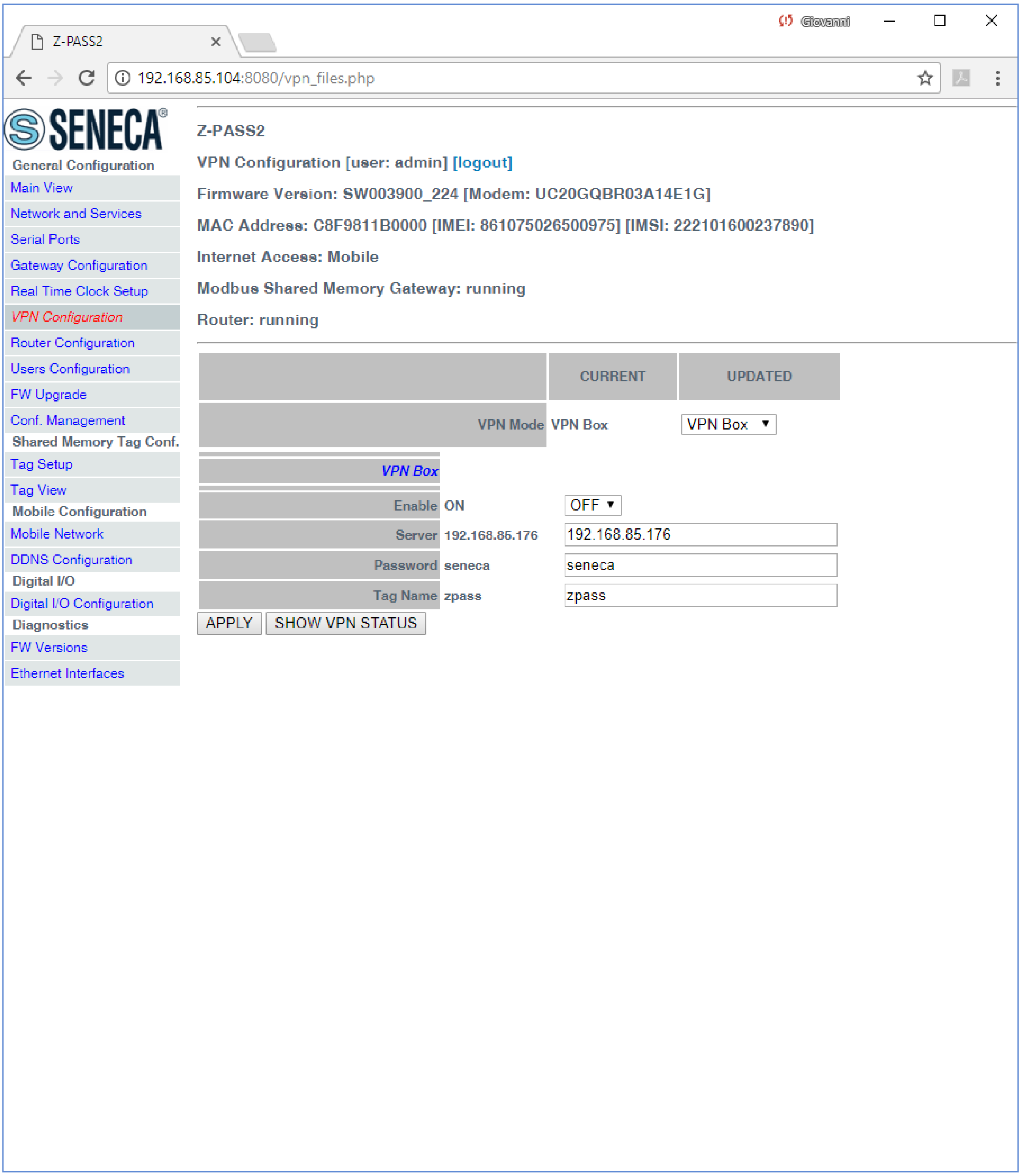
Router: running

Port values must be distinct !

Configuration not changed.

21.1.7 VPN Configuration

By clicking on the “VPN Configuration” link, in the “Basic Configuration” section, you come to the following page:



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
VPN Mode	VPN Box	VPN Box ▾

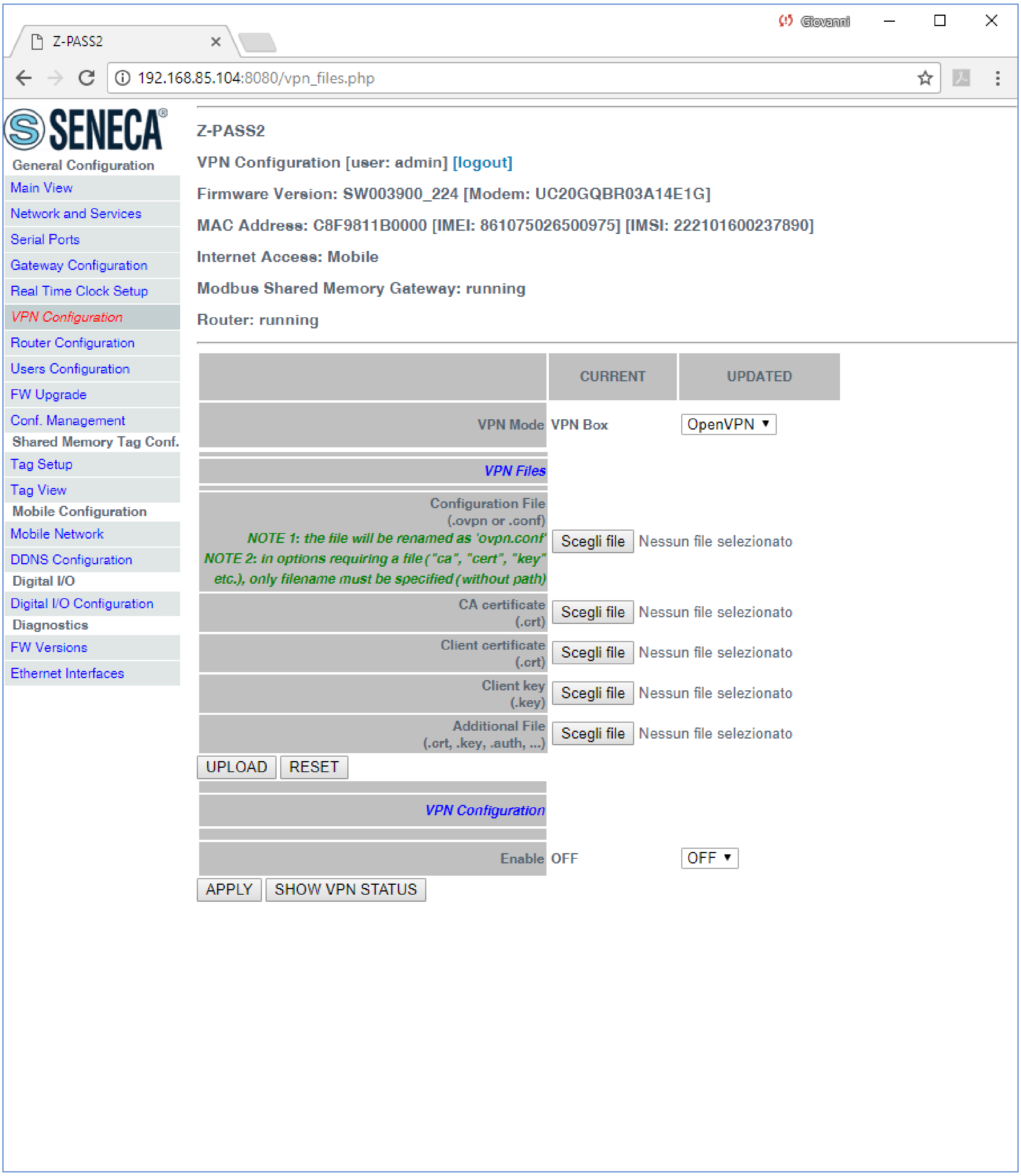
VPN Box

Enable	ON	OFF ▾
Server	192.168.85.176	192.168.85.176
Password	seneca	seneca
Tag Name	zpass	zpass

The page has a different layout depending on the value of the “VPN Mode” parameter, which can be “OpenVPN” or “VPN Box”.

21.1.7.1 OpenVPN

The page is made up of two sections: “VPN Files” and “VPN Configuration”.



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
VPN Mode	VPN Box	OpenVPN ▾
VPN Files		
Configuration File (.ovpn or .conf) *NOTE 1: the file will be renamed as 'ovpn.conf'* *NOTE 2: in options requiring a file ("ca", "cert", "key" etc.), only filename must be specified (without path)*	Scegli file	Nessun file selezionato
CA certificate (.crt)	Scegli file	Nessun file selezionato
Client certificate (.crt)	Scegli file	Nessun file selezionato
Client key (.key)	Scegli file	Nessun file selezionato
Additional File (.crt, .key, .auth, ...)	Scegli file	Nessun file selezionato

UPLOAD RESET

VPN Configuration		
Enable	OFF	OFF ▾

APPLY SHOW VPN STATUS

The "VPN Files" section lets you load the files needed to configure Open VPN and establish a secure VPN connection on the Z-PASS; these files are described in the following.

21.1.7.1.1 Configuration File

This file shall contain all the information needed to configure the Open VPN behaviour; the main configuration options are[18]:

- if Z-PASS shall act as a client or a server (typically, it will be a client)
- the transport protocol (UDP or TCP)
- the server IP address/host name and port
- the files needed to perform authentication procedures
- etc.

This file has the *.ovpn* extension (in Windows systems) or *.conf* extension (in Linux systems); regardless of the original name, it will be renamed as *ovpn.conf* on the Z-PASS.

This is the only mandatory file, that is if this file has not been loaded on the Z-PASS, VPN can't be enabled.

As reminded in the web page, in options requiring a file argument, only the file name shall be given, with no path, as in the following example:

```
ca ca.crt                   OK

ca /home/config/vpn/ca.crt  KO !
```

Other two important rules that shall be followed are:

- the "dev" option shall be: "`dev tun0`" or "`dev tap0`"
- the "log" option shall be omitted (so that, logs are written to syslog)

An example of a client configuration file is given in paragraph 21.1.7.1.7.

21.1.7.1.2 CA certificate

This file shall contain the Certification Authority (CA) certificate and has the *.crt* extension.

It is needed when the configuration file contains the *"ca"* option.

21.1.7.1.3 Client certificate

This file shall contain the client certificate and has the *.crt* extension.

It is needed when the configuration file contains the *"cert"* option.

[18] For more information about configuration options, please refer to the OpenVPN web page ("openvpn.net").

21.1.7.1.4 Client key

This file shall contain the client key and has the *.key* extension.

It is needed when the configuration file contains the *“key”* option.

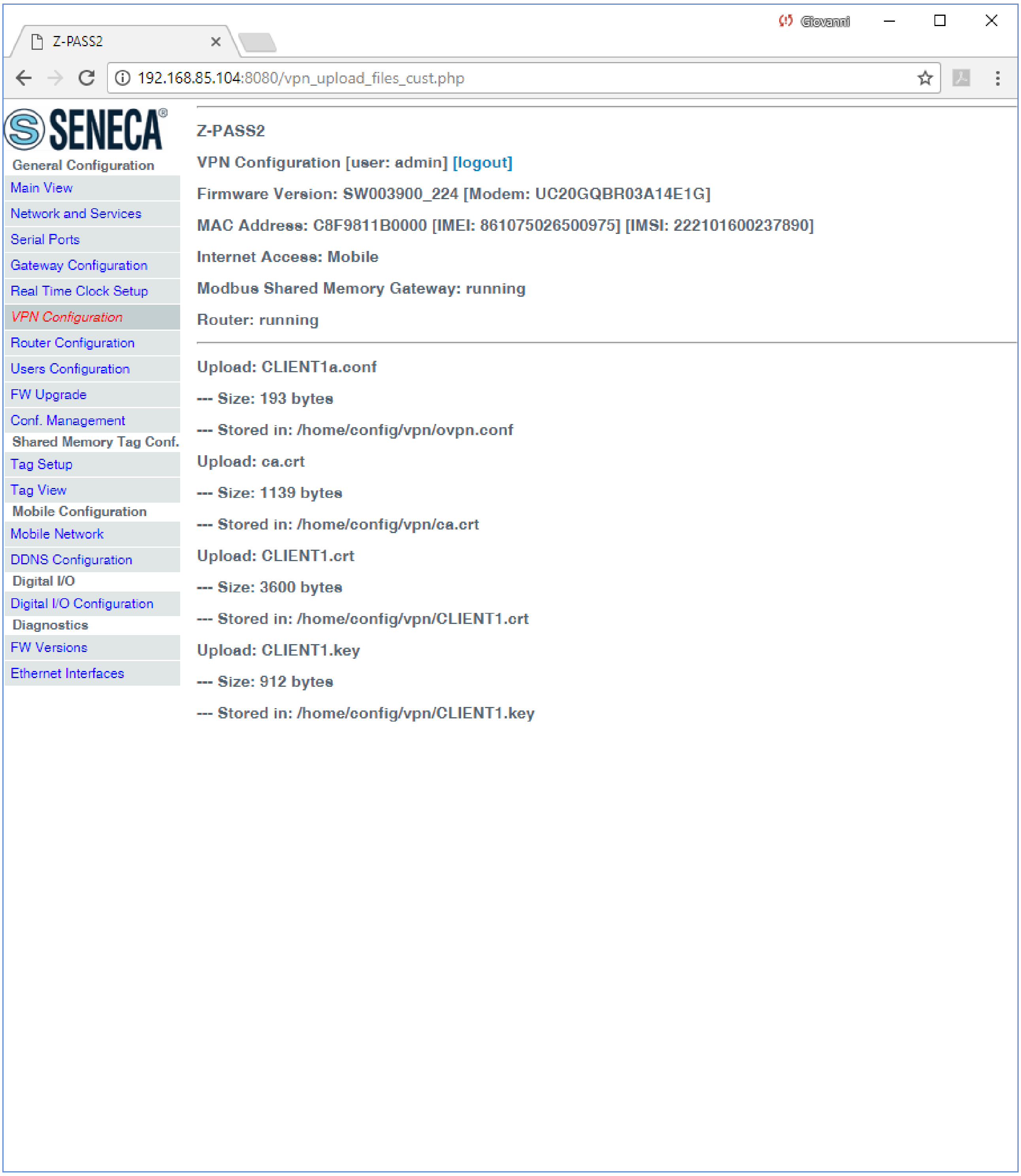
21.1.7.1.5 Additional file

This file can be of any type and may be needed for configuration options other than *“ca”*, *“cert”* and *“key*”.

Please note that more than one additional file can be loaded.

You can browse your PC to select the above files and send them to the Z-PASS by pressing the “UPLOAD” button.

Once the upload is done, a result page is shown like in the following figure.



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

Upload: CLIENT1a.conf

--- Size: 193 bytes

--- Stored in: /home/config/vpn/ovpn.conf

Upload: ca.crt

--- Size: 1139 bytes

--- Stored in: /home/config/vpn/ca.crt

Upload: CLIENT1.crt

--- Size: 3600 bytes

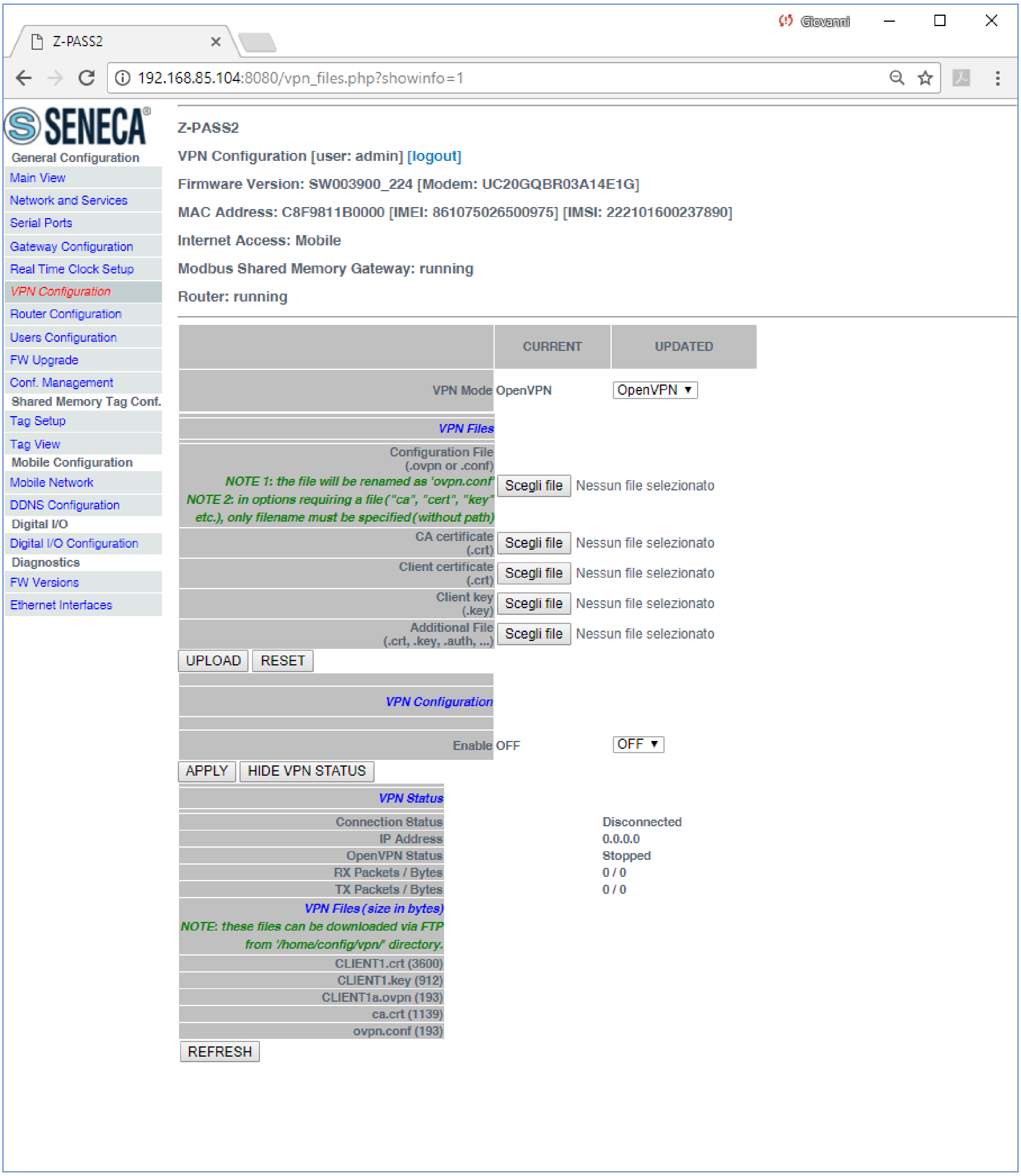
--- Stored in: /home/config/vpn/CLIENT1.crt

Upload: CLIENT1.key

--- Size: 912 bytes

--- Stored in: /home/config/vpn/CLIENT1.key

You can check which VPN files are stored on the Z-PASS by clicking on the “SHOW VPN STATUS” button, as shown in the following figure (remember that the configuration file is renamed as “ovpn.conf”):



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
VPN Mode	OpenVPN	OpenVPN ▾
VPN Files		
Configuration File (.ovpn or .conf) *NOTE 1: the file will be renamed as 'ovpn.conf'* *NOTE 2: in options requiring a file ("ca", "cert", "key" etc.), only filename must be specified (without path)*	Scegli file	Nessun file selezionato
CA certificate (.crt)	Scegli file	Nessun file selezionato
Client certificate (.crt)	Scegli file	Nessun file selezionato
Client key (.key)	Scegli file	Nessun file selezionato
Additional File (.crt, .key, .auth, ...)	Scegli file	Nessun file selezionato

UPLOAD RESET

VPN Configuration		
Enable	OFF	OFF ▾

APPLY HIDE VPN STATUS

VPN Status	
Connection Status	Disconnected
IP Address	0.0.0.0
OpenVPN Status	Stopped
RX Packets / Bytes	0 / 0
TX Packets / Bytes	0 / 0

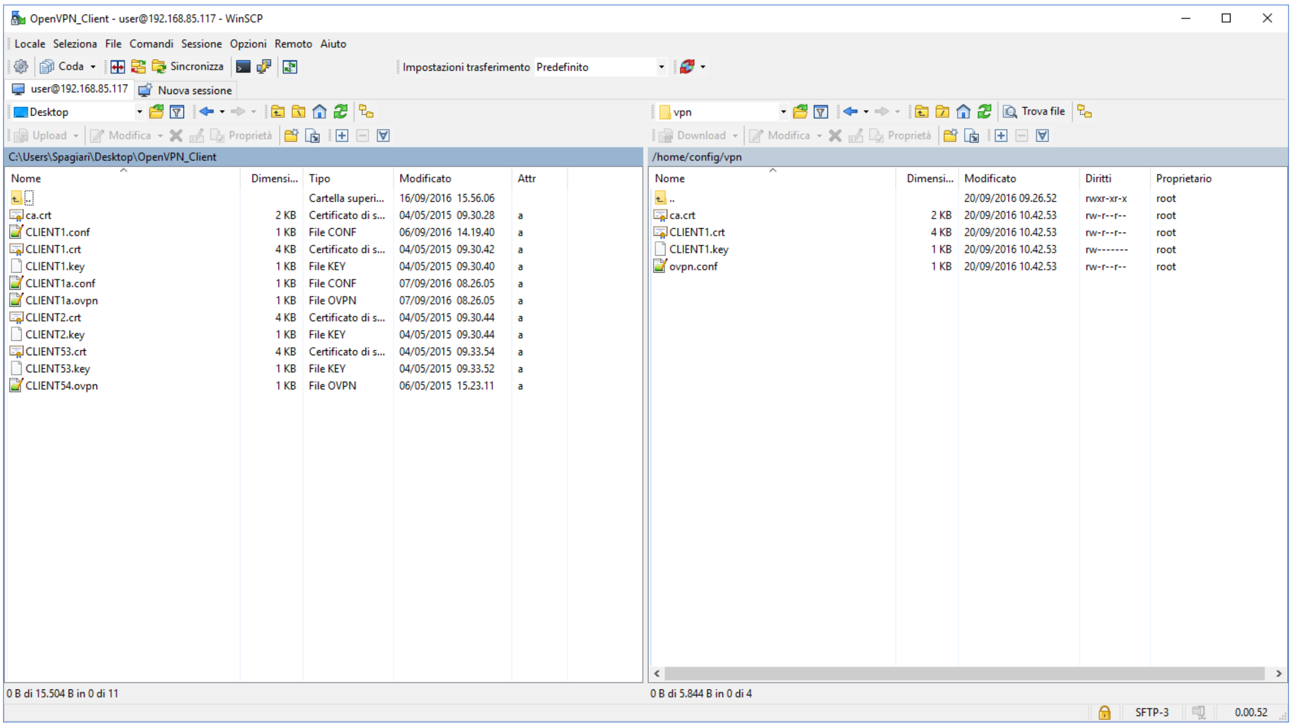
VPN Files (size in bytes)

NOTE: these files can be downloaded via FTP from '/home/config/vpn/' directory.

CLIENT1.crt (3600)
CLIENT1.key (912)
CLIENT1a.ovpn (193)
ca.crt (1139)
ovpn.conf (193)

REFRESH

As reminded by the web page, the VPN files can be downloaded from the Z-PASS, if needed, via FTP/SFTP; they can be found in the */home/config/vpn* directory, as shown in the following figure.


OpenVPN_Client - user@192.168.85.117 - WinSCP
Locale Seleziona File Comandi Sessione Opzioni Remoto Aiuto
Coda
Sincronizza
Impostazioni trasferimento Predefinito
user@192.168.85.117
Nuova sessione
Desktop
Upload
Modifica
Proprietà
vpn
Trova file
Download
Modifica
Proprietà
SFTP-3
0.00.52

C:\Users\Spagiari\Desktop\OpenVPN_Client

Nome	Dimensi...	Tipo	Modificato	Attr
..		Cartella superi...	16/09/2016 15.56.06	
ca.crt	2 KB	Certificato di s...	04/05/2015 09.30.28	a
CLIENT1.conf	1 KB	File CONF	06/09/2016 14.19.40	a
CLIENT1.crt	4 KB	Certificato di s...	04/05/2015 09.30.42	a
CLIENT1.key	1 KB	File KEY	04/05/2015 09.30.40	a
CLIENT1a.conf	1 KB	File CONF	07/09/2016 08.26.05	a
CLIENT1a.ovpn	1 KB	File OVPN	07/09/2016 08.26.05	a
CLIENT2.crt	4 KB	Certificato di s...	04/05/2015 09.30.44	a
CLIENT2.key	1 KB	File KEY	04/05/2015 09.30.44	a
CLIENT53.crt	4 KB	Certificato di s...	04/05/2015 09.33.54	a
CLIENT53.key	1 KB	File KEY	04/05/2015 09.33.52	a
CLIENT54.ovpn	1 KB	File OVPN	06/05/2015 15.23.11	a

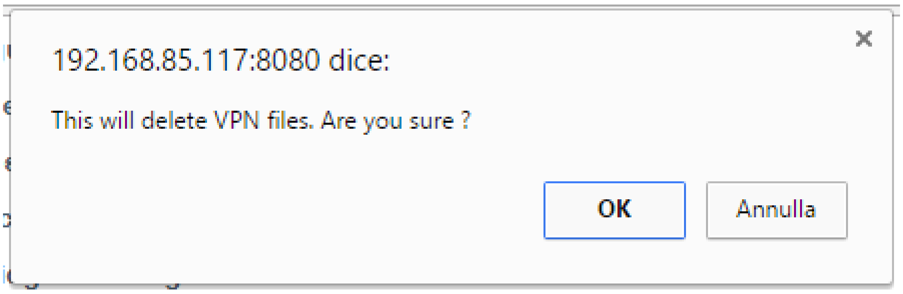
0 B di 15.504 B in 0 di 11

/home/config/vpn

Nome	Dimensi...	Modificato	Diritti	Proprietario
..		20/09/2016 09.26.52	rwxr-xr-x	root
ca.crt	2 KB	20/09/2016 10.42.53	rw-r--r--	root
CLIENT1.crt	4 KB	20/09/2016 10.42.53	rw-r--r--	root
CLIENT1.key	1 KB	20/09/2016 10.42.53	rw-------	root
ovpn.conf	1 KB	20/09/2016 10.42.53	rw-r--r--	root

0 B di 5.844 B in 0 di 4

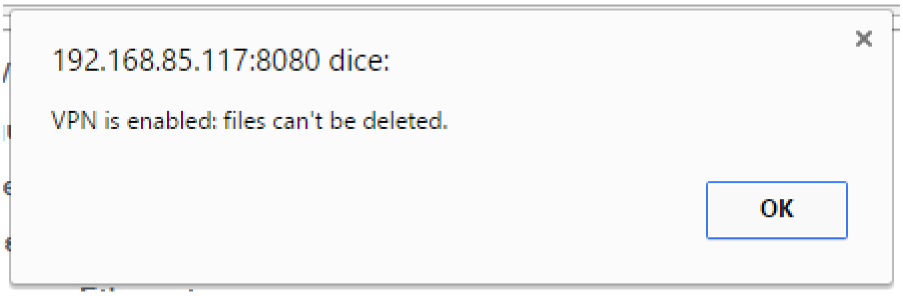
Is is possible to clear all the VPN files, by clicking on the “RESET” button; a pop-up will appear, requiring a confirmation:



192.168.85.117:8080 dice:

This will delete VPN files. Are you sure ?

If VPN is enabled, the user is not allowed to delete VPN files, as warned by the following pop-up:



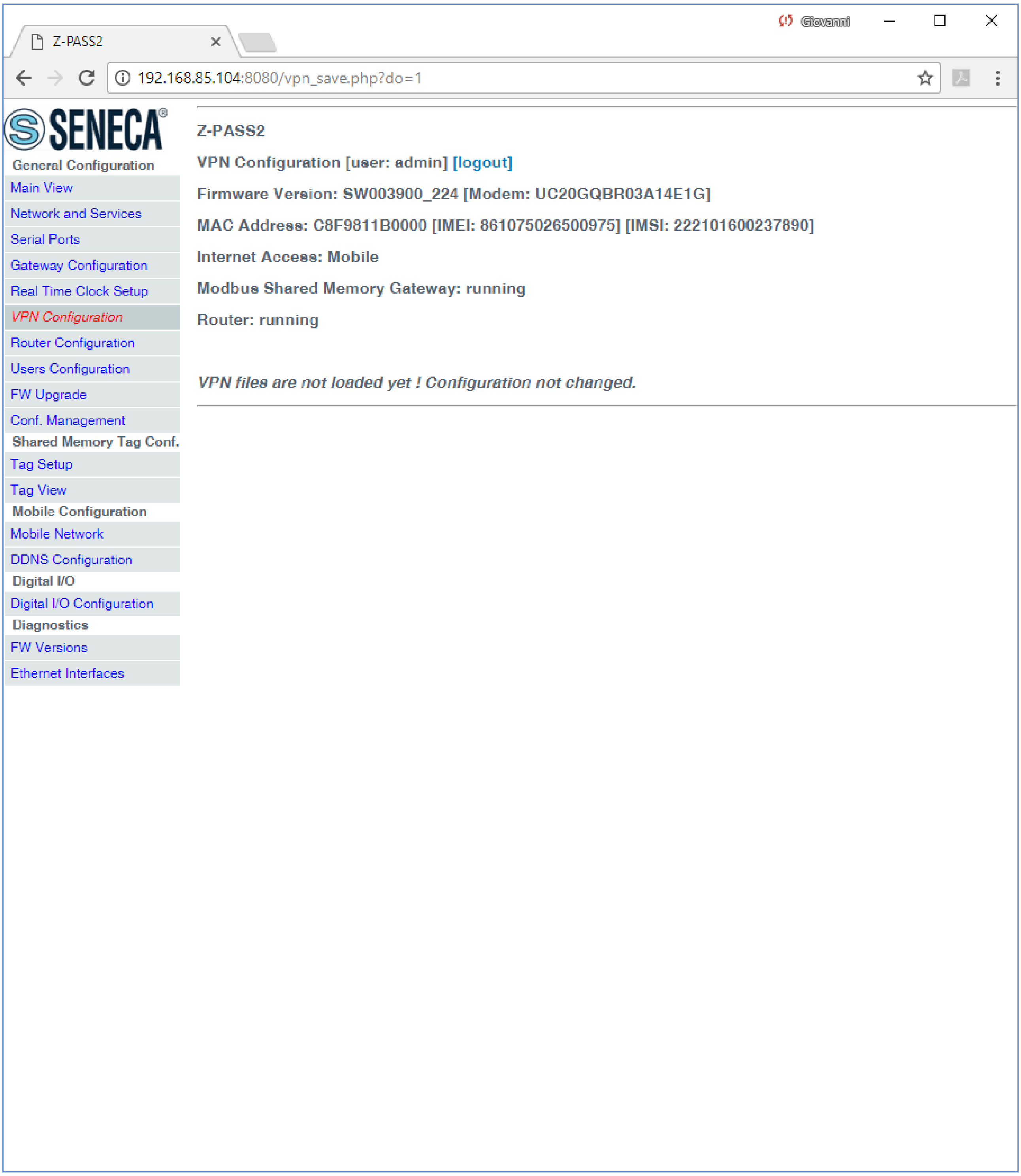
192.168.85.117:8080 dice:

VPN is enabled: files can't be deleted.

In the “VPN Configuration” section, there is only one parameter, as described in the following table:

Field	**Meaning**	**Default value**
VPN Configuration/Enable	Flag to enable/disable the VPN connectivity; when enabled, Z-PASS will run the Open VPN process with the loaded configuration	OFF

As already told above, if you try to enable the VPN connectivity, but no configuration file has been uploaded to the Z-PASS yet, an error is given as shown in the following figure:



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

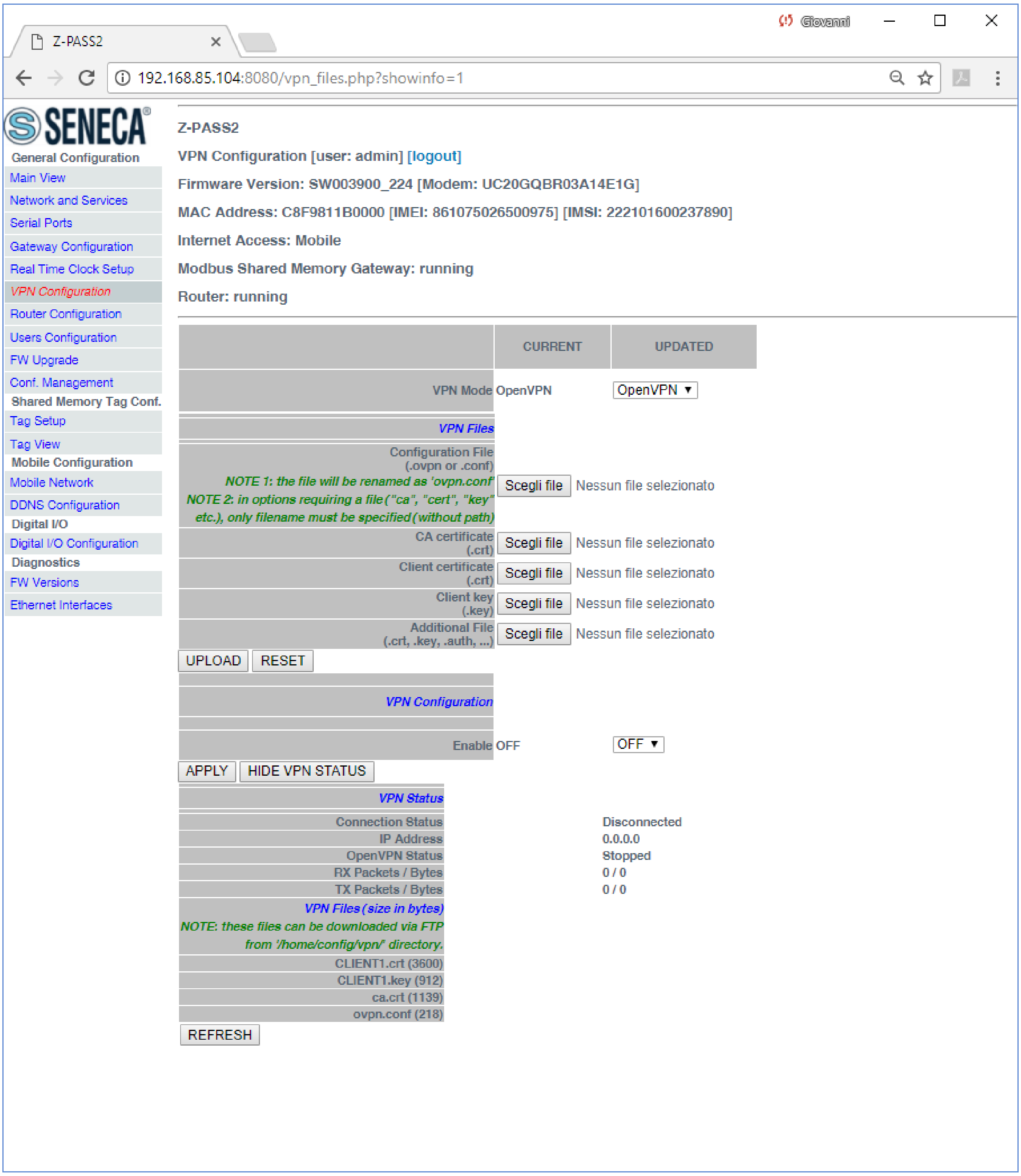
VPN files are not loaded yet ! Configuration not changed.

When you click on the “SHOW VPN STATUS” button, a third section appears, named “VPN Status”, showing:

- the VPN “Connection Status” (i.e.: “Disconnected” or “Connected”)
- the IP address assigned to the VPN interface when “Connected”, the “dummy” IP address “0.0.0.0” when “Disconnected”
- the “OpenVPN Status” (i.e.: “Stopped” or “Running”)

- the number of packets/bytes received from the VPN interface, when connected; “0/0” when disconnected
- the number of packets/bytes sent to the VPN interface, when connected; “0/0” when disconnected
- the VPN files stored on the Z-PASS (see above)

as shown in the following couple of figures:



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
VPN Mode	OpenVPN	OpenVPN ▾

VPN Files

Configuration File (.ovpn or .conf) *NOTE 1: the file will be renamed as 'ovpn.conf'* *NOTE 2: in options requiring a file ("ca", "cert", "key" etc.), only filename must be specified (without path)*	Scegli file Nessun file selezionato
CA certificate (.crt)	Scegli file Nessun file selezionato
Client certificate (.crt)	Scegli file Nessun file selezionato
Client key (.key)	Scegli file Nessun file selezionato
Additional File (.crt, .key, .auth, ...)	Scegli file Nessun file selezionato

UPLOAD RESET

VPN Configuration

Enable	OFF	OFF ▾

APPLY HIDE VPN STATUS

VPN Status

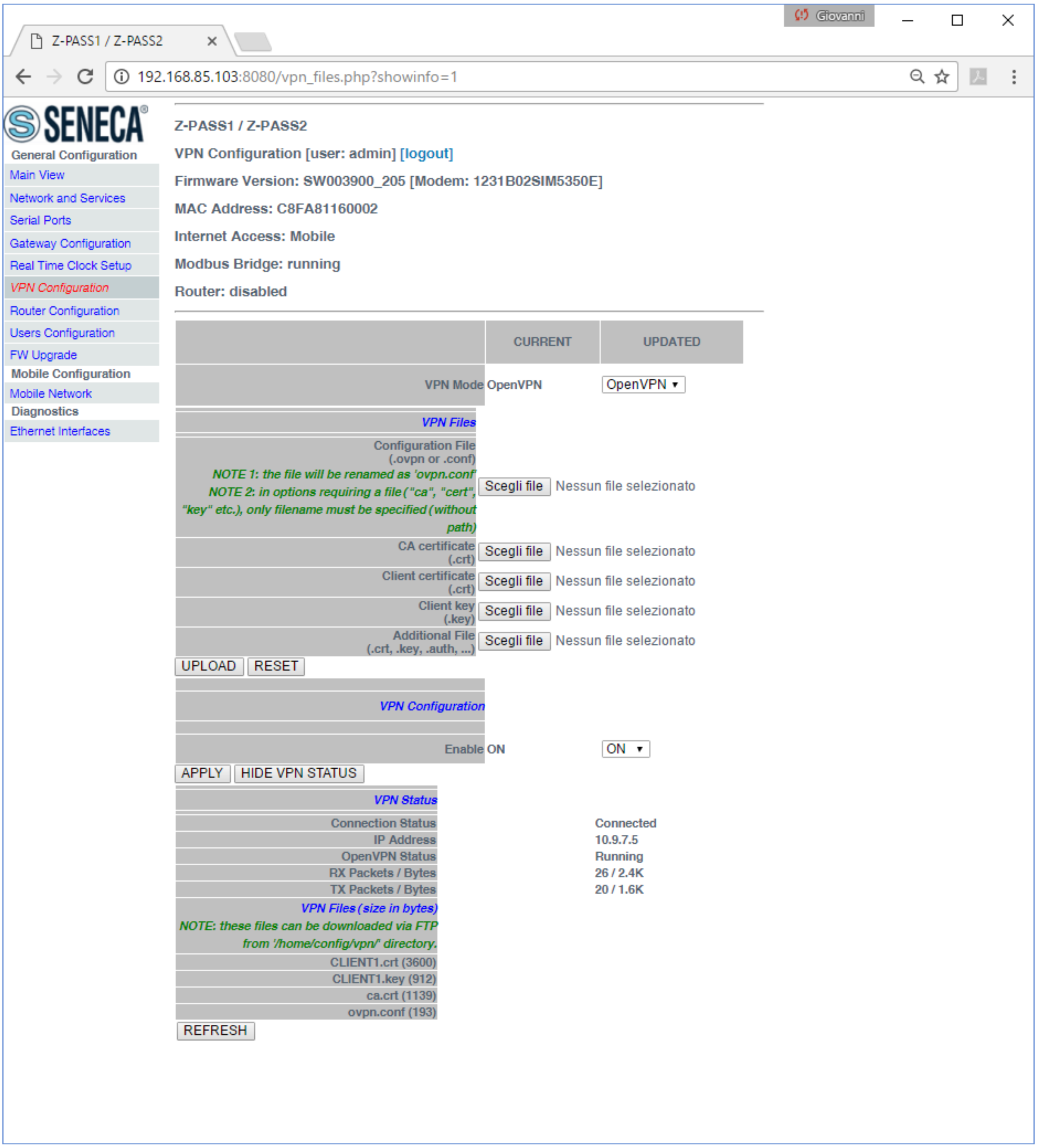
Connection Status	Disconnected
IP Address	0.0.0.0
OpenVPN Status	Stopped
RX Packets / Bytes	0 / 0
TX Packets / Bytes	0 / 0

VPN Files (size in bytes)

NOTE: these files can be downloaded via FTP from '/home/config/vpn/' directory.

CLIENT1.crt (3600)
CLIENT1.key (912)
ca.crt (1139)
ovpn.conf (218)

REFRESH



Z-PASS1 / Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_205 [Modem: 1231B02SIM5350E]

MAC Address: C8FA81160002

Internet Access: Mobile

Modbus Bridge: running

Router: disabled

	CURRENT	UPDATED
VPN Mode	OpenVPN	OpenVPN ▾
VPN Files		
Configuration File (.ovpn or .conf) *NOTE 1: the file will be renamed as 'ovpn.conf'* *NOTE 2: in options requiring a file ("ca", "cert", "key" etc.), only filename must be specified (without path)*	Scegli file Nessun file selezionato	
CA certificate (.crt)	Scegli file Nessun file selezionato	
Client certificate (.crt)	Scegli file Nessun file selezionato	
Client key (.key)	Scegli file Nessun file selezionato	
Additional File (.crt, .key, .auth, ...)	Scegli file Nessun file selezionato	

VPN Configuration		
Enable	ON	ON ▾

VPN Status	
Connection Status	Connected
IP Address	10.9.7.5
OpenVPN Status	Running
RX Packets / Bytes	26 / 2.4K
TX Packets / Bytes	20 / 1.6K
VPN Files (size in bytes) *NOTE: these files can be downloaded via FTP from '/home/config/vpn/' directory.*	
CLIENT1.crt (3600)	
CLIENT1.key (912)	
ca.crt (1139)	
ovpn.conf (193)	

An important status information is given by the "OpenVPN Status" field; <u>if VPN is enabled ("ON"), but this status is "Stopped", this means that Open VPN process could not be correctly started: probably, the configuration file contains some errors or, maybe, some options not supported by the Z-PASS Open VPN implementation.</u>

You can refresh the VPN status, by clicking on the "REFRESH" button.

Finally, you can hide the “VPN Status” section, by clicking on the “HIDE VPN STATUS” button.

21.1.7.1.6 OpenVPN Server configuration file

This paragraph gives an example of OpenVPN server configuration; this is the server configuration typically used with Z-PASS devices.

```
port 1194
proto udp
dev tun
ca ca.crt
cert server.crt
key server.key
dh dh1024.pem
server 10.9.7.0 255.255.255.0
ifconfig-pool-persist ipp.txt
client-config-dir ccd
client-to-client
keepalive 10 120
comp-lzo
persist-key
persist-tun
status openvpn-status.log
verb 3
```

21.1.7.1.7 OpenVPN Client configuration file

This paragraph gives an example of OpenVPN client configuration; this is the client configuration typically loaded on Z-PASS devices.

```
client
dev tun
port 1194
proto udp
remote 2.192.5.105 1194
nobind
ca ca.crt
cert tws4.crt
key tws4.key
comp-lzo
persist-key
persist-tun
script-security 3 system
verb 3
```

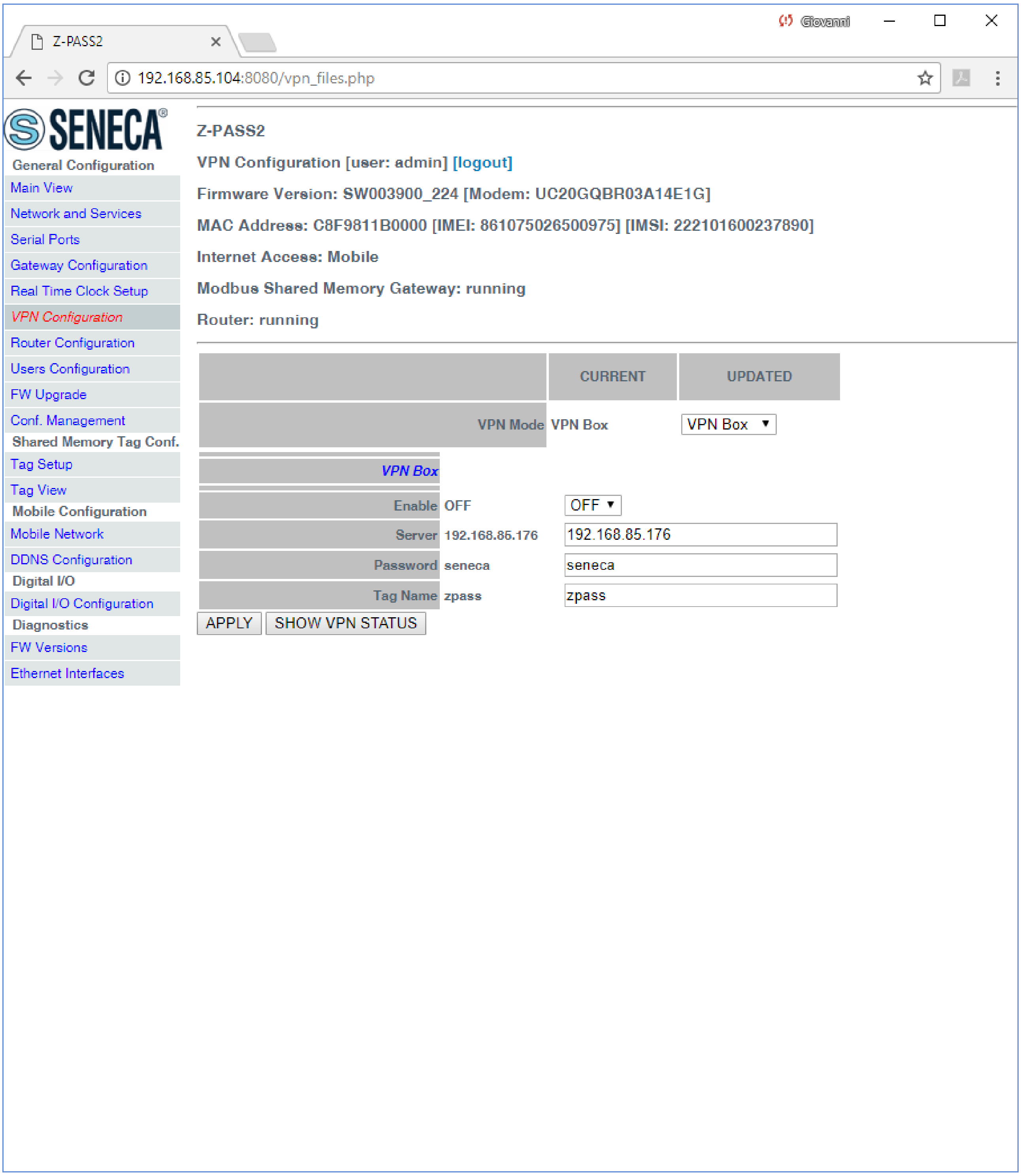
21.1.7.1.8 LED signalling

In Z-PASS products, when VPN functionality is enabled in "OpenVPN" mode, the "SERV" and "VPN" LEDs give the following status information:

LED	Status	Meaning
VPN Yellow	ON Blinking OFF	VPN connection is working properly VPN connection is not working properly VPN functionality is disabled
SERV Green	-	Not used

21.1.7.2 VPN Box

The page contains only ony section: "VPN Box", as shown in the following figure.



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
VPN Mode	VPN Box	VPN Box ▾
VPN Box		
Enable	OFF	OFF ▾
Server	192.168.86.176	192.168.85.176
Password	seneca	seneca
Tag Name	zpass	zpass

The “VPN Box” section contains the following parameters:

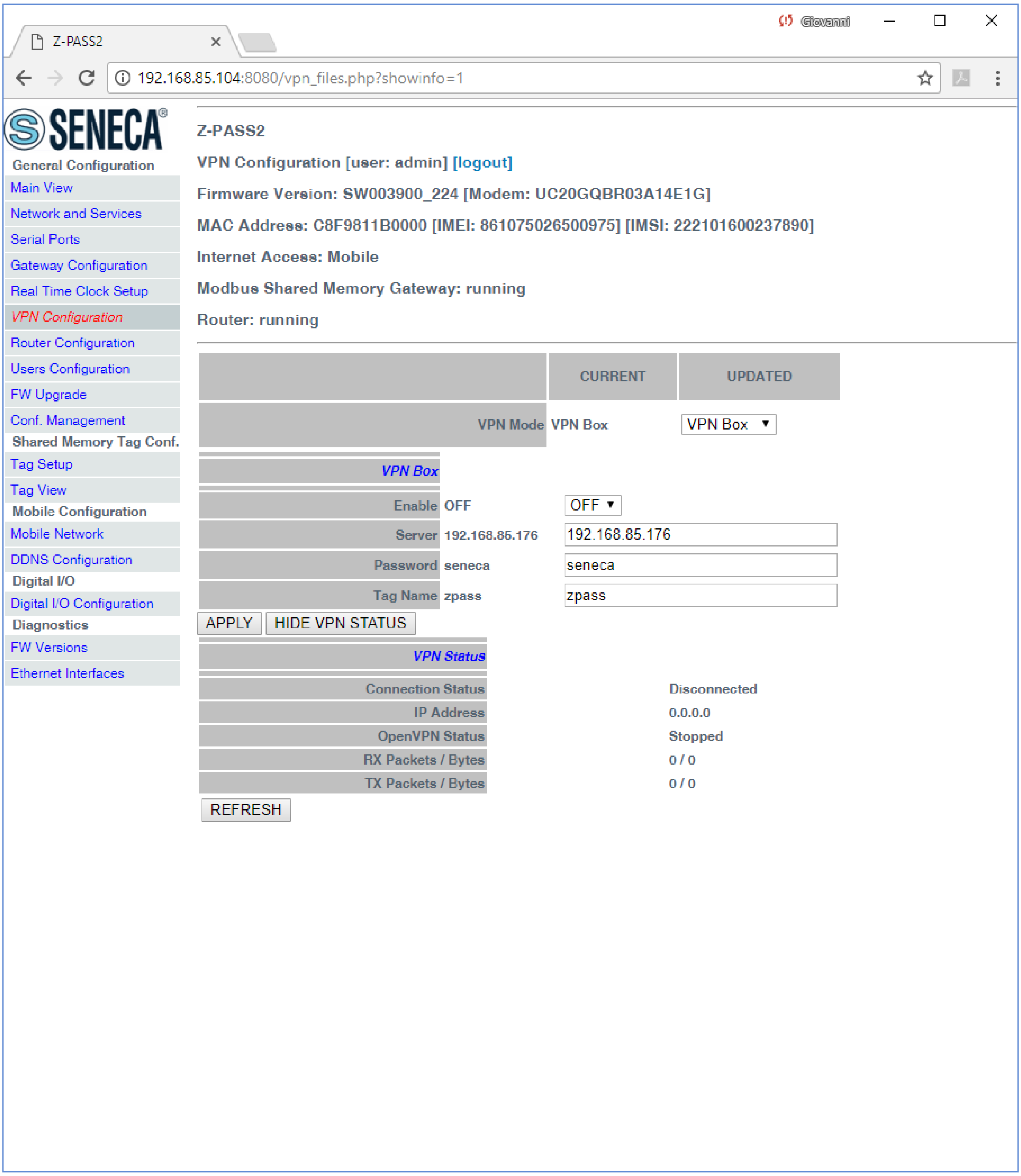
Field	Meaning	Default value
VPN BOX/Enable	Flag to enable/disable the “VPN Box” functionality, that is the procedure/protocol that lets the Z-PASS	OFF

	setup the VPN, by interacting with the "VPN Box" server (see "VPN Box User Manual")	
VPN BOX/Server	IP address or FQDN of the "VPN Box" server	192.168.90.1
VPN BOX/Password	Password to access the "VPN Box" server	seneca
VPN BOX/Tag Name	Mnemonic name used to uniquely identify the Z-PASS; if the default ("zpass") value is left, the Device will register as "zpass_<MACAddress>" on the VPN Box	zpass

When you click on the "SHOW VPN STATUS" button, a new section appears, named "VPN Status", showing:

- the VPN "Connection Status" (i.e.: "Disconnected" or "Connected")
- the VPN IP address assigned to the Z-PASS when "Connected", the "dummy" IP address "0.0.0.0" when "Disconnected"; this row is not shown for "Point-to-Point (L2)" VPN Box, since no IP address is assigned to the VPN interface
- the "OpenVPN Status" (i.e.: "Stopped" or "Running")
- the number of packets/bytes received from the VPN interface, when connected; "0/0" when disconnected
- the number of packets/bytes sent to the VPN interface, when connected; "0/0" when disconnected
- the "VPN Box Type", which can be "Point-to-Point", "Point-to-Point (L2)" or "Single LAN", if VPN Box is enabled
- the "VPN Box Status", if VPN Box is enabled
- the username of the connected user, if any

as shown in the following three figures:



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

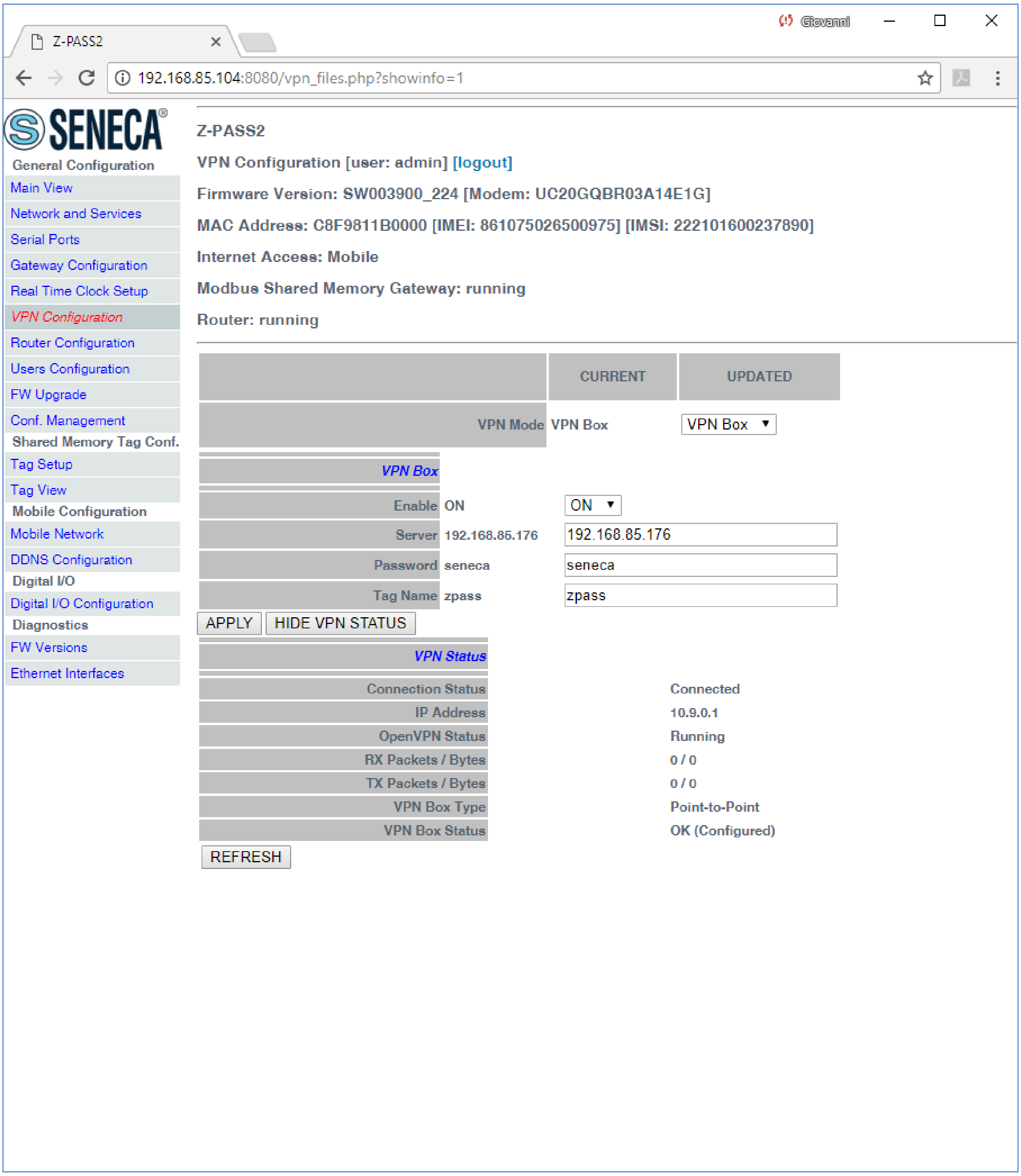
	CURRENT	UPDATED
VPN Mode	VPN Box	VPN Box ▾

VPN Box

Enable	OFF	OFF ▾
Server	192.168.86.176	192.168.85.176
Password	seneca	seneca
Tag Name	zpass	zpass

VPN Status

Connection Status	Disconnected
IP Address	0.0.0.0
OpenVPN Status	Stopped
RX Packets / Bytes	0 / 0
TX Packets / Bytes	0 / 0



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

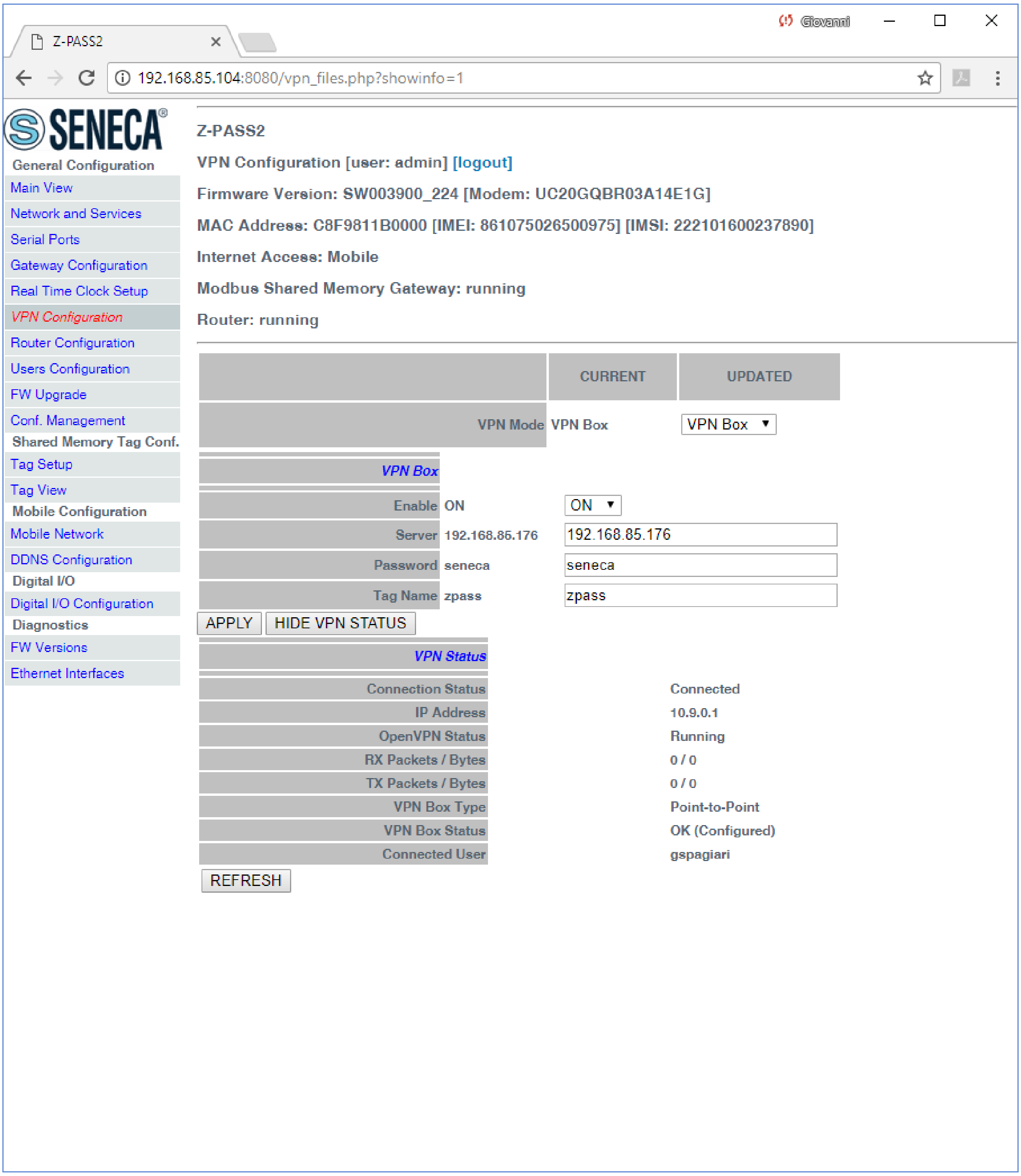
Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
VPN Mode	VPN Box	VPN Box ▾
VPN Box		
Enable	ON	ON ▾
Server	192.168.86.176	192.168.85.176
Password	seneca	seneca
Tag Name	zpass	zpass

VPN Status	
Connection Status	Connected
IP Address	10.9.0.1
OpenVPN Status	Running
RX Packets / Bytes	0 / 0
TX Packets / Bytes	0 / 0
VPN Box Type	Point-to-Point
VPN Box Status	OK (Configured)



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
VPN Mode	VPN Box	VPN Box ▾
VPN Box		
Enable	ON	ON ▾
Server	192.168.85.176	192.168.85.176
Password	seneca	seneca
Tag Name	zpass	zpass

VPN Status	
Connection Status	Connected
IP Address	10.9.0.1
OpenVPN Status	Running
RX Packets / Bytes	0 / 0
TX Packets / Bytes	0 / 0
VPN Box Type	Point-to-Point
VPN Box Status	OK (Configured)
Connected User	gspagiari

For an explanation of the differences between a “Single LAN” VPN and a “Point-to-Point” VPN, see chapter 10.

The “VPN Box Status” string has the following format:

Result (Status)

The following table gives a short explanation of the possible “Result” and “Status” strings:

Result	**Status**	**Meaning**
Error (Unexpected response)		A response code has been received that is not handled by the Z-PASS (it should never occur)
Error (No response from VPN Box)		No response has been received from the VPN Box (response timeout)
Error (Invalid response from VPN Box)		A response has been received whose content is not valid for the Z-PASS (it should never occur)
Error (Wrong password)		The password set on Z-PASS is wrong
Error (License Limit Reached)		The maximum number of devices allowed by the license are already registered on VPN Box
Error (VPN Box not configured)		The VPN Box has not been configured yet
Error (Generic error)		A generic error has occurred on the VPN Box
OK		The Z-PASS has just been registered on the VPN Box
OK	New	The Z-PASS is registered on the VPN Box, but it is not configured yet (“Single LAN” only)
OK	Configuration updated	The Z-PASS configuration has just been updated
OK	Configured	The Z-PASS is properly configured and available for VPN connection
OK	Ban	The Z-PASS has been banned
OK	Not found	The Z-PASS is unknown for the VPN Box; this happens when Z-PASS registration is deleted on the VPN Box
OK	Unknown	The Z-PASS has an “unknown” status in the VPN Box (it should never occur)
OK	Not bound	The “tunnel” between the Z-PASS and the VPN Box is not up; this may occur when the tunnel port is blocked (“not open”) in the ADSL router on the VPN Box side (“Point-to-Point” only)
OK	Unexpected status	A status code has been received that is not handled by the Z-PASS (it should never occur)

You can refresh the VPN status, by clicking on the “REFRESH” button.

Finally, you can hide the “VPN Status” section, by clicking on the “HIDE VPN STATUS” button.

21.1.7.2.1 LED signalling

In Z-PASS products, when VPN functionality is enabled in “VPN Box/Single LAN” mode, the “SERV” and “VPN“ LEDs give the following status information:

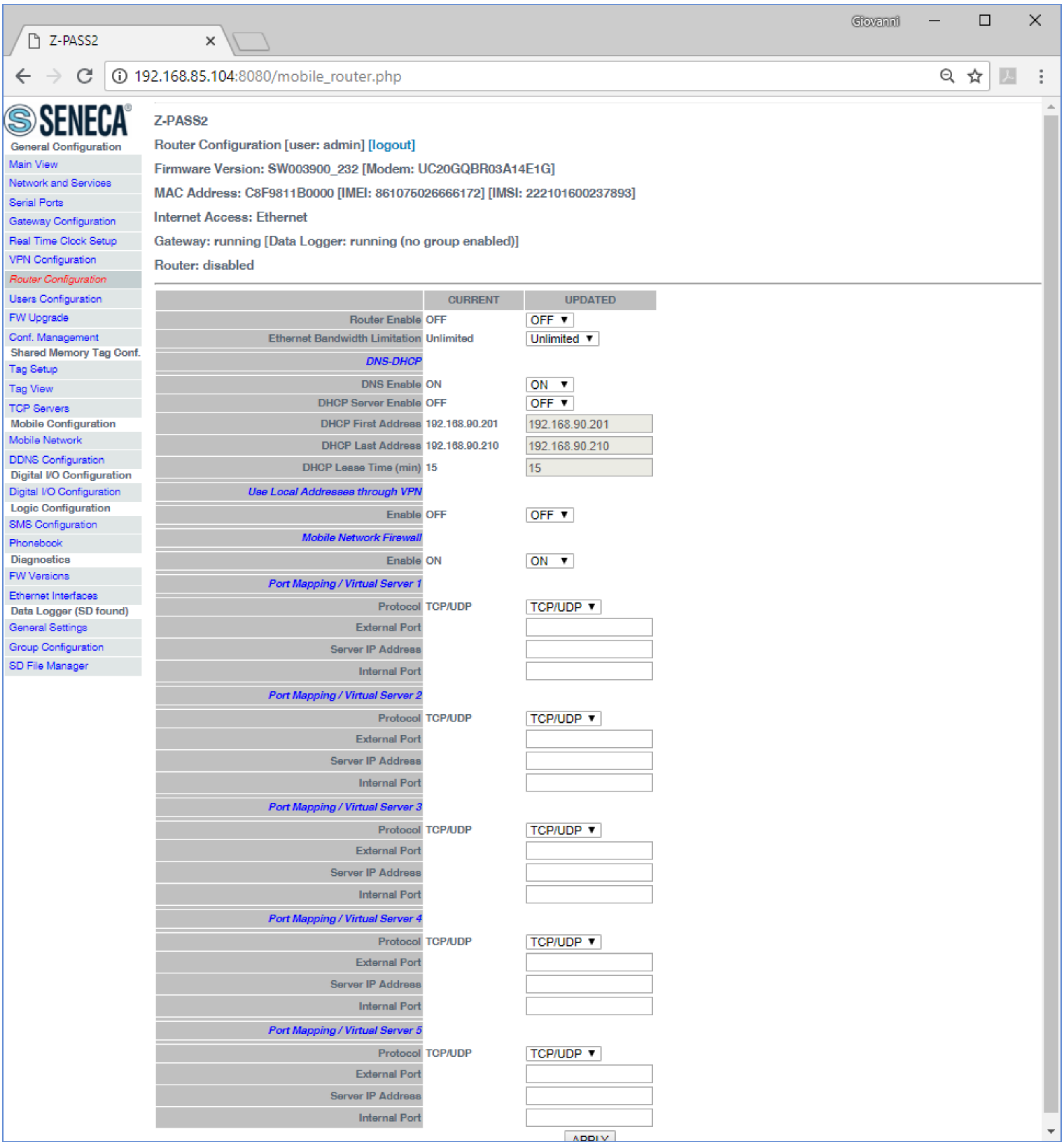
LED	Status	Meaning
VPN Yellow	ON Blinking OFF	VPN connection is working properly VPN connection is not working properly The Device has not been configured by the VPN Box yet or VPN Box functionality is disabled
SERV Green	ON Blinking OFF	VPN Box “SERVICE” connection is working properly VPN Box “SERVICE” connection is not working properly VPN Box functionality is disabled

Similarly, when VPN functionality is enabled in “VPN Box/Point-to-Point” mode, the “SERV” and “VPN“ LEDs give the following status information:

LED	Status	Meaning
VPN Yellow	ON OFF	A VPN client is connected to the Device No VPN client is connected to the Device or VPN Box functionality is disabled
SERV Green	ON Blinking OFF	VPN Box “SERVICE” connection is working properly VPN Box “SERVICE” connection is not working properly VPN Box functionality is disabled

21.1.8 Router Configuration

By clicking on the “Router Configuration” link, in the “Basic Configuration” section, you come to the following page:



Z-PASS2

Router Configuration [user: admin] [logout]

Firmware Version: SW003900_232 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237893]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

	CURRENT	UPDATED
Router Enable	OFF	OFF ▼
Ethernet Bandwidth Limitation	Unlimited	Unlimited ▼
DNS-DHCP		
DNS Enable	ON	ON ▼
DHCP Server Enable	OFF	OFF ▼
DHCP First Address	192.168.90.201	192.168.90.201
DHCP Last Address	192.168.90.210	192.168.90.210
DHCP Lease Time (min)	15	15
Use Local Addresses through VPN		
Enable	OFF	OFF ▼
Mobile Network Firewall		
Enable	ON	ON ▼
Port Mapping / Virtual Server 1		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		
Port Mapping / Virtual Server 2		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		
Port Mapping / Virtual Server 3		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		
Port Mapping / Virtual Server 4		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		
Port Mapping / Virtual Server 5		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		

In this page, you can change the parameters related to the Z-PASS Router functionality.

First, you have a set of general parameters, as listed in the following table:

Field	**Meaning**	**Default value**
Router Enable	Flag to enable/disable the Router functionality	OFF
Ethernet Bandwidth Limitation	This parameter can be used to limit the bandwidth on the ethernet interfaces;	Unlimited

	this may be needed to avoid overloading the CPU, when a large amount of data is forwarded from one interface to the other (LAN ↔ WAN). Since this does not occur when the two ethernet interfaces work in "switch" mode, the parameter is not shown when "Ethernet Mode" parameter is set to "Switch" (see paragraph 21.1.2). Possible values are: Unlimited 20 Mbit/s 10 Mbit/s 1 Mbit/s	
DNS Enable	Flag to enable/disable the DNS forwarding service	ON
DHCP Server Enable	Flag to enable/disable the DHCP service (DHCP server) NOTE: this parameter can be set to "ON" only if the "DHCP" parameter of the "Network and Services" page is set to "OFF".	OFF
DHCP First Address DHCP Last Address	These parameters define the range of IP addresses assigned by the DHCP server to requesting clients	192.168.90.201 192.168.90.210
DHCP Lease Time (min)	Validity time interval for the IP address assignment, in minutes. Possible values are in the range [1..60].	15

Then, you have the parameter shown in the following table.

Field	**Meaning**	**Default value**
Use Local Addresses Through VPN/Enable	Flag to enable/disable the access to the Z-PASS and other devices which are in the Z-PASS LAN, by using their local (LAN) IP addresses	OFF

Then, you have another important parameter, which is shown in the following table.

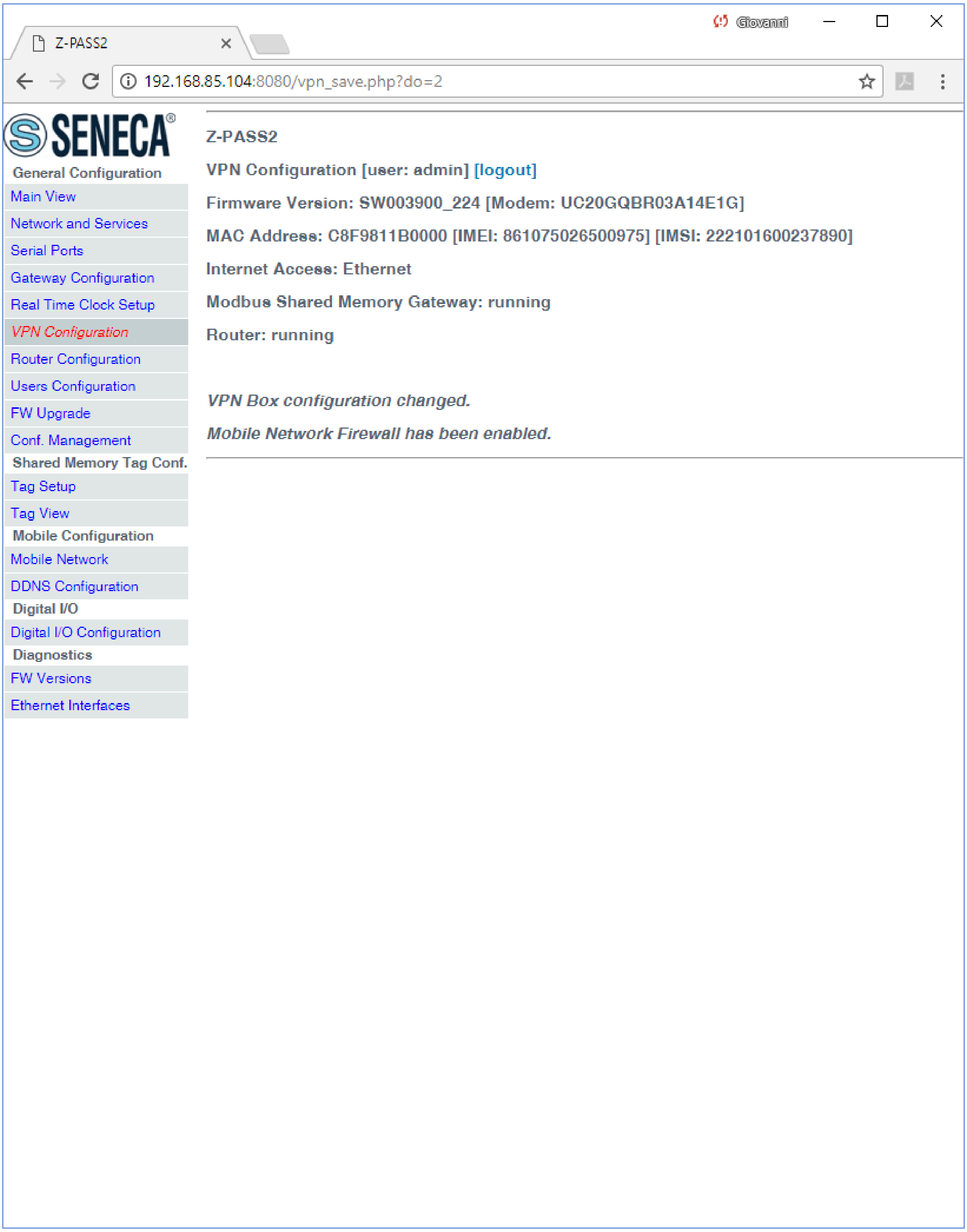
Field	**Meaning**	**Default value**
Mobile Network Firewall/Enable	Flag to enable/disable the "Mobile Network Firewall", that is disable/enable access to the Z-PASS and other devices which are in the Z-PASS LAN, by using the IP address assigned to the Mobile Network (3G) interface. To open a port in the firewall, a "Port	OFF

	Mapping / Virtual Server" rule shall be defined.	

The above parameter shall be set to ON, to protect the Z-PASS against undesired (maybe malicious) accesses.

This is the only parameter in the "Router Configuration" page that is working also when the Router functionality is disabled (Router Enable = OFF).

It is important to note that, when the VPN is activated (see 21.1.7 paragraph), the parameter is automatically set to ON, as warned by the message shown in the following figure.



Z-PASS2

VPN Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Ethernet

Modbus Shared Memory Gateway: running

Router: running

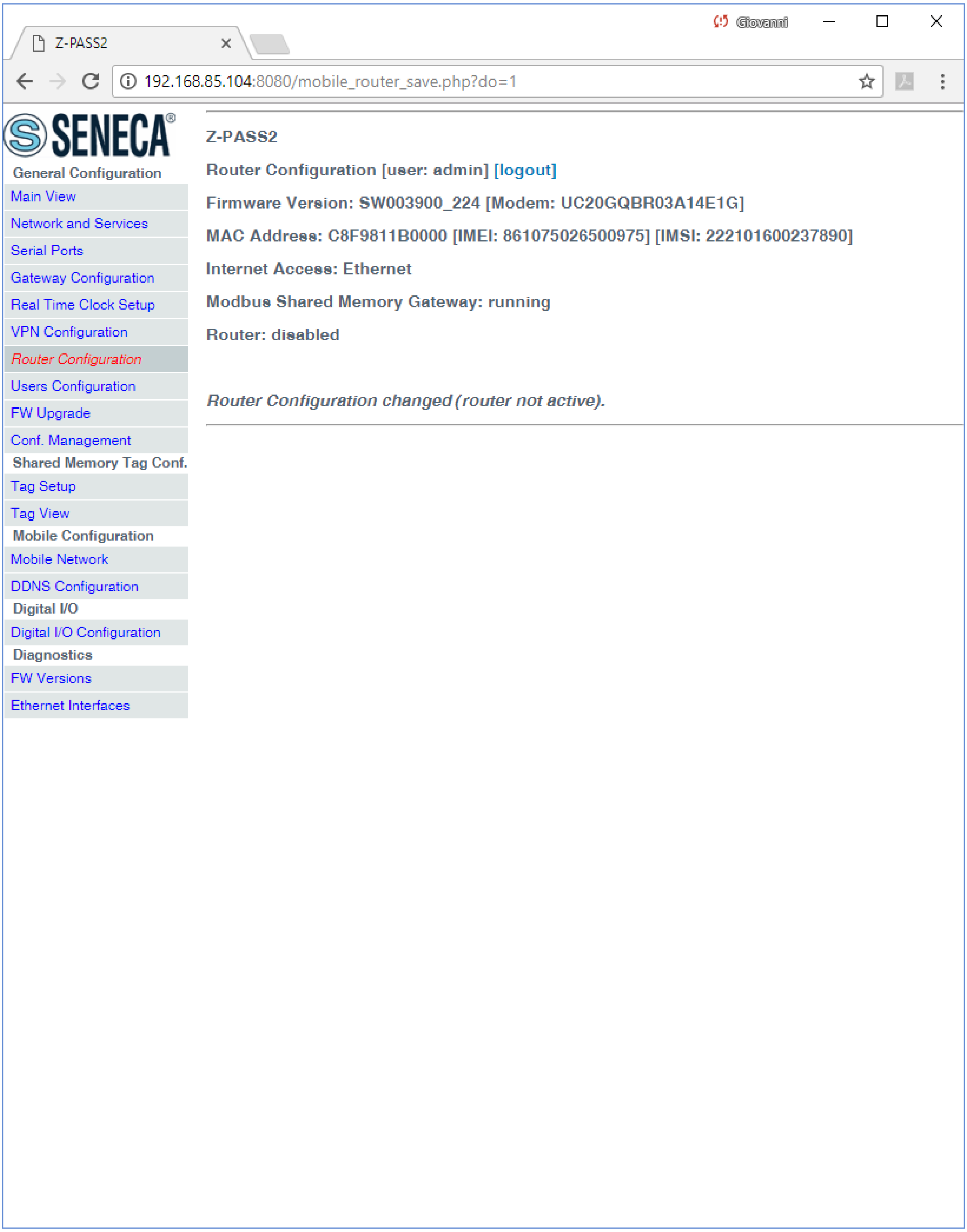
VPN Box configuration changed.

Mobile Network Firewall has been enabled.

Finally, there are 5 sections which let you define up to 5 “Port Mapping” rules (also known as “Virtual Servers”); for each section, the available parameters are the following:

Field	**Meaning**	**Default value**
Protocol	This parameter defines the transport protocol (or kind of port) which is affected by the rule: TCP, UDP or both	TCP/UDP
External Port	TCP or UDP port which a packet was originally sent to	*Empty*
Server IP Address	IP address which the received packet is forwarded to	*Empty*
Internal Port	TCP or UDP port which the received packet is forwarded to	*Empty*

If Router is left disabled (Router Enabled = OFF), you can still change parameters; changes will be saved without actually applying them (except for the “Mobile Network Firewall” parameter, as told before); the following message will be given, after clicking the “APPLY” button:



Z-PASS2

Router Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

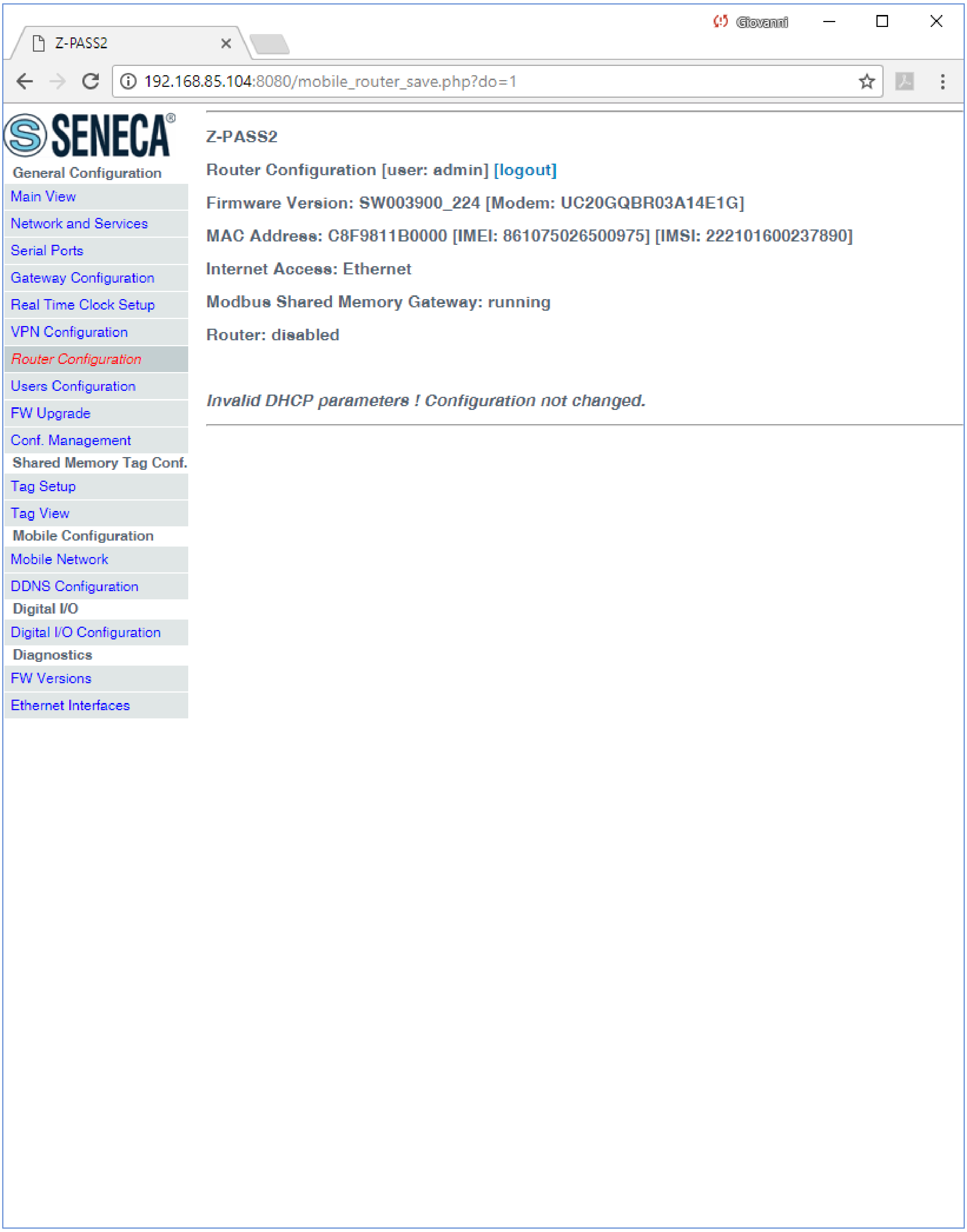
Internet Access: Ethernet

Modbus Shared Memory Gateway: running

Router: disabled

Router Configuration changed (router not active).

If you try to enable the DHCP server functionality (DHCP Enable = ON), but the “DHCP First Address” and “DHCP Last Address” parameters define an address range that is not congruent with the Ethernet configuration (IP address and network mask), an error is given, as shown in the following figure:



Z-PASS2

Router Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Ethernet

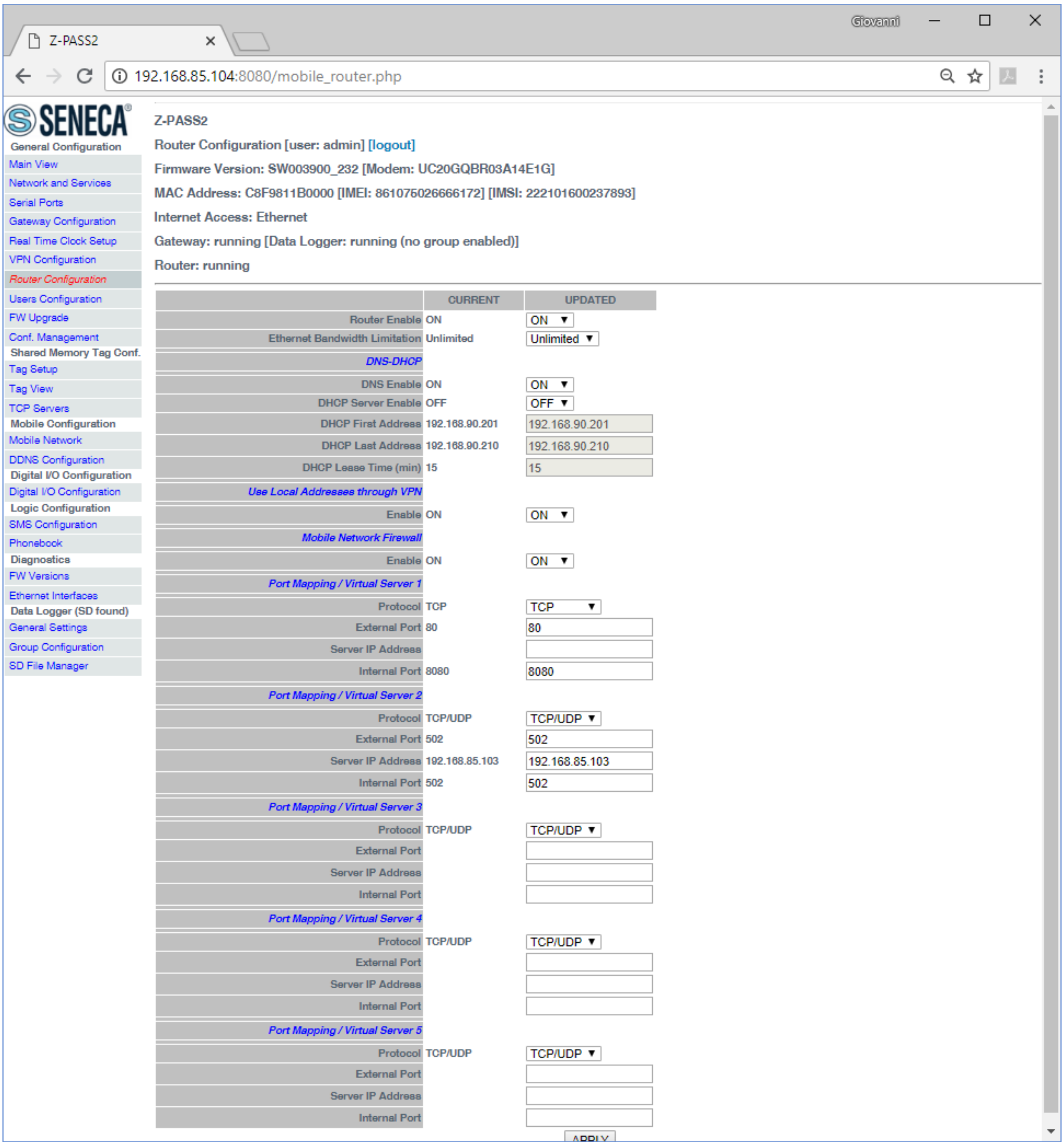
Modbus Shared Memory Gateway: running

Router: disabled

Invalid DHCP parameters ! Configuration not changed.

As already told before, the Router configuration page lets you define up to 5 “Port Forwarding” rules or “Virtual Servers”.

An example is given in the following figure:



Z-PASS2

Router Configuration [user: admin] [logout]

Firmware Version: SW003900_232 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237893]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: running

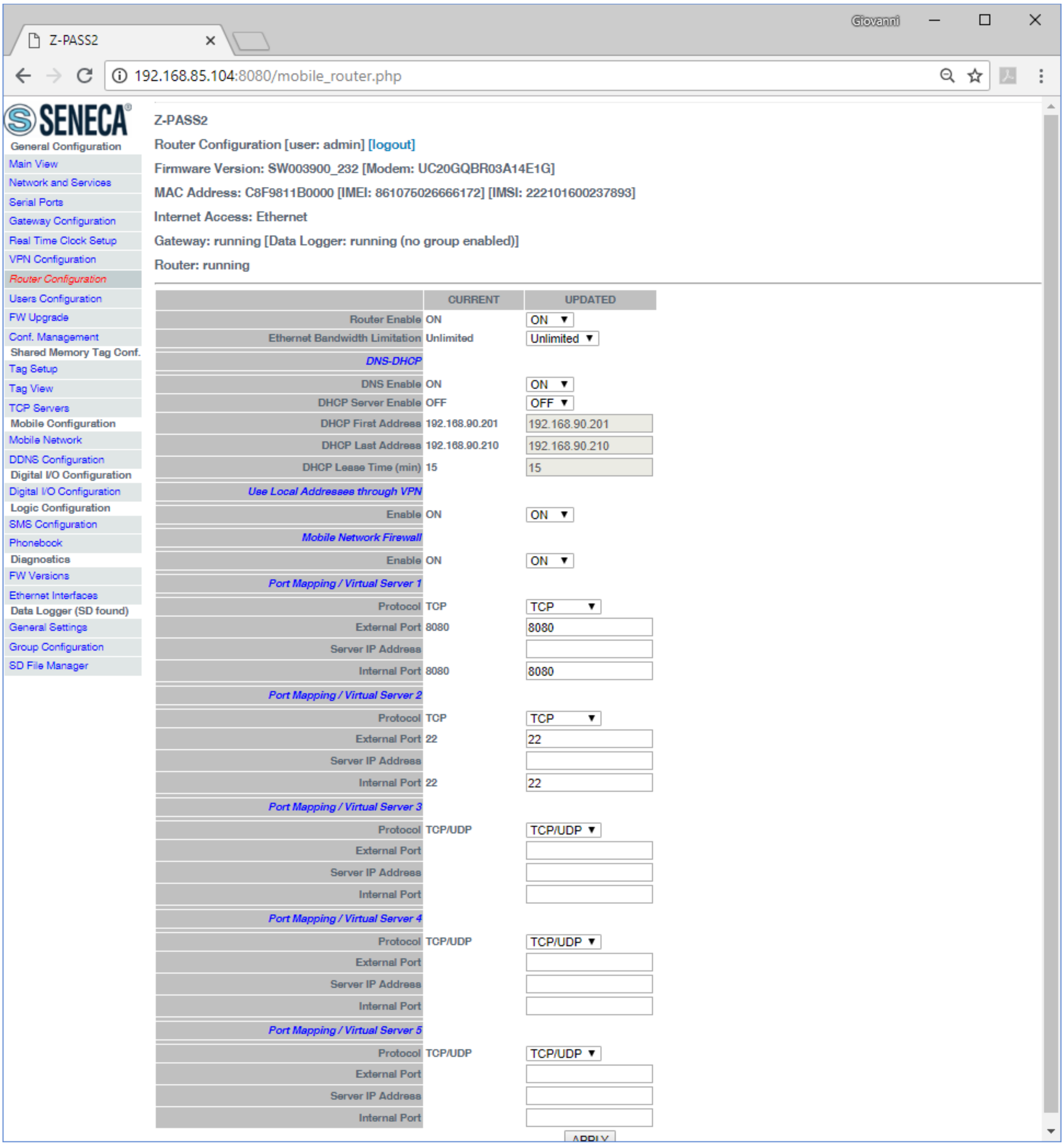
	CURRENT	UPDATED
Router Enable	ON	ON ▼
Ethernet Bandwidth Limitation	Unlimited	Unlimited ▼
DNS-DHCP		
DNS Enable	ON	ON ▼
DHCP Server Enable	OFF	OFF ▼
DHCP First Address	192.168.90.201	192.168.90.201
DHCP Last Address	192.168.90.210	192.168.90.210
DHCP Lease Time (min)	15	15
Use Local Addresses through VPN		
Enable	ON	ON ▼
Mobile Network Firewall		
Enable	ON	ON ▼
Port Mapping / Virtual Server 1		
Protocol	TCP	TCP ▼
External Port	80	80
Server IP Address		
Internal Port	8080	8080
Port Mapping / Virtual Server 2		
Protocol	TCP/UDP	TCP/UDP ▼
External Port	502	502
Server IP Address	192.168.85.103	192.168.85.103
Internal Port	502	502
Port Mapping / Virtual Server 3		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		
Port Mapping / Virtual Server 4		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		
Port Mapping / Virtual Server 5		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		

In this example, 2 rules have been set:

- the first rule tells Z-PASS that any TCP packet received on the 80 (HTTP) port has to be forwarded to the 8080 port, leaving the original destination IP address unchanged; so, this rule lets you access the Z-PASS configuration web site on the standard HTTP port;

- the second rule tells Z-PASS that any TCP or UDP packet received on the 502 port (which is often used for Modbus TCP protocol) shall be forwarded to the 192.168.85.103 IP address (which corresponds to another device) on the same (502) destination port.

Another important aspect of "Port Mapping / Virtual Server" rules is that they let define which ports are open in the "Mobile Network Firewall"; for example, if you want to connect to the web configuration site and to the SSH console, through the public IP address assigned to the 3G interface, the 8080 and 22 TCP ports shall be open; this can be done as shown in the following figure.



Z-PASS2

Router Configuration [user: admin] [logout]

Firmware Version: SW003900_232 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237893]

Internet Access: Ethernet

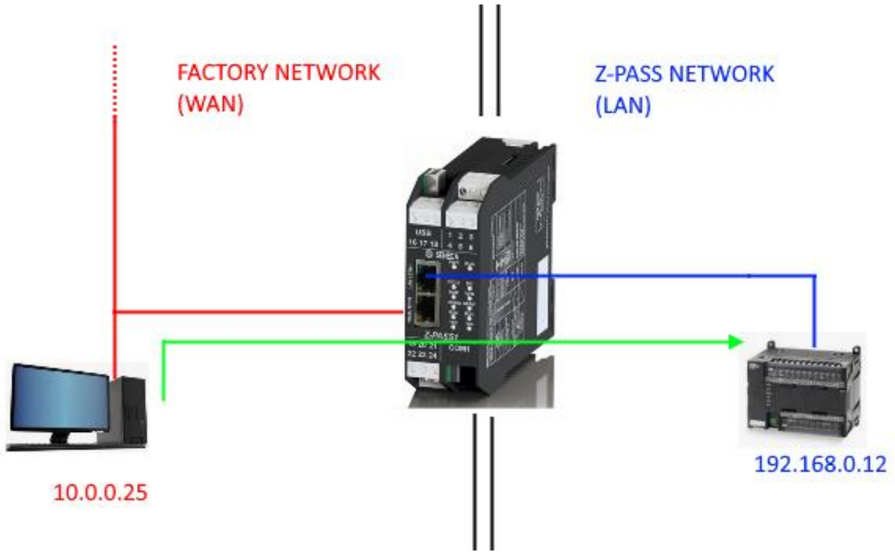
Gateway: running [Data Logger: running (no group enabled)]

Router: running

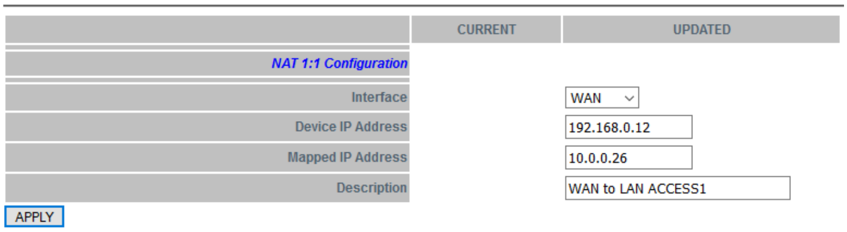
	CURRENT	UPDATED
Router Enable	ON	ON ▼
Ethernet Bandwidth Limitation	Unlimited	Unlimited ▼
DNS-DHCP		
DNS Enable	ON	ON ▼
DHCP Server Enable	OFF	OFF ▼
DHCP First Address	192.168.90.201	192.168.90.201
DHCP Last Address	192.168.90.210	192.168.90.210
DHCP Lease Time (min)	15	15
Use Local Addresses through VPN		
Enable	ON	ON ▼
Mobile Network Firewall		
Enable	ON	ON ▼
Port Mapping / Virtual Server 1		
Protocol	TCP	TCP ▼
External Port	8080	8080
Server IP Address		
Internal Port	8080	8080
Port Mapping / Virtual Server 2		
Protocol	TCP	TCP ▼
External Port	22	22
Server IP Address		
Internal Port	22	22
Port Mapping / Virtual Server 3		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		
Port Mapping / Virtual Server 4		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		
Port Mapping / Virtual Server 5		
Protocol	TCP/UDP	TCP/UDP ▼
External Port		
Server IP Address		
Internal Port		

21.1.9 NAT 1:1 RULES

You can use this feature for access a device (for example) from WAN to the LAN (a PC in the WAN network that must obtain data from a PLC in the LAN network):



For to do this you must create a new address (10.0.0.26) that is in a compatible network with the PC (10.0.0.25) so:



	CURRENT	UPDATED
NAT 1:1 Configuration		
Interface		WAN
Device IP Address		192.168.0.12
Mapped IP Address		10.0.0.26
Description		WAN to LAN ACCESS1

Now the PLC 192.168.0.12 is accessible from the WAN using the 10.0.0.26 address.

WARNING!

In SWITCH mode this feature is not available (only in LAN/WAN mode)!

21.1.10 STATIC ROUTES

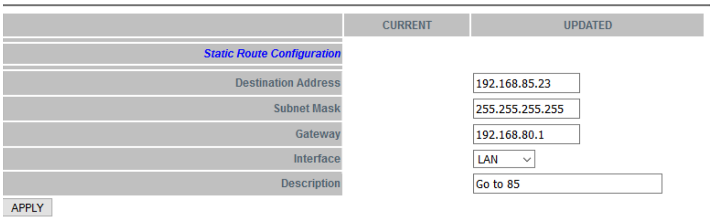
Use this function for route an address or a range of addresses to different gateways.

For example if you must reach 2 different addresses: 192.168.85.23 and 192.168.82.56 but you need to pass from 2 different gateways.

1) For access to the 192.168.85.23 you must pass from the 192.168.80.1 Gateway

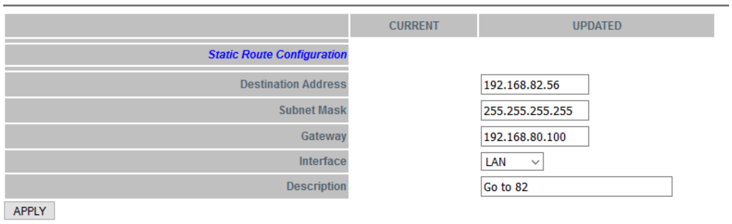
2) For access to the 192.168.82.56 you must pass from the 192.168.80.100 Gateway

So you must configure:



	CURRENT	UPDATED
Static Route Configuration		
Destination Address		192.168.85.23
Subnet Mask		255.255.255.255
Gateway		192.168.80.1
Interface		LAN
Description		Go to 85

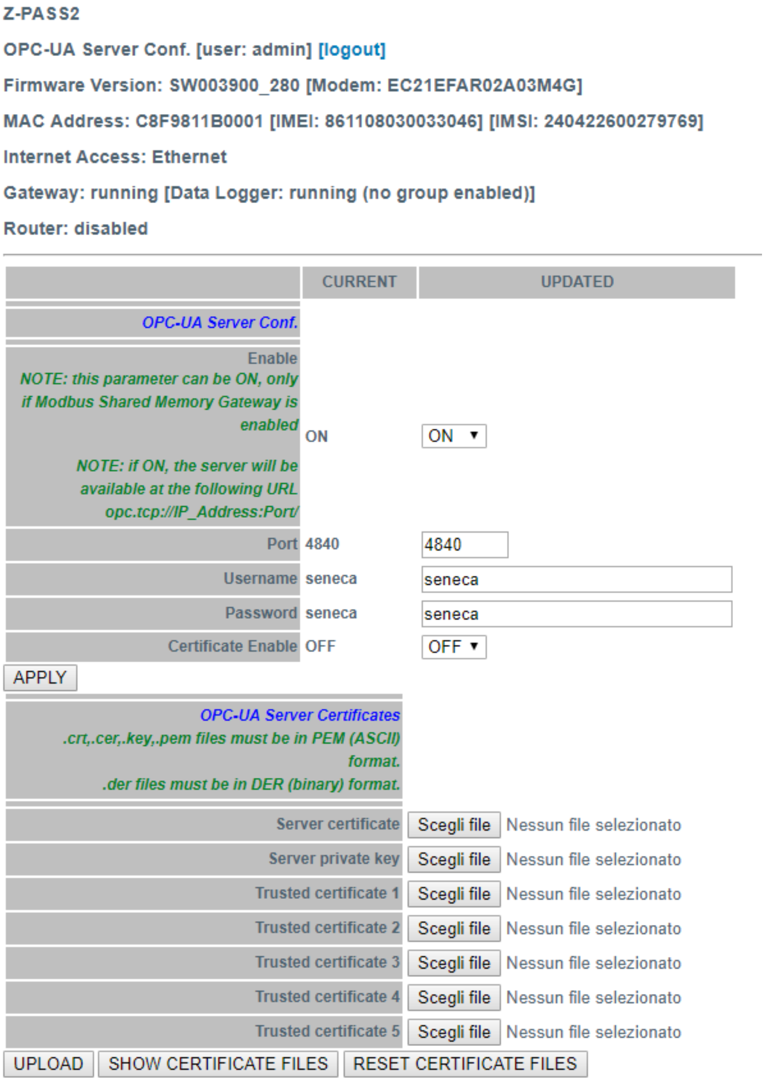
And then:



	CURRENT	UPDATED
Static Route Configuration		
Destination Address		192.168.82.56
Subnet Mask		255.255.255.255
Gateway		192.168.80.100
Interface		LAN
Description		Go to 82

21.1.11 OPC-UA Server Configuration

By clicking on the “OPC-UA Server Conf.” link, in the “Basic Configuration” menu, you come to the following page:



Z-PASS2

OPC-UA Server Conf. [user: admin] [logout]

Firmware Version: SW003900_280 [Modem: EC21EFAR02A03M4G]

MAC Address: C8F9811B0001 [IMEI: 861108030033046] [IMSI: 240422600279769]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

	CURRENT	UPDATED
OPC-UA Server Conf.		
Enable NOTE: this parameter can be ON, only if Modbus Shared Memory Gateway is enabled NOTE: if ON, the server will be available at the following URL opc.tcp://IP_Address:Port/	ON	ON ▾
Port	4840	4840
Username	seneca	seneca
Password	seneca	seneca
Certificate Enable	OFF	OFF ▾

APPLY

OPC-UA Server Certificates
.crt,.cer,.key,.pem files must be in PEM (ASCII) format.
.der files must be in DER (binary) format.

Server certificate	Scegli file Nessun file selezionato
Server private key	Scegli file Nessun file selezionato
Trusted certificate 1	Scegli file Nessun file selezionato
Trusted certificate 2	Scegli file Nessun file selezionato
Trusted certificate 3	Scegli file Nessun file selezionato
Trusted certificate 4	Scegli file Nessun file selezionato
Trusted certificate 5	Scegli file Nessun file selezionato

UPLOAD | SHOW CERTIFICATE FILES | RESET CERTIFICATE FILES

In this page, you can set the parameters related to the OPC Unified Architecture (OPC-UA) server, as listed in the following table:

Field	Meaning	Default value
Enable	Flag to enable/disable the OPC-UA server functionality	OFF
Port	OPC-UA server TCP port	4840
Username	Username that an OPC-UA Client shall use to connect to the server	empty
Password	Password that an OPC-UA Client shall use to connect to the server	empty
Security Policy	Select between “None” Or “None, Basic128Rsa15, Basic256Sha256” Note: A predefined couple of certifates	“None”

	are inlcuded in the Z-PASS.	

You can add yours certificates with the buttons

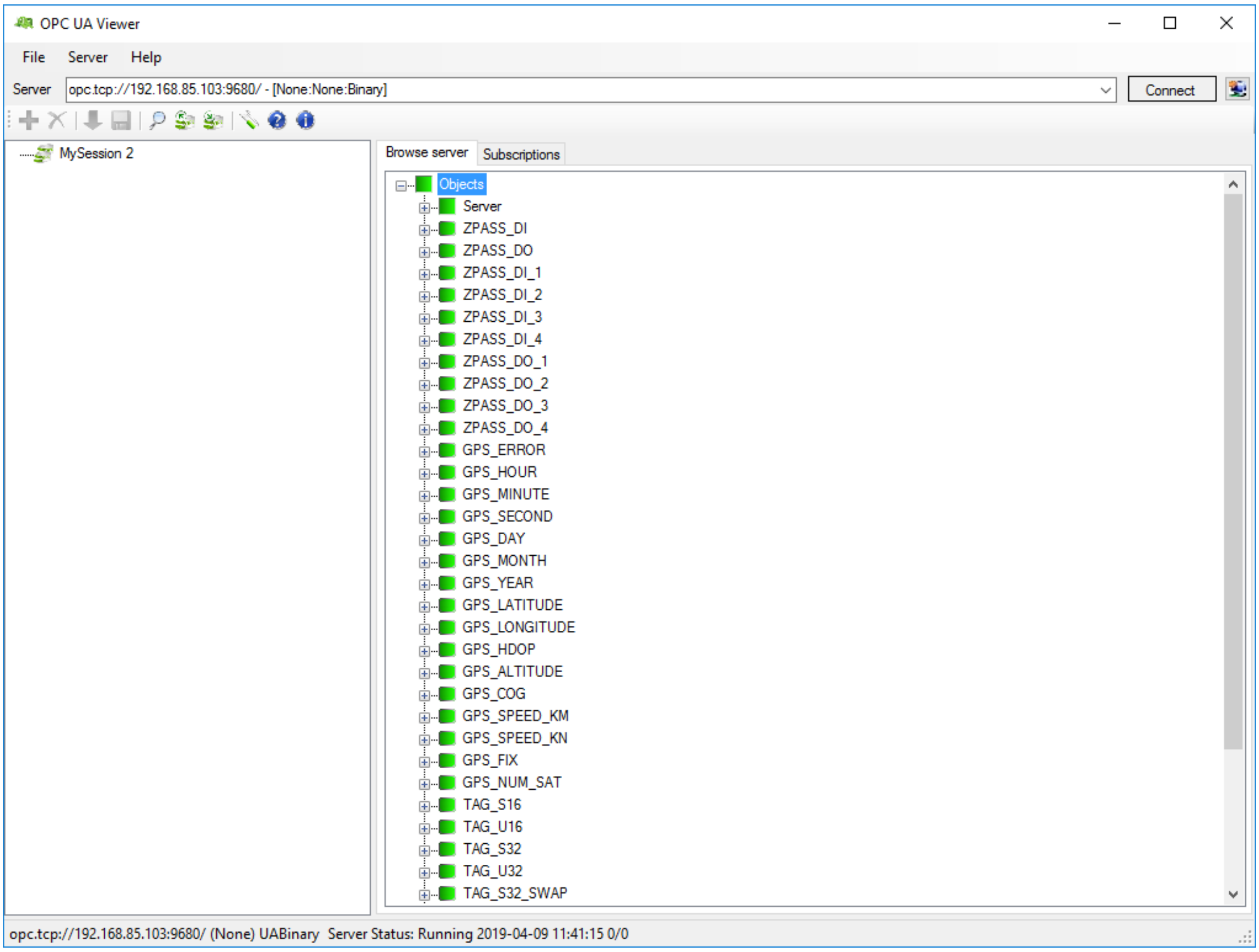
Note that, to access the Z-PASS OPC-UA server, a client shall use the following URL:

opc.tcp://IP_ADDR:PORT/

where:
IP_ADDR is the Z-PASS IP address
PORT is the TCP port configured for the OPC-UA server

Z-PASS OPC-UA server “exports” the Modbus Shared Memory Gateway tags; so, using an OPC-UA Client software, you can read/write the tags by means of the OPC-UA protocol.

The following figure shows the Z-PASS Modbus Shared Memory Gateway tags as seen by the Comm Server OPC UA Viewer SW.



opc.tcp://192.168.85.103:9680/ - [None:None:Binary]

Objects
- Server
- ZPASS_DI
- ZPASS_DO
- ZPASS_DI_1
- ZPASS_DI_2
- ZPASS_DI_3
- ZPASS_DI_4
- ZPASS_DO_1
- ZPASS_DO_2
- ZPASS_DO_3
- ZPASS_DO_4
- GPS_ERROR
- GPS_HOUR
- GPS_MINUTE
- GPS_SECOND
- GPS_DAY
- GPS_MONTH
- GPS_YEAR
- GPS_LATITUDE
- GPS_LONGITUDE
- GPS_HDOP
- GPS_ALTITUDE
- GPS_COG
- GPS_SPEED_KM
- GPS_SPEED_KN
- GPS_FIX
- GPS_NUM_SAT
- TAG_S16
- TAG_U16
- TAG_S32
- TAG_U32
- TAG_S32_SWAP

opc.tcp://192.168.85.103:9680/ (None) UABinary Server Status: Running 2019-04-09 11:41:15 0/0

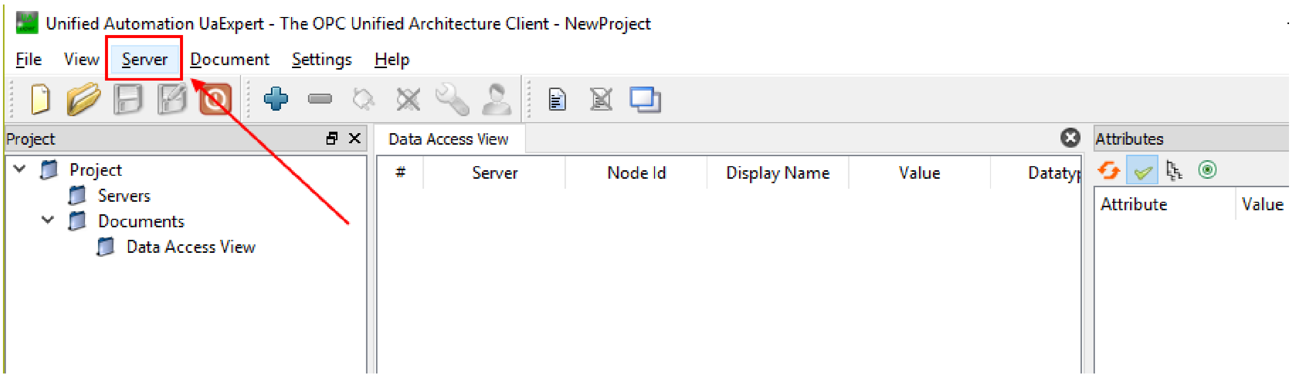
Since the Z-PASS OPC-UA server is used to “export” the Modbus Shared Memory Gateway tags, when Modbus Shared Memory Gateway is not active, also the OPC-UA server is disabled (the Enable flag is set to OFF and can’t be changed to ON).

NOTE: For all Z-PASS OPC-UA Server variables the namespace-id is fixed to “1”.

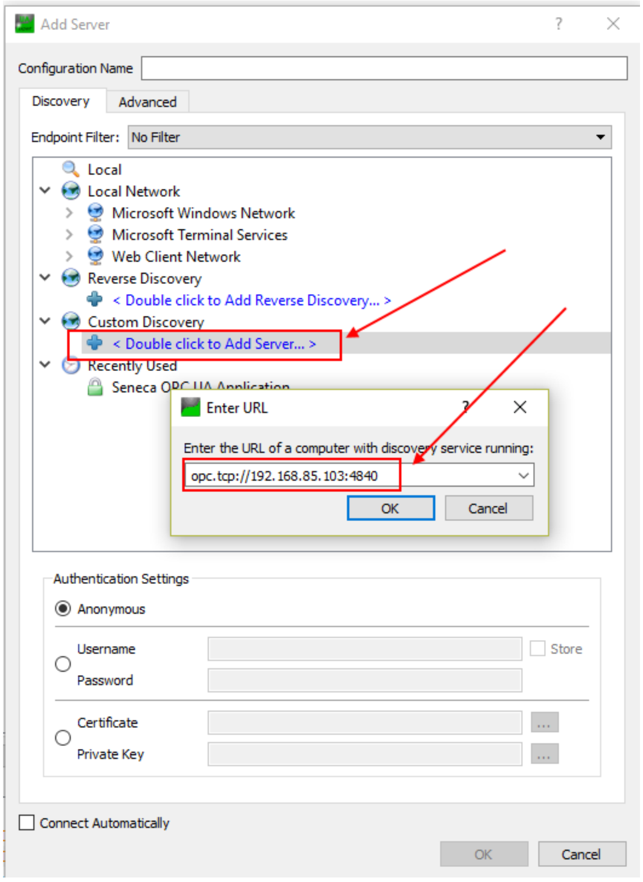
21.1.11.1 UA Expert Client Configuration

This chapter will help you to configure the connection and the correct Security Policy with the UA Expert Client

Click Select Server-> add



Go to Custom Discovery then enter the string to connect to the Z-PASS OPC-UA server:



Endpoint Filter: No Filter

Enter the URL of a computer with discovery service running:

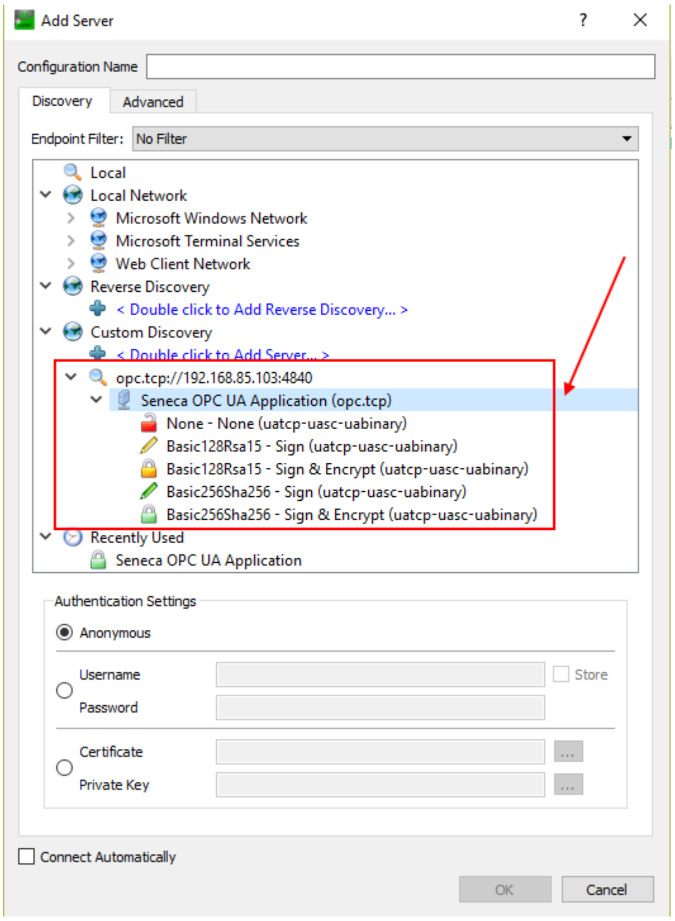
opc.tcp://192.168.85.103:4840

● Anonymous

□ Connect Automatically

Then press OK.

Now the server capability are shown:



Add Server

Configuration Name

Discovery | Advanced

Endpoint Filter: No Filter

- Local
- Local Network
  - Microsoft Windows Network
  - Microsoft Terminal Services
  - Web Client Network
- Reverse Discovery
  - < Double click to Add Reverse Discovery... >
- Custom Discovery
  - < Double click to Add Server... >
  - opc.tcp://192.168.85.103:4840
    - Seneca OPC UA Application (opc.tcp)
      - None - None (uatcp-uasc-uabinary)
      - Basic128Rsa15 - Sign (uatcp-uasc-uabinary)
      - Basic128Rsa15 - Sign & Encrypt (uatcp-uasc-uabinary)
      - Basic256Sha256 - Sign (uatcp-uasc-uabinary)
      - Basic256Sha256 - Sign & Encrypt (uatcp-uasc-uabinary)
- Recently Used
  - Seneca OPC UA Application

Authentication Settings

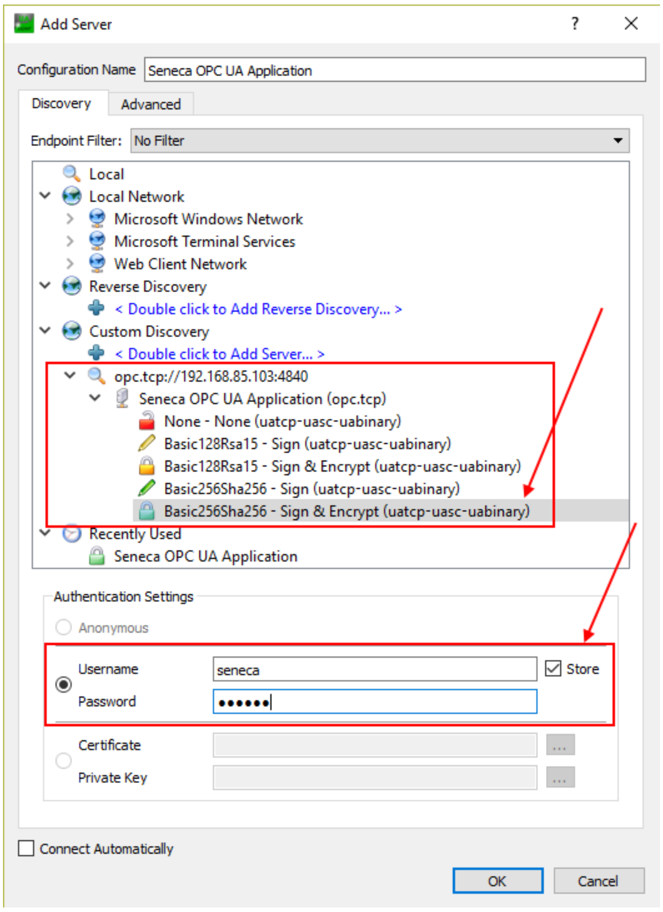
● Anonymous

○ Username / Password □ Store

○ Certificate / Private Key

□ Connect Automatically

Set Security Policy that you want to use and then the Aythentication settings:



Add Server

Configuration Name: Seneca OPC UA Application

Endpoint Filter: No Filter

```
Local
Local Network
  Microsoft Windows Network
  Microsoft Terminal Services
  Web Client Network
Reverse Discovery
  < Double click to Add Reverse Discovery... >
Custom Discovery
  < Double click to Add Server... >
  opc.tcp://192.168.85.103:4840
    Seneca OPC UA Application (opc.tcp)
      None - None (uatcp-uasc-uabinary)
      Basic128Rsa15 - Sign (uatcp-uasc-uabinary)
      Basic128Rsa15 - Sign & Encrypt (uatcp-uasc-uabinary)
      Basic256Sha256 - Sign (uatcp-uasc-uabinary)
      Basic256Sha256 - Sign & Encrypt (uatcp-uasc-uabinary)
Recently Used
  Seneca OPC UA Application
```

Authentication Settings

○ Anonymous

● Username: seneca ☑ Store

Password: ••••••

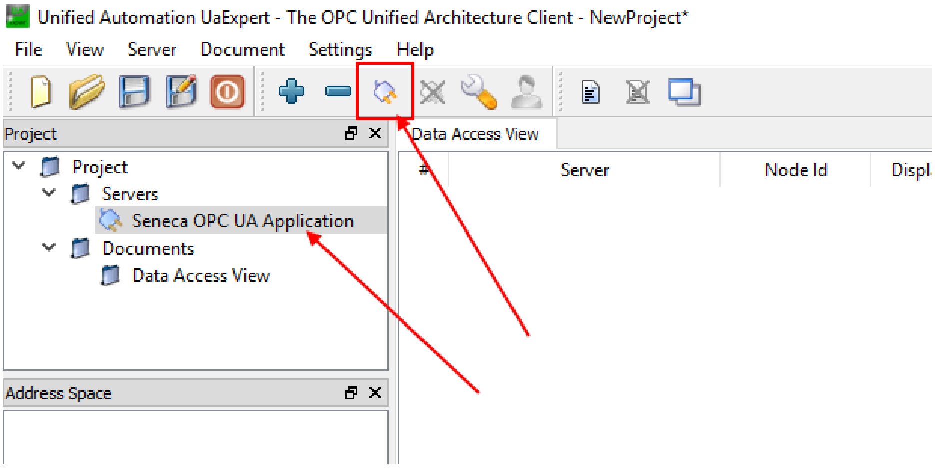
○ Certificate

Private Key

□ Connect Automatically

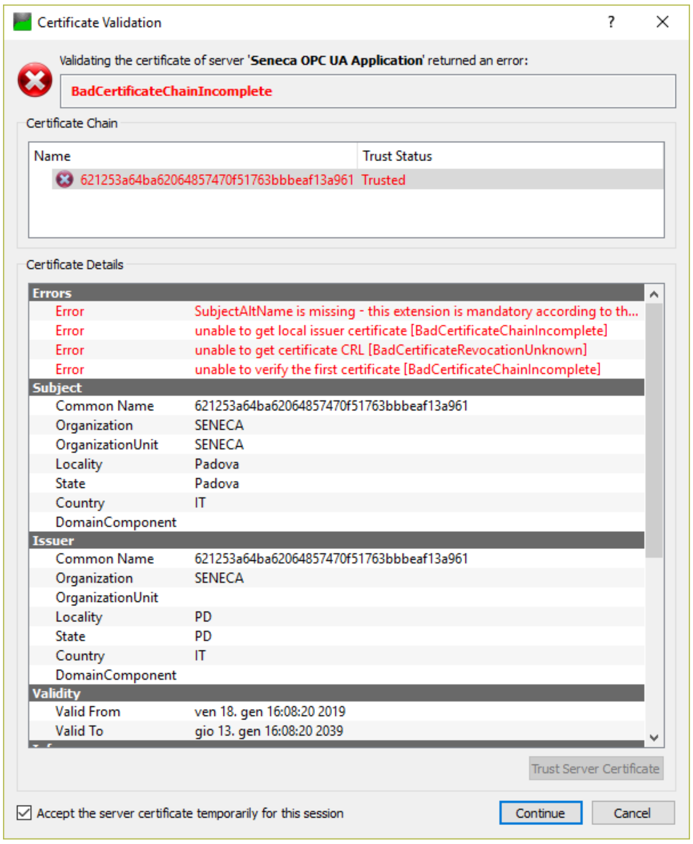
Then press OK:

Now we can connect to the server by using the plug icon:



Unified Automation UaExpert - The OPC Unified Architecture Client - NewProject*

A new dialog window for validating the Server’s certificate will open. After examining the certificate, choose Trust Server Certificate to permanently add the certificate to UaExpert’s trust list. It is also possible to check the box at Accept the server certificate temporarily for this session and choose Continue to not save the certificate in the trust list, or to choose Cancel to reject the certificate.



Validating the certificate of server '**Seneca OPC UA Application**' returned an error:

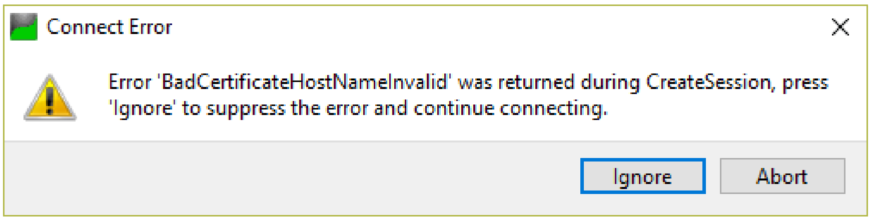
BadCertificateChainIncomplete

Name	Trust Status
621253a64ba62064857470f51763bbbeaf13a961	Trusted

Errors	
Error	SubjectAltName is missing - this extension is mandatory according to th...
Error	unable to get local issuer certificate [BadCertificateChainIncomplete]
Error	unable to get certificate CRL [BadCertificateRevocationUnknown]
Error	unable to verify the first certificate [BadCertificateChainIncomplete]
Subject	
Common Name	621253a64ba62064857470f51763bbbeaf13a961
Organization	SENECA
OrganizationUnit	SENECA
Locality	Padova
State	Padova
Country	IT
DomainComponent	
Issuer	
Common Name	621253a64ba62064857470f51763bbbeaf13a961
Organization	SENECA
OrganizationUnit	
Locality	PD
State	PD
Country	IT
DomainComponent	
Validity	
Valid From	ven 18. gen 16:08:20 2019
Valid To	gio 13. gen 16:08:20 2039

☑ Accept the server certificate temporarily for this session

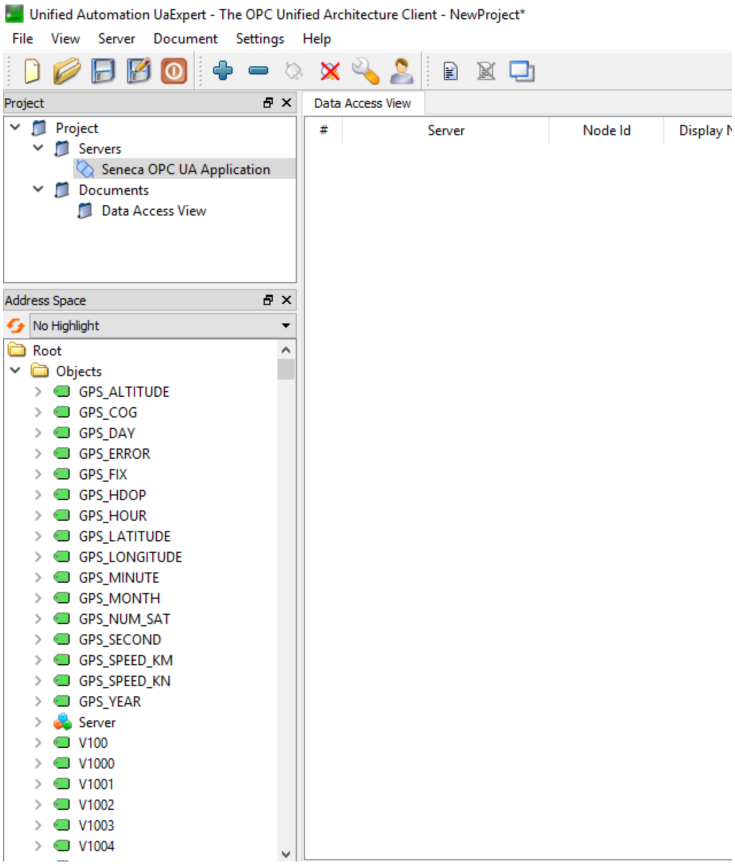
Now the Certificate Error Window will shown:



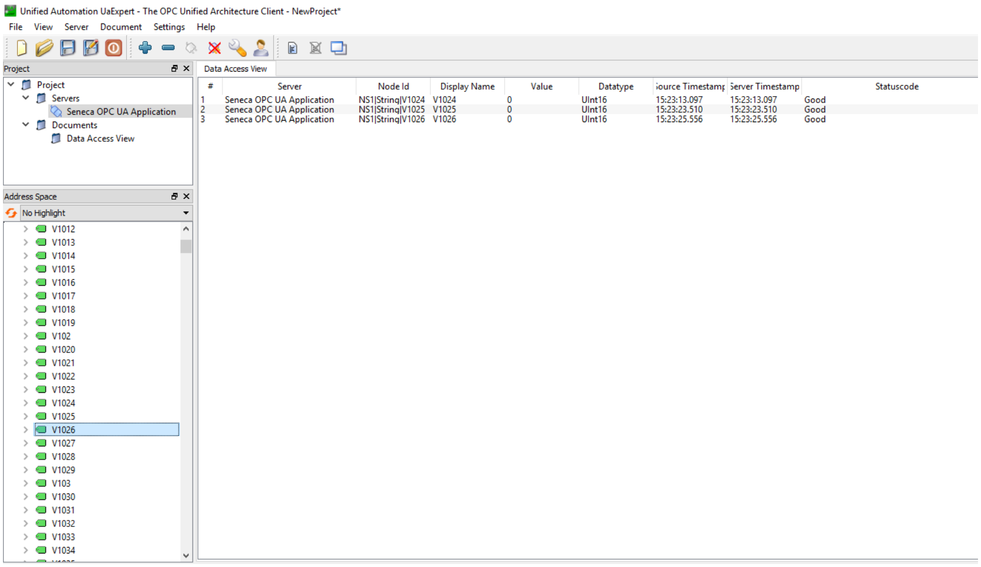
Error 'BadCertificateHostNameInvalid' was returned during CreateSession, press 'Ignore' to suppress the error and continue connecting.

Click “Ignore” to continue.

Now the connection is done, you can read the tags from the left side:



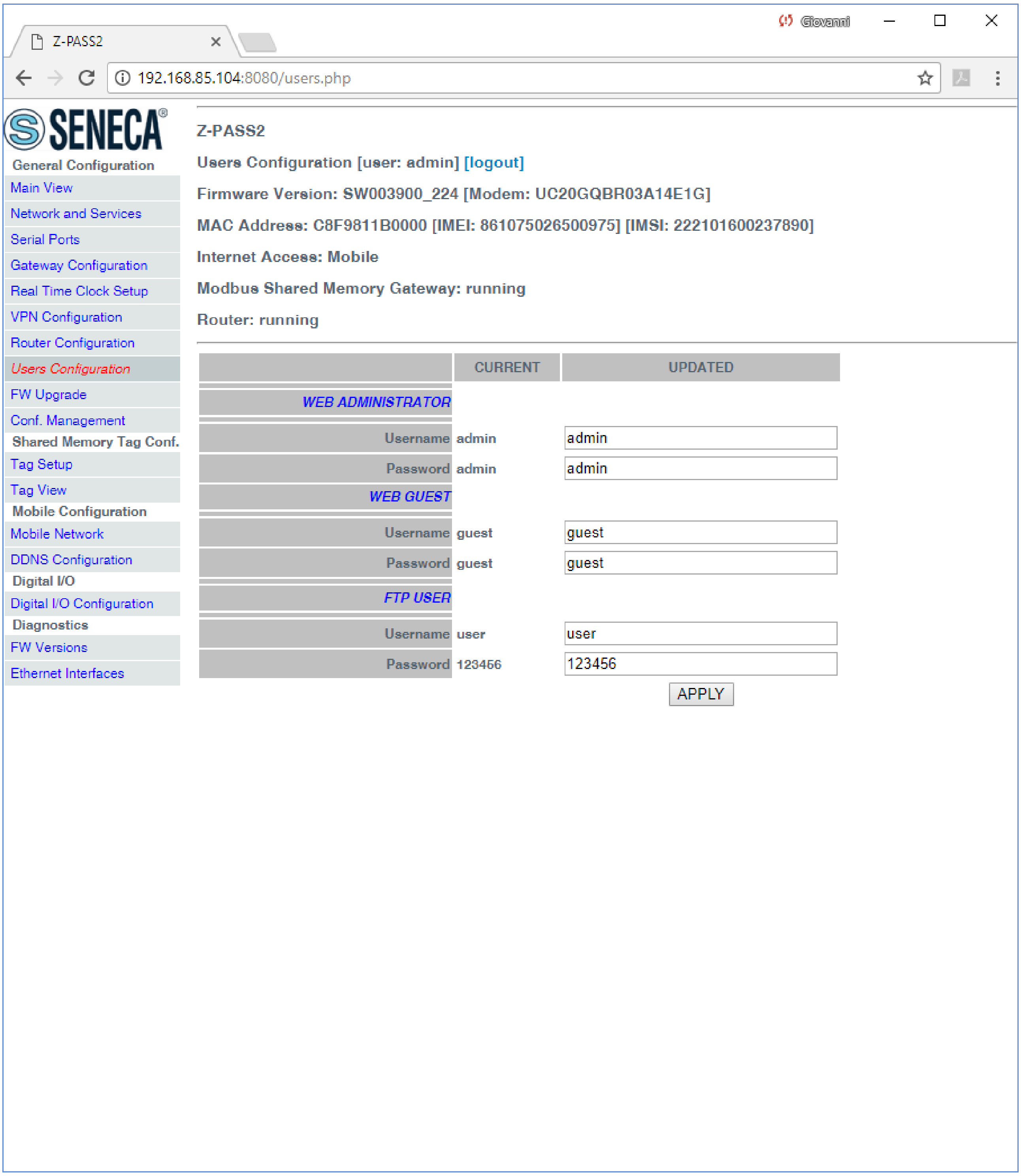
To update in real time the tags value drag and drop the Tags that you want to monitor:



#	Server	Node Id	Display Name	Value	Datatype	Source Timestamp	Server Timestamp	Statuscode
1	Seneca OPC UA Application	NS1|String|V1024	V1024	0	UInt16	15:23:13.097	15:23:13.097	Good
2	Seneca OPC UA Application	NS1|String|V1025	V1025	0	UInt16	15:23:23.510	15:23:23.510	Good
3	Seneca OPC UA Application	NS1|String|V1026	V1026	0	UInt16	15:23:25.556	15:23:25.556	Good

21.1.12 Users Configuration

By clicking on the “Users Configuration” link, in the “Basic Configuration” section, you come to the following page:



Z-PASS2

Users Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
WEB ADMINISTRATOR		
Username	admin	admin
Password	admin	admin
WEB GUEST		
Username	guest	guest
Password	guest	guest
FTP USER		
Username	user	user
Password	123456	123456

In this page, you can change the “Web Administrator”, “Web Guest” and “FTP User” credentials, as explained in the following table:

Field	Meaning	Default value
WEB ADMINISTRATOR/Username	Username to access the web configuration site (full access)	admin

WEB ADMINISTRATOR/Password	Password to access the web configuration site (full access)	admin
WEB GUEST/Username	Username to access the web configuration site, in “view-only mode” (see paragraph 21.7.2)	guest
WEB GUEST/Password	Password to access the web configuration site, in “view-only mode” (see paragraph 21.7.2)	guest
FTP USER/Username	Username to access the Device FTP/SFTP site	user
FTP USER/Password	Password to access the Device FTP/SFTP site	123456

For all the fields in this page, the following characters are allowed:

a-zA-Z0-9-_|!@$%^&*?+{}<>;,:.

each field can contain up to 100 characters.

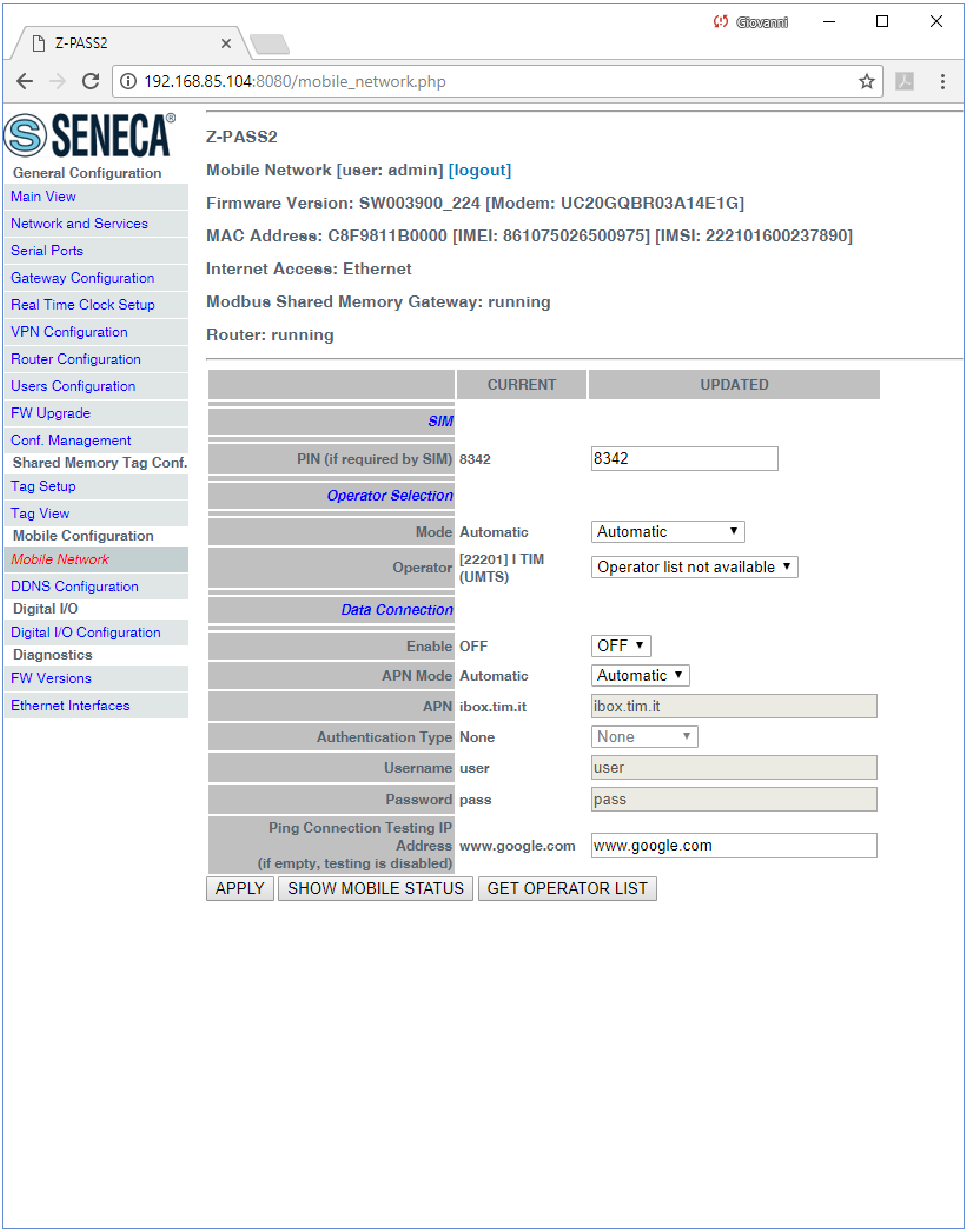
The same rules apply to the other “Username” and “Password” fields of the web pages and to the “Tag Name” field of the “VPN Configuration” page.

Please note that, after changing the Web Administrator credentials, a new login will be required to access any page.

21.2 Mobile Configuration

21.2.1 Mobile Network

By clicking on the “Mobile Network” link, in the “Mobile Configuration” section, you come to the following page:



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

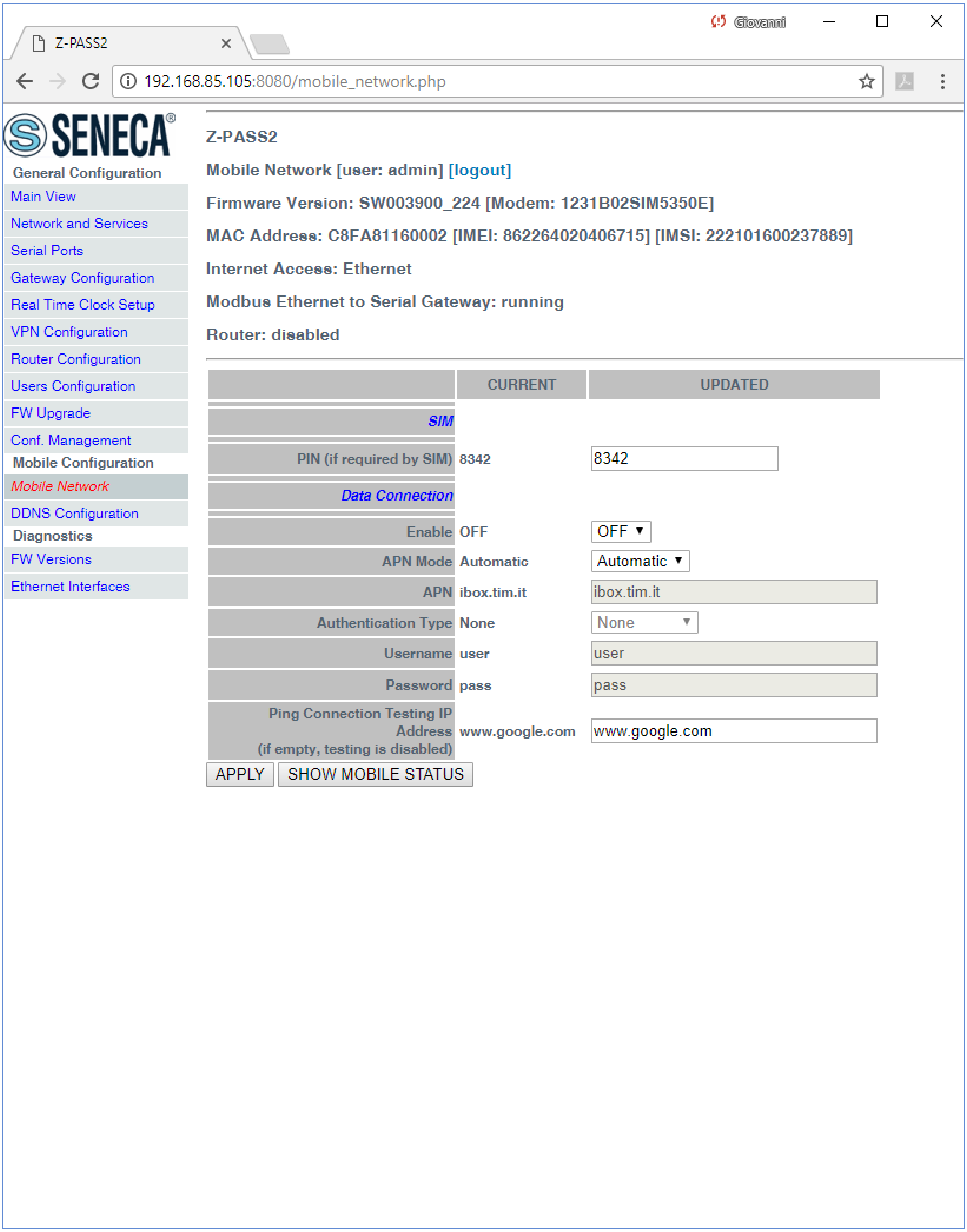
Internet Access: Ethernet

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
SIM		
PIN (if required by SIM)	8342	8342
Operator Selection		
Mode	Automatic	Automatic ▾
Operator	[22201] I TIM (UMTS)	Operator list not available ▾
Data Connection		
Enable	OFF	OFF ▾
APN Mode	Automatic	Automatic ▾
APN	ibox.tim.it	ibox.tim.it
Authentication Type	None	None ▾
Username	user	user
Password	pass	pass
Ping Connection Testing IP Address (if empty, testing is disabled)	www.google.com	www.google.com

The above figure shows the “Mobile Network” page for Z-PASS2.



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: 1231B02SIM5350E]

MAC Address: C8FA81160002 [IMEI: 862264020406715] [IMSI: 222101600237889]

Internet Access: Ethernet

Modbus Ethernet to Serial Gateway: running

Router: disabled

	CURRENT	UPDATED
SIM		
PIN (if required by SIM)	8342	8342
Data Connection		
Enable	OFF	OFF ▾
APN Mode	Automatic	Automatic ▾
APN	ibox.tim.it	ibox.tim.it
Authentication Type	None	None ▾
Username	user	user
Password	pass	pass
Ping Connection Testing IP Address (if empty, testing is disabled)	www.google.com	www.google.com

In this page, you can change the parameters related to the Mobile Network, as listed in the following table:

Field	Meaning	Default value
SIM/PIN (if required by SIM)	PIN needed to unlock the SIM card, if PIN locking functionality is enabled on it[19]	1234
Operator Selection/Mode (only on Z-PASS2)	This parameter tells if the modem shall select the Mobile Network Operator: - automatically (Mode=Automatic) - as selected by the user (Mode=Manual) - reverting to "automatic" mode, if "manual" selection fails (Mode = Manual/ Automatic)	Automatic
Operator Selection/Operator (only on Z-PASS2)	This parameter contains the list of the Mobile Network Operators currently available, that is detected by the modem. The list items are strings with the following format: - the MCC+MNC[20] code in square brackets (e.g.: "[22201]") - the string identifying the operator (e.g.: "I TIM") - the access technology, that is "GSM" or "UMTS", in brackets This list is initially empty: it shall be filled by clicking on the "GET OPERATOR LIST" button.	"[22201] I TIM (UMTS)"
Data Connection/Enable	Flag to enable/disable the Mobile Network connectivity	OFF
Data Connection/APN Mode	This parameter tells if the APN and related parameters are automatically retrieved (based on SIM IMSI) (Mode=Automatic) or the values given in this page are used (Mode=Manual). When APN Mode = Automatic, APN, Authentication Type, Username and Password parameters are disabled.	Automatic
Data Connection/APN	Access Point Name, as given by the	ibox.tim.it

[19] Please note that the procedure to enable/disable the PIN locking functionality on the SIM is not performed by the Device.

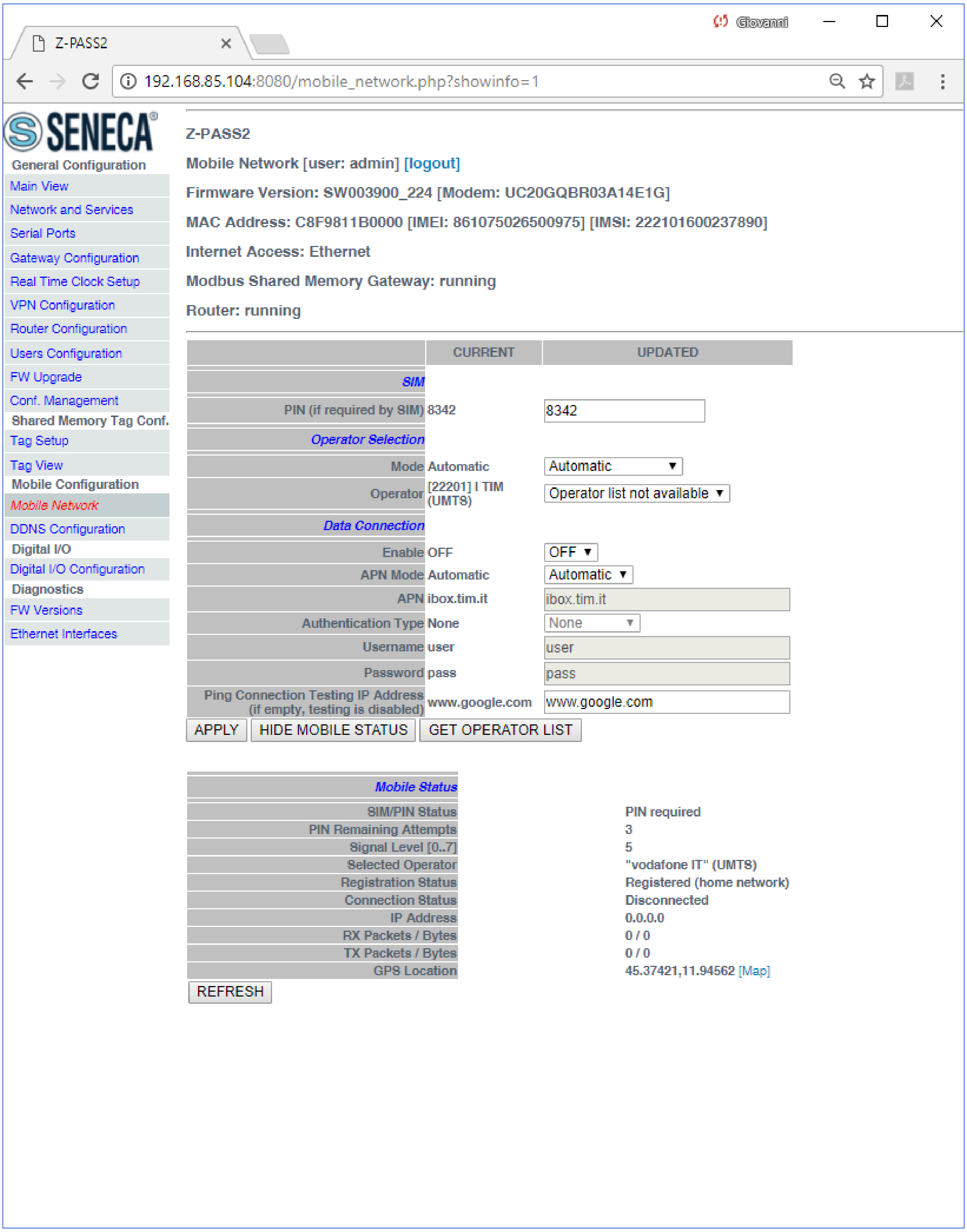
[20] MCC = Mobile Country Code, MNC = Mobile Network Code

	Mobile Network Operator	
Data Connection/Authentication Type	Type of authentication required; possible values are: “None”, “CHAP/PAP”, “CHAP only”, “PAP only”	None
Data Connection/Username	Username needed for UMTS/GPRS connectivity, as given by the Mobile Network Operator; it may be empty, if “Authentication Type” parameter is “None”	user
Data Connection/Password	Password needed for UMTS/GPRS connectivity, as given by the Mobile Network Operator; it may be empty, if “Authentication Type” parameter is “None”	pass
Data Connection/Ping Connection Testing IP Address (if empty, testing is disabled)	FQDN or IP address used to periodically check, by means of “ping” packets, if the mobile connection is actually working; if the field is lefty empty, the check is not performed. It is important to note that the FQDN or IP address specified must be reachable from the Z-PASS mobile network, otherwise the Z-PASS will detect that the mobile connection is not working and will drop it.	www.google.com

In the “Mobile Network” page, when you click on the “SHOW MOBILE STATUS” button, a new section appears, named “Mobile Status”, showing:

- the SIM/PIN Status; if an error in PIN setting has occurred or PUK/PUK2 setting is needed, this status is shown in red color
- the number of remaining attempts for PIN setting; when this value is less than 3 (shown in red color), it means that PIN setting has failed, that is the configured PIN value is wrong
- the radio “Signal Level”, in the range [0..7]
- the selected operator (only for Z-PASS2)
- the GSM “Registration Status”
- the Mobile Network “Connection Status” (i.e.: “Disconnected” or “Connected”)
- the IP address assigned to the Mobile Network interface when connected, the “dummy” IP address “0.0.0.0” when disconnected
- the number of packets/bytes received from the Mobile Network interface, when connected; “0/0” when disconnected
- the number of packets/bytes sent to the Mobile Network interface, when connected; “0/0” when disconnected

as shown in the following couple of figures:



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

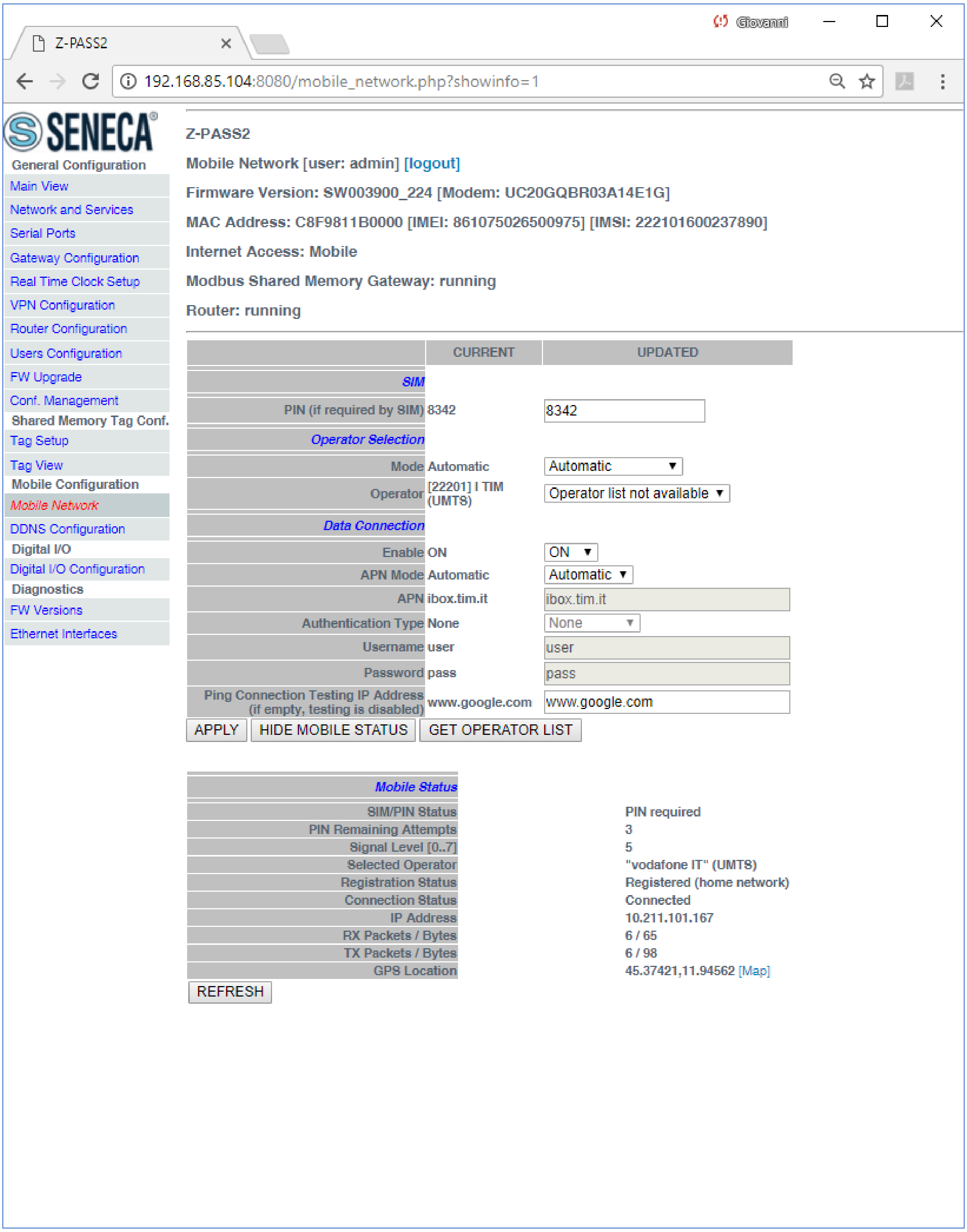
Internet Access: Ethernet

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
SIM		
PIN (if required by SIM)	8342	8342
Operator Selection		
Mode	Automatic	Automatic ▼
Operator	[22201] I TIM (UMTS)	Operator list not available ▼
Data Connection		
Enable	OFF	OFF ▼
APN Mode	Automatic	Automatic ▼
APN	ibox.tim.it	ibox.tim.it
Authentication Type	None	None ▼
Username	user	user
Password	pass	pass
Ping Connection Testing IP Address (if empty, testing is disabled)	www.google.com	www.google.com

Mobile Status	
SIM/PIN Status	PIN required
PIN Remaining Attempts	3
Signal Level [0..7]	5
Selected Operator	"vodafone IT" (UMTS)
Registration Status	Registered (home network)
Connection Status	Disconnected
IP Address	0.0.0.0
RX Packets / Bytes	0 / 0
TX Packets / Bytes	0 / 0
GPS Location	45.37421,11.94562 [Map]



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

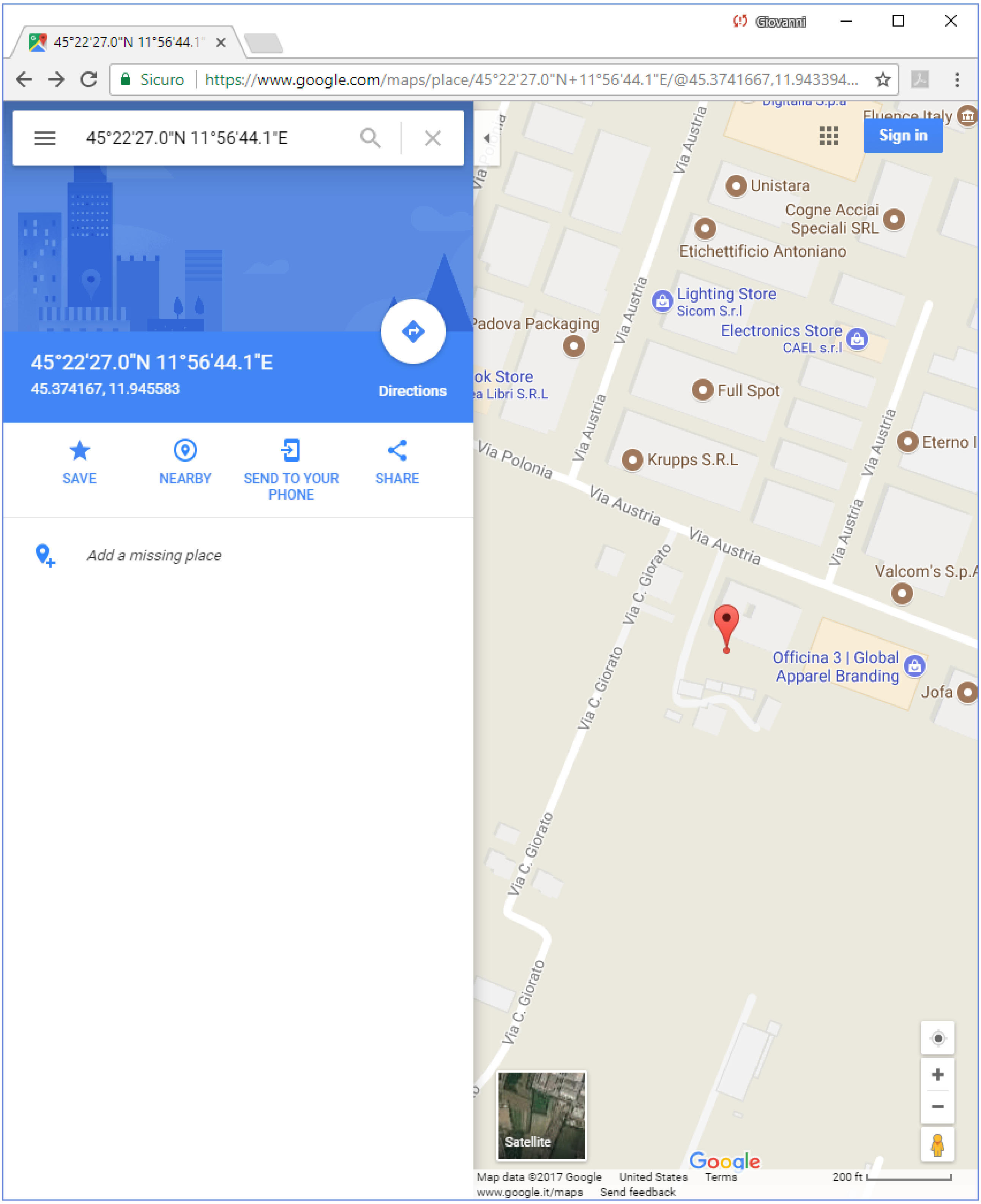
Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
SIM		
PIN (if required by SIM)	8342	8342
Operator Selection		
Mode	Automatic	Automatic ▾
Operator	[22201] I TIM (UMTS)	Operator list not available ▾
Data Connection		
Enable	ON	ON ▾
APN Mode	Automatic	Automatic ▾
APN	ibox.tim.it	ibox.tim.it
Authentication Type	None	None ▾
Username	user	user
Password	pass	pass
Ping Connection Testing IP Address (if empty, testing is disabled)	www.google.com	www.google.com

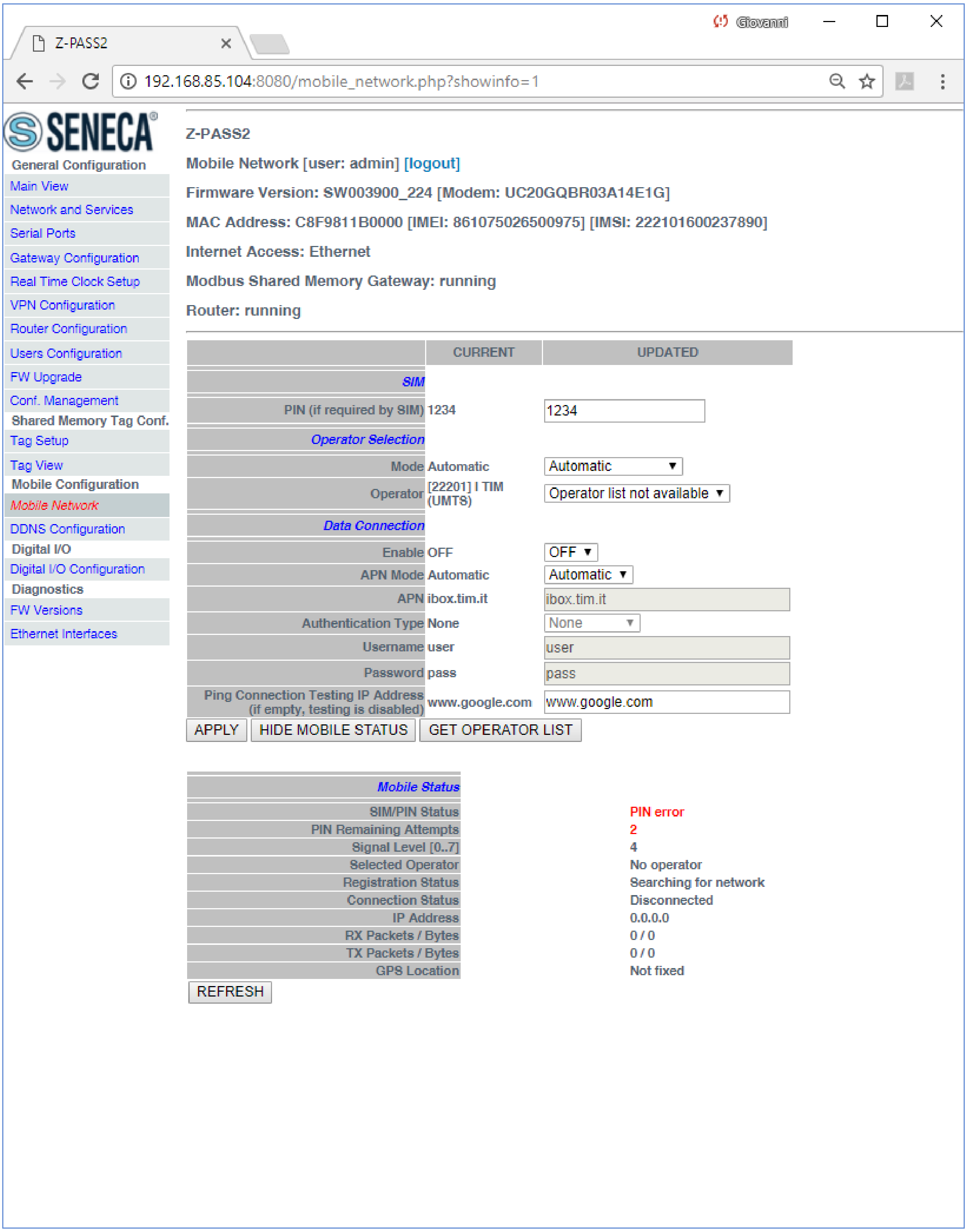
Mobile Status	
SIM/PIN Status	PIN required
PIN Remaining Attempts	3
Signal Level [0..7]	5
Selected Operator	"vodafone IT" (UMTS)
Registration Status	Registered (home network)
Connection Status	Connected
IP Address	10.211.101.167
RX Packets / Bytes	6 / 65
TX Packets / Bytes	6 / 98
GPS Location	45.37421,11.94562 [Map]

As shown in the above figures, only for Z-PASS2, the last row of the “Mobile Status” gives the “GPS Location” as `Latitude,Longitude` values; clicking on the Map link, the Google Maps™ on the current position are shown.



If the GPS signal is not available, the “GPS Location” row contains the string “Not fixed” and the Map link is not shown.

The following figure shows the situation when an error in PIN setting has occurred, due to a wrong value of the PIN parameter.



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Ethernet

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
SIM		
PIN (if required by SIM)	1234	1234
Operator Selection		
Mode	Automatic	Automatic ▼
Operator	[22201] I TIM (UMTS)	Operator list not available ▼
Data Connection		
Enable	OFF	OFF ▼
APN Mode	Automatic	Automatic ▼
APN	ibox.tim.it	ibox.tim.it
Authentication Type	None	None ▼
Username	user	user
Password	pass	pass
Ping Connection Testing IP Address (if empty, testing is disabled)	www.google.com	www.google.com

Mobile Status	
SIM/PIN Status	PIN error
PIN Remaining Attempts	2
Signal Level [0..7]	4
Selected Operator	No operator
Registration Status	Searching for network
Connection Status	Disconnected
IP Address	0.0.0.0
RX Packets / Bytes	0 / 0
TX Packets / Bytes	0 / 0
GPS Location	Not fixed

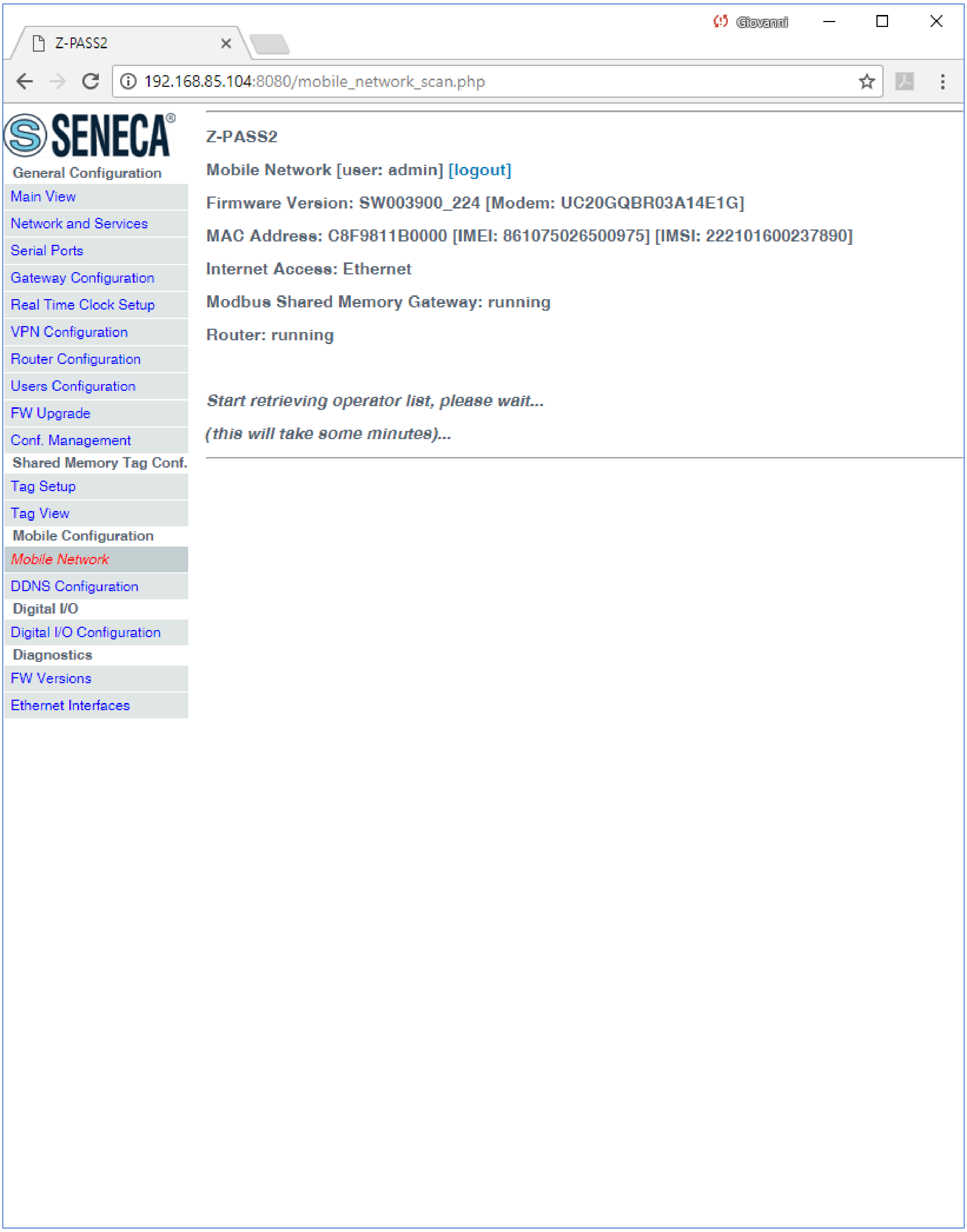
It should be noted that, when the PIN is set during procedures automatically performed by the Z-PASS firmware, if the number of remaining attempts is 1, no more attempt is done to avoid blocking the SIM.

You can refresh the Mobile Network status, by clicking on the “REFRESH” button.

You can hide the “Mobile Status” section, by clicking on the “HIDE MOBILE STATUS” button.

As already told above, the “GET OPERATOR LIST” button lets you retrieve the list of the operators currently available, that is detected by the modem (only on Z-PASS2).

When you click on the button, the following page is shown.



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Ethernet

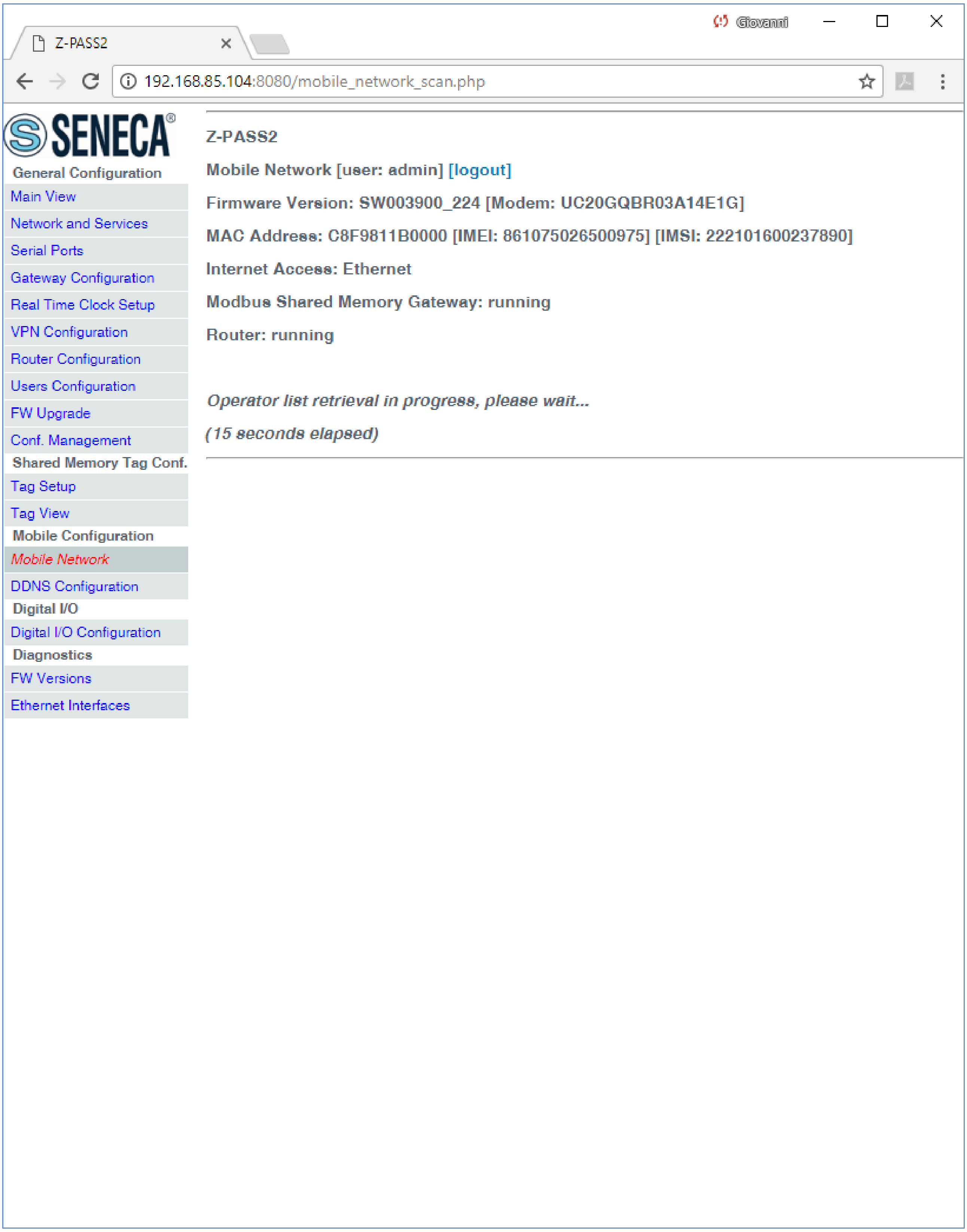
Modbus Shared Memory Gateway: running

Router: running

Start retrieving operator list, please wait...

(this will take some minutes)...

Tipically, it takes about 1 minute to get the list, so the page shows the number of seconds elapsed.



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Ethernet

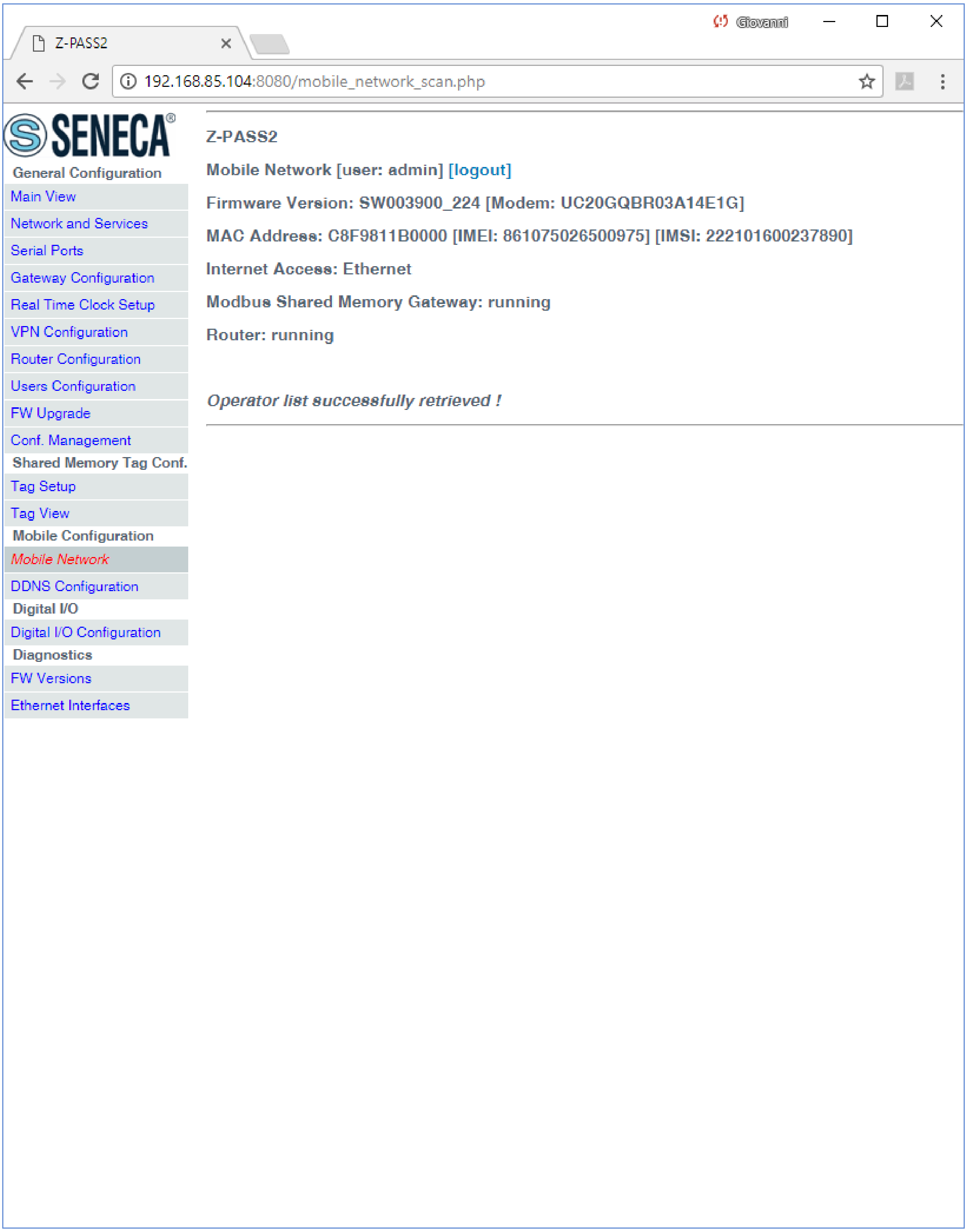
Modbus Shared Memory Gateway: running

Router: running

Operator list retrieval in progress, please wait...

(15 seconds elapsed)

When the procedure is completed, the following page is shown.



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

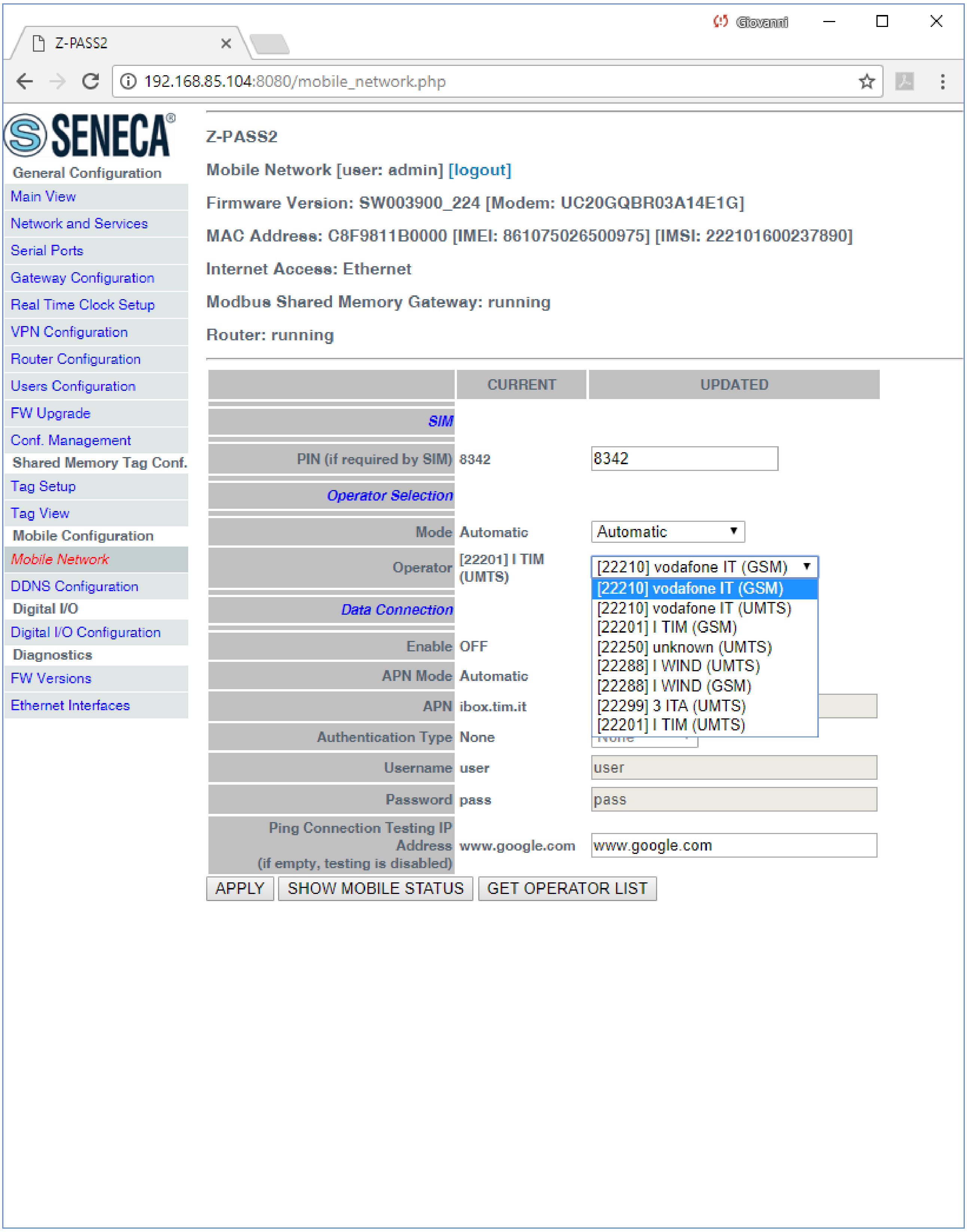
Internet Access: Ethernet

Modbus Shared Memory Gateway: running

Router: running

Operator list successfully retrieved !

After some seconds, the page automatically evolves to the “Mobile Network” page, with the operator list filled, as shown in the following figure.



Z-PASS2

Mobile Network [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Ethernet

Modbus Shared Memory Gateway: running

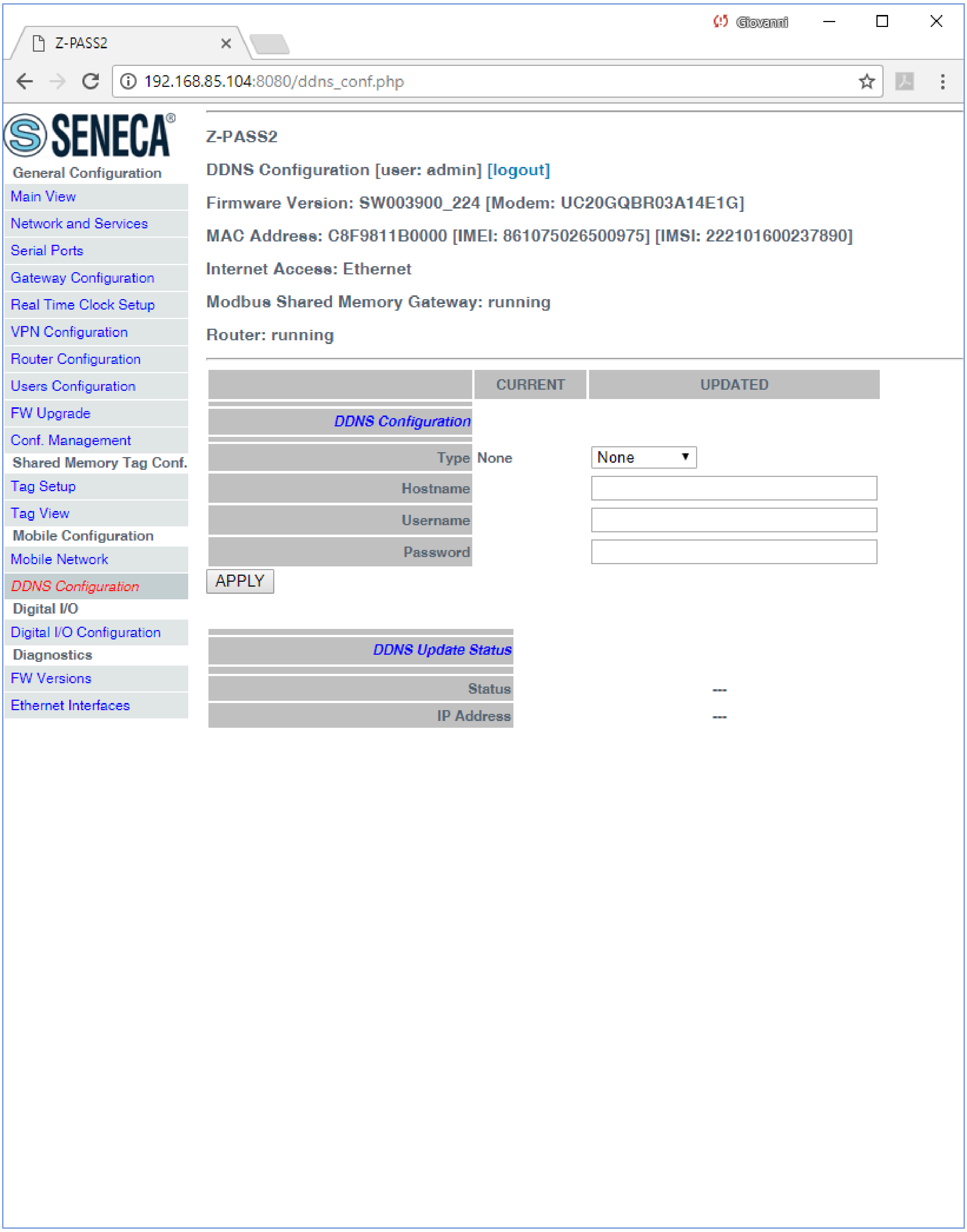
Router: running

	CURRENT	UPDATED
SIM		
PIN (if required by SIM)	8342	8342
Operator Selection		
Mode	Automatic	Automatic
Operator	[22201] I TIM (UMTS)	[22210] vodafone IT (GSM)
Data Connection		
Enable	OFF	
APN Mode	Automatic	
APN	ibox.tim.it	
Authentication Type	None	None
Username	user	user
Password	pass	pass
Ping Connection Testing IP Address (if empty, testing is disabled)	www.google.com	www.google.com

You can choose an operator from the list, to perform “Manual” or “Manual/Automatic” selection.

21.2.2 DDNS Configuration

By clicking on the “DDNS Configuration” link, in the “Mobile Configuration” section, you come to the following page:



Z-PASS2

DDNS Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Ethernet

Modbus Shared Memory Gateway: running

Router: running

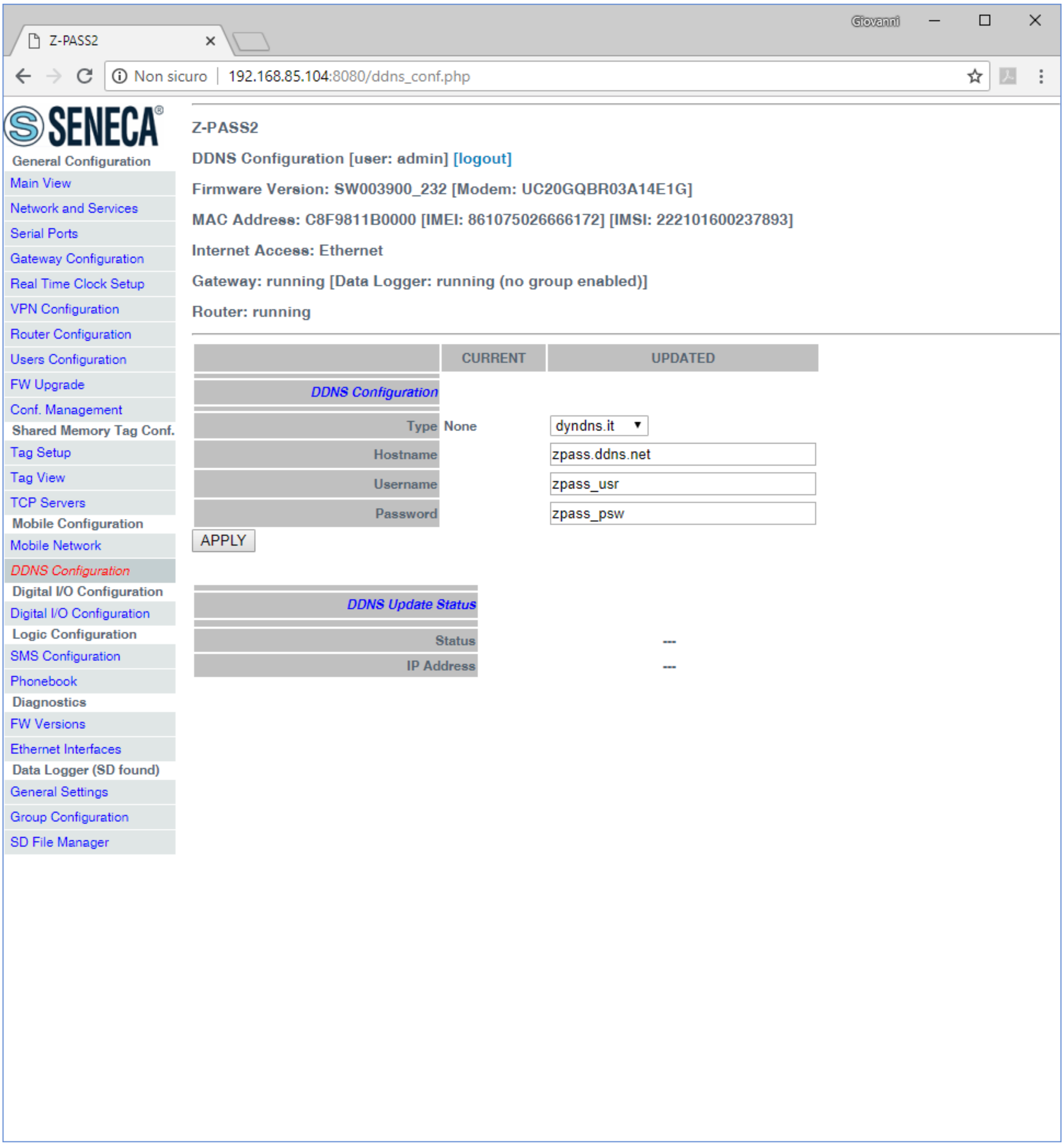
	CURRENT	UPDATED
DDNS Configuration		
Type	None	None ▼
Hostname		
Username		
Password		

DDNS Update Status	
Status	---
IP Address	---

In this page, you can set the parameters related to the Dynamic DNS service, as listed in the following table:

Field	**Meaning**	**Default value**
Type	Type of Dynamic DNS service; possible values are: - None - dyndns.it - dyndns.org - no-ip.com	None
Hostname	The hostname provided with the service subscription	empty
Username	The username provided with the service subscription	empty
Password	The password provided with the service subscription	empty

The parameters shall be set according to the DDNS service subscription; an example is given in the following figure.



Z-PASS2

DDNS Configuration [user: admin] [logout]

Firmware Version: SW003900_232 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237893]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

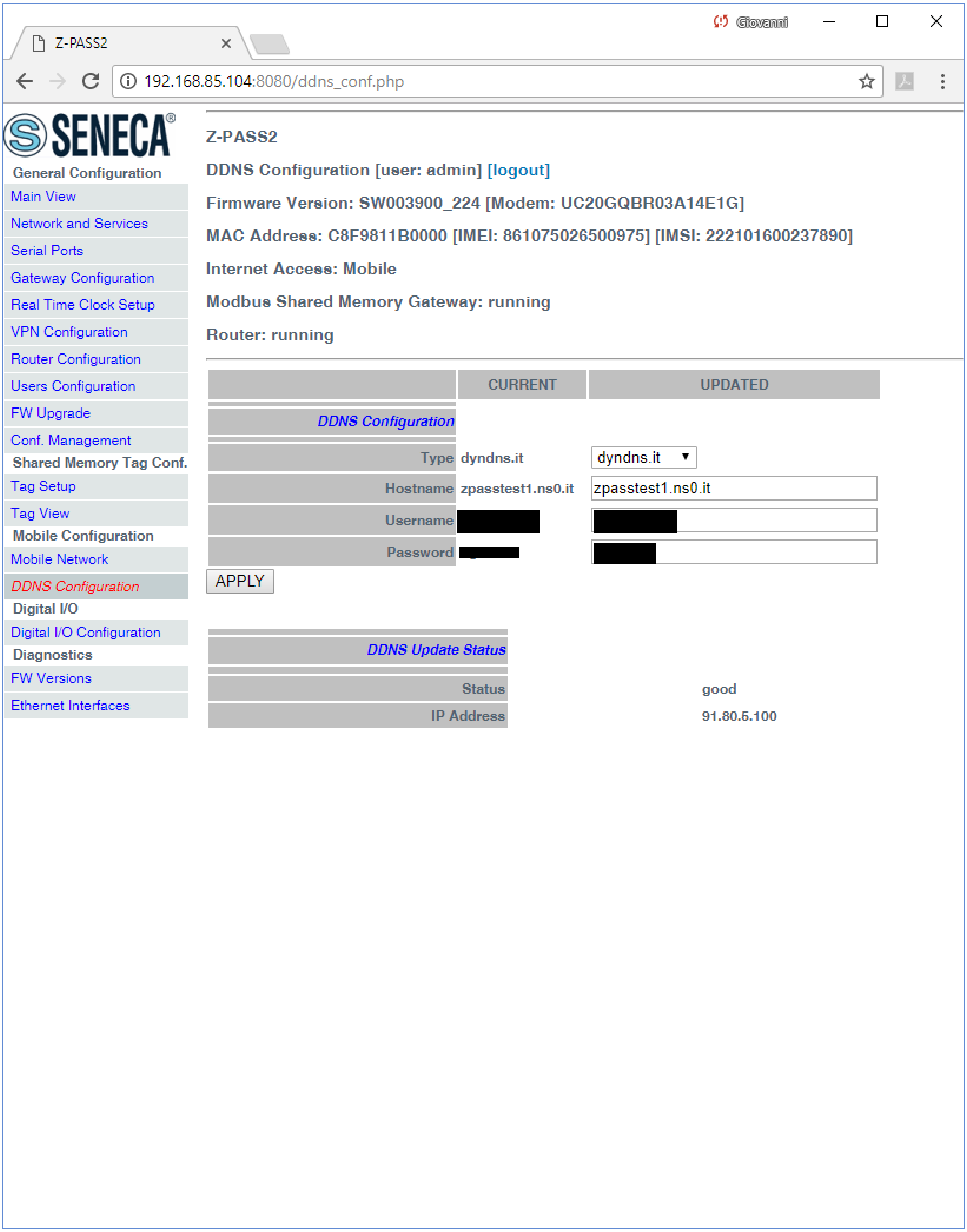
Router: running

	CURRENT	UPDATED
DDNS Configuration		
Type	None	dyndns.it
Hostname		zpass.ddns.net
Username		zpass_usr
Password		zpass_psw

APPLY

DDNS Update Status	
Status	---
IP Address	---

When an IP address assigned to the Mobile Network Interface has been bound with the hostname, the “DDNS Update Status” section appears like in the following figure.



Z-PASS2

DDNS Configuration [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

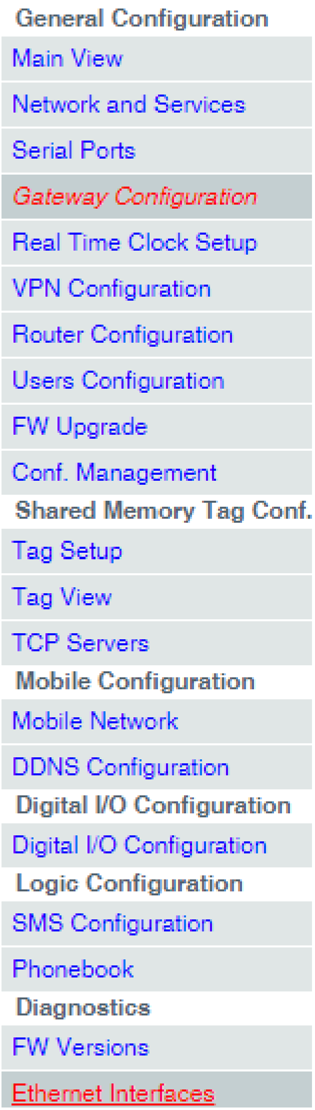
Router: running

	CURRENT	UPDATED
DDNS Configuration		
Type	dyndns.it	dyndns.it ▼
Hostname	zpasstest1.ns0.it	zpasstest1.ns0.it
Username	[redacted]	[redacted]
Password	[redacted]	[redacted]

DDNS Update Status	
Status	good
IP Address	91.80.5.100

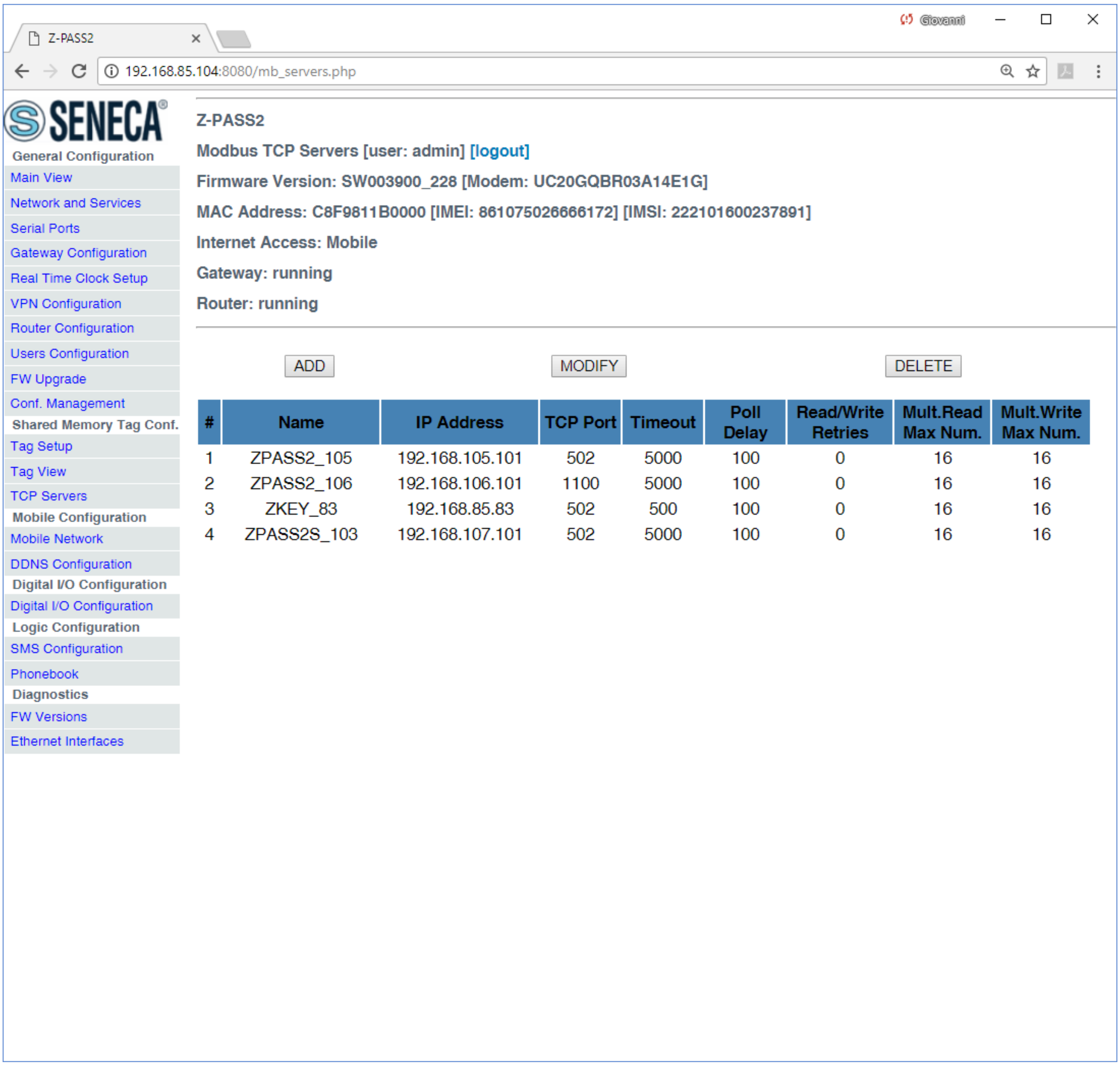
21.3 Shared Memory Tag Configuration

When the “Modbus Shared Memory/Enable” parameter, in the “Gateway Configuration” page, is set to “ON”, in the left side menu, a new section named “Shared Memory Tag Configuration” is available, containing three links, as shown in the following figure.



21.3.1 TCP Servers

By clicking on the “TCP Servers” link, in the “Shared Memory Tag Conf.” section, you come to the following page:



Z-PASS2

Modbus TCP Servers [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running

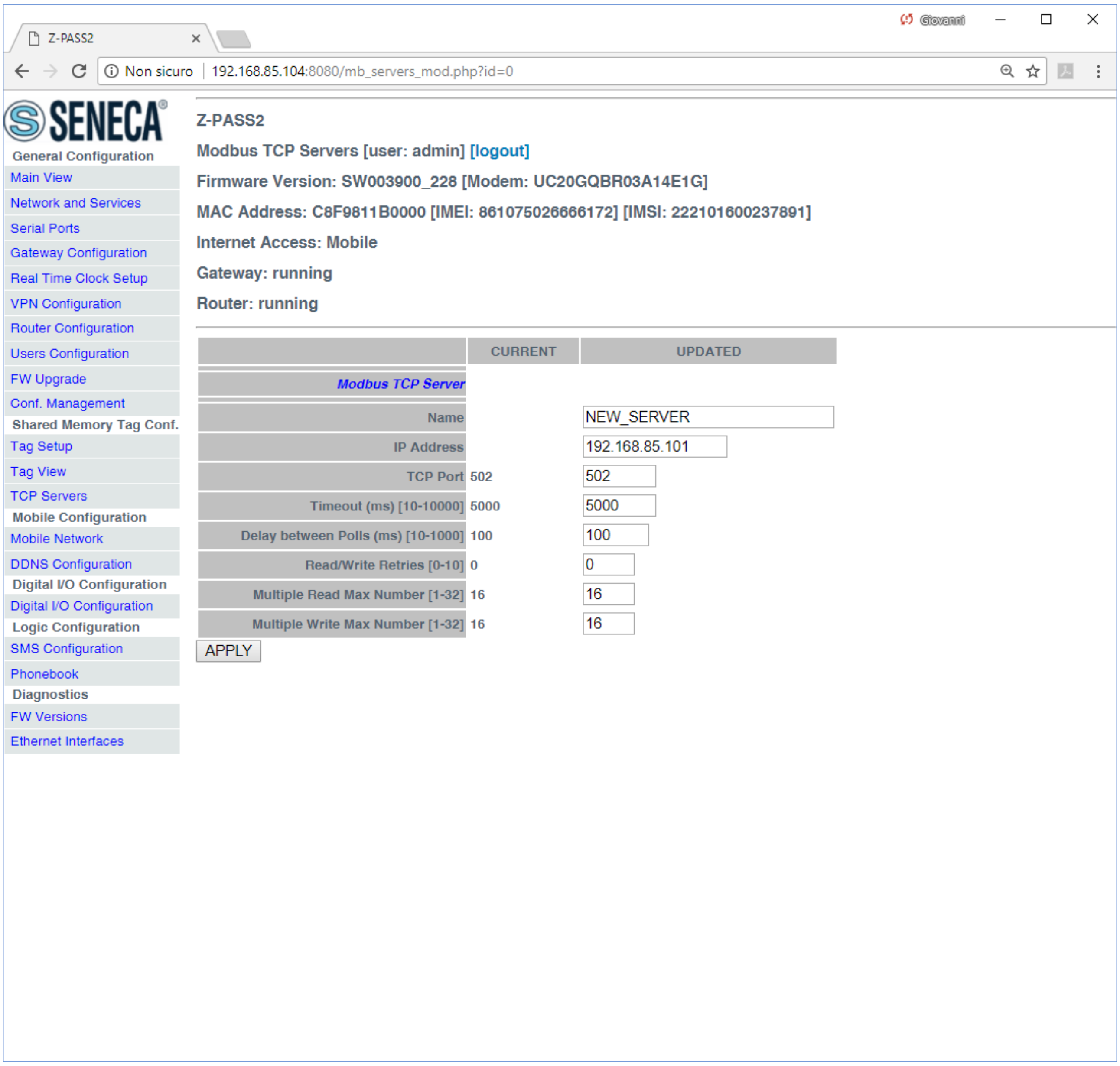
Router: running

ADD MODIFY DELETE

#	Name	IP Address	TCP Port	Timeout	Poll Delay	Read/Write Retries	Mult.Read Max Num.	Mult.Write Max Num.
1	ZPASS2_105	192.168.105.101	502	5000	100	0	16	16
2	ZPASS2_106	192.168.106.101	1100	5000	100	0	16	16
3	ZKEY_83	192.168.85.83	502	500	100	0	16	16
4	ZPASS2S_103	192.168.107.101	502	5000	100	0	16	16

In this page, the list of the TCP Servers, used for Modbus Shared Memory Gateway functionality, is shown.

By clicking on the “ADD” button, a new TCP Server can be configured, as in the following figure.



Z-PASS2

Modbus TCP Servers [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running

Router: running

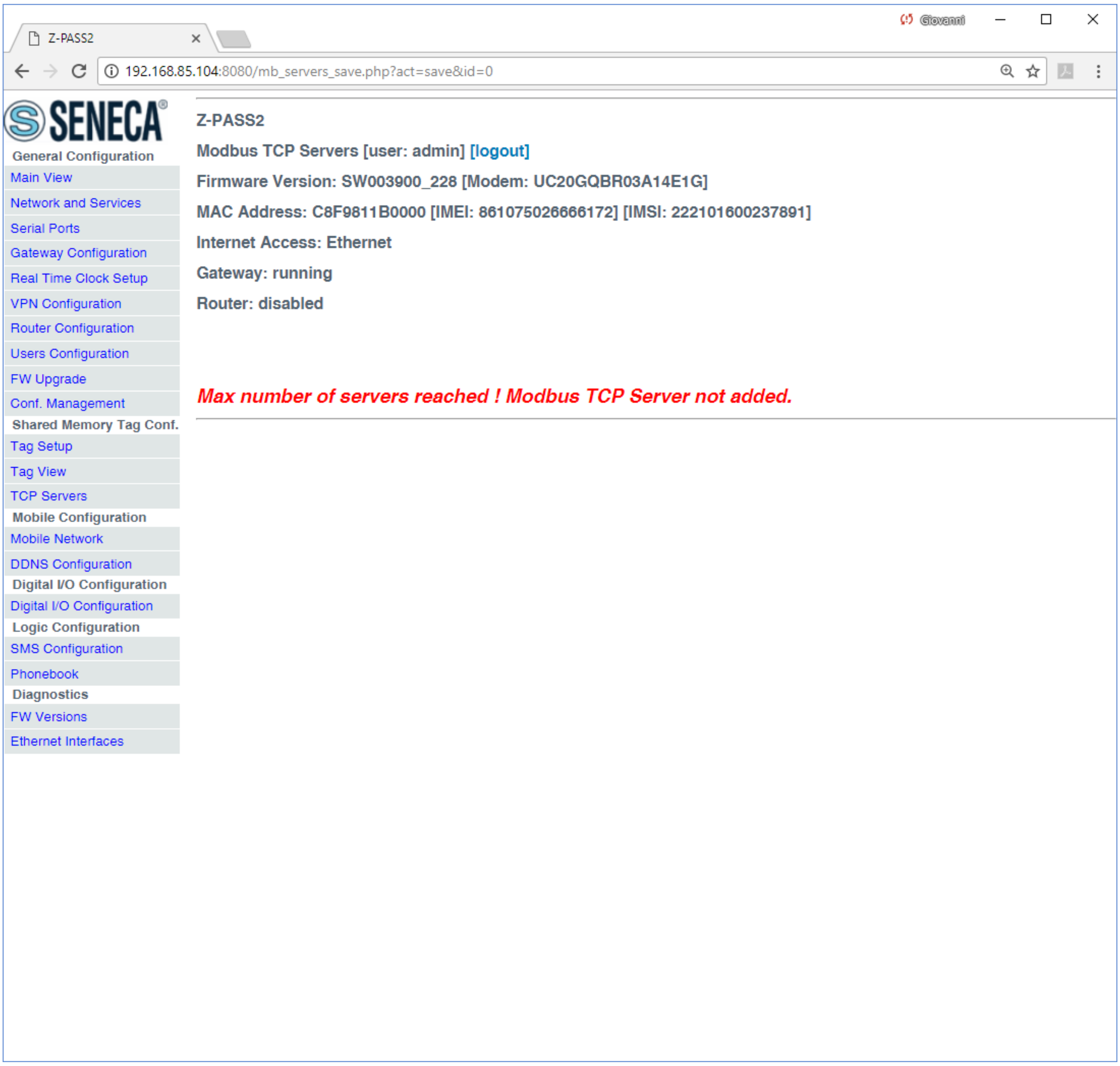
	CURRENT	UPDATED
Modbus TCP Server		
Name		NEW_SERVER
IP Address		192.168.85.101
TCP Port	502	502
Timeout (ms) [10-10000]	5000	5000
Delay between Polls (ms) [10-1000]	100	100
Read/Write Retries [0-10]	0	0
Multiple Read Max Number [1-32]	16	16
Multiple Write Max Number [1-32]	16	16

The following table explains the meaning of the parameters related to a TCP Server.

Field	Meaning	Default value
Name	Mnemonic name of the TCP Server This name is used to identify the TCP Server in the “Tag Setup” and “Tag View” pages.	empty
IP Address	IP Address of the TCP Server	empty
TCP Port	Modbus TCP Server port	502
Timeout (ms) [10-10000]	Connection/Response timeout for Modbus TCP requests, in milliseconds	5000
Delay between Polls (ms) [10-1000]	Interval between Modbus TCP requests, in milliseconds	100

Read/Write Retries [0-10]	Maximum number of retries for Modbus TCP requests; this always applies to write requests; for read requests, it applies only to tags with "Gateway Tag Mode"="BRIDGE" (see 21.3.2.1 paragraph)	0
Multiple Read Max Number [1-32]	Maximum number of Modbus registers that can be read in a single Modbus TCP request; this is used to reduce the number of read requests sent over the TCP connection, thus performing optimization	16
Multiple Write Max Number [1-32]	Maximum number of Modbus registers that can be written in a single Modbus TCP request; this is used to reduce the number of write requests sent over the TCP connection, thus performing optimization	16

A maximum of 25 TCP Servers can be configured; so, when trying to add the eleventh server, the following error message is shown.



Z-PASS2

Modbus TCP Servers [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

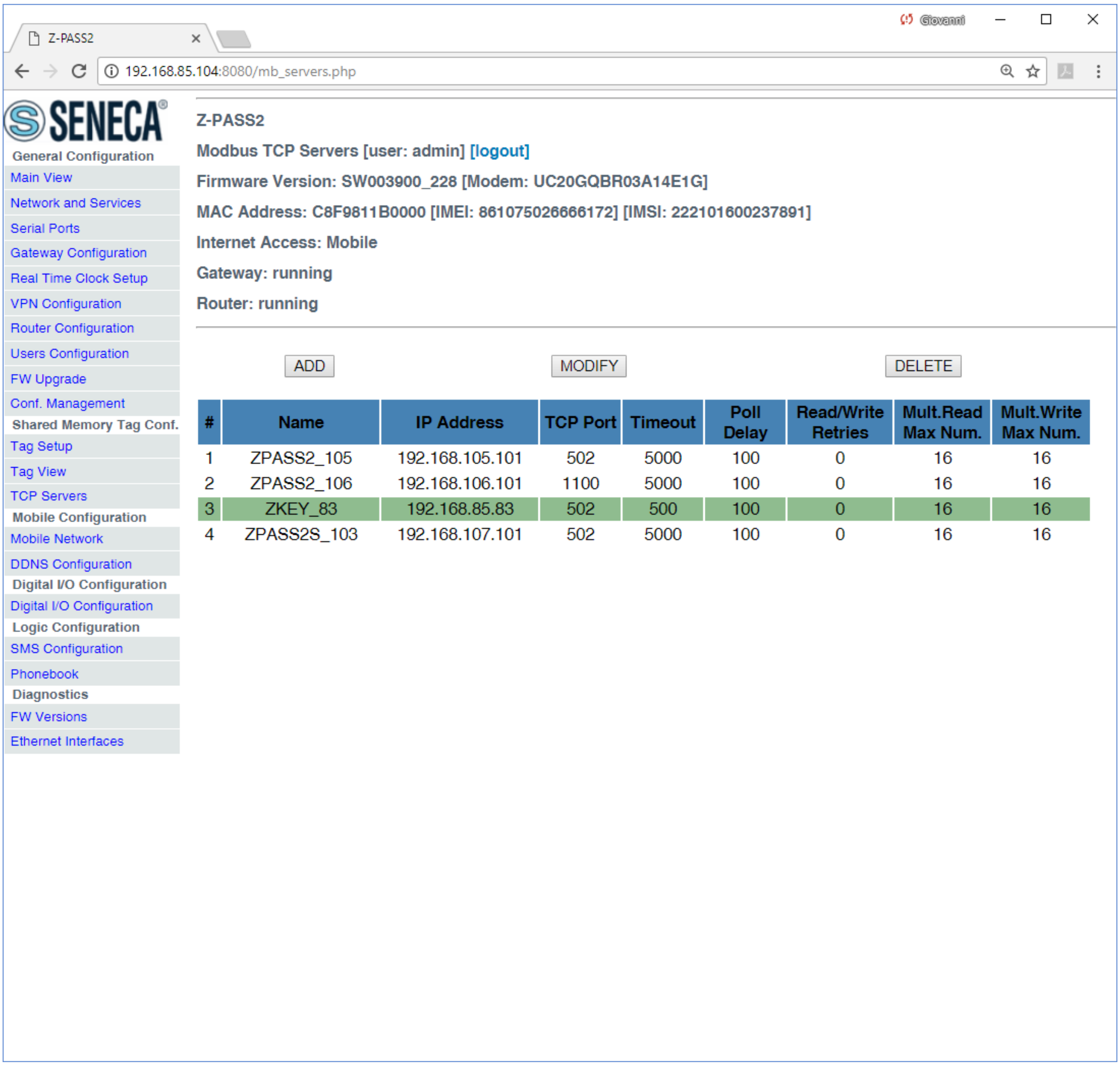
Internet Access: Ethernet

Gateway: running

Router: disabled

Max number of servers reached ! Modbus TCP Server not added.

Selecting a TCP Server in the list and clicking on the “MODIFY” button, you can modify the TCP Server parameters, as in the following figures.



Z-PASS2

Modbus TCP Servers [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

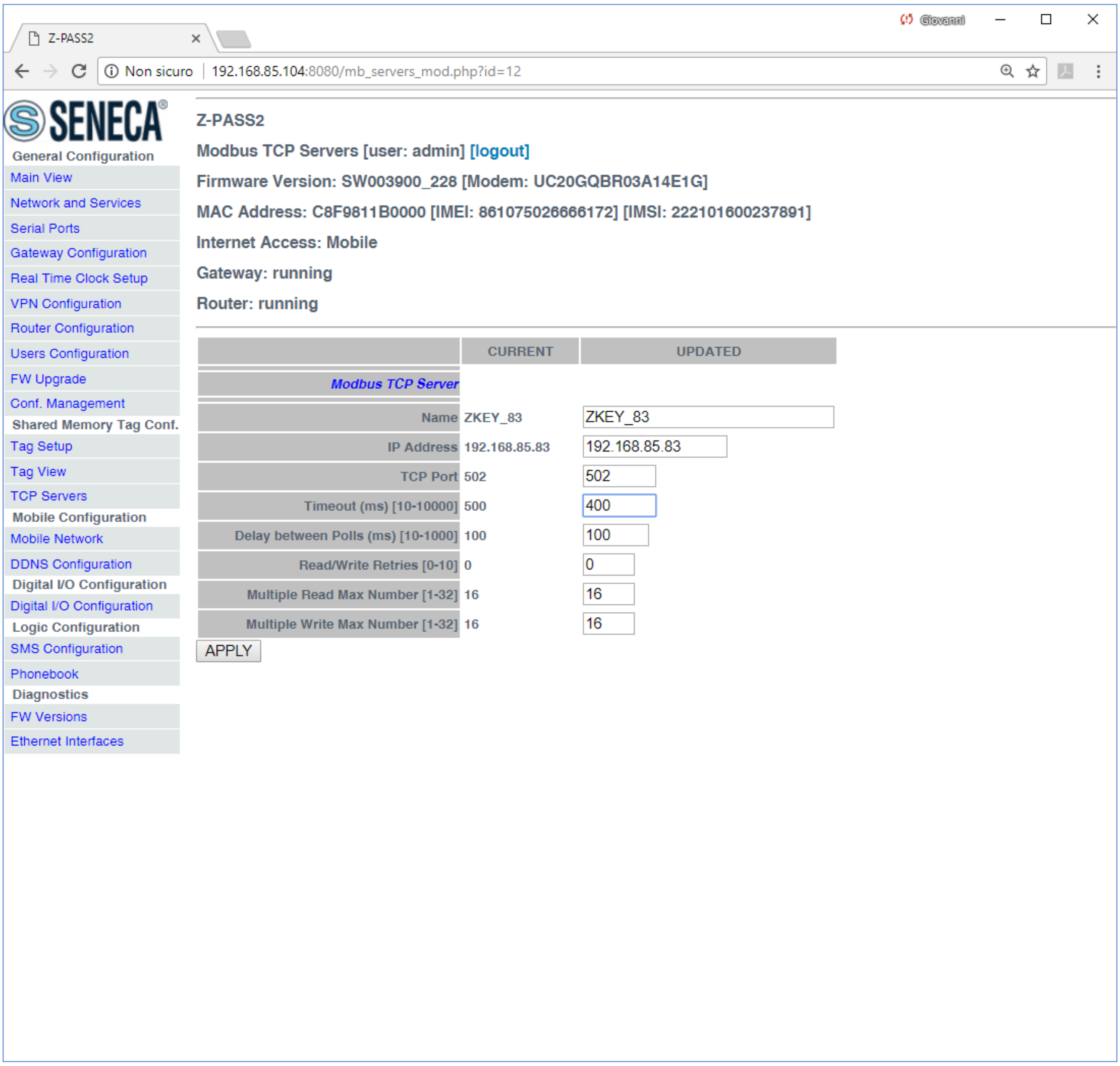
MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running

Router: running

#	Name	IP Address	TCP Port	Timeout	Poll Delay	Read/Write Retries	Mult.Read Max Num.	Mult.Write Max Num.
1	ZPASS2_105	192.168.105.101	502	5000	100	0	16	16
2	ZPASS2_106	192.168.106.101	1100	5000	100	0	16	16
3	ZKEY_83	192.168.85.83	502	500	100	0	16	16
4	ZPASS2S_103	192.168.107.101	502	5000	100	0	16	16



Z-PASS2

Modbus TCP Servers [user: admin] [logout]

Firmware Version: SW003900_228 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running

Router: running

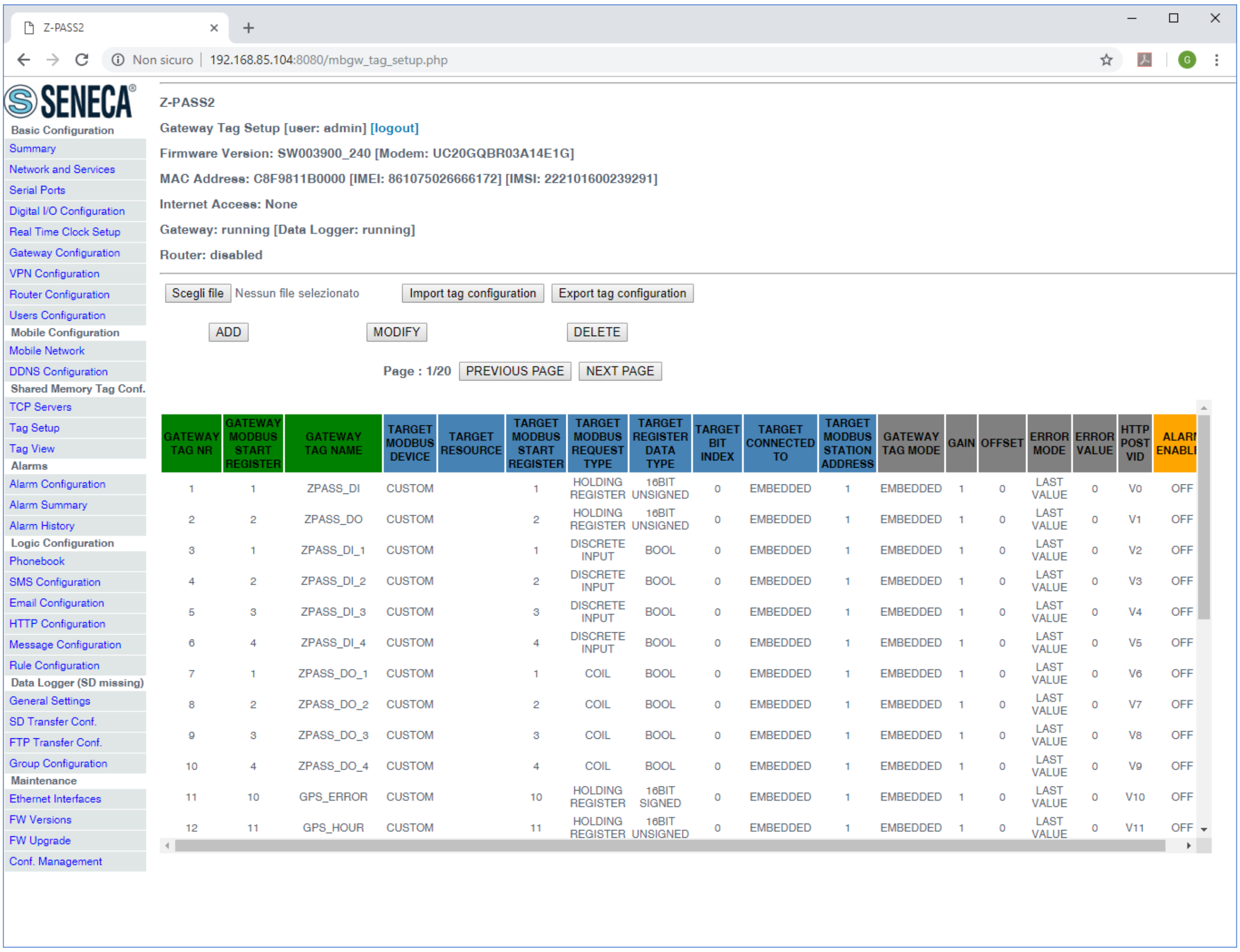
	CURRENT	UPDATED
Modbus TCP Server		
Name	ZKEY_83	ZKEY_83
IP Address	192.168.85.83	192.168.85.83
TCP Port	502	502
Timeout (ms) [10-10000]	500	400
Delay between Polls (ms) [10-1000]	100	100
Read/Write Retries [0-10]	0	0
Multiple Read Max Number [1-32]	16	16
Multiple Write Max Number [1-32]	16	16

APPLY

Finally, selecting a TCP Server in the list and clicking on the “DELETE” button, you can remove it from the configuration.

21.3.2 Tag Setup

This page is used to configure the Modbus Shared Memory Gateway tags.



Z-PASS2

Gateway Tag Setup [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600239291]

Internet Access: None

Gateway: running [Data Logger: running]

Router: disabled

GATEWAY TAG NR	GATEWAY MODBUS START REGISTER	GATEWAY TAG NAME	TARGET MODBUS DEVICE	TARGET RESOURCE	TARGET MODBUS START REGISTER	TARGET MODBUS REQUEST TYPE	TARGET REGISTER DATA TYPE	TARGET BIT INDEX	TARGET CONNECTED TO	TARGET MODBUS STATION ADDRESS	GATEWAY TAG MODE	GAIN	OFFSET	ERROR MODE	ERROR VALUE	HTTP POST VID	ALAR ENABL
1	1	ZPASS_DI	CUSTOM		1	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V0	OFF
2	2	ZPASS_DO	CUSTOM		2	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V1	OFF
3	1	ZPASS_DI_1	CUSTOM		1	DISCRETE INPUT	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V2	OFF
4	2	ZPASS_DI_2	CUSTOM		2	DISCRETE INPUT	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V3	OFF
5	3	ZPASS_DI_3	CUSTOM		3	DISCRETE INPUT	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V4	OFF
6	4	ZPASS_DI_4	CUSTOM		4	DISCRETE INPUT	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V5	OFF
7	1	ZPASS_DO_1	CUSTOM		1	COIL	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V6	OFF
8	2	ZPASS_DO_2	CUSTOM		2	COIL	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V7	OFF
9	3	ZPASS_DO_3	CUSTOM		3	COIL	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V8	OFF
10	4	ZPASS_DO_4	CUSTOM		4	COIL	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V9	OFF
11	10	GPS_ERROR	CUSTOM		10	HOLDING REGISTER	16BIT SIGNED	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V10	OFF
12	11	GPS_HOUR	CUSTOM		11	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V11	OFF

In this page, the following buttons (i.e. functionalities) are available.

Import tag configuration

This button allows the user to upload a binary file containing the tag configuration to the Z-PASS; this file shall have been exported from the “Microsoft Excel™ Template” (see 21.3.2.4 paragraph).
When a configuration is loaded which does not contain valid VIDs, the message *“NOTE: HTTP POST have been automatically set.”* is shown (as in the above figure).

Export tag configuration

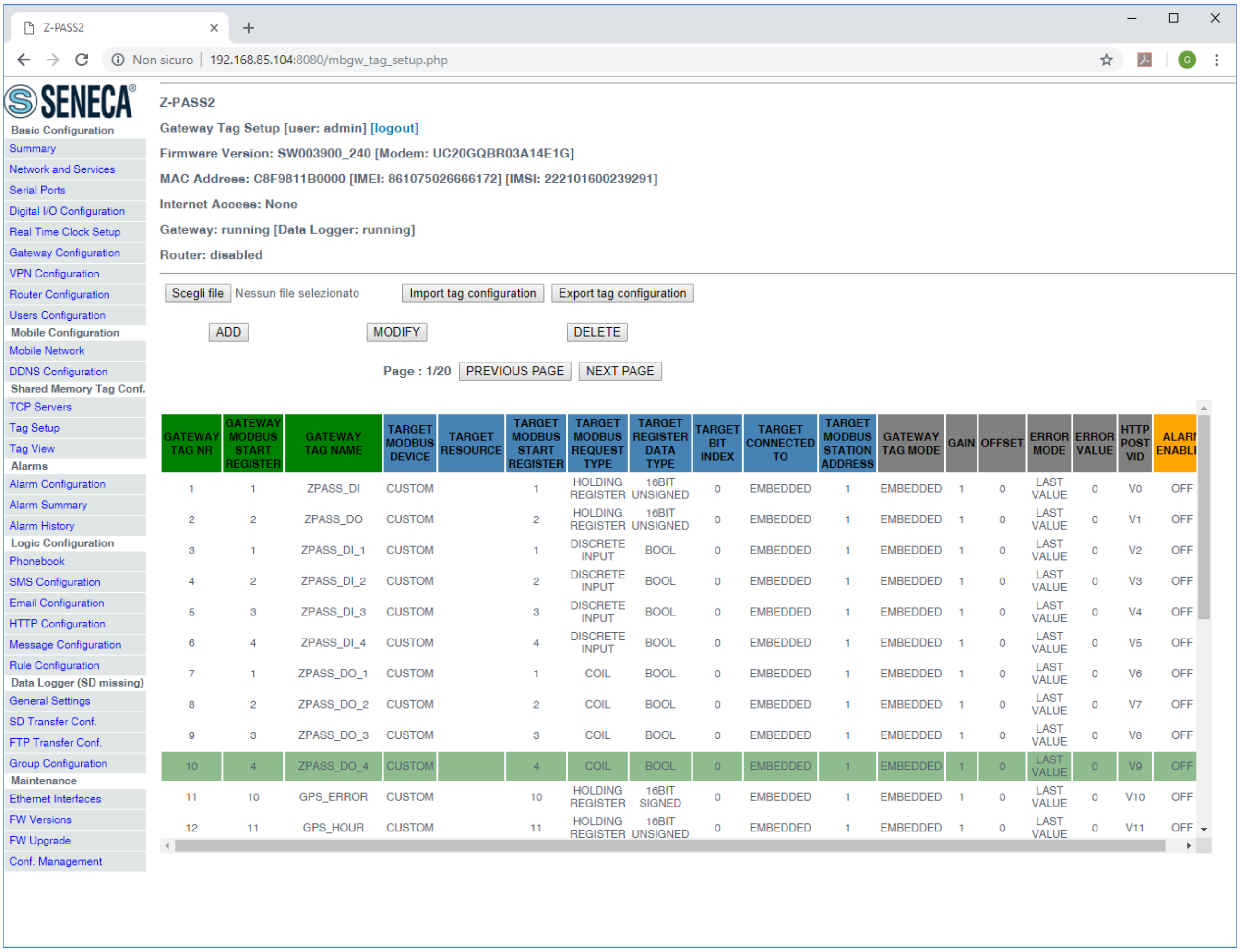
This button allows the user to download a binary file containing the tag configuration from the Z-PASS; this file can be imported into the “Microsoft Excel™ Template” (see 21.3.2.4 paragraph).

ADD

This button allows the user to add a new tag (see paragraph below); up to 2000 tags can be configured.

MODIFY

This button allows the user to modify an existing tag (see paragraph below); the tag shall have been previously selected, by clicking on the corresponding table row, as shown in the following figure.



Z-PASS2

Gateway Tag Setup [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600239291]

Internet Access: None

Gateway: running [Data Logger: running]

Router: disabled

Page : 1/20

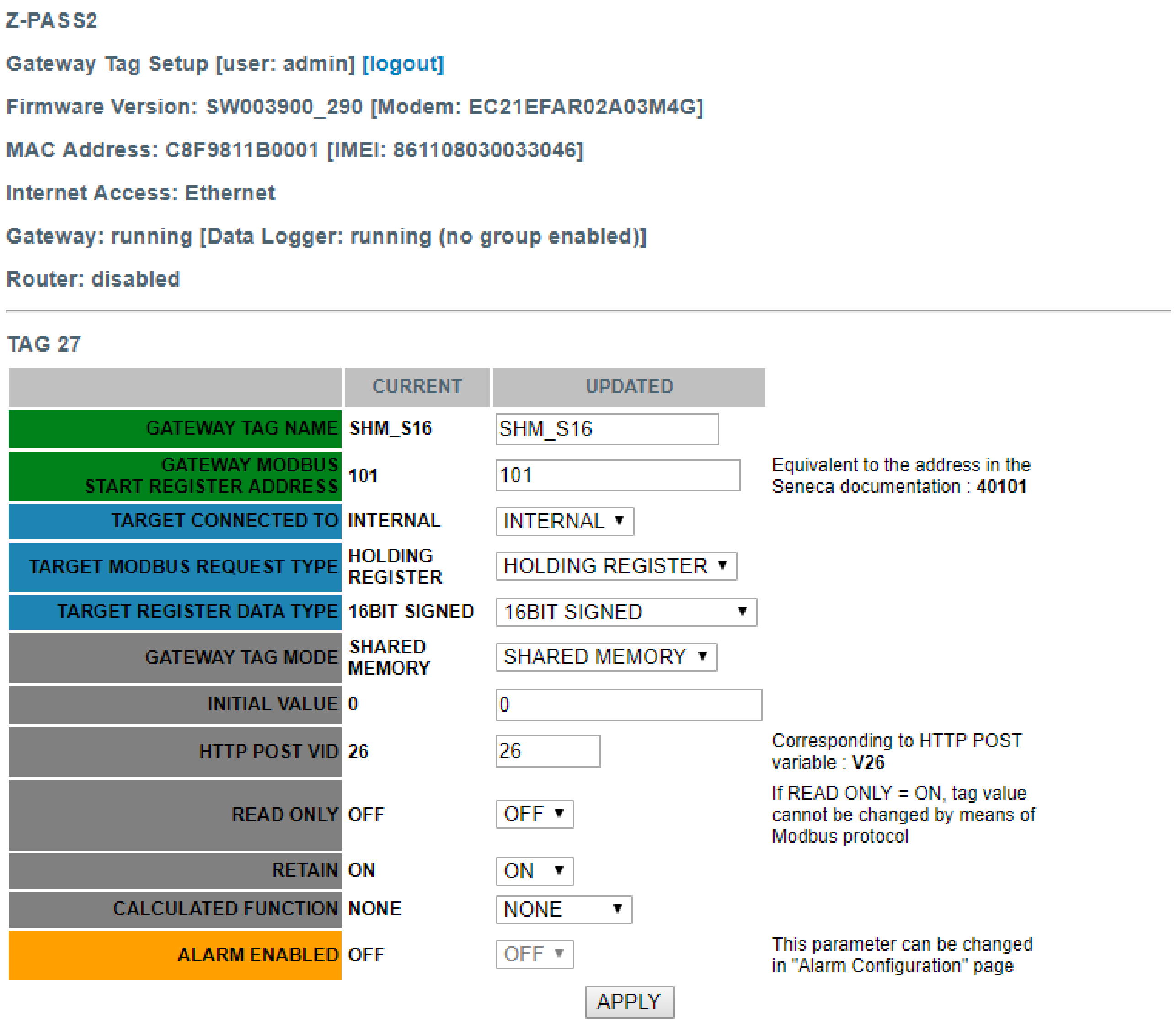
GATEWAY TAG NR	GATEWAY MODBUS START REGISTER	GATEWAY TAG NAME	TARGET MODBUS DEVICE	TARGET RESOURCE	TARGET MODBUS START REGISTER	TARGET MODBUS REQUEST TYPE	TARGET REGISTER DATA TYPE	TARGET BIT INDEX	TARGET CONNECTED TO	TARGET MODBUS STATION ADDRESS	GATEWAY TAG MODE	GAIN	OFFSET	ERROR MODE	ERROR VALUE	HTTP POST VID	ALARI ENABLI
1	1	ZPASS_DI	CUSTOM		1	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V0	OFF
2	2	ZPASS_DO	CUSTOM		2	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V1	OFF
3	1	ZPASS_DI_1	CUSTOM		1	DISCRETE INPUT	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V2	OFF
4	2	ZPASS_DI_2	CUSTOM		2	DISCRETE INPUT	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V3	OFF
5	3	ZPASS_DI_3	CUSTOM		3	DISCRETE INPUT	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V4	OFF
6	4	ZPASS_DI_4	CUSTOM		4	DISCRETE INPUT	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V5	OFF
7	1	ZPASS_DO_1	CUSTOM		1	COIL	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V6	OFF
8	2	ZPASS_DO_2	CUSTOM		2	COIL	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V7	OFF
9	3	ZPASS_DO_3	CUSTOM		3	COIL	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V8	OFF
10	4	ZPASS_DO_4	CUSTOM		4	COIL	BOOL	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V9	OFF
11	10	GPS_ERROR	CUSTOM		10	HOLDING REGISTER	16BIT SIGNED	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V10	OFF
12	11	GPS_HOUR	CUSTOM		11	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	1	EMBEDDED	1	0	LAST VALUE	0	V11	OFF

DELETE

This button allows the user to delete a tag; the tag shall have been previously selected, by clicking on the corresponding table row.

21.3.2.1 Tag Creation/Modification

By clicking on the "ADD" or "MODIFY" button, you come to the following page.



Z-PASS2

Gateway Tag Setup [user: admin] [logout]

Firmware Version: SW003900_290 [Modem: EC21EFAR02A03M4G]

MAC Address: C8F9811B0001 [IMEI: 861108030033046]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

TAG 27

	CURRENT	UPDATED	
GATEWAY TAG NAME	SHM_S16	SHM_S16	
GATEWAY MODBUS START REGISTER ADDRESS	101	101	Equivalent to the address in the Seneca documentation : **40101**
TARGET CONNECTED TO	INTERNAL	INTERNAL ▾	
TARGET MODBUS REQUEST TYPE	HOLDING REGISTER	HOLDING REGISTER ▾	
TARGET REGISTER DATA TYPE	16BIT SIGNED	16BIT SIGNED ▾	
GATEWAY TAG MODE	SHARED MEMORY	SHARED MEMORY ▾	
INITIAL VALUE	0	0	
HTTP POST VID	26	26	Corresponding to HTTP POST variable : **V26**
READ ONLY	OFF	OFF ▾	If READ ONLY = ON, tag value cannot be changed by means of Modbus protocol
RETAIN	ON	ON ▾	
CALCULATED FUNCTION	NONE	NONE ▾	
ALARM ENABLED	OFF	OFF ▾	This parameter can be changed in "Alarm Configuration" page

The following table describes the available parameters.

Field	Meaning	Default value
Gateway Tag Name	Mnemonic name to identify the tag	TAG
Gateway Modbus Start Register Address	Start Register Address of the tag	1
Target Modbus Device	Type of Modbus device: “CUSTOM” or one of the following Seneca devices: "Z-D-IN" "Z-10-D-IN" "Z-D-OUT" "Z-10-D-OUT" "Z-D-IO" "ZC-24-DI" "ZC-24-DO"	CUSTOM

	"ZC-16DI-8DO" "Z-4-AI-1" "Z-8-AI-1" "Z-3-AO" "Z-4-TC" "Z-8-TC" "Z-203" "Z-4RTD-2" "Z-SG" "Z-DAQ-PID" "S-203T" "S-203TA" "ZE-4DI-2AI-2DO" "ZE-2AI" "Z-4DI-2AI-2DO" "S203TA-D" "S203RC-D" “Z-PASS-IO” “Z-PASS-GPS”	
Target Resource	This field identifies a particular resource (tag) on one of Seneca devices; possibile values depend on the selected device, in “Target Modbus Device” field; if that field is set to “CUSTOM”, “Target Resource” field is empty; when “Target Resource” field is set, “Target Modbus Start Register Address”, “Target Modbus Request Type” and “Target Register Data Type” fields are automatically set	*Empty*
Target Connected To	This field identifies the serial port the target device is connected to; possible values are: COM1, COM2, COM4 (only if the ports are configured as master), INTERNAL or the Modbus TCP-IP Server name.	The first available serial port, that is the first port with “Task” other than “None”
Target Modbus Station Address	Modbus Address of the target device	1
Target Modbus Start Register Address	Start Register Address of the tag on the Modbus device	1
Target Modbus Request Type	Possible Modbus data types: COIL DISCRETE INPUT HOLDING REGISTER INPUT REGISTER	HOLDING REGISTER
Target Register Data Type	Possible data types: 16BIT SIGNED	16 BIT SIGNED

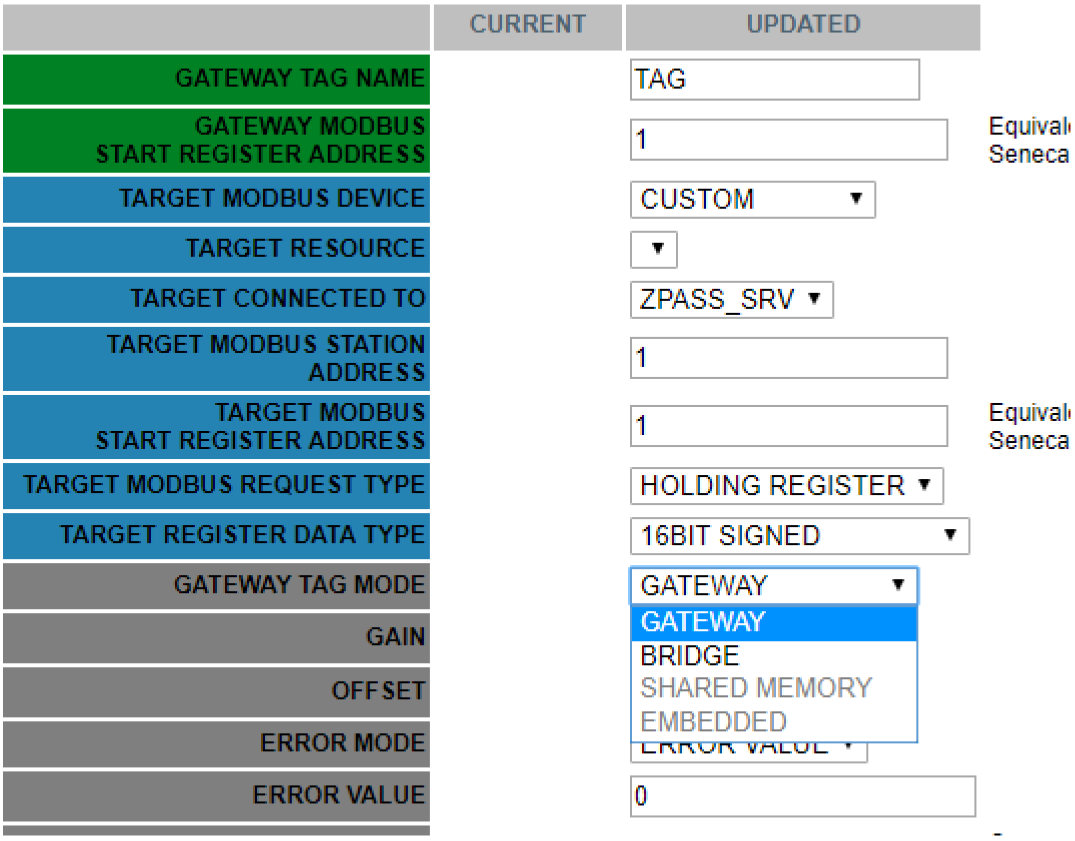
	16BIT UNSIGNED 32BIT SIGNED MSW 32BIT UNSIGNED MSW 32BIT SIGNED LSW 32BIT UNSIGNED LSW 32BIT REAL MSW 32BIT REAL LSW 64BIT UNSIGNED MSW 64BIT UNSIGNED LSW 64BIT SIGNED MSW 64BIT SIGNED LSW 64BIT REAL LSW BOOL For more information about the above data types, see table below	
Target Bit Index	This parameter defines the position, in the [0..16] interval, of the bit to be extracted from the tag value. 0 means no bit shall be extracted and the tag value shall be taken as a whole. This parameter is meaningful only when the tag "Target Register Data Type" is set to "16 BIT UNSIGNED"	0
Gateway Tag Mode	This field defines how the tag will be handled by the gateway processes; possible values are: GATEWAY, BRIDGE, SHARED MEMORY or EMBEDDED. The difference between Gateway and Bridge is that the Bridge tags are updated only when requested. SHARED MEMORY are tags that can be written from Modbus RTU/Modbus TCP-IP or from the Logic Rules. These type of tags can be used also for the Calculated Tags. EMBEDDED for embedded Digital I/Os and GPS Info tags (see next paragraphs)	
Gain	This field corresponds to the *m* coefficient value in the m*val + q	1

	formula applied to the *val* value read from the device	
Offset	This field corresponds to the *q* factor value in the m*val + q formula applied to the *val* value read from the device	0
Initial Value	This filed is available only if “Gateway Tag mode” is configured in “Shared Memory” and define the TAG staring value.	0
Error Mode	This field defines which value is given in the response to a Modbus (read) request, when the value from the target device is not available. Possible modes are: LAST VALUE: the last available value is given ERROR VALUE: the value specified in the “ERROR VALUE” field is given	LAST VALUE
Error Value	This field defines which value is given in the response to a Modbus (read) request, when the value from the target device is not available and the “ERROR MODE” field is set to “ERROR VALUE”	Empty
HTTP POST VID	This field is used to build the “Variable ID” (VID) which identifies the tag in HTTP POST requests (useful only when HTTP POST protocol is enabled). The VID string is given by “V” character plus the number contained in the field	“V” + tag index, e.g. “V0” for the first tag, “V1” for the second and so on
Read Only	If selected the tag can only be written from an external protocol (for example Modbus RTU or TCP-IP) and not from a logic rule.	DISABLED
Retain	If selected the tag is saved in a retain memory (feRAM), when you reboot the device the last value is loaded from the memory. This option is available only for SHARED MEMORY Tags.	OFF
Calculated Function	Active only if Gatway Tag mode is “Shared Memory”. Can be used for calculate the MIN/MAX/AVG value of a	NONE

	tag. Note that the calculation is enabled only if the datalogger is enabled. The calculation time is the acquisition time.	
Alarm Enabled	This field is a read-only flag telling if an alarm is defined for the tag (see “Alarm Configuration” paragraph)	OFF

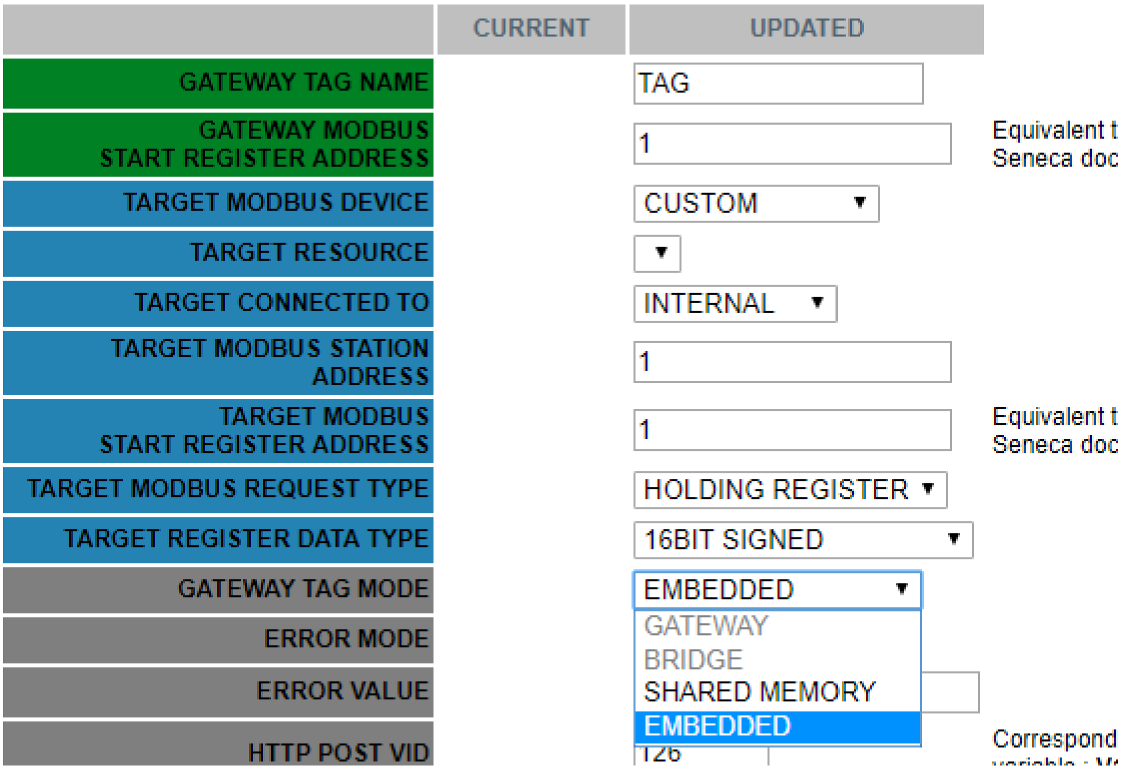
Data Type	**Meaning**
16BIT SIGNED	1 register, from -32768 to +32767
16BIT UNSIGNED	1 register, from 0 to 65535
32BIT SIGNED MSW	2 registers with the lowest address register holding the Most Significant Word, from -2147483648 to +2147483647
32BIT UNSIGNED MSW	2 registers with the lowest address register holding the Most Significant Word, from 0 to 4294967295
32BIT SIGNED LSW	2 registers with the lowest address register holding the Least Significant Word, from -2147483648 to +2147483647
32BIT UNSIGNED LSW	2 registers with the lowest address register holding the Least Significant Word, from 0 to 4294967295
32BIT REAL MSW	2 registers with the lowest address register holding the Most Significant Word, Floating Point single precision (IEEE 754-2008)
32BIT REAL LSW	2 registers with the lowest address register holding the Least Significant Word, Floating Point single precision (IEEE 754-2008)
64 BIT REAL LSW	4 registers, Floating Point double precision (IEEE 754-2008)
64BIT UNSIGNED MSW	4 with the lowest address register holding the Most Significant Word, from 0 to 18446744073709551616
64BIT UNSIGNED LSW	4 with the lowest address register holding the Least Significant Word, from 0 to 18446744073709551616
64BIT SIGNED MSW	4 with the lowest address register holding the Most Significant Word, from -9223372036854775808 to +9223372036854775807
64BIT SIGNED LSW	4 with the lowest address register holding the Least Significant Word, from -9223372036854775808 to +9223372036854775807
BOOL	1 Boolean Coil or Discrete Input register

The following figure shows the case when no serial port is used for Modbus Shared Memory Gateway and a TCP Server named “Z-PASS2_SRV” is configured; so the possible values for “GATEWAY TAG MODE” parameter are “GATEWAY” and “BRIDGE”.



	CURRENT	UPDATED	
GATEWAY TAG NAME		TAG	
GATEWAY MODBUS START REGISTER ADDRESS		1	Equival Seneca
TARGET MODBUS DEVICE		CUSTOM ▾	
TARGET RESOURCE		▾	
TARGET CONNECTED TO		ZPASS_SRV ▾	
TARGET MODBUS STATION ADDRESS		1	
TARGET MODBUS START REGISTER ADDRESS		1	Equival Seneca
TARGET MODBUS REQUEST TYPE		HOLDING REGISTER ▾	
TARGET REGISTER DATA TYPE		16BIT SIGNED ▾	
GATEWAY TAG MODE		GATEWAY ▾ GATEWAY BRIDGE SHARED MEMORY EMBEDDED	
GAIN			
OFFSET			
ERROR MODE		ERROR VALUE ▾	
ERROR VALUE		0	-

The following figure shows the case when “TARGET CONNECT TO” parmeter is “Internal” so the possible values for “GATEWAY TAG MODE” parameter are “SHARED MEMORY” and “BRIDGE”.



	CURRENT	UPDATED	
GATEWAY TAG NAME		TAG	
GATEWAY MODBUS START REGISTER ADDRESS		1	Equivalent t Seneca doc
TARGET MODBUS DEVICE		CUSTOM ▾	
TARGET RESOURCE		▾	
TARGET CONNECTED TO		INTERNAL ▾	
TARGET MODBUS STATION ADDRESS		1	
TARGET MODBUS START REGISTER ADDRESS		1	Equivalent t Seneca doc
TARGET MODBUS REQUEST TYPE		HOLDING REGISTER ▾	
TARGET REGISTER DATA TYPE		16BIT SIGNED ▾	
GATEWAY TAG MODE		EMBEDDED ▾ GATEWAY BRIDGE SHARED MEMORY EMBEDDED	
ERROR MODE			
ERROR VALUE			
HTTP POST VID		126	Correspond

Some more explanations are needed for “Gateway Tag Mode” parameter.

Tags with Mode=GATEWAY are handled in the “classic” Modbus Shared Memory Gateway way, that is tags are read periodically, even if no Modbus read request is received for those tags.

Tags with Mode=BRIDGE are read only when a Modbus read request is received for those tags.

Instead, for write operations, tags with Mode=GATEWAY and tags with Mode=BRIDGE are handled in the same way, that is tags are written only when a Modbus write request is received for those tags.

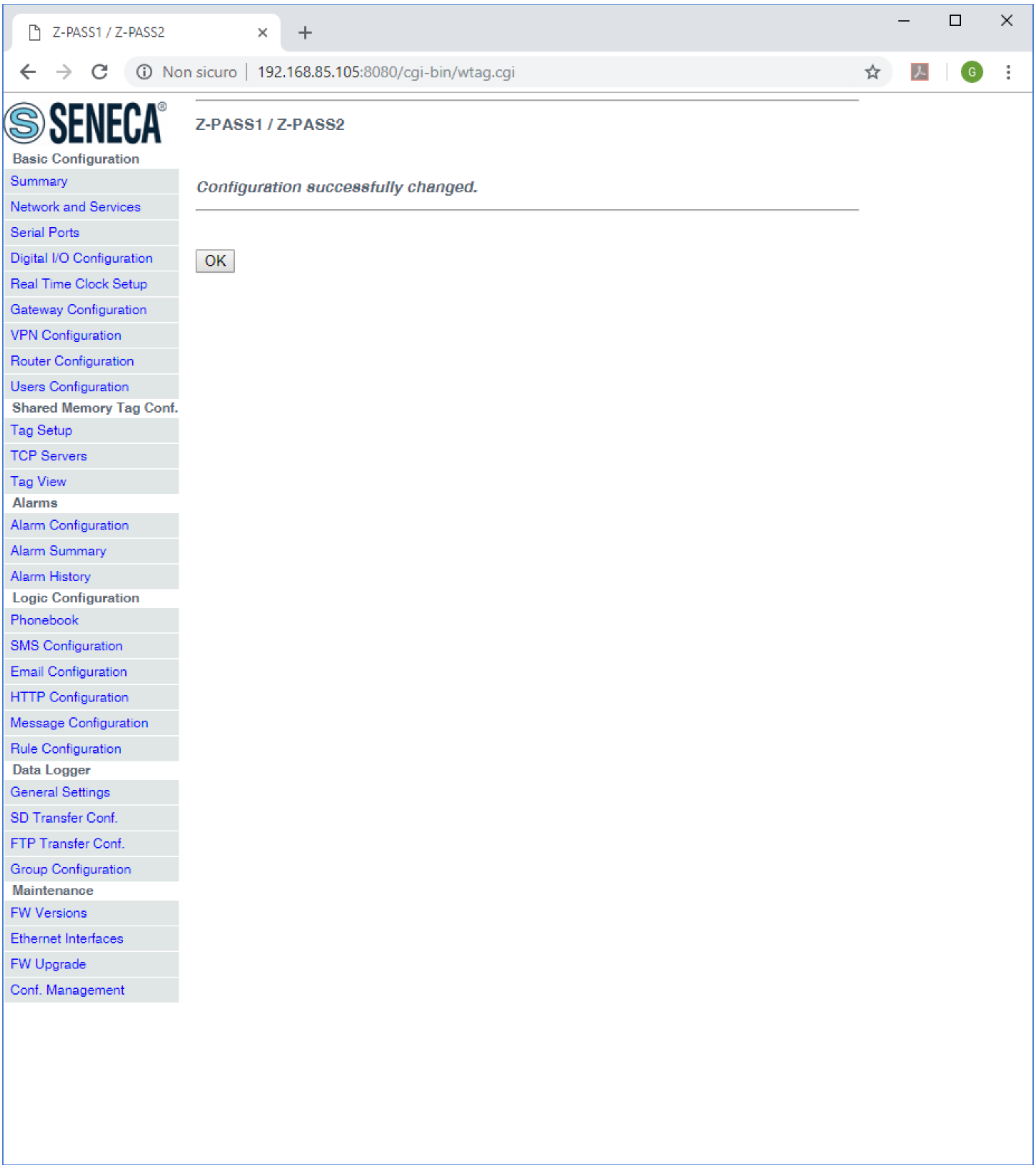
The Mode=BRIDGE option is particularly useful for Modbus RTU devices with the “Fail Safe” feature available for output lines, as for many Seneca devices; normally, those devices are designed to put their output lines to “fail safe” value, when the connection to the master (e.g. a SCADA system) goes down; since the criterion to detect the “connection failure” is that no Modbus (write and read) request is received, the “fail safe” mode can’t be entered with “classic” gateway behaviour.

Tags with Mode=SHARED MEMORY are stored only in CPU memory, not in any device, so their values are written/read only when a Modbus write/read request is received for those tags.

Tags Embedded are used for embedded I/O and GPS.

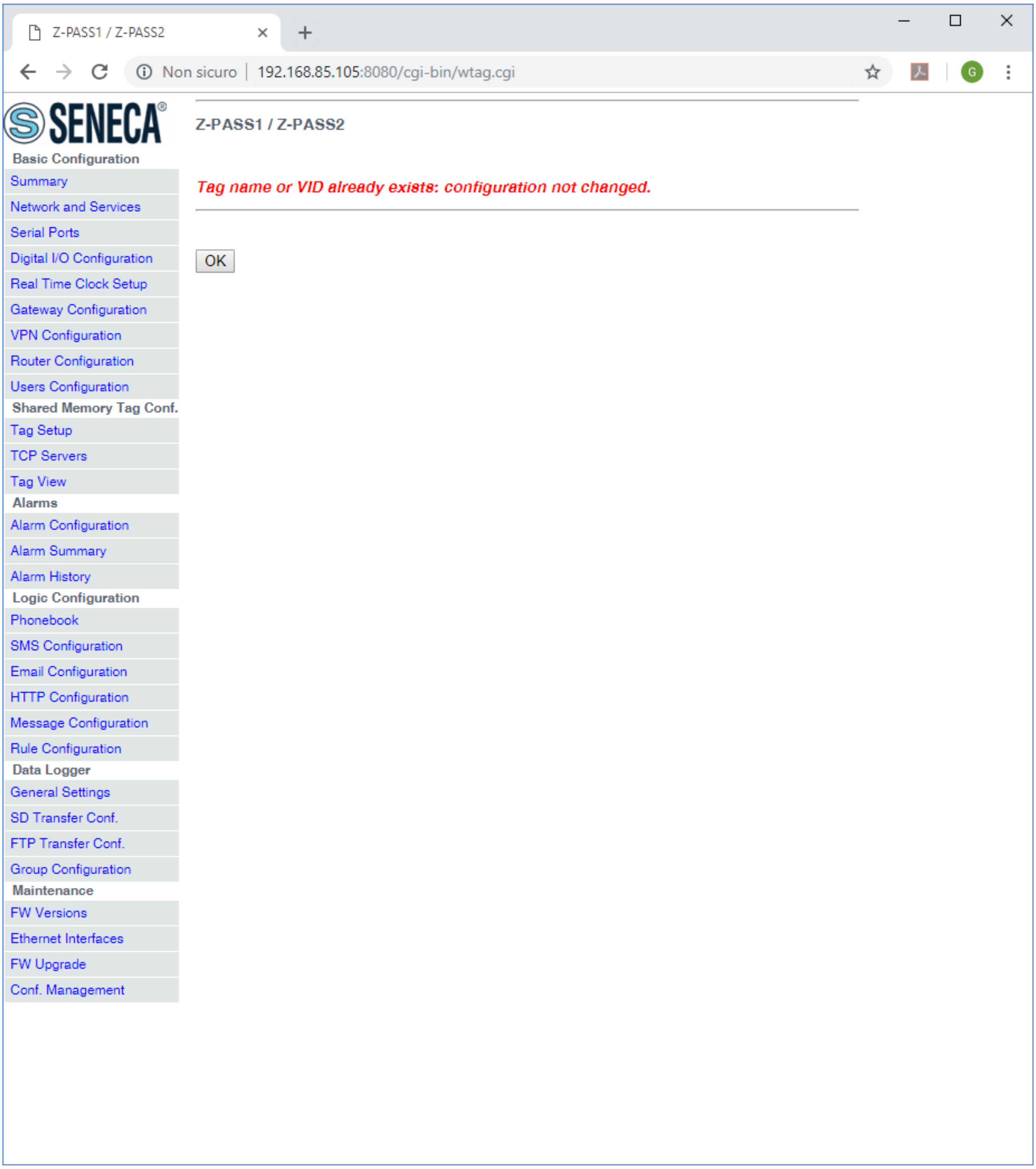
NOTE: all considerations related to requests received on the Modbus TCP/IP side identically apply to requests received on a serial port configured as Modbus RTU Slave.

By clicking on the “APPLY” button, the tag is added/modified and the following page is shown.



Configuration successfully changed.

To let the Data Logger functionality work properly, the tag names shall be distinct; so if you add/modify a tag and its name is already assigned to another tag, the following error message is shown.

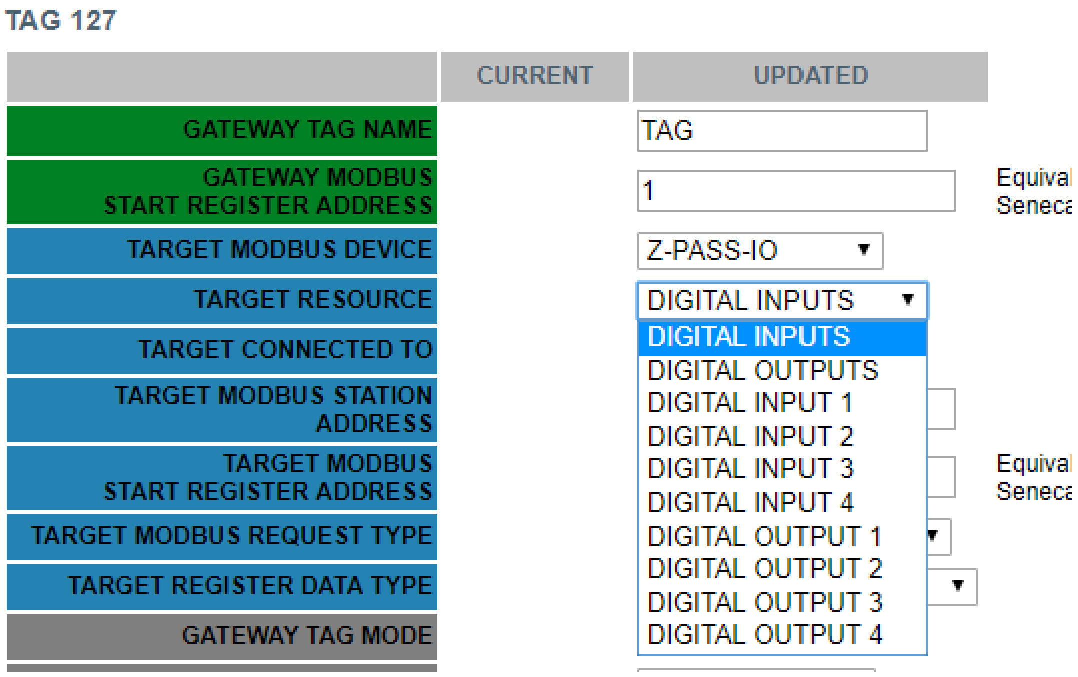


Tag name or VID already exists: configuration not changed.

By clicking on the “OK” button, you go back to the “Gateway Tag Setup” page.

21.3.2.2 Tags for Embedded I/O

Tags corresponding to the Z-PASS embedded digital I/Os, as shown in the following figure:



TAG 127

	CURRENT	UPDATED
GATEWAY TAG NAME		TAG
GATEWAY MODBUS START REGISTER ADDRESS		1
TARGET MODBUS DEVICE		Z-PASS-IO ▼
TARGET RESOURCE		DIGITAL INPUTS ▼
TARGET CONNECTED TO		
TARGET MODBUS STATION ADDRESS		
TARGET MODBUS START REGISTER ADDRESS		
TARGET MODBUS REQUEST TYPE		
TARGET REGISTER DATA TYPE		
GATEWAY TAG MODE		

Depending on the value of the "TARGET RESOURCE" parameter, the other parameters are set to the values shown in the following table:

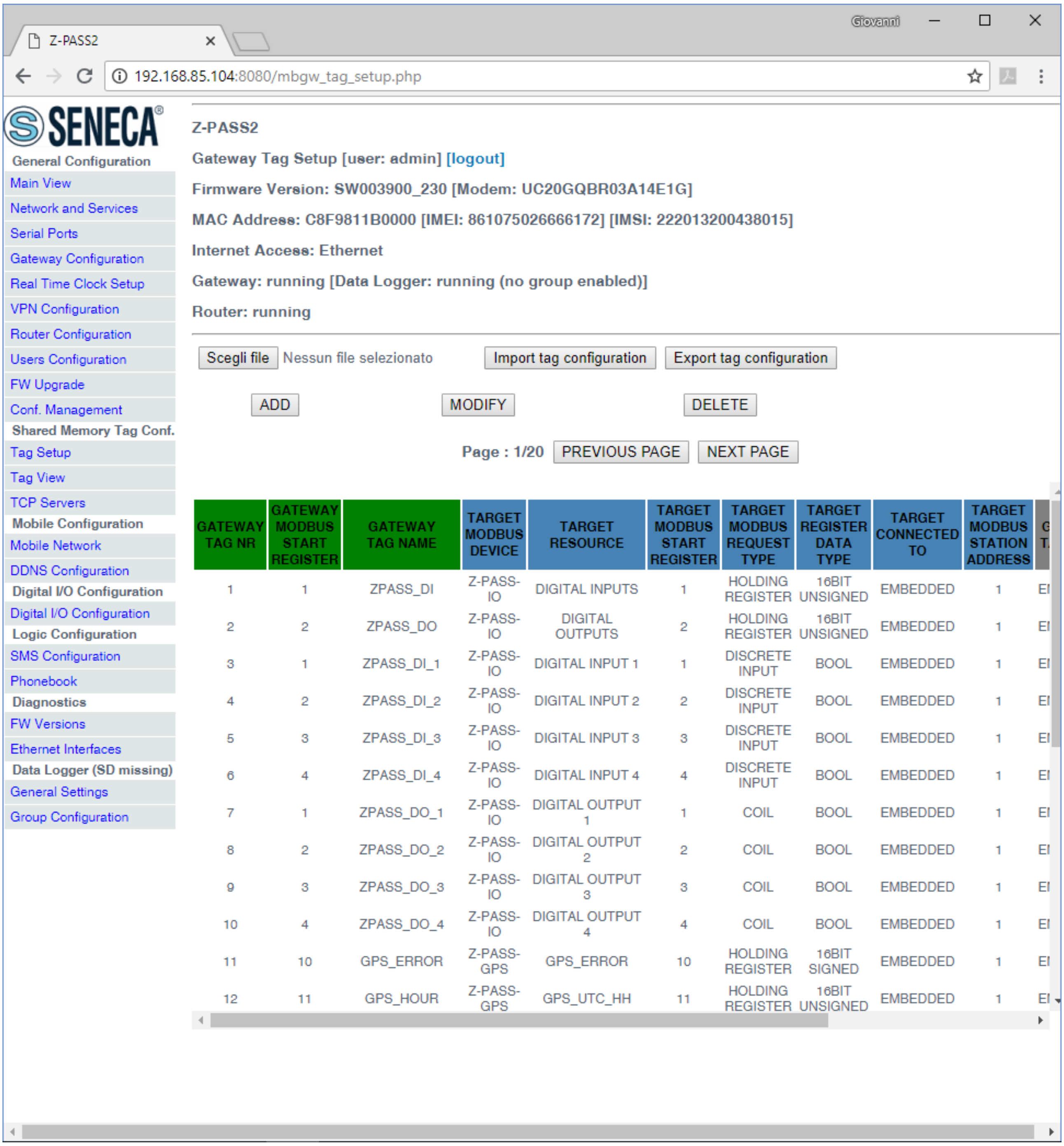
TARGET RESOURCE	TARGET MODBUS RTU START REGISTER ADDRESS	TARGET MODBUS REQUEST TYPE	TARGET REGISTER DATA TYPE
DIGITAL INPUTS	1 (40001)	HOLDING REGISTER	16BIT UNSIGNED
DIGITAL OUTPUTS	2 (40002)	HOLDING REGISTER	16BIT UNSIGNED
DIGITAL INPUT 1	1 (10001)	DISCRETE INPUT	BOOL
DIGITAL INPUT 2	2 (10002)	DISCRETE INPUT	BOOL
DIGITAL INPUT 3	3 (10003)	DISCRETE INPUT	BOOL
DIGITAL INPUT 4	4 (10004)	DISCRETE INPUT	BOOL
DIGITAL OUTPUT 1	1 (1)	COIL	BOOL
DIGITAL OUTPUT 2	2 (2)	COIL	BOOL
DIGITAL OUTPUT 3	3 (3)	COIL	BOOL
DIGITAL OUTPUT 4	4 (4)	COIL	BOOL

You can easily check that these tags correspond to Modbus Registers defined in paragraph 21.1.6.1.1.

For these tags, other parameter values are fixed:

- TARGET MODBUS SLAVE STATION ADDRESS	1
- TARGET CONNECTED TO SERIAL PORT	EMBEDDED
- GATEWAY TAG MODE	EMBEDDED

The default configuration for Z-PASS1 and Z-PASS2 already contain tags for embedded I/Os, as shown in the following figure.



Z-PASS2

Gateway Tag Setup [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222013200438015]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: running

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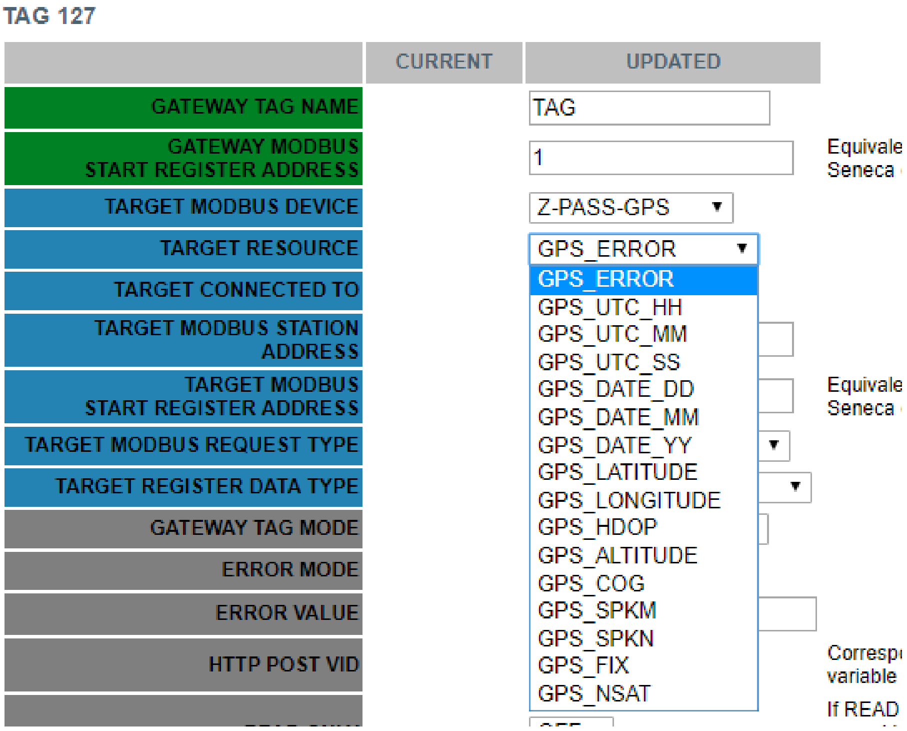
GATEWAY TAG NR	GATEWAY MODBUS START REGISTER	GATEWAY TAG NAME	TARGET MODBUS DEVICE	TARGET RESOURCE	TARGET MODBUS START REGISTER	TARGET MODBUS REQUEST TYPE	TARGET REGISTER DATA TYPE	TARGET CONNECTED TO	TARGET MODBUS STATION ADDRESS	G T
1	1	ZPASS_DI	Z-PASS-IO	DIGITAL INPUTS	1	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI
2	2	ZPASS_DO	Z-PASS-IO	DIGITAL OUTPUTS	2	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI
3	1	ZPASS_DI_1	Z-PASS-IO	DIGITAL INPUT 1	1	DISCRETE INPUT	BOOL	EMBEDDED	1	EI
4	2	ZPASS_DI_2	Z-PASS-IO	DIGITAL INPUT 2	2	DISCRETE INPUT	BOOL	EMBEDDED	1	EI
5	3	ZPASS_DI_3	Z-PASS-IO	DIGITAL INPUT 3	3	DISCRETE INPUT	BOOL	EMBEDDED	1	EI
6	4	ZPASS_DI_4	Z-PASS-IO	DIGITAL INPUT 4	4	DISCRETE INPUT	BOOL	EMBEDDED	1	EI
7	1	ZPASS_DO_1	Z-PASS-IO	DIGITAL OUTPUT 1	1	COIL	BOOL	EMBEDDED	1	EI
8	2	ZPASS_DO_2	Z-PASS-IO	DIGITAL OUTPUT 2	2	COIL	BOOL	EMBEDDED	1	EI
9	3	ZPASS_DO_3	Z-PASS-IO	DIGITAL OUTPUT 3	3	COIL	BOOL	EMBEDDED	1	EI
10	4	ZPASS_DO_4	Z-PASS-IO	DIGITAL OUTPUT 4	4	COIL	BOOL	EMBEDDED	1	EI
11	10	GPS_ERROR	Z-PASS-GPS	GPS_ERROR	10	HOLDING REGISTER	16BIT SIGNED	EMBEDDED	1	EI
12	11	GPS_HOUR	Z-PASS-GPS	GPS_UTC_HH	11	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI

21.3.2.3 Tags for GPS Info (Z-PASS2)

Tags corresponding to the Z-PASS2 GPS are shown in the following figure:



TAG 127

	CURRENT	UPDATED	
GATEWAY TAG NAME		TAG	
GATEWAY MODBUS START REGISTER ADDRESS		1	Equivale Seneca
TARGET MODBUS DEVICE		Z-PASS-GPS ▼	
TARGET RESOURCE		GPS_ERROR ▼	
TARGET CONNECTED TO			
TARGET MODBUS STATION ADDRESS			
TARGET MODBUS START REGISTER ADDRESS			Equivale Seneca
TARGET MODBUS REQUEST TYPE		▼	
TARGET REGISTER DATA TYPE		▼	
GATEWAY TAG MODE			
ERROR MODE			
ERROR VALUE			
HTTP POST VID			Corresp variable
			If READ

Depending on the value of the “TARGET RESOURCE” parameter, the other parameters are set to the values shown in the following table:

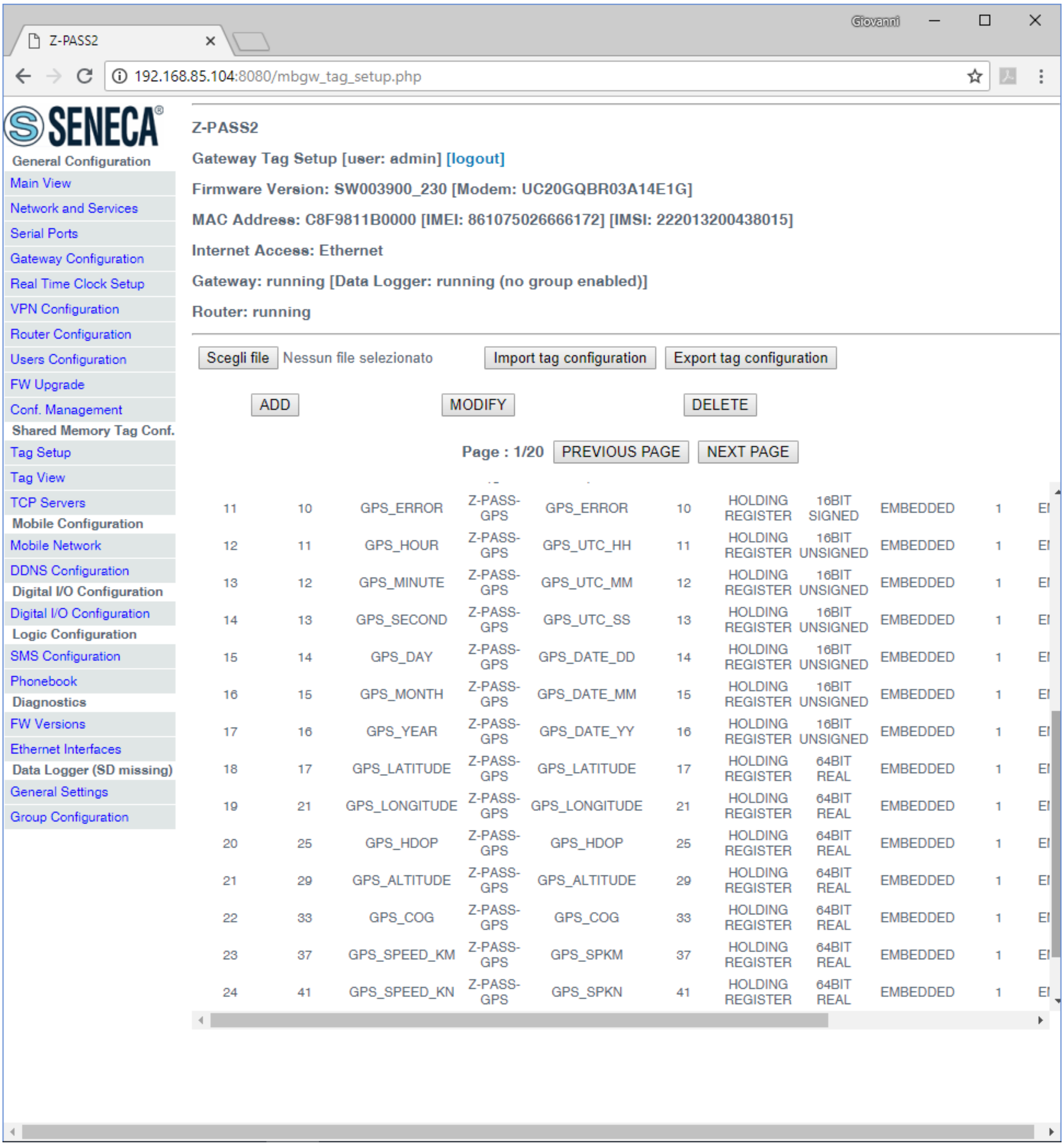
TARGET RESOURCE	TARGET MODBUS RTU START REGISTER ADDRESS	TARGET MODBUS REQUEST TYPE	TARGET REGISTER DATA TYPE
GPS_ERROR	10 (40010)	HOLDING REGISTER	16BIT SIGNED
GPS_UTC_HH	11 (40011)	HOLDING REGISTER	16BIT UNSIGNED
GPS_UTC_MM	12 (40012)	HOLDING REGISTER	16BIT UNSIGNED
GPS_UTC_SS	13 (40013)	HOLDING REGISTER	16BIT UNSIGNED
GPS_DATE_DD	14 (40014)	HOLDING REGISTER	16BIT UNSIGNED
GPS_DATE_MM	15 (40015)	HOLDING REGISTER	16BIT UNSIGNED
GPS_DATE_YY	16 (40016)	HOLDING REGISTER	16BIT UNSIGNED
GPS_LATITUDE	17 – 20 (40017 – 40020)	HOLDING REGISTER	64BIT REAL
GPS_LONGITUDE	21 – 24 (40021 – 40024)	HOLDING REGISTER	64BIT REAL
GPS_HDOP	25 – 28 (40025 – 40028)	HOLDING REGISTER	64BIT REAL
GPS_ALTITUDE	29 – 32 (40029 – 40032)	HOLDING REGISTER	64BIT REAL
GPS_COG	33 – 36 (40033 – 40036)	HOLDING REGISTER	64BIT REAL
GPS_SPEED_KM	37 – 40 (40037 – 40040)	HOLDING REGISTER	64BIT REAL
GPS_SPEED_KN	41 – 44 (40041 – 40044)	HOLDING REGISTER	64BIT REAL
GPS_FIX	45 (40045)	HOLDING REGISTER	16BIT UNSIGNED
GPS_NSAT	46 (40046)	HOLDING REGISTER	16BIT UNSIGNED

For these tags, other parameter values are fixed:

- TARGET MODBUS STATION ADDRESS	1
- TARGET CONNECTED TO	EMBEDDED

- GATEWAY TAG MODE EMBEDDED

The default configuration for Z-PASS2 already contain tags for GPS information, as shown in the following figure.



Z-PASS2

Gateway Tag Setup [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222013200438015]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: running

Nessun file selezionato

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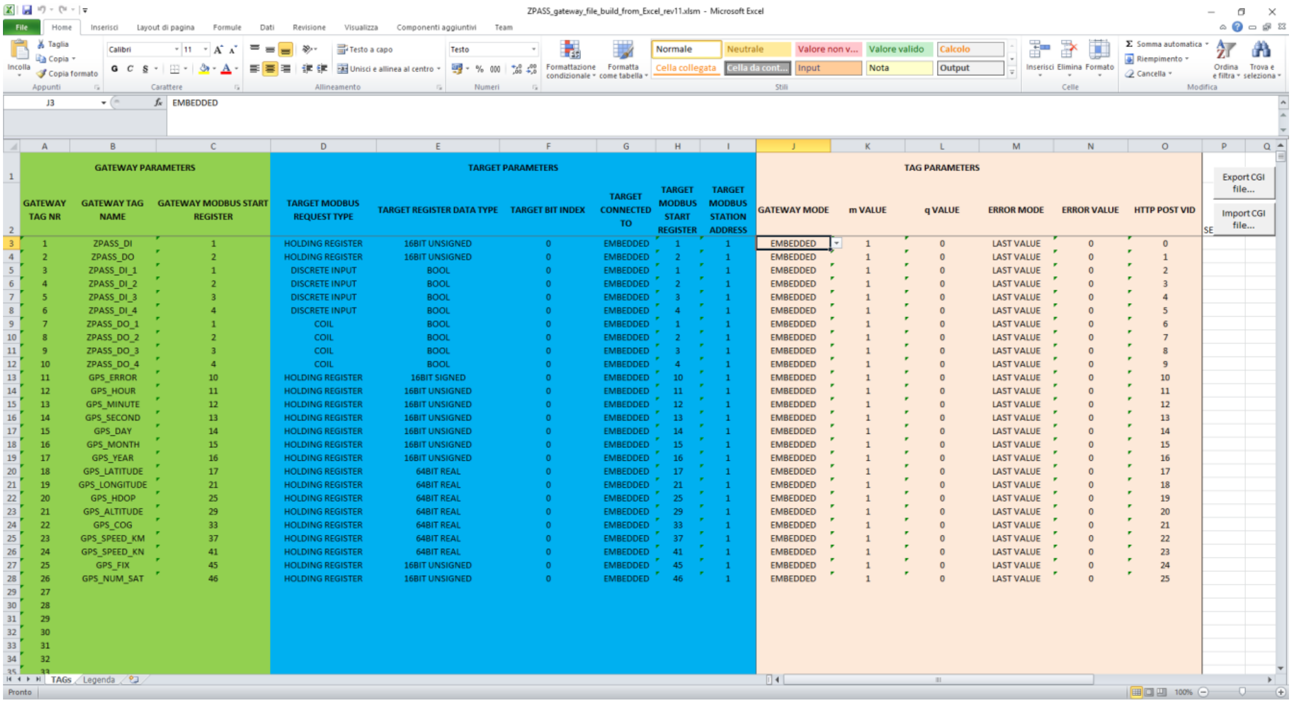
11	10	GPS_ERROR	Z-PASS-GPS	GPS_ERROR	10	HOLDING REGISTER	16BIT SIGNED	EMBEDDED	1	EI
12	11	GPS_HOUR	Z-PASS-GPS	GPS_UTC_HH	11	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI
13	12	GPS_MINUTE	Z-PASS-GPS	GPS_UTC_MM	12	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI
14	13	GPS_SECOND	Z-PASS-GPS	GPS_UTC_SS	13	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI
15	14	GPS_DAY	Z-PASS-GPS	GPS_DATE_DD	14	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI
16	15	GPS_MONTH	Z-PASS-GPS	GPS_DATE_MM	15	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI
17	16	GPS_YEAR	Z-PASS-GPS	GPS_DATE_YY	16	HOLDING REGISTER	16BIT UNSIGNED	EMBEDDED	1	EI
18	17	GPS_LATITUDE	Z-PASS-GPS	GPS_LATITUDE	17	HOLDING REGISTER	64BIT REAL	EMBEDDED	1	EI
19	21	GPS_LONGITUDE	Z-PASS-GPS	GPS_LONGITUDE	21	HOLDING REGISTER	64BIT REAL	EMBEDDED	1	EI
20	25	GPS_HDOP	Z-PASS-GPS	GPS_HDOP	25	HOLDING REGISTER	64BIT REAL	EMBEDDED	1	EI
21	29	GPS_ALTITUDE	Z-PASS-GPS	GPS_ALTITUDE	29	HOLDING REGISTER	64BIT REAL	EMBEDDED	1	EI
22	33	GPS_COG	Z-PASS-GPS	GPS_COG	33	HOLDING REGISTER	64BIT REAL	EMBEDDED	1	EI
23	37	GPS_SPEED_KM	Z-PASS-GPS	GPS_SPKM	37	HOLDING REGISTER	64BIT REAL	EMBEDDED	1	EI
24	41	GPS_SPEED_KN	Z-PASS-GPS	GPS_SPKN	41	HOLDING REGISTER	64BIT REAL	EMBEDDED	1	EI

21.3.2.4 Microsoft Excel™ Template for Tag Setup

Another way to create the tag configuration is by means of the “Microsoft Excel™ Template” provided by Seneca, shown in the following figure.


ZPASS_gateway_file_build_from_Excel_rev11.xlsm - Microsoft Excel
J3
EMBEDDED
Export CGI file...
Import CGI file...
TAGs
Legenda
Pronto

GATEWAY PARAMETERS			TARGET PARAMETERS						TAG PARAMETERS					
GATEWAY TAG NR	GATEWAY TAG NAME	GATEWAY MODBUS START REGISTER	TARGET MODBUS REQUEST TYPE	TARGET REGISTER DATA TYPE	TARGET BIT INDEX	TARGET CONNECTED TO	TARGET MODBUS START REGISTER	TARGET MODBUS STATION ADDRESS	GATEWAY MODE	m VALUE	q VALUE	ERROR MODE	ERROR VALUE	HTTP POST VID
1	ZPASS_DI	1	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	1	1	EMBEDDED	1	0	LAST VALUE	0	0
2	ZPASS_DO	2	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	2	1	EMBEDDED	1	0	LAST VALUE	0	1
3	ZPASS_DI_1	1	DISCRETE INPUT	BOOL	0	EMBEDDED	1	1	EMBEDDED	1	0	LAST VALUE	0	2
4	ZPASS_DI_2	2	DISCRETE INPUT	BOOL	0	EMBEDDED	2	1	EMBEDDED	1	0	LAST VALUE	0	3
5	ZPASS_DI_3	3	DISCRETE INPUT	BOOL	0	EMBEDDED	3	1	EMBEDDED	1	0	LAST VALUE	0	4
6	ZPASS_DI_4	4	DISCRETE INPUT	BOOL	0	EMBEDDED	4	1	EMBEDDED	1	0	LAST VALUE	0	5
7	ZPASS_DO_1	1	COIL	BOOL	0	EMBEDDED	1	1	EMBEDDED	1	0	LAST VALUE	0	6
8	ZPASS_DO_2	2	COIL	BOOL	0	EMBEDDED	2	1	EMBEDDED	1	0	LAST VALUE	0	7
9	ZPASS_DO_3	3	COIL	BOOL	0	EMBEDDED	3	1	EMBEDDED	1	0	LAST VALUE	0	8
10	ZPASS_DO_4	4	COIL	BOOL	0	EMBEDDED	4	1	EMBEDDED	1	0	LAST VALUE	0	9
11	GPS_ERROR	10	HOLDING REGISTER	16BIT SIGNED	0	EMBEDDED	10	1	EMBEDDED	1	0	LAST VALUE	0	10
12	GPS_HOUR	11	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	11	1	EMBEDDED	1	0	LAST VALUE	0	11
13	GPS_MINUTE	12	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	12	1	EMBEDDED	1	0	LAST VALUE	0	12
14	GPS_SECOND	13	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	13	1	EMBEDDED	1	0	LAST VALUE	0	13
15	GPS_DAY	14	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	14	1	EMBEDDED	1	0	LAST VALUE	0	14
16	GPS_MONTH	15	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	15	1	EMBEDDED	1	0	LAST VALUE	0	15
17	GPS_YEAR	16	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	16	1	EMBEDDED	1	0	LAST VALUE	0	16
18	GPS_LATITUDE	17	HOLDING REGISTER	64BIT REAL	0	EMBEDDED	17	1	EMBEDDED	1	0	LAST VALUE	0	17
19	GPS_LONGITUDE	21	HOLDING REGISTER	64BIT REAL	0	EMBEDDED	21	1	EMBEDDED	1	0	LAST VALUE	0	18
20	GPS_HDOP	25	HOLDING REGISTER	64BIT REAL	0	EMBEDDED	25	1	EMBEDDED	1	0	LAST VALUE	0	19
21	GPS_ALTITUDE	29	HOLDING REGISTER	64BIT REAL	0	EMBEDDED	29	1	EMBEDDED	1	0	LAST VALUE	0	20
22	GPS_COG	33	HOLDING REGISTER	64BIT REAL	0	EMBEDDED	33	1	EMBEDDED	1	0	LAST VALUE	0	21
23	GPS_SPEED_KM	37	HOLDING REGISTER	64BIT REAL	0	EMBEDDED	37	1	EMBEDDED	1	0	LAST VALUE	0	22
24	GPS_SPEED_KN	41	HOLDING REGISTER	64BIT REAL	0	EMBEDDED	41	1	EMBEDDED	1	0	LAST VALUE	0	23
25	GPS_FIX	45	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	45	1	EMBEDDED	1	0	LAST VALUE	0	24
26	GPS_NUM_SAT	46	HOLDING REGISTER	16BIT UNSIGNED	0	EMBEDDED	46	1	EMBEDDED	1	0	LAST VALUE	0	25
27														
28														
29														
30														
31														
32														
33														

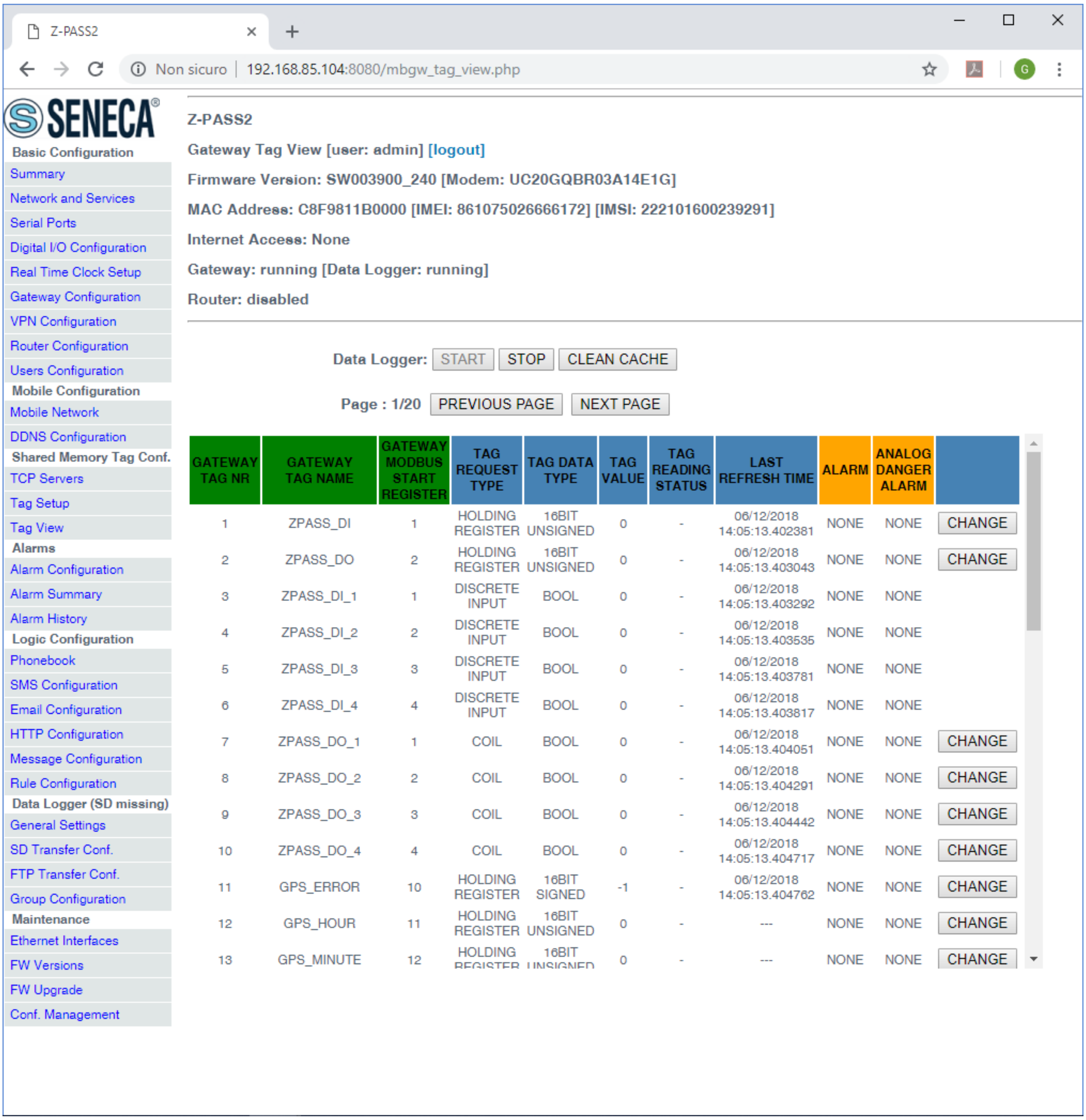
The tag configuration in the Excel sheet can be exported by clicking on the “Export CGI file…” button; the exported binary file can be uploaded to the Z-PASS, by means of the “Import tag configuration” button in the “Tag Setup” page (see 21.3.1 paragraph).

Conversely, the tag configuration created by means of the web page can be imported into the Excel sheet by clicking on the “Import CGI file…” button.

The sheet columns correspond to the parameters in the “Tag Setup” page; please, see 21.3.2.1 paragraph for their meanings.

21.3.3 Tag View

The “Gateway Tag View” page shows the tag values in real-time, as shown in the following figure.



Z-PASS2

Gateway Tag View [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600239291]

Internet Access: None

Gateway: running [Data Logger: running]

Router: disabled

Data Logger: START STOP CLEAN CACHE

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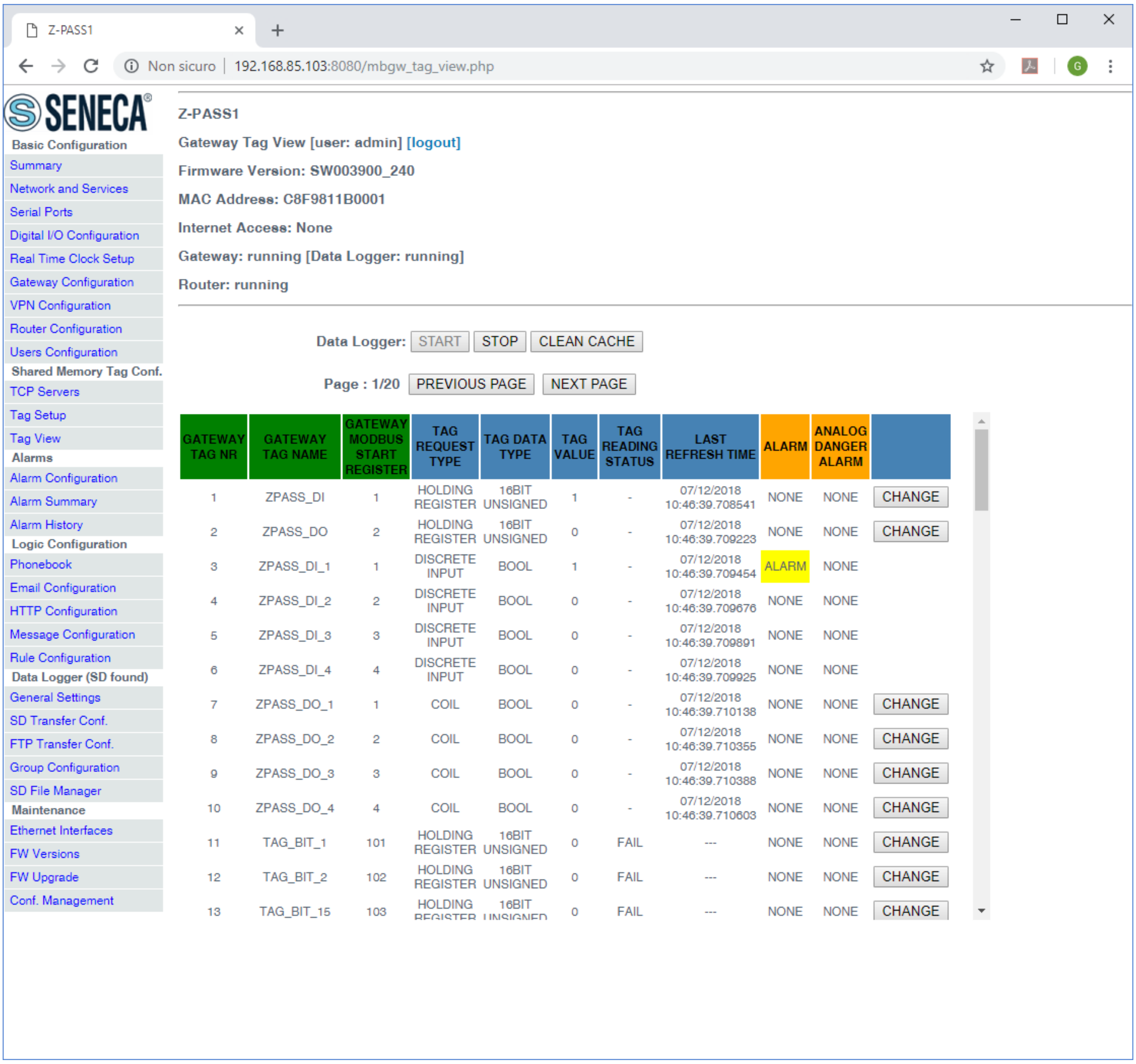
GATEWAY TAG NR	GATEWAY TAG NAME	GATEWAY MODBUS START REGISTER	TAG REQUEST TYPE	TAG DATA TYPE	TAG VALUE	TAG READING STATUS	LAST REFRESH TIME	ALARM	ANALOG DANGER ALARM	
1	ZPASS_DI	1	HOLDING REGISTER	16BIT UNSIGNED	0	-	06/12/2018 14:05:13.402381	NONE	NONE	CHANGE
2	ZPASS_DO	2	HOLDING REGISTER	16BIT UNSIGNED	0	-	06/12/2018 14:05:13.403043	NONE	NONE	CHANGE
3	ZPASS_DI_1	1	DISCRETE INPUT	BOOL	0	-	06/12/2018 14:05:13.403292	NONE	NONE	
4	ZPASS_DI_2	2	DISCRETE INPUT	BOOL	0	-	06/12/2018 14:05:13.403535	NONE	NONE	
5	ZPASS_DI_3	3	DISCRETE INPUT	BOOL	0	-	06/12/2018 14:05:13.403781	NONE	NONE	
6	ZPASS_DI_4	4	DISCRETE INPUT	BOOL	0	-	06/12/2018 14:05:13.403817	NONE	NONE	
7	ZPASS_DO_1	1	COIL	BOOL	0	-	06/12/2018 14:05:13.404051	NONE	NONE	CHANGE
8	ZPASS_DO_2	2	COIL	BOOL	0	-	06/12/2018 14:05:13.404291	NONE	NONE	CHANGE
9	ZPASS_DO_3	3	COIL	BOOL	0	-	06/12/2018 14:05:13.404442	NONE	NONE	CHANGE
10	ZPASS_DO_4	4	COIL	BOOL	0	-	06/12/2018 14:05:13.404717	NONE	NONE	CHANGE
11	GPS_ERROR	10	HOLDING REGISTER	16BIT SIGNED	-1	-	06/12/2018 14:05:13.404762	NONE	NONE	CHANGE
12	GPS_HOUR	11	HOLDING REGISTER	16BIT UNSIGNED	0	-	---	NONE	NONE	CHANGE
13	GPS_MINUTE	12	HOLDING REGISTER	16BIT UNSIGNED	0	-	---	NONE	NONE	CHANGE

The “Data Logger” buttons can be used to:

- start the Data Logger functionality, if it is stopped;
- stop the Data Logger functionality, if it is running;
- clean the internal Data Logger cache (this will also stop the Data Logger).

The view is automatically refreshed.

As shown in the following figures, the “ALARM” column reports the status of the alarm defined for the tag, if any; the “ANALOG DANGER ALARM” column has a similar behavior, but it is meaningful only for analog tags when, in the alarm configuration, the “Alarm Low Low Value” and “Alarm High High Value” thresholds are defined (see paragraph “Alarm Configuration” 21.4.1).



Z-PASS1

Gateway Tag View [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: None

Gateway: running [Data Logger: running]

Router: running

Data Logger: START STOP CLEAN CACHE

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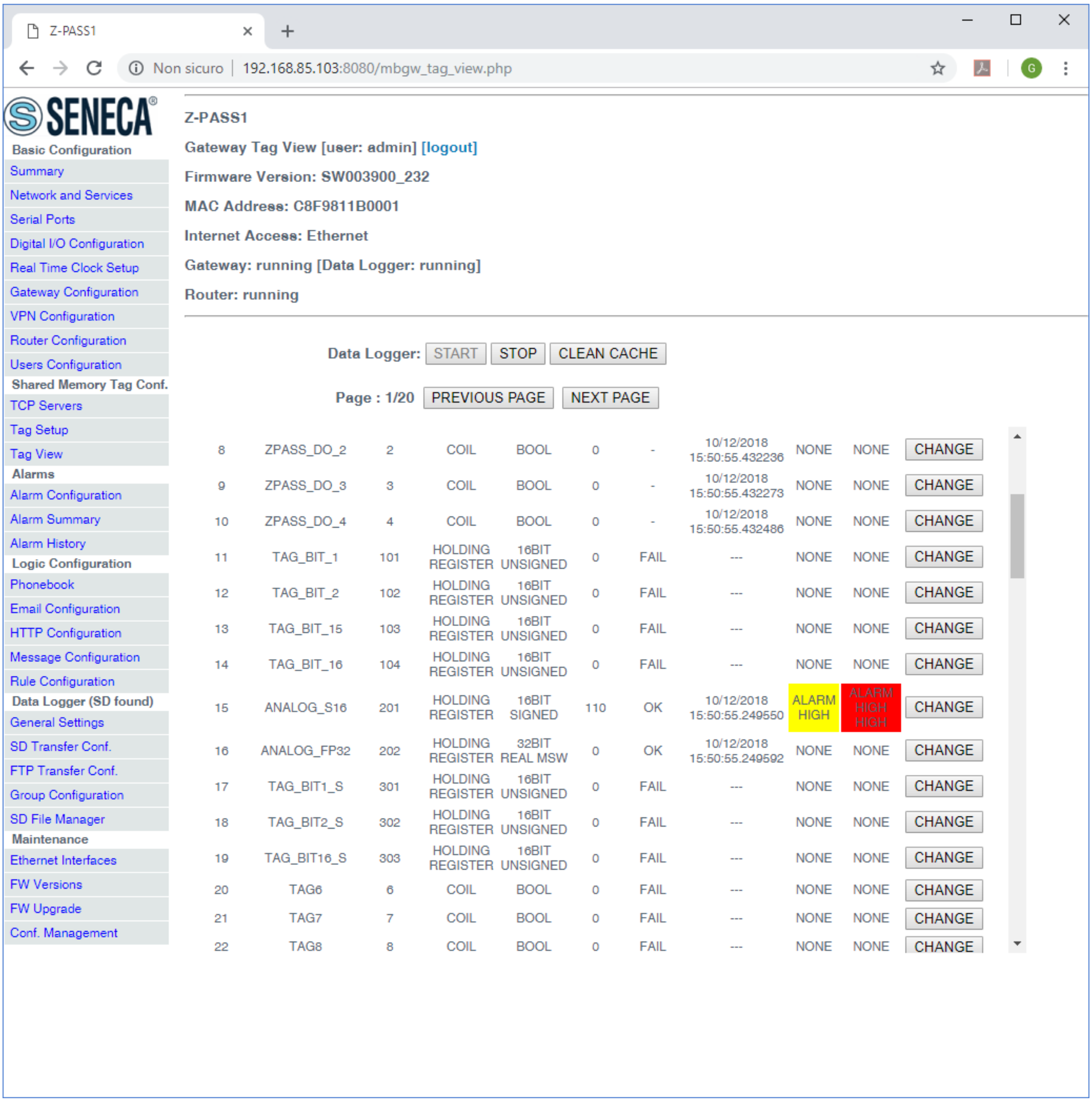
GATEWAY TAG NR	GATEWAY TAG NAME	GATEWAY MODBUS START REGISTER	TAG REQUEST TYPE	TAG DATA TYPE	TAG VALUE	TAG READING STATUS	LAST REFRESH TIME	ALARM	ANALOG DANGER ALARM	
1	ZPASS_DI	1	HOLDING REGISTER	16BIT UNSIGNED	1	-	07/12/2018 10:46:39.708541	NONE	NONE	CHANGE
2	ZPASS_DO	2	HOLDING REGISTER	16BIT UNSIGNED	0	-	07/12/2018 10:46:39.709223	NONE	NONE	CHANGE
3	ZPASS_DI_1	1	DISCRETE INPUT	BOOL	1	-	07/12/2018 10:46:39.709454	ALARM	NONE	
4	ZPASS_DI_2	2	DISCRETE INPUT	BOOL	0	-	07/12/2018 10:46:39.709676	NONE	NONE	
5	ZPASS_DI_3	3	DISCRETE INPUT	BOOL	0	-	07/12/2018 10:46:39.709891	NONE	NONE	
6	ZPASS_DI_4	4	DISCRETE INPUT	BOOL	0	-	07/12/2018 10:46:39.709925	NONE	NONE	
7	ZPASS_DO_1	1	COIL	BOOL	0	-	07/12/2018 10:46:39.710138	NONE	NONE	CHANGE
8	ZPASS_DO_2	2	COIL	BOOL	0	-	07/12/2018 10:46:39.710355	NONE	NONE	CHANGE
9	ZPASS_DO_3	3	COIL	BOOL	0	-	07/12/2018 10:46:39.710388	NONE	NONE	CHANGE
10	ZPASS_DO_4	4	COIL	BOOL	0	-	07/12/2018 10:46:39.710603	NONE	NONE	CHANGE
11	TAG_BIT_1	101	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
12	TAG_BIT_2	102	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
13	TAG_BIT_15	103	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE



Z-PASS1

Gateway Tag View [user: admin] [logout]

Firmware Version: SW003900_232

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: running

Data Logger: START STOP CLEAN CACHE

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8	ZPASS_DO_2	2	COIL	BOOL	0	-	10/12/2018 15:50:55.432236	NONE	NONE	CHANGE
9	ZPASS_DO_3	3	COIL	BOOL	0	-	10/12/2018 15:50:55.432273	NONE	NONE	CHANGE
10	ZPASS_DO_4	4	COIL	BOOL	0	-	10/12/2018 15:50:55.432486	NONE	NONE	CHANGE
11	TAG_BIT_1	101	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
12	TAG_BIT_2	102	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
13	TAG_BIT_15	103	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
14	TAG_BIT_16	104	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
15	ANALOG_S16	201	HOLDING REGISTER	16BIT SIGNED	110	OK	10/12/2018 15:50:55.249550	ALARM HIGH	ALARM HIGH HIGH	CHANGE
16	ANALOG_FP32	202	HOLDING REGISTER	32BIT REAL MSW	0	OK	10/12/2018 15:50:55.249592	NONE	NONE	CHANGE
17	TAG_BIT1_S	301	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
18	TAG_BIT2_S	302	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
19	TAG_BIT16_S	303	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL	---	NONE	NONE	CHANGE
20	TAG6	6	COIL	BOOL	0	FAIL	---	NONE	NONE	CHANGE
21	TAG7	7	COIL	BOOL	0	FAIL	---	NONE	NONE	CHANGE
22	TAG8	8	COIL	BOOL	0	FAIL	---	NONE	NONE	CHANGE

Some notes are worthy about the “TAG READING STATUS” and “LAST REFRESH TIME” columns.

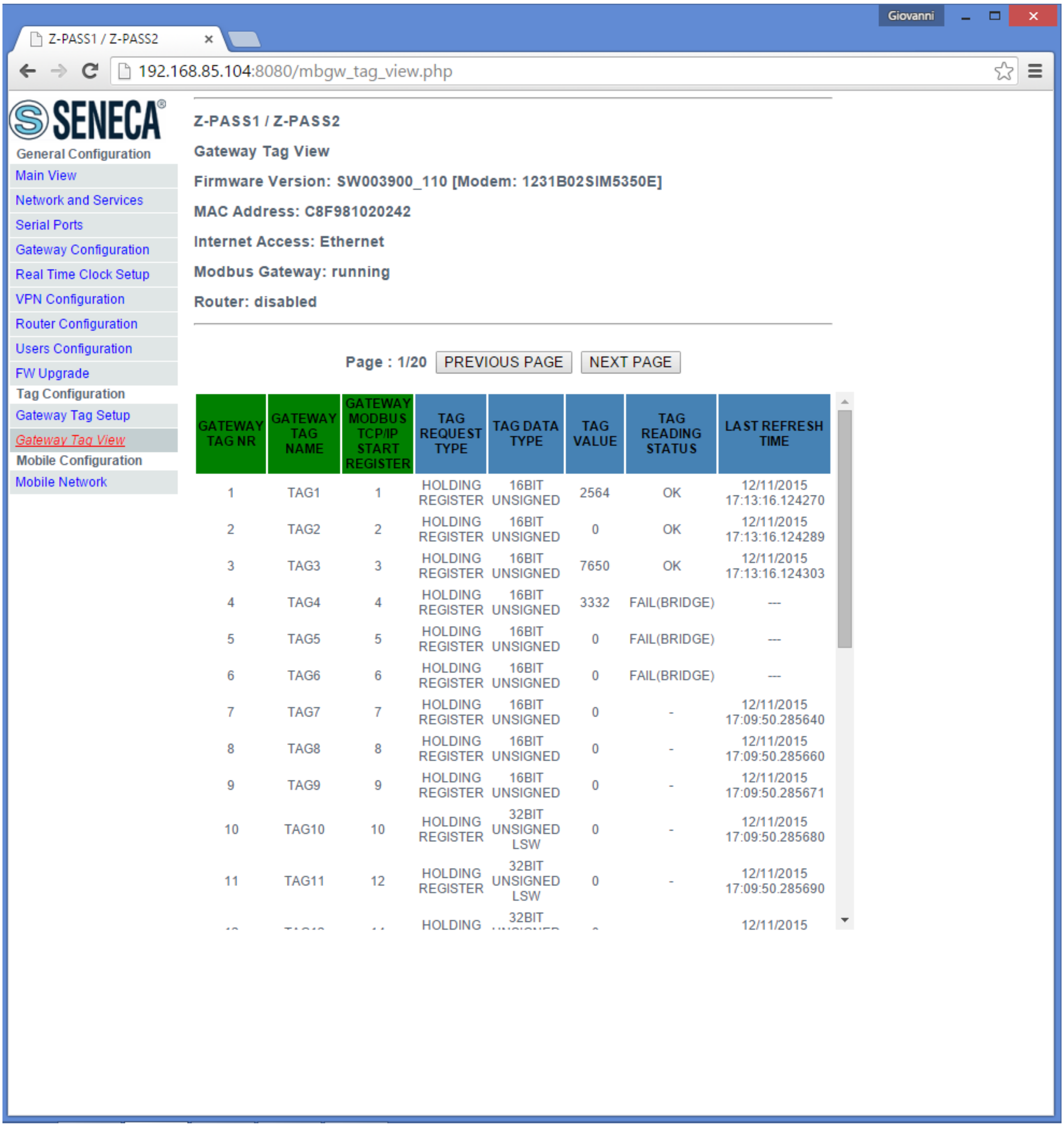
The possible “TAG READING STATUS” values depend on the “GATEWAY TAG MODE” value, in the following way:

OK / FAIL	for tags with Mode=GATEWAY
OK (BRIDGE) / FAIL(BRIDGE)	for tags with Mode=BRIDGE
-	for tags with Mode=SHARED MEMORY or EMBEDDED

The timestamp in the “LAST REFRESH TIME” column is updated:

- on a successful (Master) read/write operation, for tags with Mode=GATEWAY|BRIDGE|EMBEDDED

- on Modbus Shared Memory Gateway start and on a successful TCP or RTU (Slave) write operation, for tags with Mode=SHARED MEMORY



Z-PASS1 / Z-PASS2

Gateway Tag View

Firmware Version: SW003900_110 [Modem: 1231B02SIM5350E]

MAC Address: C8F981020242

Internet Access: Ethernet

Modbus Gateway: running

Router: disabled

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GATEWAY TAG NR	GATEWAY TAG NAME	GATEWAY MODBUS TCP/IP START REGISTER	TAG REQUEST TYPE	TAG DATA TYPE	TAG VALUE	TAG READING STATUS	LAST REFRESH TIME
1	TAG1	1	HOLDING REGISTER	16BIT UNSIGNED	2564	OK	12/11/2015 17:13:16.124270
2	TAG2	2	HOLDING REGISTER	16BIT UNSIGNED	0	OK	12/11/2015 17:13:16.124289
3	TAG3	3	HOLDING REGISTER	16BIT UNSIGNED	7650	OK	12/11/2015 17:13:16.124303
4	TAG4	4	HOLDING REGISTER	16BIT UNSIGNED	3332	FAIL(BRIDGE)	---
5	TAG5	5	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL(BRIDGE)	---
6	TAG6	6	HOLDING REGISTER	16BIT UNSIGNED	0	FAIL(BRIDGE)	---
7	TAG7	7	HOLDING REGISTER	16BIT UNSIGNED	0	-	12/11/2015 17:09:50.285640
8	TAG8	8	HOLDING REGISTER	16BIT UNSIGNED	0	-	12/11/2015 17:09:50.285660
9	TAG9	9	HOLDING REGISTER	16BIT UNSIGNED	0	-	12/11/2015 17:09:50.285671
10	TAG10	10	HOLDING REGISTER	32BIT UNSIGNED LSW	0	-	12/11/2015 17:09:50.285680
11	TAG11	12	HOLDING REGISTER	32BIT UNSIGNED LSW	0	-	12/11/2015 17:09:50.285690
			HOLDING	32BIT			12/11/2015

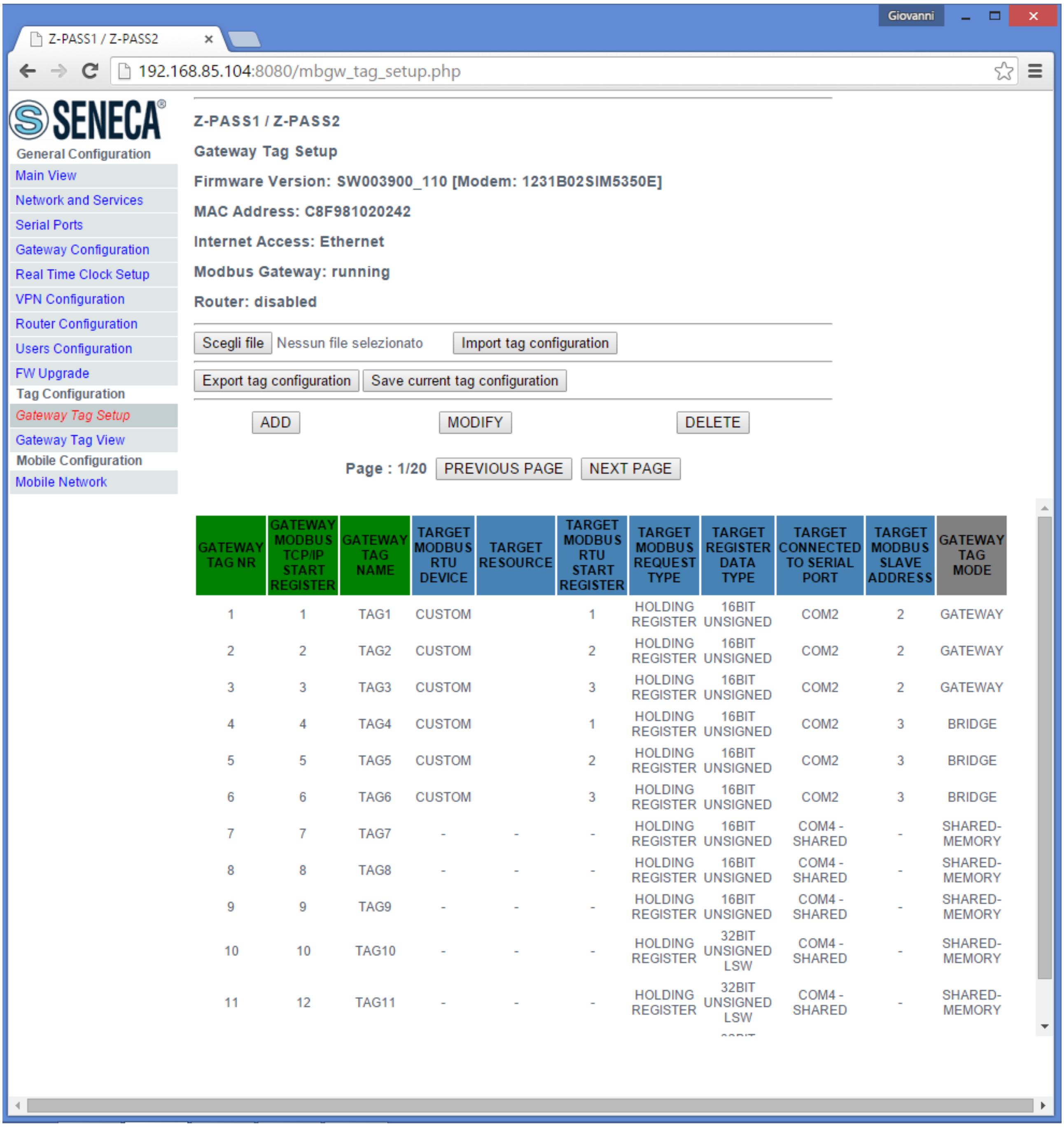
In the above figure[21], the first three tags (Mode=GATEWAY) have been successfully read, so the "TAG READING STATUS" column shows "OK" and the "LAST REFRESH TIME" column contains a valid timestamp.

The next three tags (Mode=BRIDGE) have not been read nor written yet, so the "TAG READING STATUS" column shows "FAIL(BRIDGE)" and the "LAST REFRESH TIME" column does not contain a timestamp.

Finally, for the last tags (Mode=SHARED MEMORY), the "TAG READING STATUS" column shows "-" and the "LAST REFRESH TIME" column contains a valid timestamp that, in this example, corresponds to the Modbus Shared Memory Gateway start time.

Just as an example, the tag configuration corresponding to the above figure is show below.

[21] This and the following figures refer to an old FW release.



Z-PASS1 / Z-PASS2

Gateway Tag Setup

Firmware Version: SW003900_110 [Modem: 1231B02SIM5350E]

MAC Address: C8F981020242

Internet Access: Ethernet

Modbus Gateway: running

Router: disabled

Nessun file selezionato

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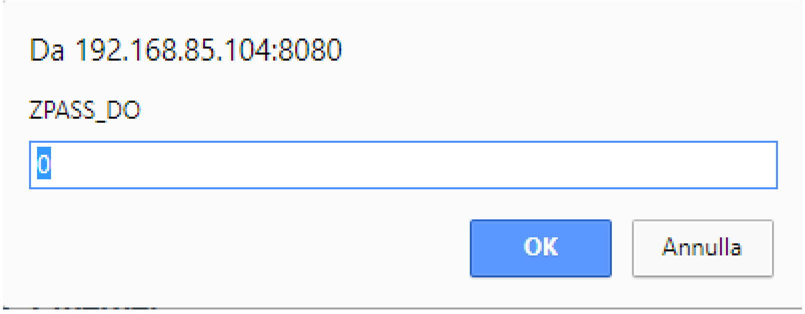
GATEWAY TAG NR	GATEWAY MODBUS TCP/IP START REGISTER	GATEWAY TAG NAME	TARGET MODBUS RTU DEVICE	TARGET RESOURCE	TARGET MODBUS RTU START REGISTER	TARGET MODBUS REQUEST TYPE	TARGET REGISTER DATA TYPE	TARGET CONNECTED TO SERIAL PORT	TARGET MODBUS SLAVE ADDRESS	GATEWAY TAG MODE
1	1	TAG1	CUSTOM		1	HOLDING REGISTER	16BIT UNSIGNED	COM2	2	GATEWAY
2	2	TAG2	CUSTOM		2	HOLDING REGISTER	16BIT UNSIGNED	COM2	2	GATEWAY
3	3	TAG3	CUSTOM		3	HOLDING REGISTER	16BIT UNSIGNED	COM2	2	GATEWAY
4	4	TAG4	CUSTOM		1	HOLDING REGISTER	16BIT UNSIGNED	COM2	3	BRIDGE
5	5	TAG5	CUSTOM		2	HOLDING REGISTER	16BIT UNSIGNED	COM2	3	BRIDGE
6	6	TAG6	CUSTOM		3	HOLDING REGISTER	16BIT UNSIGNED	COM2	3	BRIDGE
7	7	TAG7	-	-	-	HOLDING REGISTER	16BIT UNSIGNED	COM4 - SHARED	-	SHARED-MEMORY
8	8	TAG8	-	-	-	HOLDING REGISTER	16BIT UNSIGNED	COM4 - SHARED	-	SHARED-MEMORY
9	9	TAG9	-	-	-	HOLDING REGISTER	16BIT UNSIGNED	COM4 - SHARED	-	SHARED-MEMORY
10	10	TAG10	-	-	-	HOLDING REGISTER	32BIT UNSIGNED LSW	COM4 - SHARED	-	SHARED-MEMORY
11	12	TAG11	-	-	-	HOLDING REGISTER	32BIT UNSIGNED LSW	COM4 - SHARED	-	SHARED-MEMORY

In the “Tag View” page, for each “HOLDING REGISTER” or “COIL” tag, a “CHANGE” button is present that lets you change the tag value; when clicking on this button, the following pop-up is shown:

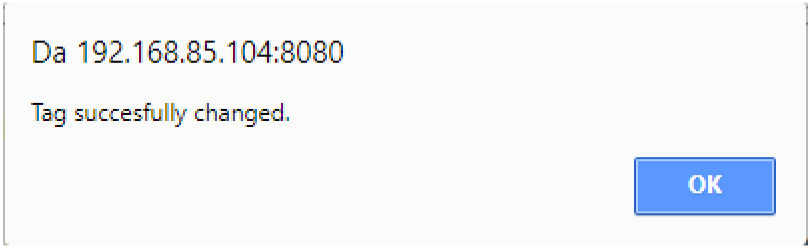


Da 192.168.85.104:8080

ZPASS_DO

0

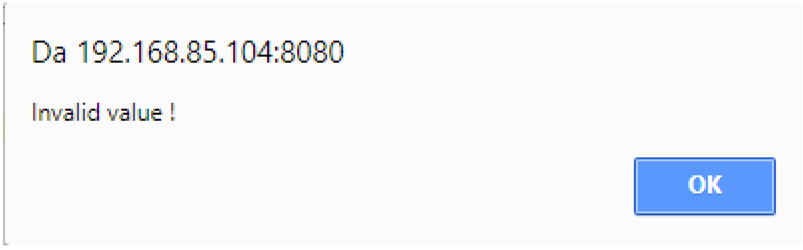
After changing the value in the text-box and clicking on the “OK” button, the following message is shown, if the tag value has been successfully changed.



Da 192.168.85.104:8080

Tag succesfully changed.

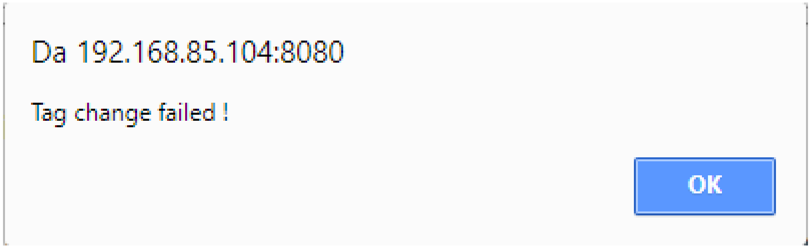
If the given value does not fit the tag “Data Type”, the following message is shown:



Da 192.168.85.104:8080

Invalid value !

Finally, if the tag value could not be changed, the following message is shown:



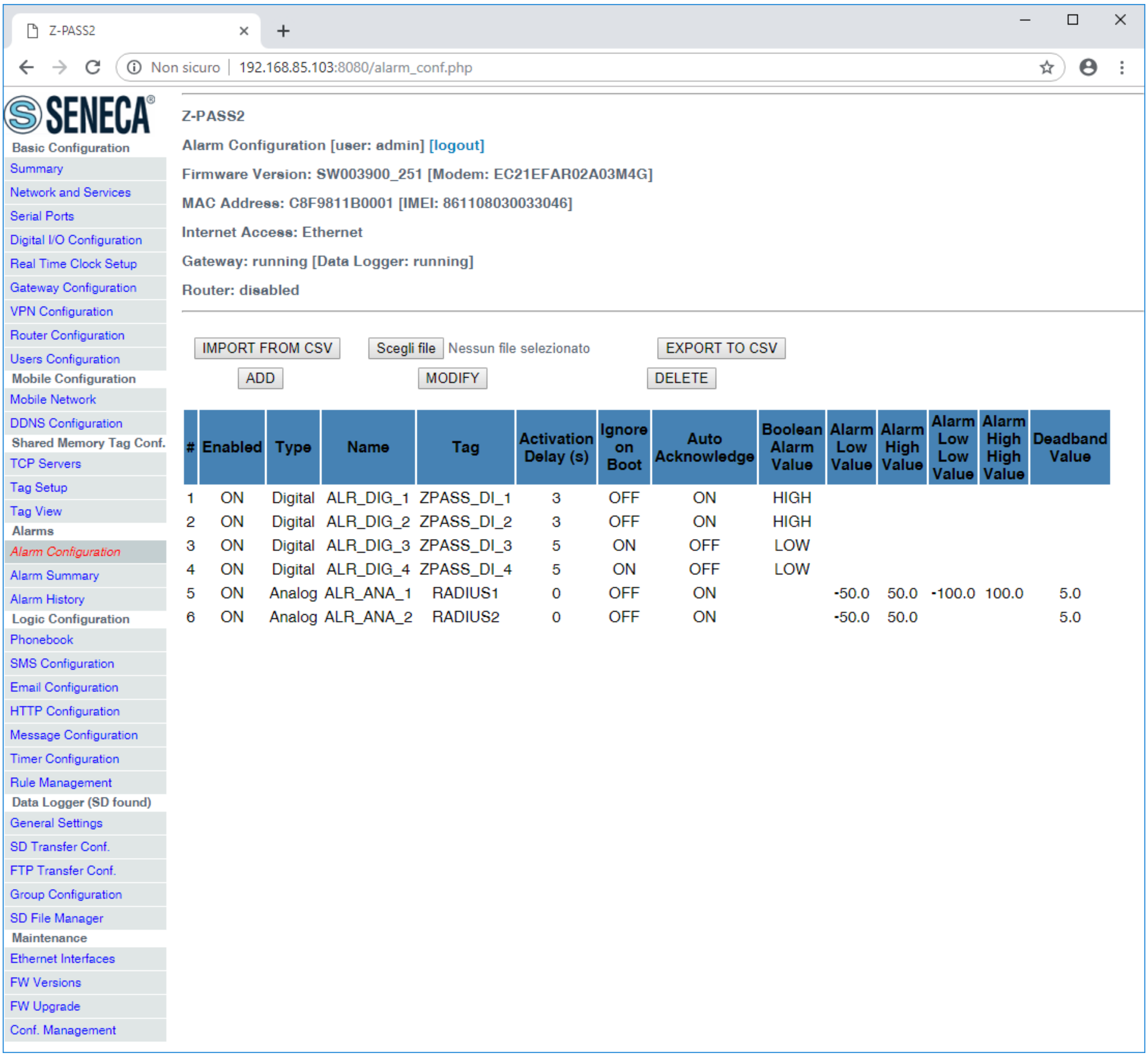
Da 192.168.85.104:8080

Tag change failed !

21.4 Alarms

21.4.1 Alarm Configuration

By clicking on the “Alarm Configuration” link, in the “Alarms” section, you come to the following page:



Z-PASS2

Alarm Configuration [user: admin] [logout]

Firmware Version: SW003900_251 [Modem: EC21EFAR02A03M4G]

MAC Address: C8F9811B0001 [IMEI: 861108030033046]

Internet Access: Ethernet

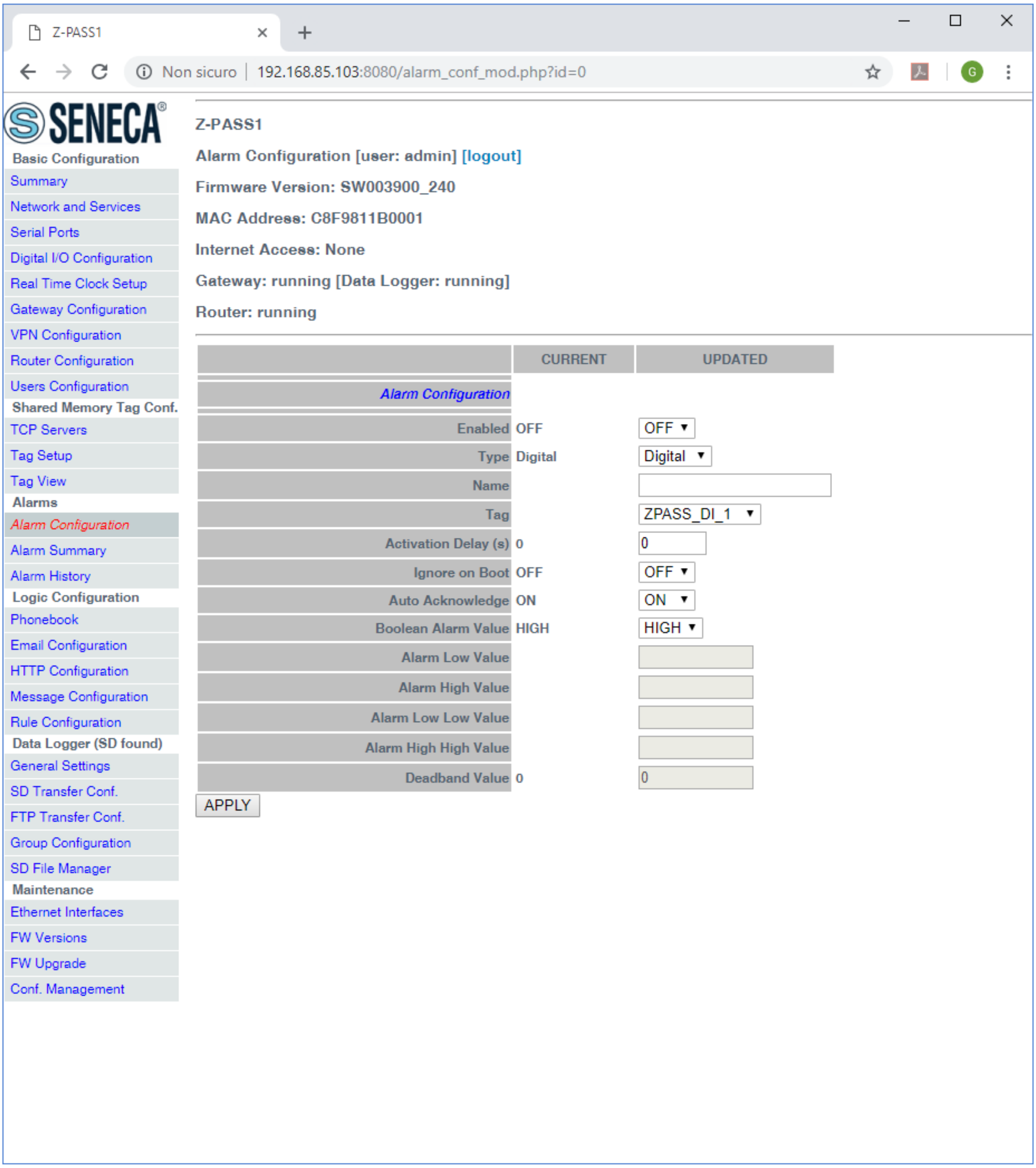
Gateway: running [Data Logger: running]

Router: disabled

#	Enabled	Type	Name	Tag	Activation Delay (s)	Ignore on Boot	Auto Acknowledge	Boolean Alarm Value	Alarm Low Value	Alarm High Value	Alarm Low Low Value	Alarm High High Value	Deadband Value
1	ON	Digital	ALR_DIG_1	ZPASS_DI_1	3	OFF	ON	HIGH					
2	ON	Digital	ALR_DIG_2	ZPASS_DI_2	3	OFF	ON	HIGH					
3	ON	Digital	ALR_DIG_3	ZPASS_DI_3	5	ON	OFF	LOW					
4	ON	Digital	ALR_DIG_4	ZPASS_DI_4	5	ON	OFF	LOW					
5	ON	Analog	ALR_ANA_1	RADIUS1	0	OFF	ON		-50.0	50.0	-100.0	100.0	5.0
6	ON	Analog	ALR_ANA_2	RADIUS2	0	OFF	ON		-50.0	50.0			5.0

In this page, the list of the configured alarms is shown.

By clicking on the “ADD” button, a new alarm can be configured, as in the following figure.



Z-PASS1

Alarm Configuration [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: None

Gateway: running [Data Logger: running]

Router: running

	CURRENT	UPDATED
Alarm Configuration		
Enabled	OFF	OFF ▾
Type	Digital	Digital ▾
Name		
Tag		ZPASS_DI_1 ▾
Activation Delay (s)	0	0
Ignore on Boot	OFF	OFF ▾
Auto Acknowledge	ON	ON ▾
Boolean Alarm Value	HIGH	HIGH ▾
Alarm Low Value		
Alarm High Value		
Alarm Low Low Value		
Alarm High High Value		
Deadband Value	0	0

The following table explains the meaning of all the parameters available for an alarm.

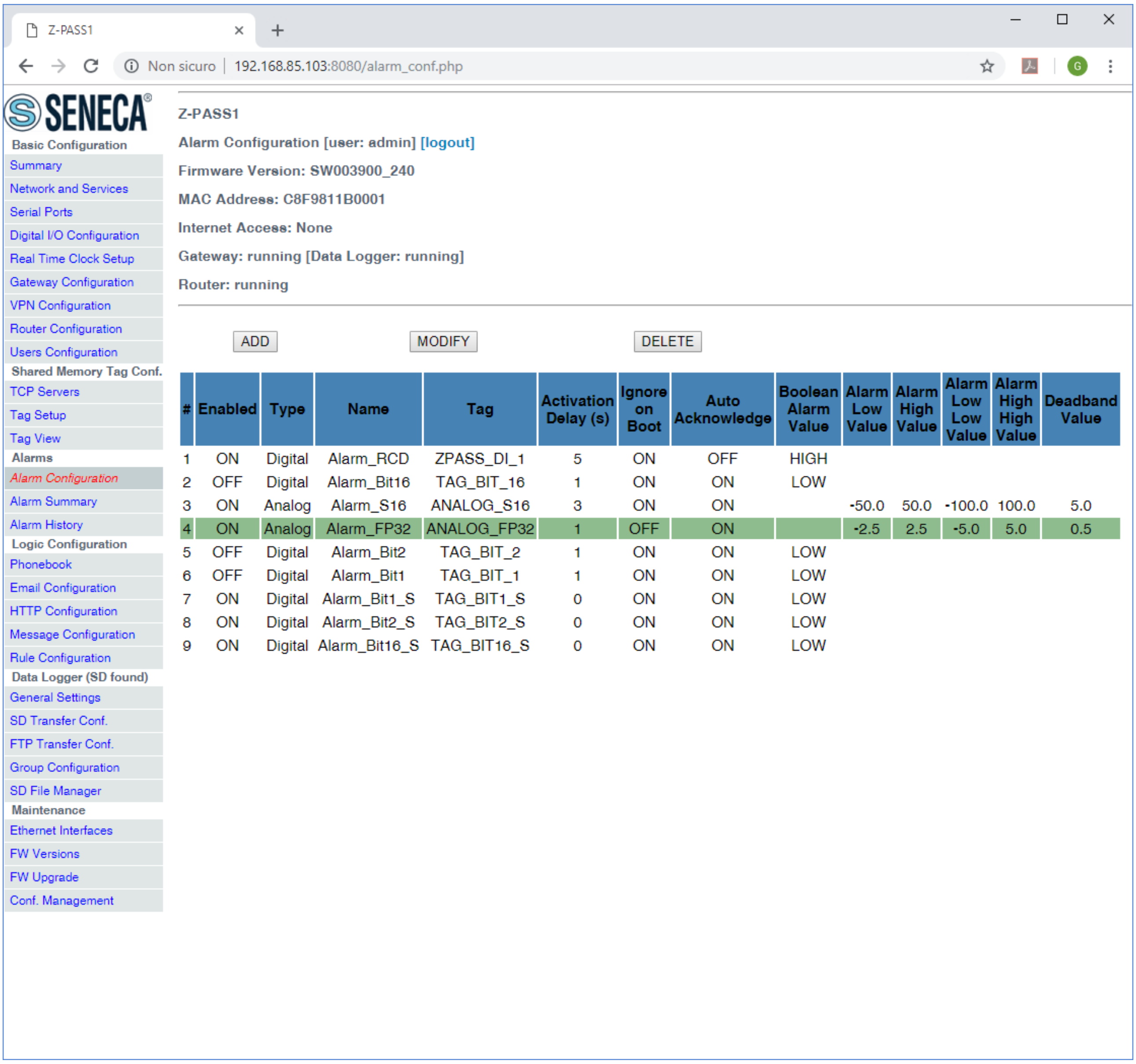
Field	Meaning	Default value
Enabled	Flag to enable/disable the alarm	OFF
Type	This parameter tells if this is a Digital or Analog alarm; when changing the type, some parameters become enabled or	Digital

	disabled	
Name	The alarm name; since this parameter is used as a key to identify the alarm, two alarms cannot be configured with the same name	*Empty*
Tag	The tag which the alarm is related to. The tag list changes depending on the alarm type (Digital or Analog). Only one alarm can be associated to a tag	*First tag in the list*
Activation Delays (s)	This parameter defines the time interval, in seconds, during which the alarm condition shall be kept true to generate the alarm	0
Ignore on Boot	This is a flag used to avoid generating the alarm, if the alarm condition is temporarily detected during the system boot	OFF
Auto Acknowledge	This is a flag used to avoid the need of an acknowledgment by the user to let the alarm be cancelled, after the alarm condition has ceased	ON
Boolean Alarm Value	For a Digital alarm, this parameter tells which is the tag value (LOW or HIGH) which corresponds to the alarm condition	HIGH
Alarm Low Value	For an Analog alarm, this parameter defines the low alarm threshold that is, when the tag value goes under this value, the alarm condition is entered	*Empty*
Alarm High Value	For an Analog alarm, this parameter defines the high alarm threshold that is, when the tag value goes over this value, the alarm condition is entered	*Empty*
Alarm Low Low Value	For an Analog alarm, this parameter defines the low danger alarm threshold that is, when the tag value goes under this value, the danger alarm condition is entered	*Empty*
Alarm High High Value	For an Analog alarm, this parameter defines the high danger alarm threshold that is, when the tag value goes over this value, the danger alarm condition is entered	*Empty*
Deadband Value	This parameter defines a non negative value to be summed to the low	0

	threshold/subtracted from the high threshold, such that the tag value shall go over/under the resultant value to let the alarm condition be exited	

For an Analog alarm, at least one of the four threshold parameters (Alarm Low Value, Alarm High Value, Alarm Low Low Value, Alarm High High Value) shall be defined.

Selecting an alarm in the list and clicking on the “MODIFY” button, you can modify the alarm parameters, as in the following figures.



Z-PASS1

Alarm Configuration [user: admin] [logout]

Firmware Version: SW003900_240

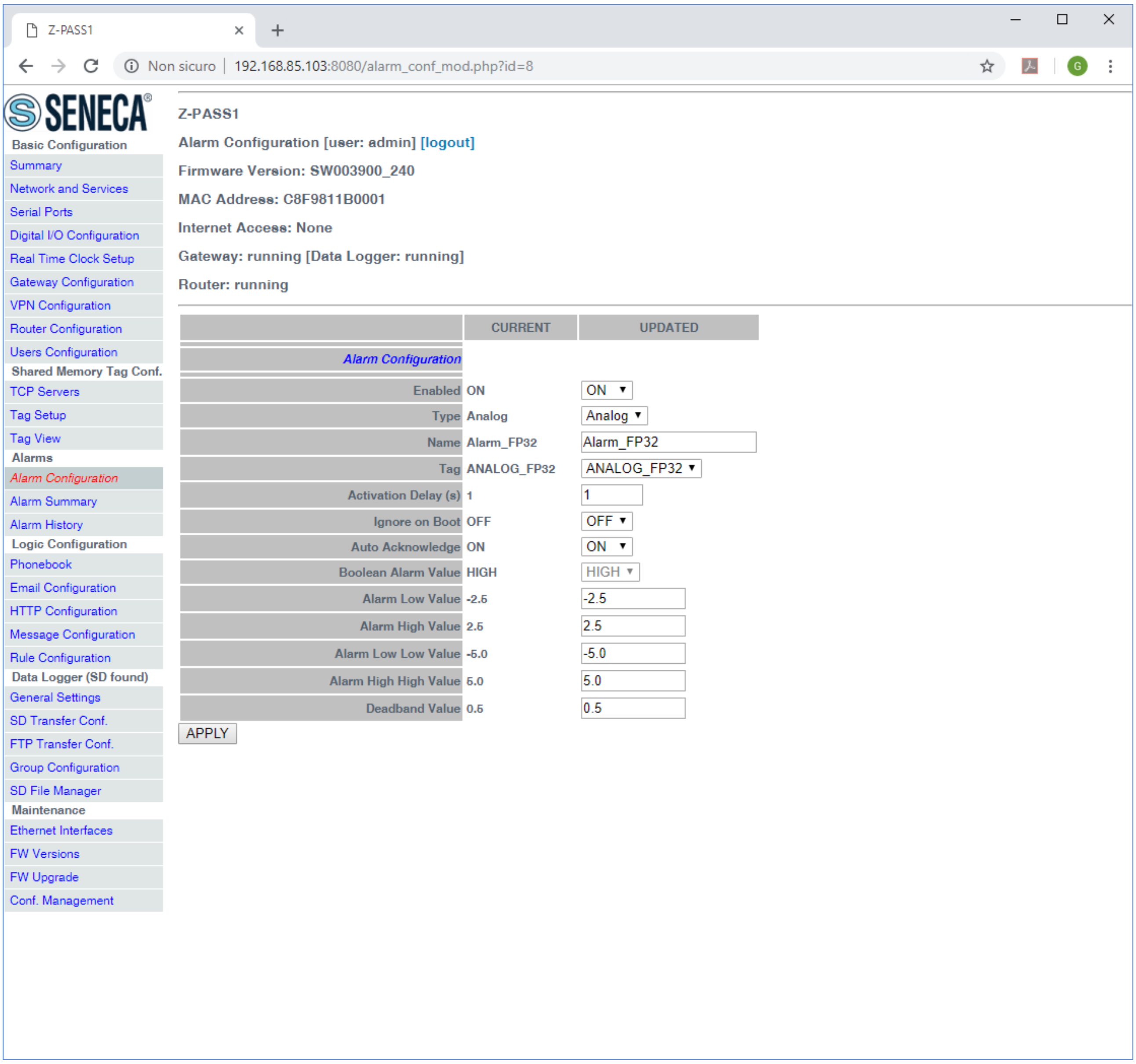
MAC Address: C8F9811B0001

Internet Access: None

Gateway: running [Data Logger: running]

Router: running

#	Enabled	Type	Name	Tag	Activation Delay (s)	Ignore on Boot	Auto Acknowledge	Boolean Alarm Value	Alarm Low Value	Alarm High Value	Alarm Low Low Value	Alarm High High Value	Deadband Value
1	ON	Digital	Alarm_RCD	ZPASS_DI_1	5	ON	OFF	HIGH					
2	OFF	Digital	Alarm_Bit16	TAG_BIT_16	1	ON	ON	LOW					
3	ON	Analog	Alarm_S16	ANALOG_S16	3	ON	ON		-50.0	50.0	-100.0	100.0	5.0
4	ON	Analog	Alarm_FP32	ANALOG_FP32	1	OFF	ON		-2.5	2.5	-5.0	5.0	0.5
5	OFF	Digital	Alarm_Bit2	TAG_BIT_2	1	ON	ON	LOW					
6	OFF	Digital	Alarm_Bit1	TAG_BIT_1	1	ON	ON	LOW					
7	ON	Digital	Alarm_Bit1_S	TAG_BIT1_S	0	ON	ON	LOW					
8	ON	Digital	Alarm_Bit2_S	TAG_BIT2_S	0	ON	ON	LOW					
9	ON	Digital	Alarm_Bit16_S	TAG_BIT16_S	0	ON	ON	LOW					



Z-PASS1

Alarm Configuration [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: None

Gateway: running [Data Logger: running]

Router: running

	CURRENT	UPDATED
Alarm Configuration		
Enabled	ON	ON ▾
Type	Analog	Analog ▾
Name	Alarm_FP32	Alarm_FP32
Tag	ANALOG_FP32	ANALOG_FP32 ▾
Activation Delay (s)	1	1
Ignore on Boot	OFF	OFF ▾
Auto Acknowledge	ON	ON ▾
Boolean Alarm Value	HIGH	HIGH ▾
Alarm Low Value	-2.5	-2.5
Alarm High Value	2.5	2.5
Alarm Low Low Value	-5.0	-5.0
Alarm High High Value	5.0	5.0
Deadband Value	0.5	0.5

Selecting an alarm in the list and clicking on the “DELETE” button, you can delete an alarm.

The possible states of an alarm are explained in the following table.

State	Level	Meaning
None	-	The tag has never entered the alarm condition
Alarm	Alarm	The digital tag has got the value defined by “Boolean Alarm Level” parameter
Alarm Low	Alarm	The analog tag has got a value that is under the one defined by “Alarm Low Value” parameter
Alarm High	Alarm	The analog tag has got a value that is over the one defined by “Alarm High Value” parameter
Alarm Low Low	Analog Danger Alarm	The analog tag has got a value that is under the one defined by “Alarm Low Low Value” parameter

Alarm High High	Analog Danger Alarm	The analog tag has got a value that is over the one defined by “Alarm High High Value” parameter
Acknowledge	-	The alarm has been aknowledged (see page “Alarm Summary”)
Return	-	The tag has exited the alarm condition, but the alarm has not been acknowledged and the alarm has the parameter “Auto Acknowledge” set to OFF
End	-	The tag has exited the alarm condition and the alarm has been aknowledged or the alarm has the parameter “Auto Acknowledge” set to ON

As already mentioned in the previous table, when exiting the alarm condition the alarm states can follow two different paths, depending on the value of the “Auto Acknowledge” parameter :

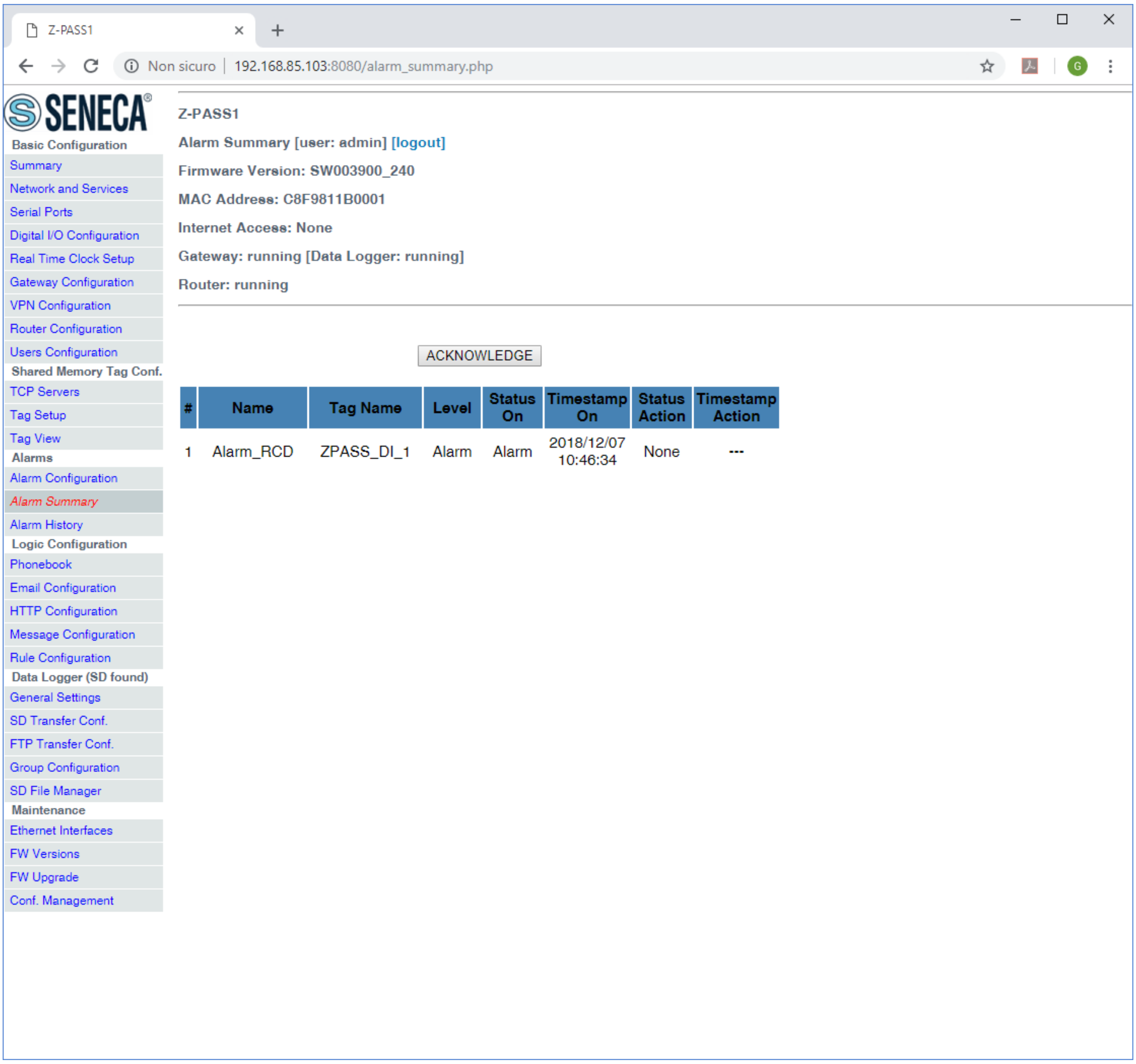
- Alarm* → Return → <acknowledgement> → End if “Auto Acknowledge”=OFF
- Alarm* → End if “Auto Acknowledge”=ON

The “EXPORT TO CSV” and “IMPORT FROM CSV” buttons let you export/import the alarm configuration to/from a “.csv” file (the separator character is “;”).

Please note that, when importing the alarm configuration from a .csv file, the previously existing alarms are deleted; so, a fast way to “clean” the alarm configuration, if it contains many entries, is to import an empty .csv file.

21.4.2 Alarm Summary

By clicking on the “Alarm Summary” link, in the “Alarms” section, you come to the following page:



Z-PASS1

Alarm Summary [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: None

Gateway: running [Data Logger: running]

Router: running

#	Name	Tag Name	Level	Status On	Timestamp On	Status Action	Timestamp Action
1	Alarm_RCD	ZPASS_DI_1	Alarm	Alarm	2018/12/07 10:46:34	None	---

This page shows the alarms currently active in the system.

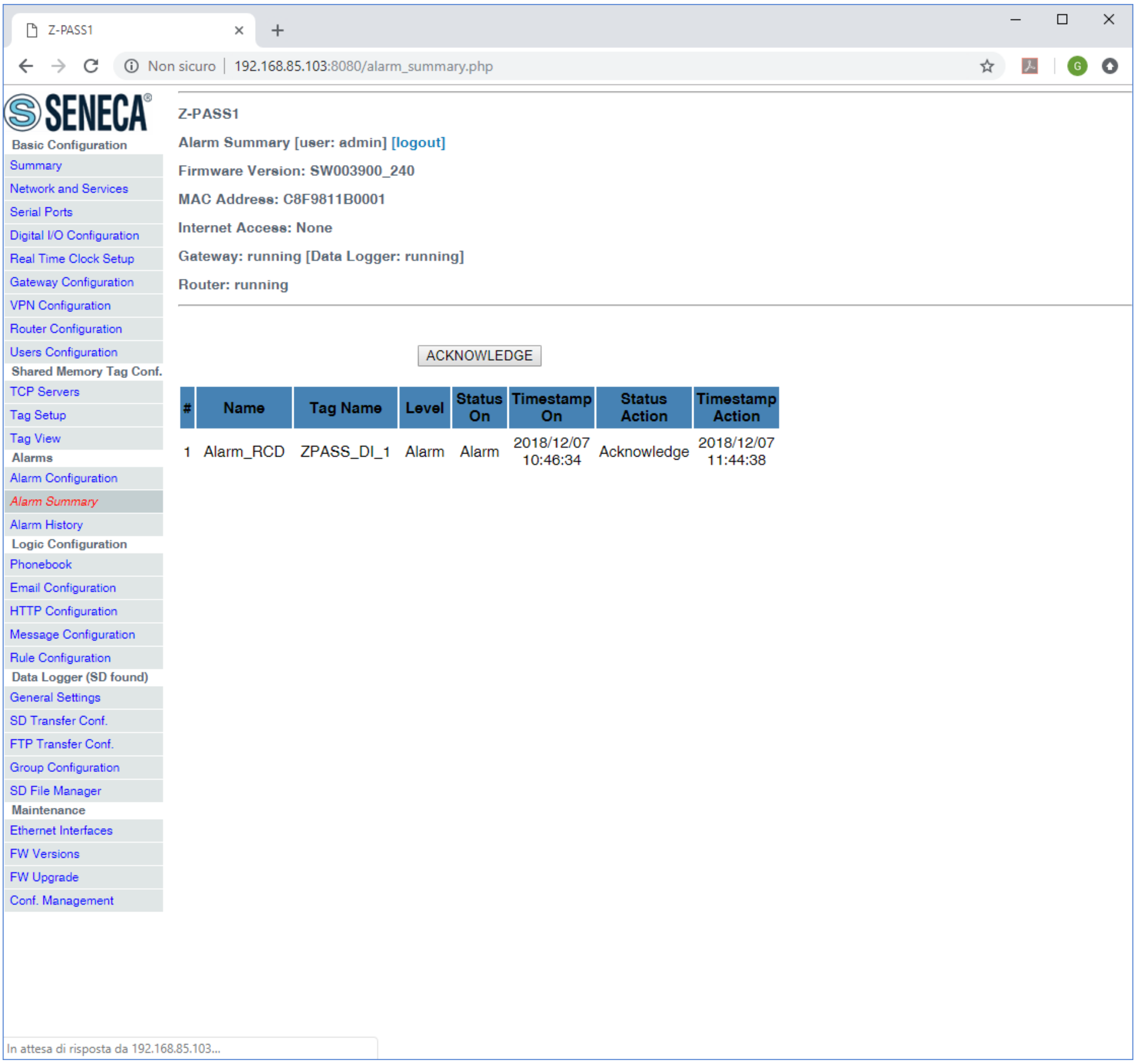
The following table explains the meaning of all the information given for an alarm.

Field	Meaning
Name	The alarm name
Tag Name	The name of the tag which the alarm is related to
Level	Always “Alarm” for digital alarms “Alarm” or “Analog Danger Alarm” for analog alarms
Status On	The alarm status when the alarm has been generated: always “Alarm” for digital alarms “Alarm Low” or “Alarm High” for analog alarms with Level = “Alarm” “Alarm Low Low” or “Alarm High High” for analog alarms with Level = “Analog Danger Alarm”

Timestamp On	The timestamp corresponding to the alarm generation
Status Action	“None” when the alarm is generated It may evolve in: “Acknowledged”, if the alarm has been acknowledged when in the alarm state “Return”, if the alarm state has been exited for an alarm with “Auto Acknowledge” = OFF
Timestamp Action	The timestamp corresponding to the acknowledgement action or alarm state evolution

You can acknowledge an alarm by selecting it and clicking on the “ACKNOWLEDGE” button.

The row corresponding to the alarm changes as in the following figure.



Z-PASS1

Alarm Summary [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: None

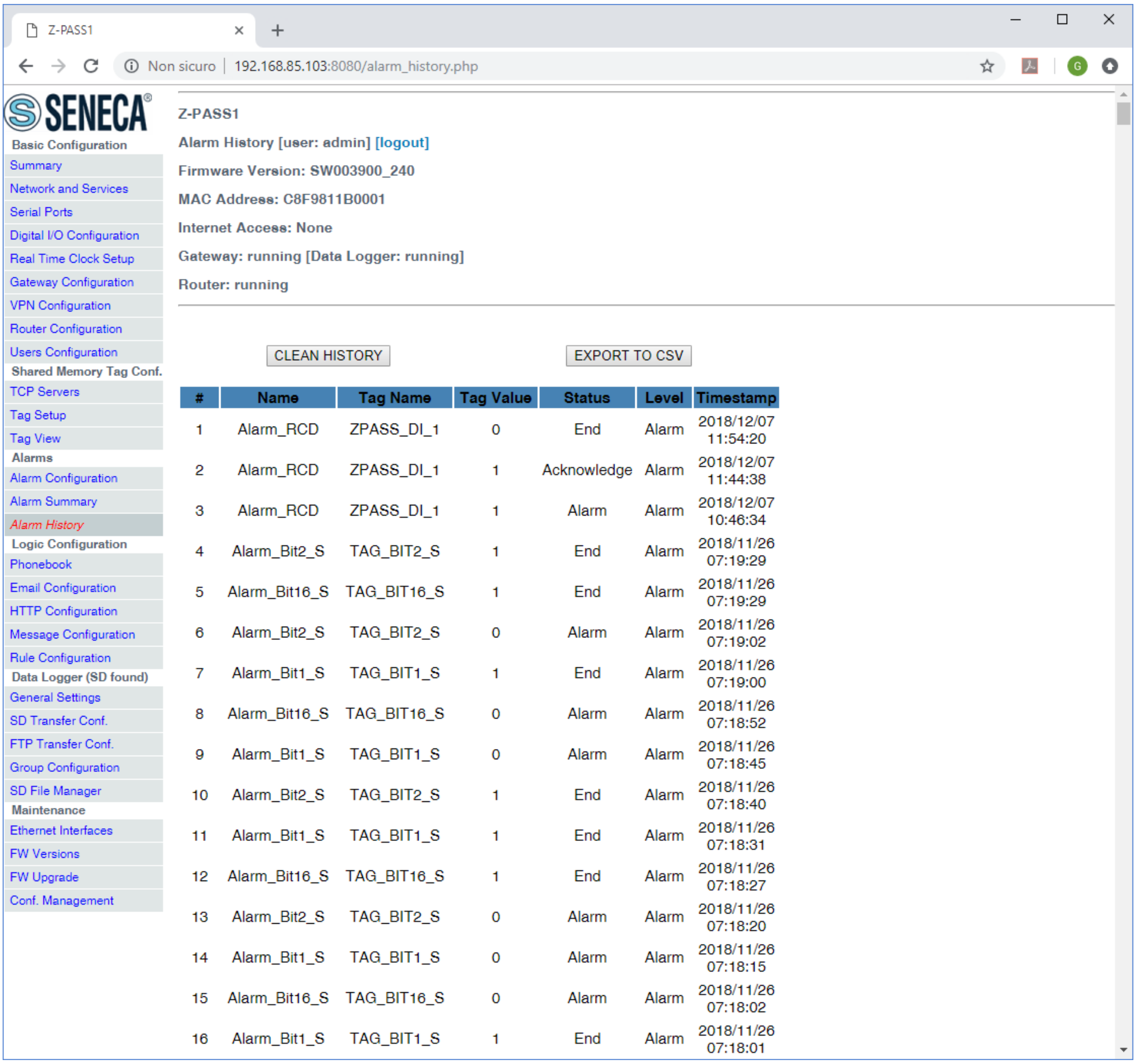
Gateway: running [Data Logger: running]

Router: running

#	Name	Tag Name	Level	Status On	Timestamp On	Status Action	Timestamp Action
1	Alarm_RCD	ZPASS_DI_1	Alarm	Alarm	2018/12/07 10:46:34	Acknowledge	2018/12/07 11:44:38

21.4.3 Alarm History

By clicking on the “Alarm History” link, in the “Alarms” section, you come to the following page:



Z-PASS1

Alarm History [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: None

Gateway: running [Data Logger: running]

Router: running

#	Name	Tag Name	Tag Value	Status	Level	Timestamp
1	Alarm_RCD	ZPASS_DI_1	0	End	Alarm	2018/12/07 11:54:20
2	Alarm_RCD	ZPASS_DI_1	1	Acknowledge	Alarm	2018/12/07 11:44:38
3	Alarm_RCD	ZPASS_DI_1	1	Alarm	Alarm	2018/12/07 10:46:34
4	Alarm_Bit2_S	TAG_BIT2_S	1	End	Alarm	2018/11/26 07:19:29
5	Alarm_Bit16_S	TAG_BIT16_S	1	End	Alarm	2018/11/26 07:19:29
6	Alarm_Bit2_S	TAG_BIT2_S	0	Alarm	Alarm	2018/11/26 07:19:02
7	Alarm_Bit1_S	TAG_BIT1_S	1	End	Alarm	2018/11/26 07:19:00
8	Alarm_Bit16_S	TAG_BIT16_S	0	Alarm	Alarm	2018/11/26 07:18:52
9	Alarm_Bit1_S	TAG_BIT1_S	0	Alarm	Alarm	2018/11/26 07:18:45
10	Alarm_Bit2_S	TAG_BIT2_S	1	End	Alarm	2018/11/26 07:18:40
11	Alarm_Bit1_S	TAG_BIT1_S	1	End	Alarm	2018/11/26 07:18:31
12	Alarm_Bit16_S	TAG_BIT16_S	1	End	Alarm	2018/11/26 07:18:27
13	Alarm_Bit2_S	TAG_BIT2_S	0	Alarm	Alarm	2018/11/26 07:18:20
14	Alarm_Bit1_S	TAG_BIT1_S	0	Alarm	Alarm	2018/11/26 07:18:15
15	Alarm_Bit16_S	TAG_BIT16_S	0	Alarm	Alarm	2018/11/26 07:18:02
16	Alarm_Bit1_S	TAG_BIT1_S	1	End	Alarm	2018/11/26 07:18:01

This page shows all alarm state transitions occurred in the system, up to a maximum of 1000; the alarm state transitions are given in reverse time order.

For example, the first three rows in the list show the state transitions for the alarm named “Alarm_RCD”, which is related to the tag named “ZPASS_DI_1”; this is a digital alarm, so its level can be only “Alarm”; the alarm has passed through the following states:

- “Alarm” when the alarm condition has been entered
- “Acknowledge” when the alarm has been acknowledged, in the “Alarm Summary” page
- “End” when the alarm condition has been exited

The “Tag Value” column gives the value of the tag corresponding to the alarm state transition.

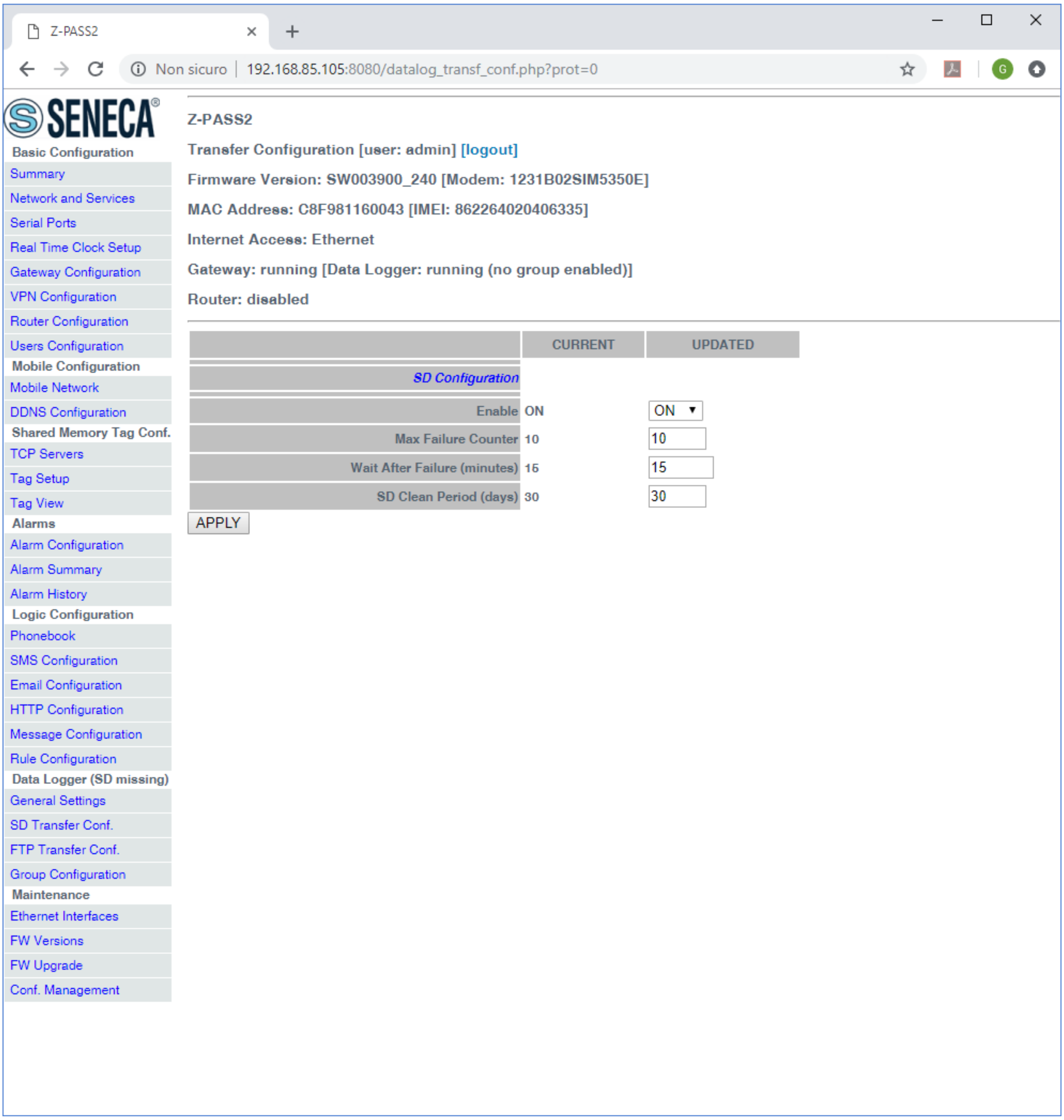
By clicking on the “CLEAN HISTORY” button, it’s possible to clean the whole alarm history.

By clicking on the “EXPORT TO CSV” button, it’s possible to export the alarm history to a “.csv” file (the separator character is “;”).

21.5 Client Protocols

21.5.1 SD Transfer Configuration

By clicking on the “SD Transfer Configuration” link, in the “Client Protocols” section, you come to the following page:



Z-PASS2

Transfer Configuration [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: 1231B02SIM5350E]

MAC Address: C8F981160043 [IMEI: 862264020406335]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

	CURRENT	UPDATED
SD Configuration		
Enable	ON	ON ▾
Max Failure Counter	10	10
Wait After Failure (minutes)	15	15
SD Clean Period (days)	30	30

This page contains the parameters telling if log files are copied to the SD Card and how long they are kept, as explained in the following table.

Field	Meaning	Default value
Enable	Flag telling if log files are copied to the SD Card or not	OFF
Max Failure Counter	This parameter defines the maximum number of failed copy attempts before entering the "Wait after failure" status	10

	(see next field)	
Wait After Failure (minutes)	This parameter defines the duration, in minutes, of the "Wait after failure" status. In this status, no further attempt to copy a log file to the SD Card is performed	15
SD Clean Period (days)	This parameter defines for how many days the log files shall be kept on the SD Card; that is, after the specified number of days, the log files are deleted	30

On the SD card, log files are saved in directories with names having the following format:

yyyymmdd (yyyy=year, mm=month, dd=day)

e.g.:

20180612

Each of these directories contains one more subdirectories:

logX X=[1..4], group number

which in turn contain the log files of the corresponding group.

Log file names have the following format:

Lmmmmmmm.csv

where *mmmmmmm* is the number of minutes starting from the date/hour [1/1/2000 00:00], corresponding to the first line (sample) in the log file

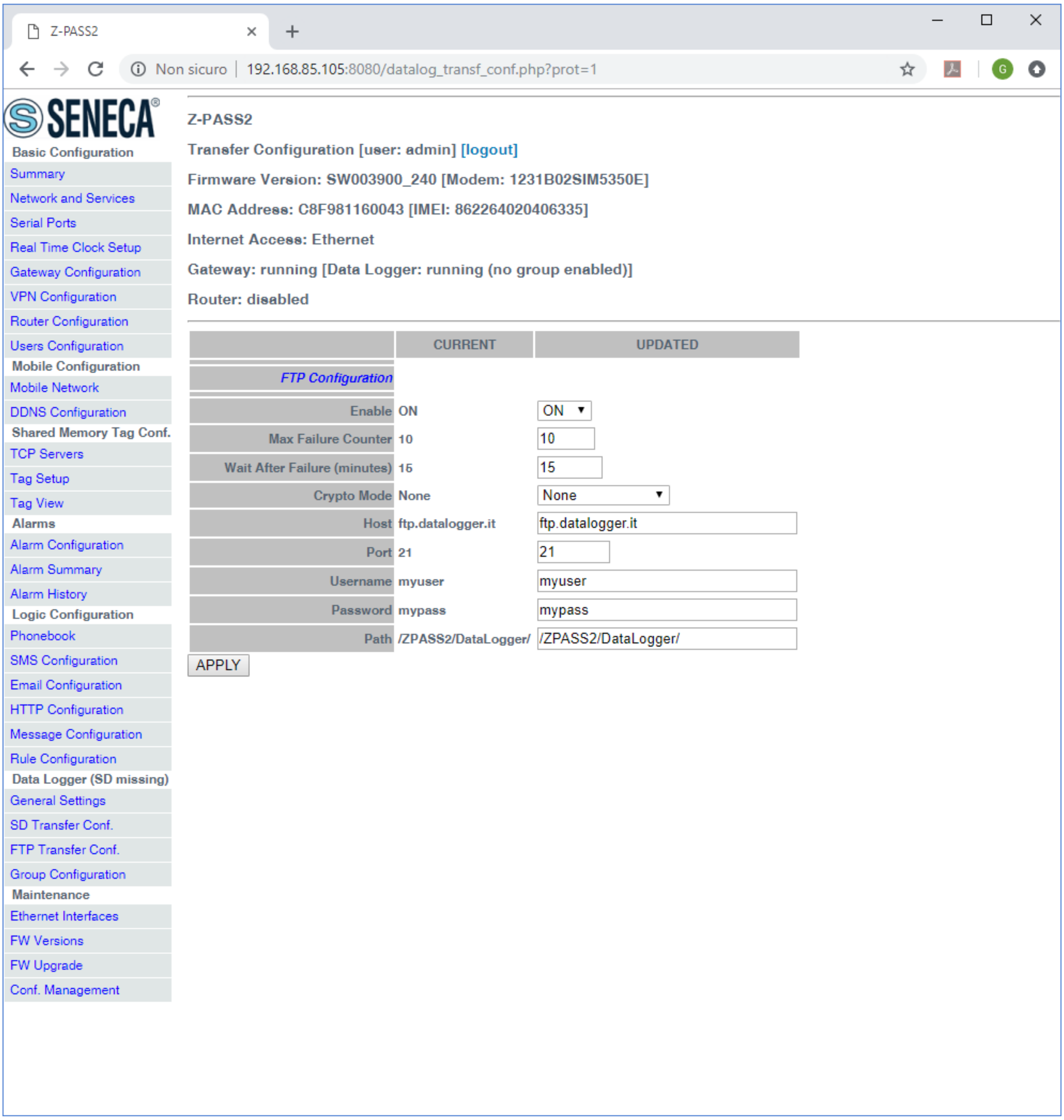
e.g.:

L9701690.csv

See also the "SD File Manager" [21.7.3] paragraph.

21.5.2 FTP Transfer Configuration

By clicking on the "FTP Transfer Configuration" link, in the "Client Protocols" section, you come to the following page:



Z-PASS2

Transfer Configuration [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: 1231B02SIM5350E]

MAC Address: C8F981160043 [IMEI: 862264020406335]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

	CURRENT	UPDATED
FTP Configuration		
Enable	ON	ON
Max Failure Counter	10	10
Wait After Failure (minutes)	15	15
Crypto Mode	None	None
Host	ftp.datalogger.it	ftp.datalogger.it
Port	21	21
Username	myuser	myuser
Password	mypass	mypass
Path	/ZPASS2/DataLogger/	/ZPASS2/DataLogger/

This page contains the parameters related to the transfer of log files via FTP, as explained in the following table.

Field	Meaning	Default value
Enable	Flag telling if log files are transferred via FTP or not	OFF
Max Failure Counter	This parameter defines the maximum number of failed transfer attempts before entering the “Wait after failure”	10

	status (see next field)	
Wait After Failure (minutes)	This parameter defines the duration, in minutes, of the "Wait after failure" status. In this status, no further attempt to transfer a log file via FTP is performed	15
Crypto Mode	This parameter defines the encryption mode of the FTP connection. Possible modes are: - None - TLS/SSL Implicit - TLS/SSL Explicit	None
Host	Hostname (FQDN) or IP address of the FTP server	empty
Port	FTP server (TCP) port	21
Username	Username to access the FTP server	empty
Password	Password to access the FTP server	empty
Path	Path of the directory, on the FTP server, where the log files shall be saved	empty

Log files transferred via FTP have names with the following format:

<RTU_Name>_X_log<date_time>.csv

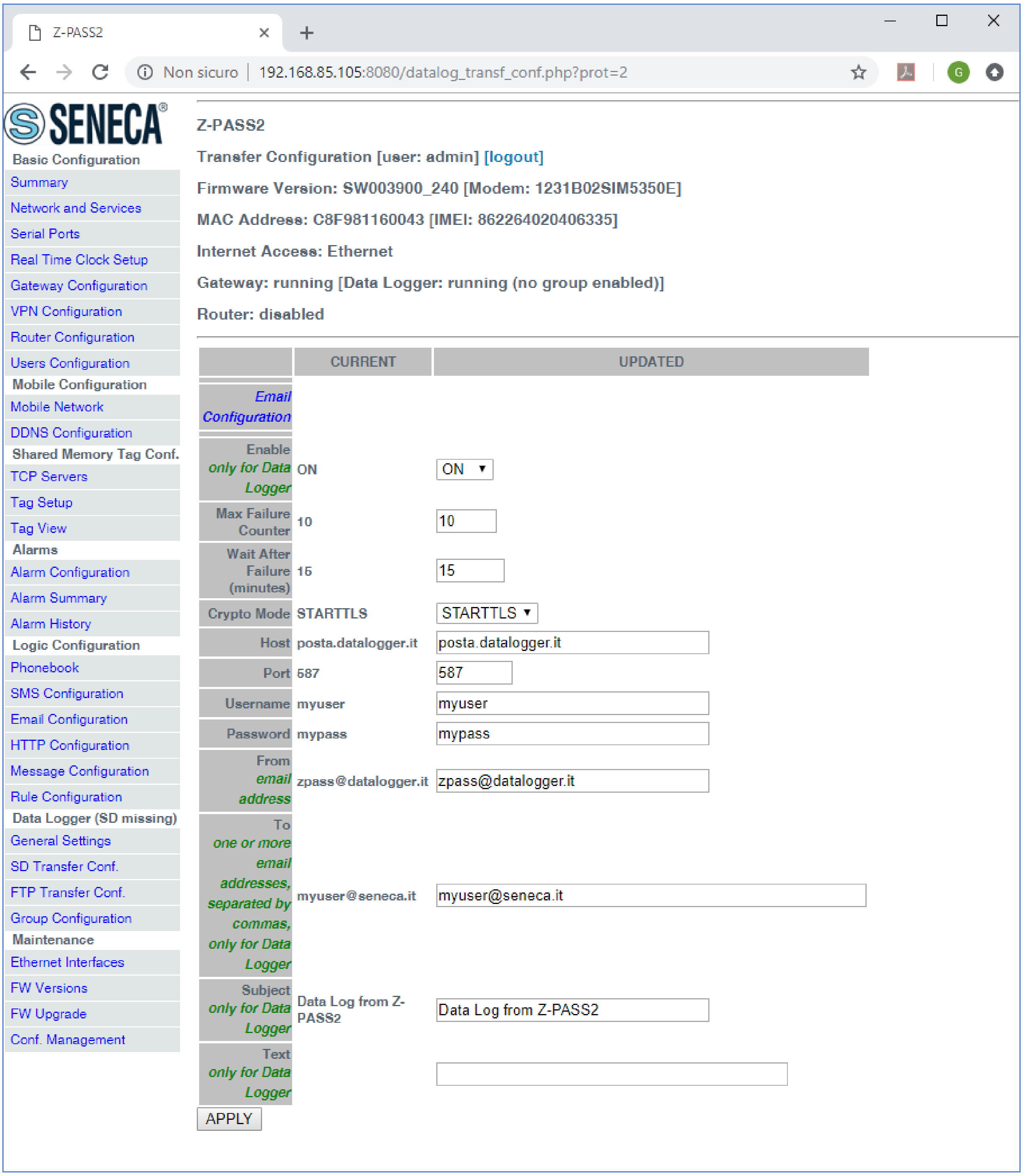
where:
- *<RTU_Name>* is the value of "RTU Name" parameter in "General Settings" page
- *X=[1..4]* is the group number
- *<date_time>* has the format *yyyymmdd* (yyyy=year, mm=month, dd=day); this is the timestamp of the first sample (line) in the log file

e.g.:

```
Z-PASS_1_log20180507101507.csv
```

21.5.3 Email Configuration

By clicking on the "Email Configuration" link, in the "Client Protocols" section, you come to the following page:



Z-PASS2

Transfer Configuration [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: 1231B02SIM5350E]

MAC Address: C8F981160043 [IMEI: 862264020406335]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

	CURRENT	UPDATED
Email Configuration		
Enable *only for Data Logger*	ON	ON ▾
Max Failure Counter	10	10
Wait After Failure (minutes)	15	15
Crypto Mode	STARTTLS	STARTTLS ▾
Host	posta.datalogger.it	posta.datalogger.it
Port	587	587
Username	myuser	myuser
Password	mypass	mypass
From *email address*	zpass@datalogger.it	zpass@datalogger.it
To *one or more email addresses, separated by commas, only for Data Logger*	myuser@seneca.it	myuser@seneca.it
Subject *only for Data Logger*	Data Log from Z-PASS2	Data Log from Z-PASS2
Text *only for Data Logger*		

In Z-PASS, emails can be used to transfer data log files or to send alarms; some parameters in this page are used only when transferring data log files, not when sending alarms; these parameters are marked with the “only for Data Logger” caption.

All parameters are explained in the following table.

Field	Meaning	Default value
Enable	Flag telling if log files are transferred via EMAIL or not Conversely, alarms can be sent via EMAIL even if this parameter is set to OFF, provided that the other parameters are correctly set	OFF
Max Failure Counter	This parameter defines the maximum number of failed attempts before entering the “Wait after failure” status (see next field)	10
Wait After Failure (minutes)	This parameter defines the duration, in minutes, of the “Wait after failure” status. In this status, no further attempt to send a log file or an alarm via EMAIL is performed	15
Crypto Mode	This parameter defines the encryption mode of the EMAIL connection. Possible modes are: - None - TLS/SSL - STARTTLS	None
Host	Hostname (FQDN) or IP address of the EMAIL server	empty
Port	EMAIL server (TCP) port	25
Username	Username to access the EMAIL server	empty
Password	Password to access the EMAIL server	empty
From	Email sender address	empty
To	List of one or more email recipient addresses, separated by commas This parameter is used only for log files transfer	empty
Subject	Email subject This parameter is used only for log files transfer	empty
Text	Email text; if left empty, the text “This is a mail from Z-PASS2 [or Z-PASS1]” is sent This parameter is used only for log	empty

	files transfer	

Log files sent as EMAIL attachments have names with the following format:

<RTU_Name>_X_log<date_time>.csv

where:
- *<RTU_Name>* is the value of "RTU Name" parameter in "General Settings" page
- *X=[1..4]* is the group number
- *<date_time>* has the format *yyyymmdd* (yyyy=year, mm=month, dd=day); this is the timestamp of the first sample (line) in the log file

e.g.:

```
Z-PASS_1_log20180507101507.csv
```

Emails carrying alarms have the following text format:

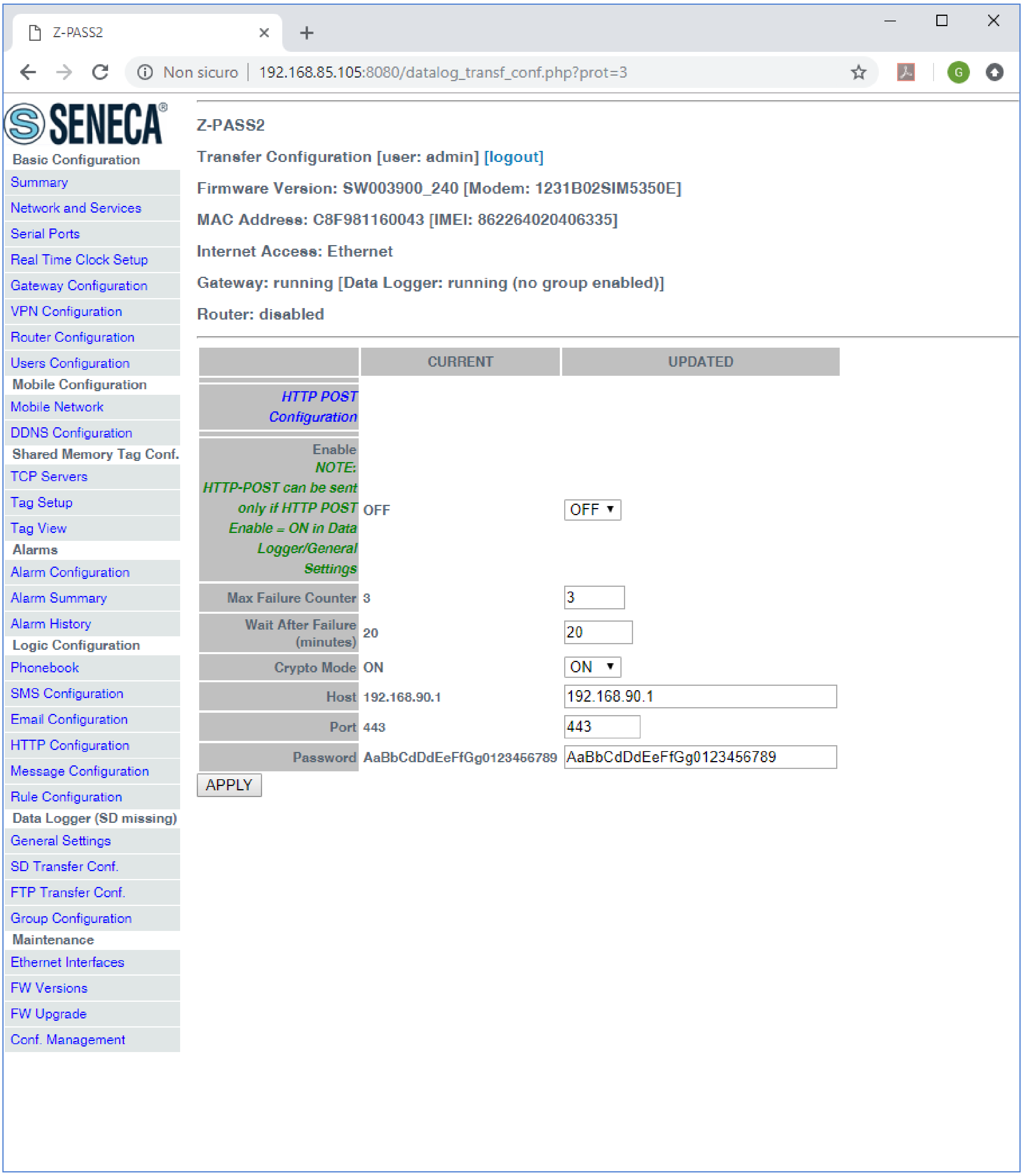
```
MESSAGE:<timestamp>
<rtu name> <message text>
```

with the following subject:

```
<rtu name>:ALARM
```

21.5.4 HTTP Configuration

By clicking on the "HTTP Configuration" link, in the "Client Protocols" section, you come to the following page:



Z-PASS2

Transfer Configuration [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: 1231B02SIM5350E]

MAC Address: C8F981160043 [IMEI: 862264020406335]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

	CURRENT	UPDATED
HTTP POST Configuration		
Enable *NOTE: HTTP-POST can be sent only if HTTP POST Enable = ON in Data Logger/General Settings*	OFF	OFF ▾
Max Failure Counter	3	3
Wait After Failure (minutes)	20	20
Crypto Mode	ON	ON ▾
Host	192.168.90.1	192.168.90.1
Port	443	443
Password	AaBbCdDdEeFfGg0123456789	AaBbCdDdEeFfGg0123456789

APPLY

In Z-PASS, HTTP POSTs can be used to send log samples or alarms (events).

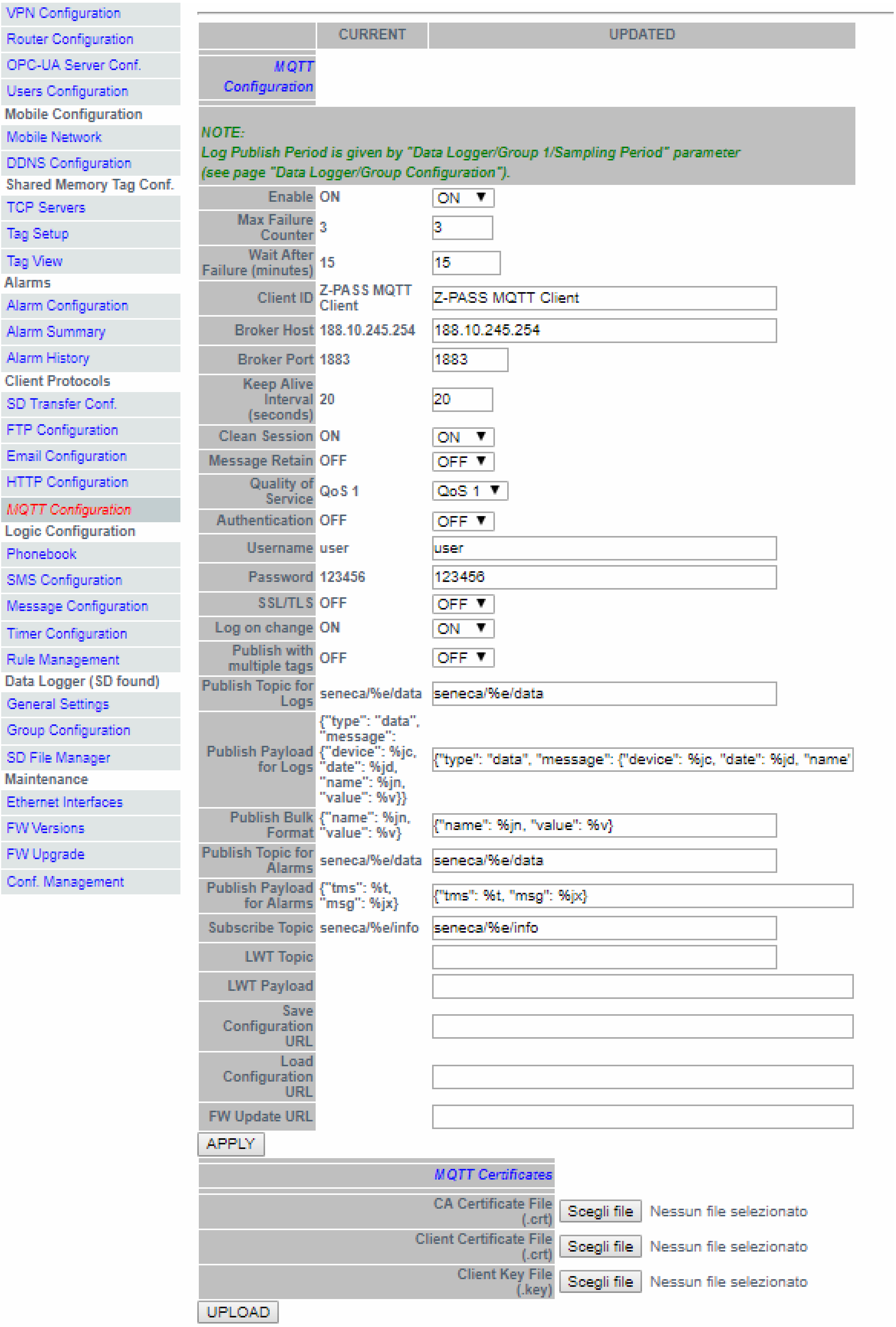
All parameters are explained in the following table.

Field	Meaning	Default value
Enable	Flag telling if log samples/events are	OFF

	sent via HTTP POST requests or not	
Max Failure Counter	This parameter defines the maximum number of failed attempts before entering the “Wait after failure” status (see next field)	10
Wait After Failure (minutes)	This parameter defines the duration, in minutes, of the “Wait after failure” status. In this status, no further attempt to send a log sample via HTTP POST request is performed	15
Crypto Mode	This parameter defines the encryption mode of the HTTP connection. Possible modes are: - OFF (HTTP) - ON (HTTPS)	ON
Host	Hostname (FQDN) or IP address of the HTTP server	192.168.90.1
Port	HTTP server (TCP) port	443
Password	Password to access the HTTP server	AaBbCdDdEeFfGg0123456789

21.5.5 MQTT Configuration

By clicking on the “MQTT Configuration” link, in the “Client Protocols” section, you come to the following page:



	CURRENT	UPDATED
MQTT Configuration		

NOTE:
Log Publish Period is given by "Data Logger/Group 1/Sampling Period" parameter
(see page "Data Logger/Group Configuration").

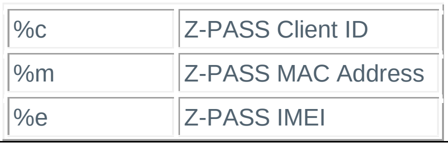
Enable	ON	ON ▼
Max Failure Counter	3	3
Wait After Failure (minutes)	15	15
Client ID	Z-PASS MQTT Client	Z-PASS MQTT Client
Broker Host	188.10.245.254	188.10.245.254
Broker Port	1883	1883
Keep Alive Interval (seconds)	20	20
Clean Session	ON	ON ▼
Message Retain	OFF	OFF ▼
Quality of Service	QoS 1	QoS 1 ▼
Authentication	OFF	OFF ▼
Username	user	user
Password	123456	123456
SSL/TLS	OFF	OFF ▼
Log on change	ON	ON ▼
Publish with multiple tags	OFF	OFF ▼
Publish Topic for Logs	seneca/%e/data	seneca/%e/data
Publish Payload for Logs	{"type": "data", "message": {"device": %jc, "date": %jd, "name": %jn, "value": %v}}	{"type": "data", "message": {"device": %jc, "date": %jd, "name'
Publish Bulk Format	{"name": %jn, "value": %v}	{"name": %jn, "value": %v}
Publish Topic for Alarms	seneca/%e/data	seneca/%e/data
Publish Payload for Alarms	{"tms": %t, "msg": %jx}	{"tms": %t, "msg": %jx}
Subscribe Topic	seneca/%e/info	seneca/%e/info
LWT Topic		
LWT Payload		
Save Configuration URL		
Load Configuration URL		
FW Update URL		

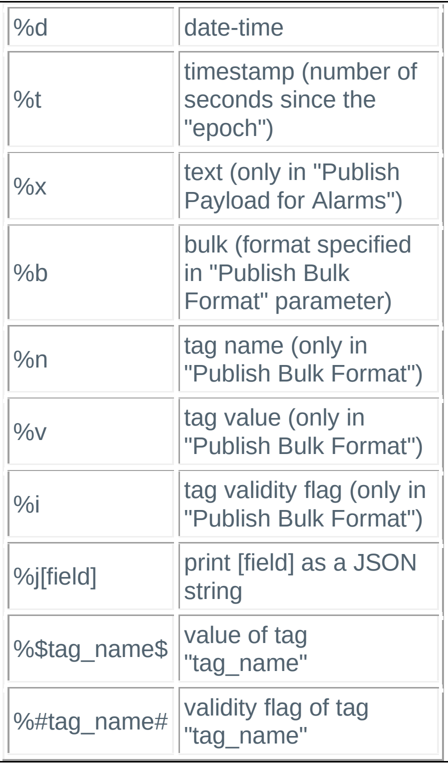
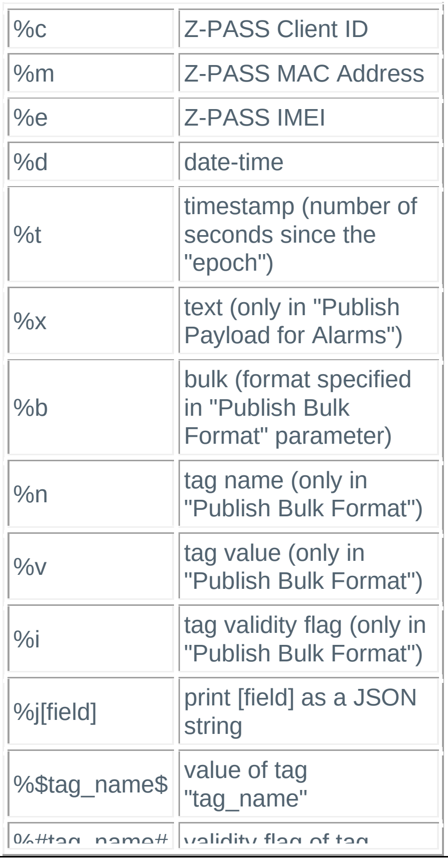
MQTT Certificates		
CA Certificate File (.crt)	Scegli file	Nessun file selezionato
Client Certificate File (.crt)	Scegli file	Nessun file selezionato
Client Key File (.key)	Scegli file	Nessun file selezionato

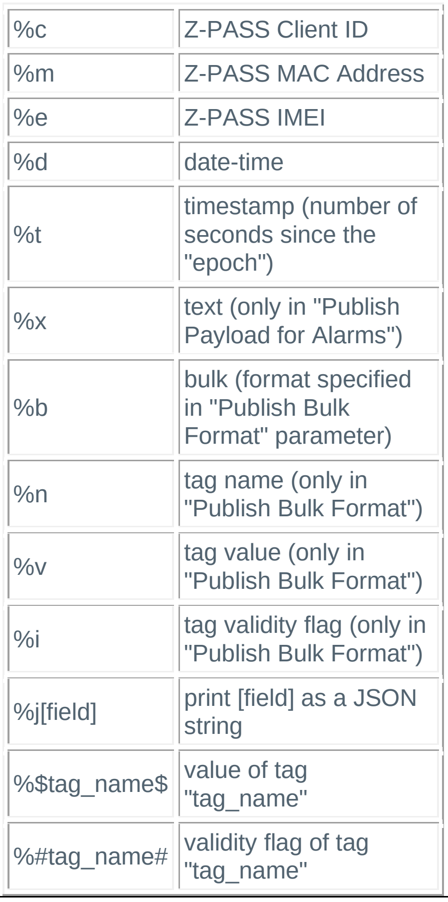
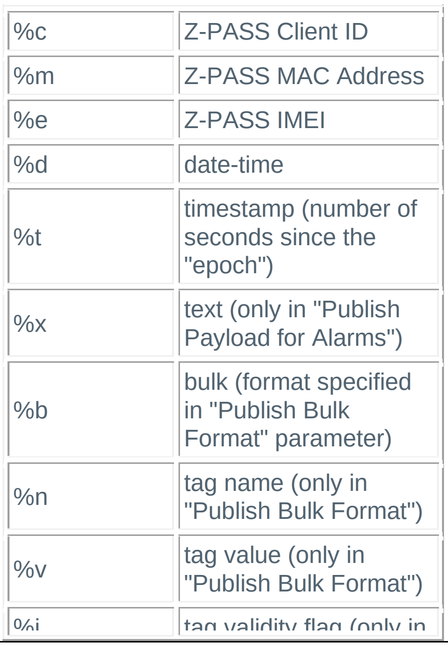
In Z-PASS, MQTT protocol can be used to send (and receive) data or events to a cloud (called broker).

All parameters are explained in the following table.

Field	**Meaning**	**Default value**
Enable	Flag telling if data/events are sent/receive via MQTT protocol or not	OFF
Max Failure Counter	This parameter defines the maximum number of failed attempts before entering the “Wait after failure” status (see next field)	3
Wait After Failure (minutes)	This parameter defines the duration, in minutes, of the “Wait after failure” status. In this status, no further attempt to send or receive MQTT data is performed	15
Client ID	This parameter defines the Client ID used in the MQTT protocol	Z-PASS MQTT Client
Broker Host	This parameter defines the Broker Host name or address	192.168.90.1
Broker Port	This parameter defines the Broker Port	1883
Keep Alive Interval (seconds)	This parameter defines the Keep alive: ensures that the connection between the broker and client is still open and that the broker and the client are aware of being connected. When the client establishes a connection to the broker, the client communicates a time interval in seconds to the broker. This interval defines the maximum length of time that the broker and client may not communicate with each other	20
Clean Session	This parameter defines the clean session. When the clean session flag is set to true, the client does not want a persistent session. If the client disconnects for any reason, all	ON

	information and messages that are queued from a previous persistent session are lost.	
Message Retain	This parameter defines the message retain. Normally if a publisher publishes a message to a topic, and no one is subscribed to that topic the message is simply discarded by the broker. However the publisher can tell the broker to keep the last message on that topic by setting theretained message flag.	OFF
Quality of service	This parameter defines the quality of service for the MQTT protocol. Can be selected from QOS 0 (only once, without ack) QOS 1 (At Least Once, with ack) QOS 2 (Only Once, with ack and resend)	QOS 1
Authentication	This parameter defines if must be used the authentication with user/password for access to the broker	OFF
Username	Username for atuthentication (only if authentication is ON)	-
Password	Password for atuthentication (only if authentication is ON)	
SSL/TLS	This parameter defines if the communication is encrypted with SSL/TLS	OFF
Log on Change	This parameter defines if topics must be sent only on change (according to minimum datalog time) or not.	ON
Publish with multiple tags	This parameter defines if the publish contains multiple tags or if the device must send a publish for each tag.	ON
Publish Topic for Logs	Select the topic name for logs data using the following legenda:  %c Z-PASS Client ID %m Z-PASS MAC Address %e Z-PASS IMEI	seneca/%c/data

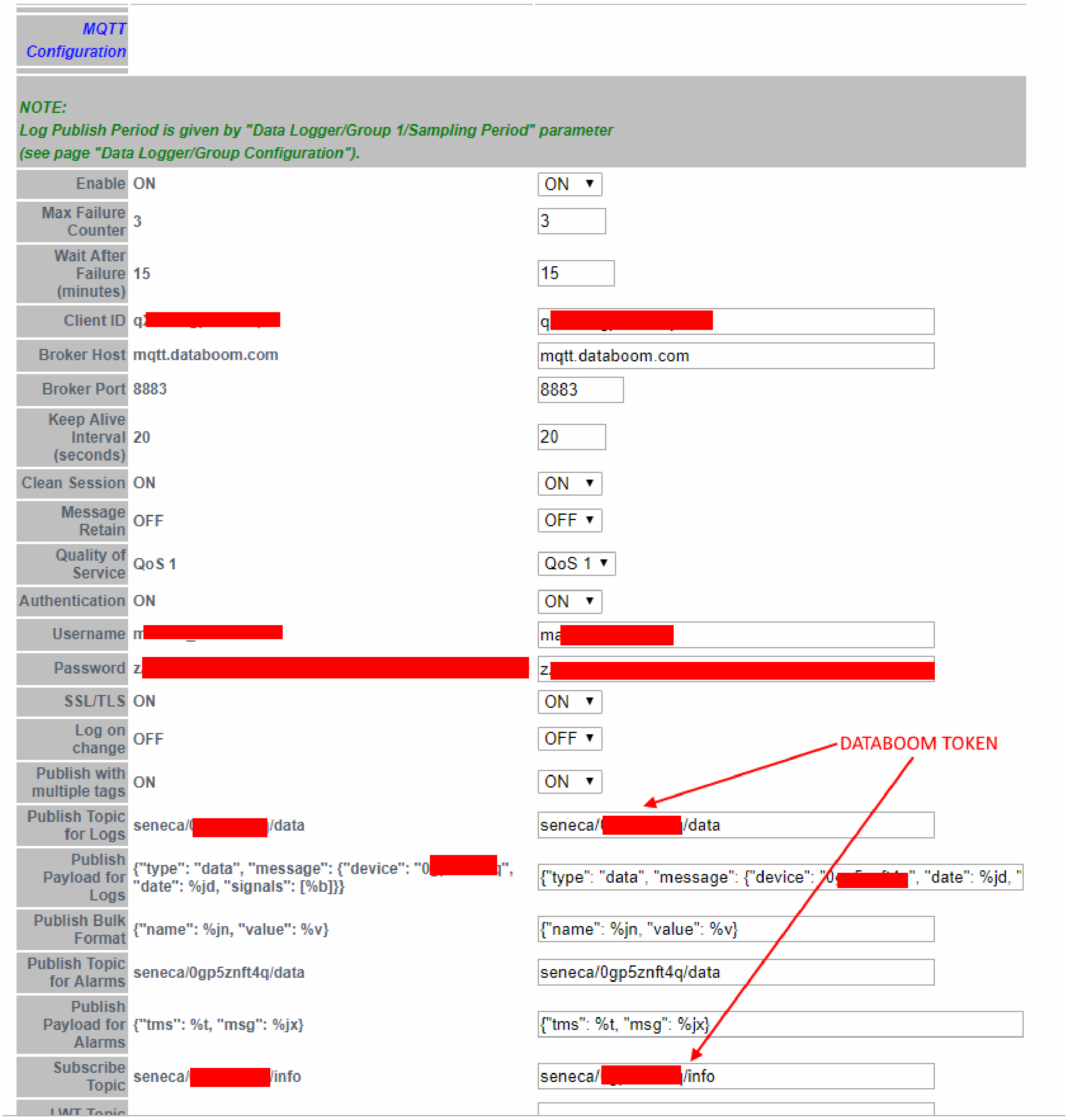
<table>
<tr>
<td></td>
<td>

<table>
<tr><td>%d</td><td>date-time</td></tr>
<tr><td>%t</td><td>timestamp (number of seconds since the "epoch")</td></tr>
<tr><td>%x</td><td>text (only in "Publish Payload for Alarms")</td></tr>
<tr><td>%b</td><td>bulk (format specified in "Publish Bulk Format" parameter)</td></tr>
<tr><td>%n</td><td>tag name (only in "Publish Bulk Format")</td></tr>
<tr><td>%v</td><td>tag value (only in "Publish Bulk Format")</td></tr>
<tr><td>%i</td><td>tag validity flag (only in "Publish Bulk Format")</td></tr>
<tr><td>%j[field]</td><td>print [field] as a JSON string</td></tr>
<tr><td>%tag_name</td><td>value of tag "tag_name"</td></tr>
<tr><td>%#tag_name#</td><td>validity flag of tag "tag_name"</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td>Publish Payload for Logs</td>
<td>
Select the format that must be used for the publish payload in Json format using the following legenda:

<table>
<tr><td>%c</td><td>Z-PASS Client ID</td></tr>
<tr><td>%m</td><td>Z-PASS MAC Address</td></tr>
<tr><td>%e</td><td>Z-PASS IMEI</td></tr>
<tr><td>%d</td><td>date-time</td></tr>
<tr><td>%t</td><td>timestamp (number of seconds since the "epoch")</td></tr>
<tr><td>%x</td><td>text (only in "Publish Payload for Alarms")</td></tr>
<tr><td>%b</td><td>bulk (format specified in "Publish Bulk Format" parameter)</td></tr>
<tr><td>%n</td><td>tag name (only in "Publish Bulk Format")</td></tr>
<tr><td>%v</td><td>tag value (only in "Publish Bulk Format")</td></tr>
<tr><td>%i</td><td>tag validity flag (only in "Publish Bulk Format")</td></tr>
<tr><td>%j[field]</td><td>print [field] as a JSON string</td></tr>
<tr><td>%tag_name</td><td>value of tag "tag_name"</td></tr>
<tr><td>%#tag_name#</td><td>validity flag of tag</td></tr>
</table>
</td>
<td>{"type": "data", "message": {"device": %jc, "date": %jd, "name": %jn, "value": %v}}</td>
</tr>
</table>

	 "tag_name"	
Publish Bulk Format	Select the format for the bulk mode using the following legenda:  %c Z-PASS Client ID %m Z-PASS MAC Address %e Z-PASS IMEI %d date-time %t timestamp (number of seconds since the "epoch") %x text (only in "Publish Payload for Alarms") %b bulk (format specified in "Publish Bulk Format" parameter) %n tag name (only in "Publish Bulk Format") %v tag value (only in "Publish Bulk Format") %i tag validity flag (only in "Publish Bulk Format") %j[field] print [field] as a JSON string %tag_name value of tag "tag_name" %#tag_name# validity flag of tag "tag_name"	{"name": %jn, "value": %v}
Publish Topic for Alarms	Select the topic name for Alarms using the following legenda:  %c Z-PASS Client ID %m Z-PASS MAC Address %e Z-PASS IMEI %d date-time %t timestamp (number of seconds since the "epoch") %x text (only in "Publish Payload for Alarms") %b bulk (format specified in "Publish Bulk Format" parameter) %n tag name (only in "Publish Bulk Format") %v tag value (only in "Publish Bulk Format") %i tag validity flag (only in	seneca/%c/data

<table>
<tr>
<td></td>
<td>
<table>
<tr><td></td><td>"Publish Bulk Format")</td></tr>
<tr><td>%j[field]</td><td>print [field] as a JSON string</td></tr>
<tr><td>%tag_name</td><td>value of tag "tag_name"</td></tr>
<tr><td>%#tag_name#</td><td>validity flag of tag "tag_name"</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td>Subscribe Topic</td>
<td>Select the subscribe topic using the following legenda:
<table>
<tr><td>%c</td><td>Z-PASS Client ID</td></tr>
<tr><td>%m</td><td>Z-PASS MAC Address</td></tr>
<tr><td>%e</td><td>Z-PASS IMEI</td></tr>
<tr><td>%d</td><td>date-time</td></tr>
<tr><td>%t</td><td>timestamp (number of seconds since the "epoch")</td></tr>
<tr><td>%x</td><td>text (only in "Publish Payload for Alarms")</td></tr>
<tr><td>%b</td><td>bulk (format specified in "Publish Bulk Format" parameter)</td></tr>
<tr><td>%n</td><td>tag name (only in "Publish Bulk Format")</td></tr>
<tr><td>%v</td><td>tag value (only in "Publish Bulk Format")</td></tr>
<tr><td>%i</td><td>tag validity flag (only in "Publish Bulk Format")</td></tr>
<tr><td>%j[field]</td><td>print [field] as a JSON string</td></tr>
<tr><td>%tag_name</td><td>value of tag "tag_name"</td></tr>
<tr><td>%#tag_name#</td><td>validity flag of tag "tag_name"</td></tr>
</table>
</td>
<td>seneca/%c/info</td>
</tr>
<tr>
<td>LWT Topic</td>
<td>Select the Last Weel and Testament topic using the following legenda:
<table>
<tr><td>%c</td><td>Z-PASS Client ID</td></tr>
<tr><td>%m</td><td>Z-PASS MAC Address</td></tr>
<tr><td>%e</td><td>Z-PASS IMEI</td></tr>
<tr><td>%d</td><td>date-time</td></tr>
<tr><td>%t</td><td>timestamp (number of seconds since the "epoch")</td></tr>
<tr><td>%x</td><td>text (only in "Publish Payload for Alarms")</td></tr>
</table>
</td>
<td>-</td>
</tr>
</table>

<table>
<tr><td></td><td><table>
<tr><td>%b</td><td>bulk (format specified in "Publish Bulk Format" parameter)</td></tr>
<tr><td>%n</td><td>tag name (only in "Publish Bulk Format")</td></tr>
<tr><td>%v</td><td>tag value (only in "Publish Bulk Format")</td></tr>
<tr><td>%i</td><td>tag validity flag (only in "Publish Bulk Format")</td></tr>
<tr><td>%j[field]</td><td>print [field] as a JSON string</td></tr>
<tr><td>%tag_name</td><td>value of tag "tag_name"</td></tr>
<tr><td>%#tag_name#</td><td>validity flag of tag "tag_name"</td></tr>
</table></td><td></td></tr>
<tr><td>LWT Payload</td><td>Select the Last Weel and Testament payload.</td><td>-</td></tr>
<tr><td>Save Configuration URL</td><td>The URL for the “Save Configuration” command received from MQTT</td><td></td></tr>
<tr><td>Load Configuration URL</td><td>The URL for the “Load Configuration” command received from MQTT</td><td></td></tr>
<tr><td>FW Update URL</td><td>The URL for the “FW Update” command received from MQTT</td><td></td></tr>
<tr><td>Sleep Timeout</td><td>Wake-up time of the MQTT task, the shorter it is, the more reactive MQTT is (at the expense of a higher cpu load)</td><td></td></tr>
<tr><td>MQTT Certificates</td><td>Used for load the certificates that can be used with the SSL/TLS encryption.</td><td></td></tr>
</table>

21.5.5.1 MQTT Example configuration for Databoom.com



MQTT Configuration

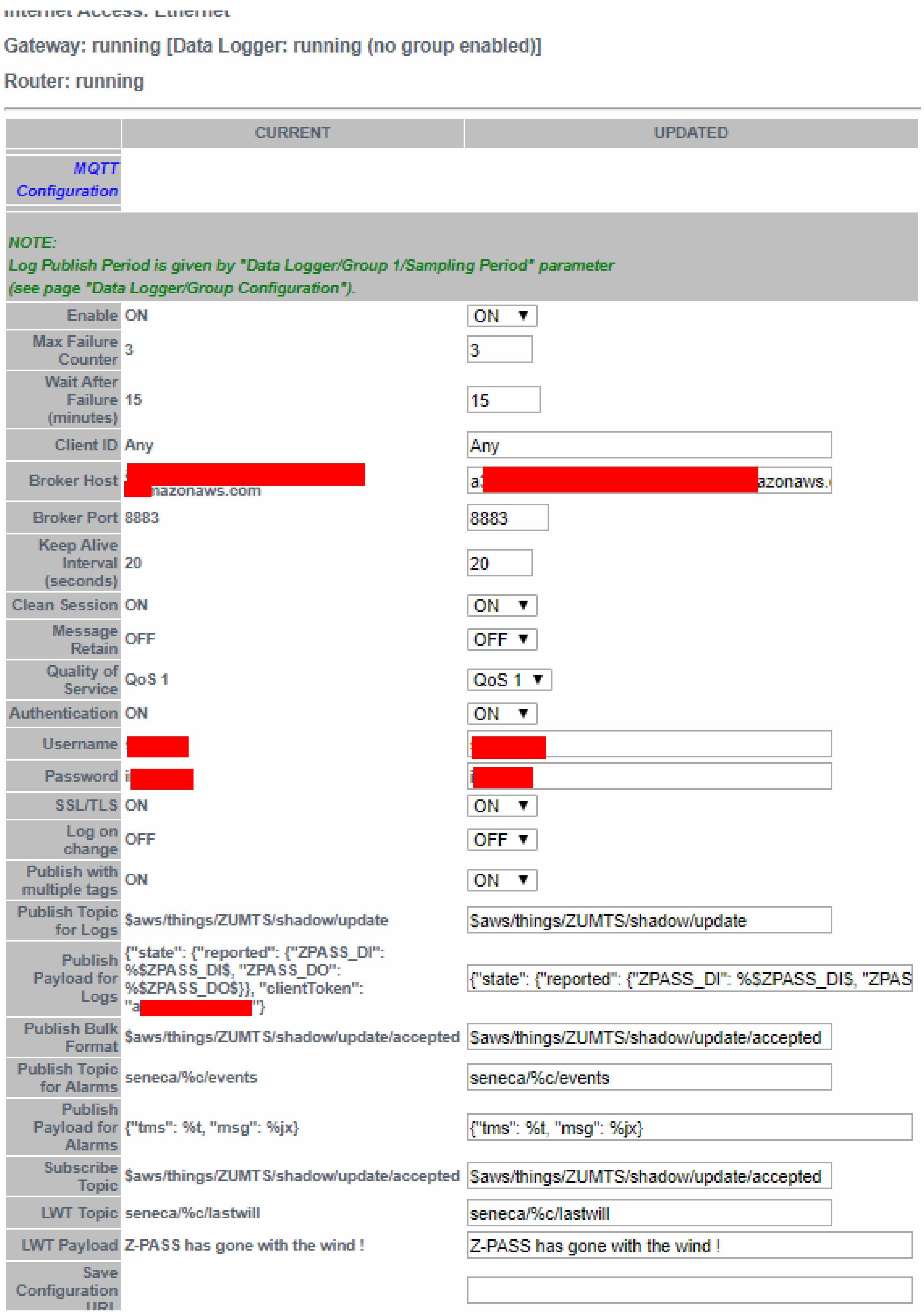
NOTE:
Log Publish Period is given by "Data Logger/Group 1/Sampling Period" parameter
(see page "Data Logger/Group Configuration").

Enable	ON	ON ▾
Max Failure Counter	3	3
Wait After Failure (minutes)	15	15
Client ID	q[redacted]	q[redacted]
Broker Host	mqtt.databoom.com	mqtt.databoom.com
Broker Port	8883	8883
Keep Alive Interval (seconds)	20	20
Clean Session	ON	ON ▾
Message Retain	OFF	OFF ▾
Quality of Service	QoS 1	QoS 1 ▾
Authentication	ON	ON ▾
Username	m[redacted]	ma[redacted]
Password	z[redacted]	z[redacted]
SSL/TLS	ON	ON ▾
Log on change	OFF	OFF ▾
Publish with multiple tags	ON	ON ▾
Publish Topic for Logs	seneca/[redacted]/data	seneca/[redacted]/data
Publish Payload for Logs	{"type": "data", "message": {"device": "0[redacted]", "date": %jd, "signals": [%b]}}	{"type": "data", "message": {"device": "0[redacted]", "date": %jd, "
Publish Bulk Format	{"name": %jn, "value": %v}	{"name": %jn, "value": %v}
Publish Topic for Alarms	seneca/0gp5znft4q/data	seneca/0gp5znft4q/data
Publish Payload for Alarms	{"tms": %t, "msg": %jx}	{"tms": %t, "msg": %jx}
Subscribe Topic	seneca/[redacted]/info	seneca/[redacted]/info
LWT Topic		

DATABOOM TOKEN

Then you must add the Databoom certificates.

21.5.5.2 MQTT Example configuration for Amazon AWS



Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: running

	CURRENT	UPDATED
MQTT Configuration		
NOTE: Log Publish Period is given by "Data Logger/Group 1/Sampling Period" parameter (see page "Data Logger/Group Configuration").		
Enable	ON	ON ▼
Max Failure Counter	3	3
Wait After Failure (minutes)	15	15
Client ID	Any	Any
Broker Host	[redacted] nazonaws.com	a[redacted]azonaws.
Broker Port	8883	8883
Keep Alive Interval (seconds)	20	20
Clean Session	ON	ON ▼
Message Retain	OFF	OFF ▼
Quality of Service	QoS 1	QoS 1 ▼
Authentication	ON	ON ▼
Username	[redacted]	[redacted]
Password	[redacted]	[redacted]
SSL/TLS	ON	ON ▼
Log on change	OFF	OFF ▼
Publish with multiple tags	ON	ON ▼
Publish Topic for Logs	$aws/things/ZUMTS/shadow/update	$aws/things/ZUMTS/shadow/update
Publish Payload for Logs	{"state": {"reported": {"ZPASS_DI": %$ZPASS_DI$, "ZPASS_DO": %$ZPASS_DO$}}, "clientToken": "[redacted]"}	{"state": {"reported": {"ZPASS_DI": %$ZPASS_DI$, "ZPAS
Publish Bulk Format	$aws/things/ZUMTS/shadow/update/accepted	$aws/things/ZUMTS/shadow/update/accepted
Publish Topic for Alarms	seneca/%c/events	seneca/%c/events
Publish Payload for Alarms	{"tms": %t, "msg": %jx}	{"tms": %t, "msg": %jx}
Subscribe Topic	$aws/things/ZUMTS/shadow/update/accepted	$aws/things/ZUMTS/shadow/update/accepted
LWT Topic	seneca/%c/lastwill	seneca/%c/lastwill
LWT Payload	Z-PASS has gone with the wind !	Z-PASS has gone with the wind !
Save Configuration URL		

Then you must add the AWS certificates.

21.5.6 Write a TAG(s) from MQTT

For write a single tag (for example ZPASS_DO_4 to value “1”) from MQTT use:

```
seneca/Z-PASS MQTT Client/info/ZPASS_DO_4

{"val": 1}
```

21.5.7 Write multiple TAGs from MQTT

For write multiple tags from MQTT use:

```
seneca/Z-PASS MQTT Client/info

{"tags": [{"ZPASS_DO_4": 1}]}

{"tags": [{"ZPASS_DO_2": 1}, {"ZPASS_DO_4": 0}]}

{"tags": [{"SHM_S16": -113}, {"SHM_FP": 0.7564}]}

{"tags": [{"SHM_U16": 69}, {"SHM_FP": -1.3291}]}
```

21.5.8 Send a command from MQTT

For send a command from MQTT use:

```
seneca/Z-PASS MQTT Client/info/act

{"act": 1}

This command will do a “RESET”


Other commands are:

RESET          = 1

CONF_SET       = 2

CONF_GET       = 3

FW_UPDATE      = 4

VPN_PPP_ON     = 5

VPN_ON         = 6
```

```
VPN_OFF        = 7

VPN_CUSTOM_ON  = 8

VPN_CUSTOM_OFF = 9

DL_CLEAN_LOGS  = 10
```

21.6 Logic Configuration

The logic configuration can be used to create programs that run in the gateway.

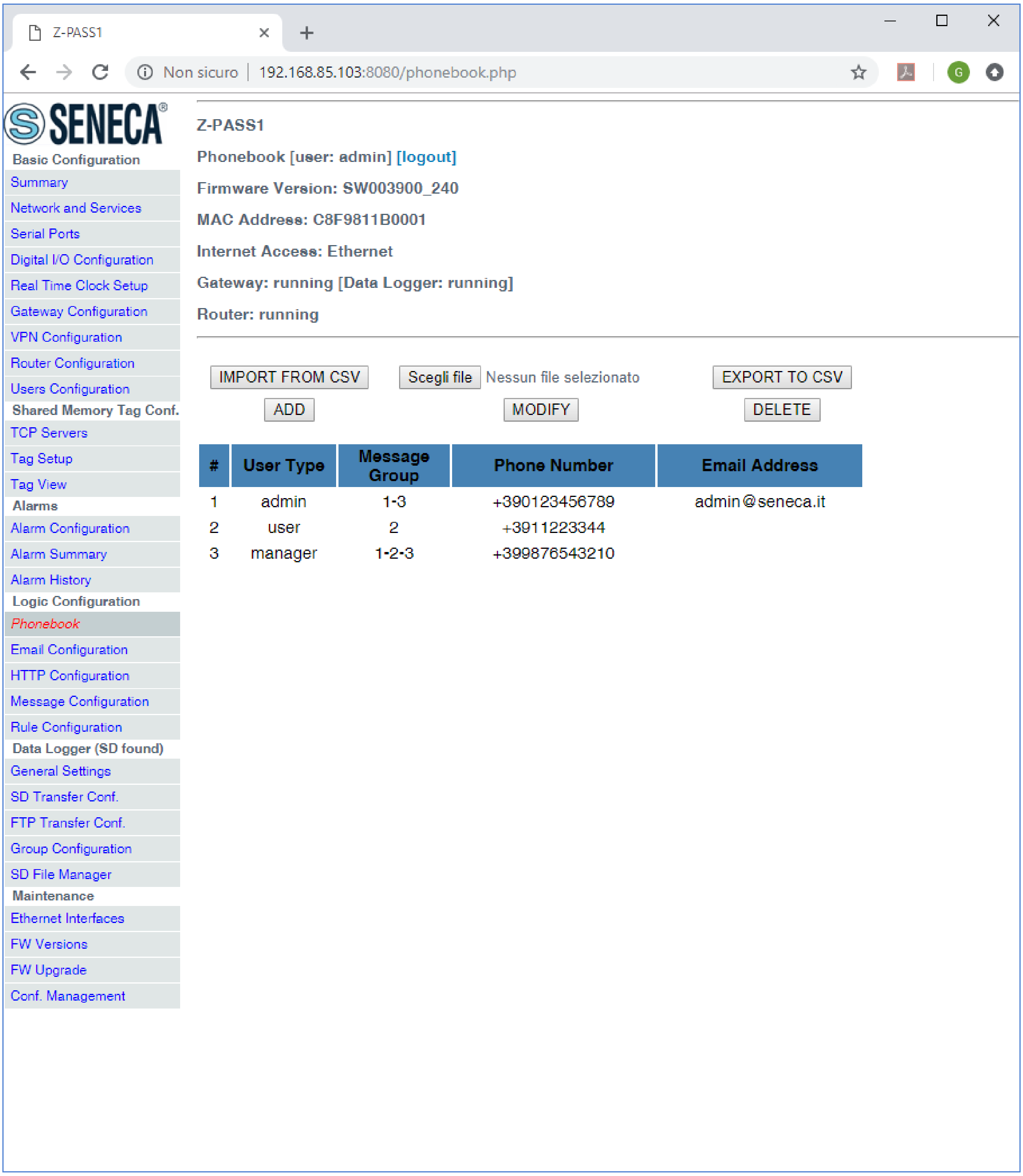
If you need to send text messages by SMS, EMAIL or HTTP, you have first to setup the corresponding configuration. After that the Rule configuration is used to write the program.

Up to 2000 rules can be written.

The rules are executed from top to down and from left to right.

21.6.1 Phonebook

By clicking on the “Phonebook” link, in the “Logic Configuration” section, you come to the following page:



Z-PASS1

Phonebook [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: Ethernet

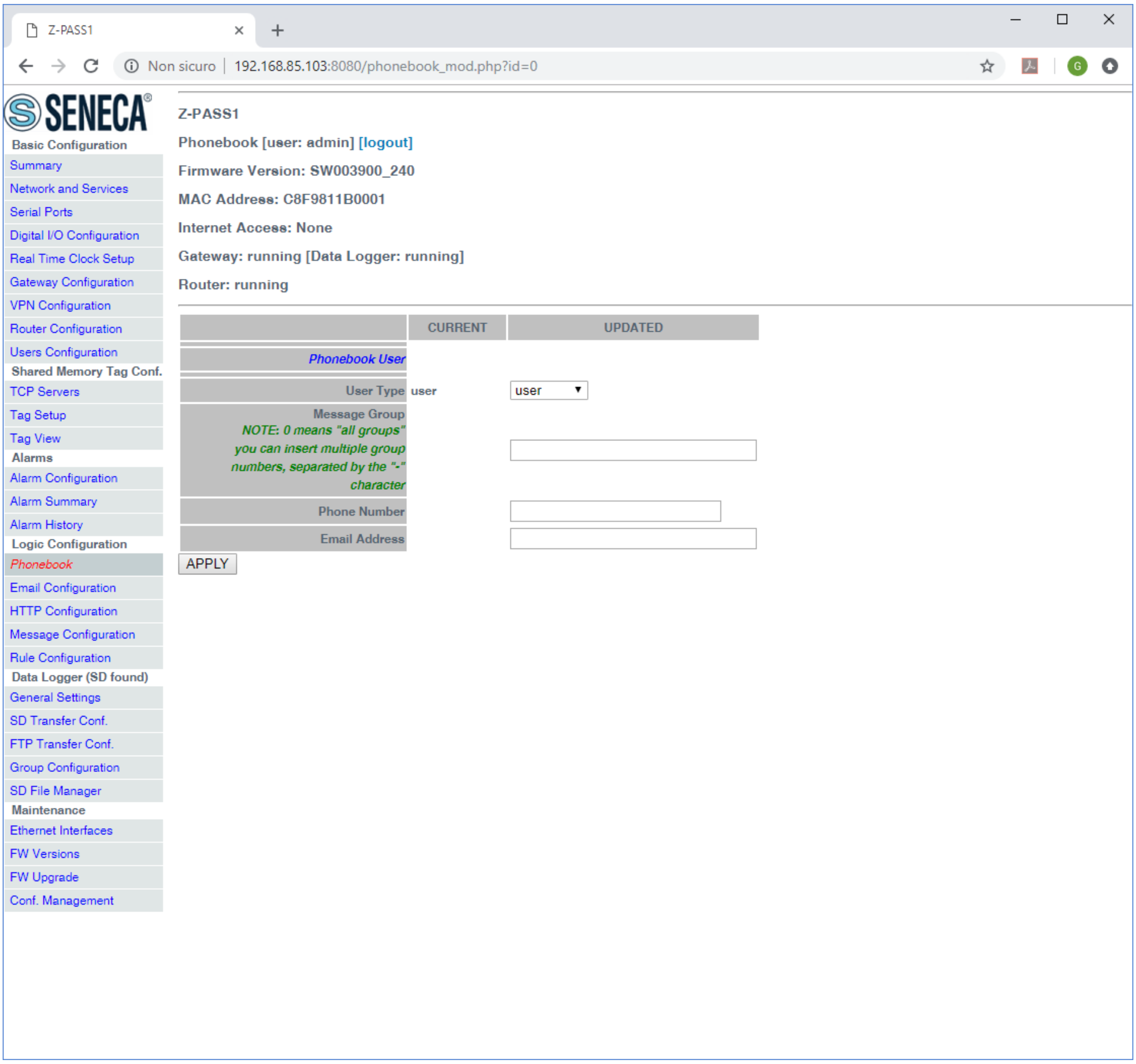
Gateway: running [Data Logger: running]

Router: running

#	User Type	Message Group	Phone Number	Email Address
1	admin	1-3	+390123456789	admin@seneca.it
2	user	2	+3911223344	
3	manager	1-2-3	+399876543210	

In this page, the list of the Phonebook “users” is shown.

By clicking on the “ADD” button, a new user can be inserted into the Phonebook, as in the following figure.



Z-PASS1

Phonebook [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: None

Gateway: running [Data Logger: running]

Router: running

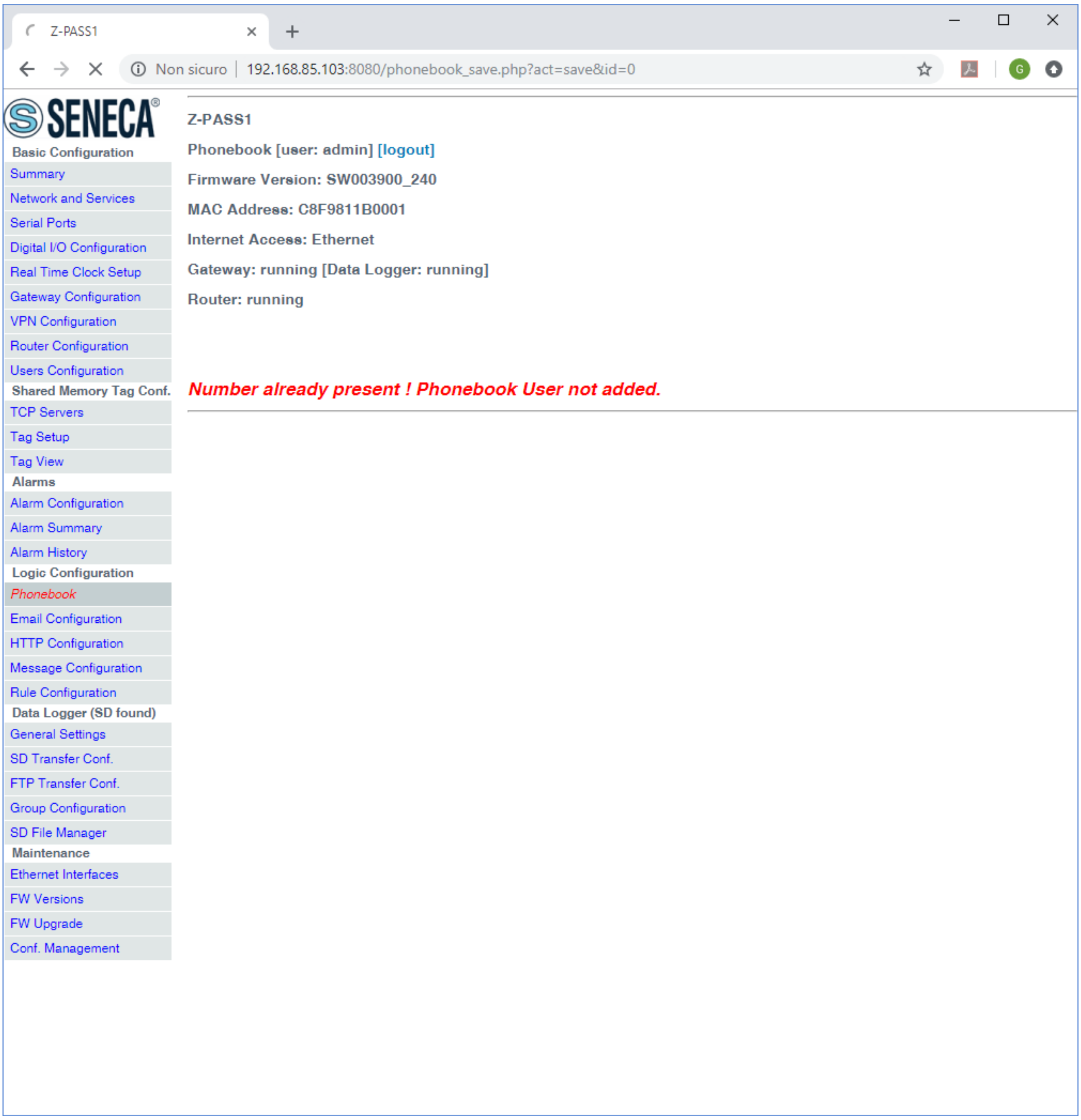
	CURRENT	UPDATED
Phonebook User		
User Type	user	user ▾
Message Group *NOTE: 0 means "all groups" you can insert multiple group numbers, separated by the "-" character*		
Phone Number		
Email Address		

The following table explains the meaning of the parameters related to a Phonebook user.

Field	Meaning	Default value
User Type	Possible user types: - “admin”: this is the user which receives all the rejected or unrecognized SMS commands, if the “SMS Relay to Admin” parameter is set to ON and the “Startup SMS” messages, if the “Startup SMS” parameter is set to ON; this user can send SMS commands to the device; it also	user

	receives all SMS/EMAIL alarms - “manager”: this user can send SMS commands to the device; it receives SMS/EMAIL alarms sent to one of the message groups it belongs to - “user”: this user receives SMS/EMAIL alarms sent to one of the message groups it belongs to	
Message Group	This parameter contains a list of one or more numbers, separated by the ‘-‘ character, which identify the Message Groups which the user belongs to; Message Groups are used as recipients for SMS or EMAIL alarms. The value 0 corresponds to “All Message Groups”	Empty
Phone Number	Phone Number in “international format”; the initial ‘+’ character shall be present	Empty
Email Address	Email Address, used as a recipient for alarms sent via Email	Empty

Two users with the same phone number cannot be present in the Phonebook; so, when trying to add a new user with an already existing phone number, the following error is given.



Z-PASS1

Phonebook [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

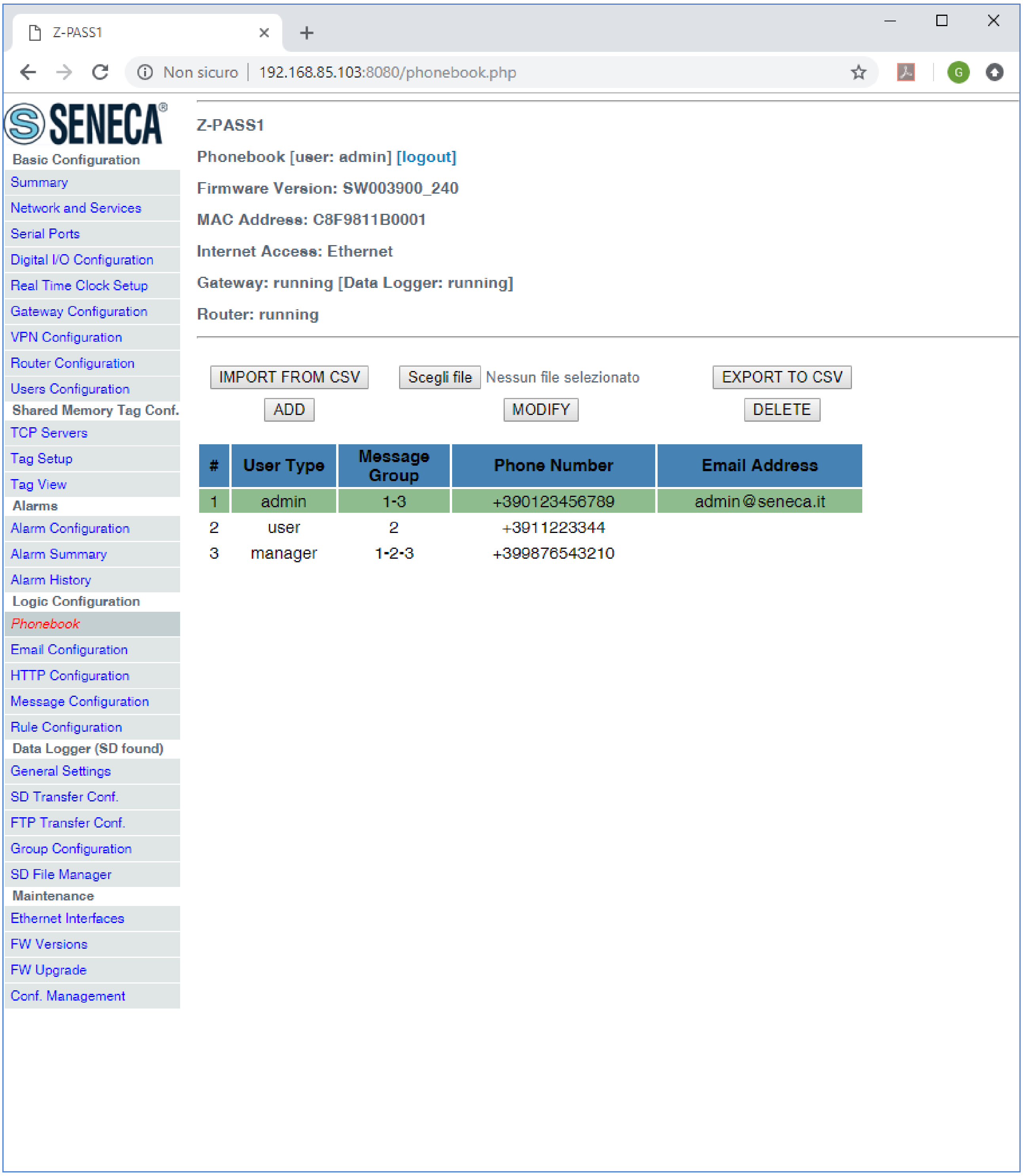
Router: running

Number already present ! Phonebook User not added.

It is possible to insert more than one “admin” user into the Phonebook; just note that only the most recently inserted “admin” user will receive “relayed” SMS commands and “Startup SMS” messages.

Conversely, if no “admin” user is present in the Phonebook, rejected and unrecognized SMS commands won’t be relayed and “Startup SMS” messages won’t be sent, even if the corresponding enable parameters are set to ON.

Selecting a user in the list and clicking on the “MODIFY” button, you can modify the user’s parameters, as in the following figures.



Z-PASS1

Phonebook [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

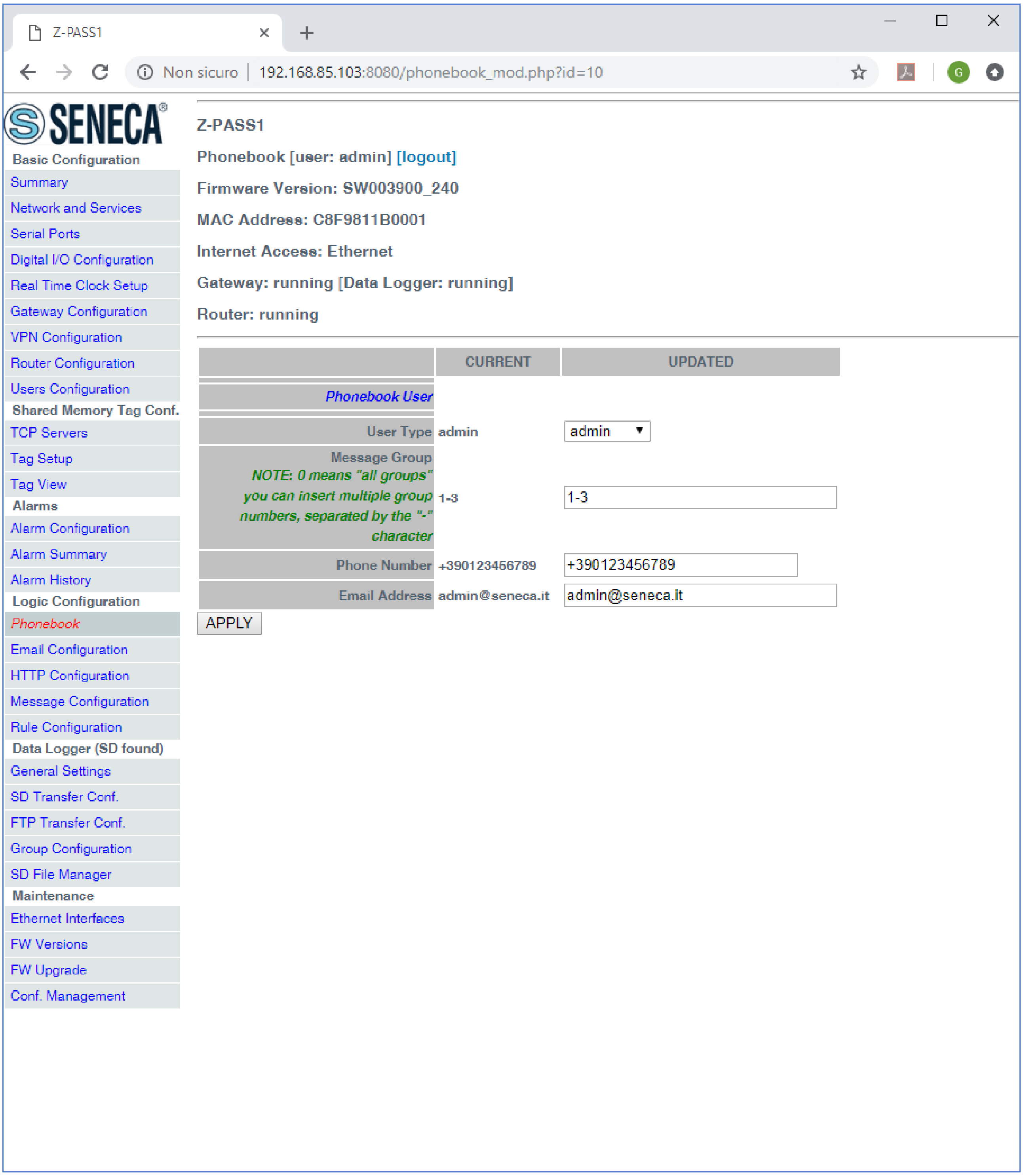
Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: running

Nessun file selezionato

#	User Type	Message Group	Phone Number	Email Address
1	admin	1-3	+390123456789	admin@seneca.it
2	user	2	+3911223344	
3	manager	1-2-3	+399876543210	



Z-PASS1

Phonebook [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: running

	CURRENT	UPDATED
Phonebook User		
User Type	admin	admin ▾
Message Group *NOTE: 0 means "all groups" you can insert multiple group numbers, separated by the "-" character*	1-3	1-3
Phone Number	+390123456789	+390123456789
Email Address	admin@seneca.it	admin@seneca.it

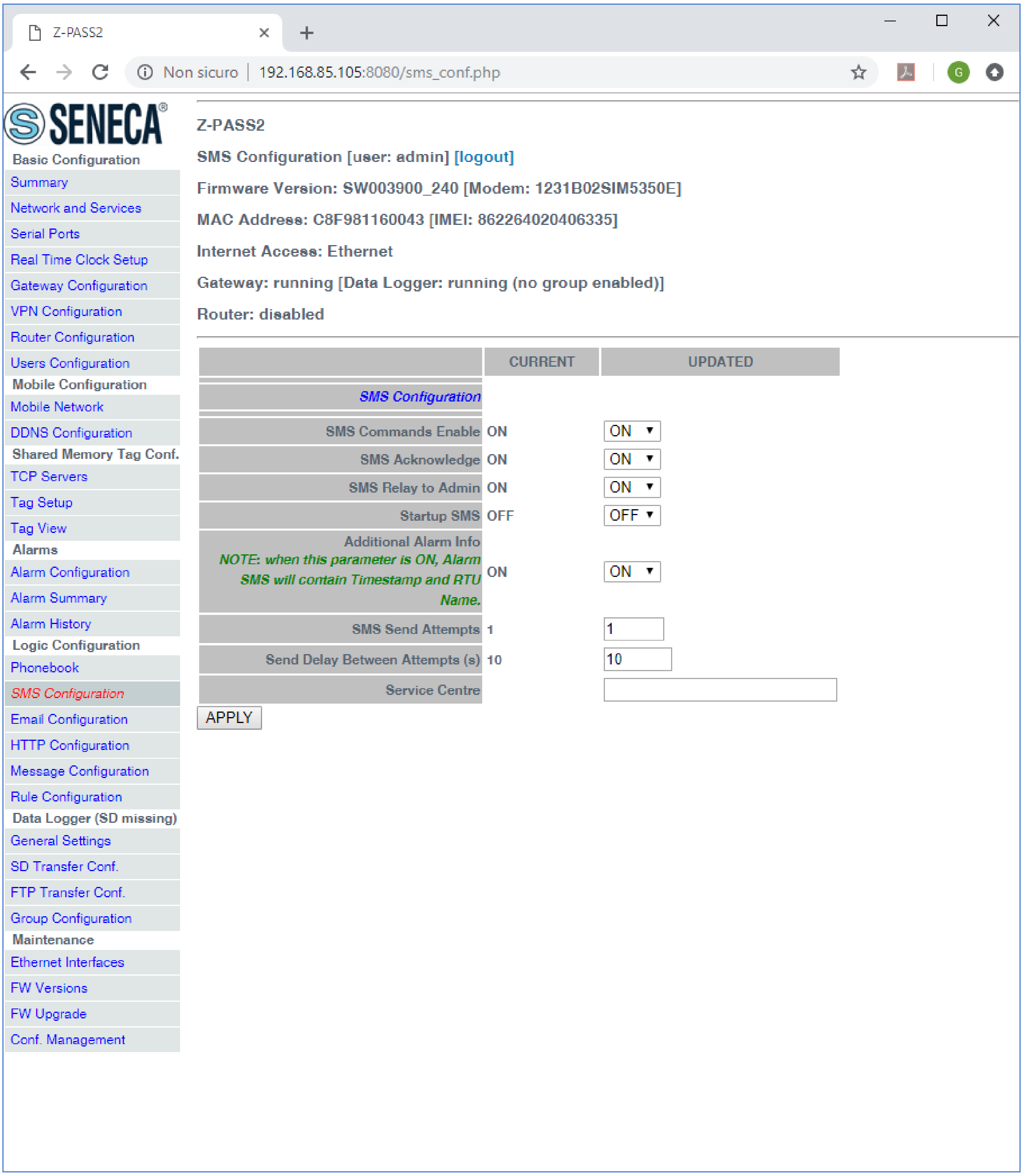
Selecting a user in the list and clicking on the “DELETE” button, you can remove a user from the Phonebook.

Finally, the “EXPORT TO CSV” and “IMPORT FROM CSV” buttons let you export/import the Phonebook to/from a “.csv” file (the separator character is “;”).

Please note that, when importing the Phonebook from a .csv file, the previous Phonebook contents are deleted; so, a fast way to "clean" the Phonebook, if it contains many users, is to import an empty .csv file.

21.6.2 SMS Configuration

By clicking on the "SMS Configuration" link, in the "Logic Configuration" section, you come to the following page:



Z-PASS2

SMS Configuration [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: 1231B02SIM5350E]

MAC Address: C8F981160043 [IMEI: 862264020406335]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

	CURRENT	UPDATED
SMS Configuration		
SMS Commands Enable	ON	ON ▼
SMS Acknowledge	ON	ON ▼
SMS Relay to Admin	ON	ON ▼
Startup SMS	OFF	OFF ▼
Additional Alarm Info *NOTE: when this parameter is ON, Alarm SMS will contain Timestamp and RTU Name.*	ON	ON ▼
SMS Send Attempts	1	1
Send Delay Between Attempts (s)	10	10
Service Centre		

In this page, you can set the parameters related to the “SMS Commands” functionality (see chapter 18), as listed in the following table:

Field	Meaning	Default value
SMS Commands Enable	Flag to enable/disable the SMS commands functionality	ON

SMS Acknowledge	Flag to enable/disable the sending of a response ("acknowledge") to "set" commands (while "get" commands always have a response) (see chapter 18)	ON
SMS Relay To Admin	Flag to enable/disable the relaying of rejected or unrecognized commands to the "admin" user	ON
Startup SMS	Flag to enable/disable the sending of a "startup" message to the "admin" user	OFF
SMS Send Attempts	Number of attempts to send an SMS	1
Additional Alarm Info	Flag telling if "additional info", that is RTU Name and timestamp, shall be put before the message text in alarm SMS	ON
Send Delay Between Attempts (s)	Delay, in seconds, between attempts to send an SMS	10
Service Centre	SMS Service Centre (SMS-SC) number Typically, this parameter can be left empty, since SMS-SC number is already configured on the SIM	empty

The "Startup SMS", controlled by the corresponding parameter, has the following format:

```
Z-PASS2<hwrev> '<vpnbox tag name>' (IMEI:<modem IMEI>) STARTED
```

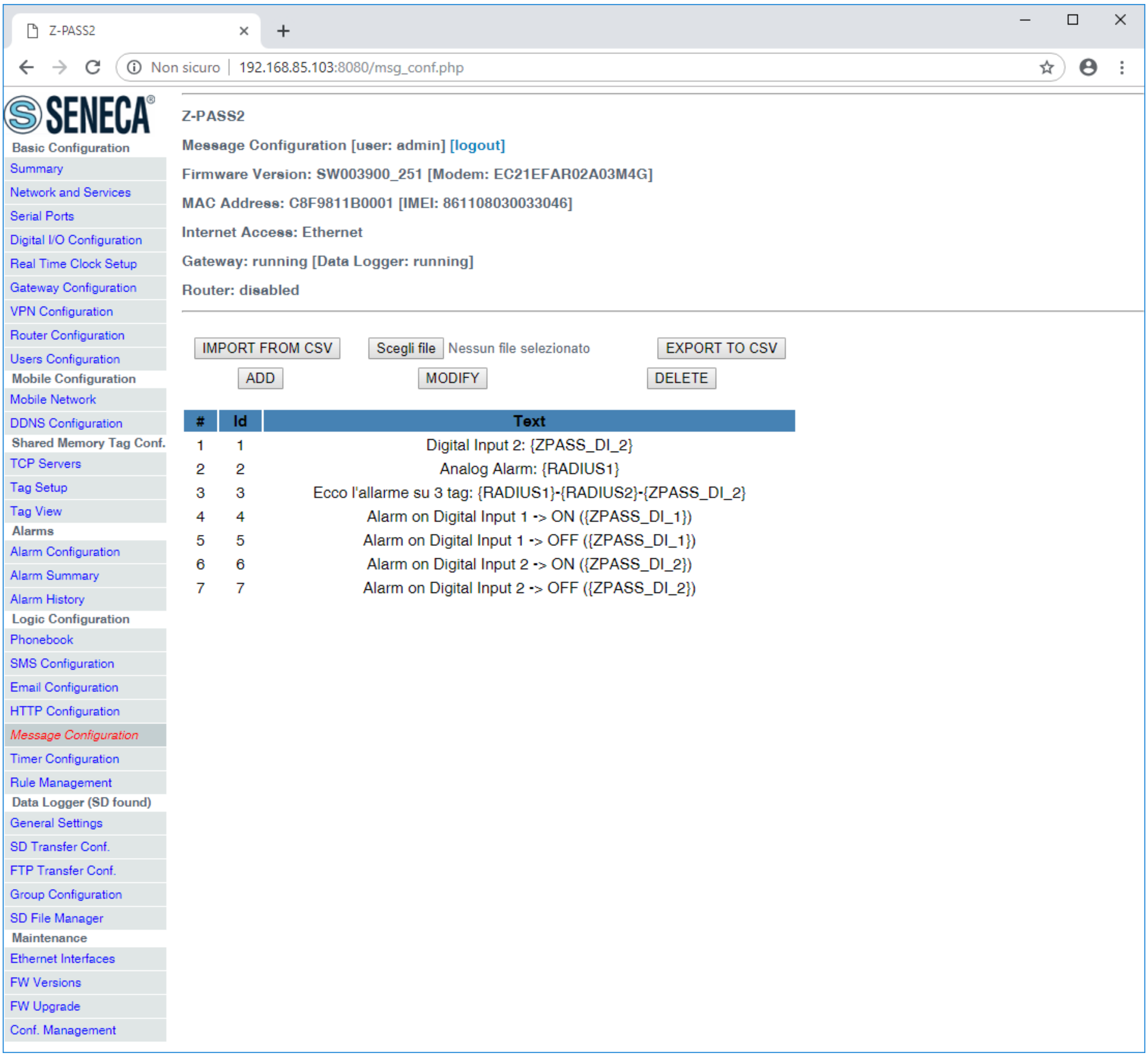
as in the following example:

```
Z-PASS2-IO 'zpass' (IMEI:861108030033046) STARTED
```

Obviously, this page is not available for Z-PASS1 products.

21.6.3 Message Configuration

By clicking on the "Message Configuration" link, in the "Logic Configuration" section, you come to the following page:



Z-PASS2

Message Configuration [user: admin] [logout]

Firmware Version: SW003900_251 [Modem: EC21EFAR02A03M4G]

MAC Address: C8F9811B0001 [IMEI: 861108030033046]

Internet Access: Ethernet

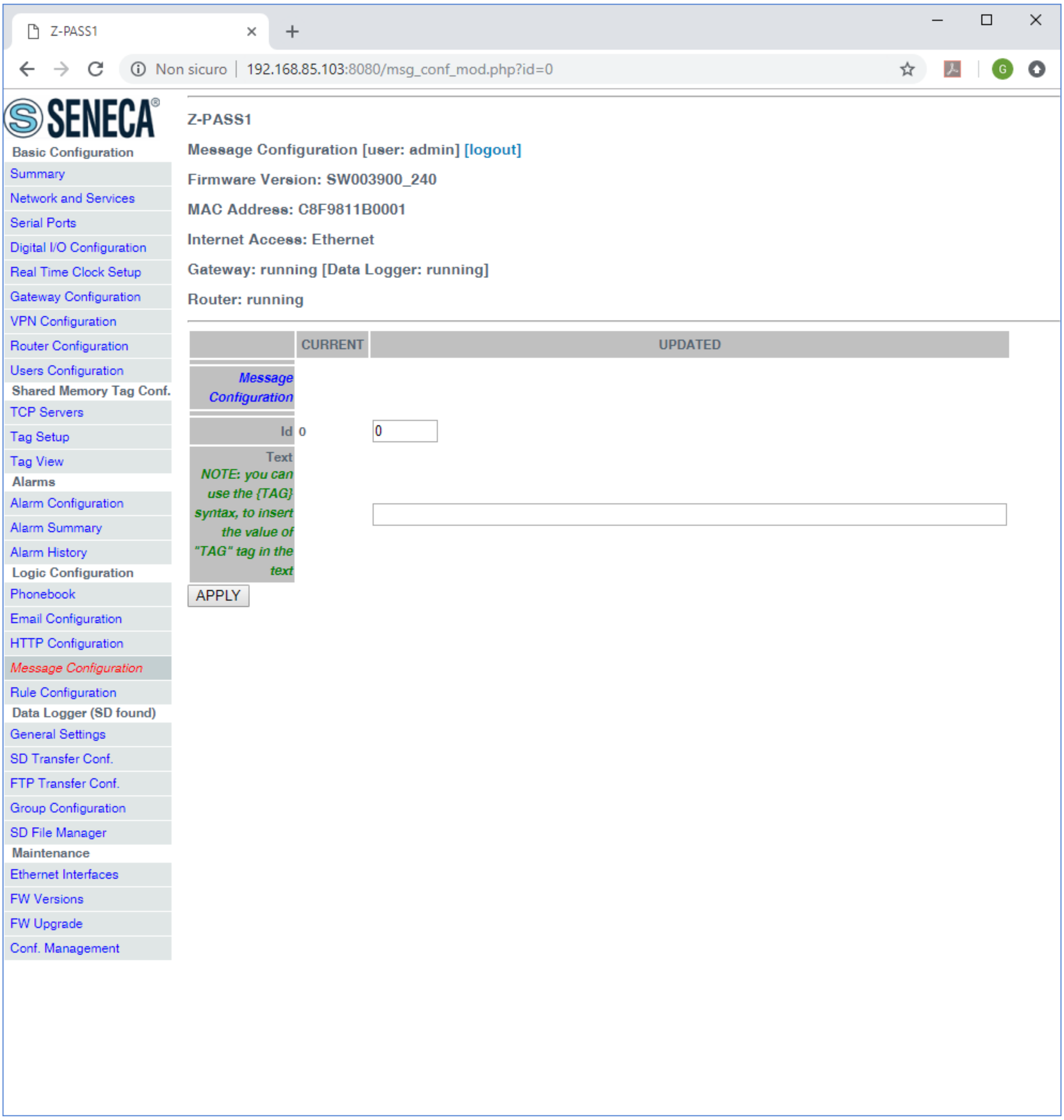
Gateway: running [Data Logger: running]

Router: disabled

#	Id	Text
1	1	Digital Input 2: {ZPASS_DI_2}
2	2	Analog Alarm: {RADIUS1}
3	3	Ecco l'allarme su 3 tag: {RADIUS1}-{RADIUS2}-{ZPASS_DI_2}
4	4	Alarm on Digital Input 1 -> ON ({ZPASS_DI_1})
5	5	Alarm on Digital Input 1 -> OFF ({ZPASS_DI_1})
6	6	Alarm on Digital Input 2 -> ON ({ZPASS_DI_2})
7	7	Alarm on Digital Input 2 -> OFF ({ZPASS_DI_2})

This page lets you configure text messages used for alarms sent via SMS, EMAIL, HTTP POST.

By clicking on the “ADD” button, a new message can be configured, as in the following figure.



Z-PASS1

Message Configuration [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: running

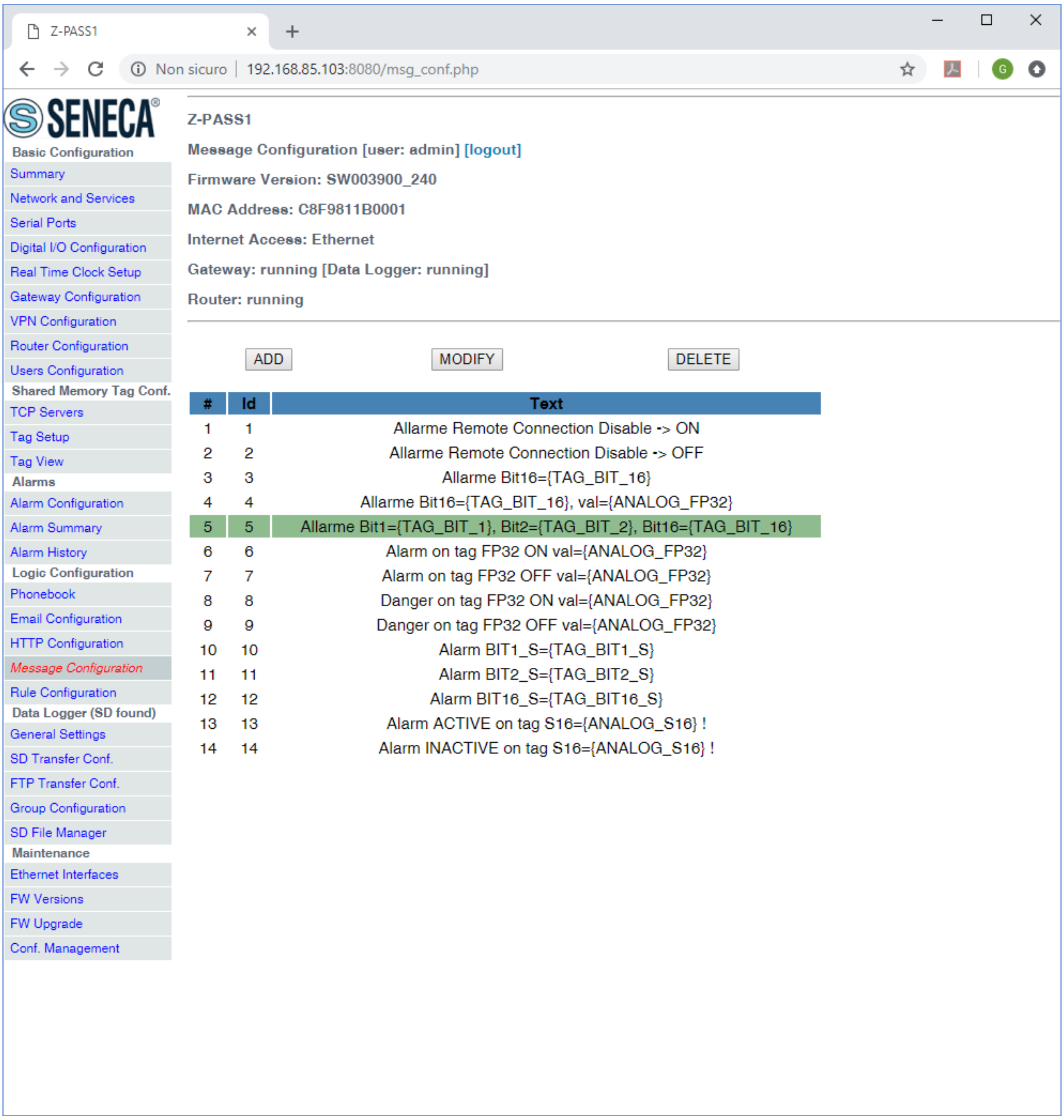
	CURRENT	UPDATED
Message Configuration		
Id	0	0
Text *NOTE: you can use the {TAG} syntax, to insert the value of "TAG" tag in the text*		

Messages are identified by a numeric identifier.

The message text can currently contain only ASCII characters.

As highlighted by the note in the page, the syntax *{TAG}* will be replaced, in the text, with the current value of the "TAG" tag. This syntax can be used more than once in a message text.

Selecting a message in the list and clicking on the "MODIFY" button, you can modify the message id and text, as in the following figures.



Z-PASS1

Message Configuration [user: admin] [logout]

Firmware Version: SW003900_240

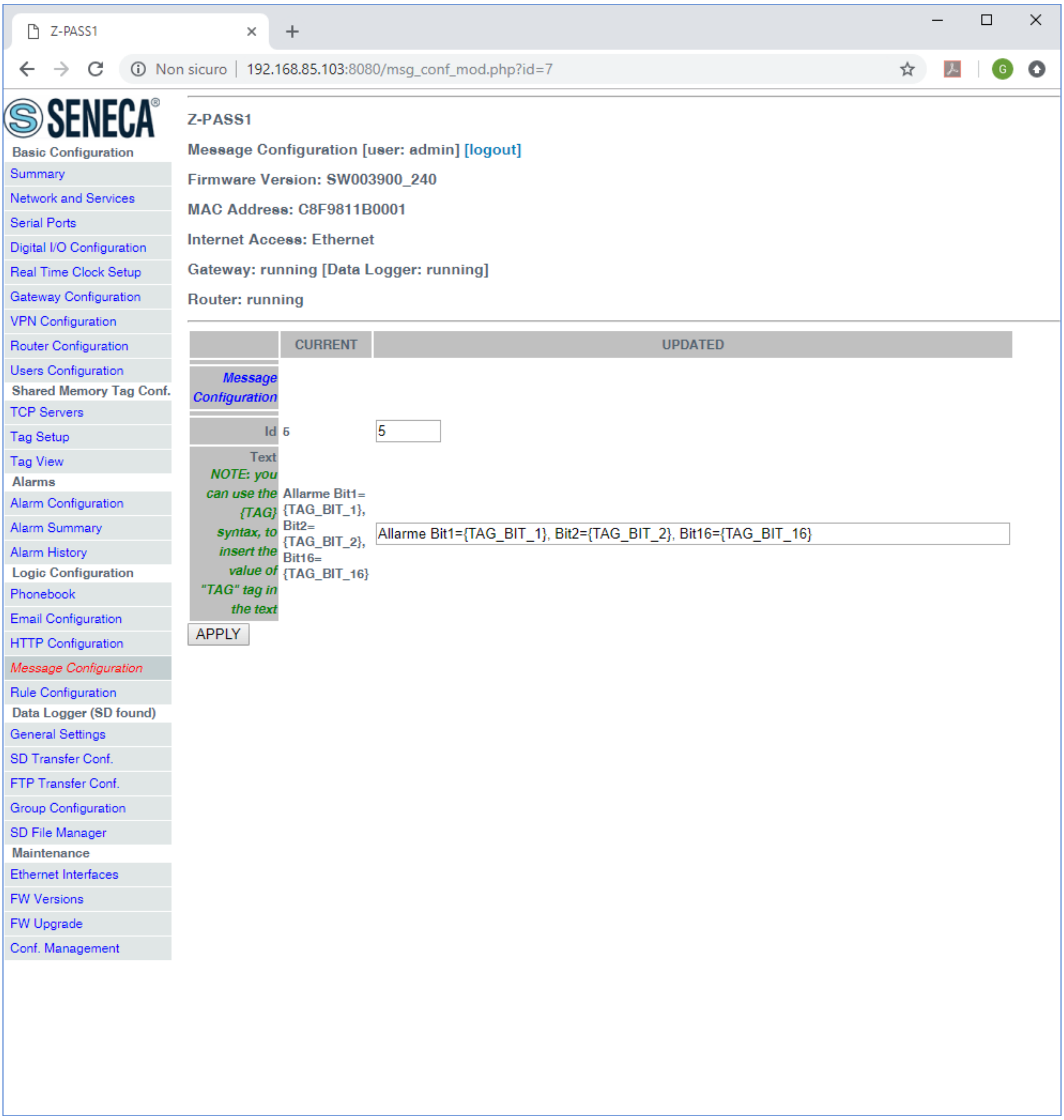
MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: running

#	Id	Text
1	1	Allarme Remote Connection Disable -> ON
2	2	Allarme Remote Connection Disable -> OFF
3	3	Allarme Bit16={TAG_BIT_16}
4	4	Allarme Bit16={TAG_BIT_16}, val={ANALOG_FP32}
5	5	Allarme Bit1={TAG_BIT_1}, Bit2={TAG_BIT_2}, Bit16={TAG_BIT_16}
6	6	Alarm on tag FP32 ON val={ANALOG_FP32}
7	7	Alarm on tag FP32 OFF val={ANALOG_FP32}
8	8	Danger on tag FP32 ON val={ANALOG_FP32}
9	9	Danger on tag FP32 OFF val={ANALOG_FP32}
10	10	Alarm BIT1_S={TAG_BIT1_S}
11	11	Alarm BIT2_S={TAG_BIT2_S}
12	12	Alarm BIT16_S={TAG_BIT16_S}
13	13	Alarm ACTIVE on tag S16={ANALOG_S16} !
14	14	Alarm INACTIVE on tag S16={ANALOG_S16} !



Z-PASS1

Message Configuration [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: running

	CURRENT	UPDATED
Message Configuration		
Id	5	5
Text *NOTE: you can use the {TAG} syntax, to insert the value of "TAG" tag in the text*	Allarme Bit1={TAG_BIT_1}, Bit2={TAG_BIT_2}, Bit16={TAG_BIT_16}	Allarme Bit1={TAG_BIT_1}, Bit2={TAG_BIT_2}, Bit16={TAG_BIT_16}

Selecting a message in the list and clicking on the “DELETE” button, you can delete a message.

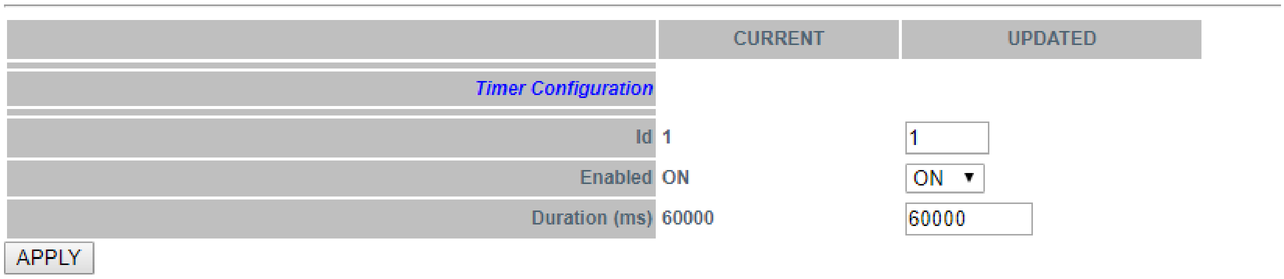
Finally, the “EXPORT TO CSV” and “IMPORT FROM CSV” buttons let you export/import the message configuration to/from a “.csv” file (the separator character is “;”).

Please note that, when importing the message configuration from a .csv file, the previously existing messages are deleted; so, a fast way to “clean” the message configuration, if it contains many entries, is to import an empty .csv file.

Also it is important to note that, to let the Z-PASS properly handle the messages, the imported text must contain only ASCII characters.

21.6.4 Timer Configuration

The “Timer Configuration” page lets you define up to 100 timers to be used in the logic rules.



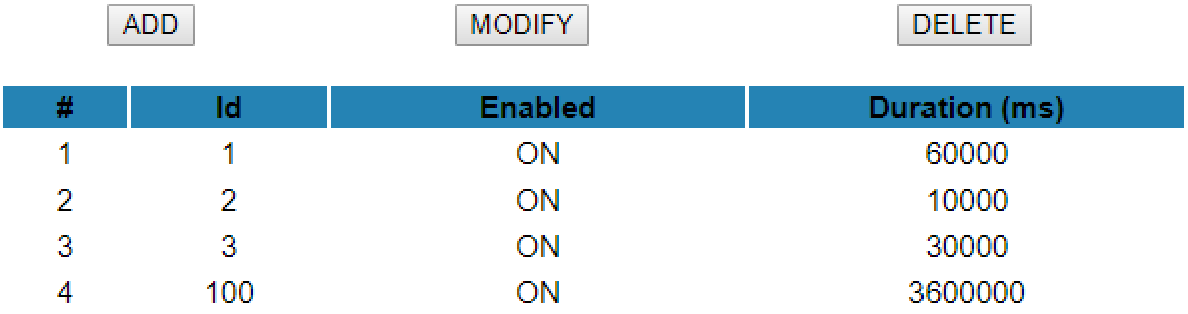
	CURRENT	UPDATED
Timer Configuration		
Id	1	1
Enabled	ON	ON ▾
Duration (ms)	60000	60000

APPLY

The ID represents the timer mnemonic that must be used in the rules.

Enabled selects if the timer is active or not.

Duration is the trigger value in [ms].

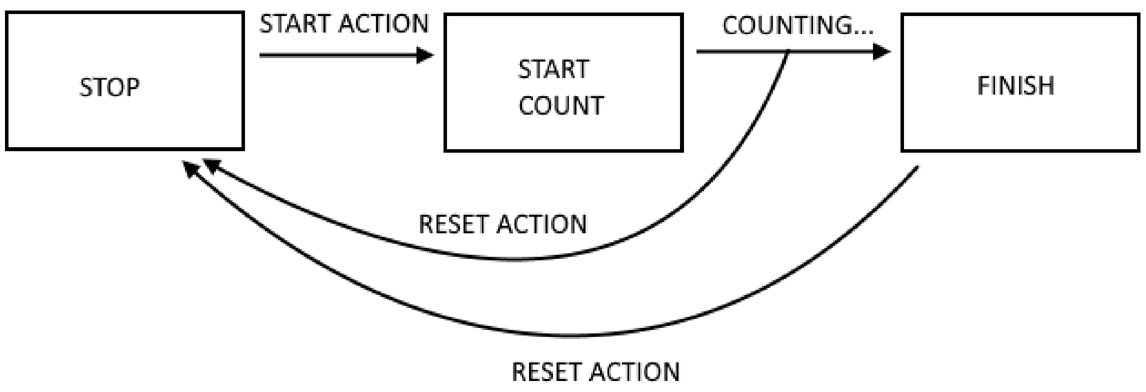


ADD MODIFY DELETE

#	Id	Enabled	Duration (ms)
1	1	ON	60000
2	2	ON	10000
3	3	ON	30000
4	100	ON	3600000

Note

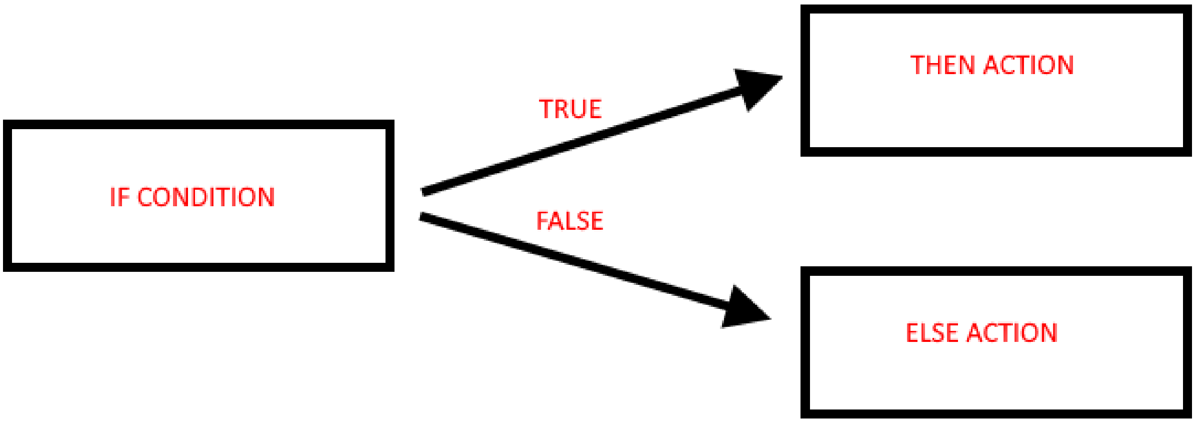
The Timers by default are in stop mode, they need an action for start and an action for reset, see the following diagram:



21.6.5 Rule Management

21.6.5.1 Basic Information

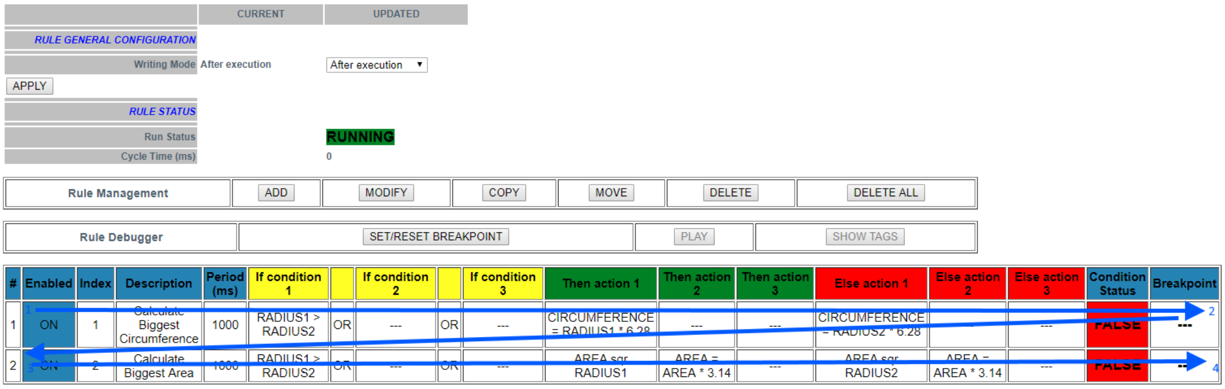
A Rule is composed by “If Condition(s)”, “Then Action(s)” and “Else Action(s)”.



If the “If condition” is true the “then action” is executed

If the “if condition” is false the “else action” is executed

The Rules are executed from top to down and from left to right (in figure 1->2->3->4):



	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▾

APPLY

RULE STATUS		
Run Status		RUNNING
Cycle Time (ms)		0

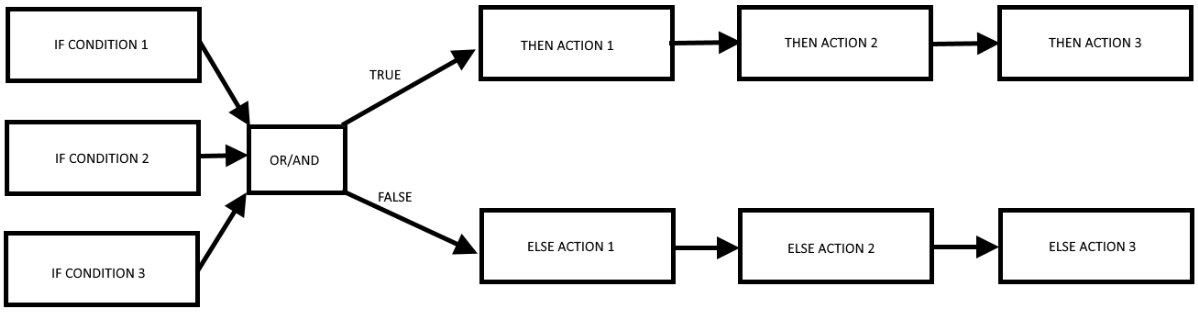
Rule Management: ADD | MODIFY | COPY | MOVE | DELETE | DELETE ALL

Rule Debugger: SET/RESET BREAKPOINT | PLAY | SHOW TAGS

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	---
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	---

When the rules are terminated then the execution returns to the first.

More in details the correct diagram is:



The “If conditions” can be combined together in “OR” or “AND” logic to obtain a unique boolean state:

IF CONDITION 1	*IF CONDITION 2*	*IF CONDITION 3*	*“OR” RESULT*	*“AND” RESULT*
FALSE	FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE	FALSE
FALSE	TRUE	FALSE	TRUE	FALSE
FALSE	TRUE	TRUE	TRUE	FALSE
TRUE	FALSE	FALSE	TRUE	FALSE
TRUE	FALSE	TRUE	TRUE	FALSE
TRUE	TRUE	FALSE	TRUE	FALSE

TRUE	TRUE	TRUE	TRUE	TRUE

Up to 3 different actions can be executed for each true/false result, the execution order is from 1 to 3.

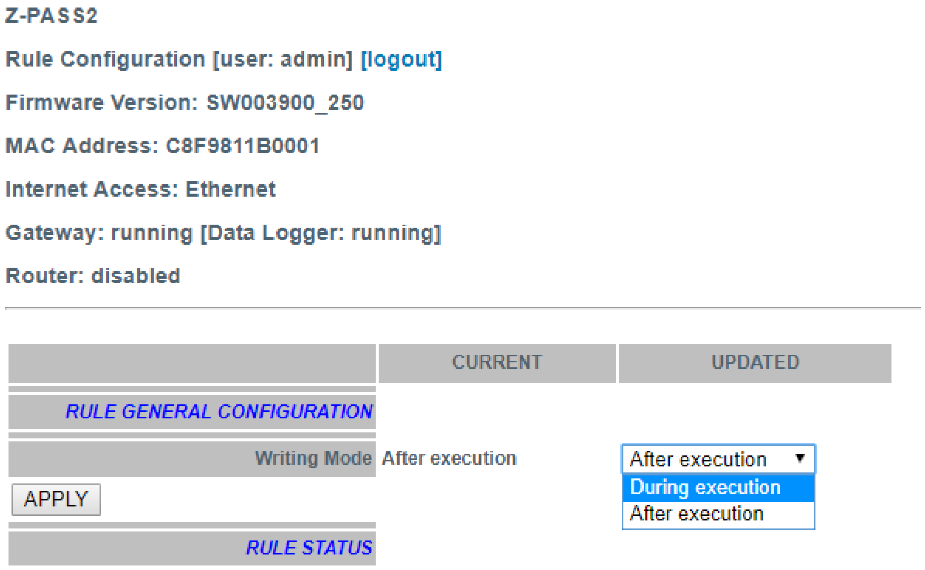
Combining more than one rules, you can create a program, up to 2000 rules can be created.

A rule can be configured to execute actions:

-Only when there is a change in the “OR/AND” result

-At every loop

In the “Rule General Configuration” we can choose when the Tags are written to the external (Modbus) memory image:



Z-PASS2

Rule Configuration [user: admin] [logout]

Firmware Version: SW003900_250

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: disabled

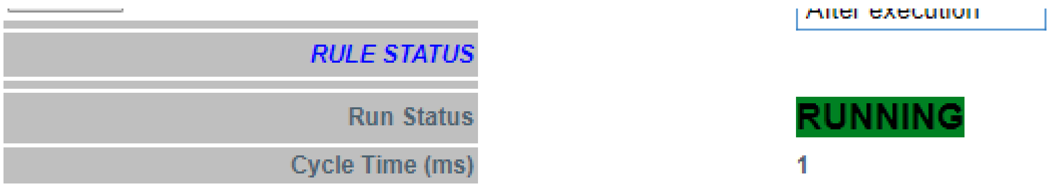
	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▼ During execution After execution
APPLY		
RULE STATUS		

With “After Execution”, we obtain that the tag values are copied to the external image memory at the end of all rules.

With “During Execution”, we obtain that the tag values are copied to the external image memory at the end of each rule.

So, using the “After Execution” mode, the new tag values will be refreshed only at end of all rules (also tags that must be written to Mobus RTU/TCP-IP).

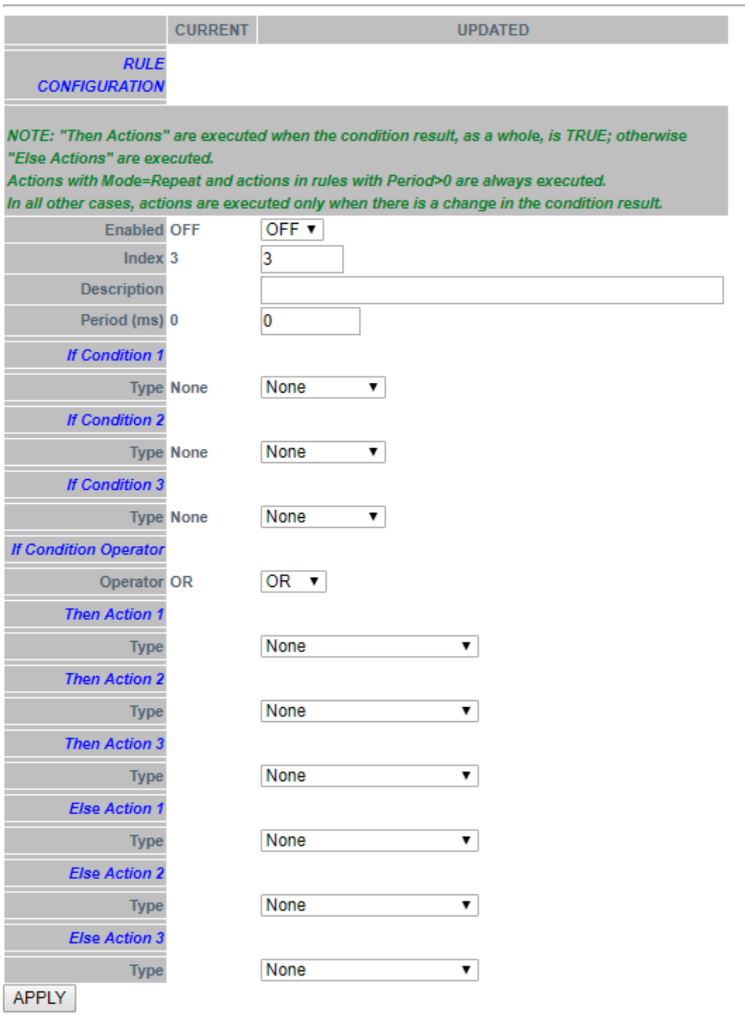
The Rule Status will show the Run status (if the rules are in run or pause mode) and the Cycle time that is the time spent to execute all the rules (note that if you need to write tags with modbus protocol the cycle time will include also the time spent for this operation):



	After execution
RULE STATUS	
Run Status	RUNNING
Cycle Time (ms)	1

21.6.5.2 Add a Rule

By clicking on the “ADD” button, a new rule can be configured:



	CURRENT	UPDATED
RULE CONFIGURATION		

NOTE: "Then Actions" are executed when the condition result, as a whole, is TRUE; otherwise "Else Actions" are executed.
Actions with Mode=Repeat and actions in rules with Period>0 are always executed.
In all other cases, actions are executed only when there is a change in the condition result.

	CURRENT	UPDATED
Enabled	OFF	OFF ▾
Index	3	3
Description		
Period (ms)	0	0
If Condition 1		
Type	None	None ▾
If Condition 2		
Type	None	None ▾
If Condition 3		
Type	None	None ▾
If Condition Operator		
Operator	OR	OR ▾
Then Action 1		
Type		None ▾
Then Action 2		
Type		None ▾
Then Action 3		
Type		None ▾
Else Action 1		
Type		None ▾
Else Action 2		
Type		None ▾
Else Action 3		
Type		None ▾

To configure a rule, the parameters explained in the following table are available.

Field	Meaning	Default value
Enabled	Flag telling if the rule is enabled or disabled, that is if the rule will be processed or not	OFF

Index	This parameter defines the rule execution order (1 = first rule to be executed)	-
Description	Rule text description	-
Period [ms]	If the value is = 0 then the Actions are executed only if there is a change in the "OR/AND" result. If the value is different from 0 the Actions are executed every Period [ms]. ***Don't use little Period values for sending EMAIL/SMS Actions!*** ***Note that the Period is in milliseconds (seconds/1000).*** ***NOTE:*** ***If Period is >0 the Actions are always executed in "repeat" mode***	0
If Condition X Type X=[1..3]	This parameter defines the type of condition, for each of the three available "if conditions" Possible types are: - None - Alarm State - Alarm Active - Always - Digital Tag - Analog Tag - Timer - Scheduler - Rule Status - Bitmask See paragraph 21.6.5.2.1	None
If Condition Operator	The possible types are: OR/AND IF Conditions can be combined in OR or AND boolean operations. Remember that using "OR" the result is true if at least one condition is true. Using "AND" the result is true if all the conditions are true.	OR
Then/Else Action X with X=[1..3]	This parameter defines the type of action, for each of the three available "then/else actions"	None

	Possible types are: - None - Send Alarm SMS[22] - Send Alarm EMAIL - Send Alarm HTTP POST - Digital Tag - Analog Tag - Timer - Scheduler - Datalogger - Network - Set Bits See paragraph 21.6.5.2.2	

21.6.5.2.1 If Condition

<u>Alarm State parameters</u>

Field	**Meaning**	**Default value**
Alarm Name	The name of the alarm can be selected from the list of all configured alarms	*First alarm name in the list*
Alarm State	The state of the alarm; possible states are: - None - Alarm (digital only) - Alarm Low Low (analog only) - Alarm Low (analog only) - Alarm High (analog only) - Alarm High High (analog only) - Acknowledge - Return - End Depending on the type (digital or analog) of the selected alarm, some states are disabled	None
Analog Danger Alarm	Flag telling if alarm level shall be “Analog Danger” or not, meaningful only for analog alarms	OFF

[22] This option is not available in Z-PASS1 product.

Alarm Active parameters

Field	Meaning	Default value
Alarm Name	The name of the alarm can be selected from the list of all configured alarms	*First alarm name in the list*
Alarm Active	Flag telling if alarm shall be "active" or not Alarm is "active" if it is in one of the states: - Alarm (digital only) - Alarm Low Low (analog only) - Alarm Low (analog only) - Alarm High (analog only) - Alarm High High (analog only) - Acknowledge Alarm is "not active" if it is in one of the states: - None - Return - End	OFF
Analog Danger Alarm	Flag telling if alarm level shall be "Analog Danger" or not, meaningful only for analog alarms.	OFF

Always

The If condition is always true.

Note that the Rule is executed only one time if Period is = 0 ms or if the actions are in one time mode.
If you need to execute a rule at every cycle you must put the actions in "repeat mode".
If you need to execute a rule every xx ms you need to put Period > 0ms.

Digital Tag

Field	Meaning	Default value
Tag	Select the Tag that must be used for the condition	-
Operator	Can be only "="	=
Tag / Constant value	Select if the comparison is between a tag or a constant boolean value	-

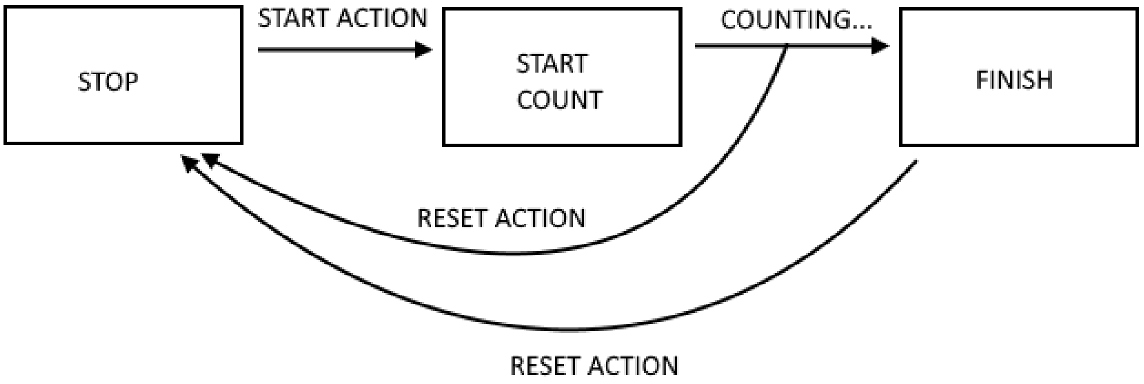
Analog Tag

Field	Meaning	Default value
Tag	Select the Tag that must be used for the condition	-
Operator	Can be : “=” “>” “<” “>=” “<=”	=
Tag / Constant value	Select if the comparison is between a tag or a constant value	-

Timer

Field	Meaning	Default value
ID	Select the Timer ID to be used	-
Expired	Can be: “OFF” or “ON” With “ON” the condition is true only when the timer is expired (finish state). With “OFF” the condition is true until the timer is in STOP or COUNTING STATE. When the timer is in FINISH state the condition became false. See chapter 21.6.4	OFF

The Timer functioning is represented in the following diagram:



Schedule

Field	Meaning	Default value

Type	Can be Daily, Weekly Monthly Daily: the condition is true every day at Hour:minute configured Weekly: the condition is true the selected day of the week at hour:minute Monthly: : the condition is true the selected day of the month at hour:minute	-
Day	If type is Weekly: 0 = Sunday 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday If type is Monthly: Select the day of the month from 1 to 31	-
Hour	Hours	-
Minute	Seconds	-

Rule Status

Field	**Meaning**	**Default value**
ID	Select which Rule ID	-
Enabled	Select between Enabled or Disabled. If “Enabled” the condition is TRUE if the selected Rule is enabled. If “Disabled” the condition is TRUE if the selected Rule is disabled.	-

Bitmask

Field	**Meaning**	**Default value**
Tag	Select which tag the bit mask shall be applied to from a list containing all the tags with data type “16Bit Unsigned” and bit index 0	-
Mask	The bitmask represented as a string of 4 hexadecimal digits	0000

The "Bitmask" condition is TRUE if the bitwise AND operation between the given Tag and Mask is different from 0; FALSE otherwise.

21.6.5.2.2 Then/Else Actions

None

No Action must be executed

Send Alarm SMS, Send Alarm EMAIL parameters

Field	Meaning	Default value
Message	The message text to be inserted in the SMS or EMAIL	*First message in the list*
Group	The group of users the alarm will be sent to	*First group in the list*

Send Alarm HTTP POST parameters

Field	Meaning	Default value
Message	The message text to be inserted in the HTTP POST	*First message in the list*

Please note that the currently available conditions ("Alarm State", "Alarm Active") act as "event triggered", that is the condition is true, and the action is executed, only when:

- the specified state is entered, for "Alarm State"
- one of the states of the "active" or "not active" sets is entered, for "Alarm Active"

Digital Tag

Field	Meaning	Default value
Action Mode	Action mode, select from "One time" or "Repeat". With "One Time" the Actions are executed only if there is a change in the OR/AND Conditions Result. With "Repeat" the Actions are executed at every loop (if the rule is enabled and if there is no period configured).	One time
Destination Tag	It's the Tag where the calculated result is copied to	-
Operator	It's the boolean operator to use, select between =, NOT, OR etc…	-
Source Tag 1 / Constant value 1	Select the Tag to use in the boolen	-

	calculation. You can also use a boolean constant	
Source Tag 2 / Constant value 2	Select the second Tag if the operator needs 2 inputs (For example "OR" operator). You can also use a boolean constant	-

Analog Tag

Field	**Meaning**	**Default value**
Action Mode	Action mode, select from "One time" or "Repeat". With "One Time" the Actions are executed only if there is a change in the OR/AND Conditions Result. With "Repeat" the Actions are executed at every loop (if the rule is enabled and if there is no period configured).	One time
Destination Tag	It's the Tag where the calculated result is copied to	-
Operator	It's the mathematical operator to use, select between: ***"="*** copy the Source Tag 1/ Constant value 1 into the Destination Tag Example: Destination Tag = Source Tag 1 Or Destination Tag = Constant value 1 ***"+="*** Sum to the Destination Tag the value of Source Tag1 / Constant value 1 and copy the result to the Destination Tag. Example: Destination Tag = Destination Tag+Source Tag1 ***"-="*** Subtract to the Destination Tag the value of Source Tag1 and copy the result to the Destination Tag. Example: Destination Tag = Destination Tag –	-

	Source Tag1 ***“*=”*** Multiply the Destination Tag with the value of Source Tag1 and copy the result to the Destination Tag. Example: Destination Tag = Destination Tag * Source Tag1 ***“/=”*** Divide the Destination Tag with the value of Source Tag1 and copy the result to the Destination Tag. Example: Destination Tag = Destination Tag / Source Tag1 ***“%=”*** Calculate the rest of the division From the Destination Tag and the value of Source Tag1 and copy the result to the Destination Tag. (Note that 53%7 = 4) Example: Destination Tag = Destination Tag % Source Tag1 ***“abs”*** Calculate the absolute value of Source Tag 1/ Constant value 1 and copy the result to the Destination Tag (Note that abs(-4) = 4) Example: Destination Tag = abs(Source Tag 1) ***“sqrt”*** Calculate the square root value of Source Tag 1 / Constant value 1 and copy the result to the Destination Tag. (Note that sqrt(9) = √9 = 3) Example: Destination Tag = sqrt(Source Tag 1)	

	“sqr” Calculate the square value of Source Tag 1 / Constant value 1 and copy the result to the Destination Tag. (Note that sqr(3) = 3^2 = 9) Example: Destination Tag = sqr(Source Tag 1) ***“log”*** Calculate the decimal logarithm of Source Tag 1 / Constant value 1 and copy the result to the Destination Tag. (Note that log(3) = 0.4771212) Example: Destination Tag = log (Source Tag 1) ***“ln”*** Calculate the natural logarithm of Source Tag 1 / Constant value 1 and copy the result to the Destination Tag. (Note that ln(3) = 1.09861228867) Example: Destination Tag = ln (Source Tag 1) ***“exp”*** Calculate the Euler's number raised to Source Tag 1 / Constant value 1 and copy the result to the Destination Tag. (Note that $\exp(3) = e^3 = 20.0855369232$ ln(exp(3)) = 3 Example: Destination Tag = exp(Source Tag 1) ***“+”*** Sum to Source Tag 1 / Constant value 1 With the value of Source Tag 2 / Constant value 2 and copy the result to the Destination Tag. Example: Destination Tag = Source Tag 1+ Source Tag 2 ***“-”*** Subtract the Source Tag 1 / Constant value 1 With the value of Source Tag 2 / Constant value 2 and copy the result to	

	the Destination Tag. Example: Destination Tag = Source Tag 1- Source Tag 2 ***“*”*** Multiply the Source Tag 1 / Constant value 1 With the value of Source Tag 2 / Constant value 2 and copy the result to the Destination Tag. Example: Destination Tag = Source Tag 1* Source Tag 2 ***“/”*** Divide the Source Tag 1 / Constant value 1 With the value of Source Tag 2 / Constant value 2 and copy the result to the Destination Tag. Example: Destination Tag = Source Tag 1 / Source Tag 2 ***“%”*** Calculate the rest of the division between the Source Tag 1 / Constant value 1 and the value of Source Tag 2 / Constant value 2 and copy the result to the Destination Tag. (Note that 53%7 = 4) Example: Destination Tag = Source Tag 1 % Source Tag 2 ***“pow”*** Calculate the Source Tag1 / Constant value 1 raised to the power of the Sorce Tag2 / Constant value 2 and copy the result to the Destination Tag. Example: $DestinationTag = Source\ Tag1^{Source\ Tag2}$	
Source Tag 1 / Constant value 1	Select the Tag to use as input 1 for the operator used. You can also use a constant value.	-
Source Tag 2 / Constant value 2	Select the Tag to use as input 2 in the calculation if the operator needs 2 inputs.	-

	You can also use a constant value.	

Timer

Field	**Meaning**	**Default value**
ID	Select the Timer ID to use. See chapter 21.6.4	-
Action	Select the action to be done to the specified timer: “Start” will start a timer to count “Reset” will reset the timer to the stop state (See chapter 21.6.4)	-

Rule Status

Field	**Meaning**	**Default value**
ID	Select the Rule to Control	-
Enable	Select the action to be done to the specified rule: “ON” will enable a disabled Rule “OFF” will disable an enabled Rule	-

Data Logger

Field	**Meaning**	**Default value**
Group	Select the Logger group to start/stop Select between ALL, 1, 2, 3, 4	-
Enable	Select the action to be done to the specified rule: “ON” will start to log the selected group(s) “OFF” will stop to log the selected group(s)	-

Network

Field	**Meaning**	**Default value**
Feature	Select the action to be done to a network feature, select between: PPP* (Start or Stop the connection to the data mobile connection) VPN (Start or Stop the VPN /Let’s connection) Firewall (Start or Stop the Firewall)	-

	* Only for Z-PASS2 model	
Start	Select the action to be done to the specified Feature: "ON" will enable the feature "OFF" will disabled the feature	-

Set Bits

Field	**Meaning**	**Default value**
Action Mode	Action mode, select from "One time" or "Repeat". With "One Time", the Actions are executed only if there is a change in the OR/AND Conditions Result. With "Repeat", the Actions are executed at every loop (if the rule is enabled and if there is no period configured).	One Time
Destination Tag	Select the destination tag from a list containing all the tags with data type "16Bit Unsigned" and bit index 0	-
Source Tag	Select the source tag from a list containing all the tags with data type "16Bit Unsigned" and bit index 0	-
Mask	The bitmask represented as a string of 4 hexadecimal digits	0000
Action	*Reset*: set the masked bits to 0 *Set*: set the masked bits to 1	Reset

21.6.5.3 Example Program

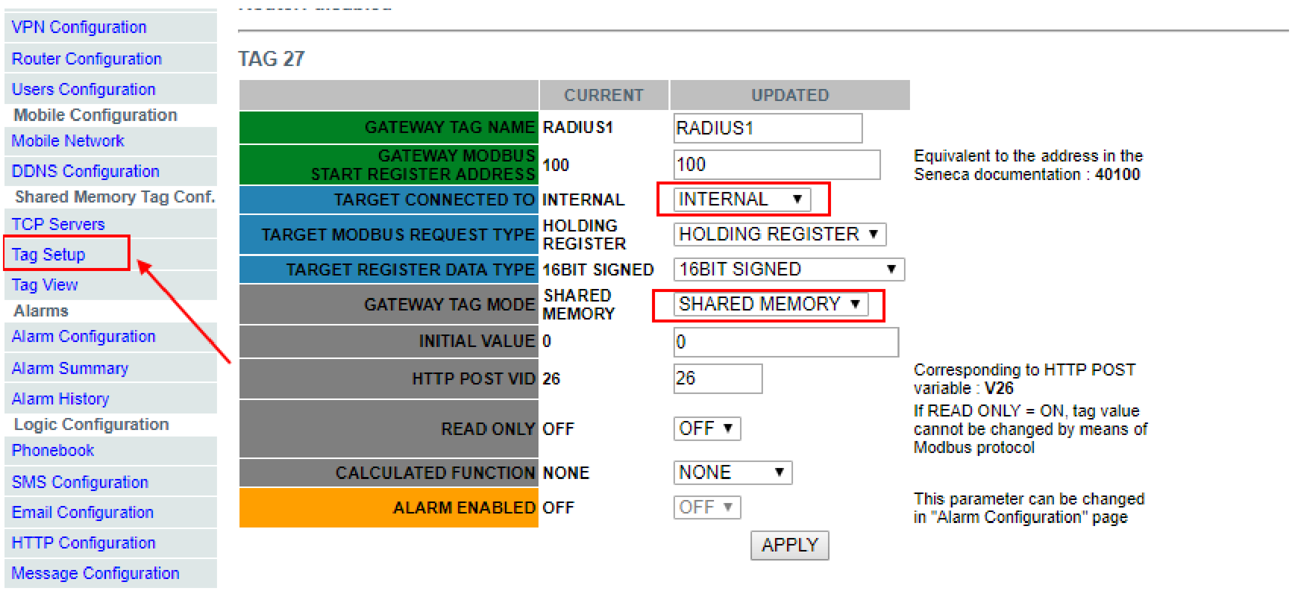
Now we want to create a program that calculate the maximum Circumference and the maximum Area from 2 radius.

21.6.5.3.1 Add the Tags

First of all we add the Tags that we need for the program:

We define Radius1 and Radius2 tags in integer type

Circumference and Area in Real 32 bits (floating point single precision) type:



TAG 27

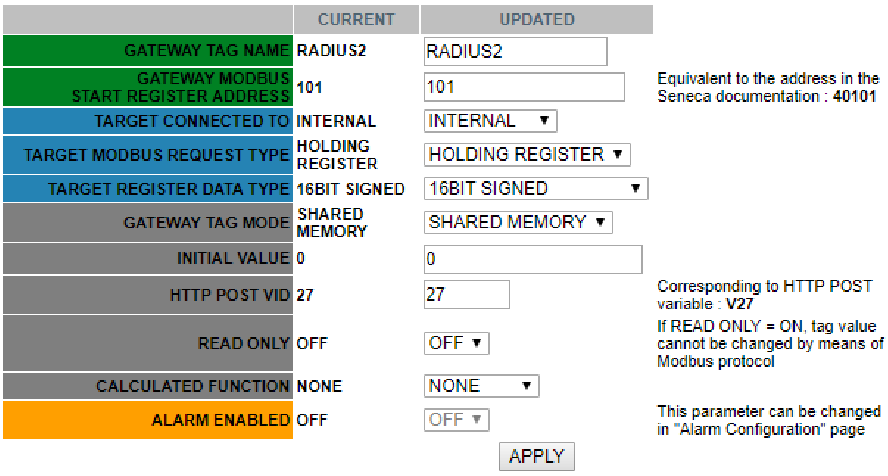
	CURRENT	UPDATED
GATEWAY TAG NAME	RADIUS1	RADIUS1
GATEWAY MODBUS START REGISTER ADDRESS	100	100
TARGET CONNECTED TO	INTERNAL	INTERNAL ▼
TARGET MODBUS REQUEST TYPE	HOLDING REGISTER	HOLDING REGISTER ▼
TARGET REGISTER DATA TYPE	16BIT SIGNED	16BIT SIGNED ▼
GATEWAY TAG MODE	SHARED MEMORY	SHARED MEMORY ▼
INITIAL VALUE	0	0
HTTP POST VID	26	26
READ ONLY	OFF	OFF ▼
CALCULATED FUNCTION	NONE	NONE ▼
ALARM ENABLED	OFF	OFF ▼

Equivalent to the address in the Seneca documentation : **40100**

Corresponding to HTTP POST variable : **V26**

If READ ONLY = ON, tag value cannot be changed by means of Modbus protocol

This parameter can be changed in "Alarm Configuration" page



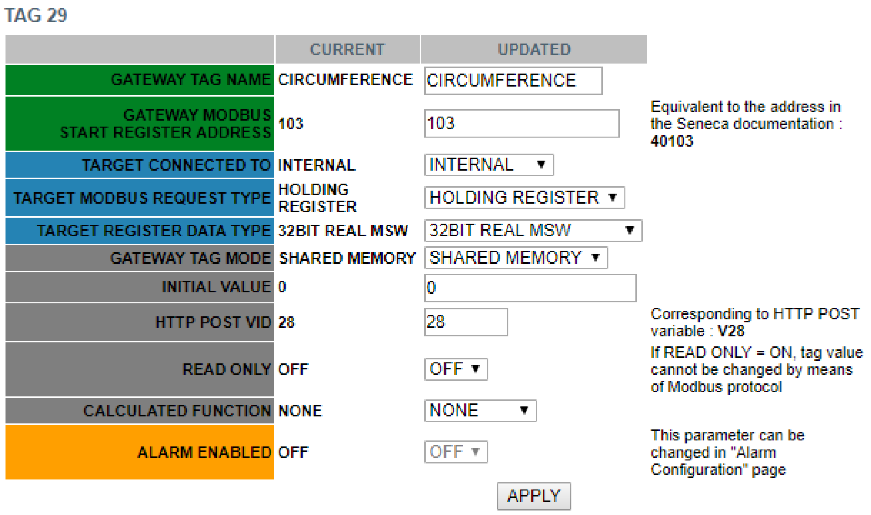
	CURRENT	UPDATED
GATEWAY TAG NAME	RADIUS2	RADIUS2
GATEWAY MODBUS START REGISTER ADDRESS	101	101
TARGET CONNECTED TO	INTERNAL	INTERNAL ▼
TARGET MODBUS REQUEST TYPE	HOLDING REGISTER	HOLDING REGISTER ▼
TARGET REGISTER DATA TYPE	16BIT SIGNED	16BIT SIGNED ▼
GATEWAY TAG MODE	SHARED MEMORY	SHARED MEMORY ▼
INITIAL VALUE	0	0
HTTP POST VID	27	27
READ ONLY	OFF	OFF ▼
CALCULATED FUNCTION	NONE	NONE ▼
ALARM ENABLED	OFF	OFF ▼

Equivalent to the address in the Seneca documentation : **40101**

Corresponding to HTTP POST variable : **V27**

If READ ONLY = ON, tag value cannot be changed by means of Modbus protocol

This parameter can be changed in "Alarm Configuration" page



TAG 29

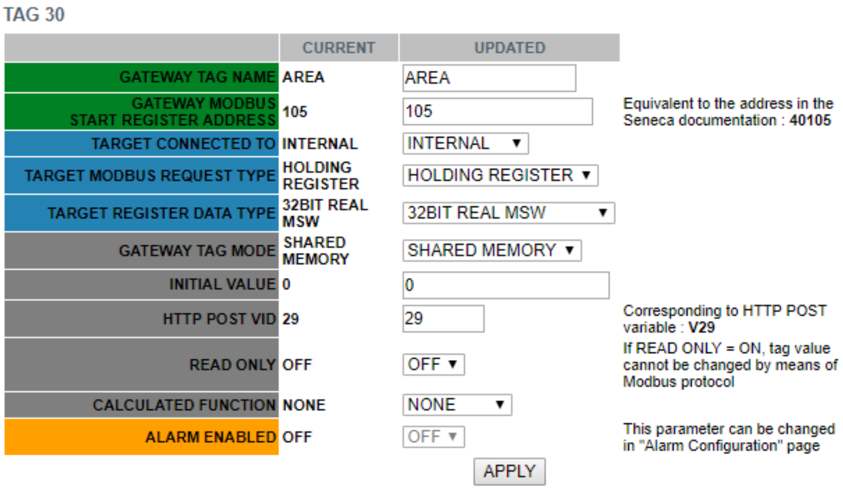
	CURRENT	UPDATED
GATEWAY TAG NAME	CIRCUMFERENCE	CIRCUMFERENCE
GATEWAY MODBUS START REGISTER ADDRESS	103	103
TARGET CONNECTED TO	INTERNAL	INTERNAL ▼
TARGET MODBUS REQUEST TYPE	HOLDING REGISTER	HOLDING REGISTER ▼
TARGET REGISTER DATA TYPE	32BIT REAL MSW	32BIT REAL MSW ▼
GATEWAY TAG MODE	SHARED MEMORY	SHARED MEMORY ▼
INITIAL VALUE	0	0
HTTP POST VID	28	28
READ ONLY	OFF	OFF ▼
CALCULATED FUNCTION	NONE	NONE ▼
ALARM ENABLED	OFF	OFF ▼

Equivalent to the address in the Seneca documentation : **40103**

Corresponding to HTTP POST variable : **V28**

If READ ONLY = ON, tag value cannot be changed by means of Modbus protocol

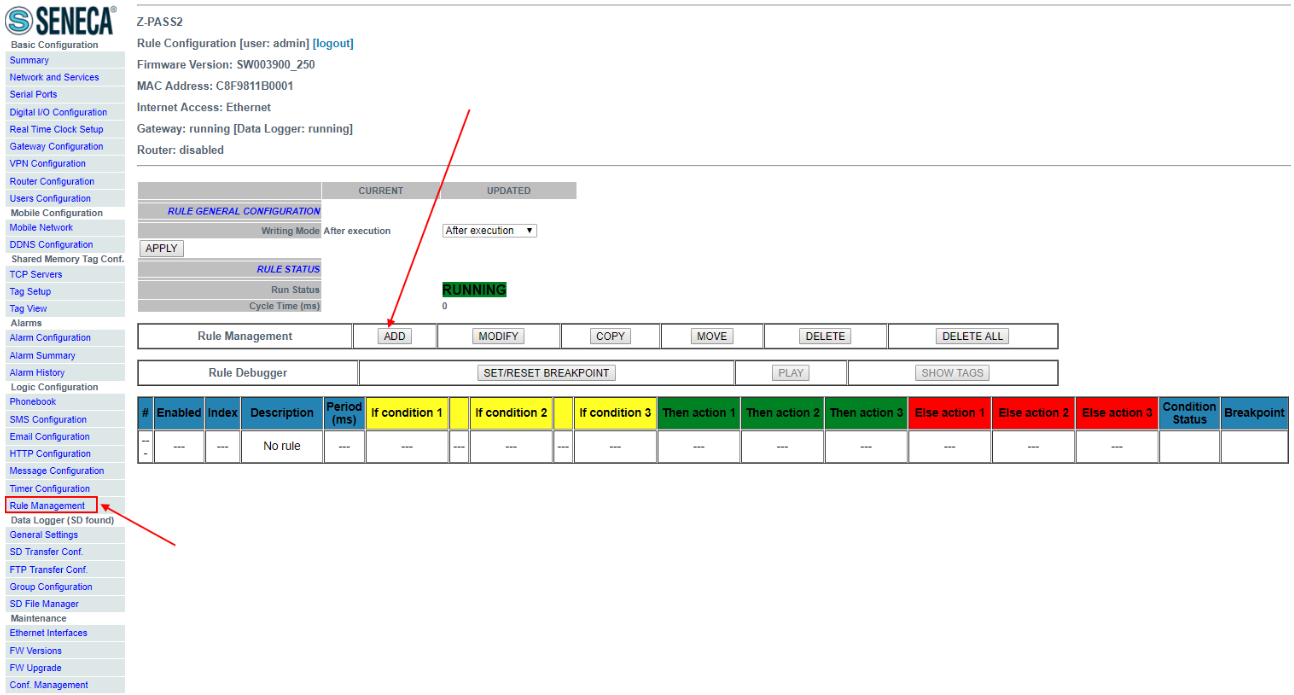
This parameter can be changed in "Alarm Configuration" page


TAG 30

	CURRENT	UPDATED	
GATEWAY TAG NAME	AREA	AREA	
GATEWAY MODBUS START REGISTER ADDRESS	105	105	Equivalent to the address in the Seneca documentation : **40105**
TARGET CONNECTED TO	INTERNAL	INTERNAL ▼	
TARGET MODBUS REQUEST TYPE	HOLDING REGISTER	HOLDING REGISTER ▼	
TARGET REGISTER DATA TYPE	32BIT REAL MSW	32BIT REAL MSW ▼	
GATEWAY TAG MODE	SHARED MEMORY	SHARED MEMORY ▼	
INITIAL VALUE	0	0	
HTTP POST VID	29	29	Corresponding to HTTP POST variable : **V29**
READ ONLY	OFF	OFF ▼	If READ ONLY = ON, tag value cannot be changed by means of Modbus protocol
CALCULATED FUNCTION	NONE	NONE ▼	
ALARM ENABLED	OFF	OFF ▼	This parameter can be changed in "Alarm Configuration" page

21.6.5.3.2 Add the Rules

Now click on “Rule Mangement” and then ADD to add a new rule:



Z-PASS2

Rule Configuration [user: admin] [logout]

Firmware Version: SW003900_250

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

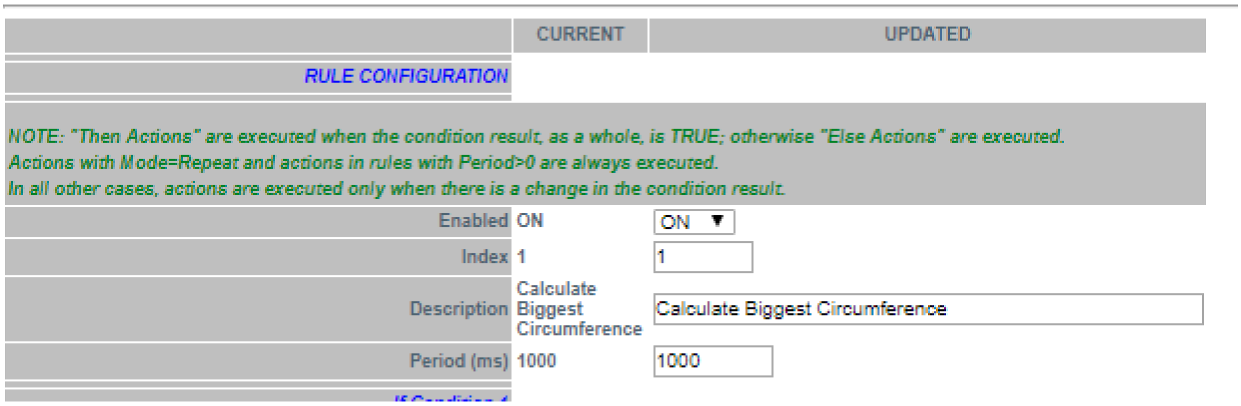
Router: disabled

	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▼
RULE STATUS		
Run Status		RUNNING
Cycle Time (ms)		0

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
---	---	---	No rule	---	---	---	---	---	---	---	---	---	---	---	---		

We Create now the first Rule for calculate the circumference using the biggest Radius between Radius1 and Radius2:

We need that the Rule will be executed every 1000 ms:

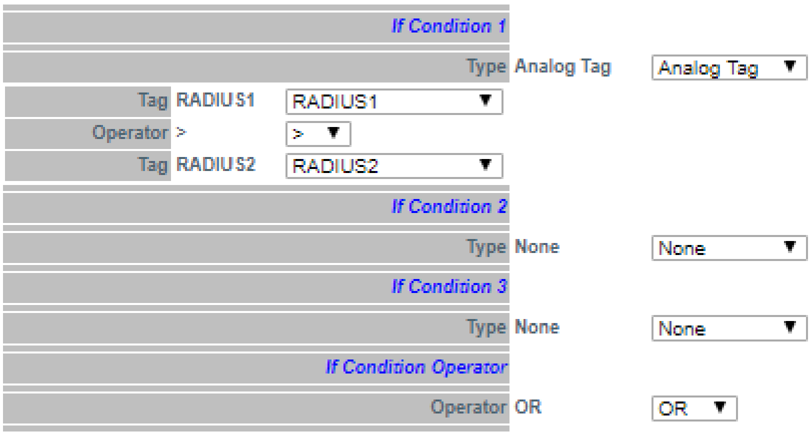


	CURRENT	UPDATED
RULE CONFIGURATION		

NOTE: "Then Actions" are executed when the condition result, as a whole, is TRUE; otherwise "Else Actions" are executed.
Actions with Mode=Repeat and actions in rules with Period>0 are always executed.
In all other cases, actions are executed only when there is a change in the condition result.

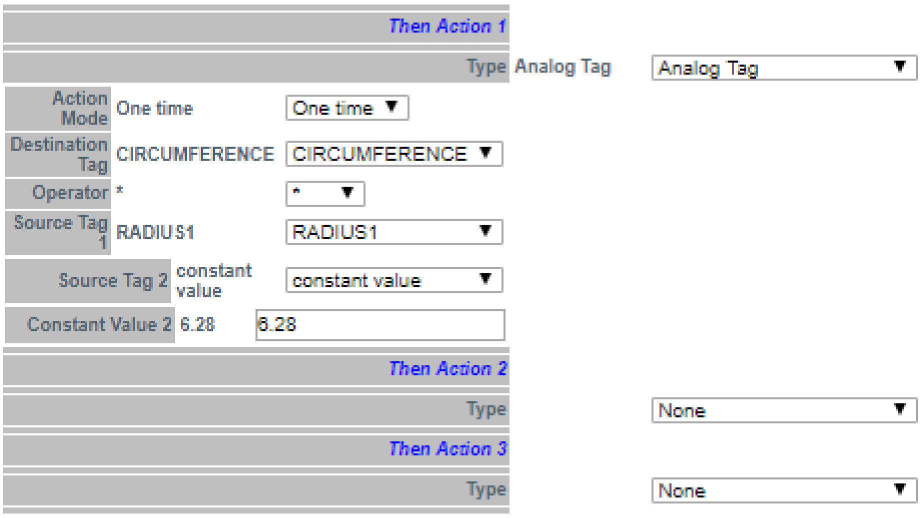
	CURRENT	UPDATED
Enabled	ON	ON ▼
Index	1	1
Description	Calculate Biggest Circumference	Calculate Biggest Circumference
Period (ms)	1000	1000

Then the "if condition" with the biggest radius (we need only 1 if condition):



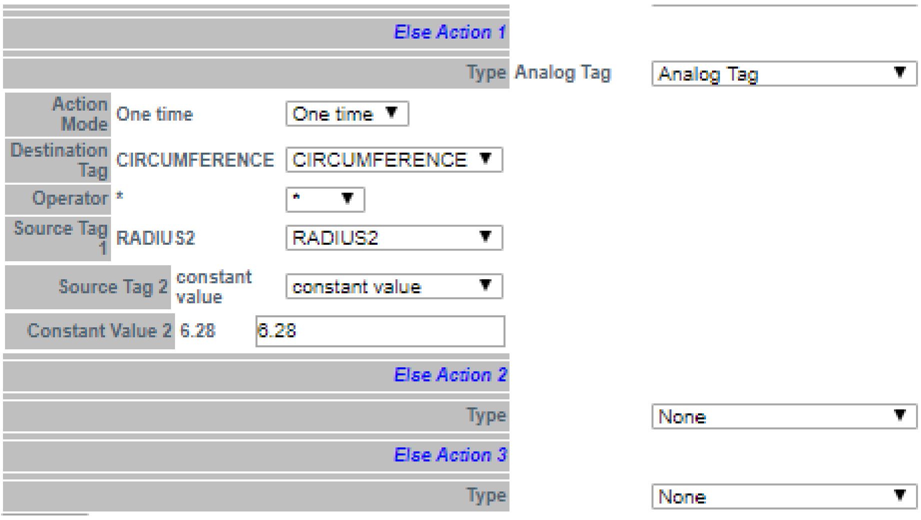
If Condition 1		
Type	Analog Tag	Analog Tag ▼
Tag	RADIUS1	RADIUS1 ▼
Operator	>	> ▼
Tag	RADIUS2	RADIUS2 ▼
If Condition 2		
Type	None	None ▼
If Condition 3		
Type	None	None ▼
If Condition Operator		
Operator	OR	OR ▼

So, if the condition is true the Radius1 > Radius2 so we must calculate the circumference with Radius1 (Circumference = Radius 1 * 6.28):



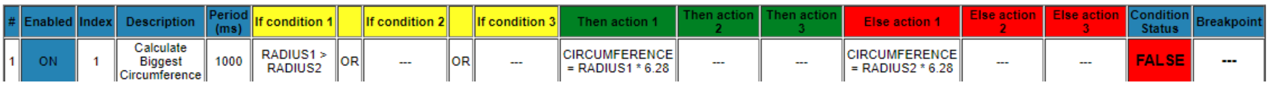
Then Action 1		
Type	Analog Tag	Analog Tag ▼
Action Mode	One time	One time ▼
Destination Tag	CIRCUMFERENCE	CIRCUMFERENCE ▼
Operator	*	* ▼
Source Tag 1	RADIUS1	RADIUS1 ▼
Source Tag 2	constant value	constant value ▼
Constant Value 2	6.28	6.28
Then Action 2		
Type		None ▼
Then Action 3		
Type		None ▼

Else the Radius 1< Radius 2 so we need to calculate the circumference with Radius2 (Circumference = Radius 2 * 6.28):



Else Action 1		
Type	Analog Tag	Analog Tag ▼
Action Mode	One time	One time ▼
Destination Tag	CIRCUMFERENCE	CIRCUMFERENCE ▼
Operator	*	* ▼
Source Tag 1	RADIUS2	RADIUS2 ▼
Source Tag 2	constant value	constant value ▼
Constant Value 2	6.28	6.28
Else Action 2		
Type		None ▼
Else Action 3		
Type		None ▼

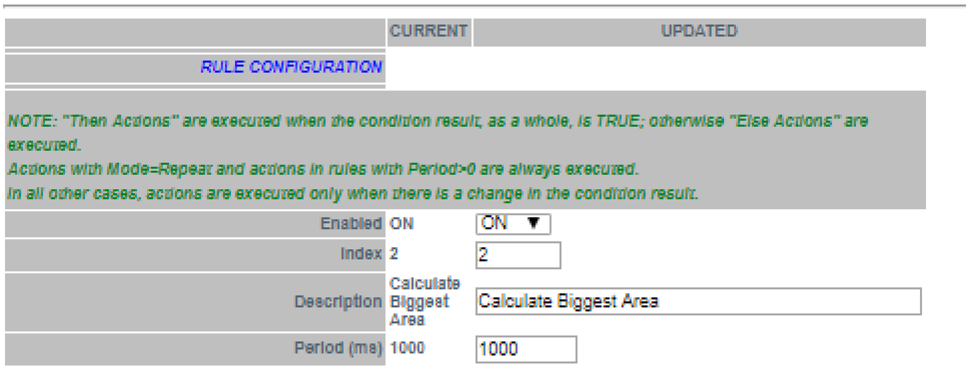
Now click on “APPLY” to save the first Rule:



#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	---

In the same way we create the Second Rule for calculate the biggest Area:

Also this rule must be execute every 1000ms:

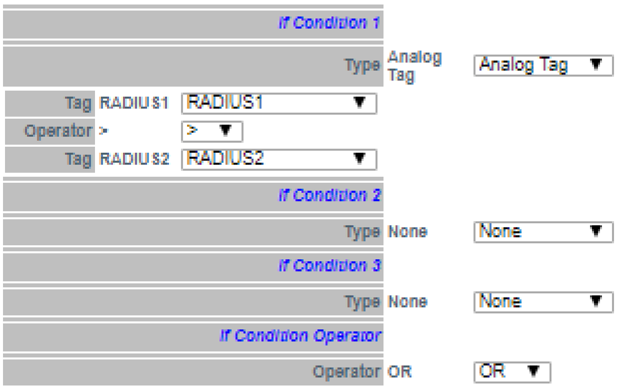


	CURRENT	UPDATED
RULE CONFIGURATION		

NOTE: "Then Actions" are executed when the condition result, as a whole, is TRUE; otherwise "Else Actions" are executed.
Actions with Mode=Repeat and actions in rules with Period>0 are always executed.
In all other cases, actions are executed only when there is a change in the condition result.

Enabled	ON	ON ▼
Index	2	2
Description	Calculate Biggest Area	Calculate Biggest Area
Period (ms)	1000	1000

The “if condition” is the same of the first rule:



If Condition 1		
Type	Analog Tag	Analog Tag ▼
Tag	RADIUS1	RADIUS1 ▼
Operator	>	> ▼
Tag	RADIUS2	RADIUS2 ▼
If Condition 2		
Type	None	None ▼
If Condition 3		
Type	None	None ▼
If Condition Operator		
Operator	OR	OR ▼

Now we must calculate the AREA using the following calculation:

$$AREA = (RADIUS^2) * 3.14$$

We need to brench the realtion in two step:

In the first step we calculate:

$$AREA = \ RADIUS1^2$$

And in the second:

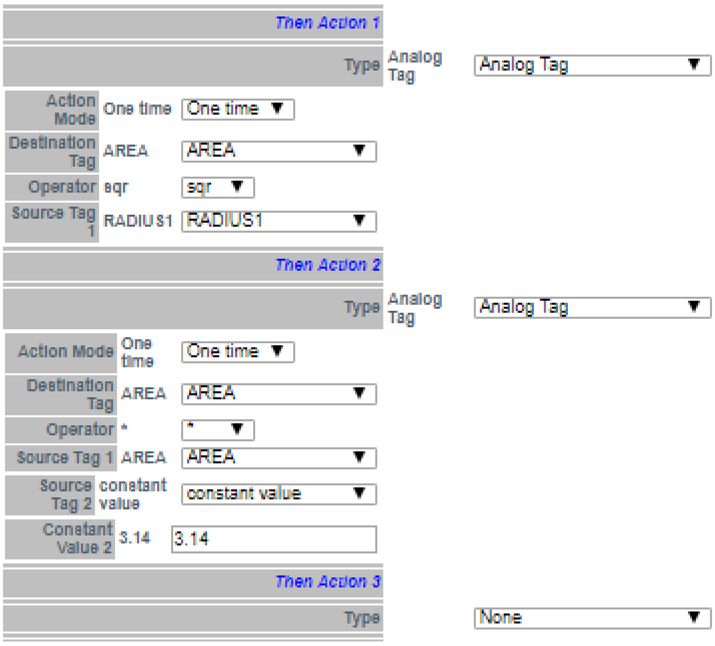
$$AREA = \ AREA * 3.14$$

So, in our rule if RADIUS1 > RADIUS2 we calculate AREA with RADIUS1 using the square function (sqr):

AREA = sqr(RADIUS1)

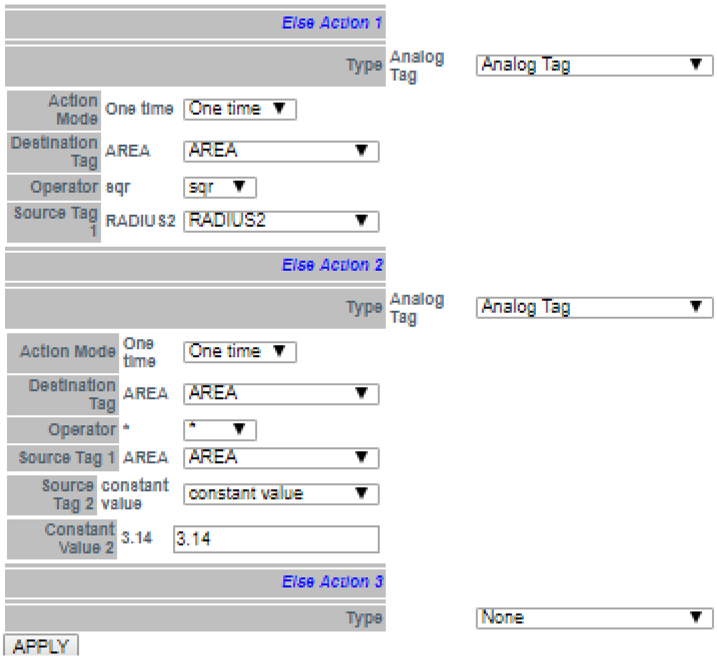
And then

AREA = AREA*3.14



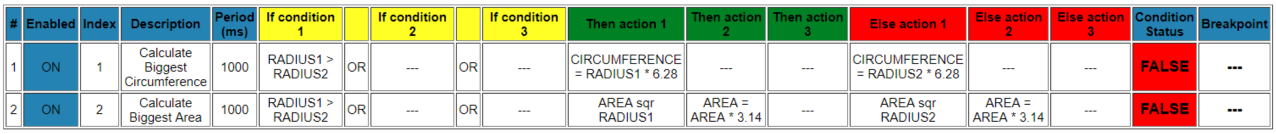
Then Action 1		
Type	Analog Tag	Analog Tag ▼
Action Mode	One time	One time ▼
Destination Tag	AREA	AREA ▼
Operator	sqr	sqr ▼
Source Tag 1	RADIUS1	RADIUS1 ▼
Then Action 2		
Type	Analog Tag	Analog Tag ▼
Action Mode	One time	One time ▼
Destination Tag	AREA	AREA ▼
Operator	*	* ▼
Source Tag 1	AREA	AREA ▼
Source Tag 2	constant value	constant value ▼
Constant Value 2	3.14	3.14
Then Action 3		
Type		None ▼

Then if RADIUS1 < RADIUS2 we calculate AREA with RADIUS2:



Else Action 1		
Type	Analog Tag	Analog Tag ▼
Action Mode	One time	One time ▼
Destination Tag	AREA	AREA ▼
Operator	sqr	sqr ▼
Source Tag 1	RADIUS2	RADIUS2 ▼
Else Action 2		
Type	Analog Tag	Analog Tag ▼
Action Mode	One time	One time ▼
Destination Tag	AREA	AREA ▼
Operator	*	* ▼
Source Tag 1	AREA	AREA ▼
Source Tag 2	constant value	constant value ▼
Constant Value 2	3.14	3.14
Else Action 3		
Type		None ▼

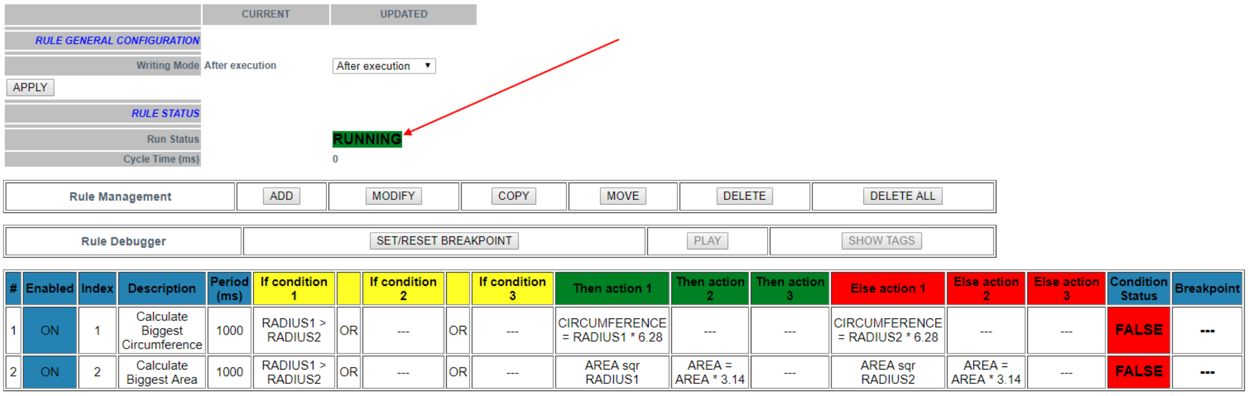
Now click on “APPLY” to save the second Rule too:



#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	---
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	---

21.6.5.4 Testing the Example Program

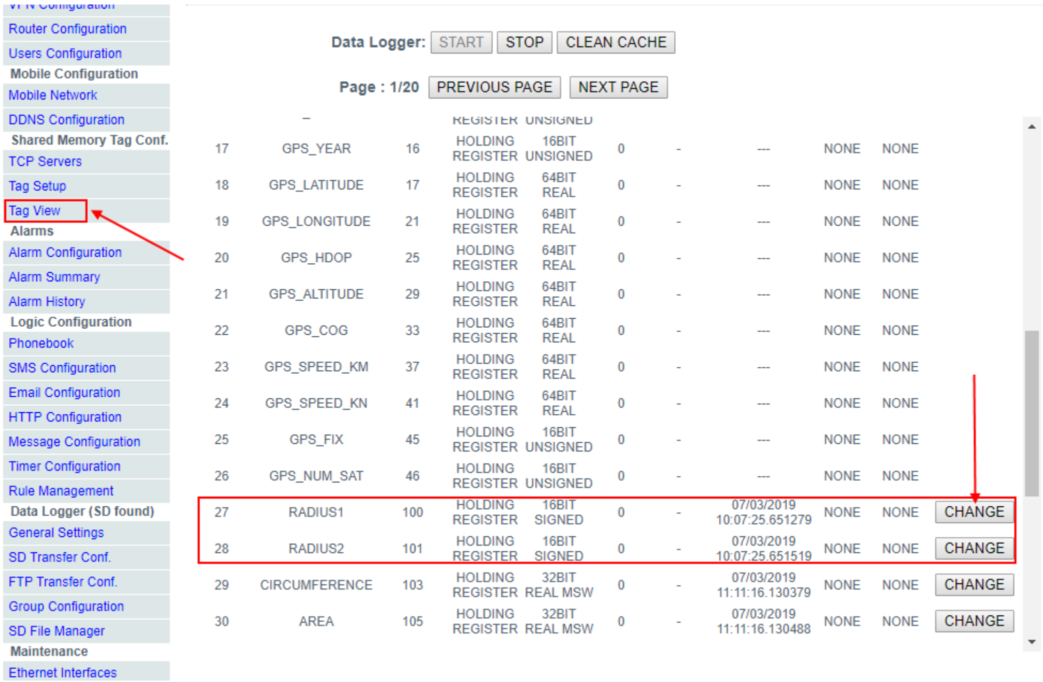
When a rule is added the Rule start automatically (RUNNING):



	CURRENT	UPDATED
Writing Mode	After execution	After execution ▾
Run Status		RUNNING
Cycle Time (ms)		0

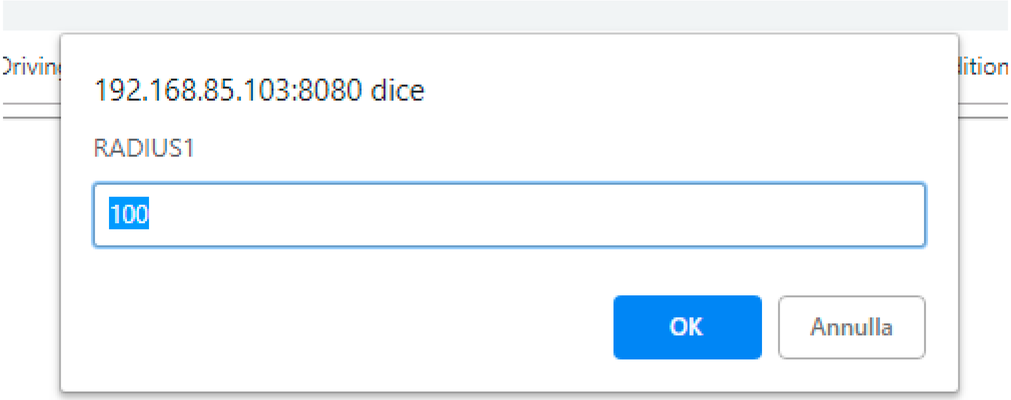
#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	---
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	---

For testing the program we can write the tags RADIUS1 and RADIUS2 from Modbus RTU/MODBUS TCP-IP (registers 40100-40101 in our example) or using the page “Tag View”:



	–		REGISTER	UNSIGNED						
17	GPS_YEAR	16	HOLDING REGISTER	16BIT UNSIGNED	0	-	---	NONE	NONE	
18	GPS_LATITUDE	17	HOLDING REGISTER	64BIT REAL	0	-	---	NONE	NONE	
19	GPS_LONGITUDE	21	HOLDING REGISTER	64BIT REAL	0	-	---	NONE	NONE	
20	GPS_HDOP	25	HOLDING REGISTER	64BIT REAL	0	-	---	NONE	NONE	
21	GPS_ALTITUDE	29	HOLDING REGISTER	64BIT REAL	0	-	---	NONE	NONE	
22	GPS_COG	33	HOLDING REGISTER	64BIT REAL	0	-	---	NONE	NONE	
23	GPS_SPEED_KM	37	HOLDING REGISTER	64BIT REAL	0	-	---	NONE	NONE	
24	GPS_SPEED_KN	41	HOLDING REGISTER	64BIT REAL	0	-	---	NONE	NONE	
25	GPS_FIX	45	HOLDING REGISTER	16BIT UNSIGNED	0	-	---	NONE	NONE	
26	GPS_NUM_SAT	46	HOLDING REGISTER	16BIT UNSIGNED	0	-	---	NONE	NONE	
27	RADIUS1	100	HOLDING REGISTER	16BIT SIGNED	0	-	07/03/2019 10:07:25.651279	NONE	NONE	CHANGE
28	RADIUS2	101	HOLDING REGISTER	16BIT SIGNED	0	-	07/03/2019 10:07:25.651519	NONE	NONE	CHANGE
29	CIRCUMFERENCE	103	HOLDING REGISTER	32BIT REAL MSW	0	-	07/03/2019 11:11:16.130379	NONE	NONE	CHANGE
30	AREA	105	HOLDING REGISTER	32BIT REAL MSW	0	-	07/03/2019 11:11:16.130488	NONE	NONE	CHANGE

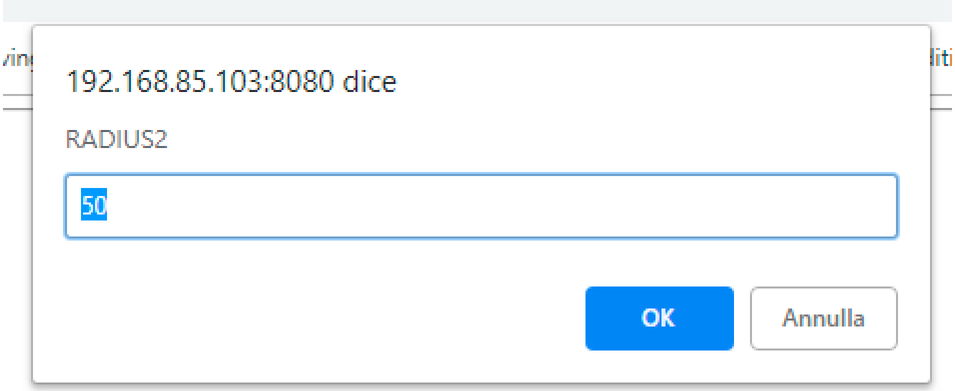
Now we change the RADIUS1=100 and RADIUS2=50 by clicking on “CHANGE” button:



192.168.85.103:8080 dice

RADIUS1

100

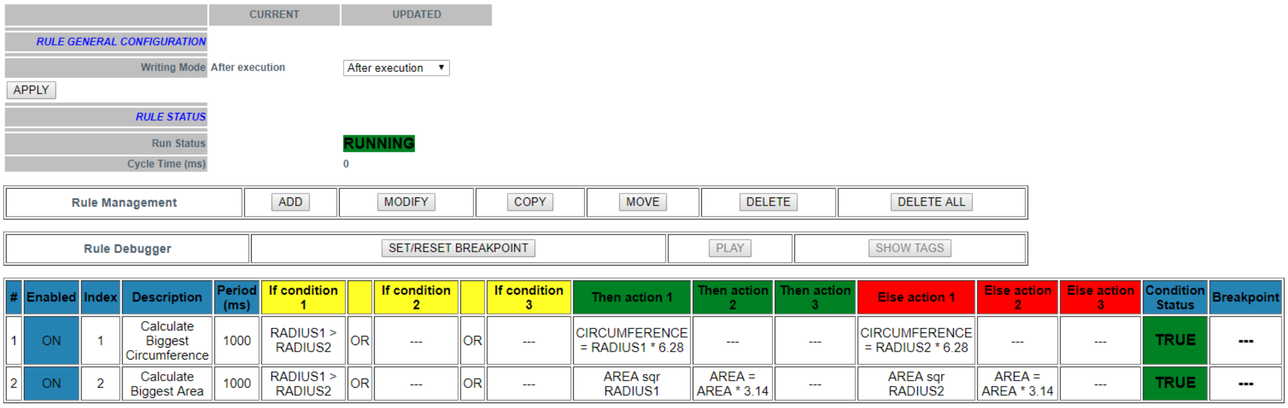


192.168.85.103:8080 dice

RADIUS2

50

Now we can pass to “Rule Management” page for view the result:

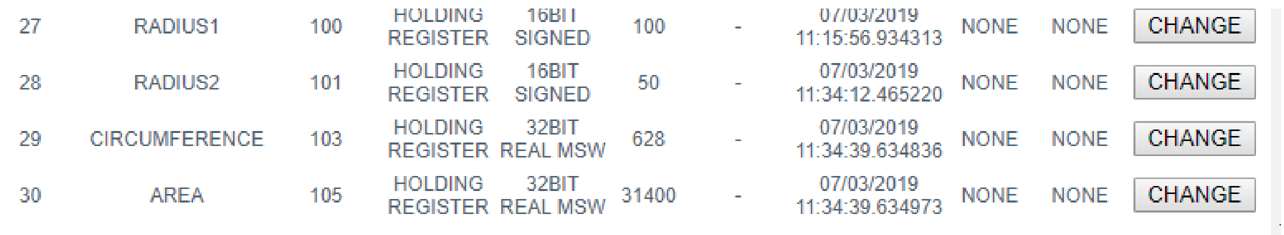


	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▾
RULE STATUS		
Run Status		RUNNING
Cycle Time (ms)		0

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	TRUE	---
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	TRUE	---

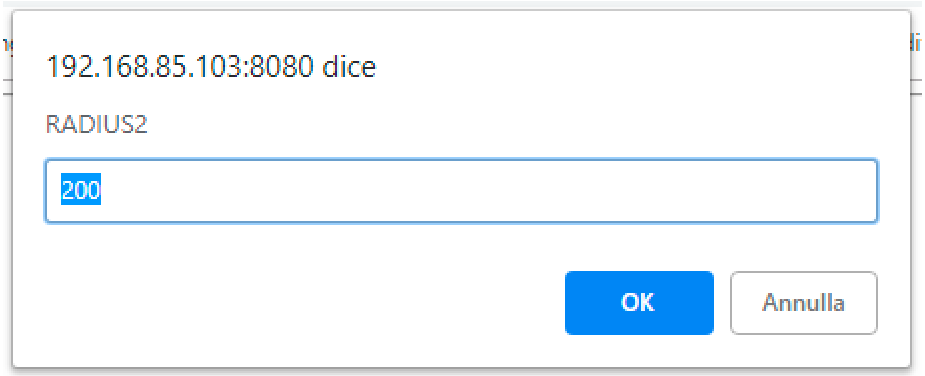
Now the condition status of the 2 rules is true because the RADIUS1 > RADIUS2, so are executed the “Then Actions”

In Tag view the calculation of CIRCUMFERENCE and AREA are updated:



27	RADIUS1	100	HOLDING REGISTER	16BIT SIGNED	100	-	07/03/2019 11:15:56.934313	NONE	NONE	CHANGE
28	RADIUS2	101	HOLDING REGISTER	16BIT SIGNED	50	-	07/03/2019 11:34:12.465220	NONE	NONE	CHANGE
29	CIRCUMFERENCE	103	HOLDING REGISTER	32BIT REAL MSW	628	-	07/03/2019 11:34:39.634836	NONE	NONE	CHANGE
30	AREA	105	HOLDING REGISTER	32BIT REAL MSW	31400	-	07/03/2019 11:34:39.634973	NONE	NONE	CHANGE

Now we change to 200 the RADIUS2 value in the tag view pages:

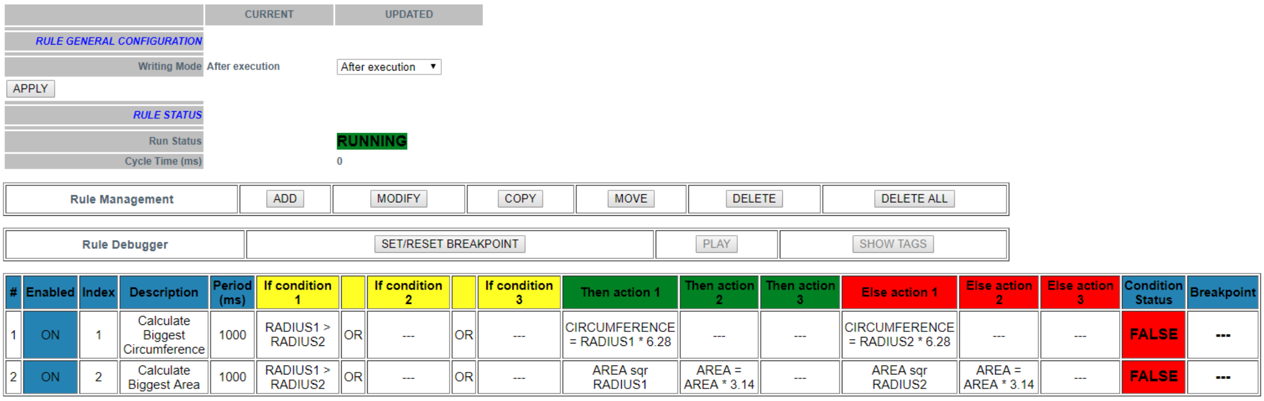


192.168.85.103:8080 dice

RADIUS2

200

And now:

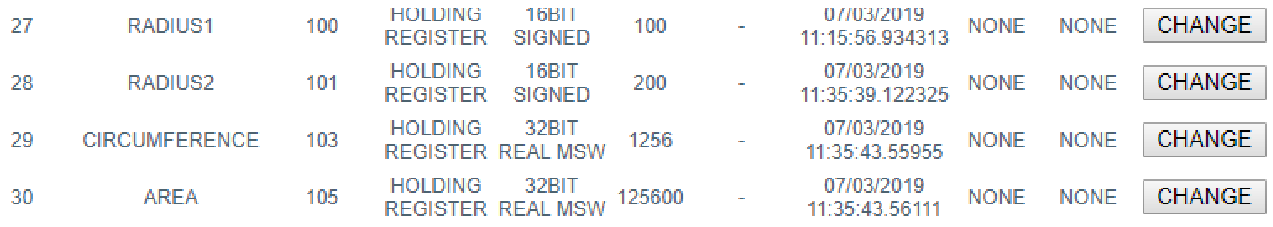


	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▾
APPLY		
RULE STATUS		
Run Status		RUNNING
Cycle Time (ms)		0

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	---
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	---

Now the condition status of the 2 rules is false because the RADIUS1 < RADIUS2, so are executed the “Else Actions”

In Tag view the calculation of CIRCUMFERENCE and AREA are updated:



27	RADIUS1	100	HOLDING REGISTER	16BIT SIGNED	100	-	07/03/2019 11:15:56.934313	NONE	NONE	CHANGE
28	RADIUS2	101	HOLDING REGISTER	16BIT SIGNED	200	-	07/03/2019 11:35:39.122325	NONE	NONE	CHANGE
29	CIRCUMFERENCE	103	HOLDING REGISTER	32BIT REAL MSW	1256	-	07/03/2019 11:35:43.55955	NONE	NONE	CHANGE
30	AREA	105	HOLDING REGISTER	32BIT REAL MSW	125600	-	07/03/2019 11:35:43.56111	NONE	NONE	CHANGE

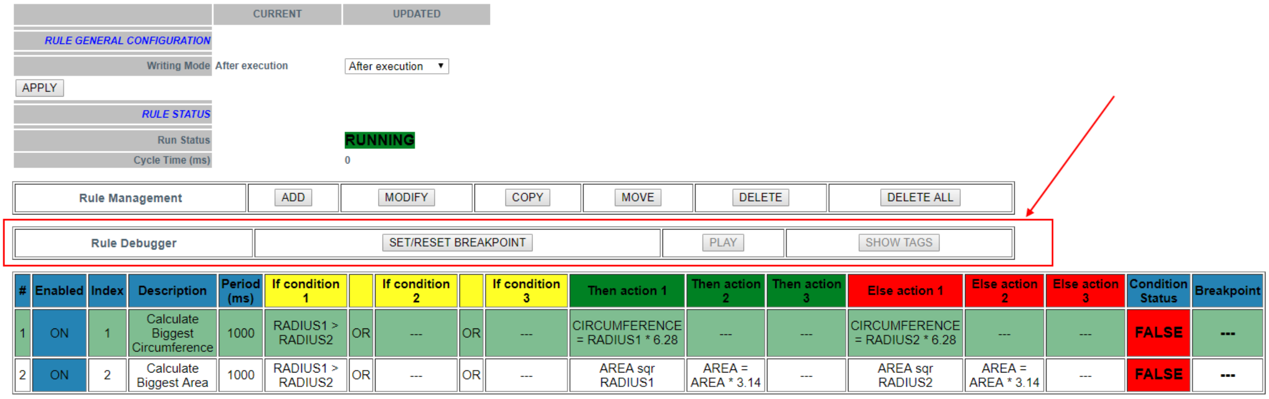
21.6.5.5 Debug the Example Program

A program can be debugged by using the internal Rule debugger.

With the internal debugger you can:

-Insert a Breakpoint before the execution of a rule

-View the tag values before/after the execution of a rule



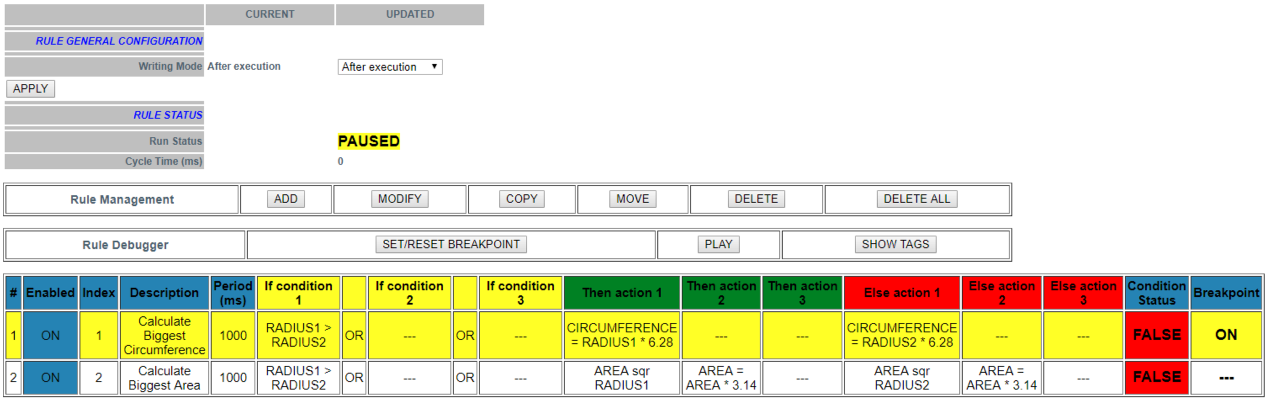
	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▾
APPLY		
RULE STATUS		
Run Status		RUNNING
Cycle Time (ms)		0

Rule Management: ADD | MODIFY | COPY | MOVE | DELETE | DELETE ALL

Rule Debugger: SET/RESET BREAKPOINT | PLAY | SHOW TAGS

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	---
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	---

For adding a breakpoint select the a rule and then press the "SET/RESET BREAKPOINT":



	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▾
APPLY		
RULE STATUS		
Run Status		PAUSED
Cycle Time (ms)		0

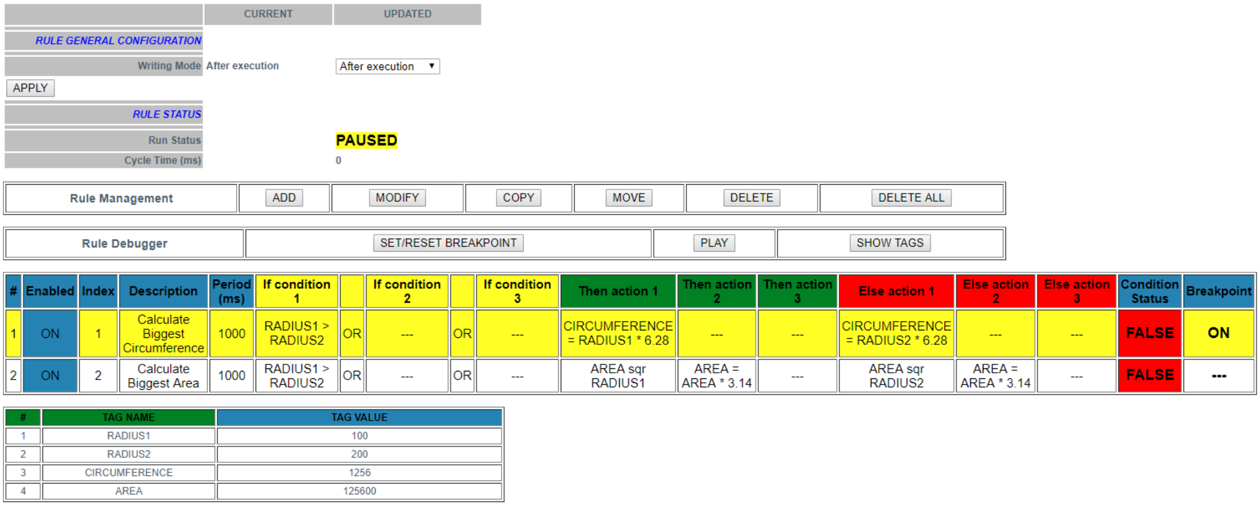
Rule Management: ADD | MODIFY | COPY | MOVE | DELETE | DELETE ALL

Rule Debugger: SET/RESET BREAKPOINT | PLAY | SHOW TAGS

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	ON
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	---

The rule became yellow and the rule status change in "paused". Note that the breakpoint is ***before*** the execution of the rule.

By clicking on "Show tags" the actual tags values are displayed:



	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▾

APPLY

RULE STATUS		
Run Status		PAUSED
Cycle Time (ms)		0

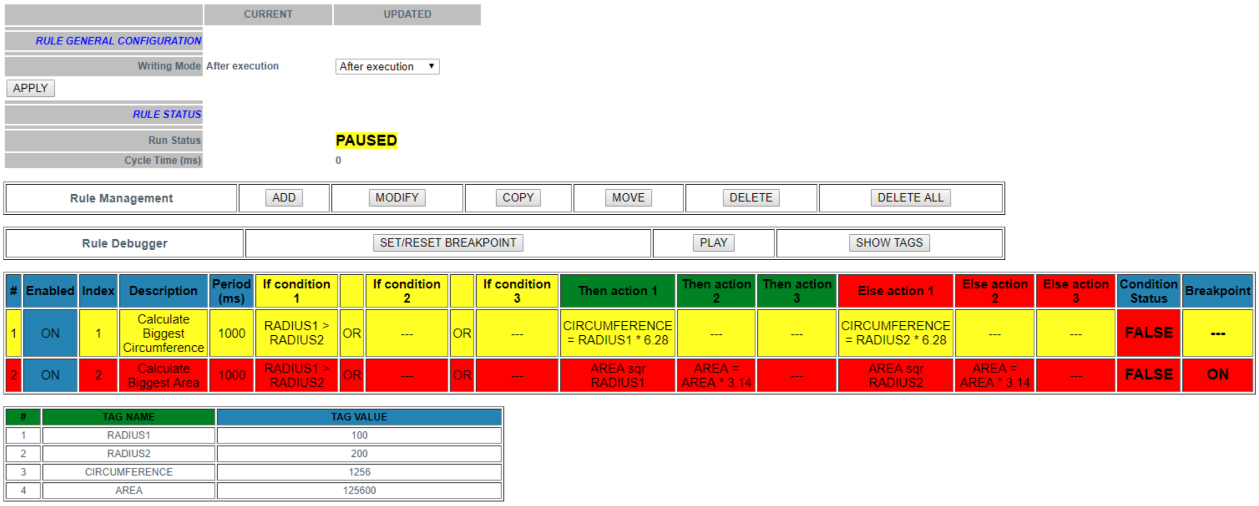
Rule Management	ADD	MODIFY	COPY	MOVE	DELETE	DELETE ALL

Rule Debugger	SET/RESET BREAKPOINT	PLAY	SHOW TAGS

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	ON
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	---

#	TAG NAME	TAG VALUE
1	RADIUS1	100
2	RADIUS2	200
3	CIRCUMFERENCE	1256
4	AREA	125600

Now you can move the breakpoint to the following rule, select the next rule and press the "SET/RESET BREAKPOINT" button:



	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▾

APPLY

RULE STATUS		
Run Status		PAUSED
Cycle Time (ms)		0

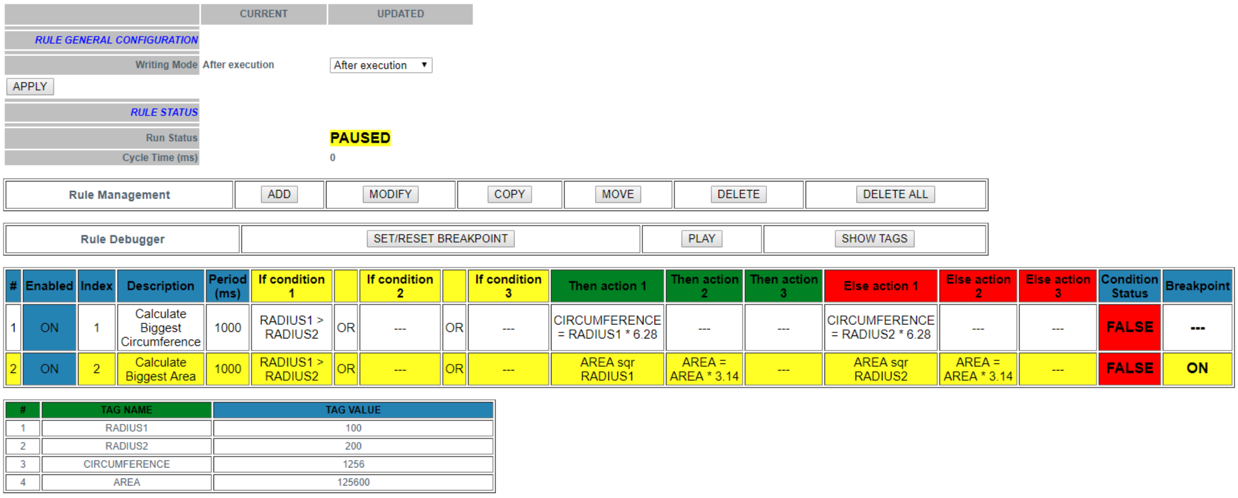
Rule Management	ADD	MODIFY	COPY	MOVE	DELETE	DELETE ALL

Rule Debugger	SET/RESET BREAKPOINT	PLAY	SHOW TAGS

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	---
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	ON

#	TAG NAME	TAG VALUE
1	RADIUS1	100
2	RADIUS2	200
3	CIRCUMFERENCE	1256
4	AREA	125600

Note that the execution is pause because you must press "PLAY" for advance to the next breakpoint, press "PLAY":



	CURRENT	UPDATED
RULE GENERAL CONFIGURATION		
Writing Mode	After execution	After execution ▾

	CURRENT	UPDATED
RULE STATUS		
Run Status		PAUSED
Cycle Time (ms)		0

#	Enabled	Index	Description	Period (ms)	If condition 1		If condition 2		If condition 3	Then action 1	Then action 2	Then action 3	Else action 1	Else action 2	Else action 3	Condition Status	Breakpoint
1	ON	1	Calculate Biggest Circumference	1000	RADIUS1 > RADIUS2	OR	---	OR	---	CIRCUMFERENCE = RADIUS1 * 6.28	---	---	CIRCUMFERENCE = RADIUS2 * 6.28	---	---	FALSE	---
2	ON	2	Calculate Biggest Area	1000	RADIUS1 > RADIUS2	OR	---	OR	---	AREA sqr RADIUS1	AREA = AREA * 3.14	---	AREA sqr RADIUS2	AREA = AREA * 3.14	---	FALSE	ON

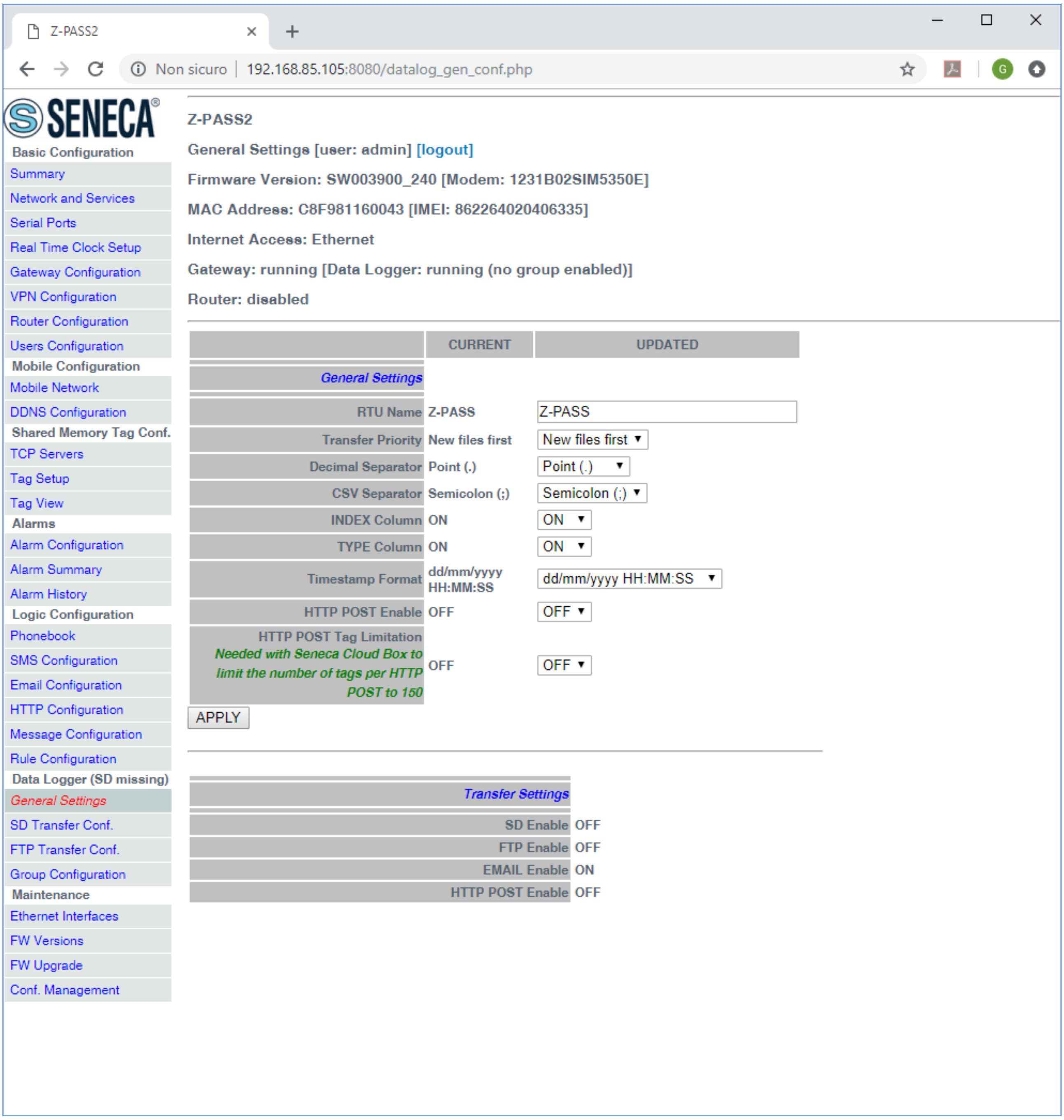
#	TAG NAME	TAG VALUE
1	RADIUS1	100
2	RADIUS2	200
3	CIRCUMFERENCE	1256
4	AREA	125600

The execution is stopped before the Rule nr 2.

21.7 Data Logger

21.7.1 General Settings

By clicking on the “General Settings” link, in the “Data Logger” section, you come to the following page:



Z-PASS2

General Settings [user: admin] [logout]

Firmware Version: SW003900_240 [Modem: 1231B02SIM5350E]

MAC Address: C8F981160043 [IMEI: 862264020406335]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

	CURRENT	UPDATED
General Settings		
RTU Name	Z-PASS	Z-PASS
Transfer Priority	New files first	New files first ▾
Decimal Separator	Point (.)	Point (.) ▾
CSV Separator	Semicolon (;)	Semicolon (;) ▾
INDEX Column	ON	ON ▾
TYPE Column	ON	ON ▾
Timestamp Format	dd/mm/yyyy HH:MM:SS	dd/mm/yyyy HH:MM:SS ▾
HTTP POST Enable	OFF	OFF ▾
HTTP POST Tag Limitation *Needed with Seneca Cloud Box to limit the number of tags per HTTP POST to 150*	OFF	OFF ▾

Transfer Settings	
SD Enable	OFF
FTP Enable	OFF
EMAIL Enable	ON
HTTP POST Enable	OFF

In the "General Settings" section, this page contains the general parameters related to the Data Logger functionality, as listed in the following table.

Field	Meaning	Default value
RTU Name	Name identifying the Z-PASS device. It is used in log file names, transferred via FTP or sent as email attachments	Z-PASS
Transfer Priority	This field tells if newer or older log files shall be transferred first.	New files first

	Possible values are: - Old files first - New files first	
Decimal separator	Character used as decimal separator for floating point values in log files. Possible values are: - Point (.) - Comma (,)	Point (.)
CSV Separator	Character used as field separator in *csv* log files. Possible values are: - Semicolon (;) - Point (.) - Blank ( )	Semicolon (;)
INDEX Column	Flag telling if the “INDEX” column, containing the line (sample) progressive index, shall be present in the log files or not	ON
TYPE Column	Flag telling if the “TYPE” column, containing the line (sample) type, shall be present in the log files or not. NOTE: currently, this column always contains the “LOG” string	ON
Timestamp Format	Format of the timestamp value in the “TIMESTAMP” column. Possible formats are: dd/mm/yyyy HH:MM:SS yyyy/mm/dd HH:MM:SS dd/mm/yy HH:MM:SS yy/mm/dd HH:MM:SS seconds since the Epoch	dd/mm/yyyy HH:MM:SS
HTTP POST Enable	Flag to enable/disable the HTTP POST protocol (see paragraph 10.1)	OFF
HTTP POST Tag Limitation	When this parameter is set to ON, the HTTP POST requests contain a maximum of 150 tags, even if Group 1 contains a larger number of tags; conversely, when it is set to OFF, the HTTP POST requests contain all the Group 1 tags. This limitation is needed when using the Z-PASS with the Seneca Cloud Box product.	OFF

Please note that, when the “HTTP POST Enable” parameter is changed from OFF to ON, the following changes are also automatically applied:

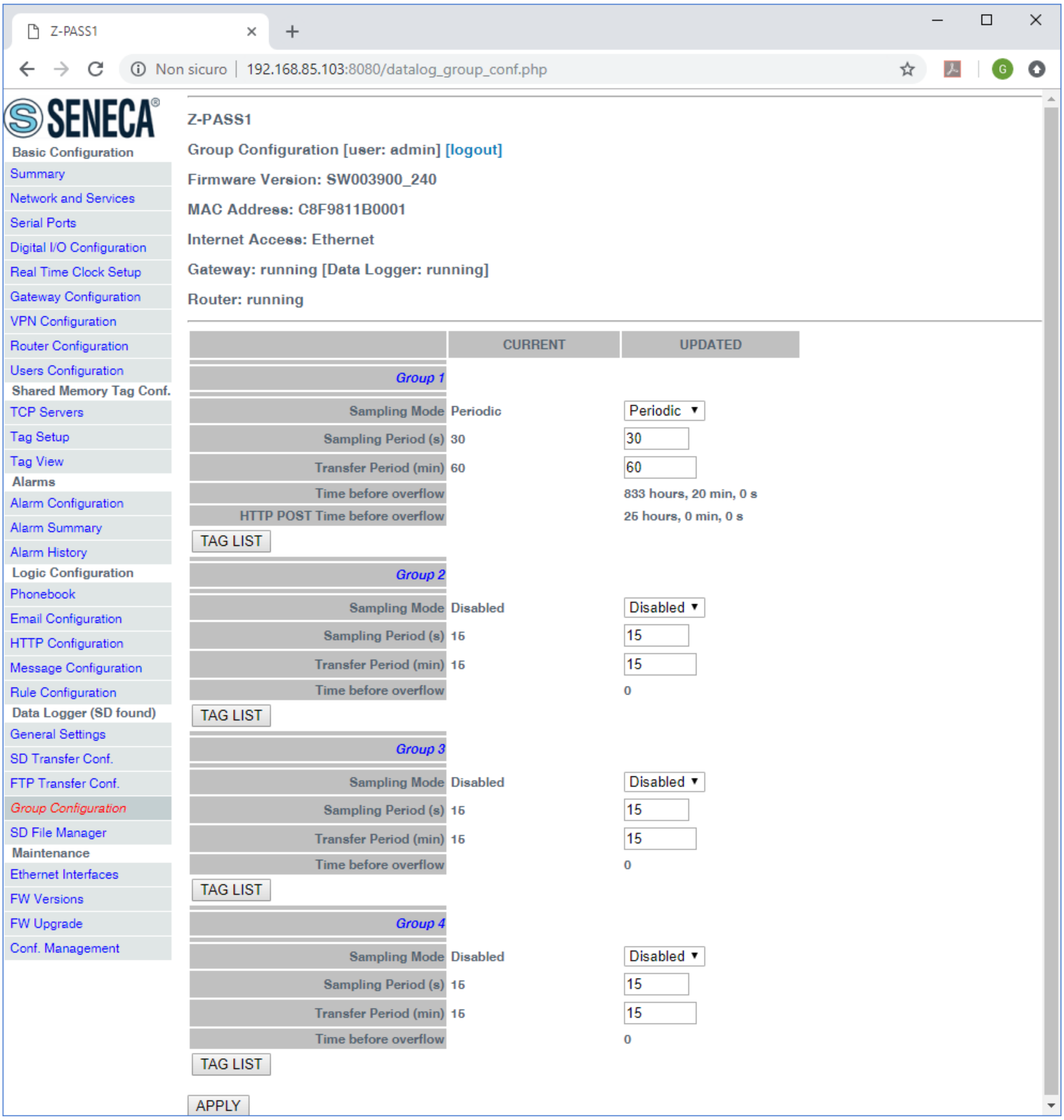
- the “Enable” parameter in the “HTTP POST Configuration” page is set to ON;
- the “Sampling Mode” parameter for all the groups in the “Group Configuration” page is set to Disabled; then, it can be changed only for Group 1;
- the “Sampling Period” parameter for Group 1 in the “Group Configuration” page shall be a multiple of 30 (seconds).

In the “Transfer Settings” section, the “enable” (OFF/ON) status for all the transfer methods is shown.

Note that from release FW SW00390_297 it’s also possible to use the Datalogger on trigger feature. In this mode the data acquisition it’s made only when a rule command it’s “TRIGGER LOG” (see Logic Configuration).

21.7.2 Group Configuration

By clicking on the “Group Configuration” link, in the “Data Logger” section, you come to the following page:



Z-PASS1

Group Configuration [user: admin] [logout]

Firmware Version: SW003900_240

MAC Address: C8F9811B0001

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: running

	CURRENT	UPDATED
Group 1		
Sampling Mode	Periodic	Periodic ▼
Sampling Period (s)	30	30
Transfer Period (min)	60	60
Time before overflow		833 hours, 20 min, 0 s
HTTP POST Time before overflow		25 hours, 0 min, 0 s
Group 2		
Sampling Mode	Disabled	Disabled ▼
Sampling Period (s)	15	15
Transfer Period (min)	15	15
Time before overflow		0
Group 3		
Sampling Mode	Disabled	Disabled ▼
Sampling Period (s)	15	15
Transfer Period (min)	15	15
Time before overflow		0
Group 4		
Sampling Mode	Disabled	Disabled ▼
Sampling Period (s)	15	15
Transfer Period (min)	15	15
Time before overflow		0

The page contains four sections, one for each Data Logger group.

Each section contains the parameters described in the following table.

Field	Meaning	Default value
Sampling Mode	Since, currently, the only supported sampling mode is “Periodic”, this parameter is actually a flag used to enable (“Periodic”) or disable (“Disabled”) the group.	Disabled

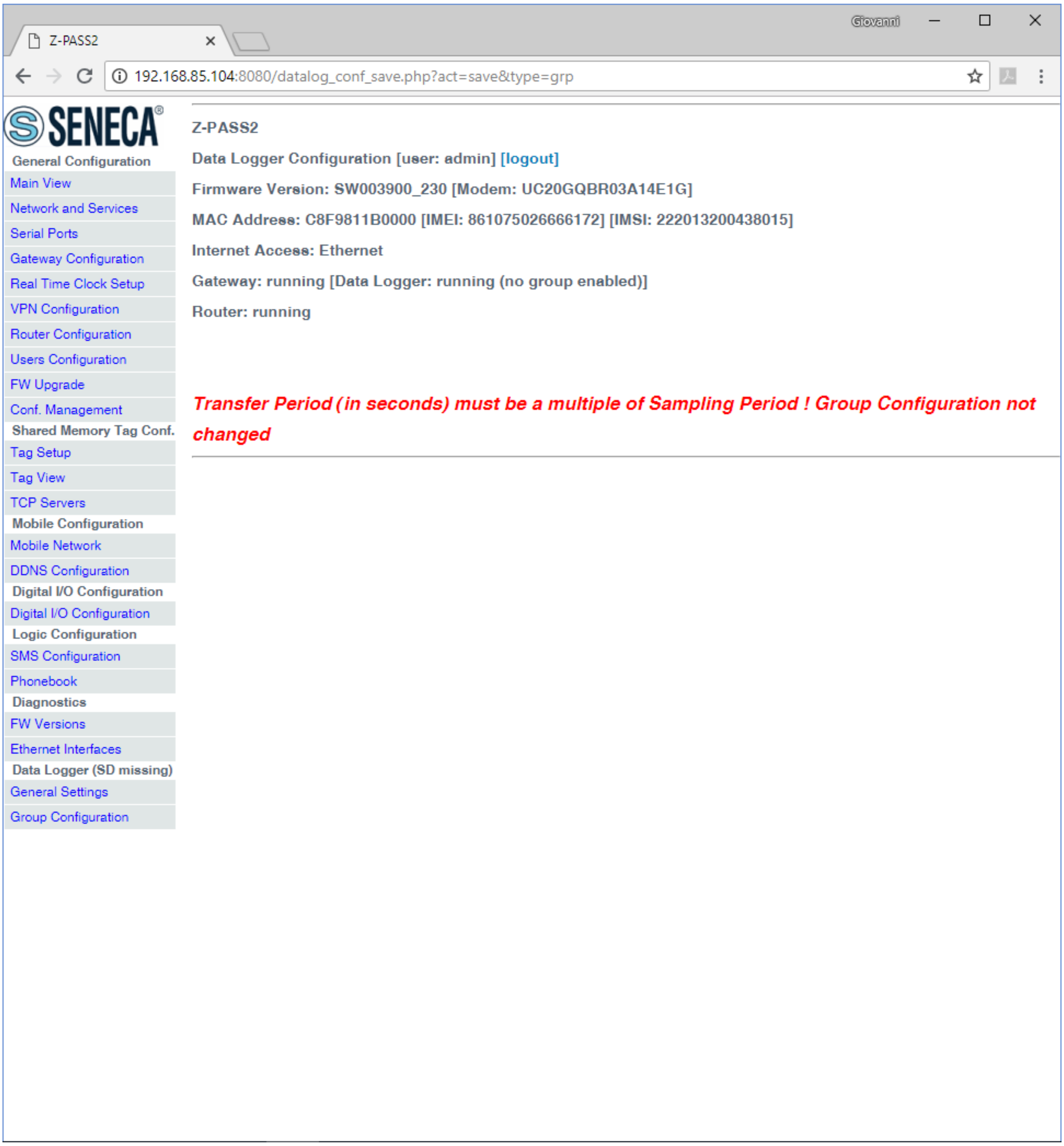
Sampling Period (s)	This parameter defines the sampling period, in seconds. Minimum: 1, Maximum: 7200	15
Transfer Period (min)	This parameter defines the transfer period, in minutes; that is every time interval defined by this parameter the log file is closed and transferred. Minimum: 1, Maximum: 43200	15

For any group with “Sampling Mode” set to “Periodic”, the “Time before overflow” information is given; this is the time (given in hour, minutes, seconds) after which the oldest log files will be overwritten by the new files; in other words, this value represents the time interval during which Z-PASS can store data samples, before data loss occurs.

If “HTTP POST Enable” is set to ON, for Group 1 with “Sampling Mode” set to “Periodic”, also the “HTTP POST Time before overflow” is given, which is the same concept of “Time before overflow” applied to data samples sent via HTTP POST.

It should be noticed that the values of the “Sampling Period” and “Transfer Period” parameters determine the maximum number of lines (samples) in a log file.

The “Transfer Period” (in seconds) shall be a multiple of the “Sampling Period”: if this condition is not satisfied the following error message is shown:



Z-PASS2

Data Logger Configuration [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222013200438015]

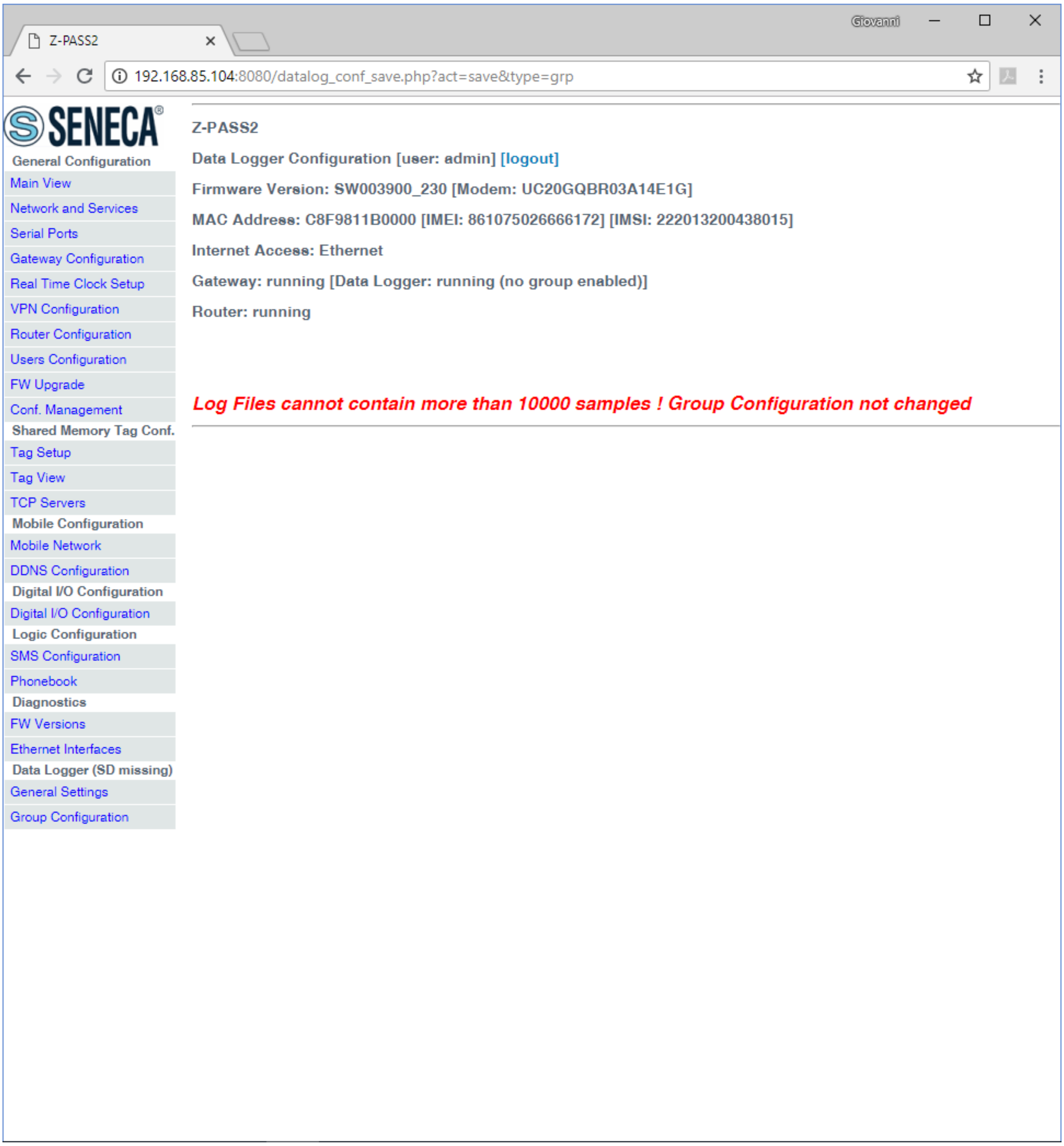
Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: running

Transfer Period (in seconds) must be a multiple of Sampling Period ! Group Configuration not changed

To prevent creating log files that are too large to store and transfer, a maximum number of 10000 lines (samples) per log file has been set; if the "Sampling Period" and "Transfer Period" values are such that this limit is overcome, the following error message is shown.



Z-PASS2

Data Logger Configuration [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222013200438015]

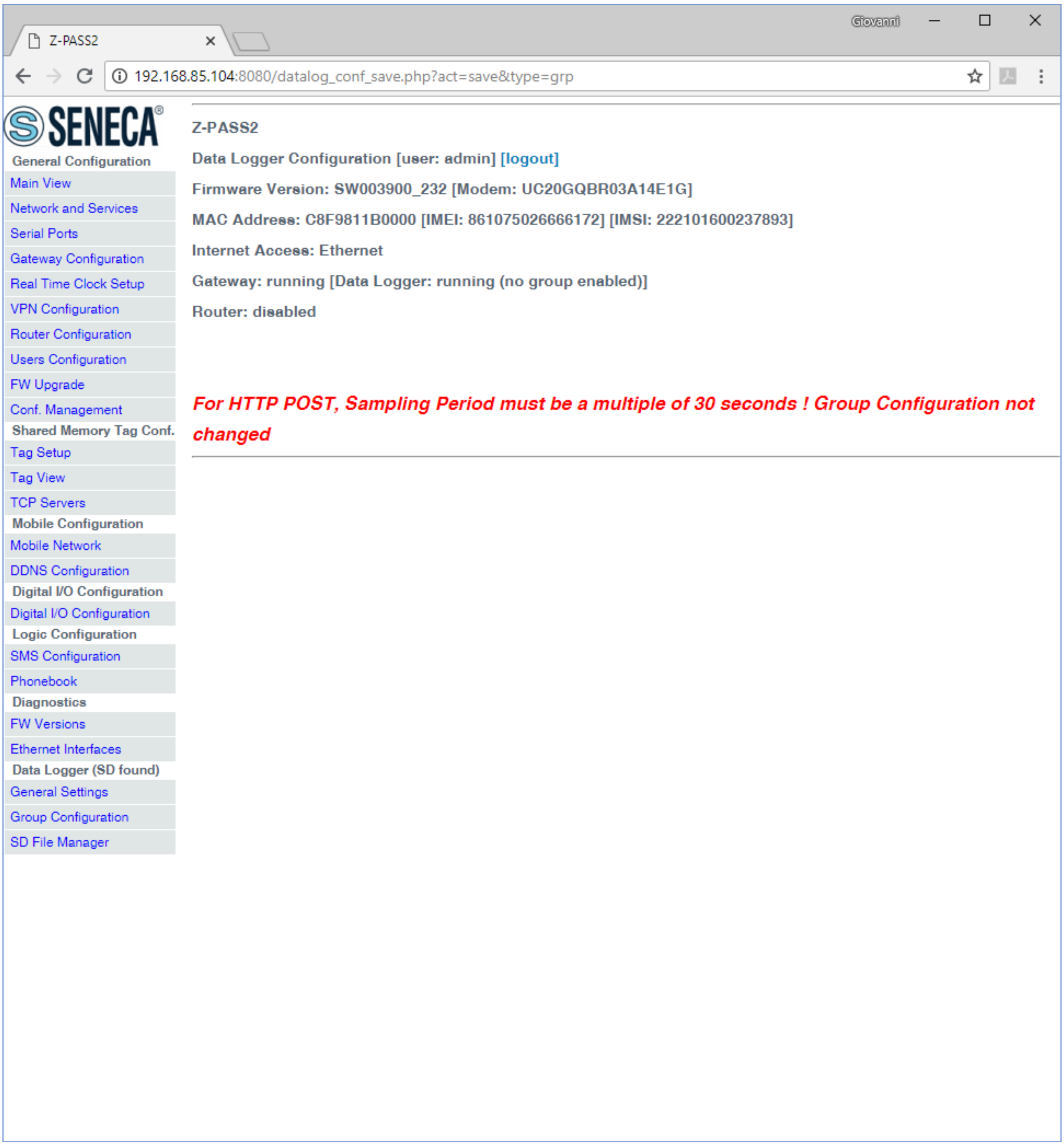
Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: running

Log Files cannot contain more than 10000 samples ! Group Configuration not changed

When HTTP POST protocol is enabled and the Group 1 Sampling Mode parameter is set to a value that is not a multiple of 30, the following error message is shown.



Z-PASS2

Data Logger Configuration [user: admin] [logout]

Firmware Version: SW003900_232 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222101600237893]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: disabled

For HTTP POST, Sampling Period must be a multiple of 30 seconds ! Group Configuration not changed

If the Data Logger is running but no group is enabled, the Data Logger status in the page headers is reported as:

[Data Logger: running (no group enabled)]

Instead, if the Data Logger is running and at least one group is enabled, the Data Logger status in the page headers is reported as:

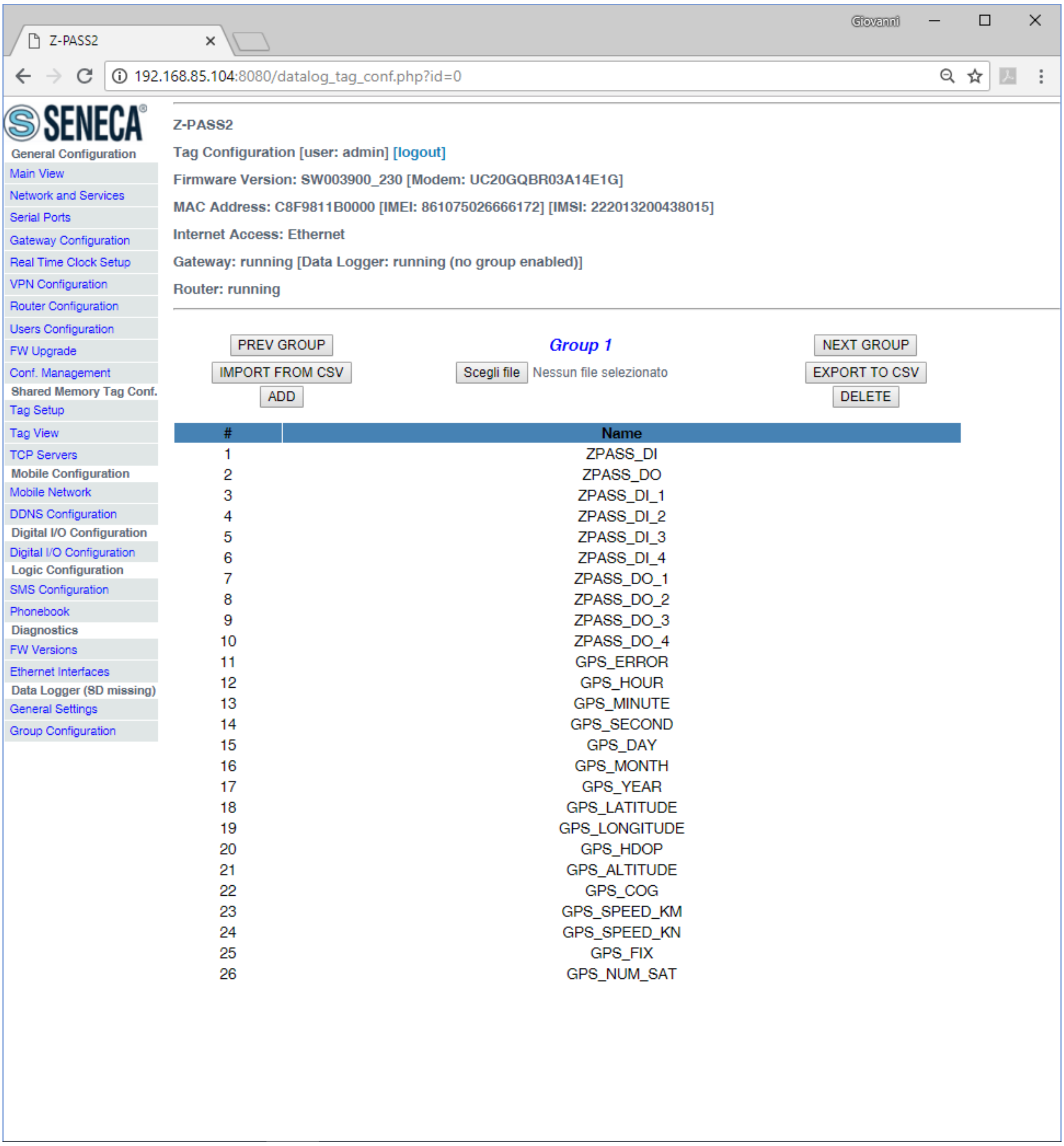
[Data Logger: running]

The Data Logger implementation is such that a log file is closed and transferred when the current date-time in seconds is a multiple of the “Transfer Period“ in seconds; so, for example, if the “Transfer Period“ is set to 60 (1 hour), the log files are closed and transferred at the beginning of each hour (00:00, 01:00, 02:00 etc.); obviously, if the Data Logger is started after the beginning of the current hour, the first log file will contain less lines that the expected number.

For enabled groups, the log files are closed and transferred, regardless of the transfer period, also in the following situations:

- if any change to Data Logger configuration parameters is applied;
- if Data Logger is stopped and restarted.

Each group section contains a button named “TAG LIST”; by clicking on this button, you come to a page like the following:



Z-PASS2

Tag Configuration [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222013200438015]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: running

#	Name
1	ZPASS_DI
2	ZPASS_DO
3	ZPASS_DI_1
4	ZPASS_DI_2
5	ZPASS_DI_3
6	ZPASS_DI_4
7	ZPASS_DO_1
8	ZPASS_DO_2
9	ZPASS_DO_3
10	ZPASS_DO_4
11	GPS_ERROR
12	GPS_HOUR
13	GPS_MINUTE
14	GPS_SECOND
15	GPS_DAY
16	GPS_MONTH
17	GPS_YEAR
18	GPS_LATITUDE
19	GPS_LONGITUDE
20	GPS_HDOP
21	GPS_ALTITUDE
22	GPS_COG
23	GPS_SPEED_KM
24	GPS_SPEED_KN
25	GPS_FIX
26	GPS_NUM_SAT

In this page, the list of the Modbus Shared Memory Gateway tags associated to the group (Group 1, in the above figure) is shown.

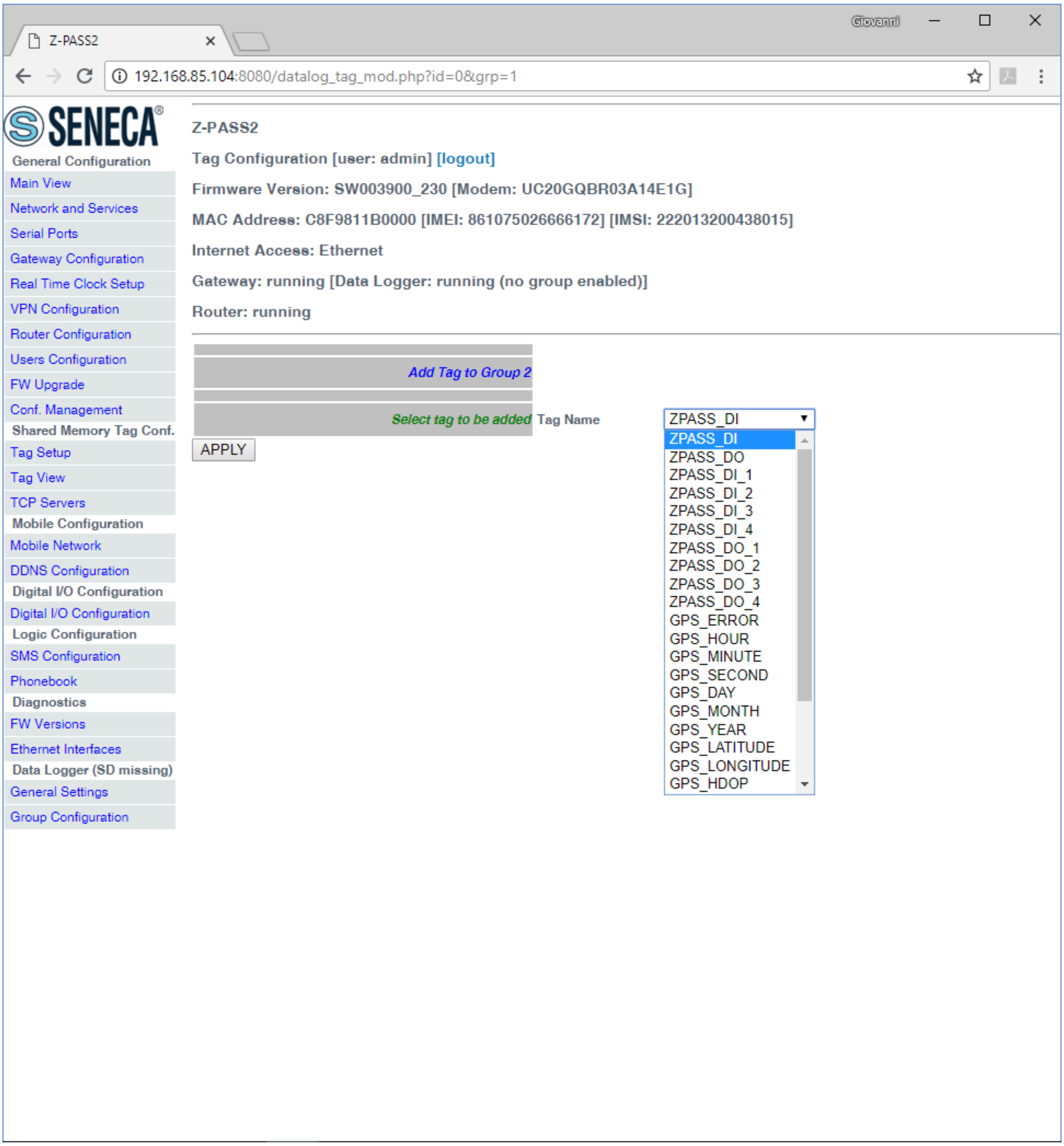
Please note that the order of the tags in the list corresponds to the order of the tag columns in the log files.

In this page, you can:

- select a tag and delete it (that is de-associate it from the group), by means of the “DELETE” button

- export the tag list to a csv file (actually, containing a single column, that is the tag names), by means of the “EXPORT TO CSV” button; by default, the name of the exported file is: *zpass_dl_tags_X.csv*, where X=[1..4] is the group number)
- importing the tag list from a csv file, by means of the “IMPORT FROM CSV” button
- go to the next/previous group, by means of the “NEXT GROUP”/”PREV GROUP” button

Finally, by clicking on the “ADD” button, you come to a page like the following.



Z-PASS2

Tag Configuration [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026666172] [IMSI: 222013200438015]

Internet Access: Ethernet

Gateway: running [Data Logger: running (no group enabled)]

Router: running

Add Tag to Group 2

Select tag to be added Tag Name ZPASS_DI

In this page, the list of the tags not associated to the group is shown.

By selecting a tag and clicking on the “APPLY” button, the tag is added to the group.

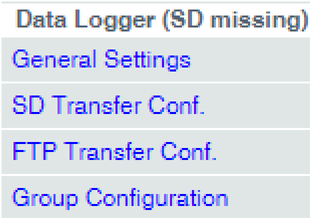
It is important to highlight some points about the association between tags and groups:

- a tag can be associated to more than one group;
- when a tag is added, in the “Tag Setup” page, it is automatically added to Group 1;
- when a tag is deleted, in the “Tag Setup” page, it is automatically deleted from all the groups;
- when a tag name is changed, in the “Tag Setup” page, it is automatically changed in all the groups which contain it;
- when the tag configuration is imported from a “cgi” file, in the “Tag Setup” page, the tag list is cleaned for all the groups and all imported tags are associated to Group 1.

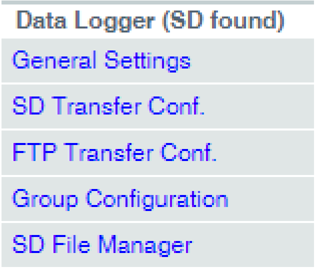
Finally, it is useful to note that a very fast and simple way to modify the tag list for the groups (e.g., to change the tag order) is to export the list, modify it and then import it.

21.7.3 SD File Manager

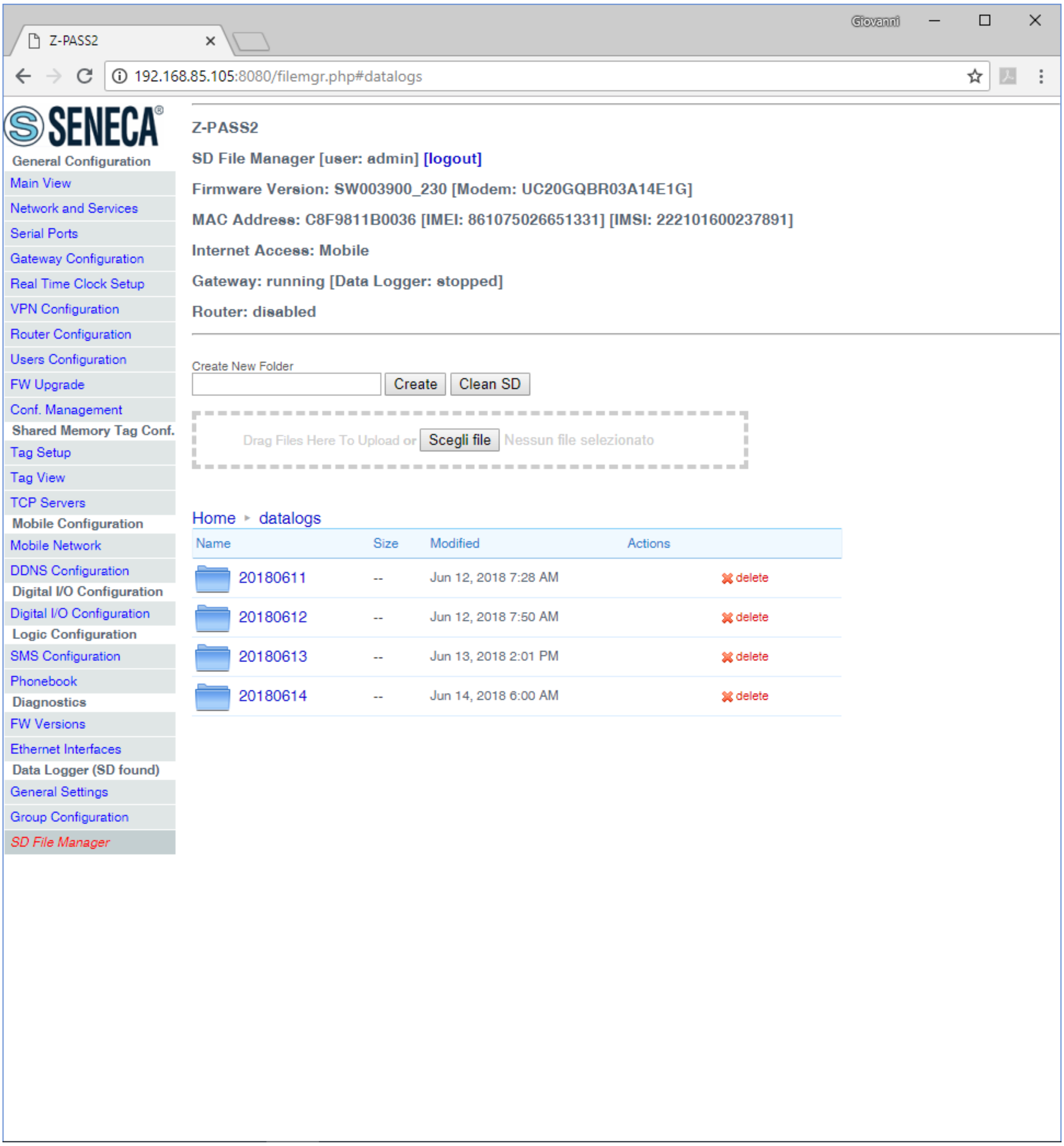
If the SD Card is not inserted in the Z-PASS, the “Data Logger” section of the web pages menu is like the following:



When the SD Card is inserted in the Z-PASS, the “Data Logger” section of the web pages menu becomes:



By clicking on the “SD File Manager” link, you come to the following page:



Z-PASS2

SD File Manager [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0036 [IMEI: 861075026651331] [IMSI: 222101600237891]

Internet Access: Mobile

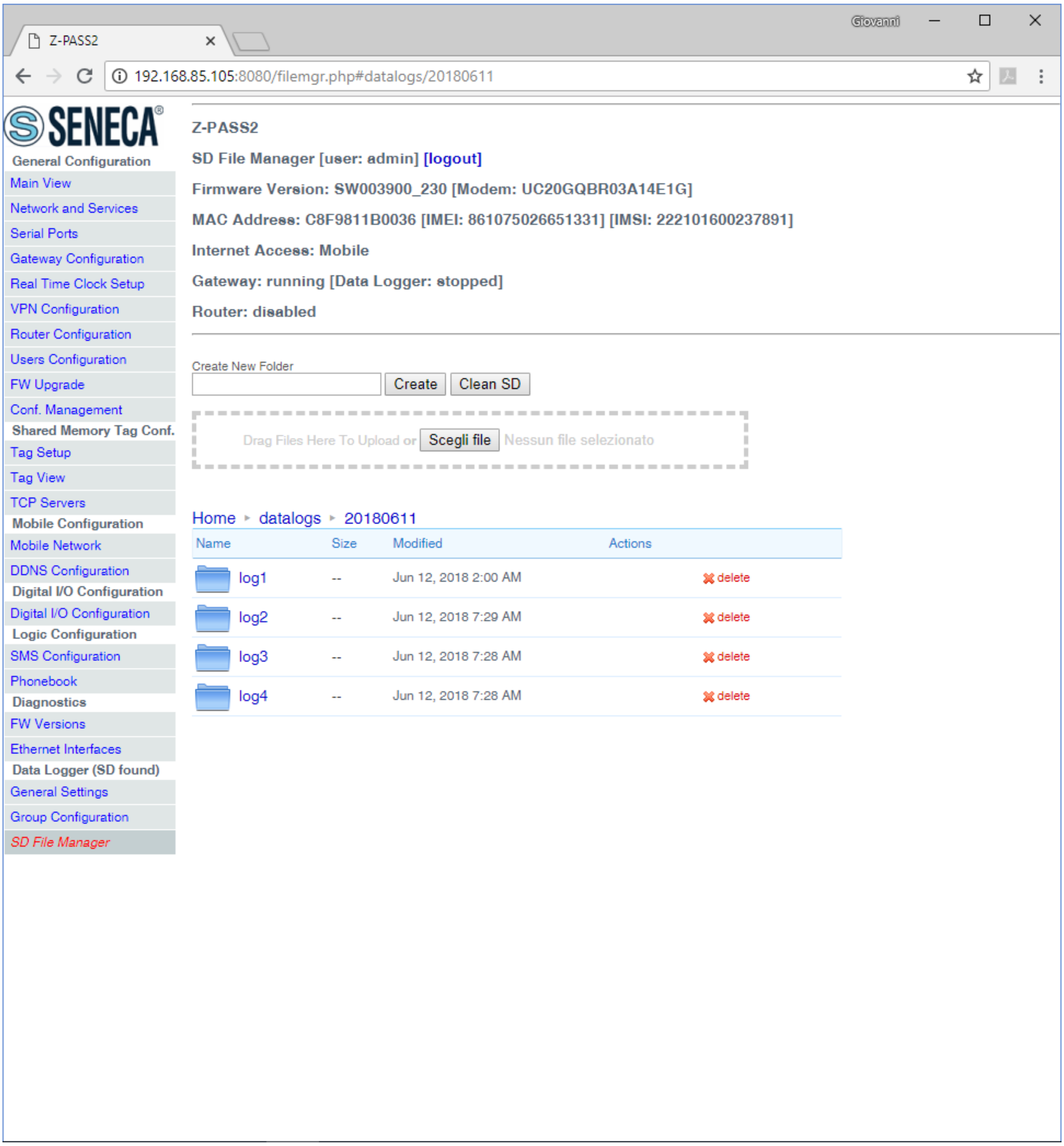
Gateway: running [Data Logger: stopped]

Router: disabled

Create New Folder

Home ▸ datalogs

Name	Size	Modified	Actions
20180611	--	Jun 12, 2018 7:28 AM	✖ delete
20180612	--	Jun 12, 2018 7:50 AM	✖ delete
20180613	--	Jun 13, 2018 2:01 PM	✖ delete
20180614	--	Jun 14, 2018 6:00 AM	✖ delete



Z-PASS2

SD File Manager [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

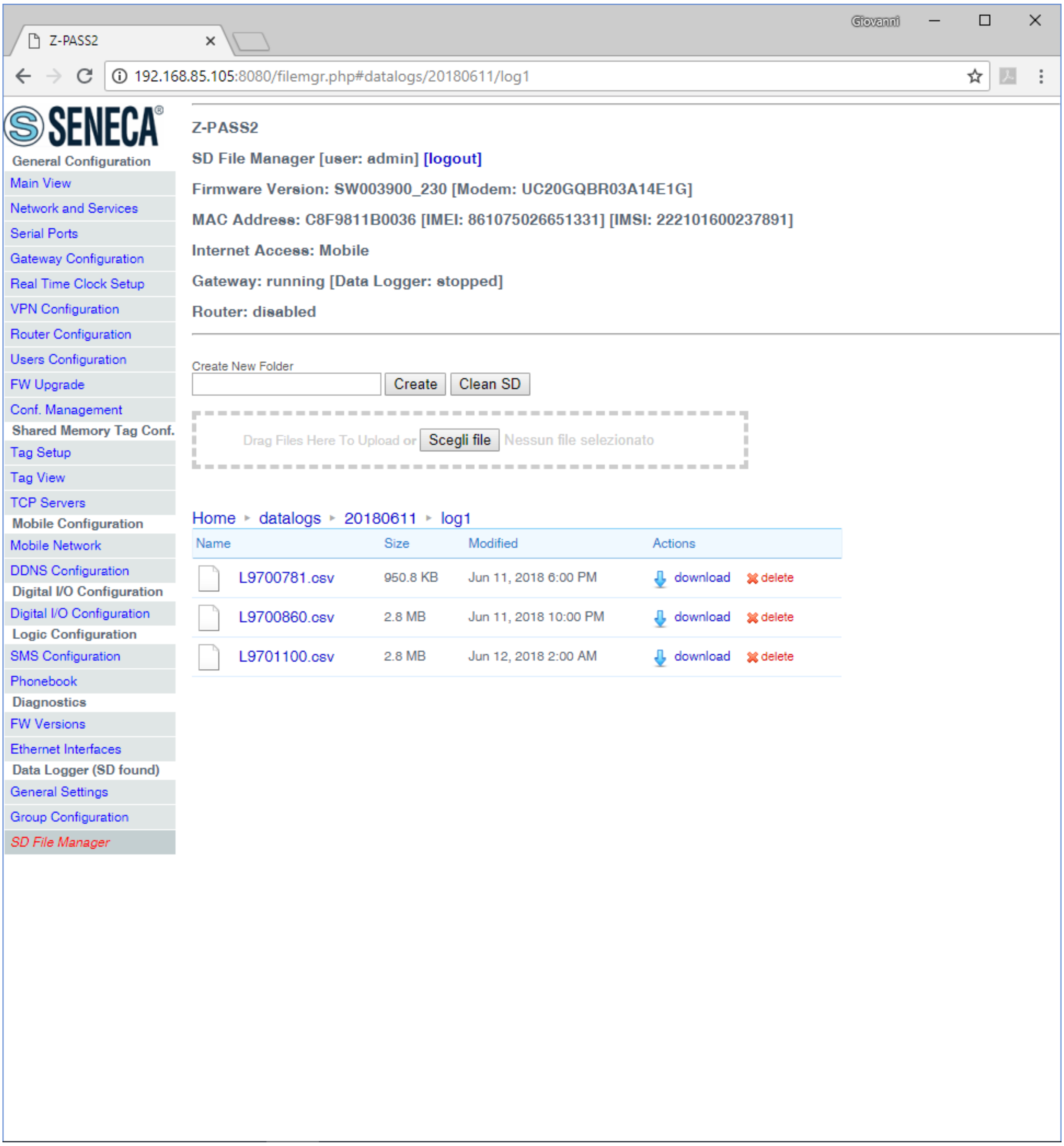
MAC Address: C8F9811B0036 [IMEI: 861075026651331] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running [Data Logger: stopped]

Router: disabled

Name	Size	Modified	Actions
log1	--	Jun 12, 2018 2:00 AM	✖ delete
log2	--	Jun 12, 2018 7:29 AM	✖ delete
log3	--	Jun 12, 2018 7:28 AM	✖ delete
log4	--	Jun 12, 2018 7:28 AM	✖ delete



Z-PASS2

SD File Manager [user: admin] [logout]

Firmware Version: SW003900_230 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0036 [IMEI: 861075026651331] [IMSI: 222101600237891]

Internet Access: Mobile

Gateway: running [Data Logger: stopped]

Router: disabled

Home ▸ datalogs ▸ 20180611 ▸ log1

Name	Size	Modified	Actions
L9700781.csv	950.8 KB	Jun 11, 2018 6:00 PM	download ✖delete
L9700860.csv	2.8 MB	Jun 11, 2018 10:00 PM	download ✖delete
L9701100.csv	2.8 MB	Jun 12, 2018 2:00 AM	download ✖delete

This page shows the contents of the SD card which, typically, is used to store the data log files.

The page lets you perform the following operations:

- browse the SD folder tree, clicking on the folder name links
- delete a folder, clicking on the “delete” link
- create a new folder, by means of the “Create New Folder” text-box and “Create” button; the new folder is created in the folder currently shown
- download a file, clicking on the filename link or on the “download” link

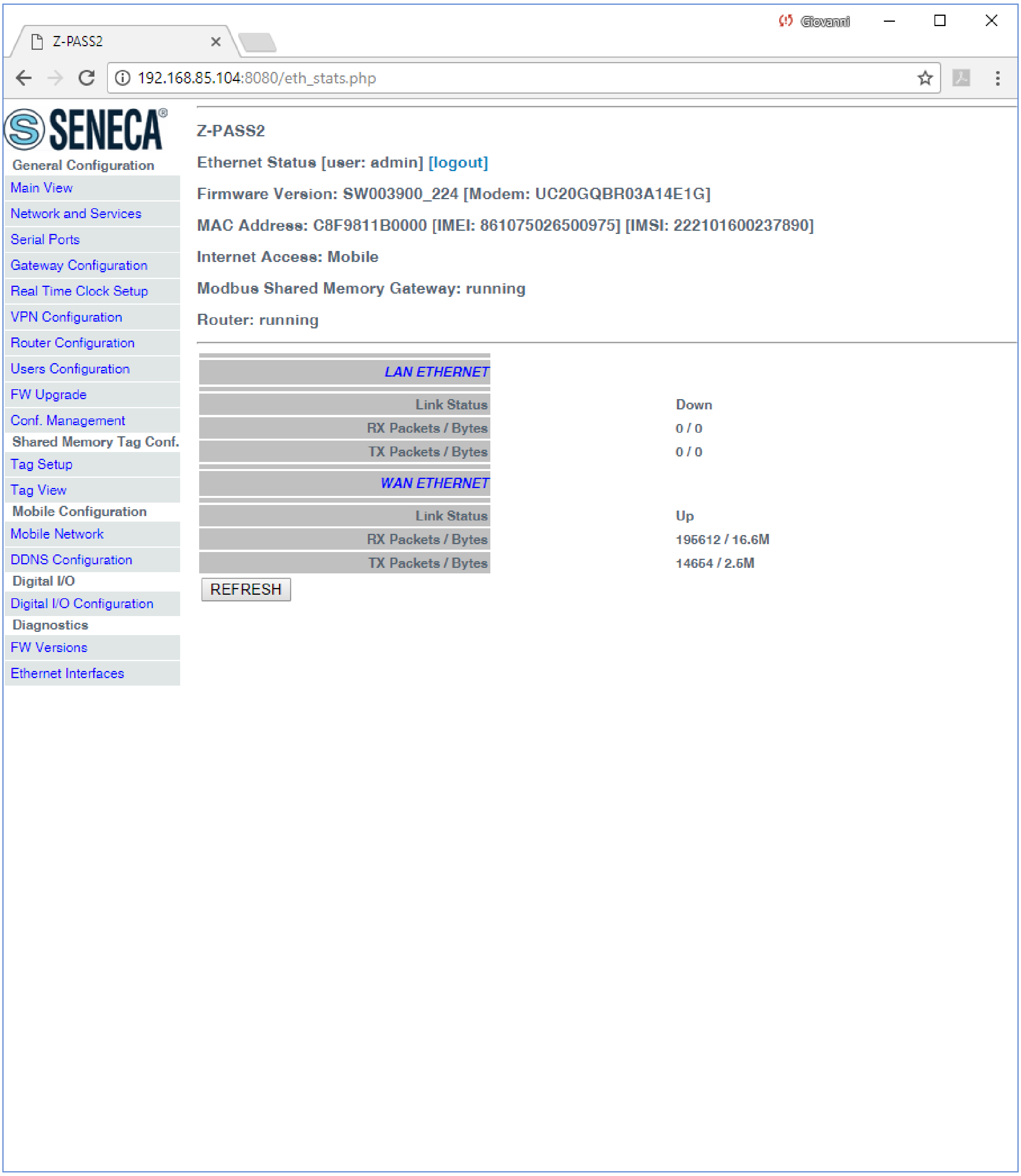
- delete a file, clicking on the “delete” link
- uploading a file, selecting it by means of the “Choose file” button or dragging it into the dashed area; the file is created in the folder currently shown
- clean the SD, by means of the “Clean SD” button; please note that this is done by formatting the SD, so all SD contents will be lost

Please note that the “guest” user (see 21.8.3 paragraph) cannot access the “SD File Manager” page.

21.8 Maintenance

21.8.1 Ethernet Interfaces

By clicking on the “Ethernet Interfaces” link, in the “Maintenance” section, you come to the following page:



Z-PASS2

Ethernet Status [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

LAN ETHERNET	
Link Status	Down
RX Packets / Bytes	0 / 0
TX Packets / Bytes	0 / 0
WAN ETHERNET	
Link Status	Up
RX Packets / Bytes	195612 / 16.6M
TX Packets / Bytes	14654 / 2.5M

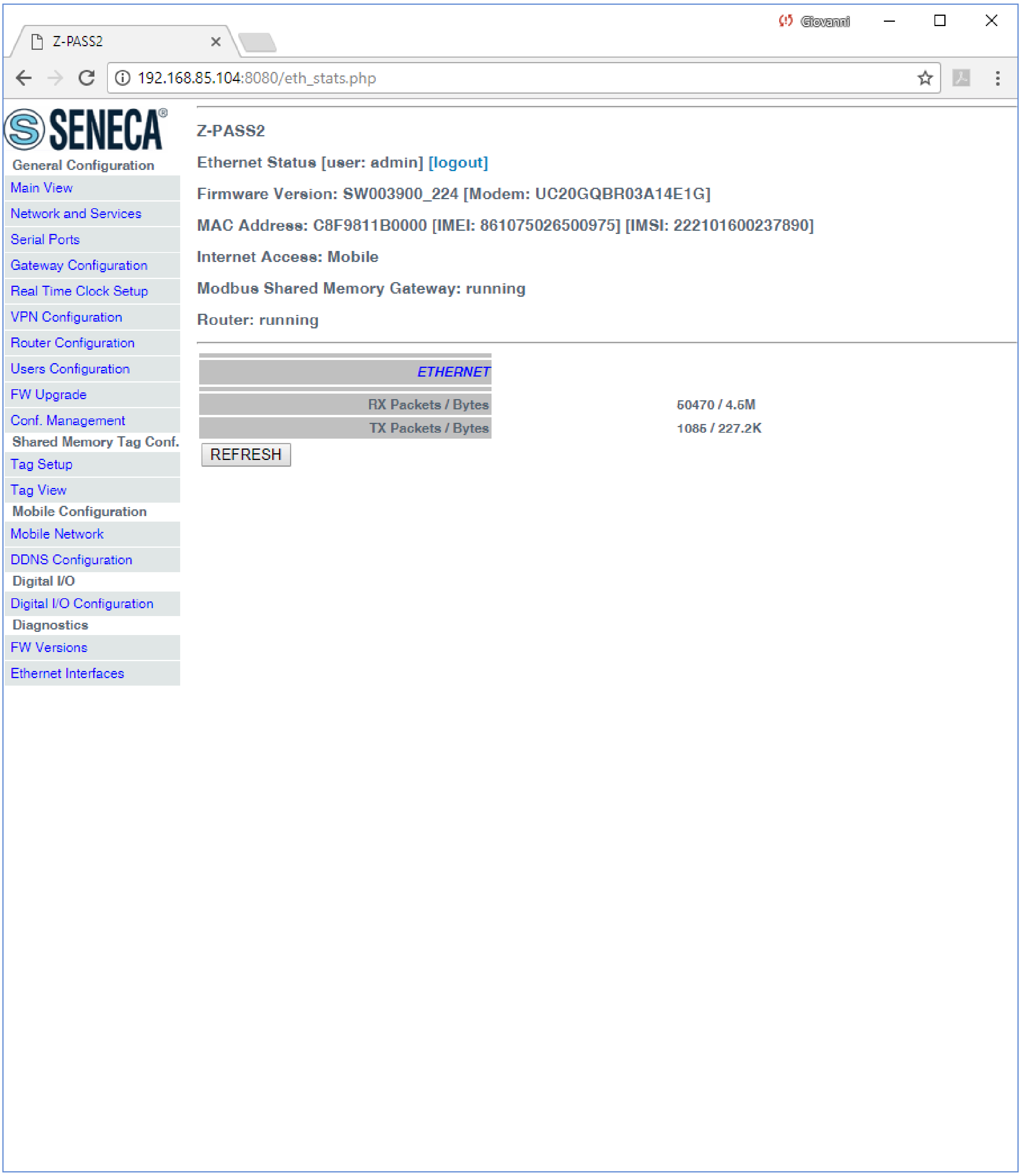
The above figure applies to a Z-PASS2, when the “Ethernet Mode” is “LAN/WAN.

In this page, for each of the two available Ethernet interfaces (LAN and WAN), the following information is shown:

- the Ethernet link status (i.e. “Down” or “Up”)

- the number of packets/bytes received from the Ethernet interface, when the link is up; “0/0” when the link is down
- the number of packets/bytes sent to the Ethernet interface, when the link is up; “0/0” when the link is down

For Z-PASS1, Z-PASS2 when the “Ethernet Mode” is “Switch”, the “Ethernet Interfaces” page is similar to the one shown in the following figure.



Z-PASS2

Ethernet Status [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

ETHERNET	
RX Packets / Bytes	50470 / 4.5M
TX Packets / Bytes	1085 / 227.2K

In this page, for the one available Ethernet interface, the following information is shown:

- the number of packets/bytes received from the Ethernet interface
- the number of packets/bytes sent to the Ethernet interface

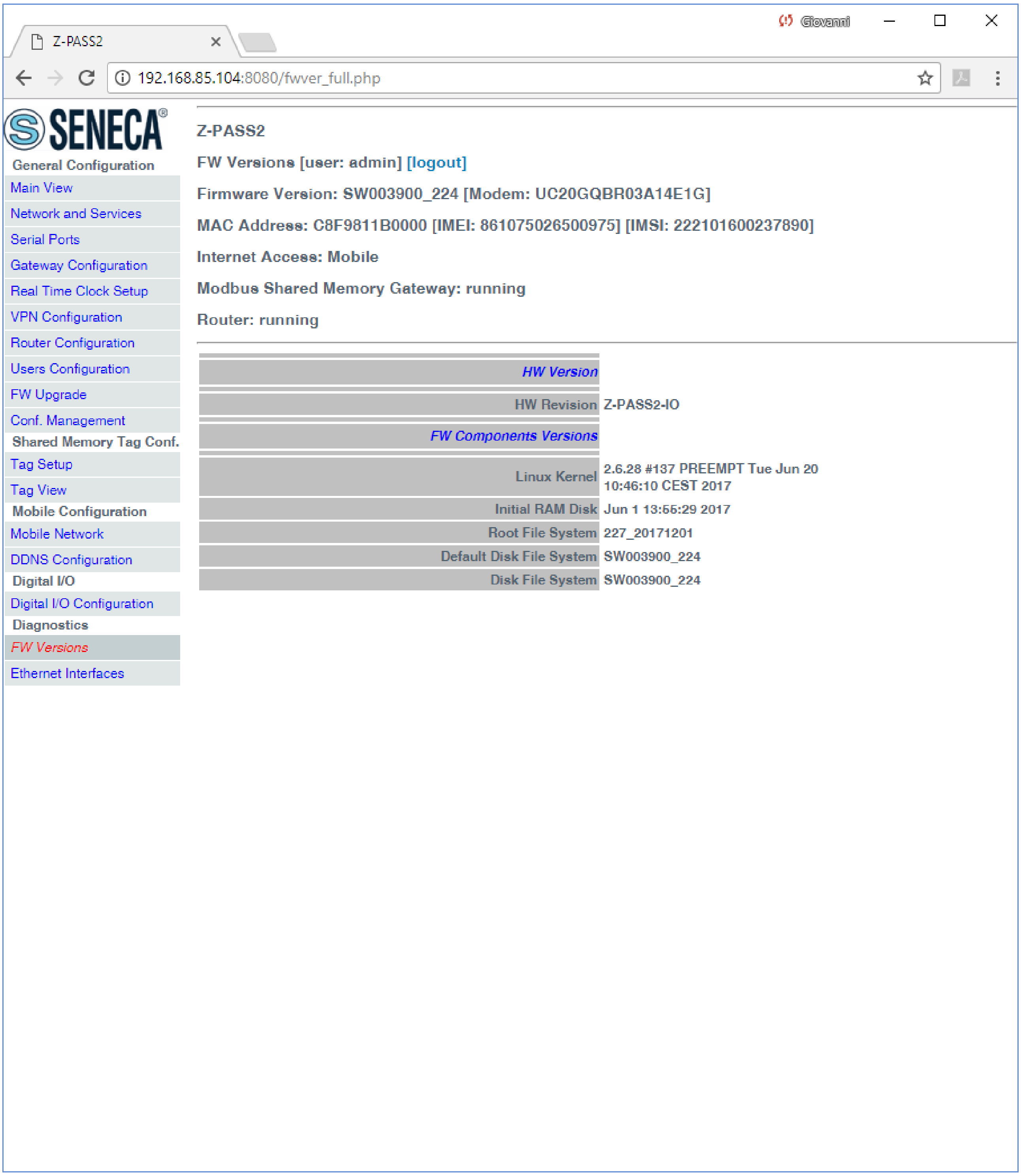
You can refresh the Ethernet status, by clicking on the “REFRESH” button.

21.8.2 Modbus Serial Trace

This is a serial sniffer useful for analyzing serial traffic. It is also possible to export the traffic to analyze it later.

21.8.3 FW Versions

By clicking on the “FW Versions” link, in the “Diagnostics” section, you come to the following page:



Z-PASS2

FW Versions [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

HW Version	
HW Revision	Z-PASS2-IO
FW Components Versions	
Linux Kernel	2.6.28 #137 PREEMPT Tue Jun 20 10:46:10 CEST 2017
Initial RAM Disk	Jun 1 13:56:29 2017
Root File System	227_20171201
Default Disk File System	SW003900_224
Disk File System	SW003900_224

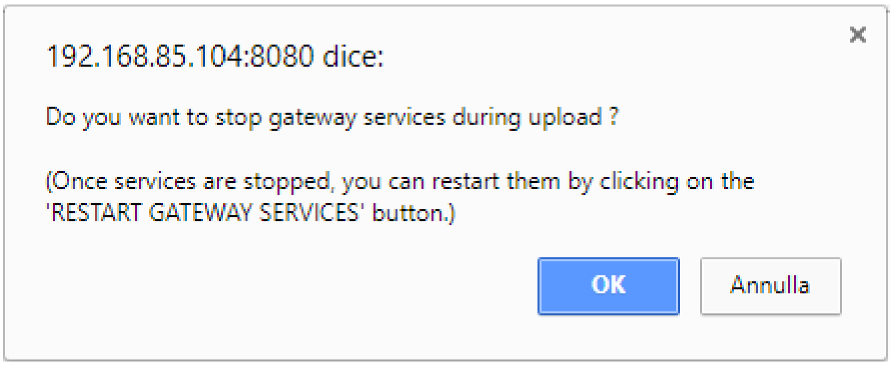
In this page, the following information are shown:

- the product name along with its HW revision (in the above figure: “Z-PASS2-R01”)
- the version strings of all the FW components, which are:
  - Linux Kernel (*kernel*)
  - Initial RAM Disk (*initrd*)

- Root File System (*rootfs*)
- Default Disk File System (*diskdfl*)
- Disk File System (*disk*)

21.8.4 FW Upgrade

When clicking on the “FW Upgrade” link, in the “Maintenance” section, the following pop-up is shown:

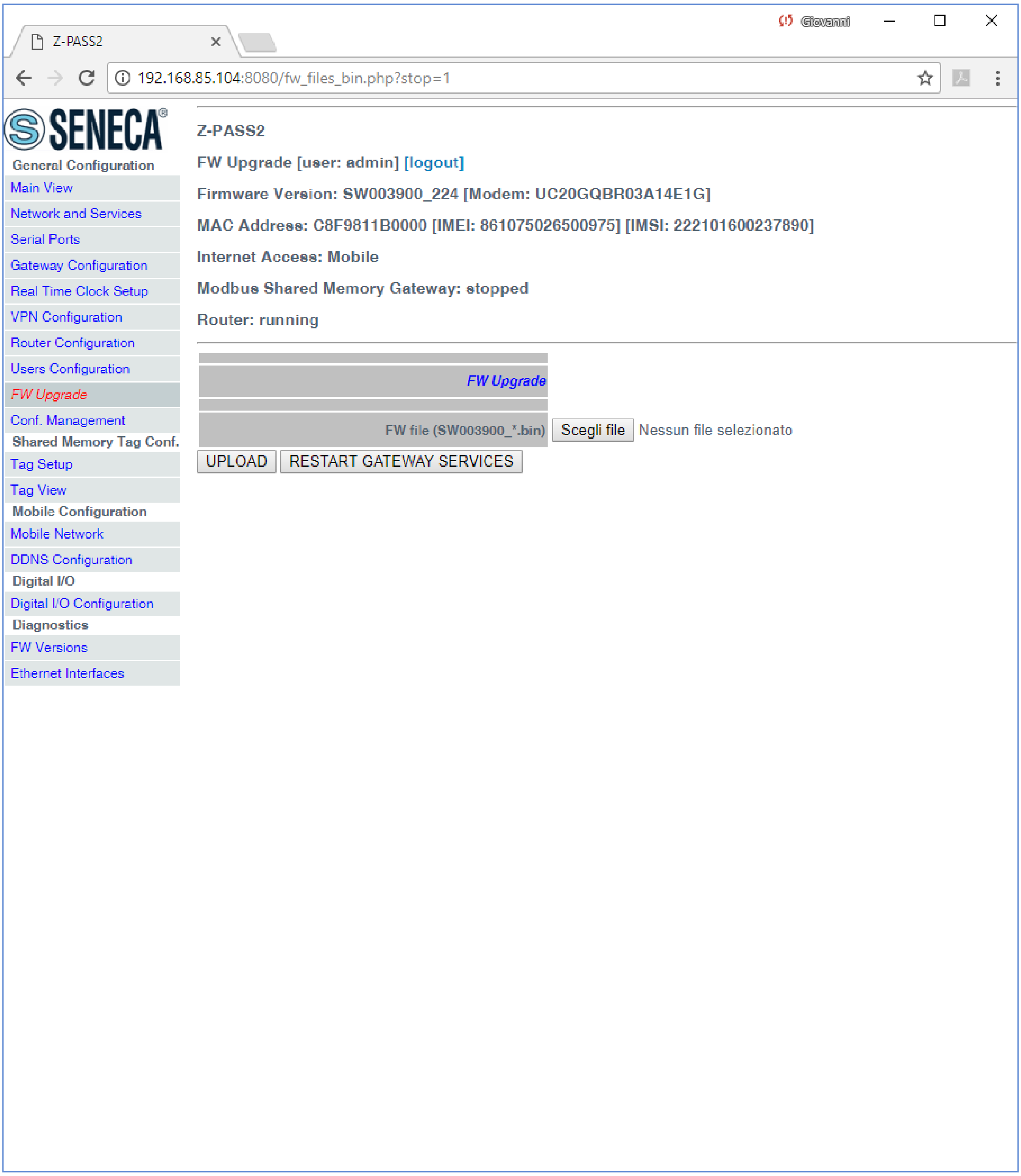


192.168.85.104:8080 dice:

Do you want to stop gateway services during upload ?

(Once services are stopped, you can restart them by clicking on the 'RESTART GATEWAY SERVICES' button.)

If you click on the “OK” button, Modbus Ethernet to Serial/Transparent/Modbus Shared Memory Gateway Services are stopped and you come to the “FW Upgrade” page, shown in the following figure.



Z-PASS2

FW Upgrade [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: stopped

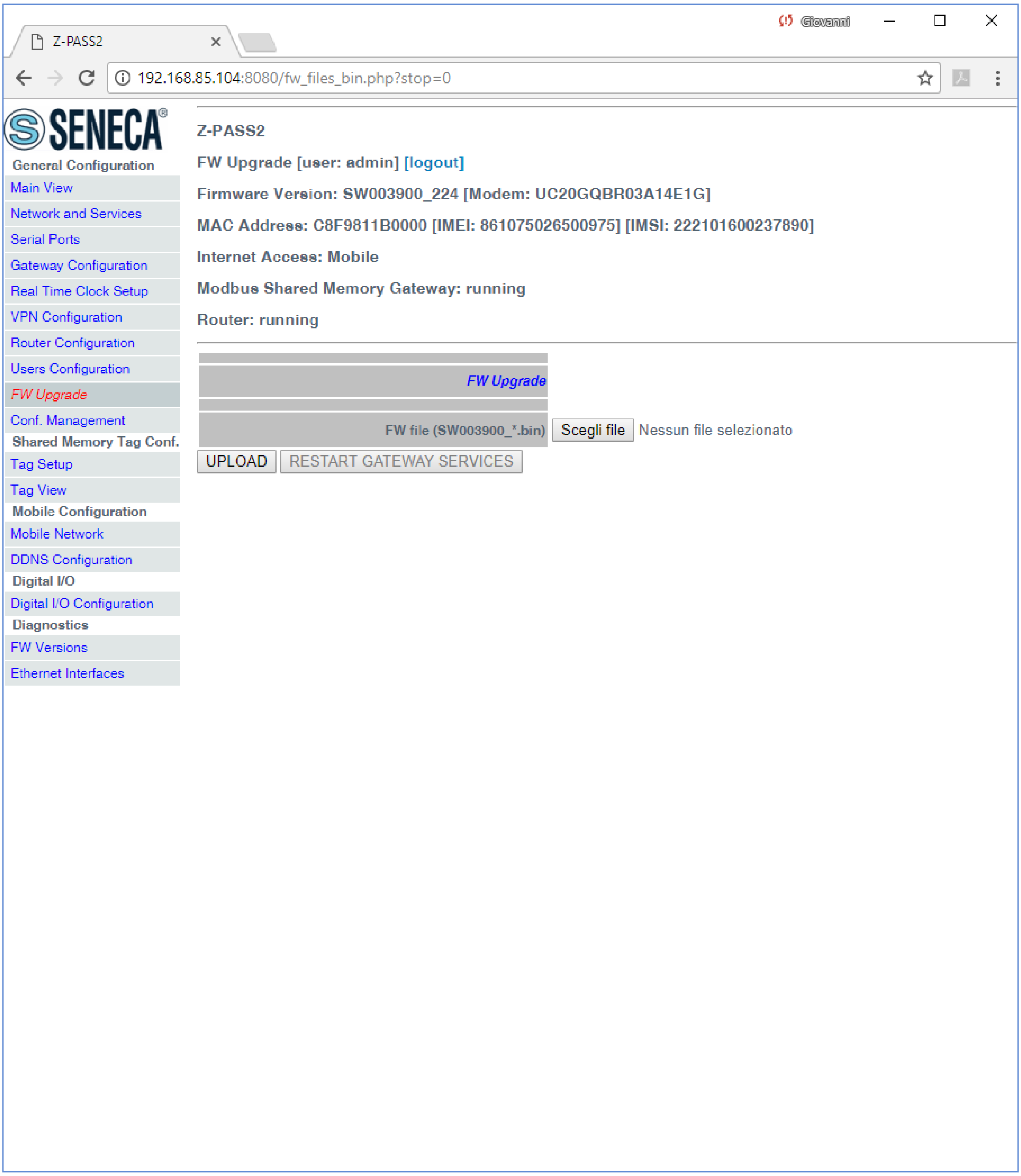
Router: running

FW Upgrade

FW file (SW003900_*.bin) Scegli file Nessun file selezionato

Now, if you want to leave this page without performing the FW upgrade, the “RESTART GATEWAY SERVICES” button lets you restart the gateway services which, otherwise, would remain in the “stopped” state.

Otherwise, if you click on the “Cancel” button of the pop-up, Gateway Services are not stopped and you come to the same page where the “RESTART TWS SERVICES” button is disabled.



Z-PASS2

FW Upgrade [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

FW Upgrade

FW file (SW003900_*.bin) Scegli file Nessun file selezionato

So, it is up to the user to choose if Gateway Services shall be stopped or not, during FW Upload; on one side, stopping them is more safe and let the upload be completed in a shorter time; on the other side, there are situations in which gateway services stop time shall be as short as possible.

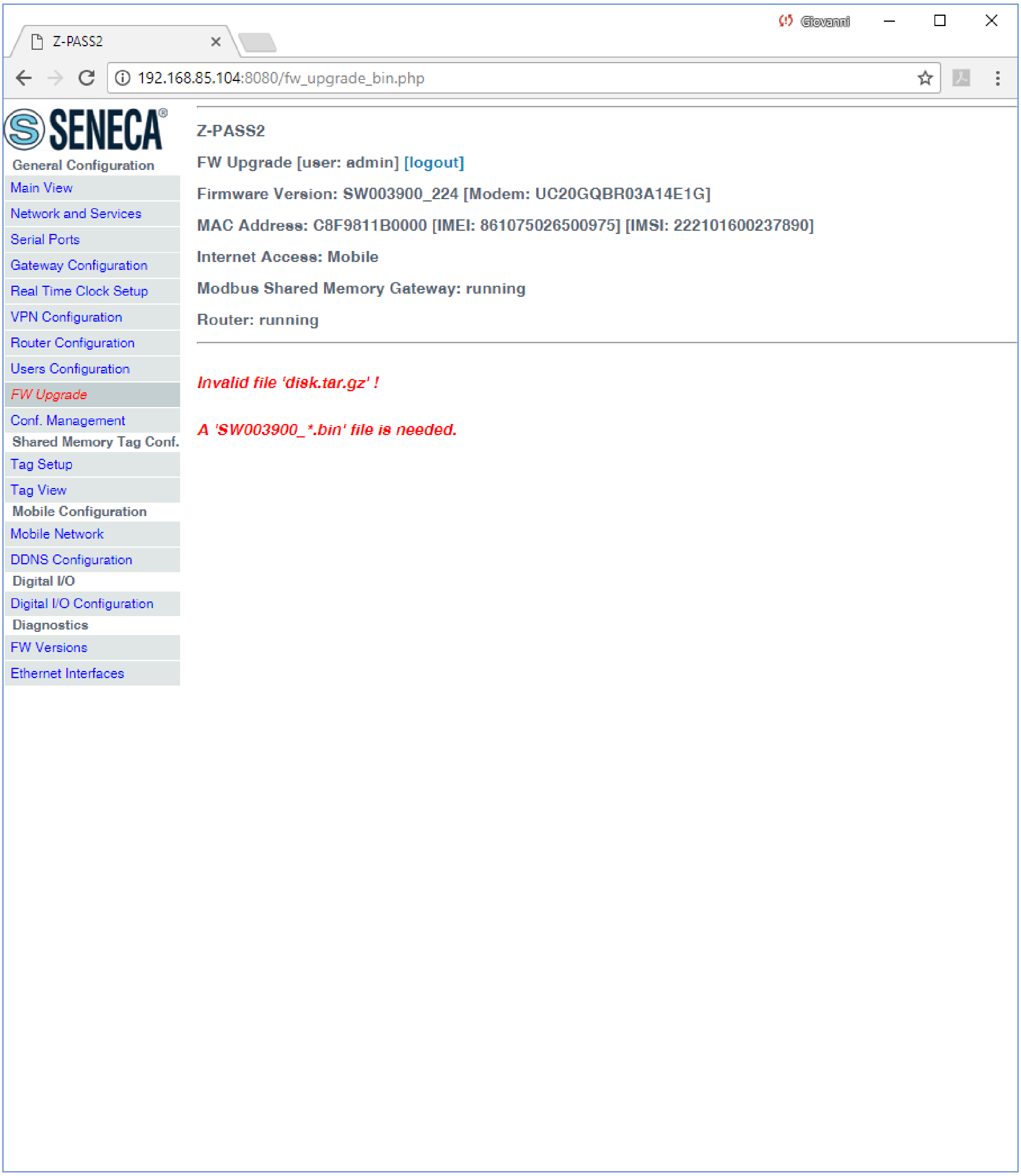
Since an erroneous use of the FW Upgrade functionality might compromise the proper Z-PASS operation, use this page only to apply upgrades provided by Seneca, with the support of Seneca personnel.

This page lets you browse your PC to select the file containing the FW, which shall have a name of the following type:

SW003900_xxx.bin[23]

If you select a file with a different name, an error will be shown at the end of the upload, as in the following figure.

[23] The FW file can be downloaded from Seneca web site (see chapter "Upgrading the firmware by USB pen").



Z-PASS2

FW Upgrade [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

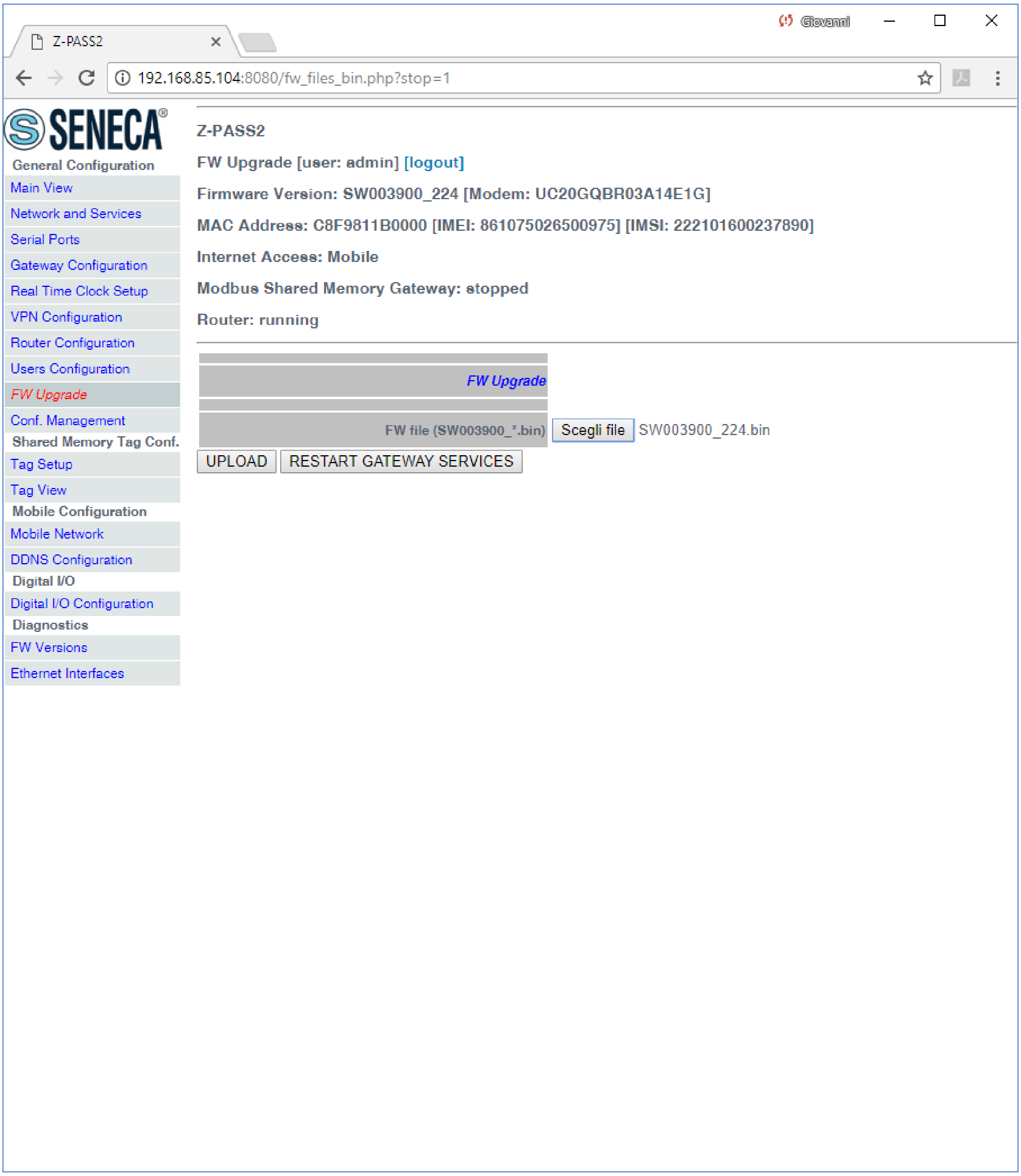
Modbus Shared Memory Gateway: running

Router: running

Invalid file 'disk.tar.gz' !

A 'SW003900_*.bin' file is needed.

Once a file is selected, you can start the upload, by pressing the “UPLOAD” button.



Z-PASS2

FW Upgrade [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

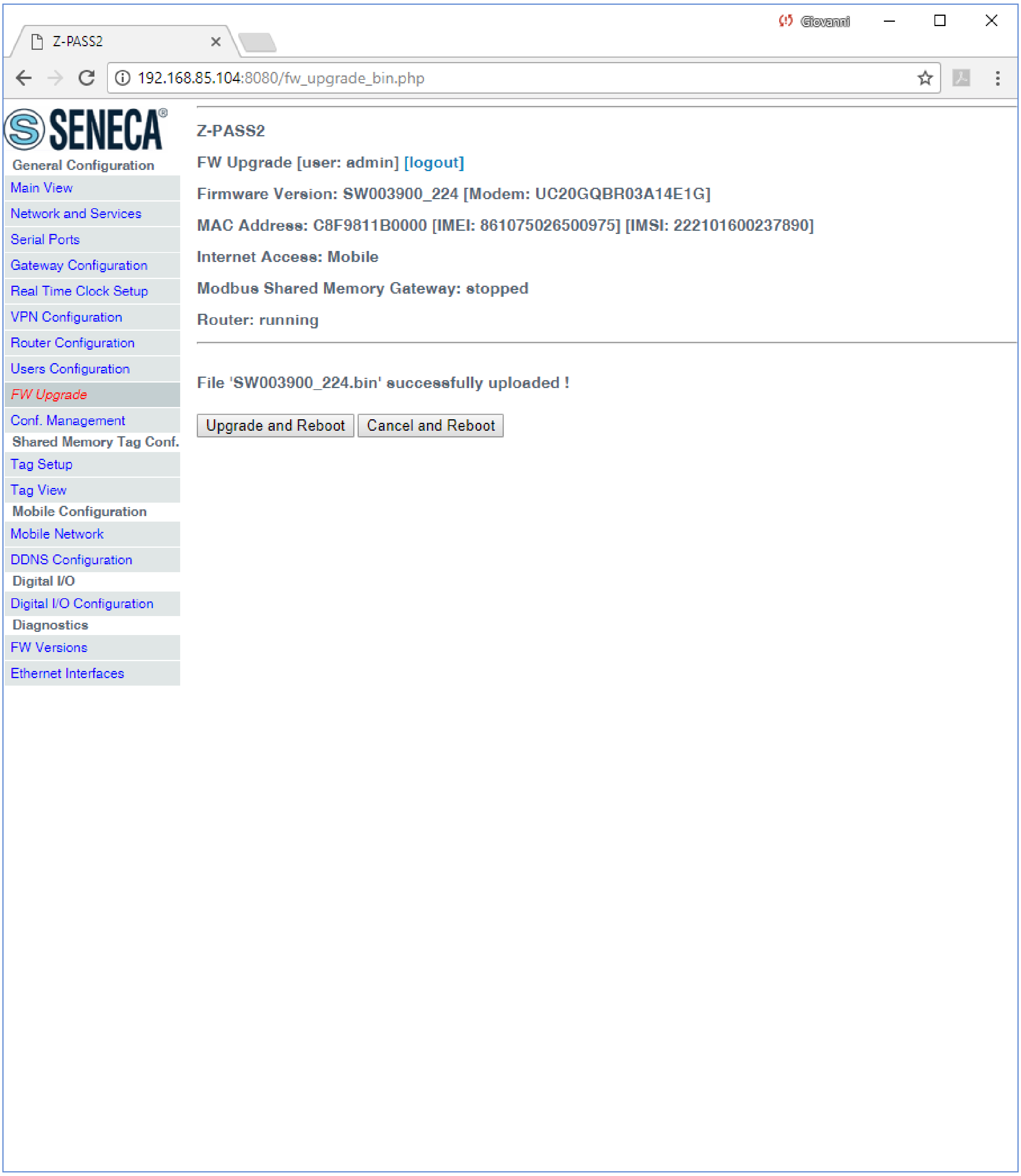
Modbus Shared Memory Gateway: stopped

Router: running

FW Upgrade

FW file (SW003900_*.bin) SW003900_224.bin

Once the upload is successfully completed, the following page is shown:



Z-PASS2

FW Upgrade [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: stopped

Router: running

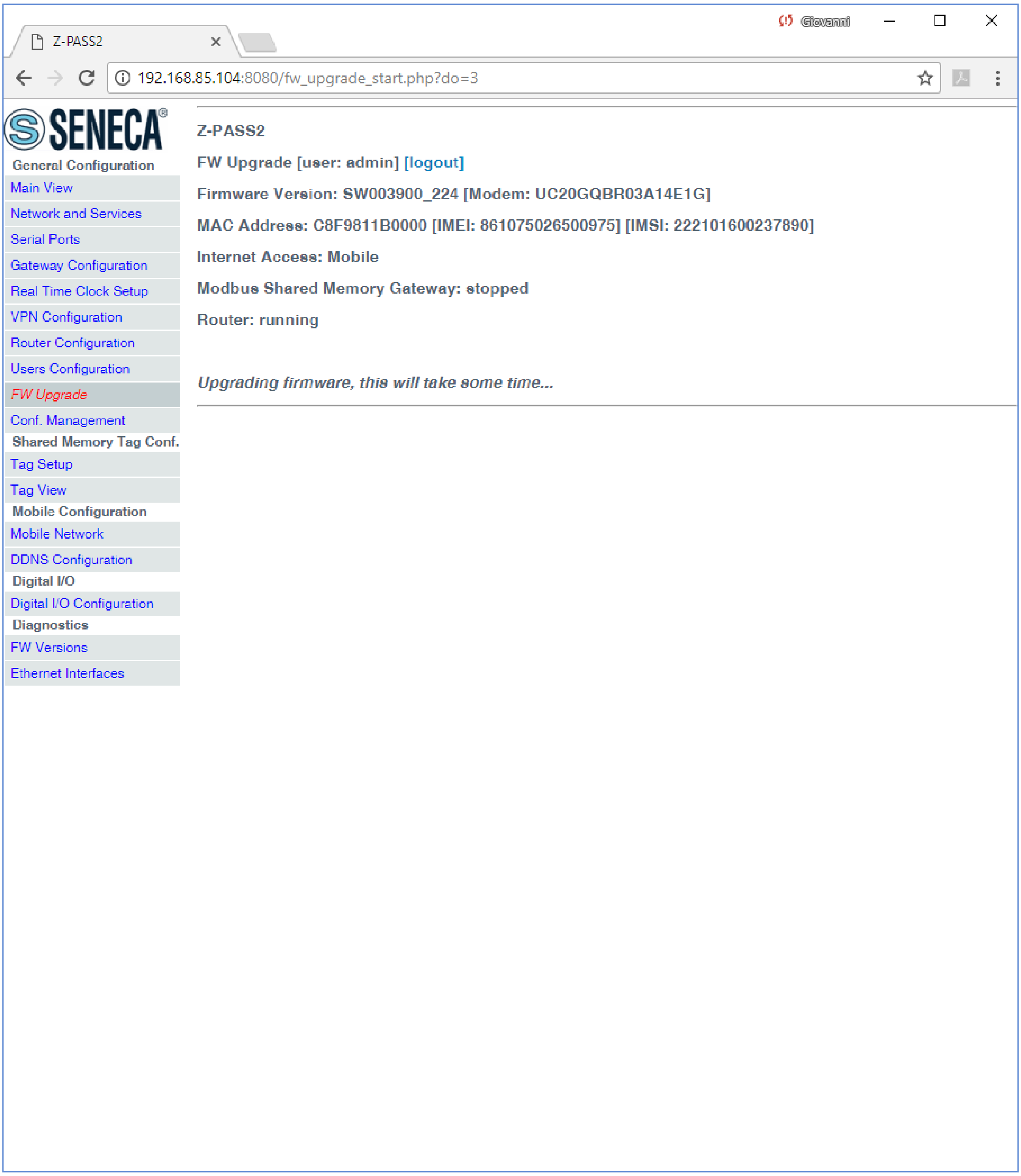
File 'SW003900_224.bin' successfully uploaded !

In this page, you can:

- press the "Upgrade and Reboot" button: this will start the upgrade procedure, which takes some minutes to be completed; during this time, the Z-PASS MUST NOT be switched off; during the procedure, the Z-PASS will be rebooted several times; also, during the procedure, several LEDS will blink simultaneously[24]; the upgrade procedure is ended when only the LED "RUN" is blinking[25];

[24] This applies only to products with HW revisions IO and R01; in details: for IO HW revision, all LEDs will blink simultaneously, except for Power, LAN/WAN, COM and modem LEDs; for R01 HW revision, RUN, VPN and SERV LEDs will blink.

[25] Also SERV and VPN LEDs might blink, depending on the Device configuration and status.



Z-PASS2

FW Upgrade [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

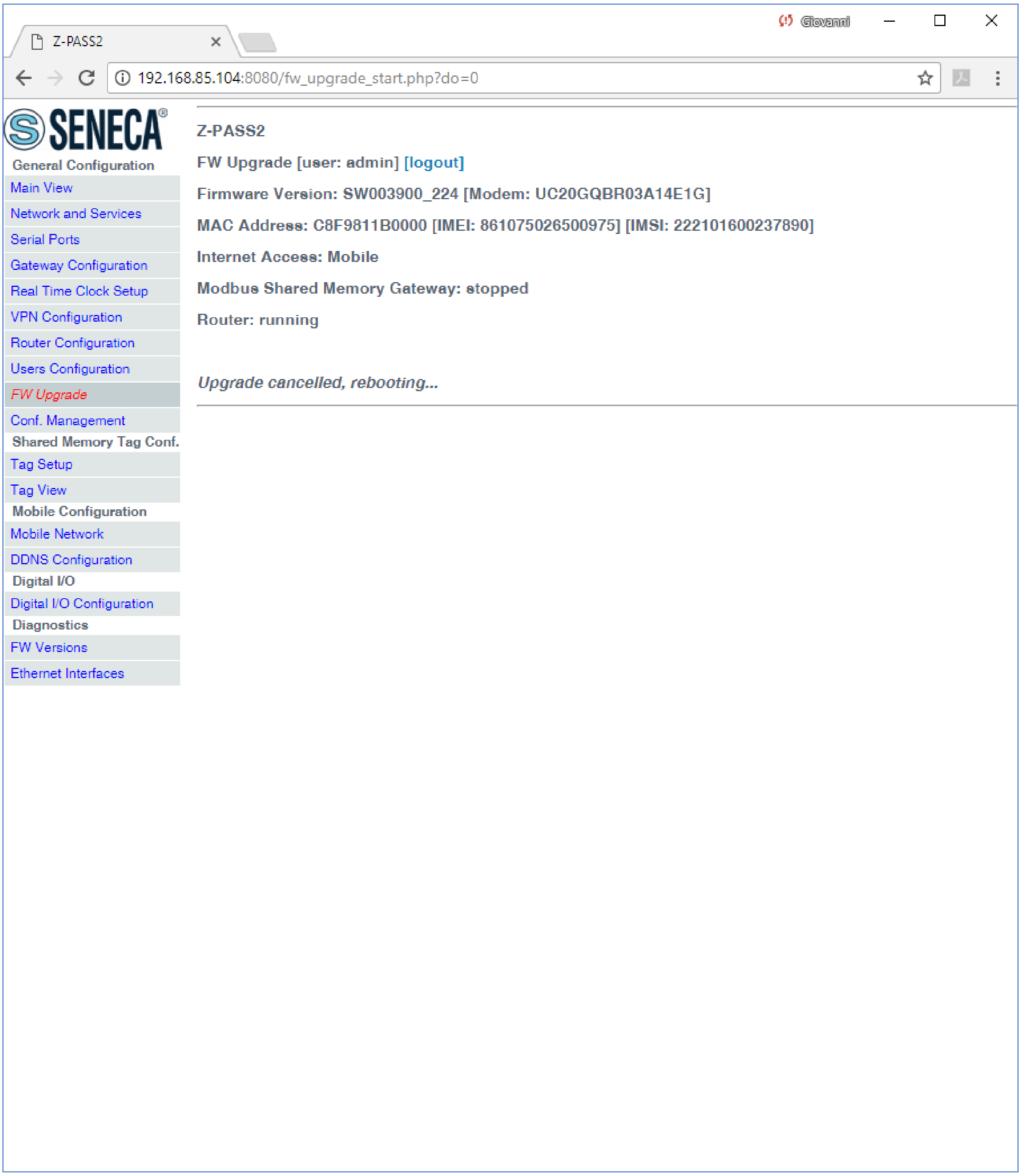
Internet Access: Mobile

Modbus Shared Memory Gateway: stopped

Router: running

Upgrading firmware, this will take some time...

- press the “Cancel and Reboot” button: this will delete the uploaded file on the Z-PASS and perform the reboot.



Z-PASS2

FW Upgrade [user: admin] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: stopped

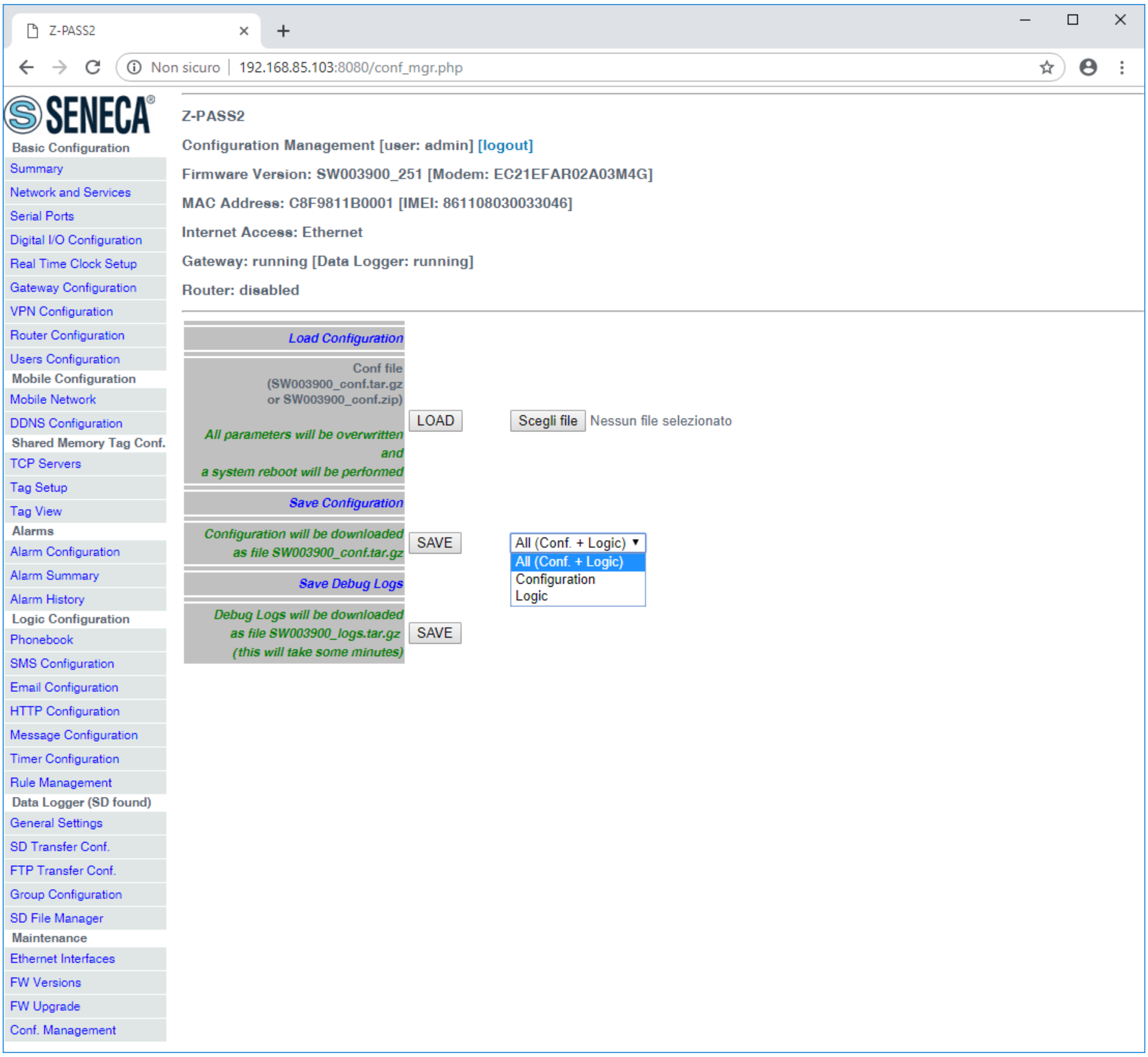
Router: running

Upgrade cancelled, rebooting...

Please note that the “guest” user (see 21.8.3 paragraph) cannot access the “FW Upgrade” page.

21.8.5 Configuration Management

By clicking on the “Conf. Management” link, in the “Maintenance” section, you come to the following page:



Z-PASS2

Configuration Management [user: admin] [logout]

Firmware Version: SW003900_251 [Modem: EC21EFAR02A03M4G]

MAC Address: C8F9811B0001 [IMEI: 861108030033046]

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: disabled

Load Configuration

Conf file (SW003900_conf.tar.gz or SW003900_conf.zip) — Nessun file selezionato

All parameters will be overwritten and a system reboot will be performed

Save Configuration

Configuration will be downloaded as file SW003900_conf.tar.gz — All (Conf. + Logic)

Save Debug Logs

Debug Logs will be downloaded as file SW003900_logs.tar.gz (this will take some minutes)

This page lets you save and load the whole Z-PASS configuration; this is very useful, for example, when you have to apply the same configuration to many devices.

The configuration archive file is named *SW003900_conf.tar.gz*; its contents depend on the selected option, as shown in the following table:

Option	**Files**
All (Conf. + Logic)	- configuration parameters - OpenVPN configuration (if present) - Modbus Shared Memory Gateway tags - Logic configuration - web user pages (if present)
Configuration	- configuration parameters - OpenVPN configuration (if present)

Logic	- Modbus Shared Memory Gateway tags - Logic configuration - web user pages (if present)

The configuration archive, once created and downloaded by means of the “SAVE” button can be uploaded to the same or another device, in two ways:

- by means of the “LOAD” button, in this page
- by means of a USB pen

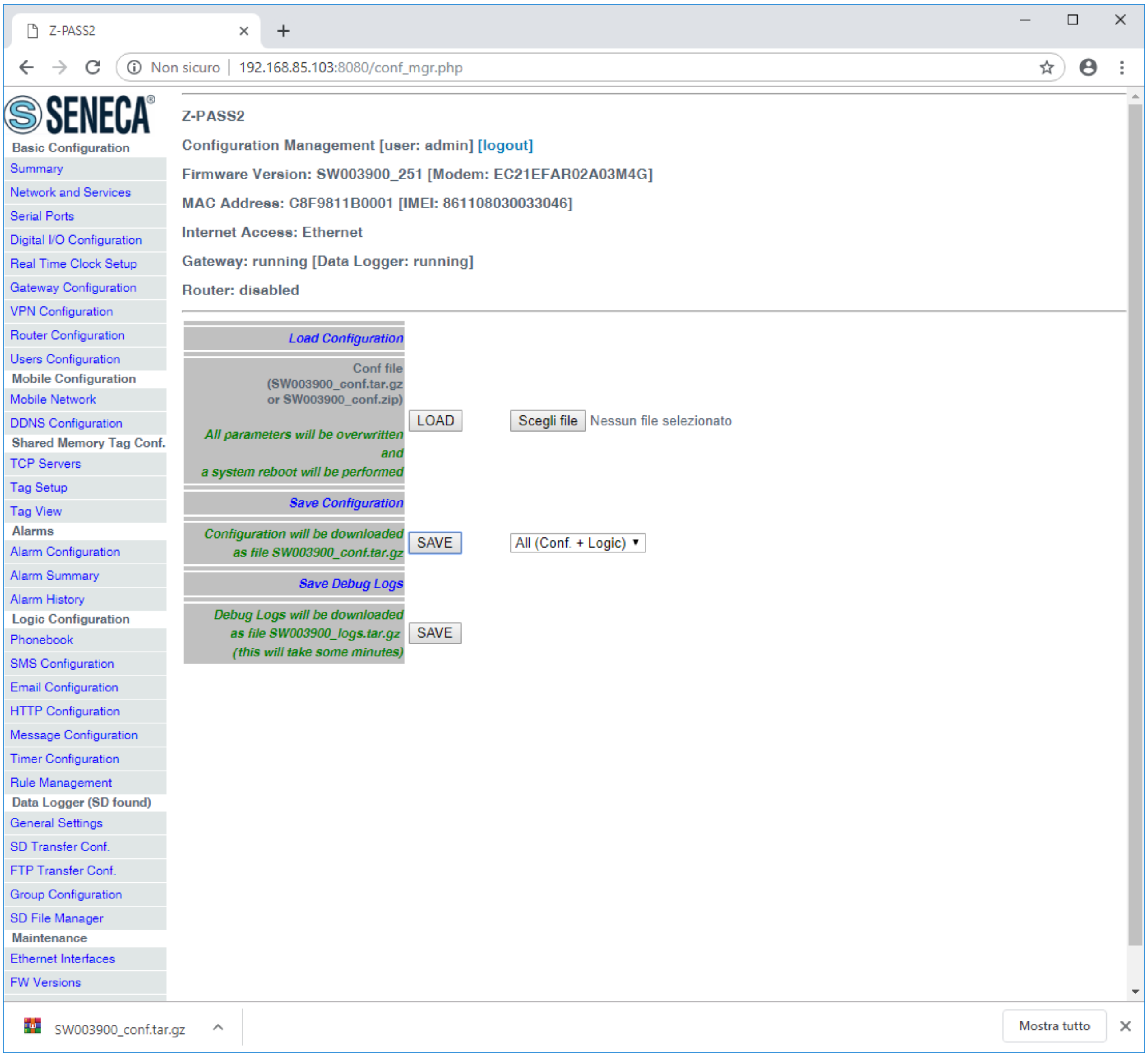
The procedure to load the configuration into the Z-PASS by means of a USB pen is the following:

- copy the *SW003900_conf.tar.gz* file into the root folder of the USB pen;
- switch off the Device;
- insert the USB pen into the USB#1 port of the Z-PASS;
- switch on the Z-PASS; the procedure will take some minutes to be completed; during this time, the Z-PASS MUST NOT be switched off; during the procedure, the Z-PASS will be rebooted;
- after the reboot, wait until you see the “RUN” LED blinking;
- remove the USB pen;
- the configuration has been applied to the Z-PASS.

The only care when you carry the configuration archive from a device to another one is that the two devices should be the same product model; for example, it’s not safe to load the configuration archive saved on a Z-PASS1 into a Z-PASS2.

This page lets you also load the configuration archive as a zip file (*SW003900_conf.zip*).

Another useful feature available in this page is the one provided by the “Save Debug Logs / SAVE” button: when you click on it, a file named *SW003900_logs.tar.gz* is downloaded, which contains the debug logs stored by the CPU during its operation.



Z-PASS2

Configuration Management [user: admin] [logout]

Firmware Version: SW003900_251 [Modem: EC21EFAR02A03M4G]

MAC Address: C8F9811B0001 [IMEI: 861108030033046]

Internet Access: Ethernet

Gateway: running [Data Logger: running]

Router: disabled

Load Configuration

Conf file (SW003900_conf.tar.gz or SW003900_conf.zip) — Nessun file selezionato

All parameters will be overwritten and a system reboot will be performed

Save Configuration

Configuration will be downloaded as file SW003900_conf.tar.gz — All (Conf. + Logic)

Save Debug Logs

Debug Logs will be downloaded as file SW003900_logs.tar.gz (this will take some minutes)

Please note that, to get detailed debug logs, the “DEBUG LOGS / Enable” parameter, in “Network and Services” page, shall be set to ON.

Also note that the “guest” user (see 21.8.3 paragraph) cannot access the “Configuration Management” page.

21.8.5.1 Factory reset by USB pen

A USB pen can be used also to reset the Z-PASS to its factory state; the procedure is the following:

- create an empty file named *SW003900_reset_cmd* into the root of the USB pen;
- switch off the Z-PASS;
- insert the USB pen into the USB#1 port of the Z-PASS;
- switch on the Z-PASS; the procedure will take some minutes to be completed; during this time, the Z-PASS MUST NOT be switched off; during the procedure, the Z-PASS will be rebooted;

- after the reboot, wait until you see the “RUN” LED blinking;
- remove the USB pen;
- the factory reset has been performed.

21.9 Guest pages

It is also possible to access the Z-PASS configuration site as a “guest” user; this user is allowed to access all the pages except for “FW Upgrade”, “Configuration Management” and “SD File Manager” pages, viewing all configuration parameters and status information, without changing any parameter; so, in all the pages, the “APPLY” buttons (and any other button used to perform changes) are disabled.

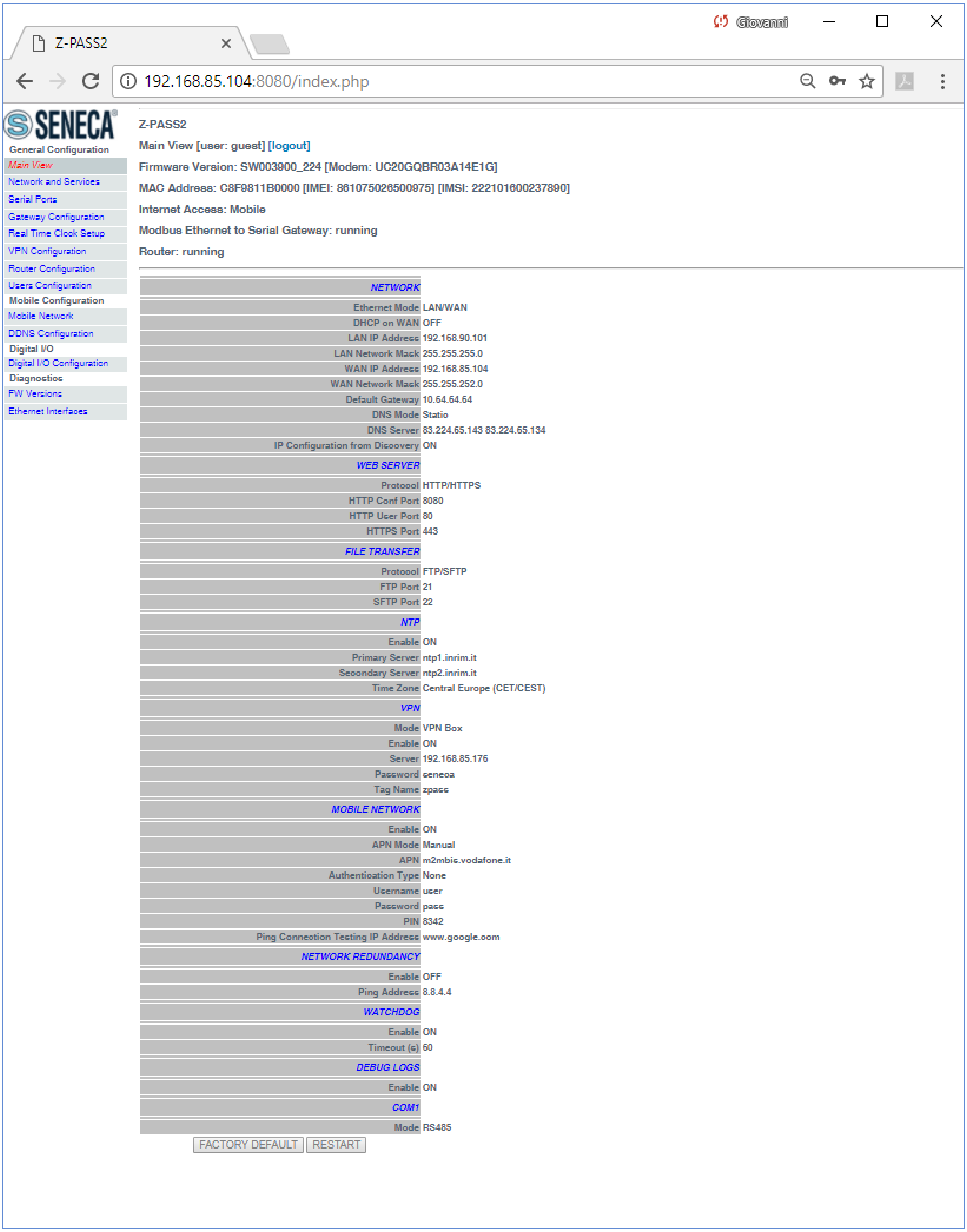
To login as “guest” user, connect the browser to the Device IP address on port 8080, e.g.:

http://192.168.90.101:8080

and, when asked, provide the following credentials (default values):

Username: guest
Password: guest

You come to the “Summary” page, shown in the following figure.



General Configuration
Main View
Network and Services
Serial Ports
Gateway Configuration
Real Time Clock Setup
VPN Configuration
Router Configuration
Users Configuration
Mobile Configuration
Mobile Network
DDNS Configuration
Digital I/O
Digital I/O Configuration
Diagnostics
FW Versions
Ethernet Interfaces

Z-PASS2

Main View [user: guest] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

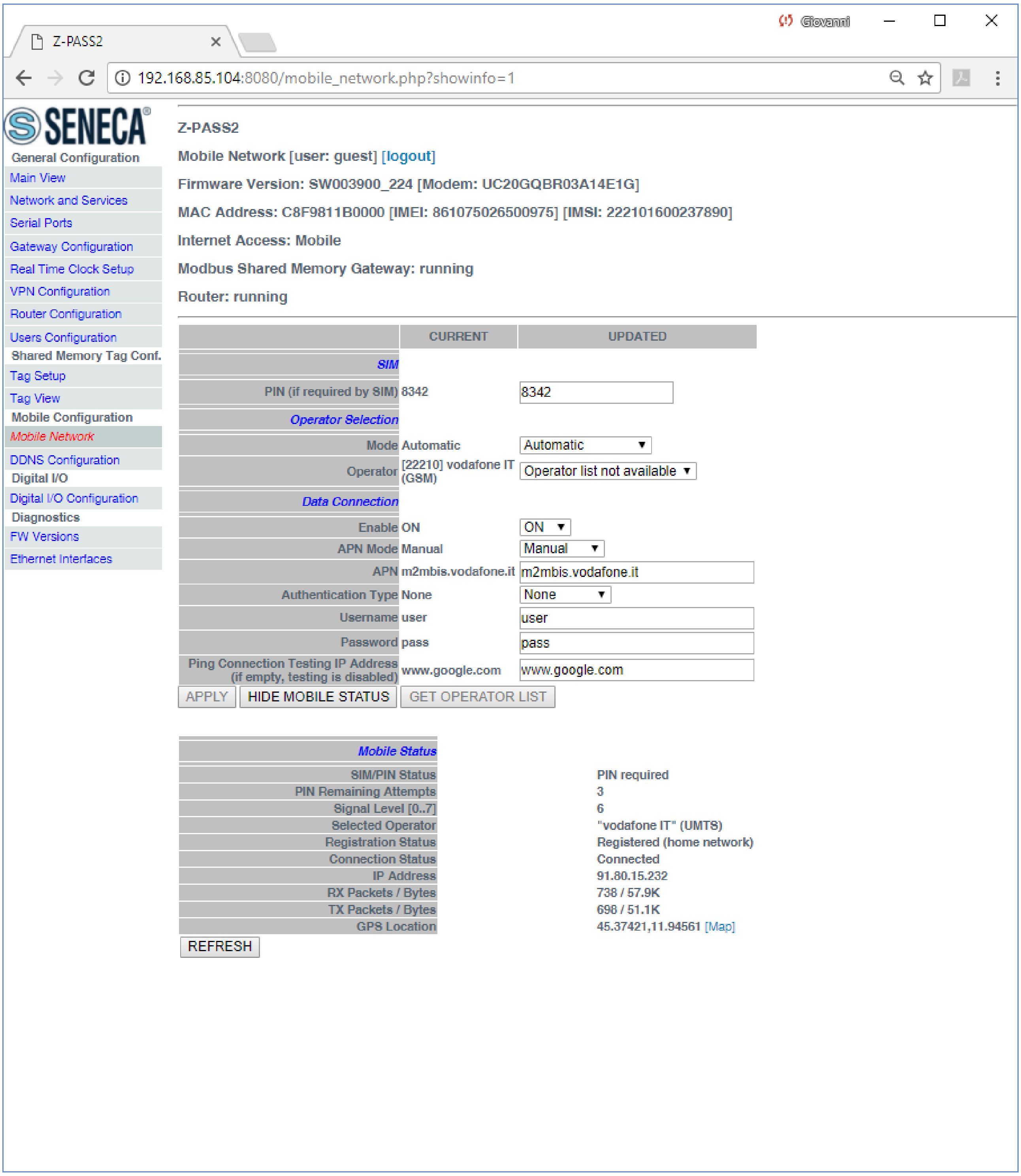
Modbus Ethernet to Serial Gateway: running

Router: running

NETWORK	
Ethernet Mode	LAN/WAN
DHCP on WAN	OFF
LAN IP Address	192.168.90.101
LAN Network Mask	255.255.255.0
WAN IP Address	192.168.85.104
WAN Network Mask	255.255.252.0
Default Gateway	10.64.64.64
DNS Mode	Static
DNS Server	83.224.65.143 83.224.65.134
IP Configuration from Discovery	ON
WEB SERVER	
Protocol	HTTP/HTTPS
HTTP Conf Port	8080
HTTP User Port	80
HTTPS Port	443
FILE TRANSFER	
Protocol	FTP/SFTP
FTP Port	21
SFTP Port	22
NTP	
Enable	ON
Primary Server	ntp1.inrim.it
Secondary Server	ntp2.inrim.it
Time Zone	Central Europe (CET/CEST)
VPN	
Mode	VPN Box
Enable	ON
Server	192.168.85.176
Password	seneca
Tag Name	zpass
MOBILE NETWORK	
Enable	ON
APN Mode	Manual
APN	m2mbis.vodafone.it
Authentication Type	None
Username	user
Password	pass
PIN	8342
Ping Connection Testing IP Address	www.google.com
NETWORK REDUNDANCY	
Enable	OFF
Ping Address	8.8.4.4
WATCHDOG	
Enable	ON
Timeout (s)	60
DEBUG LOGS	
Enable	ON
COM1	
Mode	RS485

Note that, as told above, the “FACTORY DEFAULT” and “RESTART” buttons are disabled.

Another example of a page accessed by the “guest” user is given in the following figure.



Z-PASS2

Mobile Network [user: guest] [logout]

Firmware Version: SW003900_224 [Modem: UC20GQBR03A14E1G]

MAC Address: C8F9811B0000 [IMEI: 861075026500975] [IMSI: 222101600237890]

Internet Access: Mobile

Modbus Shared Memory Gateway: running

Router: running

	CURRENT	UPDATED
SIM		
PIN (if required by SIM)	8342	8342
Operator Selection		
Mode	Automatic	Automatic ▼
Operator	[22210] vodafone IT (GSM)	Operator list not available ▼
Data Connection		
Enable	ON	ON ▼
APN Mode	Manual	Manual ▼
APN	m2mbis.vodafone.it	m2mbis.vodafone.it
Authentication Type	None	None ▼
Username	user	user
Password	pass	pass
Ping Connection Testing IP Address (if empty, testing is disabled)	www.google.com	www.google.com

Mobile Status	
SIM/PIN Status	PIN required
PIN Remaining Attempts	3
Signal Level [0..7]	6
Selected Operator	"vodafone IT" (UMTS)
Registration Status	Registered (home network)
Connection Status	Connected
IP Address	91.80.15.232
RX Packets / Bytes	738 / 57.9K
TX Packets / Bytes	698 / 51.1K
GPS Location	45.37421,11.94561 [Map]

In the “Mobile Network” page, the “APPLY” and “GET OPERATOR LIST” buttons are disabled, whereas the “SHOW MOBILE STATUS”/”HIDE MOBILE STATUS” and “REFRESH” buttons are enabled, letting the “guest” user view the Mobile Status.

21.10 User Pages

It is also possible to access the Z-PASS configuration site as a “user” user; this user is allowed to access only to the “Summary” and the “tag view” pages.

To login as “user” user, connect the browser to the Device IP address on port 8080, e.g.:

http://192.168.90.101:8080

and, when asked, provide the following credentials (default values):

Username: user
Password: user

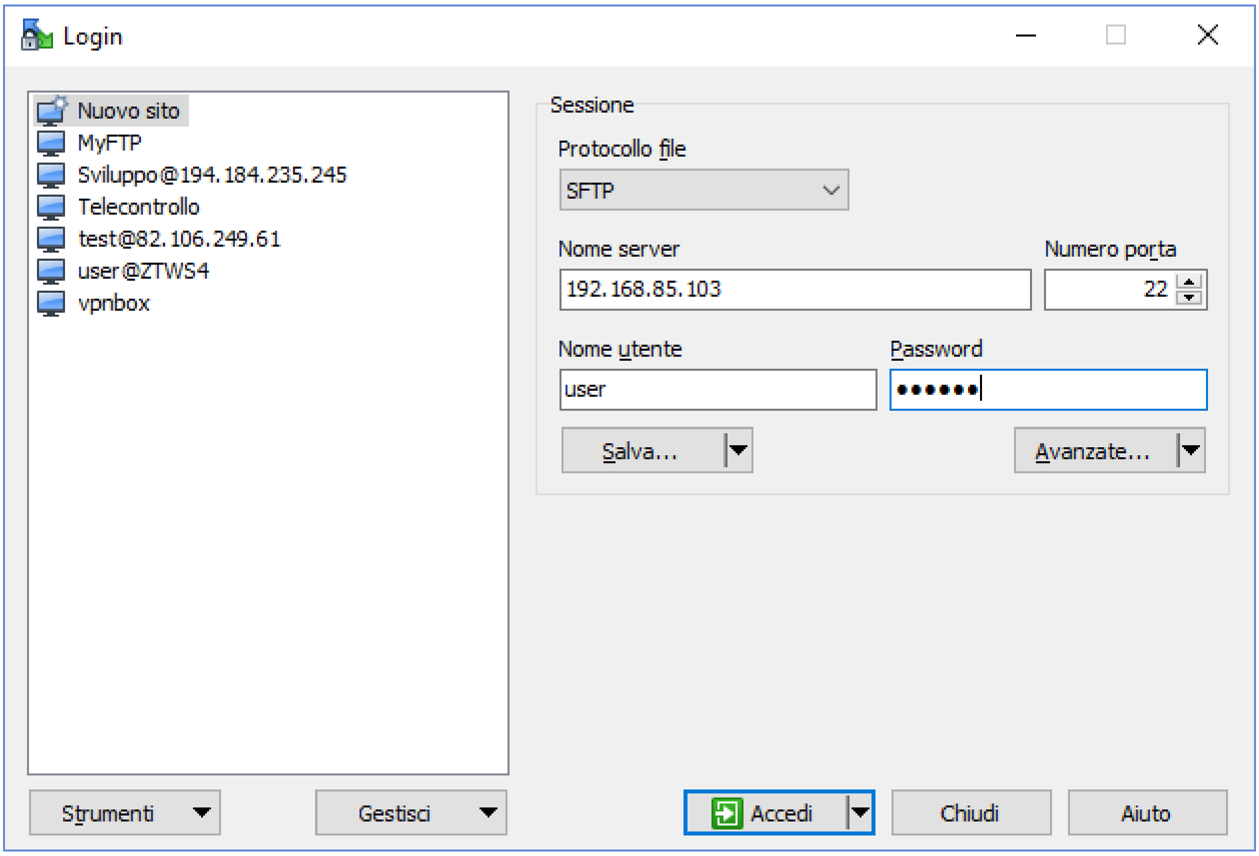
You come to the “Summary” page.

22 FTP/SFTP access

To easily access the Z-PASS by means of FTP/SFTP, you can use the WINSCP™ program; you can free download WINSCP™ from:

http://winscp.net/eng/download.php

You must set the connection as in the following figure (the screenshot shows a connection to the 192.168.85.103 IP address):



Nuovo sito
MyFTP
Sviluppo@194.184.235.245
Telecontrollo
test@82.106.249.61
user@ZTWS4
vpnbox

Sessione

Protocollo file: SFTP

Nome server: 192.168.85.103

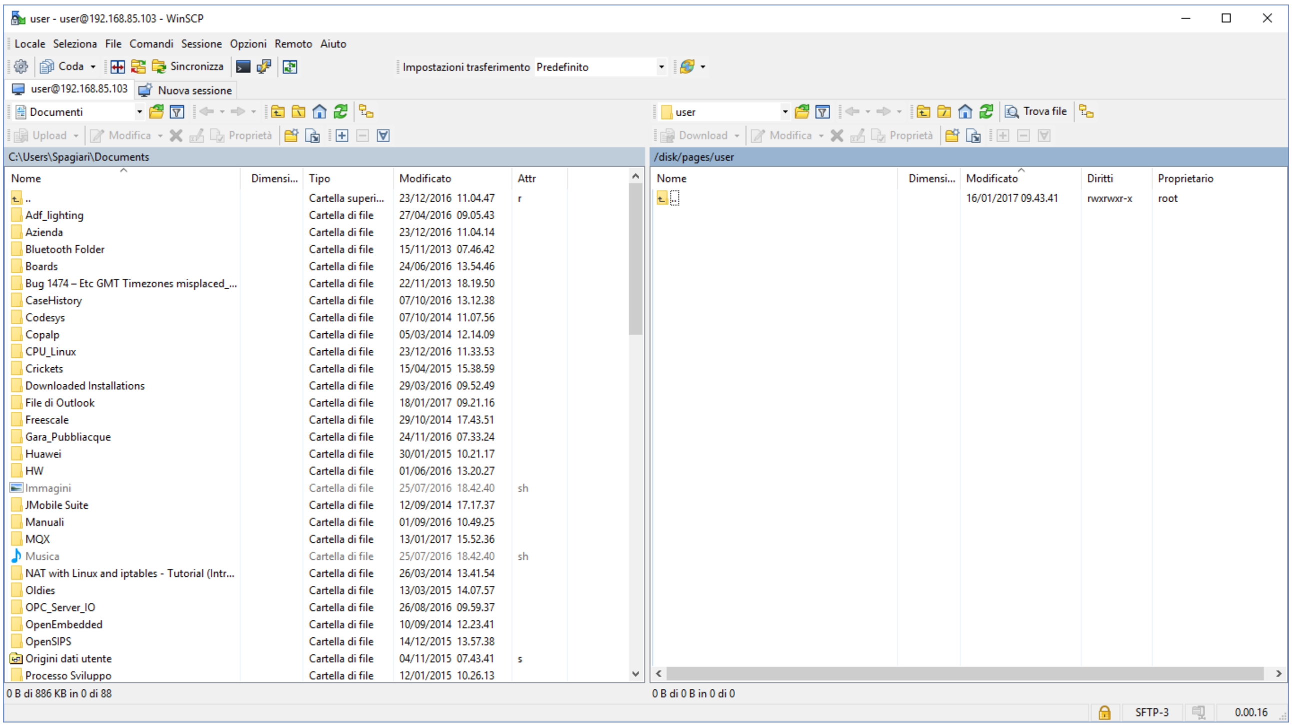
Numero porta: 22

Nome utente: user

Password: ••••••

The credentials (username and password) are those (“user”, “123456”) set for the “FTP USER” (see “Users Configuration” web page in paragraph 21.1.9).

After clicking the “Access” button, you will get a new window, as in the following screenshot; on the right, you can copy and delete files directly to/from the Device.



Impostazioni trasferimento: Predefinito

C:\Users\Spagiari\Documents

Nome	Dimensi...	Tipo	Modificato	Attr
..		Cartella superi...	23/12/2016 11.04.47	r
Adf_lighting		Cartella di file	27/04/2016 09.05.43	
Azienda		Cartella di file	23/12/2016 11.04.14	
Bluetooth Folder		Cartella di file	15/11/2013 07.46.42	
Boards		Cartella di file	24/06/2016 13.54.46	
Bug 1474 – Etc GMT Timezones misplaced_...		Cartella di file	22/11/2013 18.19.50	
CaseHistory		Cartella di file	07/10/2016 13.12.38	
Codesys		Cartella di file	07/10/2014 11.07.56	
Copalp		Cartella di file	05/03/2014 12.14.09	
CPU_Linux		Cartella di file	23/12/2016 11.33.53	
Crickets		Cartella di file	15/04/2015 15.38.59	
Downloaded Installations		Cartella di file	29/03/2016 09.52.49	
File di Outlook		Cartella di file	18/01/2017 09.21.16	
Freescale		Cartella di file	29/10/2014 17.43.51	
Gara_Pubbliacque		Cartella di file	24/11/2016 07.33.24	
Huawei		Cartella di file	30/01/2015 10.21.17	
HW		Cartella di file	01/06/2016 13.20.27	
Immagini		Cartella di file	25/07/2016 18.42.40	sh
JMobile Suite		Cartella di file	12/09/2014 17.17.37	
Manuali		Cartella di file	01/09/2016 10.49.25	
MQX		Cartella di file	13/01/2017 15.52.36	
Musica		Cartella di file	25/07/2016 18.42.40	sh
NAT with Linux and iptables - Tutorial (Intr...		Cartella di file	26/03/2014 13.41.54	
Oldies		Cartella di file	13/03/2015 14.07.57	
OPC_Server_IO		Cartella di file	26/08/2016 09.59.37	
OpenEmbedded		Cartella di file	10/09/2014 12.23.41	
OpenSIPS		Cartella di file	14/12/2015 13.57.38	
Origini dati utente		Cartella di file	04/11/2015 07.43.41	s
Processo Sviluppo		Cartella di file	12/01/2015 10.26.13	

0 B di 886 KB in 0 di 88

/disk/pages/user

Nome	Dimensi...	Modificato	Diritti	Proprietario
..		16/01/2017 09.43.41	rwxrwxr-x	root

0 B di 0 B in 0 di 0

The WinSCP program can be used both as an FTP or SFTP client to transfer files to/from the Z-PASS; just select “FTP” or “SFTP” protocol in the “WinSCP Login” window; normally, it’s better to use SFTP, since it provides a secure (i.e. encrypted) service.

23 Glossary

Bridge: a device that translates from one communications protocol into another.

Gateway: a device that acts as a portal between two programs allowing them to share information by communicating between different protocols.

Serial Device Server: a device that enables devices with an RS-232, RS-422 or RS-485 serial interface to connect to a local area network (LAN) or, more generally, an IP network.

Router: a networking device that forwards data packets between computer networks, e.g. between a LAN and a WAN (the Internet).

Switch: a networking device that connects devices together on a computer network, by using a form of packet switching to forward data to the destination device.

VPN: a Virtual Private Network extends a private network across a public network, such as the Internet. It enables a device to send and receive data across the public network as if it were directly connected to the private network. A VPN is created by establishing a virtual point-to-point connection through the use of tunnelling protocols, with traffic encryption.

Tunnel: an IP tunnel is an Internet Protocol (IP) network communications channel between two networks. It is used to transport another network protocol by encapsulation of its packets.

Tunnel Point-to-Point: an IP tunnel between a single Master device and a single Slave device.

Tunnel Point-to-Multipoint: an IP tunnel between a single Master device and multiple Slave devices.