CONFIGURATION GUIDE

ATREYO®
SOLUTIONS THAT SIMPLIFY

AG-801

Modbus RTU gateway with LTE and GSM

Table of content

1. Introduction

The AG-801 is a Modbus RTU Gateway dedicated to work witch remote monitoring systems. It support two-way communication with server trough LTE/GSM or Ethernet[1]. Gateway has isolated Modbus RTU interface to communicate with energy meters, PLCs and other Modbus devices. It can be configured by: internal website, SMS, string from server and configuration file loaded in predefined URL.

Gateway can be use to data acquisition from any Modbus RTU device – parameter measurement, energy meters, consumption measurements, PLC, and remote control of any device like: PLC's, remote pumping system, irrigation equipment, agricultural controls etc.

The AG-801 has advance alert option with 10 mobile number list for SMS alerts. In superCap models there is power backup with power loss alert facility.

1.1. Control from server overview

The AG-801 Gateway can be controlled via TCP commands from server. All Modbus queries can be controlled from server. In addition Gateway has support of JSON string format but limited to Modbus device interface. JSON communication is one way communication dedicated mostly to energy meters and sensors. In case of failure of GSM communication, Gateway has capability to store records in internal memory and sending archive data to the server after communication is reestablished for continuous energy monitoring. This option is available only in JSON string format. It is not supported by TCP/IP communication. TCP/IP communication can control all modbus features, send commands and control any device like PLC in real time.

1.2. Control and configuration option list

Gateway can be controlled through:

- Commands from TCP/IP server
- SMS

Configuration of Gateway can be done through:

- Internal website
- Configuration file from URL
- Commands from TCP/IP server
- Configuration file from predefined URL

1.3. Table of supported functions by different types of interface

Sn	Functions	www	TCP/IP	SMS	JSON
1	Modbus testing	√		√	
2	Modbus configuration: address, register, ID, endian, timeout	√			
3	Modbus direct remote control		√		

1 The current firmware version does not support SSL over Ethernet

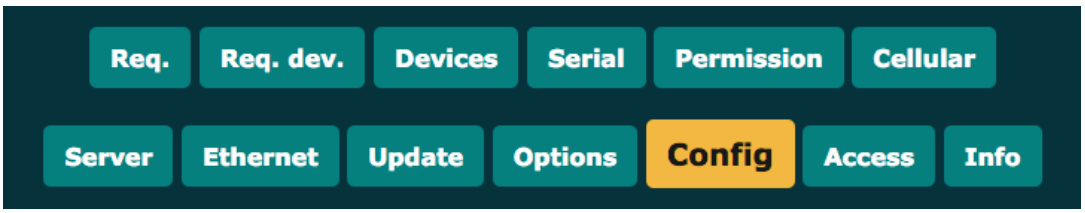
Sn	Functions	www	TCP/IP	SMS	JSON
4	Serial interface configuration: baud rate, data bit, parity, stop bit.	√			
5	Modbus device data		√		√
6	Modbus device archive data				√
7	Modbus direct device control from server		√		
8	Mobile number permission and roles	√		√	
9	GSM configuration: APN, user, password	√		√	
10	GSM signal strength	√	√	√	
11	Gateway phone number	√		√	
12	Testing mobile network: send SMS, make call	√			
13	TCP/IP server configuration: IP, port, update interval	√		√	
14	JSON server configuration: URL, token/key, update interval, archive update interval	√		√	
15	Ethernet configuration: IP, mask, gateway, DNS1, DNS2	√		√	
16	Locally update firmware by LAN	√			
17	Configuration update firmware URL	√		√	
18	Start remote update from URL		√	√	
19	Time zone configuration	√	√	√	
20	Time configuration	√	√	√	
21	Gateway configuration backup	√			
22	Gateway configuration restore	√			
23	Gateway configuration from URL setting	√	√	√	
24	Start Gateway configuration from URL	√	√	√	
25	Set access via LAN, user name, password	√		√	
26	Restart Gateway	√		√	
27	Gateway default (factory reset)	√		√	

2. Configuration and control by internal website

2.1. Login to internal website

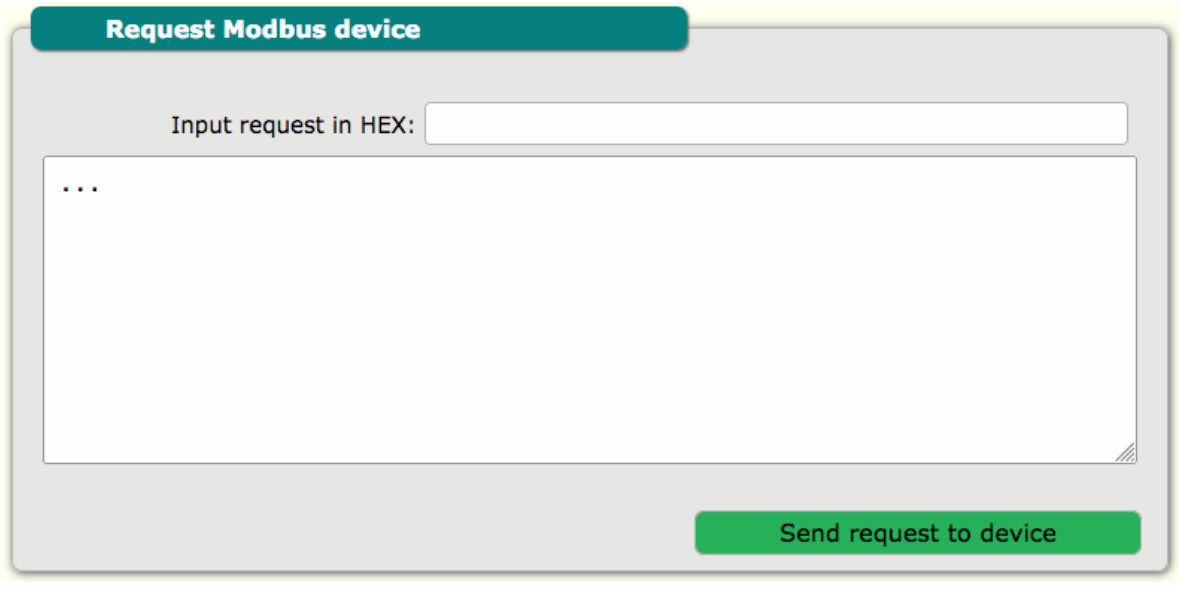
To enter internal website of Gateway make proper LAN connection and in browser address tab enter Gateway IP. The default IP is 192.168.10.50. User name is atreyo and password atreyo. In the main menu are:

- Req – request modbus device
- Req. dev. – request modbus device
- Devices – RTU configurations devices
- Serial – configuration serial communication
- Permission – permissions and role configuration for mobile numbers
- Cellular – LTE, GSM, GPRS configuration like APN, password etc.
- Server – server configuration
- Ethernet – Ethernet configuration
- Update – upload firmware and remote update configuration
- Options – for date, time, location, default etc.
- Config – backup, restore and remote configuration.
- Access – access configurations for internal website
- Info – main page with information about model, firmware version etc.



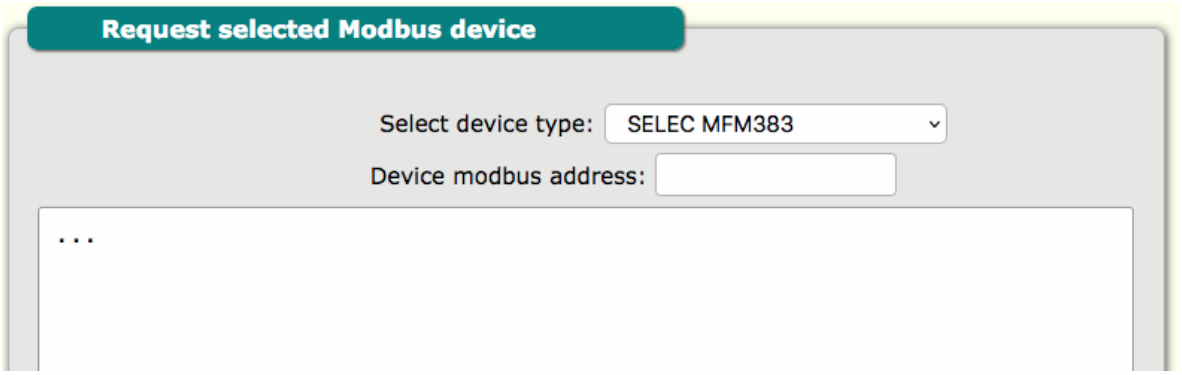
2.2. Req – Modbus request section

This section is for testing communication with modbus device. You can enter request in HEX format and gat response from modbus device.



2.3. Req. dev. – Request device log

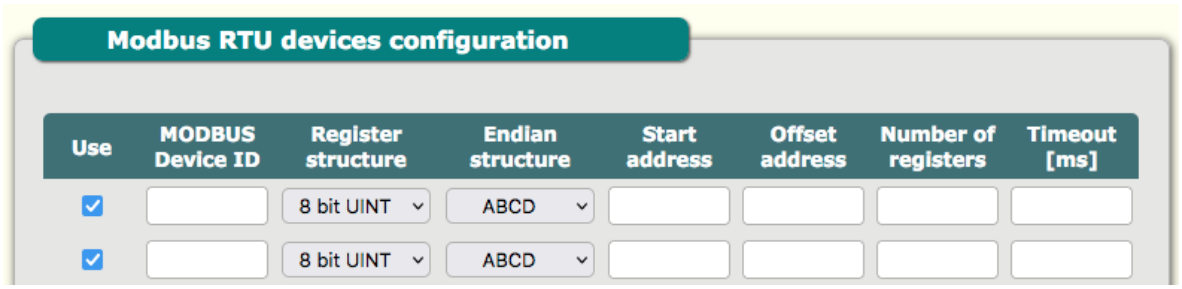
In this section is visible log of modbus devices. In this tab is optional feature to make support for Selec® company meter without necessity to set modbus device details. In window the reply from Selec® device will be visible. Now 2 models of meters are supported MFM383 and EM2M.



2.4. Devices – Modbus devices

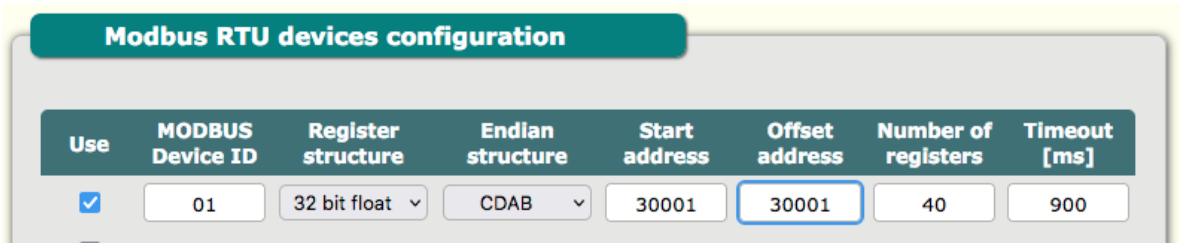
This section is for configuration of modbus devices connected to Gateway. Configuration of: device ID, register, endian, start address, offset address, registers, timeout. It can add multiple devices up to maximum 16.

Sn	Parameter	Details information
1	Use	To activate device configuration
2	Modbus Device ID	The ID of modbus device. 01 up to FF.
3	Register structure	8 bit UINT, 16 bit UINT, 32 bit UINT, 8 bit INT, 16 bit INT, 32 bit INT, 32 bit float, 16 bit HEX, 32 bit HEX, Array HEX
4	Endian Structure	ABCD, BADC, CDAB, DCBA
5	Start address	First Modbus register address
6	Offset address	Offset address for add or subtract of actual query address, according to slave device data storage system
7	Number of registers	How many registers needed to query
8	Timeout [ms]	Response time-out for query



Example for query: 01 04 00 00 00 28 F0 14

In this example F0 14 is checksum CRC-16 big endian.

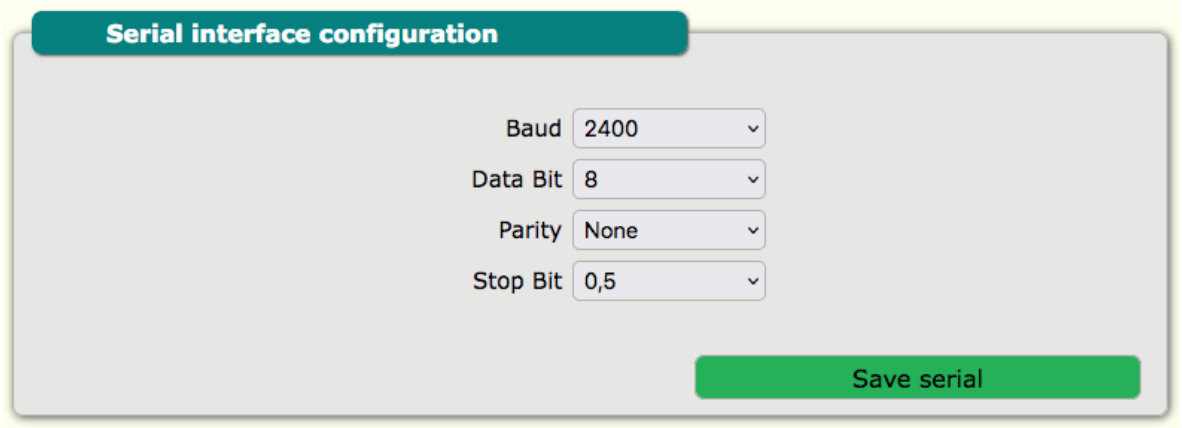


Timeout is to wait for response from slave device.

2.5. Serial – Configuration of serial communication

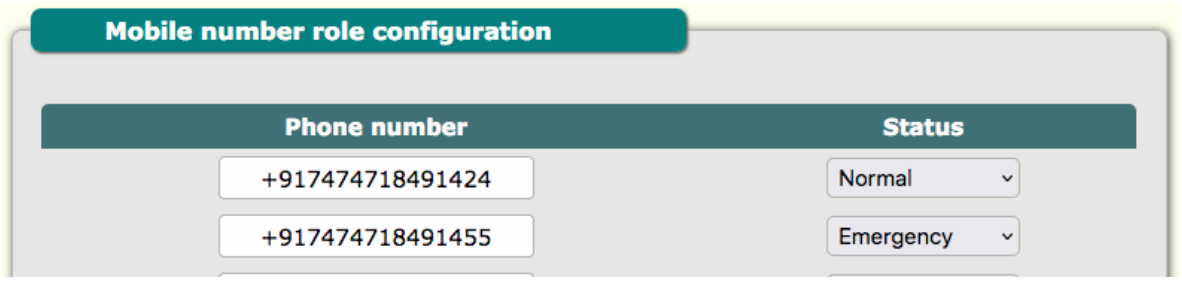
In this section are RS485 parameter configuration: baud rate, data bit, parity and stop bit.

Sn	Parameter	Option/range
1	Baudrate	2400 to 460800
2	Data bit	8, 9
3	Parity	None, Even, Odd
4	Stop bit	1, 1.5, 2



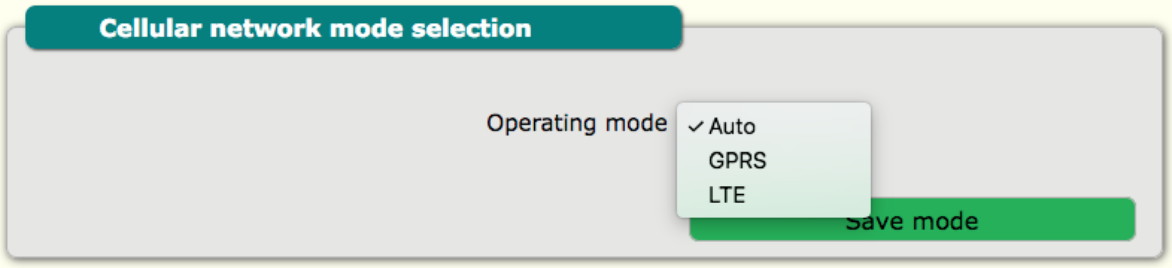
2.6. Permission – Users phone number permissions and role

This tab is for permissions of mobile numbers to protect from unauthorised access via SMS commands. By default any number can access Gateway but after input of any number only number from list is able to control Gateway. Mobile number has roles of "normal" and "emergency". Normal role allow to make control of Gateway, and emergency in addition is the emergency number for alerts. In AG-801 digital inputs high status is event for emergency SMS. It is possible to add maximum 13 telephone numbers. Number format with + before country prefix.

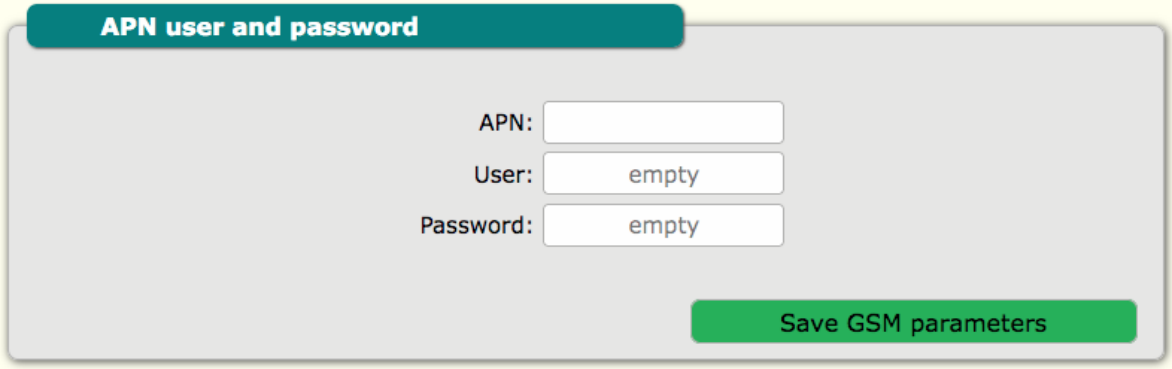


2.7. Cellular – Cellular network configuration

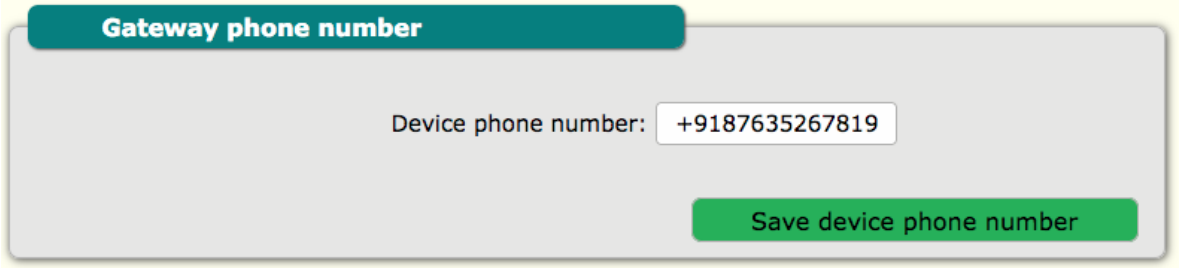
Configuration for mode of connection. Default is auto. But if you are using a SIM card that has only GPRS available, set the connection type to GPRS. If it has only LTE then select LTE and if it has both then you can leave it at auto.



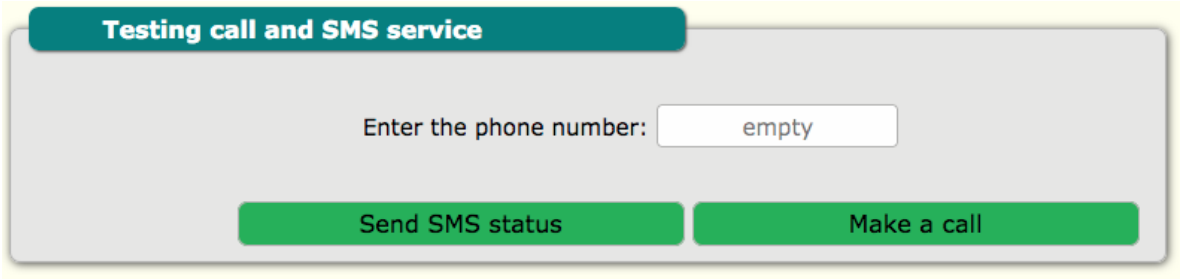
GSM configuration include: APN, user and password.



Gateway phone number it is Gateway SIM card phone number. It is not necessary to provide this, but in future this information is accessible by TCP/IP and for maintenance is good practice to add this number.

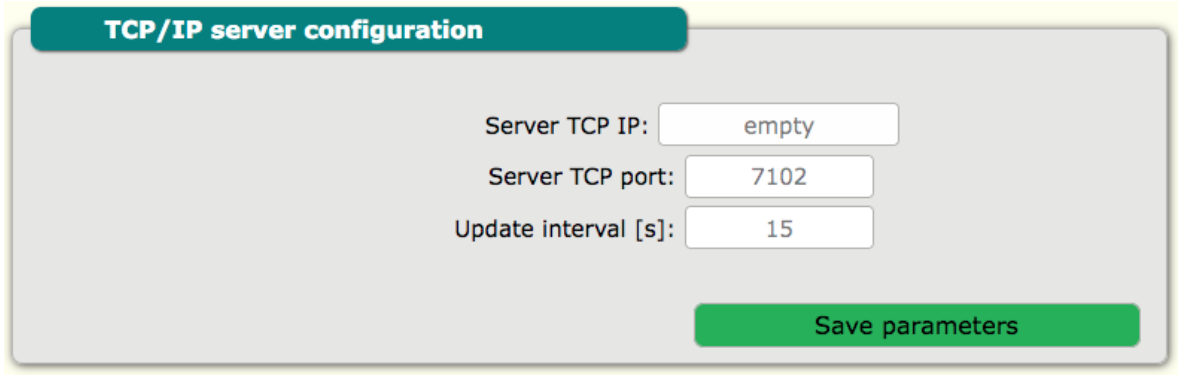


Cellular network testing is for testing of SIM card and network. You can add your number and Gateway will call or send SMS to this number. For this purpose, call and SMS support must be enabled with the mobile operator.



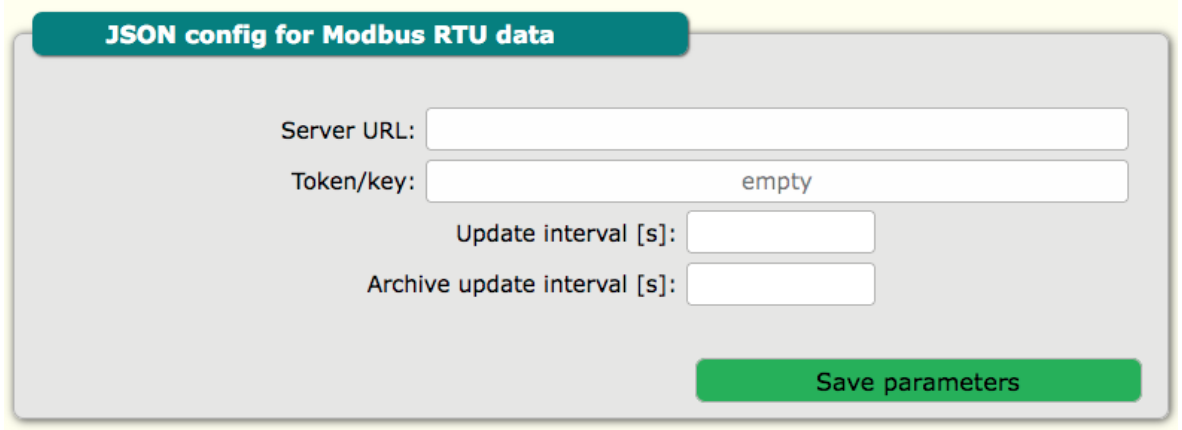
2.8. Server – TCP/IP server configuration

TCP/IP server configuration section is for configuration of: server IP, server port and update interval.



2.9. Server – JSON server configuration

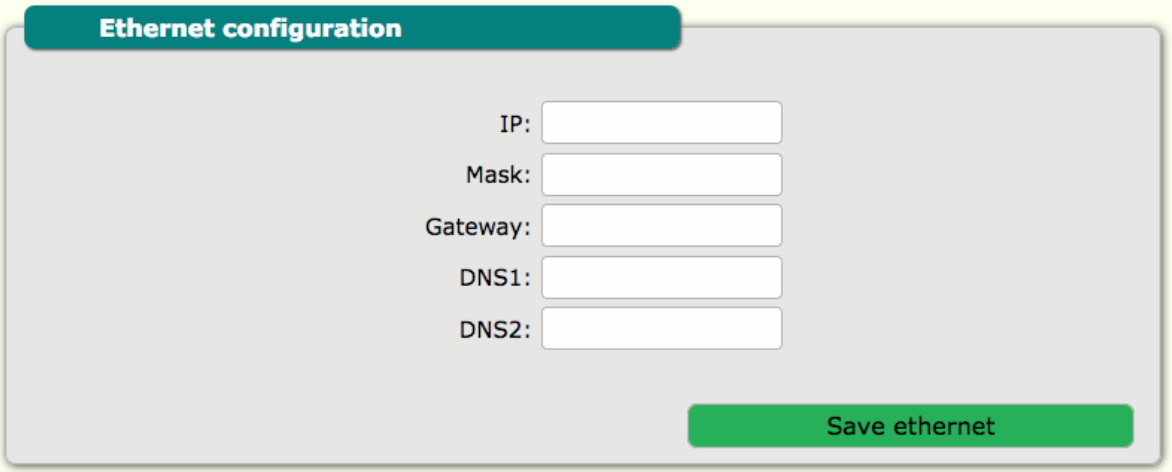
JSON server configuration section is for configuration of server URL, token/key, update interval and archive update interval.



2.10. Ethernet – Ethernet configuration

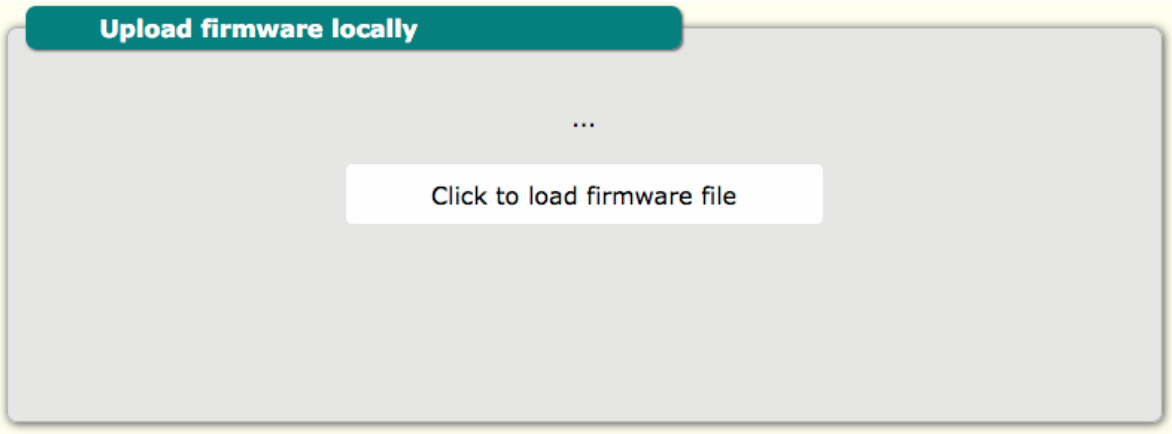
Ethernet configuration for LAN. Default value is:

IP = 192.168.10.50, Mask = 255.255.255.0, Gateway = 192.168.10.1, DNS1 = 8.8.8.8, DNS2 = 8.8.4.4

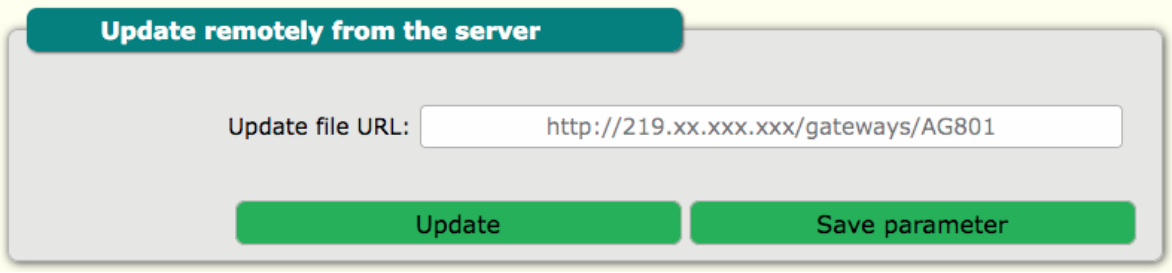


2.11. Update – Firmware update

This section is for firmware update. The Gateway can update firmware from remote URL and locally direct by uploading BIN file with proper firmware. To load firmware click load firmware file and select firmware. After loading Gateway will automaticity restart. Firmware update in normal condition will not reset configuration.



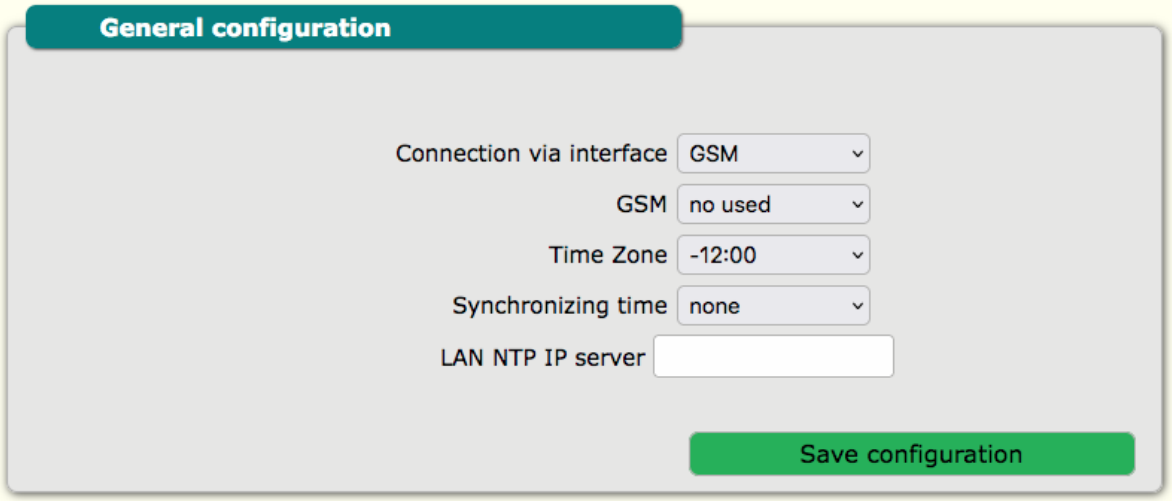
Remote file update configuration is for update from server. It is possible to start update from server by click "update" button or remotely by TCP/IP string from server.



2.12. Options – General configuration – communication and other config

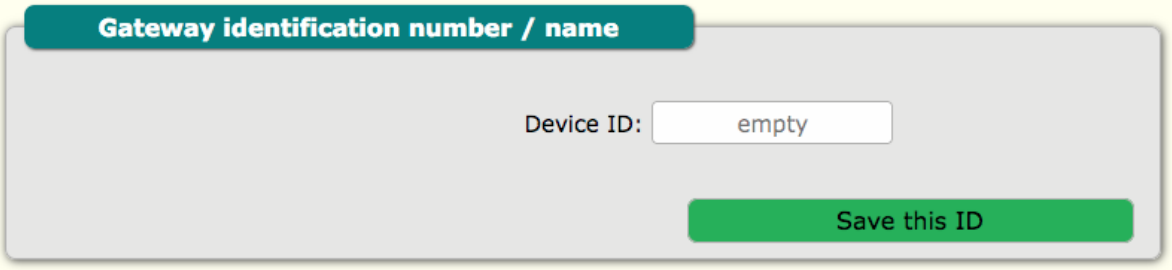
This section is for general configuration. Time zone configuration and enable/disable GSM network. Also here is an option to synchronize the Gateway RTC time with NTP servers. You can choose between LTE/GSM NTP server and LAN NTP server and none. LAN NTP server can be used when your network is not connected to the Internet. Then we should run the

NTP server on the local server. In addition, the time can be set via SMS or commands from the server.



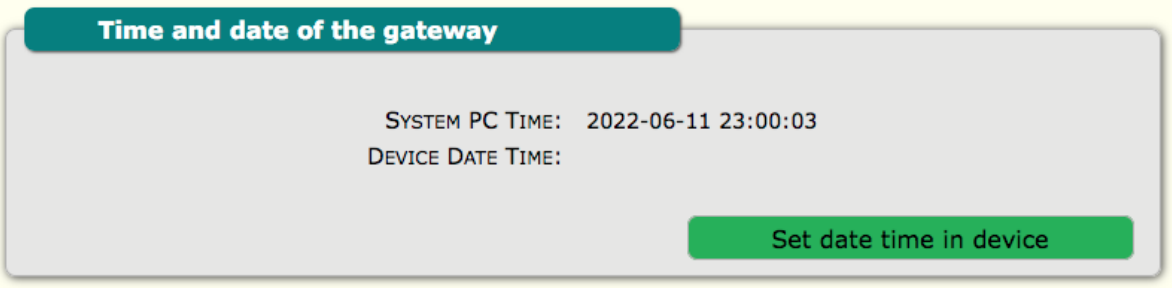
2.13. Options – Gateway identification number / name

This is an option for additional identification of the Gateway from the server side. You can enter your Gateway ID here.



2.14. Options – Date and time configuration

This section is for configuration of real time clock in Gateway. The time is taken from the time that is currently set on the computer.

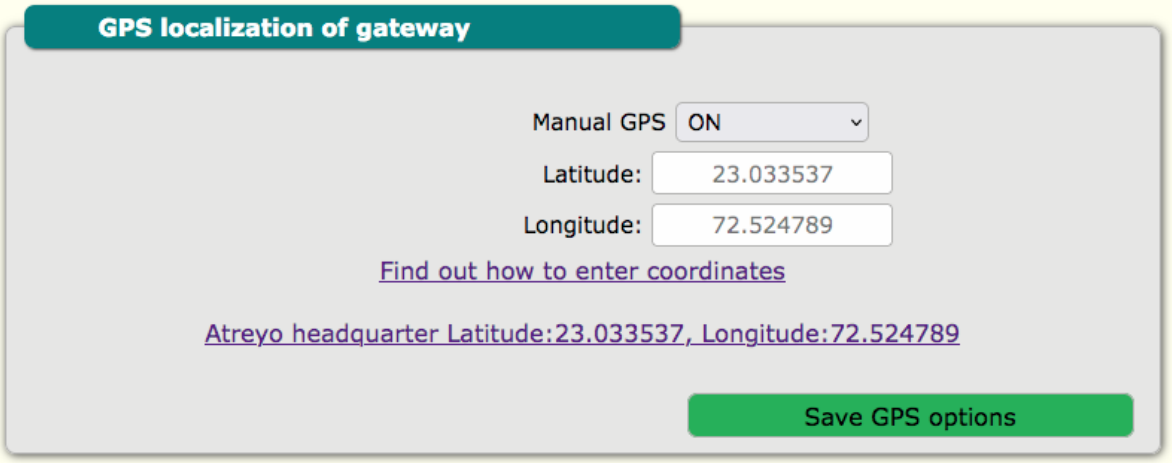


2.15. Options – Factory default – reset Gateway configuration

To make default all configurations of Gateway for safety reason type "Atreyo" in the tab and press "set default values".

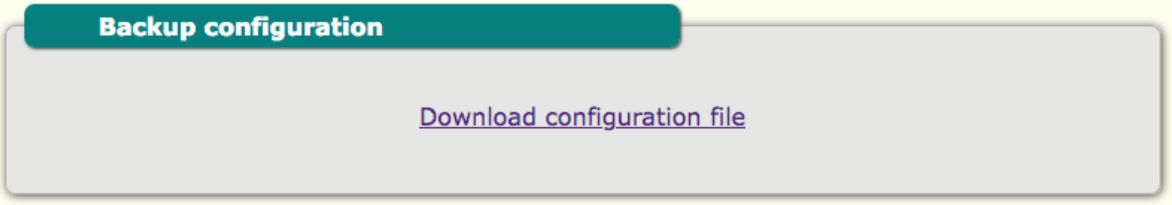
2.16. Options – GPS configuration

Gateway GPS location tab is for configuration of Gateway location. Because in AG-801 there is no inbuilt GPS thus select "Manual GPS ON".

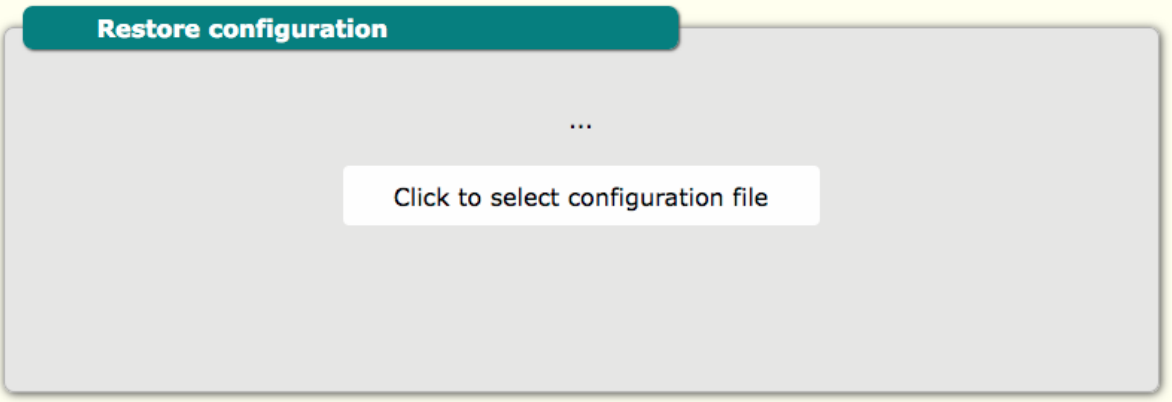


2.17. Config – Backup and restore configuration

To backup all configuration of Gateway use this tab. The configuration file has checksum so do not edit configuration file in not dedicated PC software. Use dedicated Atreyo software.

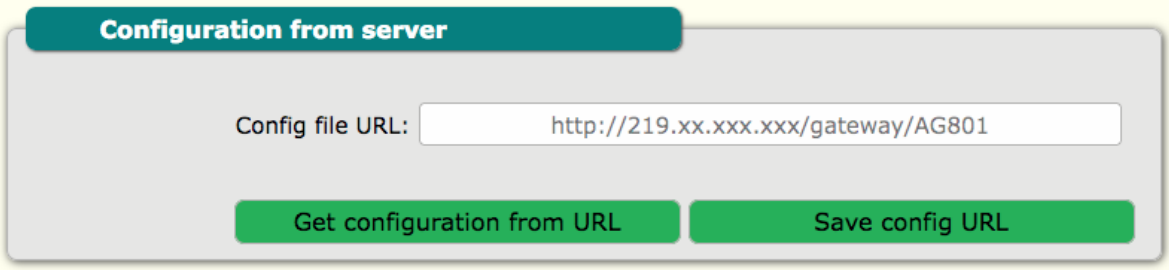


For loading previous saved configuration from computer, select and load file:



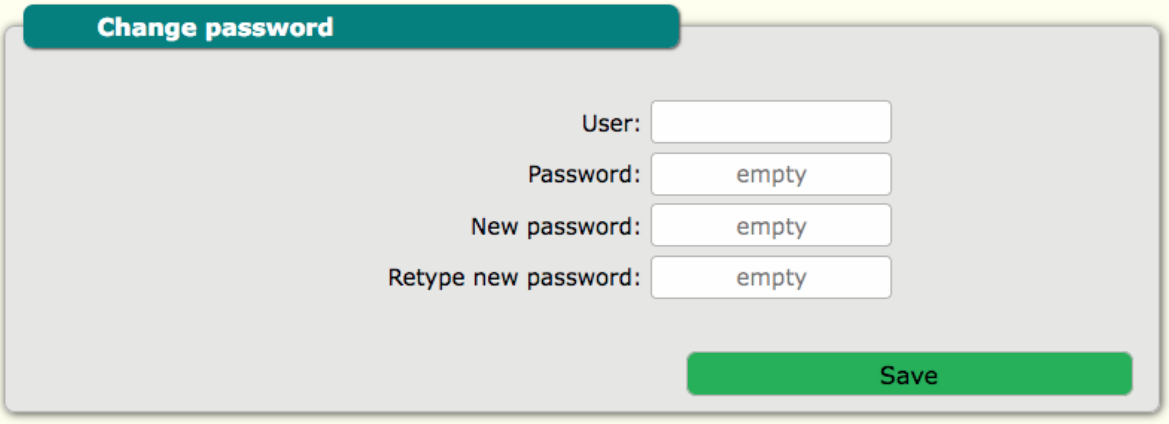
2.18. Config – Remote configuration from server

This tab is for configuring URL of remote file with Gateway configuration. By clicking "get configuration" URL device will update from remote file.



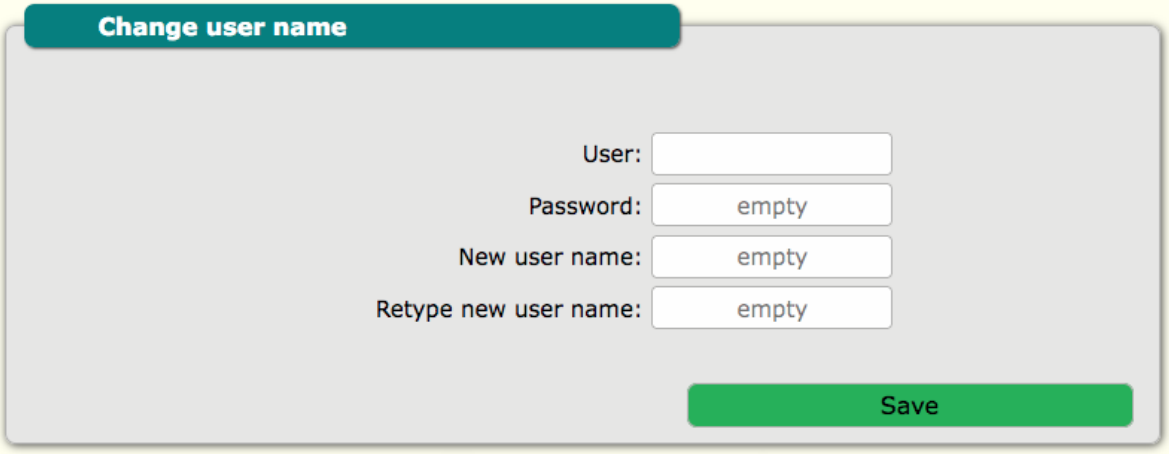
2.19. Access – Password configuration

This section is for internal website. Default password is atreyo.



2.20. Access – User configuration

For user change. Default user is atreyo.

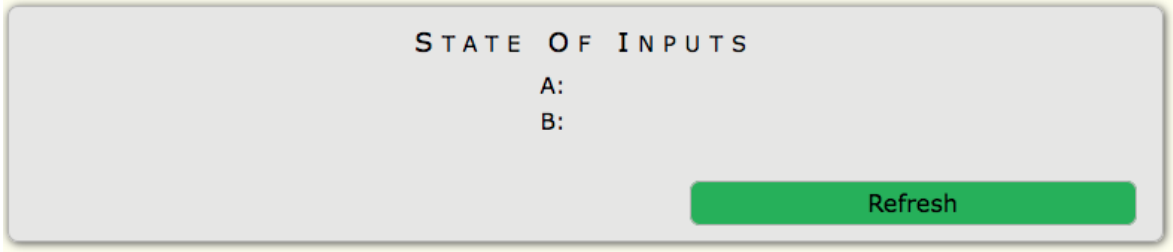


2.21. Info – Information about Gateway

This is information screen about AG-801 with firmware version etc.

2.22. Info – Digital input status

In this tab from info section can test digital input status.



2.23. Info – Restart Gateway

By this tab you can restart Gateway.

3. Configuration and control by SMS

3.1. SMS overview

Many functions of the Gateway can be controlled by SMS commands. Remember that the SMS function is available from your cellular operator in the SIM in Gateway. Gateway responds to each command with an SMS informing that it will execute the command. SMS commands in server address configuration and password configuration are case sensitive. For all other commands it is case insensitive. The Gateway after processing command will send reply by SMS with confirmation.

3.2. System commands

Sn	Description	Command	Example
1	For status of Gateway, serial number etc.	STATUS	
2	To restart Gateway	RESTART	
3	To get info about some important commands	HELP	
4	Erasing whole data aggregating from Modbus devices	ERASEARCHIVE	
5	Make device default factory configuration	MAKEDEFAULT	
6	To set Gateway ID	MYID=	MYID=AG811-1
7	To get info about Gateway ID	MYID?	
8	Not in use	NAME=	
9	Not in use	NAME?	
10	Not in use	ADMIN=	
11	Not in use	ADMIN?	
12	Not in use	DEVUSER=	
13	Not in use	DEVUSER?	

3.3. Server commands

Sn	Description	Command	Example
1	To set server IP	SERVERIP=	SERVERIP= 231.23.4.216
2	To get info about server IP	SERVERIP?	
3	To set server port	SERVERPORT=	SERVERPORT=7301
4	To get info about server port	SERVERPORT?	
5	Poll time for TCP/IP poll. Format in seconds	SLTPOLL=	SLTPOLL=30
6	To get info about polling time configuration for TCP/IP	SLTPOLL?	
7	To set JSON server address	RTUSERVER=	http://example.com/rtu
8	To get info about JSON server address	RTUSERVER?	
9	To set token for JSON server	RTUTOKEN=	RTUTOKEN=kjakaj567$
10	To get info about JSON server	RTUTOKEN?	

Sn	Description	Command	Example
11	Poll time for RTU section. Format in seconds	RTUPOLL=	RTUPOLL=15
12	To get info about poll time for RTU section.	RTUPOLL?	
13	Poll time for RTU archive data section. Format in seconds	RTUPOLLARCH=	RTUPOLL=60
14	To get info about poll time for archive data from RTU	RTUPOLLARCH?	

3.4. GSM commands

Sn	Description	Command	Example
1	To set APN for internet connection.	APN=	APN=internet
2	To get info about APN for internet connection	APN?	
3	To set APN user name for internet connection	APNUSER=	APNUSER=internet
4	To get info about APN user name for internet connection.	APNUSER?	
5	To set APN password for internet connection	APNPASS=	APNPASS=password
6	To get info about APN password for internet connection.	APNPASS?	

3.5. Ethernet commands

Sn	Description	Command	Example
1	Set LAN IP of AG-801	LANIP=	LANIP=192.168.10.50
2	To get info about LAN IP	LANIP?	
3	To set LAN mask	LANMASK=	LANMASK=255.255.255.0
4	To get info about LAN mask	LANMASK?	
5	Set LAN Gateway	LANGATE=	LANGATE=192.168.10.1
6	To get info about LAN Gateway	LANGATE?	
7	Set DNS Primary	LANDNS1=	LANDNS1=8.8.8.8
8	To get info about LAN primary DNS	LANDNS1?	
9	Set DNS Secondary	LANDNS2=	LANDNS2=8.8.4.4
10	To get info about LAN secondaryDNS	LANDNS2?	
11	To get all info about network parameters	LAN?	

3.6. Date, time and GPS configuration

Sn	Description	Command	Example
1	To set Gateway time. Always in format: HHMMSS or HH:MM:SS the dividing sign is meaningless - always format 24H	SETTIME=	SETTIME=060129 or SETTIME=06:01:29
2	To get info about internal RTC time	GETTIME?	
3	To set Gateway date. Always in format: YYYYMMDD or YYYY/MM/DD. The dividing sign is meaningless.	SETDATE=	SETDATE=20210218 or SETDATE=2021/02/18
4	To get info about RTC date	GETDATE?	

Sn	Description	Command	Example
	To get info about internal RTC time and date	GETDATETIME?	
5	To set GPS manual (simulates hardware GPS)	GPSMANUAL=ENABLE or GPSMANUAL=E	
6	To set off GPS manual (simulates hardware GPS)	PSMANUAL=DISABLE or PSMANUAL=D	
7	To set latitude	GPSMANLAT=	GPSMANLAT=50.313168
8	To set longitude	GPSMANLONG=	GPSMANLONG=18.887417
9	To get info about longitude and latitude	GPS?	

3.7. Firmware update via URL configuration file

Sn	Description	Command	Example
1	Command for start update from URL address	UPDATEGO=1	
2	Set URL address where is firmware file	UPDATEURL=	UPDATEURL=http://example/update/gateway/
3	To get info about firmware update URL	UPDATEURL?	

3.8. Configuration of update via URL configuration file

Sn	Description	Command	Example
1	Command for start update from URL address	CONFIGGO=1	
2	Set URL address of config file	CONFIGURL=	CONFIGURL=http://example/config/gateway/
3	To get info about URL address of config file	CONFIGURL?	

3.9. To set role and access permissions

After the default configuration of the Gateway has an empty list, when someone adds a mobile number, this number gives the permission to add another one. (website config)

Sn	Description	Command	Example
1	Show list of enabled phone numbers with status,"emergency" status means alert notification – for inputs IN1 and IN2	USERLIST?	
2	Add user phone number to list with function – exception notification	USERADD=	USERADD=+919936612345 -E
3	Add user phone number for access to Gateway	USERADD=	USERADD=+919936612345
4	Remove this phone number from the list	USERDEL=	USERDEL=+919936612345
5	set user name for access to internal website	HTTPUSER=	HTTPUSER=admin
6	show user name for access to internal website	HTTPUSER?	
7	Set password for access to internal website	HTTPPASS=	HTTPPASS=atreyo
8	Show password for access to internal website	HTTPPASS?	

Sn	Description	Command	Example
9	Show user name and password for access to internal website	HTTPACCESS?	

3.10. Digital inputs status

Sn	Description	Command	Example
1	To get status of digital inputs (reply will be like: INPUT A=ON B=OFF)	GETINPUTS?	

4. Server commands

4.1. Overview

Gateway's main real time communication format is TCP/IP. All ON/OFF, digital inputs, most of other functions and configurations can be done from server by this protocol. The string format is small to provide quick response from Gateway. In the TCP/IP format it is possible to control Modbus interface from server.

4.2. TCP/IP server commands

Server command are in separate API document. Go to product page for download

5. JSON format

5.1. Overview

The gateway is capable of sending the Modbus slave device's data to the server in JSON string format. The implementation of JSON is a very easy task on server side.

5.2. JSON format benefits

- Easy to use and interpret data
- Have built in Gateway id and time stamp for easy traceability
- Faster data parsing
- Archive data availability

5.3. JSON string format

The JSON string format is provided in separate document.

6. Legal Note

6.1. Copyright

6.2. Trademarks

6.3. Disclaimer

- All dimensions mentioned in the drawings are not to scale and may vary/differ due to construction contingencies and site conditions which are subject to change as may be decided by the company.
- The specifications and amenities mentioned in this document and promotional documents are only representational and informative. The descriptions in this specification are based on the default configuration of your device.
- Images used in this specification may differ in appearance from the actual product.
- The Atreyo Research and Development LLP reserves rights to make additions, deletions, alterations or amendments as and when it deems fit and proper, without any prior notice.

Atreyo Research & Development LLP

+91 9727741417
info@atreyo.in

414, Sunrise Mall, Mansi Circle,
Vastrapur
Ahmedabad 380015, India