

GateRO 400 Series

User Guide

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ABOUT THIS DOCUMENT

This document describes the GateRO401 module and how the user can configure it.

1 INTRODUCTION

GateRO 401 is a router that exchanges network data across multiple industrial network interfaces such as fieldbus, serial, Ethernet or GSM. The routing works over standard industrial protocols such as Modbus/TCP, Modbus/RTU/ASCII. In other words, GateRO 401 allows interconnection of devices (PLCs, smart sensors, SCADA) working on different protocols or bus speeds. In addition, all GateRO401 data may be remotely accessed through secured channels over Internet. Hence, the built-in cryptography feature of GateRO401 allows using Cloud based services such as Remote Access, Remote Diagnostic. All connections between GateRO devices and the associated cloud system are encrypted. The security level of algorithms is the same as the ones used in electronic banking.

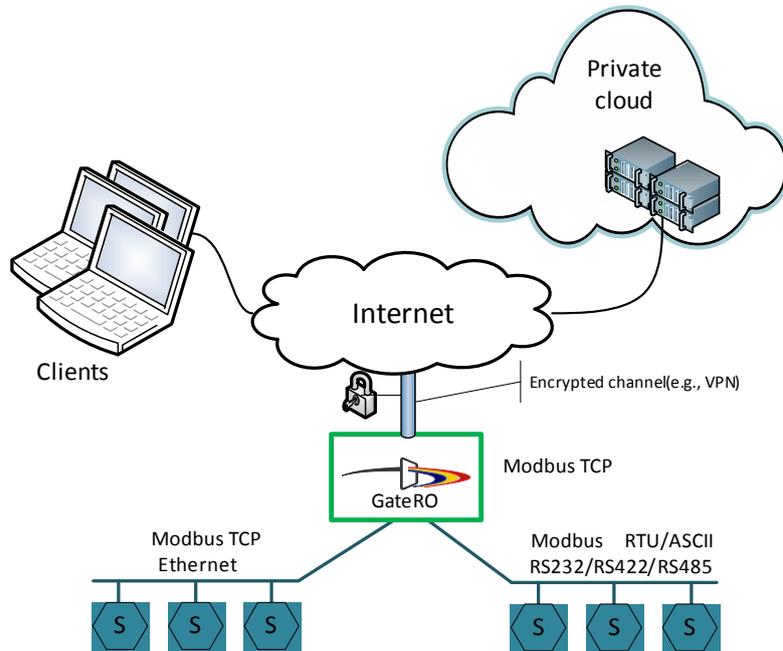


Figure 1. Typical usage of GateRO 401.

2 OVERVIEW

2.1 Front Panel

The Front Panel contains three elements:

- LCD Display

For every GateRO Interface the LCD will display a figure that indicates the interface state:

- Interface OFF

1	<input type="text"/>	×
2	Type <input type="text" value="Init Err"/>	×
3	Type <input type="text"/>	✓
4	Type <input type="text"/>	✓

- Interface ON – Startup Error (“Type” is the interface type: Eth, 232, 422, 485)
- Interface ON – No Traffic
- Interface ON – The bargraf fill represents the traffic through interface

- Buttons

Used to select the configuration menu options.

- LED

- OFF – The application is not running
- Red – The application is not running/Startup errors
- Green – The application is running ok.

2.2 Interfaces and Connectors

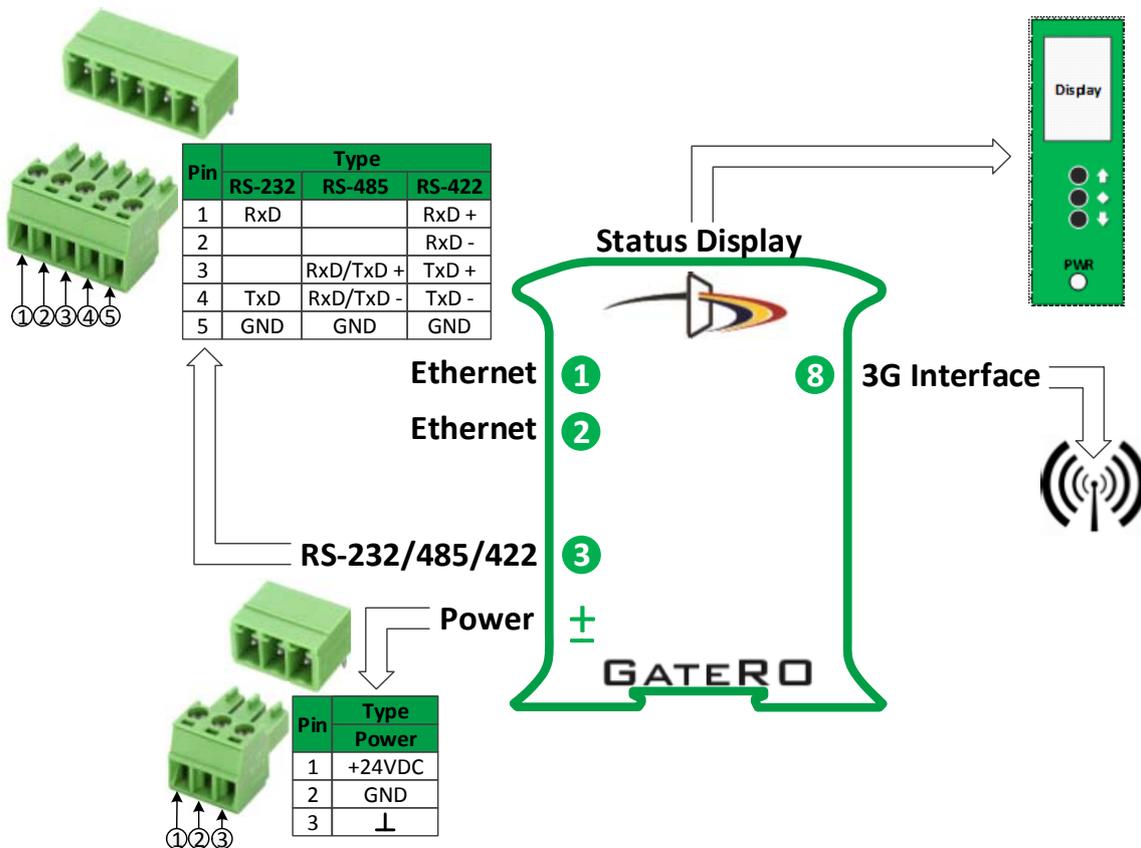


Figure 2. GateRO interfaces.

- Power Connector

It has 3 poles removable screws to connect a regulated 24±10% power supply.

- Ethernet Connectors

Allows to connect the GateRO module to Ethernet networks using UTP cable (min CAT5).

- RS232/422/485 Connector

Allows to connect the GateRO module to RS232/422/485 serial networks.

- 3G Interface
Allows to connect the GateRO module to Internet services.

2.3 Dip Switch

Will switch between RS-232/422/485 modes.

Mode	Position				Dip Switch
	1	2	3	4	
RS232	Down	Down	Down	Up	1 2 3 4
RS422	Down	Up	Down	Up	1 2 3 4
RS485	Up	Up	Down	Up	1 2 3 4

3 DIN RAIL MOUNT

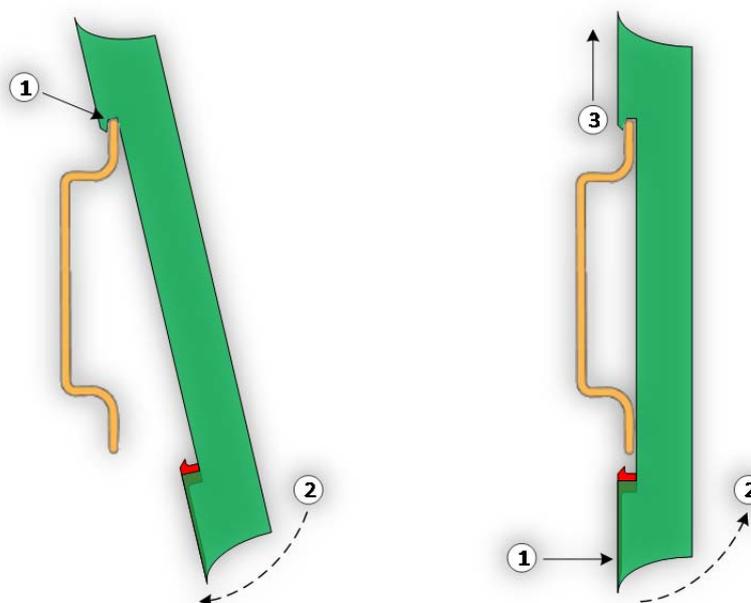


Figure 3. GateRO physical setup.

- Snap on:
 - 1.Fasten the GateRO module on top of the DIN Rail.
 - 2.Push the lower part into position.
- Snap off:
 - 1.Use a screwdriver to unlock the hook from the lower part.
 - 2-3. Pull the lower part away from the DIN Rail and pick up the GateRO module.

4 SETUP

There are three applications that can be used to configure the GateRO devices:

- The webconfig tool
- The *GateON* application
- The *Risan_GUI* application

4.1 The webconfig

The GateRO device will be configured using a computer and a web browser. The web page opens at a default IP address on the 2nd Ethernet interface: <http://192.168.3.11/webconfig>. This webpage has the main options described below:

4.1.1 Status



The *Status* menu includes some tabs where the GateRO device is described:

- *System Status* – contains information about:
 - *Device* – information about the system status;
 - *Network Services* – the state of the network services (enabled/disabled);
 - *Interfaces* – information about the GateRO interfaces.
- *Interfaces* – information about the type, the status and the communication parameters for each GateRO interface;
- *Services* – information about the VPN connection (including the log data);
- *Log* – log data for the *Kernel*, *Gateway Application*, *webconfig*;
- *Gateway* – information about the *Gateway Application*;
- *Statistics* – the traffic and the transfer rate for each GateRO interface;
- *Statistics charts* – graphical illustration of the traffic for each GateRO interface;
- *Traffic accounting* – graphical illustration of the monthly traffic during last year.

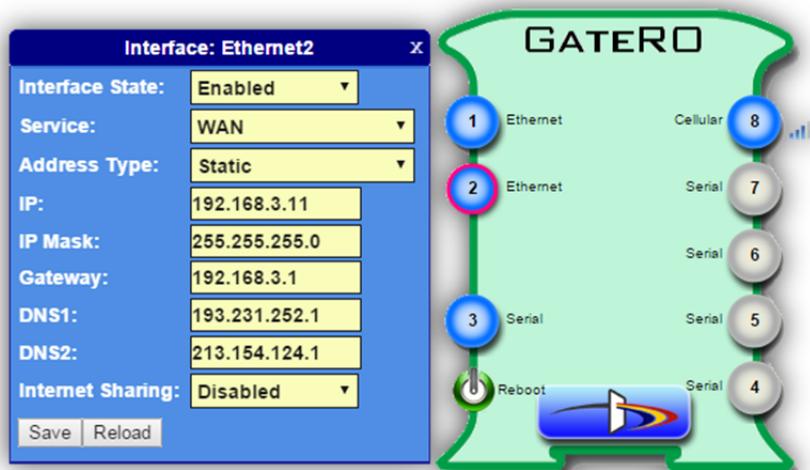
4.1.2 Config



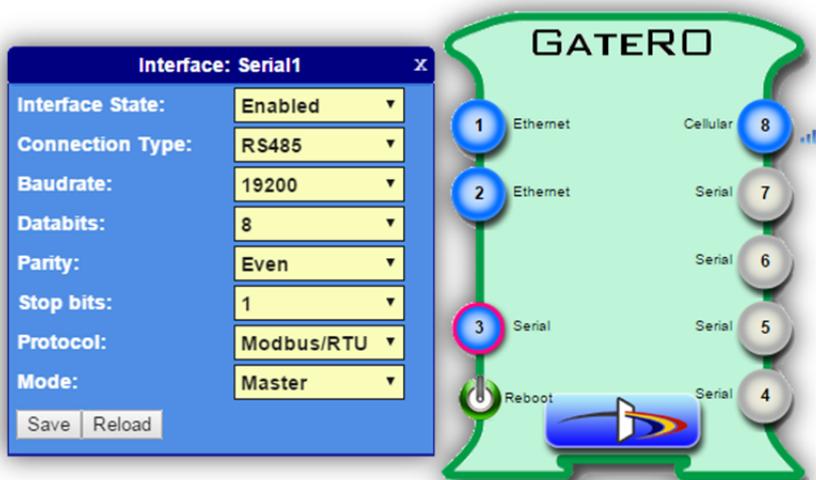
The *Config* menu is used to configure the GateRO device using the next tabs:

- *Device Configuration* – used to setup the communication parameters; the parameters can be modified by selecting the appropriate interface:

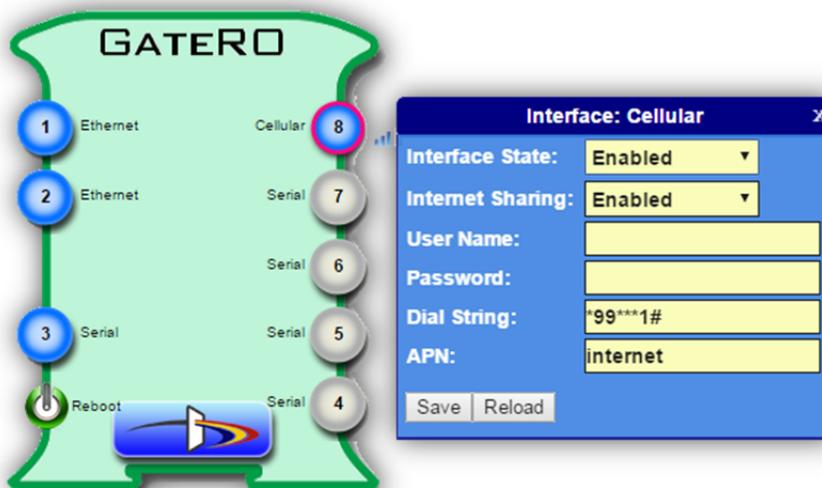
- The Ethernet Interface parameters;



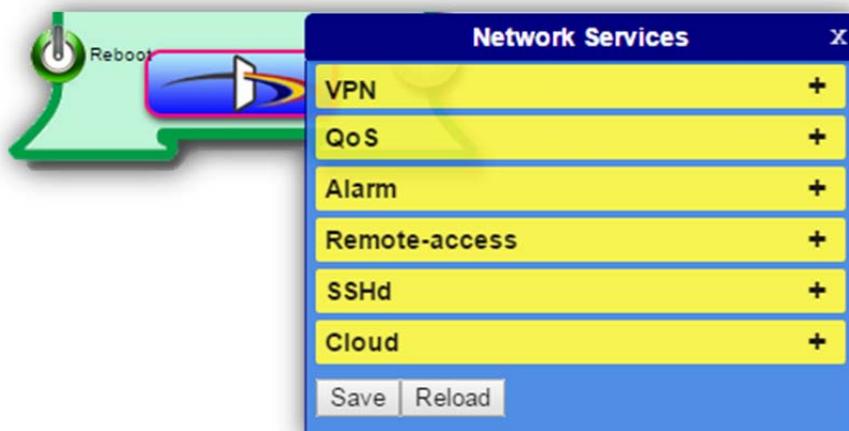
- The Serial Interface parameters;



- The 3G Interface parameters;



- Also, the *Network Services* parameters can be configured by selecting the *Network Services* button;

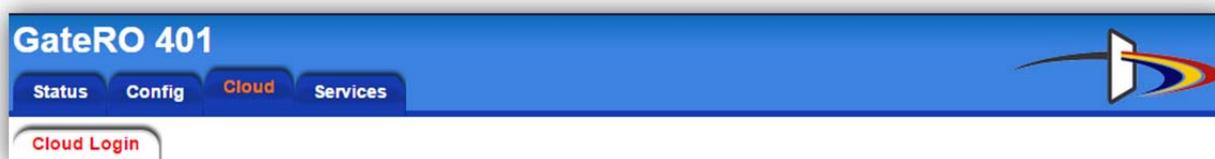


- The *Save* button will be selected to confirm the appropriate interface parameters;
- In order to submit all the GateRO parameters the device should be rebooted by selecting the *Reboot* button.



- *Device Update* – used to update and to access the GateRO device files:
 - *Time/Date Update* – used to sync the GateRO device time with the client time;
 - *File Upload* – used to update some files that GateRO device is depending on running:
 - *Gateway Application* – an application that will be run in the context of the Gateway Application;
 - *WebConfig* – a *.tar.gz* compressed file containing the *webconfig* web page;
 - *Gateway Config* – a *.cfg (json)* format file containing configuration data for the *Gateway Application*; the *Gateway Application* uses the *gro.cfg* and the *gateway.cfg* files when running;
 - *Application* – some other useful applications.
 - *File Download* – used to view or download the *Gateway Application* configuration files;
 - *Clean Up* – used to clean some data.

4.1.3 Cloud

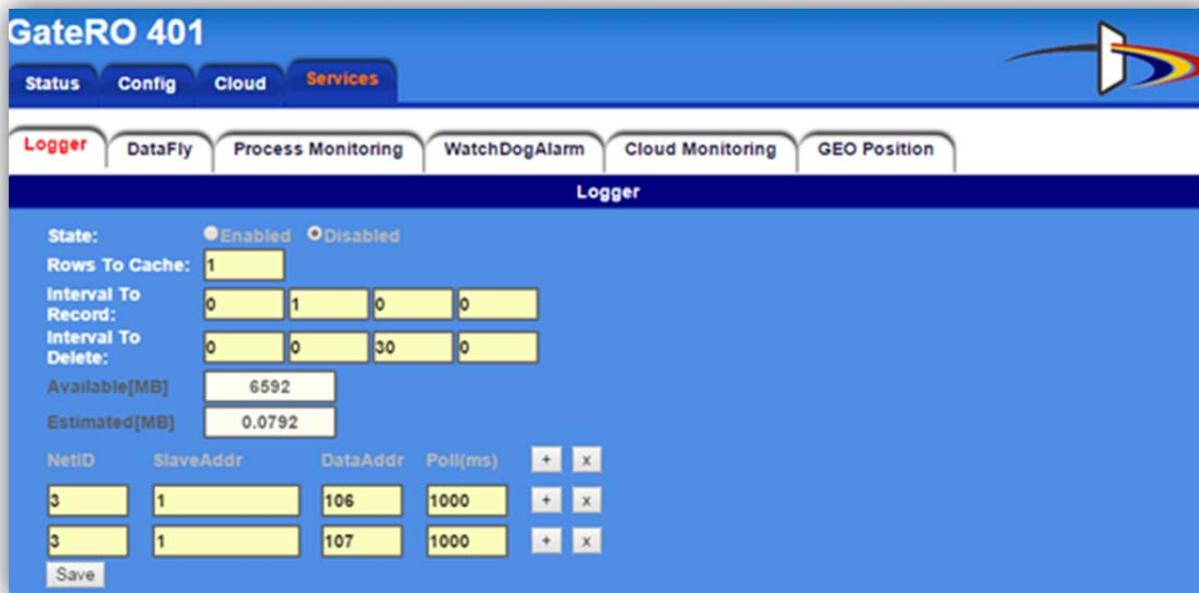


The *Cloud* menu is used to register the GateRO device to a cloud service.

4.1.4 Services

The *Services* menu is used to configure the *Gateway Application* services:

- *Logger* – used to save data locally (in a database); the data can then be accessed from a remote client (using database transactions); the next fields are used by this service:



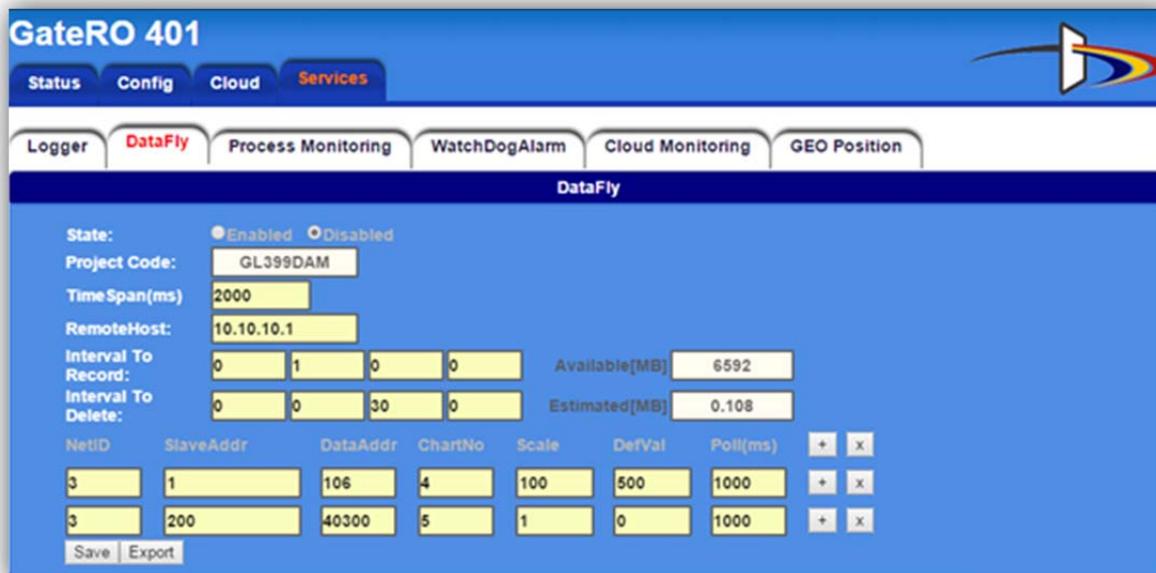
The screenshot shows the 'Logger' configuration page in the GateRO 401 interface. The page has a blue header with 'GateRO 401' and a logo. Below the header are tabs for 'Status', 'Config', 'Cloud', and 'Services'. Under 'Services', there are sub-tabs for 'Logger', 'DataFly', 'Process Monitoring', 'WatchDogAlarm', 'Cloud Monitoring', and 'GEO Position'. The 'Logger' sub-tab is active, showing the following configuration options:

- State:** Radio buttons for 'Enabled' (selected) and 'Disabled'.
- Rows To Cache:** Input field with value '1'.
- Interval To Record:** Input fields for day, hour, minute, and second, with values '0', '1', '0', and '0' respectively.
- Interval To Delete:** Input fields for day, hour, minute, and second, with values '0', '0', '30', and '0' respectively.
- Available[MB]:** Input field with value '6592'.
- Estimated[MB]:** Input field with value '0.0792'.
- Table:** A table with columns: NetID, SlaveAddr, DataAddr, Poll(ms), and buttons for '+' and 'x'.

NetID	SlaveAddr	DataAddr	Poll(ms)	+	x
3	1	106	1000	+	x
3	1	107	1000	+	x
- Save:** A button at the bottom left.

- *State* – the service state (Enabled/Disabled);
- *Rows To Cache* – the number of data to cache before writing to SD card;
- *Interval To Record* – for how long the data should be recorded (day:hours:minutes:seconds);
- *Interval To Delete* – how long to delete when the *Interval To Record* limit is reached;
- *Available* – the SD card available space to record data;
- *Estimated* – an estimate of the SD card space that will be used to record the configured data; it depends on the *Interval To Record*, the number of data configured and the *Poll* time for each data;
- The “+” and “x” buttons are used to add or delete rows;
- When a new row is added the next fields should be configured properly:
 - *NetID* – the GateRO interface number where the Modbus Slave Device is connected; the interface should be previously configured as Modbus Master Interface using the *RisanGUI* application;
 - *SlaveAddr* – the Modbus Slave Device Address (1 to 255 for Serial Devices or the IP Address for Ethernet Devices);
 - *DataAddr* – the Modbus Register Address to read;
 - *Poll* – the timespan between requests for the corresponding Modbus Register configured.
- The *Save* button is used to save the current configuration.

- *DataFly* – used to save data locally and then sync these data to a remote client (possibly located in a cloud). Then, the client uses the data to implement some services such as graphical interpretation using charts, statistic analysis, etc). The next fields are used by this service:



The screenshot shows the 'DataFly' configuration page in the GateRO 401 interface. The page has a blue header with 'GateRO 401' and a logo. Below the header are tabs for 'Status', 'Config', 'Cloud', and 'Services'. Under 'Services', there are sub-tabs for 'Logger', 'DataFly', 'Process Monitoring', 'WatchDogAlarm', 'Cloud Monitoring', and 'GEO Position'. The 'DataFly' sub-tab is active.

The configuration fields are as follows:

- State: Enabled Disabled
- Project Code: GL399DAM
- Time Span(ms): 2000
- RemoteHost: 10.10.10.1
- Interval To Record: 0 1 0 0
- Interval To Delete: 0 0 30 0
- Available[MB]: 6592
- Estimated[MB]: 0.108

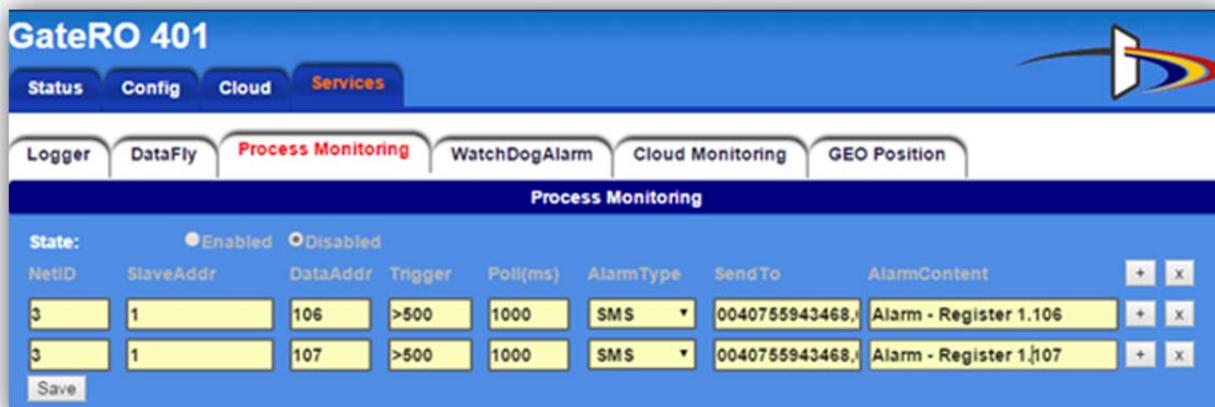
Below the fields is a table with columns: NetID, SlaveAddr, DataAddr, ChartNo, Scale, DefVal, Poll(ms), and buttons for adding (+) and deleting (x) rows.

NetID	SlaveAddr	DataAddr	ChartNo	Scale	DefVal	Poll(ms)		
3	1	106	4	100	500	1000	+	x
3	200	40300	5	1	0	1000	+	x

At the bottom of the table are 'Save' and 'Export' buttons.

- *State* – the service state (Enabled/Disabled);
- *TimeSpan* – the timespan between data syncing;
- *RemoteHost* – the remote client address;
- *Interval To Record* – for how long the data should be recorded (day:hours:minutes:seconds);
- *Interval To Delete* – how long to delete when the *Interval To Record* limit is reached;
- *Available* – the SD card available space to record data;
- *Estimated* – an estimate of the SD card space that will be used to record the configured data; it depends on the *TimeSpan*, the number of data configured and the shortest *Poll* time;
- The “+” and “x” buttons are used to add or delete rows;
- When a new row is added the next fields should be configured properly:
 - *NetID* – the GateRO interface number where the Modbus Slave Device is connected; the interface should be previously configured as Modbus Master Interface using the *RisanGUI* application;
 - *SlaveAddr* – the Modbus Slave Device Address (1 to 255 for Serial Devices or the IP Address for Ethernet Devices);
 - *DataAddr* – the Modbus Register Address to read;
 - *ChartNo* – the chart number where the data will be stored to the client side;
 - *Scale* – a value used to multiply the data that was read;
 - *DefVal* – a default value that is written to memory in case of an error (e.g. link down);
 - *Poll(ms)* – the timespan between requests for the corresponding Modbus Register configured.
- The *Save* button is used to save the current configuration.

- The *Export* button is used to export the current configuration in *.csv (Comma Separated Values)* format.
- *Process Monitoring* – used to trigger an alarm when a condition is met; the next fields are used by this service:



GateRO 401

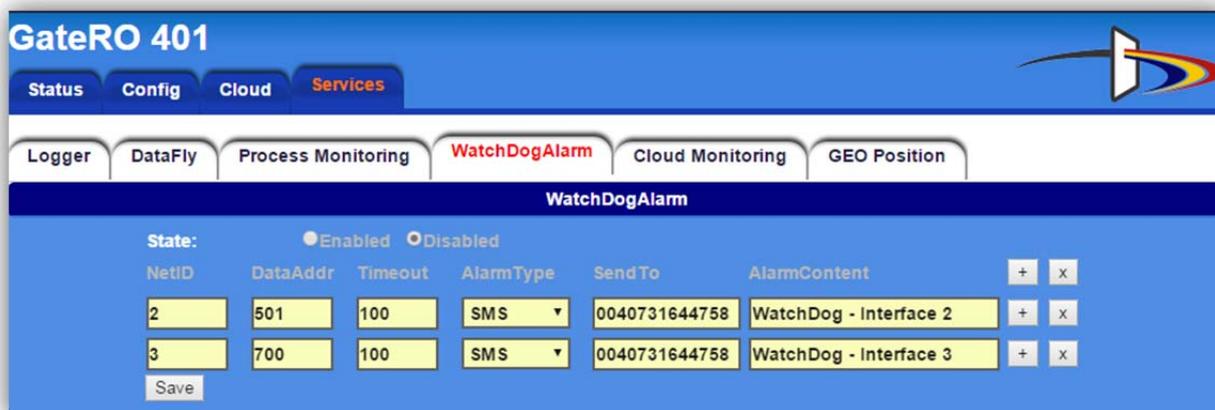
State: Enabled Disabled

NetID	SlaveAddr	DataAddr	Trigger	Poll(ms)	AlarmType	Send To	AlarmContent	+	x
3	1	106	>500	1000	SMS	0040755943468,	Alarm - Register 1,106	+	x
3	1	107	>500	1000	SMS	0040755943468,	Alarm - Register 1,107	+	x

Save

- *State* – the service state (Enabled/Disabled);
- The “+” and “x” buttons are used to add or delete rows;
- When a new row is added the next fields should be configured properly:
 - *NetID* – the GateRO interface number where the Modbus Slave Device is connected;
 - *SlaveAddr* – the Modbus Slave Device Address (1 to 255 for Serial Devices or the IP Address for Ethernet Devices);
 - *DataAddr* – the Modbus Register Address to read;
 - *Trigger* – the condition to meet before sending the alarm;
 - *Poll(ms)* – the timespan between requests for the corresponding Modbus Register configured;
 - *AlarmType* – the alarm type *SMS* or *EMAIL*;
 - *SendTo* – the destination (phone number or email address);
 - *AlarmContent* – the alarm content.
- The *Save* button is used to save the current configuration.
- *WatchDog Alarm* – used to trigger an alarm if a communication error is recorded; previously an external Modbus Master device should be connected to the GateRO Interface and programmed to updated (write) the configured Modbus Register (*DataAddr*); if the Modbus Register is not updated within the configured *Timeout* a connection error is detected and the alarm will be triggered; the next fields are used by this service:
 - *State* – the service state (Enabled/Disabled);
 - The “+” and “x” buttons are used to add or delete rows;
 - When a new row is added the next fields should be configured properly:
 - *NetID* – the GateRO interface number where the Modbus Master Device is connected; the configured interface should be previously configured as Modbus Slave Interface using the *RisanGUI* application;
 - *DataAddr* – the Modbus Register Address to be updated;
 - *Timeout* – the time used to trigger the alarm;

- *AlarmType* – the alarm type *SMS* or *EMAIL*;
- *SendTo* – the destination (phone number or email address);
- *AlarmContent* – the alarm content.
- The *Save* button is used to save the current configuration.



GateRO 401

Status Config Cloud **Services**

Logger DataFly Process Monitoring **WatchDogAlarm** Cloud Monitoring GEO Position

WatchDogAlarm

State: Enabled Disabled

NetID	DataAddr	Timeout	AlarmType	SendTo	AlarmContent	+	x
2	501	100	SMS	0040731644758	WatchDog - Interface 2	+	x
3	700	100	SMS	0040731644758	WatchDog - Interface 3	+	x

Save

- *Cloud Monitoring* – used to trigger an alarm when a cloud connection is down; the next fields are used by this service:



GateRO 401

Status Config Cloud **Services**

Logger DataFly Process Monitoring WatchDogAlarm **Cloud Monitoring** GEO Position

Cloud Monitoring

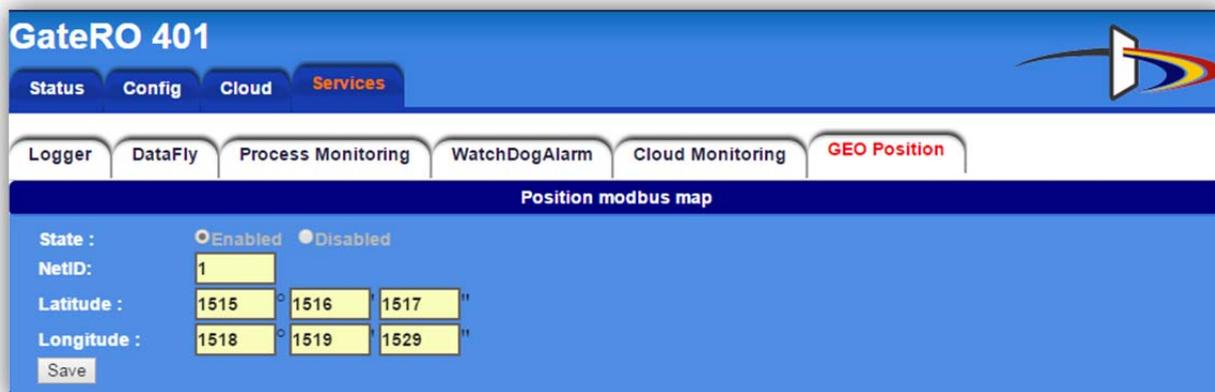
State: Enabled Disabled

IPaddress	AlarmType	SendTo	AlarmContent	Lifecheck Interval(sec)	Lifecheck failures	Max Count	+	x
10.10.0.100	SMS	0040731644758	Cloud Monitoring Alarm	100	3	3	+	x

Save

- *State* – the service state (Enabled/Disabled);
- The “+” and “x” buttons are used to add or delete rows;
- When a new row is added the next fields should be configured properly:
 - *IPaddress* – the Cloud IP address;
 - *AlarmType* – the alarm type *SMS* or *EMAIL*;
 - *SendTo* – the destination (phone number or email address);
 - *AlarmContent* – the alarm content;
 - *Lifecheck Interval* – the time interval used for the life check;
 - *Lifecheck failures* – the life check fail try count;
 - *MaxCount* – ?.
- The *Save* button is used to save the current configuration.

- *GEO Position* – used to map the GEO position (latitude/longitude) as Modbus data in order to obtain the position using Modbus protocol; the next fields are used by this service:



- *State* – the service state (Enabled/Disabled);
- *NetID* – the GateRO interface number where the Modbus Master Device is connected; the interface should be previously configured as Modbus Slave Interface using the *RisanGUI* application;
- *Latitude/Longitude* – the Modbus Register Address where the latitude and longitude data will be mapped;
- The *Save* button is used to save the current configuration.

4.2 The GateON application

The GateRO devices that will be configured should be connected to a computer using the Ethernet interfaces. The application will run on that computer and will be used to setup the communication parameters. Also the *GateON* application is used to identify the devices.

The UDP protocol is used to perform the communication between *GateON* and GateRO devices:

- The *Discover* action is always executed using broadcast messages.
- The remaining operations are executed by unicast or broadcast messages according to the *Broadcast* button:



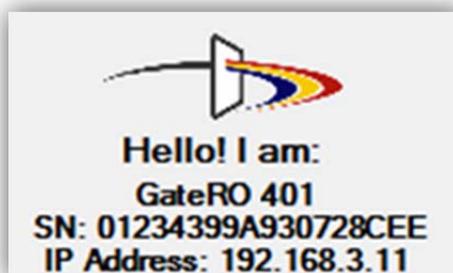
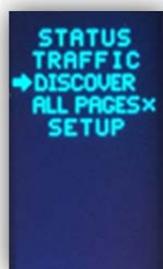
- The broadcast messages used to discover devices are stopped by NAT systems (e.g. wireless router). In this case the GateRO devices can be configured as described in chapter 4.2.1-Method2 and performing the remaining operations by unicast messages.

4.2.1 Discover new devices

- Method1: The *Discover* button will be selected.



- Method2: Using the GateRO device buttons the *Discover* option will be selected from the menu displayed on the LCD. The appropriate device will be reported by the *GateON* application in a new window.

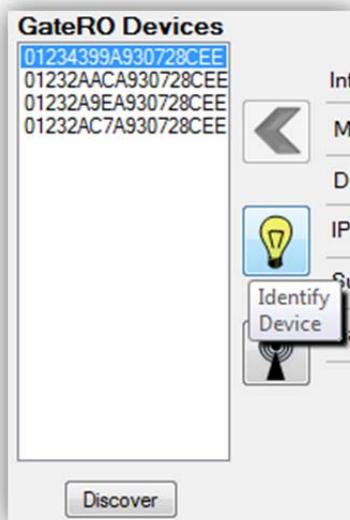


- The discovered devices will be added to the *GateRO Devices* list.



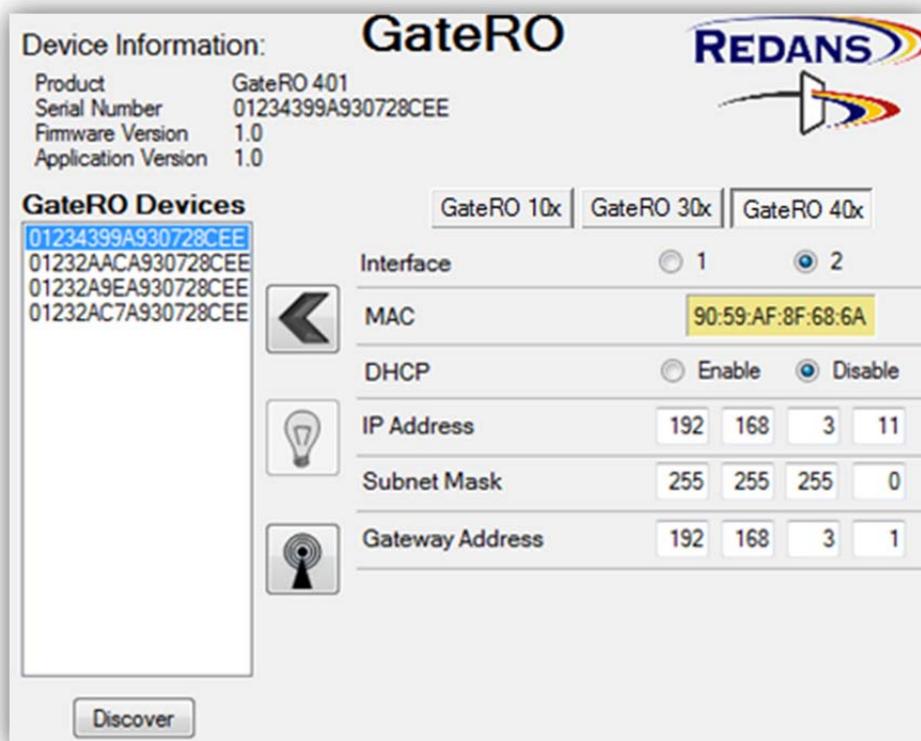
4.2.2 Identify devices on the network

- To identify a certain GateRO device (to blink the LED) the appropriate device will be chosen from the *GateRO Devices* list and the *Identify Device* button will be selected.



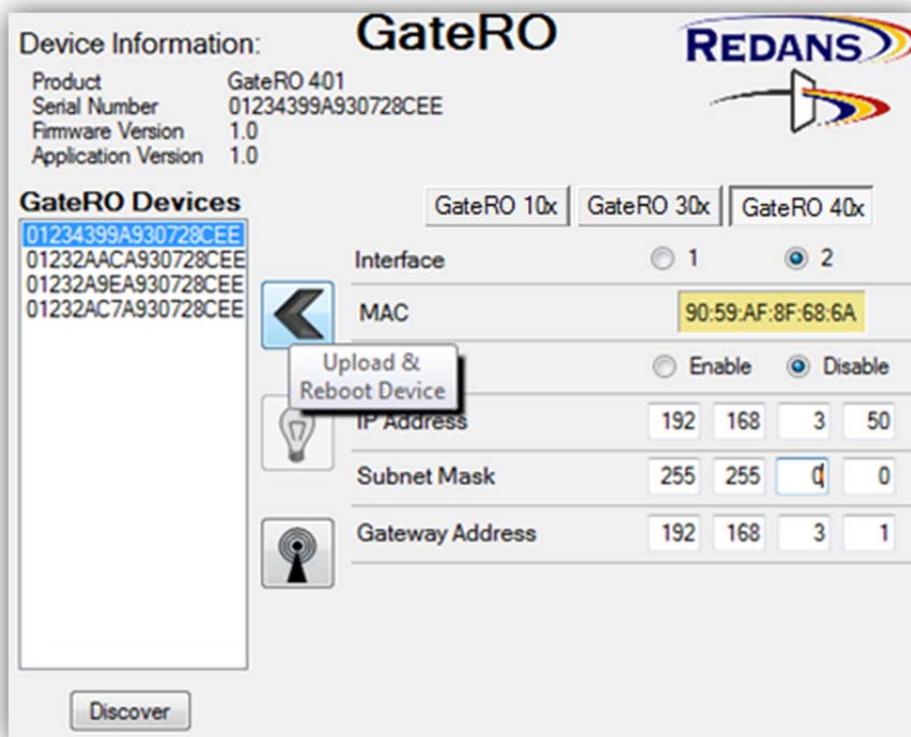
4.2.3 Downloading the GateRO parameters to the GateON application

- The GateRO features will be downloaded by double click the appropriate device from the *GateRO Devices* list. These features contain informations about the GateRO device and the communication parameters.

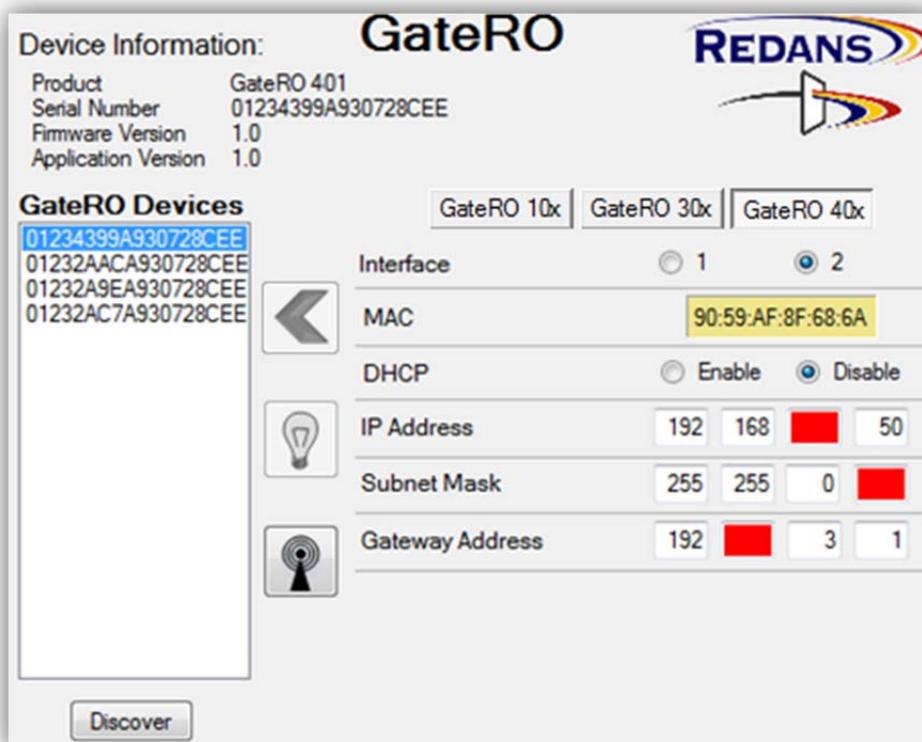


4.2.4 Setup the parameters

- To change the GateRO communication parameters the appropriate fields will be changed and then the *Upload* button will be selected.



- The fields that are incomplete will be highlighted.



4.3 The Risan_GUI application

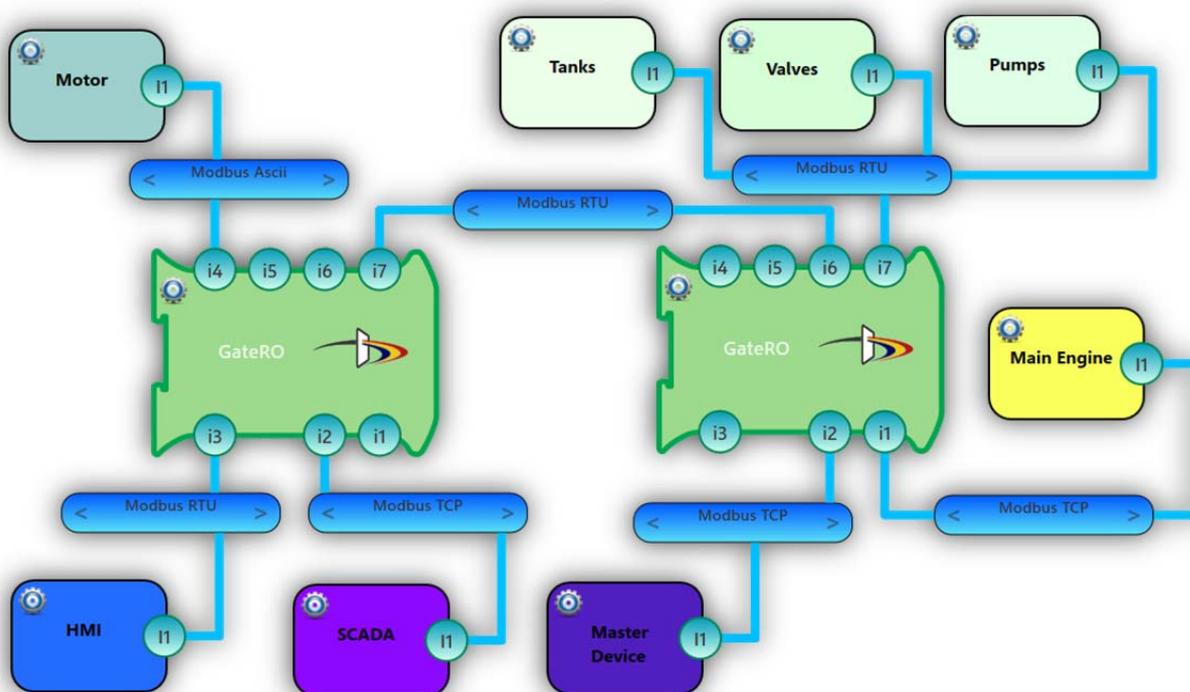
The GateRO devices that will be configured should be connected to a computer using the Ethernet interfaces. The application will run on that computer and will be used to configure the network and to setup the communication parameters and protocols features.

4.3.1 Creating a new project

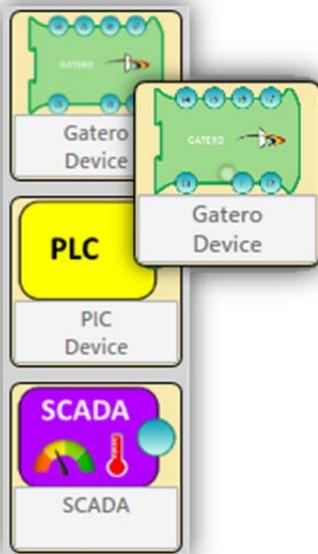
- A new project will be created by opening the *Risan_GUI* application and selecting the *Save* button. The project name and project path should be filled.
- To edit an existent project please select the *Load* button and choose the appropriate project.



4.3.2 Configuring the network



- By drag and drop the desired items from the left side list will be added to the project. In this way the physical network can be represented.



- New items can be added to the left side list by selecting the “+” button. The next form should be filled using these specifications:
 - The device name;
 - The communications standards that can be used by the device;
 - The communications protocols that can be used by the device;
 - A process value list;
 - An image.



Create PLC configuration

Name:

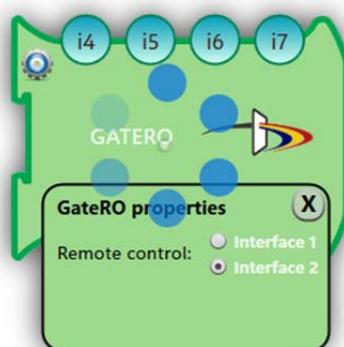
Interfaces	Protocols
RS232	Modbus RTU
RS485	Modbus Ascii
RS422	Freeport
ETHERNET	

Values loaded = 6

- The network can be representing using these type of items:
 - GateRO devices;
 - User custom devices;
 - Buses.
- The connections between devices interfaces will always be made through a bus.
- The connection between an interface and a bus will be made by drawing a line from the interface to the bus.
- A connection can be removed by clicking it.

4.3.3 Setup the parameters

- *The remote control interface:*
 - The Ethernet interface through which the parameters will be loaded to the GateRO device can be selected by click and hold the GateRO device and choose the appropriate interface.



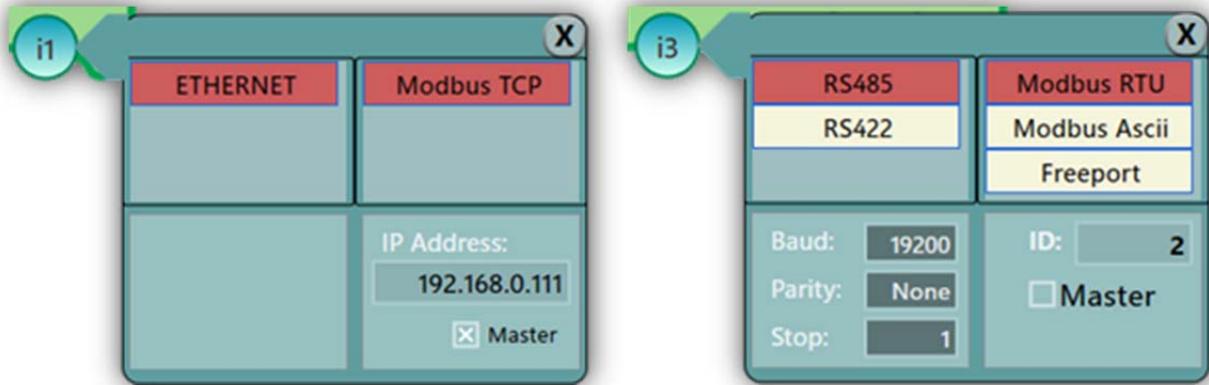
- *The communication parameters:*
 - An interface communication parameters can be modified by click and hold the appropriate interface and setup the wanted parameters.



- A bus communication parameters can be modified by click and hold the appropriate bus and setup the wanted parameters.

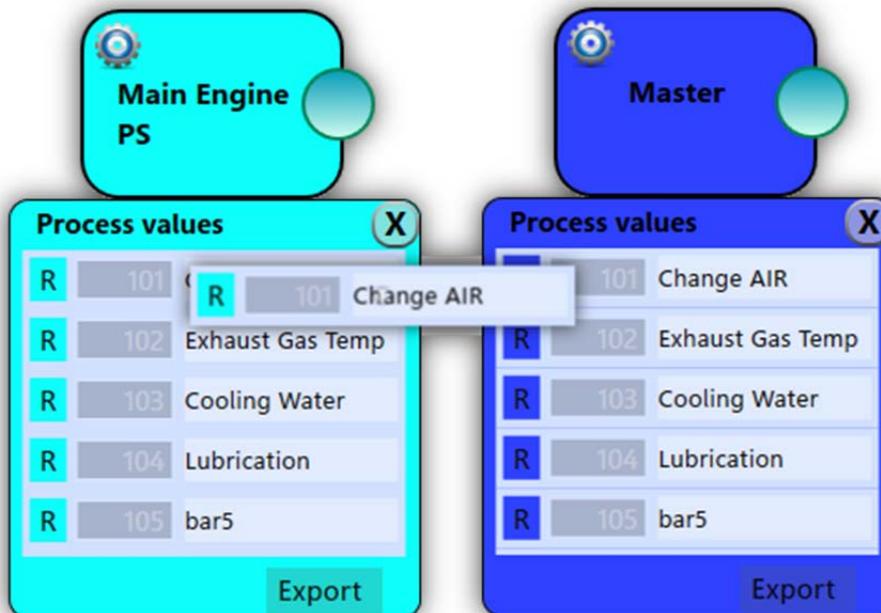


- The parameters that can be modified are:
 - The high level protocol: Modbus TCP/IP, Modbus RTU, Modbus ASCII, Freepoint;
 - The type of the device: Master, Slave;
 - Addresses: IP, Modbus ID;
 - The communications standards: Ethernet, RS232, RS422, RS485;
 - The physical link parameters: baudrate speed, parity control, stop bits.

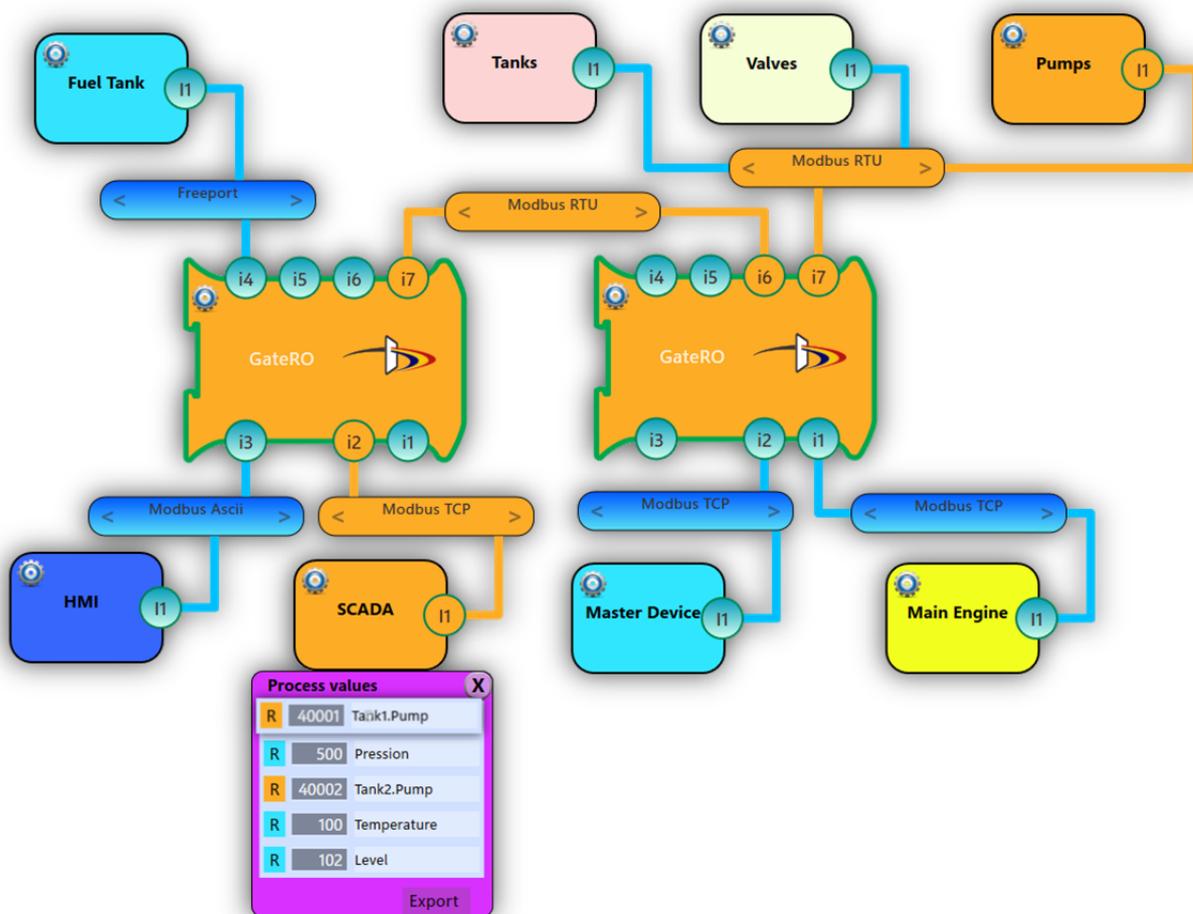


Obs! In order to provide a right setup all the interfaces that are connected to a bus and the appropriate bus must be configured the same.

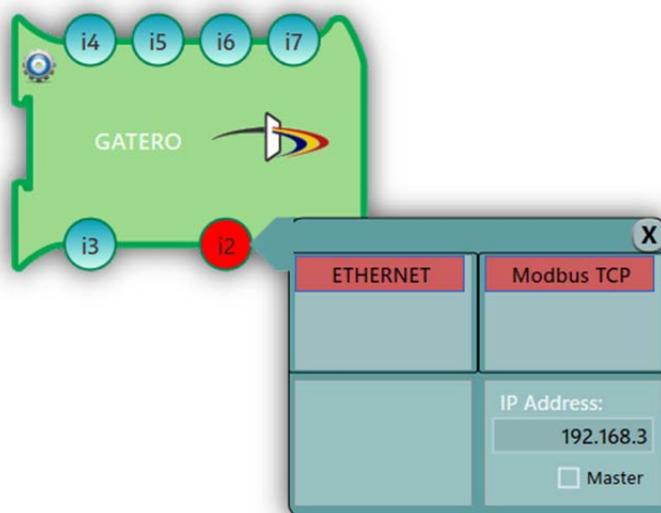
- *Data/Registers shifting between devices:*
 - In order to transfer some data between devices the *Process values* lists should be opened by click and hold the appropriate devices. By drag and drop data will be shifted from one side to another.



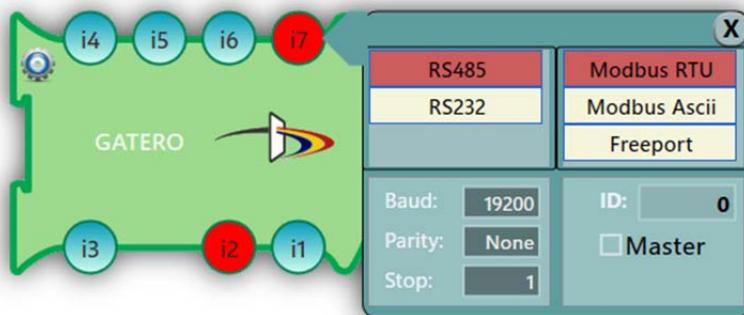
- By clicking the shifted register the physical link between source and destination devices will be highlighted using the source device color.



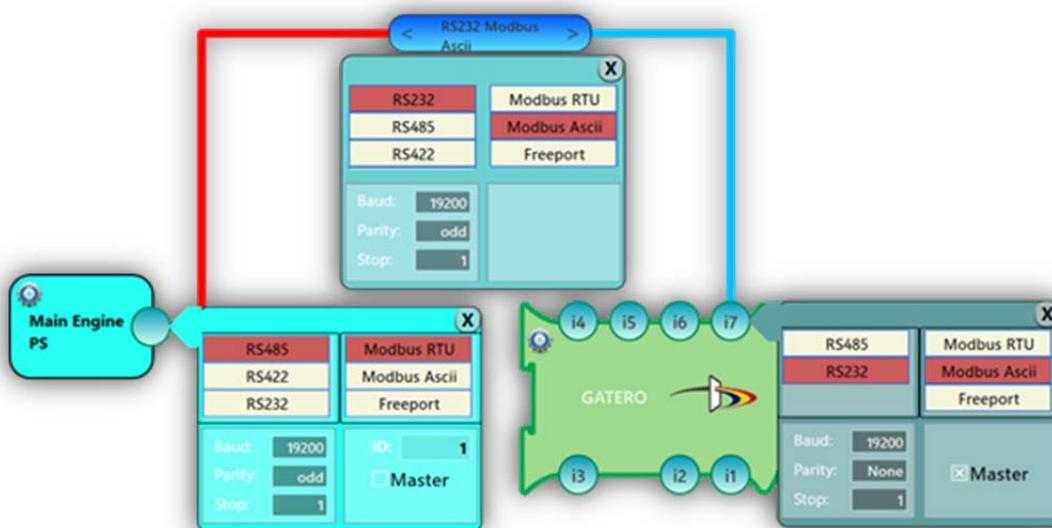
- A wrong configuration will be highlighted by:
 - Interface name displayed on red background. Causes:
 - Wrong IP address



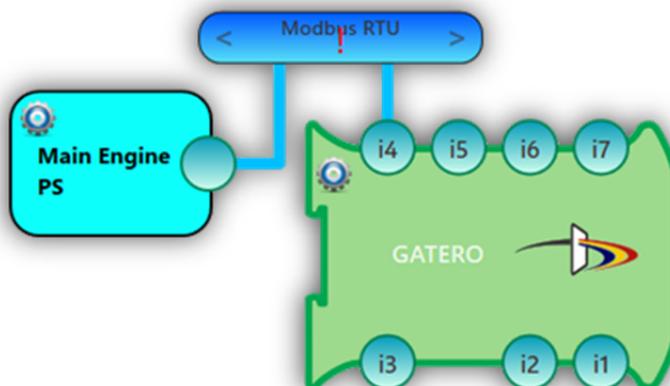
- Wrong Modbus address.



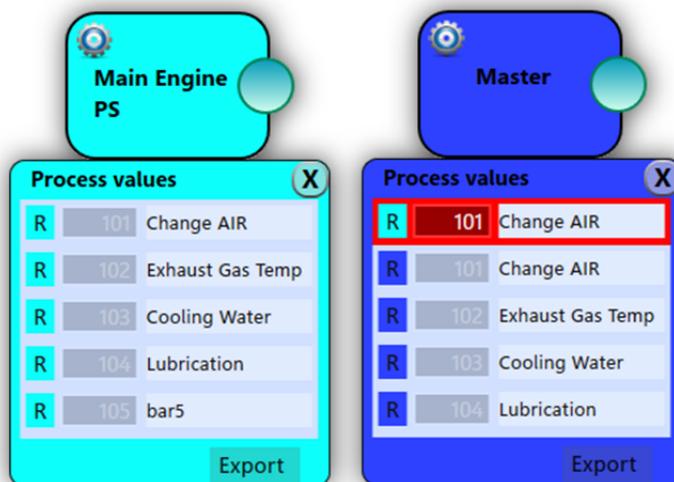
- Red connection. Cause:
 - The communication parameteres are not the same.



- Bus displayed with an exclamation mark. Causes:
 - The Master/Slave type of devices are improper configured;
 - The Modbus addresses are improper configured;
 - The IP addresses are improper configured.



- Register displayed on red background. Cause:
 - No connection between source and destination devices.



4.3.4 Loading the parameters

- The parameters will be loaded to the GateRO devices by selecting the *Update* button.



4.3.5 Other facilities

- Every device on the network has a submenu through which the user can:
 - Change the device name;
 - Change the device color;
 - Remove the device from the network.



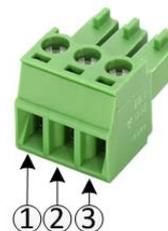
- Every item can be removed from the network by drag and drop to the trash.

5 TECHNICAL

5.1 Connectors

5.1.1 Power

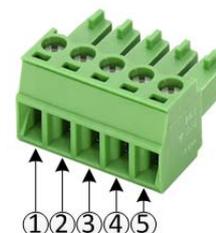
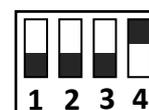
Pin	Signal
1	+24V DC
2	GND
3	



5.1.2 RS-232/422/485

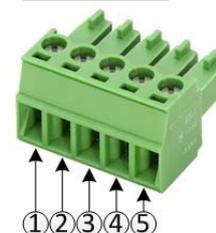
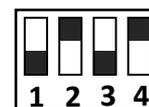
- RS-232

Pin	Signal
1	RxD
2	NC
3	NC
4	TxD
5	GND



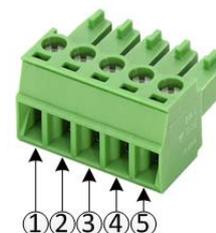
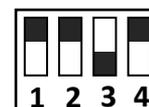
- RS-422

Pin	Signal
1	RxD+
2	RxD-
3	TxD+
4	TxD-
5	GND

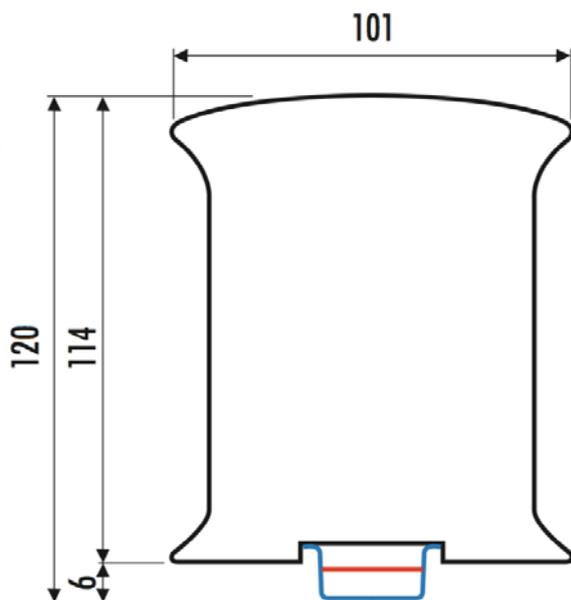


- RS-485

Pin	Signal
1	NC
2	NC
3	RxD/TxD +
4	RxD/TxD -
5	GND



5.2 Dimensions



114mm x 101mm x 35mm
4.488" x 3.976" x 1.377"

5.3 Technical Specification

Power Supply

24VDC \pm 10%, 1A

Power Consumption:

Max: 8W

Typ: 5W

Operating Temperature

-10 to +75 degree Celsius

Non-operating Temperature

-25 to +85 degree Celsius

Contact:

info@redans.eu

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