Intelligent power sockets

IQsocket / IQTS-GI500

...makes your life more comfortable

User Guide

IQTS-GI500

firmware documentation v.1.0.1
(for firmware v1.0.1)

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1. Product features

IQsocket IQTS-GI500 is a member of family of intelligent power sockets brought to you by IQtronic technologies Europe, Ltd.

IQsocket IQTS-GI500 allows you to control of any electric appliance connected to the device's socket remotely over any IP network, including internet or by GSM network. You can use for this purpose any device supporting internet browser (HTTP protocol) such as PC, smartphone etc) or GSM.
It has implemented PING function for monitoring LAN network by GSM.

Výstupem zařízení je zásuvka 230V s maximální proudovou zátěží 16A.

Veškeré změny stavu výstupní zásuvky, příchozí SMS a hovory jsou ukládány do logu.

In general, IQsocket IQTS-GI500 has following features:

- Controlling (turn on, turn off; restart by cutting power for short time) of any electric appliance connected to the switched socket by HTTP and by GSM SMS or manually by pressing pushbutton on IQTS-GI500 body
- Configuring IQTS-GI500 parameters by HTTP protocols, password protected
- XML and HTML status page, can be excluded from password protection, for easier integration with your web applications
- Can send SMS traps throught GSM network.
- IQLocator configuration utility allowing to autodiscovery your IQsocket devices within LAN network, setup IP address and upgrade firmware
- Automatic control based on evaluation of ICMP packet loss with up to three independent rules – watchdog function
- Automatic control based on day of week and time – scheduler function
- Real time clock synchronized using NTP protocol
- On board temperature sensor to monitor internal temperature
- Support remote firmware upgrade
- Event log storing up to last 50 events, such as socket on/off changes, device startups, LAN port connectivity, firmware upgrade etc.
- Tiny footprint firmware is efficiently coded in C/assembler, there is no Linux or other operating system inside, so startup times are really short (<3sec) and tcpip stack is clean with no hidden bugs ;-)

2. Installation

Once you plug your IQsocket IQTS-GI500 into a live electric socket, it become powered on and starts operation.

You can verify it by observing status of the LEDs:

- Once AC power is connected, all three LED indicators will blink shortly and internal self-test is performed. Then, if everything is ok, the Power LED (Red) will shine permanenelty. If SIM card is fully operating then Power LED shine/blinks Blue.
- LINK/ACT (Green) – solid light indicated established Ethernet link, blanked for short time when an Ethernet activity occurs
- The Output LED (Yellow) indicates state of output socket. Sold light means socket is active – appliance plugged into the output socket is operating and vice versa.

Your IQTS-GI500 is now ready for use.

IQsocket IQTS-GI500 is equipped with an internal web server, which provides an easy to use, intuitive and convenient way of management. You can both set up configuration and operation parameters and get information about device's status.
In order to access the web interface, it is necessary to setup IP network address on your PC properly.

Default IP address of the IQsocket IQTS-GI500 is 192.168.0.100, network mask 255.255.255.0.

In order to access your IQTS-GI500, it is necessary to setup IP address of your computer, connected to the same Ethernet network as the IQTS-GI500 properly – in this case set the IP address of the network adapter to 192.168.11, mask 255.255.255.0.

You can also change the IP address of your IQTS-GI500 using IQLocator utility, Once you have properly set IP address of your PC, open the address of your IQTS-GI500 (default 192.168.0.100) in your favorite internet browser:

If everything is ok, status page will be displayed.

2.1 Instalation rules for dual radio device

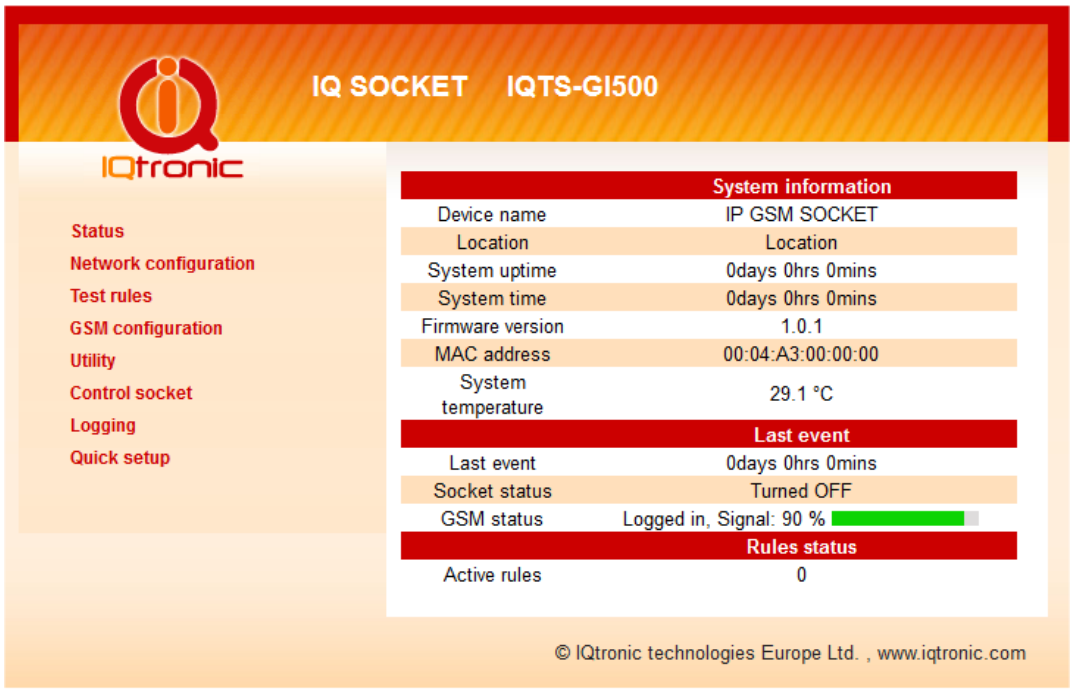
You are obliged to follow the following rules during instalation of any radio device working in duplex mode.

- Use an antenna with a higher gain and lower SVR in case of low signal level.
- Do not instal your antenna near metal objects.
- Do not instal your device in the environment which can limit the signal level, not in metal boxes!
- Your antenna cannot be directed towards the internal device electronics. Otherwise, we cannot guarantee that your device will work properly.

In order to place your antenna properly, please use the grey area indicated at the front panel of your device.

3. Status page

Provides summary of device status:



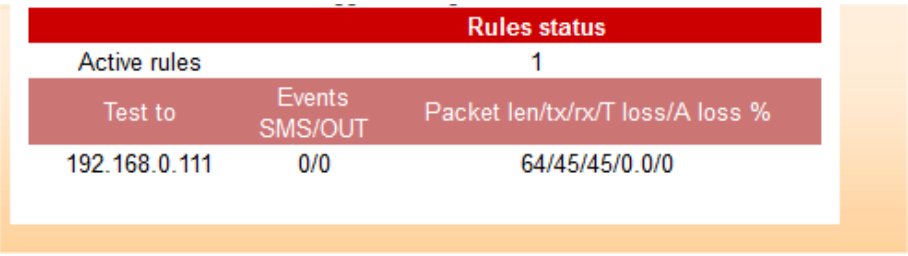
Explanation of parameters:

Section *System information* provide basic status information, such as Device name and Location, info on time, firmware version, Ethernet MAC address and temperature reading of internal temperature sensor.

Section *Last event* provides date/time of last change of socket state and current socket state.

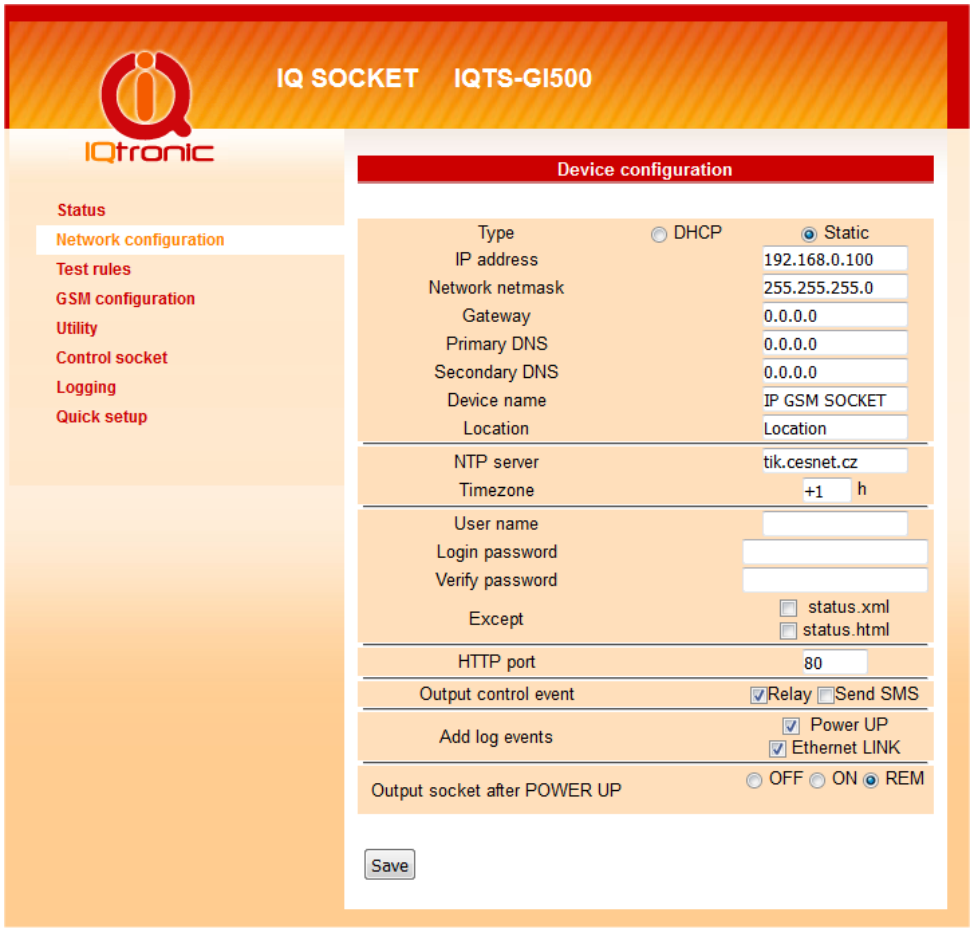
***Socket status* – Turned ON , Turned OFF, Restarted.**
GSM status – GSM is disabled,Preparing GSM,SIMcard is not inserted, SIMcard is not ready, Searching ..., Logged in, Signal : 90 %.

Section *Rules status* informs about currently active automatic rules evaluating ICMP packet loss to chosen hosts.



3. Network configuration

Here you can configure networking and security parameters:



IP address

You can setup IP networking parameters such as *IP address*, *Network mask Default Gateway, DNS servers;* please ensure to enter proper values. Please note it is necessary to define a fixed IP address even if case you are using a DHCP environment.

Note...

When your local network is using private addresses behind a NAT router and you would like to make your IQTS-GI500 accessible from the Internet, it is necessary to setup port mapping (forwarding, server rule) in your router for the IP address assigned to IQTS-GI500 and selected ports, e.g. port TCP 80 for accessing web interface.

SOHO example: Your network contains a modem/router with NAT for internet access, having IP address 192.168.1.254. Simply find an unused IP address from the private network range it use (192.168.1.1-192.168.1.253) e.g.

192.168.1.200, double check it is not used e.g. by using Ping command from your PC:
C:\>ping 192.168.1.200
Pinging 192.168.1.200 with 32 bytes of data:
Request timed out.

Then assign the 192.168.1.200 to the IQTS-GI500 by either IQLocator utility or by web interface and use address of the router (192.168.1.254) in both Gateway and DNS fields.

NTP setup

IQTS-GI500 can synchronize its clock from an *NTP* (Network Time Protocol) server, please don't forget also to define *time zone.* Please note NTP feature will work only if IQTS-GI500 will have access to the Internet.

Note...

It is highly recommended define NTP properly and allow your IQTS-GI500 accessing the Internet; otherwise logging and scheduler feature can't work properly.

Password protection

You can change/define a login username and password for protecting access to web interface. It comes with no password by default.

Note...

If you want to disable password protection, enter blank login password.

You can also activate exception from password protection for pages *status.xml* and/or *status/html* – when exceptions are active, those pages will be then always available without password, which is useful for further processing of the status information e.g. by scripts.

HTTP port

It is possible to change port for the web interface from default value 80 by entering new value to *HTTP port* field.

SNMP

SNMP can be deactivated by unchecking the SNMP checkbox, it is active by default. You can change passwords for *SNMP read* and *write communities* (default value is "public"). When there is an output control event resulting from assessment of automatic packet loss rules – the watchdog feature; IQTS-GI500 can send SNMP trap messages to defined IP address besides operating the relay of the socket, simply check particular check boxes *Relay* and/or *Send TRAP.*

The *SNMP time for restart* defines how long is socket turned off when restart command is issued via SNMP.

Add log events

You can select, which events to write into the event log: *Power UP* will write event at every device startup and time has been successfully synchronized from NTP server; *Ethernet LINK* will write event at every time when Ethernet link has been established.

Output socket state after startup

You can choice which state will have output socket after device will be powered on: to be off, on, or to remember last state before device has been turned off/power has been lost.

4. Test rules – watchdog function.

Basically, you can define up to three test rules, two with numerical IP address of evaluated host, third rule can be defined using host name, and it's IP address will be resolved via DNS. Each rule is sending periodically ICMP test packets to the host and when number of received ICMP replies is lower than allowed packet loss, rule will generate request for output control event, which can lead to restart of the output socket, sending of SNMP trap or both, depending on configuration. Finally, output control event is performed using logical OR or logical AND operations over the results (output control event requests) of particular rules.

Defining rules

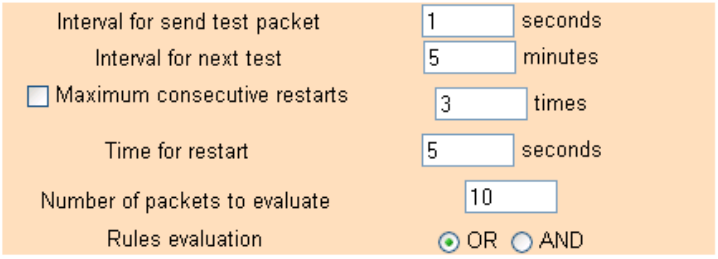
Each rule can be enabled or disabled by checking the checkbox. Enter IP address *(Rule 1, Rule 2)* or host name in case of the *Rule 3,* then size of ICMP frames, maximum allowed *packet loss* in % and *Packet timeout* interval, time

how long will device wait for answers from the host – ICMP answers coming later that the Packet timeout will be considered as lost.

Note...

If you set Packet timeout *to 0 (zero) value, device will use the value of* Interval for send test packet *as the Packet timeout interval.*

Rules evaluation



You can define periodicity of sending test ICMP packets by entering it into *Interval for send test packet* field with allowed range 2-20 seconds.

Interval for next test is time delay till testing will begin after device has been started up or a rule has been activated (packet loss to a host detected).

You can limit maximum number of consecutive restart attempts by setting *Maximum consecutive restarts* parameter to prevent continuous restarting e.g. if there is a serious problem preventing target host to be recovered back by a restart via power cycling.

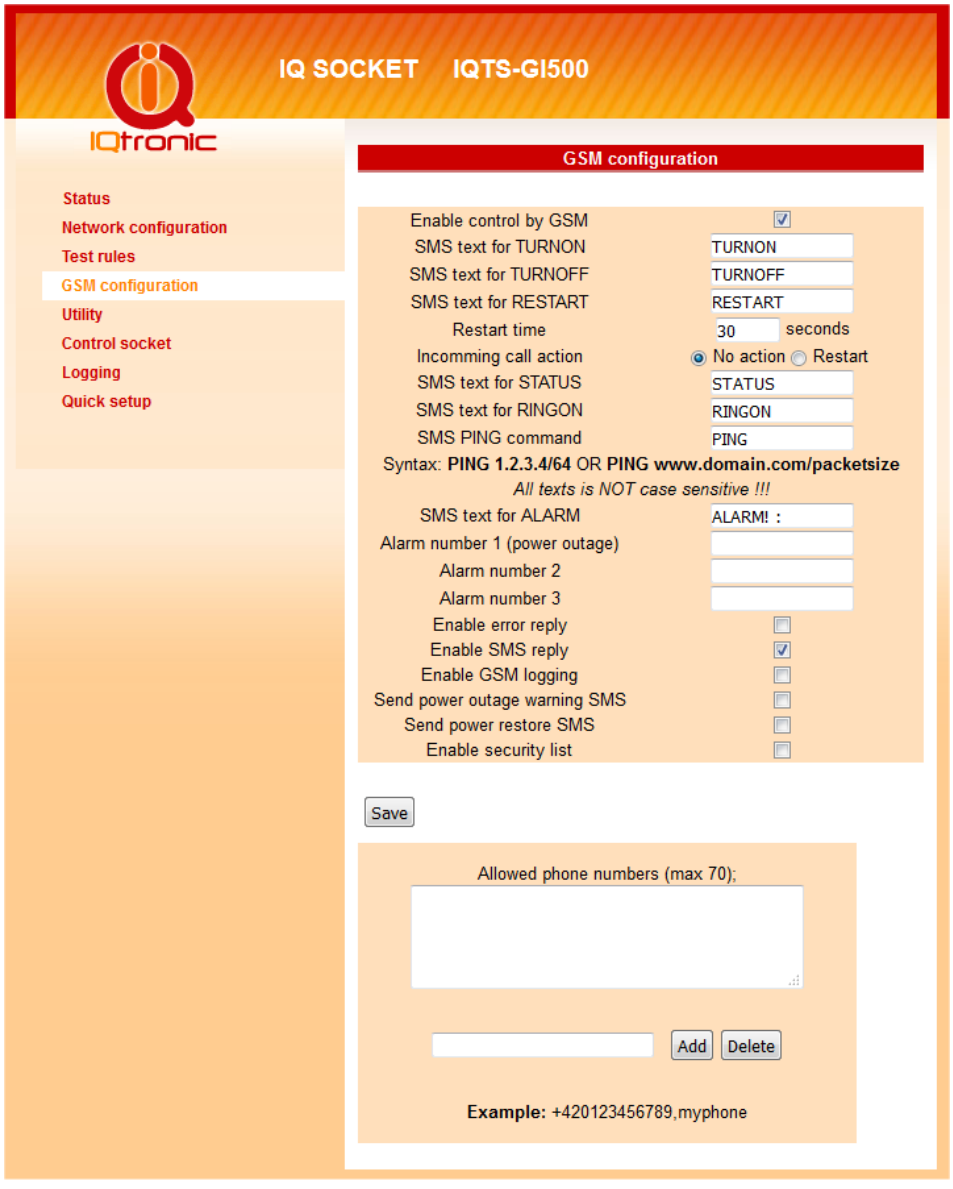
Hold restart for - defines time interval (10-600s) for waiting to connection recovery. If also this (interval, delay) expires, output socket will be restarted. It is also possible to cancel (this)
action by SNMP packet.

Restart socket hold time determines time interval how long is cut power of the output socket during a restart attempt.

Number of packets to evaluate represents how many test packets is used for evaluation of packet loss.

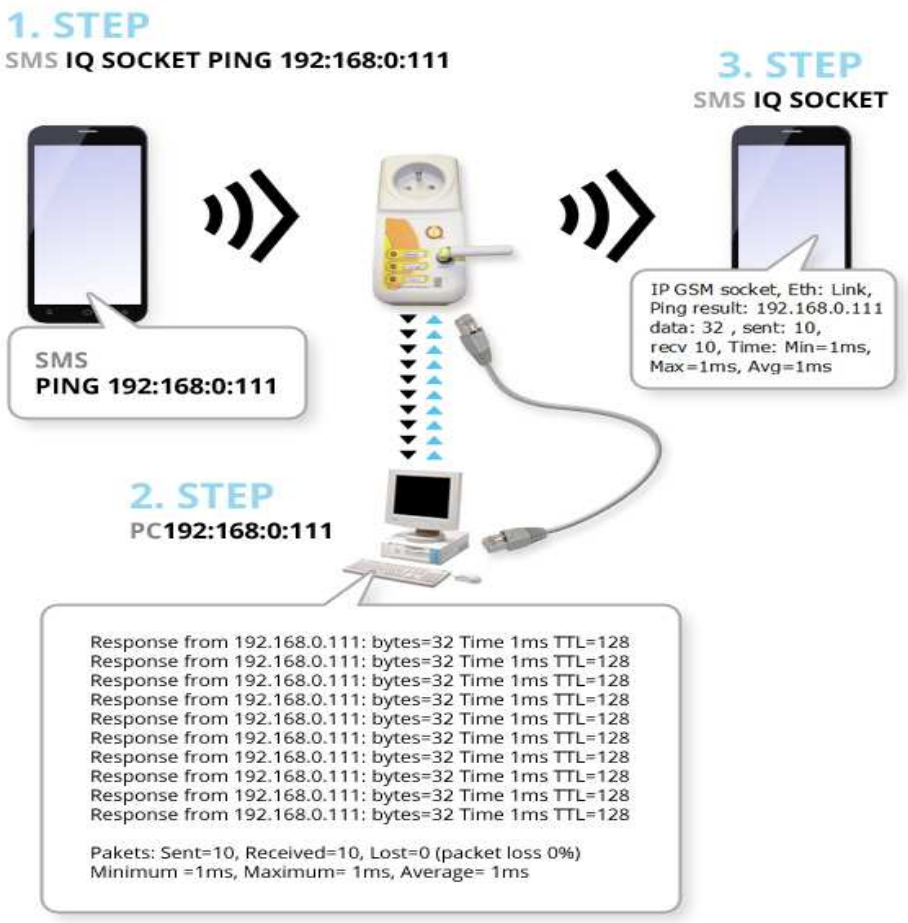
Rules evaluation allows to choose when an output control event (restart and/or SNMP trap) will be performed – in case of selected OR, it will be performed when ANY from rules is positive; while AND require that ALL rules must be positive.

5. GSM configurations



Allm texts has length up 30 characters.

5.1. Monitoring LAN network over SMS by GSM network.



1. STEP - send SMS with text PING 192.168.0.111 to phone number to SIM card inserted inside device.
You have several options: PING www.domain.cz OR PING ip address/64, PING www.domain.cz/1024, the number behind '/' is data length in ICMP packet. PING with IP address or domain name without parameters means PING with data length 32 bytes.
2. STEP - device GI500 will send 10 test ICMP packets with interwall 1 second, if input is set correctly.
3. STEP - device GI500 will send PING result back to user.

6. Utility

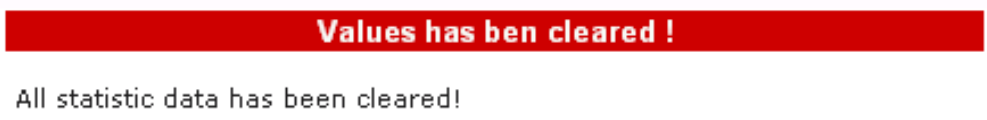
This page gives you possibility to restore factory default configuration, reboot device, upgrade firmware and clear statistics data:

Restoring default configuration

Restore default configuration will revert all settings to the factory default values. It is necessary to reboot the device in order to activate new values using *Reboot* button:

Clearing statistics

Clear statistic data will erase all collected statistics data displayed in Status page.



Firmware upgrade

Using Browse button select file containing new firmware and then click to *Upload. Upgrade process will take about 50 seconds, which is indicated by fast blinking of the Power LED (red) and following message will be displayed I case of success:*

In case of an error will be detected, following message will be displayed:

Note...

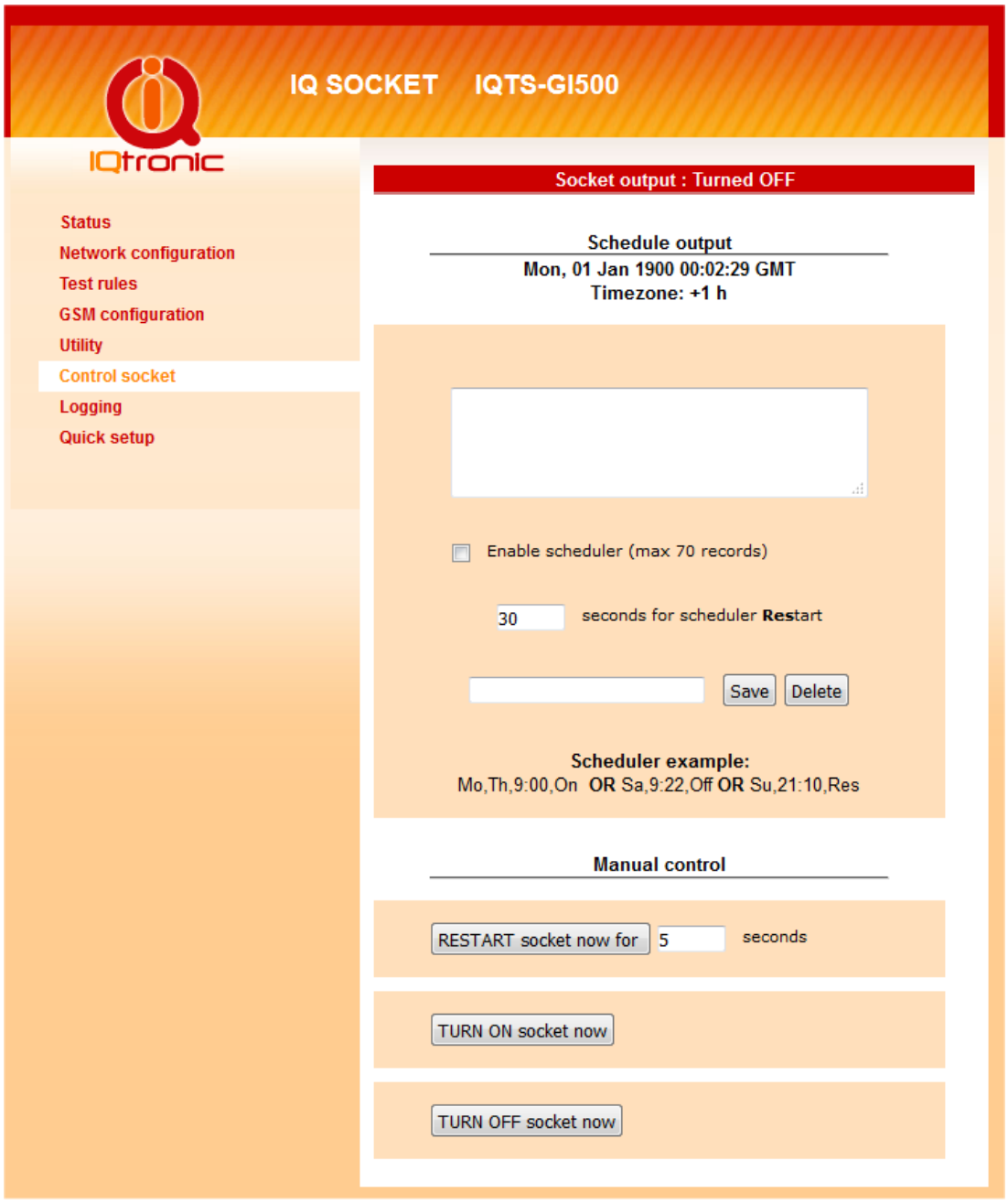
You can also upgrade firmware using IQLocator utility, please see current chapter for more information.

WARNING!

Do not remove power during a firmware upgrade process, as it can render your device inoperational!

7. Control socket

Here you can control the output socket manually and schedule automatic actions based on date/time.



Socket status

Top of the page contains status row displaying current status of the socket:

Manual control

Simply click to the buttons to turn on, turn off and restart (change current state to opposite one temporary for given number of seconds).

Scheduler

This feature allows you to schedule output socket status, up to 50 records are supported.
Scheduler function use date/time synchronized by NTP protocol, so your IQTS-GI500 must have access to the Internet (or to an NTP server located within your private network), see also chapter **Chyba! Nenalezen zdroj odkazů.**.

Each scheduler record defines target socket state at given time. It is allowed to manually control the socket while scheduler is active – each change is done only at particular time.

Each scheduler record is having following structure:
DOW,…DOW,HH:MM, action

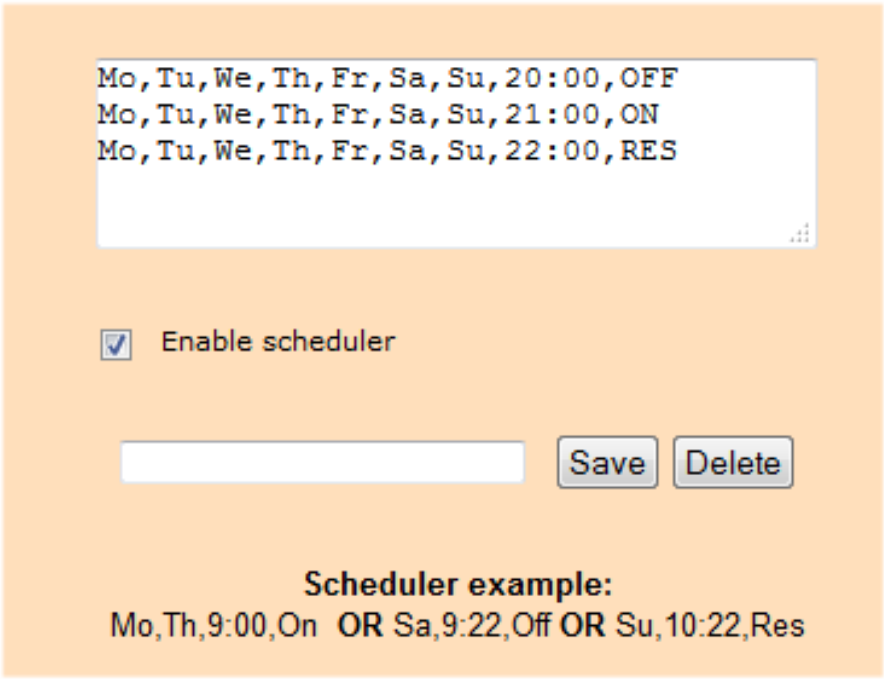
Where:

- DOW means Day of week, coded as first two letters of English day names: Mo, Tu, We, Th, Fr, Sa, Su;
- HH:MM means time in form of hour:minute in 24h format;
- Action means target socket state – off, on.

Example

Enter following rows:
Mo,Tu,We,Th,Fr,Sa,Su,20:00,Off by clicking to *Save* button
Mo,Tu,We,Th,Fr,Sa,Su,21:00,On by clicking to *Save* button
Mo,Tu,We,Th,Fr,Sa,Su,22:00,Res by clicking to *Save* button

and then activate scheduler by clicking to checkbox *Enable scheduler*



So scheduler will every day at 20:00 turn the output socket off, turn it on daily at 21:00 and restart it on daily at 22:00 for option: Time for restart output (Network settings).

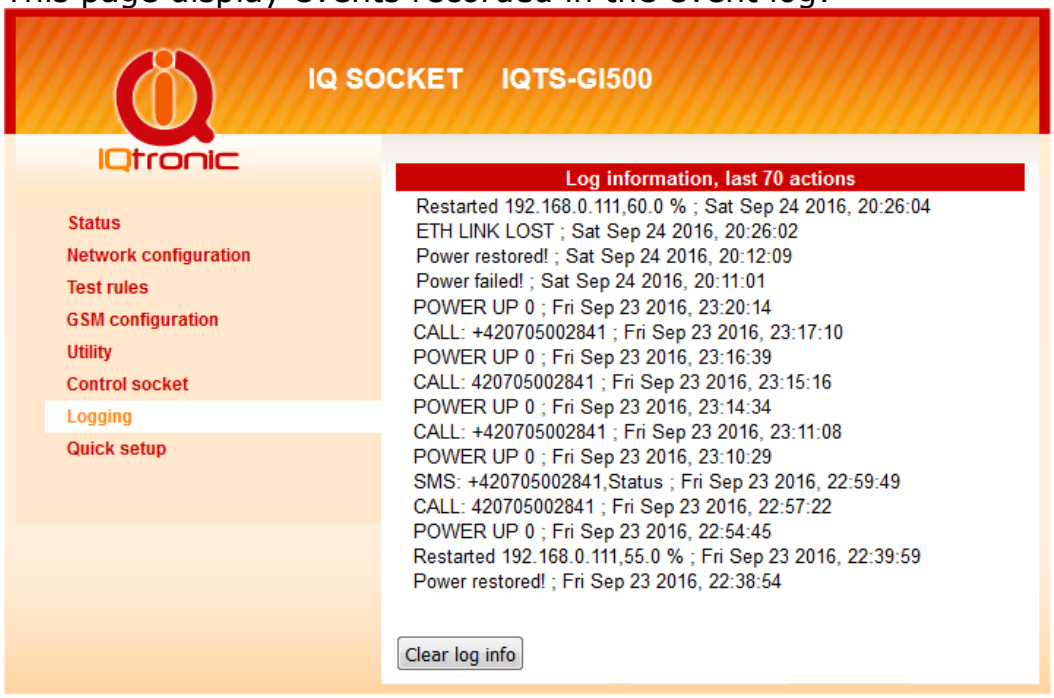
You can use any combination of days of week, such as:
Sa,Su, 20:00, Off
Sa,Su, 21:00, On
to control the socket during weekends.

I you want to delete particular scheduler row, simply enter copy of the row and click to *Delete* button; you can also enter a part of row and all similar rows will be deleted.

If you want to delete all scheduler records, enter text *ALL* and click to *Delete* button.

8. Logging.

This page display events recorded in the event log:



Event log can contain up to 100 records, oldest records being rewritten when log is full.

Automatically are recorded socket change events and firmware upgrade, optionally Ethernet link status and device startups, which can be configured in Network configuration menu.

All events are time stamped when time has been successfully obtained from an NTP server, so your IQTS-GI500 must have access to the Internet (or to an NTP server located within your private network), see also chapter **Chyba! Nenalezen zdroj odkazů.**.

Events can be sorted by time (last event is shown like last line).

Explanation of event types

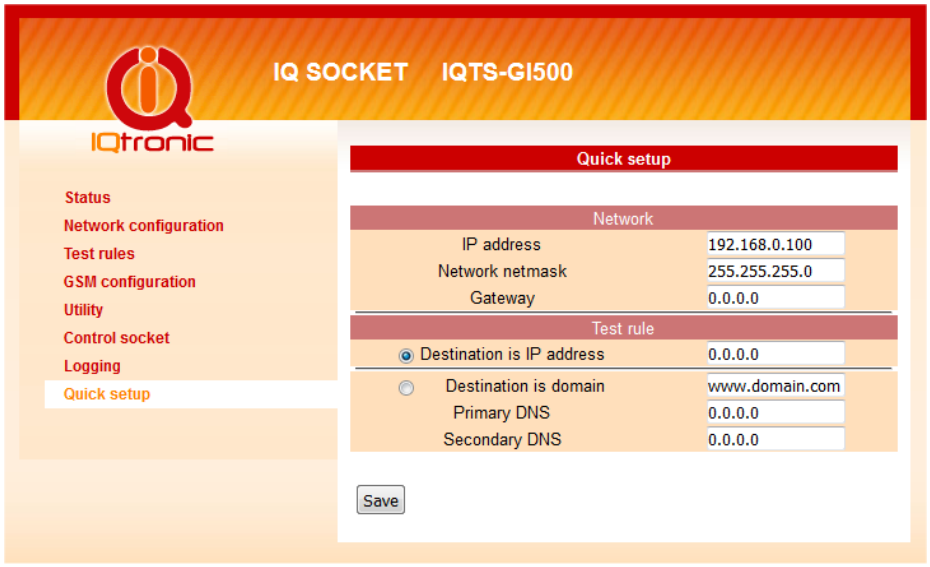
Upgraded new firmware	an upgrade firmware has been done
POWER UP 0	device has been turned on by applying power
POWER UP 1	device has been manually rebooted
Restart www.domain.com 100%	restart due to www.domain.com has been inaccessible, with ICMP packet loss 100%

DEVICE OVERHEAT	Overheat condition, allowed internal temperature is 50°C.
TURN ON by BUTTON	socket has been turned on by the push button
TURN OFF by BUTTON	socket has been turned off by the push button
TURN ON by SCHED	socket has been turned on by scheduler
TURN OFF by SCHED	socket has been turned off by scheduler

And more...

9. Quick setup.

This page provides setting up of basic networking and ICMP packet loss test rule parameters of IQTS-GI500 in an easy way suitable to less experienced users.



In case of settings entered are wrong or missing, user is informed about it the status row; settins then must be repeated until they are accepted, which is indicated by following messgae in the status row:

New settings is then passed into Test rules and are activated.

Possible errors include:

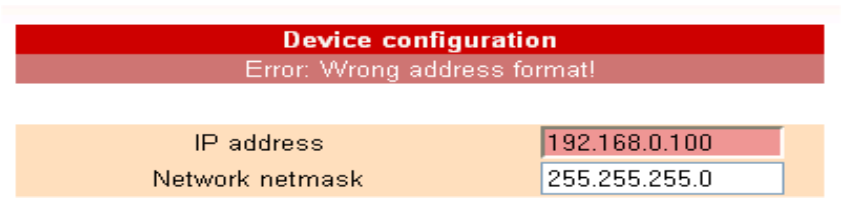
An IP address of destination host out of current IP network range has been entered, but Gateway setting is missing or it is wrong.

Destination host IP address is missing.

Gateway setting is missing, it is always required for a host specified by domain name.

If target host is specified by domain name, it is necessary to define also a DNS server which will be used to resolve IP address of the host.

WEB configuration interface has implemented function to detect incorrect parameter range. In such an attempt to enter a wrong value, an error message will be displayed in status row, the original value of parameter will be reverted back and displayed with red background:



10. XML data - status.xml

IQsocket IQTS-GI500 contains status page in XML format, it can be accessed at <IP-address>/status.xml.

You can select if this page will be protected by password on not by setting exceptions at Network configuration page.

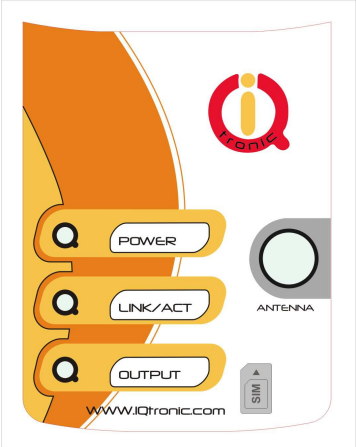
The status.xml page use following format:

```
<status>
  <devname>IP GSM SOCKET  </devname>
  <location>Location</location>
  <systimeup>0days 3hrs 2mins </systimeup>
  <systime>0days 3hrs 2mins </systime>
  <fwver>1.0.1</fwver>
  <macaddr>00:04:A3:00:00:00</macaddr>
  <systemp>34.5</systemp>
  <lastevent>0days 2hrs 48mins </lastevent>
  <socket>Turned OFF</socket>
```

```
  <rules>1</rules>
  <gsmstat>Logged in, Signal: 100 %</gsmstat>
  <ip1>192.168.0.111</ip1>
  <evt1>0/</evt1>
  <evs1>0</evs1>
  <pl1>64/</pl1>
  <pr1>9029/</pr1>
  <pt1>9029/</pt1>
  <st1>0.0/</st1>
  <at1>0</at1>
  <ip2></ip2>
  <evt2></evt2>
  <evs2></evs2>
  <pl2></pl2>
  <pr2></pr2>
  <pt2></pt2>
  <st2></st2>
  <at2></at2>
  <ip3></ip3>
  <evt3></evt3>
  <evs3></evs3>
  <pl3></pl3>
  <pr3></pr3>
  <pt3></pt3>
  <st3></st3>
  <at3></at3>
</status>
```

11. Indicators

The IQsocket IQTS-GI500 is equipped with three LED indicators:



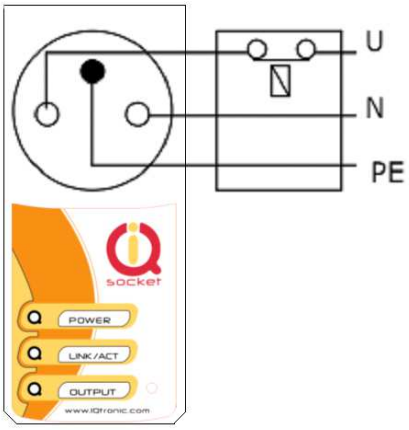
11.1. OK operations.

POWER – Light
Light shine by RED , status OK, GSM interface is not permited by user.
LINK/ACT – GREEN Link to Ethernet network established, ethernet activity in progress.
OUTPUT – Yellow Output socket is ON/OFF

11.2. Error status.

POWER - RED blinks - SIM card is not inserted , GSM interface is allowed.
BLUE - indicates GSM network, starts blinking for a longer time, approx. every second – searching for GSM network, a short blink indicates that your device has been connected to the network successfully. If the indicator starts blinking fast - SIM card has PIN protection.

12. Output socket wiring diagram.

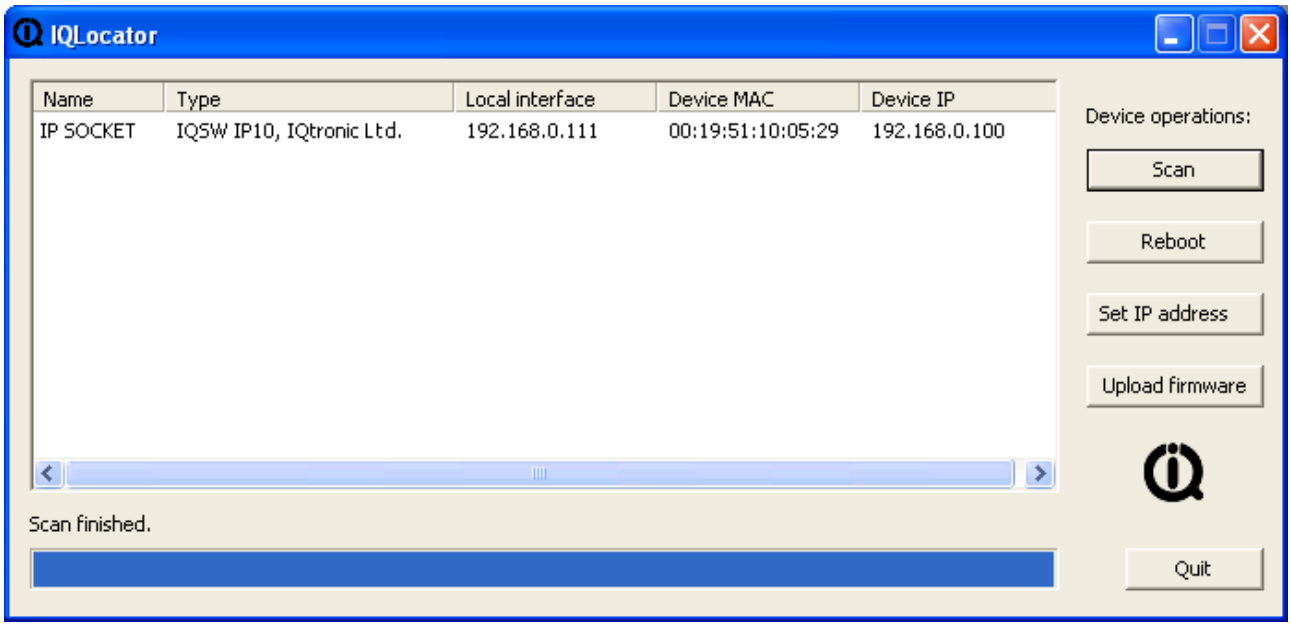


Device uses a single pole relay switch, so it is not performing safe power disconnection of the appliance plugged into socket, only functional switching is performed.

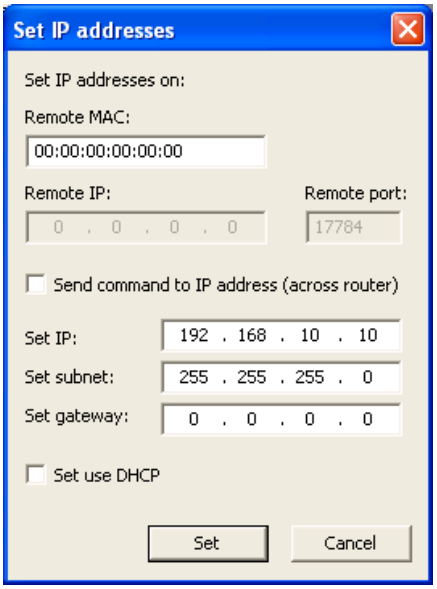
13. IQLocator utility

Purpose of IQLocator.exe utility is to make easier and faster initial configuration by locating your IQTS-GI500 using autodiscover, to change IP address and upgrade device firmware.

Simply connect your IQTS-GI500 with your computer or local Ethernet network using supplied cable and run the IQLocator.exe. After clicking to Scan button, a list of found devices will be displayed:

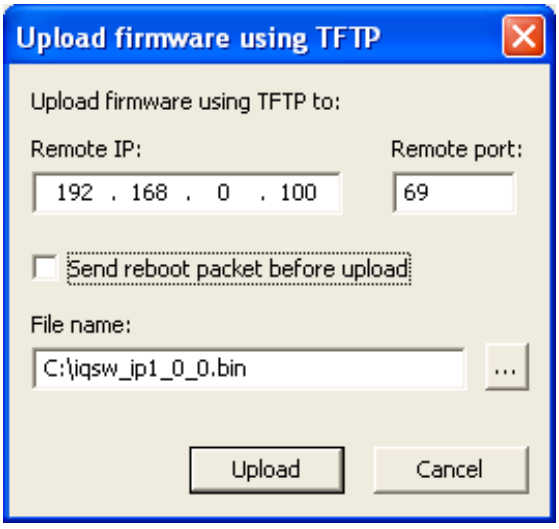


In order to change device IP address, select particular device by clicking to the row and then click to button *"SET IP addresses"* button:

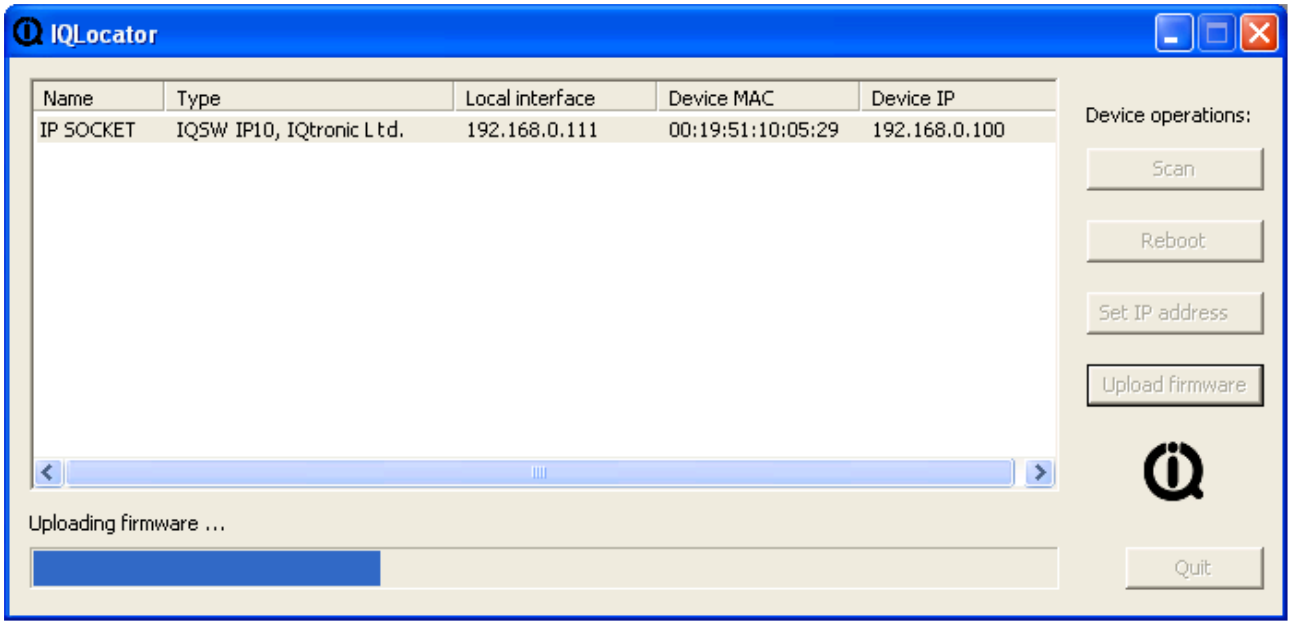


Once you enter new IP address and click to *"Set"* button, a confirmation message *"IP address was successfully set"* will be displayed and new SCAN process will be performed to locate your device with new IP address. This IP address setting is temporary, valid until next device start. To make change IP permanent, it is necessary to use WEB management (see chapter **Chyba! Nenalezen zdroj odkazů.**) to save changes permanently.

You can upgrade firmware similar way by clicking to *"Upload firmware"* button.



After browsing the target file containing new firmware and clicking to *"Upload"* button, a progress bar will be displayed. Green Link LED indicator will blink during upload process.



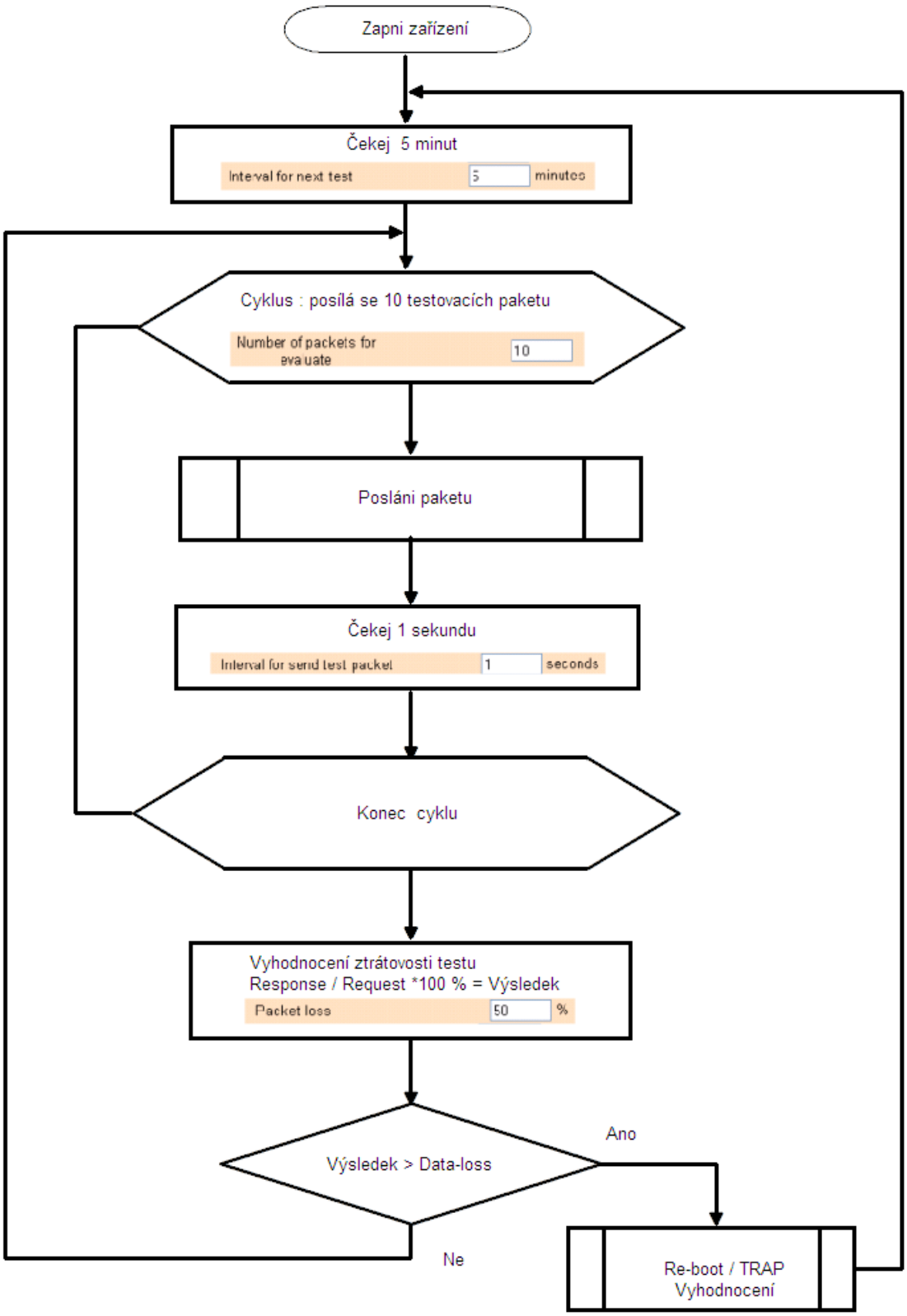
When upload is finished, a confirmation message "Successful" will appear and now it is necessary to wait about 30seconds till internal firmware rewrite procedure finishes, during which the Power LED (red) will blinking fast. Then an automatic reboot of device will be performed and device is ready for use now.

WARNING!

Do not remove power during a firmware upgrade process, as it can render your device inoperational!

14. Diagram of rules evaluation

All referenced values come from *Test rules settings* page. *Request* means testing ICMP packets sent to the target host; *response* means received ICMP answers from the target host.


Zapni zařízení
Čekej 5 minut
Interval for next test
5
minutes
Cyklus : posílá se 10 testovacích paketu
Number of packets for evaluate
10
Posláni paketu
Čekej 1 sekundu
Interval for send test packet
1
seconds
Konec cyklu
Vyhodnocení ztrátovosti testu
Response / Request *100 % = Výsledek
Packet loss
50
%
Výsledek > Data-loss
Ano
Ne
Re-boot / TRAP
Vyhodnocení

15. Technical specifications

Model	IQsocket IQTS- GI500-E, CEE 7/5 French type socket IQsocket IQTS- GI500-F, CEE 7/4 "Schuko" earthed IQsocket IQTS- GI500-N, NEMA 5-15 USA socket IQsocket IQTS- GI500-B British BS 1363 And other…
Mains power	90-250VAC / 50-60Hz, own consumption 3Watts
Output socket load	16A max (30A heavy duty relay inside)
Management	HTTP web management interface GSM 2G quad band. Manual control using push button
Security	Password for logging into web management interface SNMP read/write community passwords
Indicators	POWER: red/blue LED Link: green LED RELAY: yellow LED
Features	Appliance control over any TCPIP network Remote restart of appliances Automatic watchdog based on ICMP packet loss monitoring Scheduler
Dimensions	(LxWxH) 140 x 65 x 55mm(92mm w/ plug)
Weight	0.2kg netto
Operating temperature	0 to +50 °C
Humidity	Max. 80%, non-condensing
Environment protection	IP40, for normal environment
Installation category	Class II, overvoltage max. 2500V
Compliance	CE

16. Operation, maintenance and safety recommendations

- Do not modify product in any way and do not operate product modified any way. Warranty is void when product was disassembled or modified in any way.
- Product is not fused; ensure it is installed in fused electric installation only.

- Product can be operated only indoor office/house environment. Do not expose it to humid, wet nor chemically aggressive environment.
- Product is not designed for industrial operation with aggressive environment.
- Don’t expose product to vibrations, shaking or fall downs to avoid product damage.
- Load current 16A is valid for resistive load. If you need to switch an non-resistive or higher current load, use an external contactor rated for target load among the product. Switching a non-resistive load or higher than nominal rating currents can cause permanent damage of switching elements, which is not covered by warranty.
- WARNING: This product is not designed for use in, and should not be used for, medical applications.