iSMA-B-MG-IP

User Manual

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1 Introduction

The iSMA-B-MG-IP device (meter gateway) has been created to convert data from Modbus RTU/ASCII and M-Bus protocols to corresponding TCP/IP protocols (Modbus TCP/IP and M-Bus TCP/IP) and M-Bus UDP/IP protocols. The iSMA-B-MG-IP meter gateway allows to use one type of these conversions or both at the same time, using the same Ethernet connection.

The iSMA-B-MG-IP allows to service up to 128 Modbus RTU/ASCII devices with unique addresses connected to a COM1 port and up to 60 M-Bus meters (with unique addresses) connected to an M-Bus interface. At the same time the iSMA-B-MG-IP can manage up to 2 M-Bus UDP/IP clients, 4 M-Bus TCP/IP clients, 4 Modbus TCP/IP clients, which means it can effectively manage 10 clients.

The figure below shows an example of a system with iSMA-B-MG-IP.
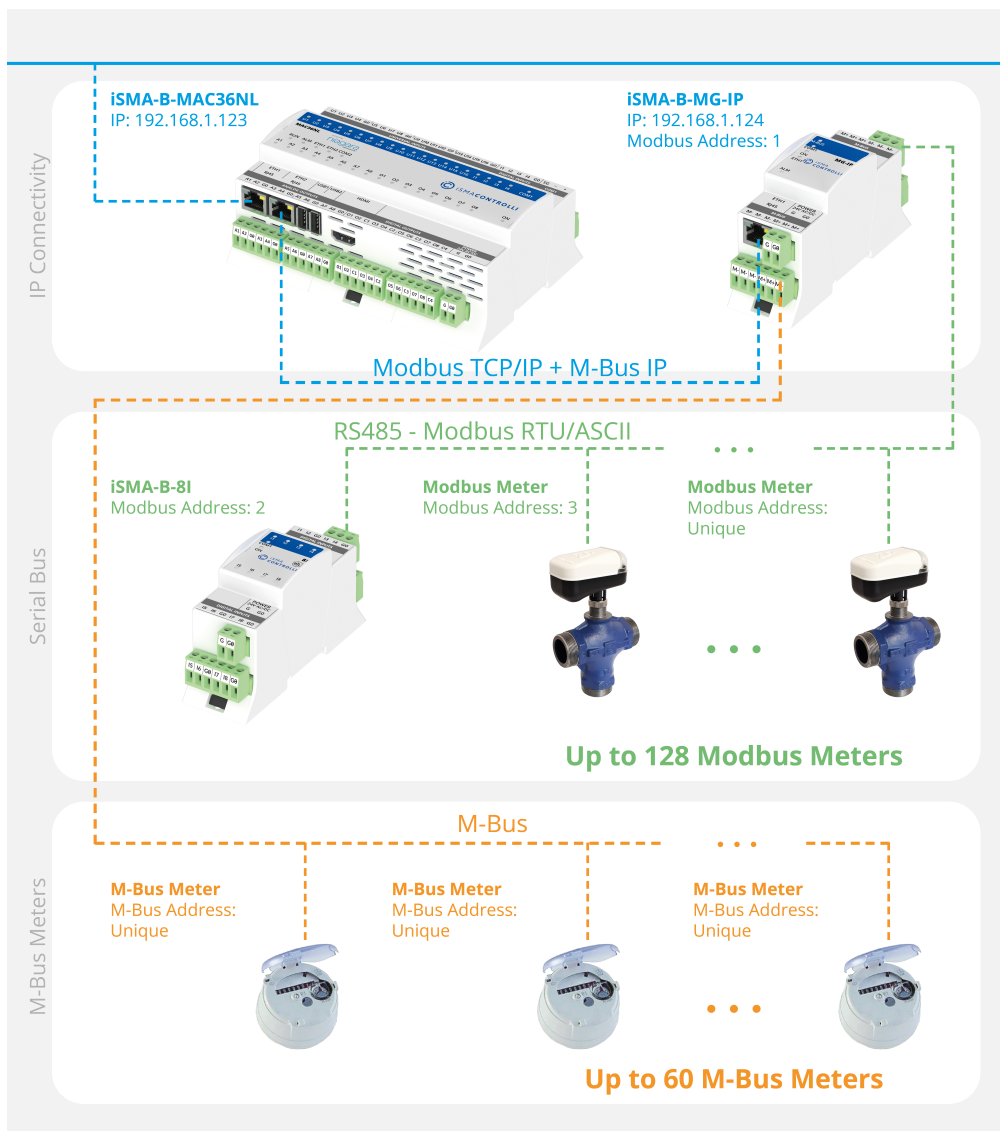
Figure 1. An example of Modbus TCP/IP to RS485 gateway and M-Bus TCP/IP to M-Bus gateway

1.1 Revision History

Rev.	Date	Description
1.7	10 Nov 2023	• Added DHCP functionality • Added Modbus TCP free sockets counter • Refreshed web server
1.6	25 May 2022	Rebranded
1.5	8 Jun 2020	• Company data update • M-Bus UDP IP protocol update • Modbus function 0x17 read/write multiple registers • Modbus function 0x2B to read the VENDOR_NAME, MODEL_NAME, FW_VERSION, HOMEPAGE • Supporting Modbus address 0xFF for communication with gateway (IP module)
1.4	11 Feb 2019	• Added MBUS BAUD RATE (32-bits) registers • Added MBUS CONNECTION TIMEOUT (32-bits) registers
1.3	15 Nov 2018	Added M-Bus extended star and tree topology
1.2	26 Oct 2018	• Corrections of typing errors in the text • Added imperial unit of measure
1.1	14 Dec 2017	• Added new Modbus registers: HW version, MAC address; • Added RS485_BIASING bit in STOP_BITS registers; • Added possibility to deactivate RS485_BIASING in hardware version 2.5 and newer • Added new elements on built-in web page: HW version, RS485 biasing;
1.0	24 Jan 2017	First edition

Table 1. Revision history

2 Safety Rules

- Improper wiring of the product can damage it and lead to other hazards. Make sure that the product has been correctly wired before turning the power on.
- Before wiring or removing/mounting the product, make sure to turn the power off. Failure to do so might cause an electric shock.
- Do not touch electrically charged parts such as power terminals. Doing so might cause an electric shock.
- Do not disassemble the product. Doing so might cause an electric shock or faulty operation.
- Use the product only within the operating ranges recommended in the specification (temperature, humidity, voltage, shock, mounting direction, atmosphere, etc.). Failure to do so might cause a fire or faulty operation.
- Firmly tighten the wires to the terminal. Failure to do so might cause a fire.
- Avoid installing the product in close proximity to high-power electrical devices and cables, inductive loads, and switching devices. Proximity of such objects may cause an uncontrolled interference, resulting in an instable operation of the product.
- Proper arrangement of the power and signal cabling affects the operation of the entire control system. Avoid laying the power and signal wiring in parallel cable trays. It can cause interferences in monitored and control signals.
- It is recommended to power controllers/modules with AC/DC power suppliers. They provide better and more stable insulation for devices compared to AC/AC transformer systems, which transmit disturbances and transient phenomena like surges and bursts to devices. They also isolate products from inductive phenomena from other transformers and loads.
- Power supply systems for the product should be protected by external devices limiting overvoltage and effects of lightning discharges.
- Avoid powering the product and its controlled/monitored devices, especially high power and inductive loads, from a single power source. Powering devices from a single power source causes a risk of introducing disturbances from the loads to the control devices.
- If an AC/AC transformer is used to supply control devices, it is strongly recommended to use a maximum 100 VA Class 2 transformer to avoid unwanted inductive effects, which are dangerous for devices.
- Long monitoring and control lines may cause loops in connection with the shared power supply, causing disturbances in the operation of devices, including external communication. It is recommended to use galvanic separators.
- To protect signal and communication lines against external electromagnetic interferences, use properly grounded shielded cables and ferrite beads.
- Switching the digital output relays of large (exceeding specification) inductive loads can cause interference pulses to the electronics installed inside the product. Therefore, it is recommended to use external relays/contactors, etc. to switch such loads. The use of controllers with triac outputs also limits similar overvoltage phenomena.
- Many cases of disturbances and overvoltage in control systems are generated by switched, inductive loads supplied by alternating mains voltage (AC 120/230 V). If they do not have appropriate built-in noise reduction circuits, it is recommended to use external circuits such as snubbers, varistors, or protection diodes to limit these effects.

3 Technical Specification

Power Supply	Voltage	24 V AC/DC ± 20%		
	Power consumption	At 24 V DC	At 24 V AC	
		5 W	7.5 VA	
RS485 Interface	RS485	Up to 128 devices		
	Communication protocols	Modbus RTU, Modbus ASCII set by switch		
	Baud rate	From 2400 to 115200 set by switch		
	Address	0 to 99 set by switch		
M-Bus Interface	M-Bus	Up to 60 devices		
	Baud rate	From 300 to 38400		
Ethernet	1 Fast Ethernet	IP Interface		
	Baud rate	10/100 Mb/s		
USB	USB	Mini USB 2.0		
Ingress protection	IP	IP40		
Temperature	Storage	-40°C to 85°C (-40°F to 185°F)		
	Operating	-10°C to 50°C (14°F to 122°F)		
Humidity	Relative	5% to 95%		
Connectors	Type	Removable		
	Maximum cable size	2.5 mm^2 (18-12 AWG)		
Dimensions	Width	110 mm (4.331 in)		
	Length	37 mm (1.457 in)		
	Height	62 mm (2.441 in)		

Table 2. Technical specification

4 Hardware Specification

4.1 Dimensions
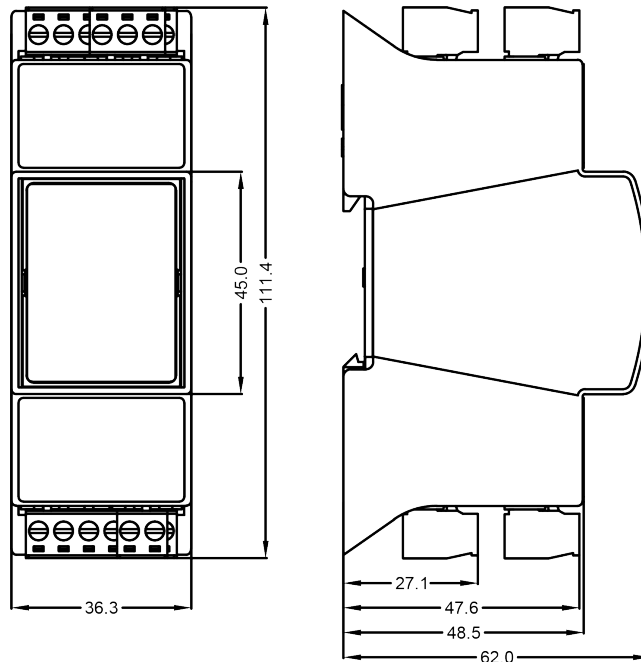
Figure 2. The iSMA-B-MG-IP dimensions
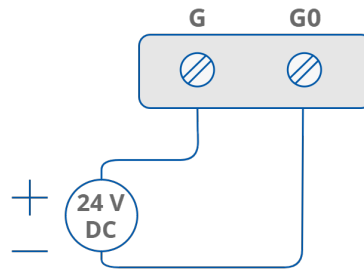
4.2 Power Supply

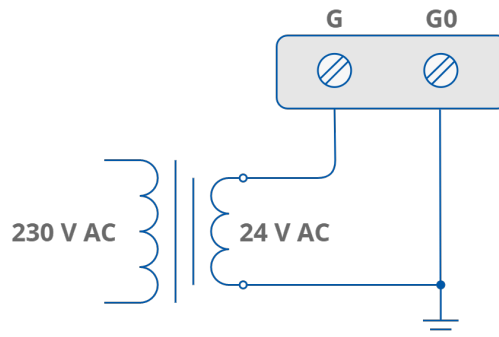
Figure 3. DC voltage connection

Figure 4. AC voltage connection

4.3 Grounding and Shielding

In most cases controllers are installed in enclosures along with other devices, which generate electromagnetic radiation (for example, relays, contactors, transformers, motor invertors, etc.). Such electromagnetic radiation can induce electrical noise into both

power and signal lines, as well as direct radiation into the controller, causing negative effects on the system. For this reason, an appropriate grounding, shielding, and other protective steps should be taken at the installation stage to prevent negative electromagnetic radiation effects, for example:

- control cabinet grounding;
- cable shield grounding;
- using protective elements for electromagnetic switching devices;
- proper wiring;
- consideration of cable types and their cross sections;
- and other.

4.4 Firmware Version and Device Type (30001)

The type and firmware version of device are encoded in the 30001 Modbus register.

Low byte contains information about the type of device. In case of iSMA-B-MG-IP it is 59_{10} ($0x3B_{16}$).

High byte contains the device firmware version multiplied by 10.

For example:

In the 30001 register the number is $15114_{10} = 0x3B0A_{16}$. It means that it is a iSMA-B-MG-IP device (0x3B) with firmware in version 1.0 ($0x0A_{16} = 10_{10}$).

4.5 Uptime (30012)

This 32-bits register contains information about uptime (in seconds). The value is reset after a power cycle.

4.6 Device Actions (40001)

Setting the 40001 register according to the table below enables 1 of 3 available actions: reset device, reload settings, and set to default.

Value [dec]	Value [hex]	Action
511	0x01FF	Reset
767	0x02FF	Reload settings
1023	0x03FF	Set to default

Table 3. Device actions

4.7 Front Panel

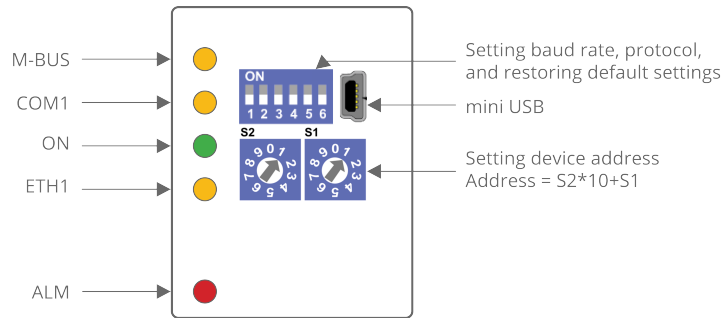### 4.7.1 LED Indicators

Figure 5. The iSMA-B-MG-IP LED indicators

· The power LED (ON) is on (green) if the device is running properly.
· The communication M-BUS LED is on (orange) for 20 ms after sending each message by the M-Bus bus. If the device receives/sends a lot of messages, the LED can be lit continuously.
· The communication COM1 LED is on (orange) for 20 ms after sending each message by the RS485 port. If the device receives/sends a lot of messages, the LED can be lit continuously.
· The communication ETH1 LED is on (orange) for 20 ms after sending each message by the Ethernet. If the device receives/sends a lot of messages, the LED can be lit continuously
· The ALM LED is ON (red) if an overload is detected on the M-Bus bus (current on the M-Bus bus exceeds 130 mA).

4.8 Default Settings

Out-of-the-box device, as well as after restoring default values procedure, has the following default registers values:

Register Name	Default Value
USER BAUD RATE	7680 (76800 bps)
STOP BITS	1
DATA BITS	8
PARITY BITS	0
RESPONSE DELAY	0
USERNAME	admin
PASSWORD	1000
IP ADDRESS	192.168.1.123
MASK	255.255.255.0

Register Name	Default Value
GATEWAY	192.168.1.1
DHCP	Disabled
HTTP PORT	80
MODBUS TCP PORT	502
MODBUS TCP TIMEOUT	60 s
RS485 TIMEOUT	500 ms
SEND MODBUS ERRORS	DISABLE
MBUS BAUD RATE	2400
MBUS TCP PORT	6021
MBUS UDP PORT	10002
MBUS RESPONSE TIMEOUT	2000 ms
RS485 BIASING RESISTORS	Disabled

Table 4. Default values

4.8.1 Restoring Default Settings

To restore the default configuration of all registers, follow the steps below:

- Turn off the power supply.
- Set section 6 of the S3 switch to on.
- Turn on the power supply, power LED is blinking.
- Switch section 6 of the S3 switch to off to restore the default settings. To cancel the reset, turn off the power, and switch section 6 of S3 switch to the off position.
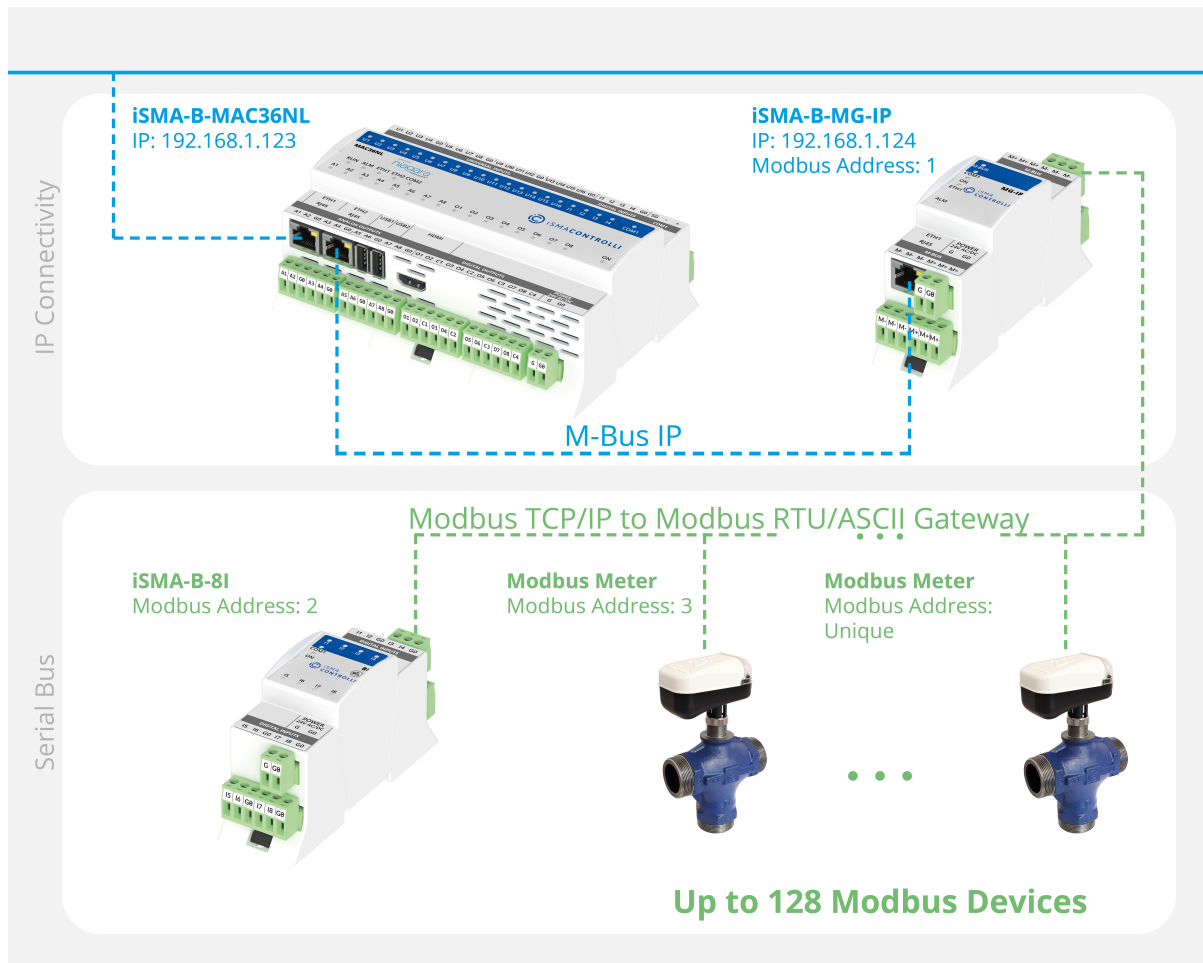
5 Modbus Gateway

Figure 6. iSMA-B-MG-IP as a Modbus gateway

The device simultaneously supports up to **4 Modbus TCP clients**. If the fifth device is to be connected to the device, a TCP connection will be rejected. In order to secure the device before filling up the call list, a mechanism for monitoring each Modbus TCP connection was introduced. There is a parameter called **Modbus TCP Connection Timeout** (by default, 60 s); if there is no request from the Modbus TCP client during this time, the device will close the connection.

To read internal registers of the device, it needs to generate the correct Modbus TCP frame with address according to the setting of a DIP switch. If the address is different, the frame will be sent to the COM1 port.

If the device receives an incorrect Modbus TCP frame, it sends back a frame with an error code:

0x01 - if the function code in the query is not supported;

0x02 - if the address of the register is invalid;

0x03 - if the amount of data disagrees in the query.

If the query is correct, the device instantly generates answer with data or acknowledgment of receipt of data, depending on the query.

The iSMA-B-MG-IP has a built-in Modbus TCP/IP to Modbus RTU/ASCII gateway, which allows to connect Modbus meters or other Modbus devices using the RS485. In order to

ensure proper operation of the Modbus gateway, please make sure that all parameters of RS485 (baud rate, stop bits, etc.) for all the devices connected to RS485 (gateway and Modbus meters/Modbus devices) are the same.

Operation of the gateway is based on checking the Modbus address in the Modbus TCP query. If the address is different from the set on the DIP switch, data frame from the query is converted to Modbus RTU/ASCII, and sent to the COM1 port. Then, the meter gateway waits for an answer from the device connected to the COM1. If the slave device does not respond within the estimated time defined by the RS485 Timeout (by default, 500 ms), an exception response will be given: error code 0x0B. If the slave device answers the correct frame, it is converted to Modbus TCP, and sent to the master device.

The meter gateway sends an error code 0x0B in case the valid frame is not received. Upon receipt of this error code, some systems do not repeat the query according to the settings. No retry may cause the point to immediately go to down mode. That is why the meter gateway has the ability to block the sending information about errors (Send Modbus Errors setting in the web page or iSMA Configurator). Then, in absence of any response, the system retries the request according to the settings.

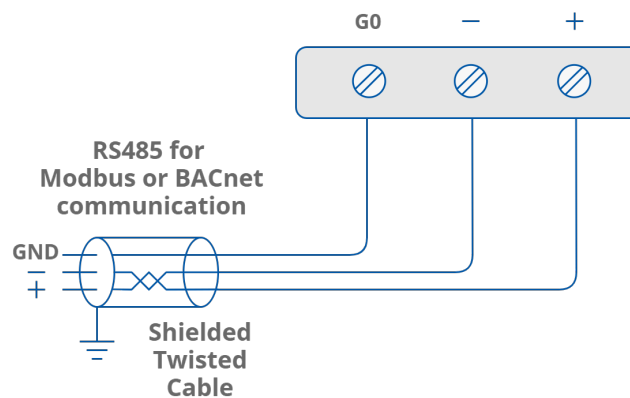## 5.1 Communication

5.1.1 RS485 Connection

Figure 7. RS485 connection

RS485 Network Termination

Transmission line effects often present problems for data communication networks. These problems include reflections and signal attenuation.

To eliminate the presence of reflections of signal from the end of the cable, the cable must be terminated at both ends with a resistor across the line adequate to its characteristic impedance. Both ends must be terminated since the propagation is bidirectional. In case of an RS485 twisted pair cable this termination is typically 120 Ω.

5.2 Modbus Settings

5.2.1 Setting Modbus Address

To determine the address on the Modbus network, the device has two rotary switches, S1 and S2, located on the top panel of the device.

It is possible to set the device address from 0 to 99.

The formula for setting the address is as follows:

Address = S2 • 10 + S1,

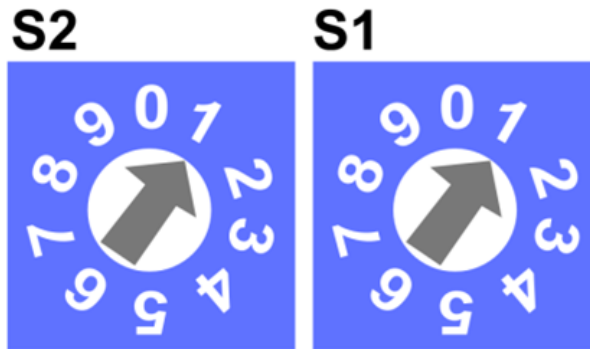where S1 and S2 are values of switches.

For example:

Figure 8. Setting Modbus address with rotary switches

Switches set as in figure above will set the device address to 11.

5.2.2 Setting Baud Rate

Transmission baud rate is determined by the S3 DIP switch (sections 1, 2 and 3) in accordance with the following table:

1	2	3	Baud Rate
Off (0)	Off (0)	Off (0)	Defined by the user in the register
Off (0)	Off (0)	On (1)	76800
Off (0)	On (1)	Off (0)	4800
Off (0)	On (1)	On (1)	9600
On (1)	Off (0)	Off (0)	19200
On (1)	Off (0)	On (1)	38400
On (1)	On (1)	Off (0)	57600
On (1)	On (1)	On (1)	115200 (factory set)

Table 5. Setting baud rate

5.2.3 Setting Protocol

Protocol selection is made by sections 4 and 5 of the S3 DIP switch according to the table:

4	5	Protocol
Off (0)	Off (0)	Modbus RTU

4	5	Protocol
Off (0)	On (1)	Modbus ASCII
On (1)	Off (0)	N/A
On (1)	On (1)	N/A

Table 6. Setting protocol

5.2.4 Free Modbus TCP Sockets Counter

> **Note:**
>
> The free Modbus TCP sockets counter is implemented from the 3.0 firmware.

The counter of free Modbus TCP sockets informs the user about the number of available Modbus TCP connections for the device.

The maximum number of TCP connections is 4.

The number of free Modbus TCP sockets can be reached in two ways:

- in the 292 Modbus register (read-only): the register shows values from 0 to 4, where 0 means no available connections, 4 means 4 available connections;
- in the IP Configuration tab in the web server.

5.3 Modbus Configuration Registers

> WARNING!
> Changing the parameters configuring a transmission (except for registers which value is read from the switch) will only take effect after restarting the device.

5.3.1 Device Address (30002)

This register contains information about the address of the Modbus device. This address is set by using switches S1 and S2 (see Modbus Settings section).

5.3.2 Baud Rate and Protocol (30003)

The register contains information about the baud rate of COM1 port and the type of protocol in accordance with the table below. This register reflects the state of the S3 DIP switch.

Baud rate				Protocol		
Bit 0	Bit 1	Bit 2	Baud rate	Bit 3	Bit 4	Protocol
0	0	0	User defined	0	0	Modbus RTU
0	0	1	76800	0	1	Modbus ASCII

Baud rate				Protocol		
0	1	0	4800	1	0	N/A
0	1	1	9600	1	1	N/A
1	0	0	19200			
1	0	1	38400			
1	1	0	57600			
1	1	1	115200			

Table 7. Setting baud rate and protocol

5.3.3 Counter of Received Messages (30004)

The 32-bit register with the number of valid Modbus messages received by the device from last powering up. The value is reset after a power cycle or after changing transmission parameters (speed, stop bits, parity, etc.).

5.3.4 Counter of Error Messages (30006)

The 32-bit register with the number of error Modbus messages received by the device from last powering up. The value is reset after a power cycle or after changing transmission parameters (speed, stop bits, parity, etc.).

5.3.5 Counter of Sent Messages (30008)

The 32-bit register with the number of Modbus messages sent by the device from last powering up. The value is reset after a power cycle or after changing transmission parameters (speed, stop bits, parity, etc.).

5.3.6 Hardware_Version (30130)

This 16-bits register contains the module hardware version multiplied by 10.

5.3.7 MAC_Address (30131)

This 32-bits register contains the module MAC address information.

5.3.8 Device Actions (40001)

Setting the 40001 register according to the table below will enable 1 of 4 available actions: reset module, reload settings, set to default, and enter bootloader.

Value	Action
511	Reset
767	Reload settings

Value	Action
1023	Set to default
1279	Enter Bootloader

Table 8. Device actions

5.3.9 Baud Rate (40136)

If sections 1, 2, and 3 of the S3 DIP switch are in off position, the baud rate is determined in accordance with this register. Baud rate is determined by the following formula:

Baud rate = Register value • 10

5.3.10 Stop Bits (40137)

Number of stop bits is determined on the basis of this register in accordance with the following table:

Value	No. of Stop Bits
1 (default)	1
2	2
256	RS485 biasing*

Bit no. 8 activates RS485 biasing resistors in order to pull up voltage on the RS485 bus. If the bit no. 8 is true (bit 8 = 1), then RS485 biasing resistors are activated. The function is **only** available in **MG-IP devices** with a hardware version 2.0 or higher.

The biasing resistors are useful in case the iSMA modules are connected with a third part devices with the same RS485 bus and communication errors appears on the network.

> WARNING! Only one single device in the network can have biasing resistors activated!
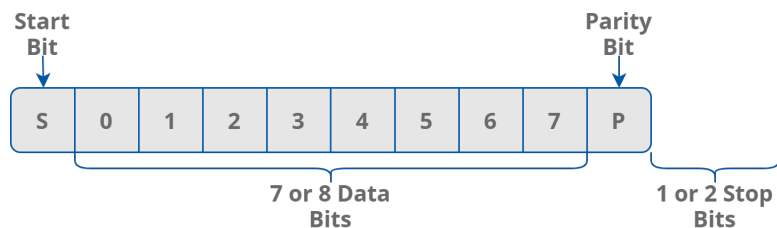

Figure 9. Modbus frame

5.3.11 Data Bits (40138)

Number of data bits transmitted in a single byte is determined according to the following table:

Value	No. of Data Bits
7	7

Value	No. of Data Bits
8 (default)	8

Table 9. Data bits

5.3.12 Parity Bit (40139)

Each byte of data being transferred may have additional protection as a parity bit added before stop bit (bits).

The method of calculating parity bit determines the table below:

Register Value	Type of Parity Bit
0 (default)	None
1	Odd (number of all ones in a byte is odd)
2	Even (number of all ones in a byte is even)
3	Always 1
4	Always 0

Table 10. Parity bit

5.3.13 Response Delay Time (40140)

The value of this 16-bits register determines the number of milliseconds to wait before the device answers the question. This time is used to extend the interval between question and answer. The default value of 0 means no delay (the answer is sent once during the 3.5 character required by the Modbus RTU protocol).
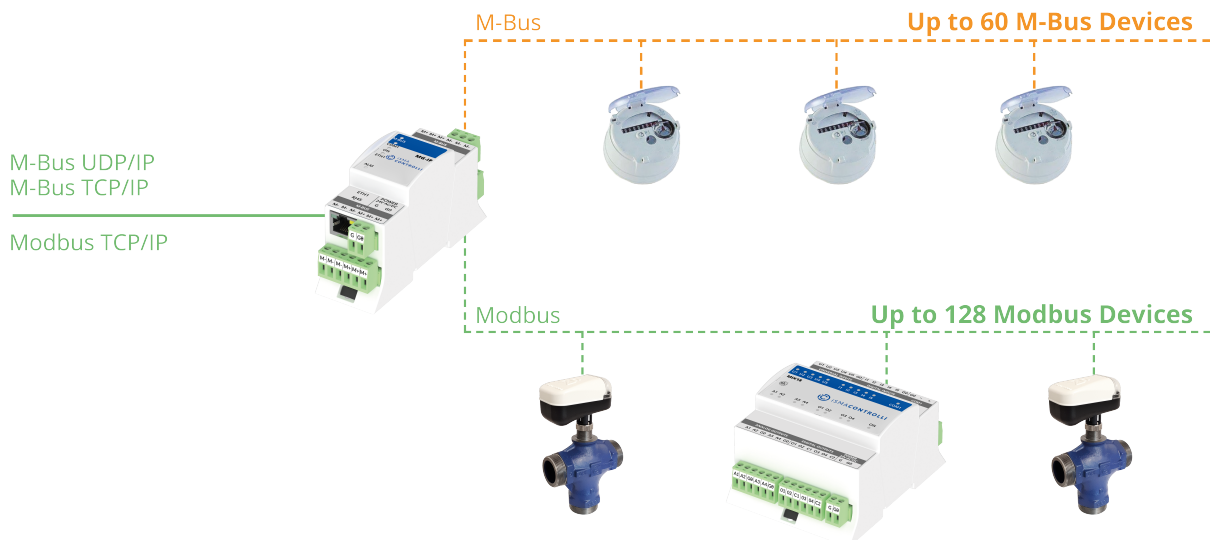
6 M-Bus Gateway

Figure 10. The iSMA-B-MG-IP M-Bus gateway

The iSMA-B-MG-IP serves as an M-Bus gateway using either one of two protocols: TCP IP or UDP IP.

6.1 M-Bus TCP IP Gateway

The device simultaneously supports up to **4 M-Bus TCP clients**. If the fifth device is to be connected to the meter gateway, TCP connection will be rejected. In order to secure the meter gateway before filling up the call list, a mechanism for monitoring each M-Bus TCP IP connection was introduced. Every 45 seconds a query is sent to the devices connected to the bus. If a device does not response to the query, after 2 seconds another query is sent. If the device does not respond three times, the meter gateway closes the connection.

The iSMA-B-MG-IP device has a built-in M-Bus TCP IP to M-Bus interface gateway, which allows to connect additional 3rd party M-Bus devices using the bus. In order to ensure proper operation of the M-Bus gateway, please make sure that the baud rate of the M-Bus interface of all the devices connected to the bus (gateway and an addition devices) are the same.

Operation of the gateway is based on sending the M-Bus TCP IP query by the M-Bus. Data frame from query is converted to M-Bus and sent to the bus. Then the iSMA-B-MG-IP device waits for an answer from a device connected to the bus; if the meter does not respond within the estimated time defined by the M-Bus Timeout parameter (by default, 2000 ms), an exception is returned: error code 0x0B. If the slave answers the correct frame, it is converted to M-Bus TCP IP and sent to the master.

6.2 M-Bus UDP IP Gateway

The device simultaneously supports up to 2 M-Bus UDP clients. In order not to miss the second client's packet delivery at high intensity periods of incoming data, the data from the first client is read from the lwIP in the loop, and only two frames are buffered with different addresses. The response via the UDP protocol is sent to the same port it came from (the default port for UDP protocol is 10002).
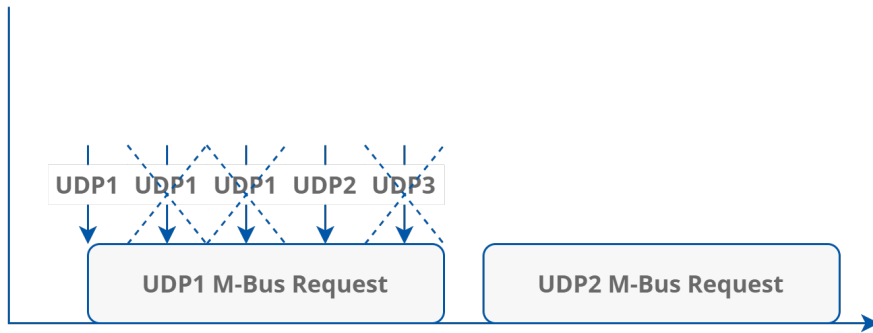
Figure 11. UDP packets delivery
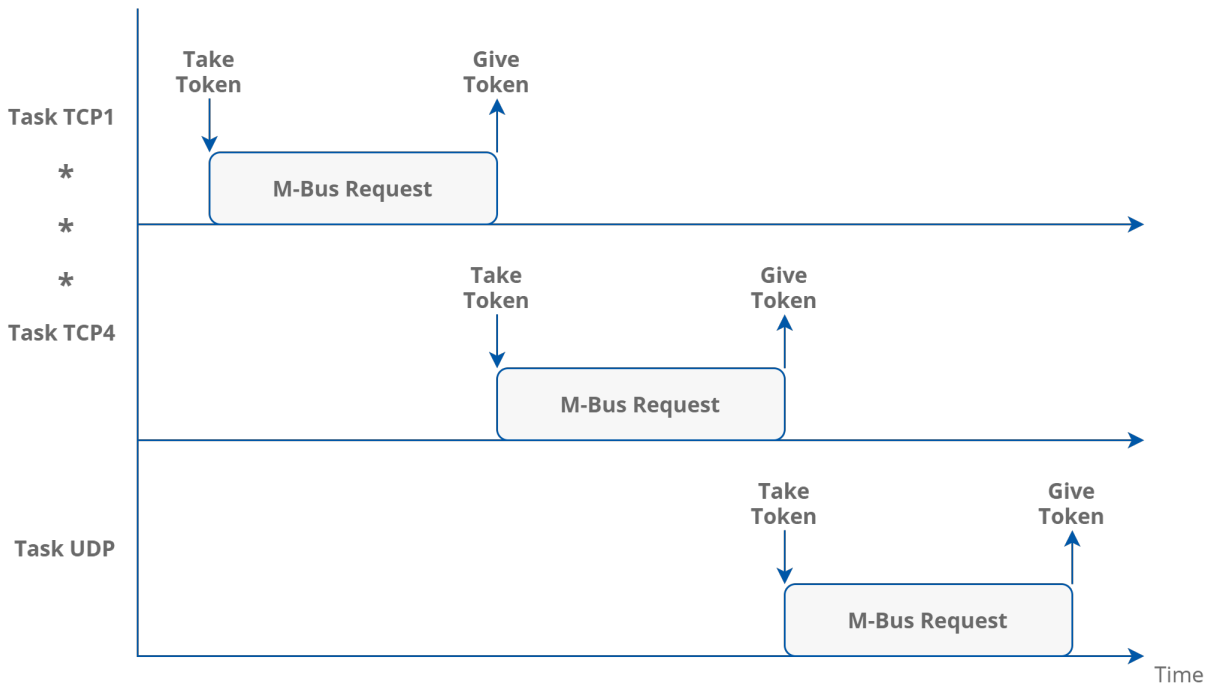
Both TCP and UDP protocols share the M-Bus interface:

Figure 12. M-Bus shared interface

6.3 M-Bus Communication
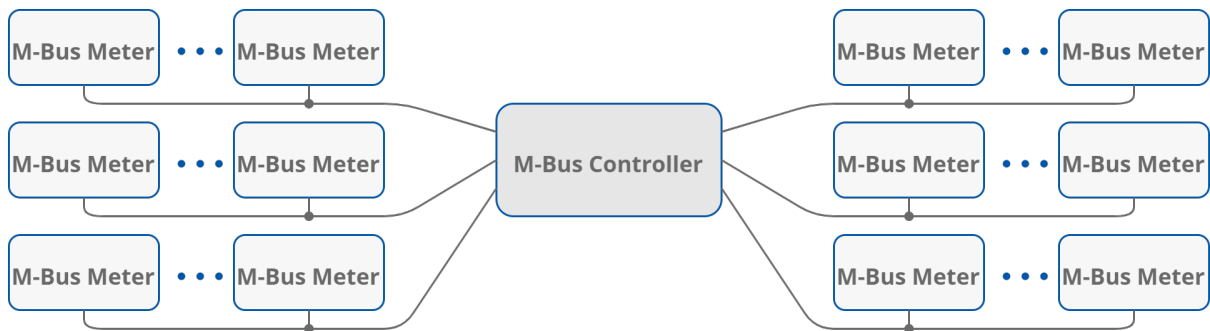
6.3.1 Connecting Communication Bus
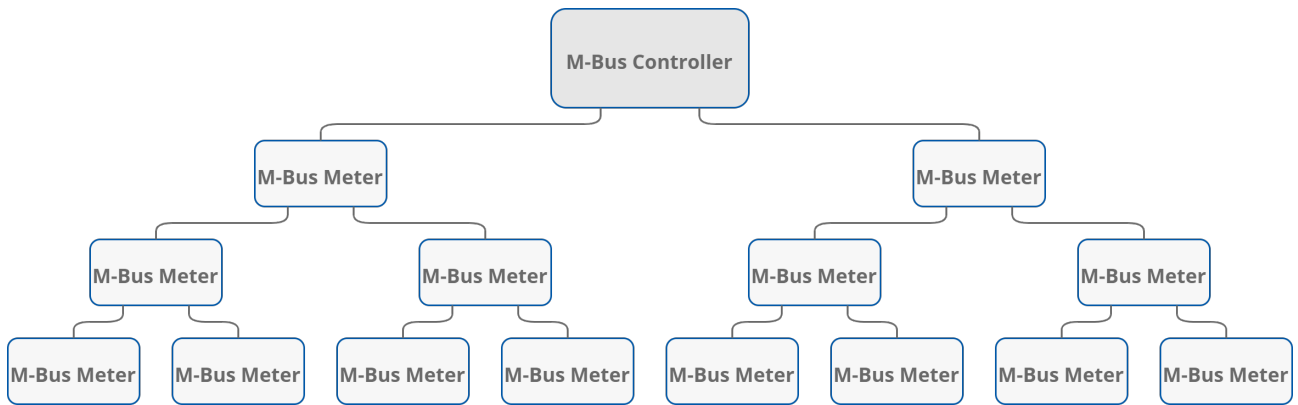

Figure 13. M-Bus star topology

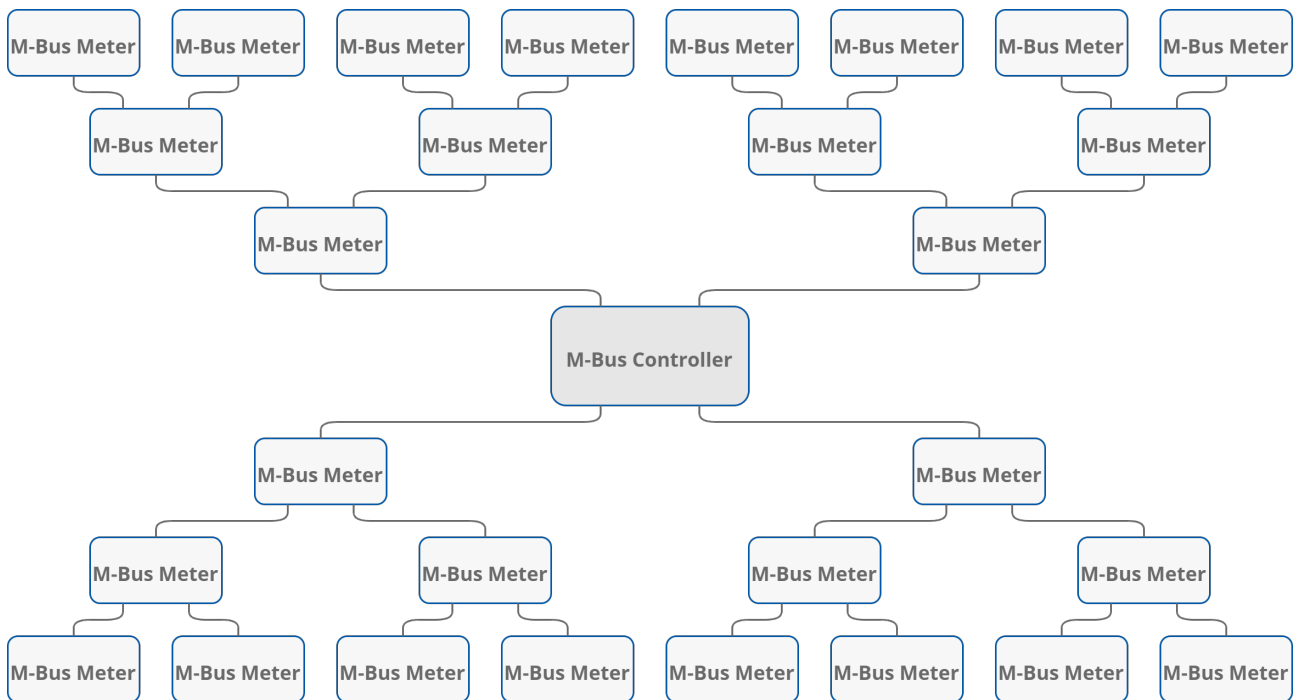*Figure 14. M-Bus tree topology*

Figure 15. M-Bus extended star topology

6.4 M-Bus Settings

6.4.1 About M-Bus

The M-Bus (Meter Bus) was developed to fill the need for a system for networking and remote reading of utility meters, for example, to measure a consumption of gas or water in the house. This bus fulfils special requirements of remotely powered or battery driven systems, including consumer utility meters. If interrogated, the meters deliver the data they have collected to a common master, for example, a DDC controller or a hand-held computer, connected at periodic intervals to read all utility meters of a building.

Topology and Cable

The M-Bus is a hierarchical system, with communication controlled by a master device (for example, the AAC20-M). The M-Bus consists of a master, a number of slaves (end-equipment meters) and a two-wire connecting cable. The slaves are connected in parallel to the transmission medium–the connecting cable.
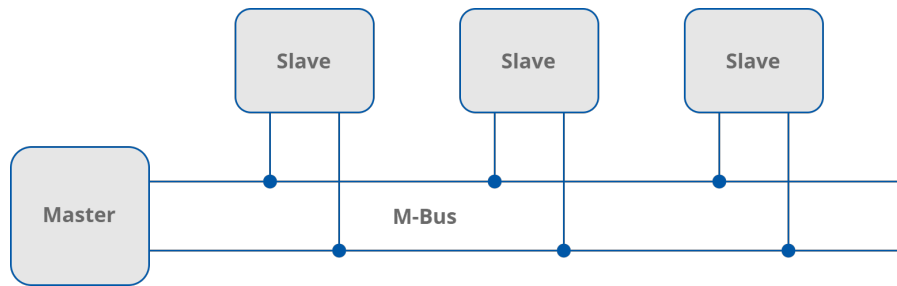
Figure 16. M-Bus connection topology

A two-wire cable (JYStY N*2*0.8 mm) is used as the transmission medium for the M-Bus. The maximum distance between the slave and the repeater is 350 m; this length corresponds to a cable resistance of up to 29 Ω. This distance applies for the standard configuration having baud rates between 300 and 9600, and maximum of 250 slaves. The maximum distance can be increased by limiting the baud rate and using fewer slaves, but the bus voltage in the space state must at no point fall below 12 V in a segment because of the remote powering of the slaves. In the standard configuration the total cable length should not exceed 1000 m in order to meet the requirement of a maximum cable capacitance of 180 nF.

6.4.2 M-Bus Addressing

M-Bus devices are using two types of addressing:

· Primary: this address is assigned by a user in a commissioning process (all new M-Bus devices have this address, set by default to 0). This type of address has a limited range from 0 to 250;
· Secondary: this address has a wider range than primary and, by default, contains a device serial number. All out-of-the-box devices connected to the bus have unique secondary address.

6.5 M-Bus Configuration Registers

> **WARNING!**
>
> Changing the parameters configuring a transmission (except for registers which value is read from the switch) will only take effect after restarting the device.

6.5.1 Counter of Received Messages (30015)

The 32-bit register with the number of valid M-Bus messages received by the device from last powering up. The value is reset after a power cycle or after changing transmission parameters.

6.5.2 Counter of Sent Messages (30017)

The 32-bit register with the number of M-Bus messages sent by the device from last powering up. The value is reset after a power cycle or after changing transmission parameters.

6.5.3 Counter of Alarms (30019)

The 32-bit register with the number of M-Bus alarms from last powering up. An alarm is detected if current bus exceeds acceptable level (130 mA). The value is reset after a power cycle or after changing transmission parameters.

7 DHCP

> **Note:**
>
> The DHCP functionality is implemented from the 3.0 firmware.

The DHCP functionality allows to turn on/off an automatic IP address setting from the available DHCP server. The DHCP functionality may be turned on/off in the web configurator and iSMA Configurator.

7.1 DHCP Algoritm

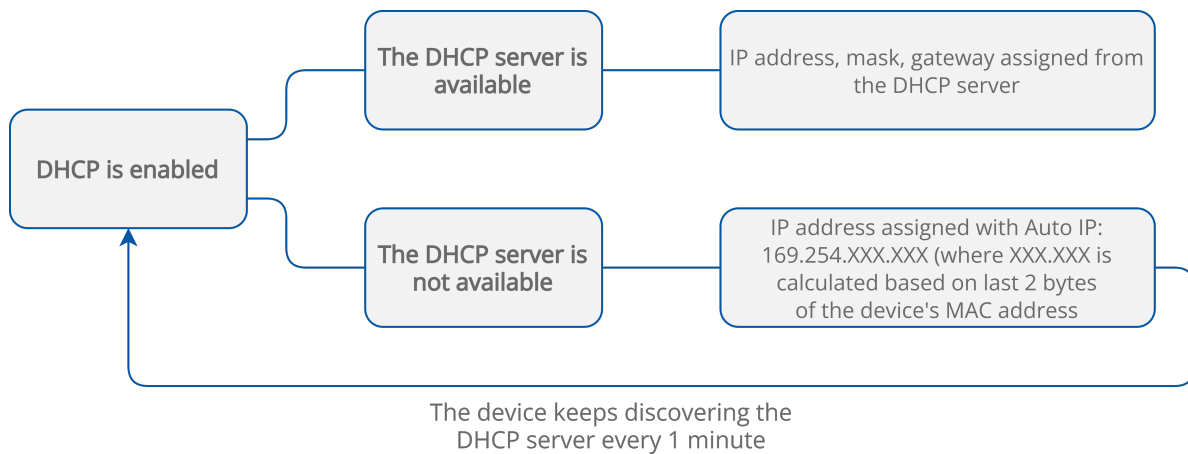The DHCP functionality works according to the following algorithm:

The device keeps discovering the DHCP server every 1 minute

Figure 17. The DHCP algorithm

- If the DHCP functionality is enabled and the DHCP server is available, all network configuration is provided by the DHCP server, and there is no possibility to edit the IP address/mask/default gateway.
- If the DHCP functionality is enabled and the DHCP server is not available, the IP address is provided by Auto IP, and its structure is the following:
  - 169.254.XXX.XXX, where XXX.XXX is calculated based on 2 last bytes of the module's MAC address.
- If the DHCP functionality is disabled, the user sets the IP address, mask, and gateway manually.

8 iSMA-B-MG-IP WEB Configuration

8.1 Web Server Access

The iSMA-B-MG-IP device has a built-in web server, which allows to show device status and to change configuration.

To access the web server, open a browser and enter an IP address of the device, default address for new device (default IP address is **192.168.1.123**). Please use the following credentials:

Username: **admin**

Password: **1000** (default)

8.2 Device Page

This page contains device technical information. The Basic Information section includes information about a device type, firmware and hardware version, and uptime.
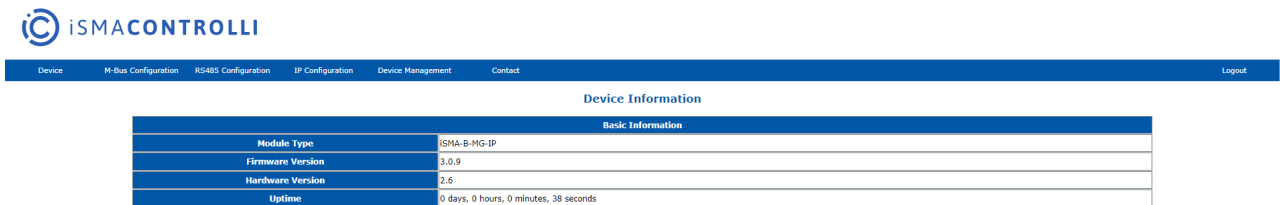
Figure 18. Device page

8.3 M-Bus Configuration

This page allows to enter configuration parameters and show information of the M-Bus interface.
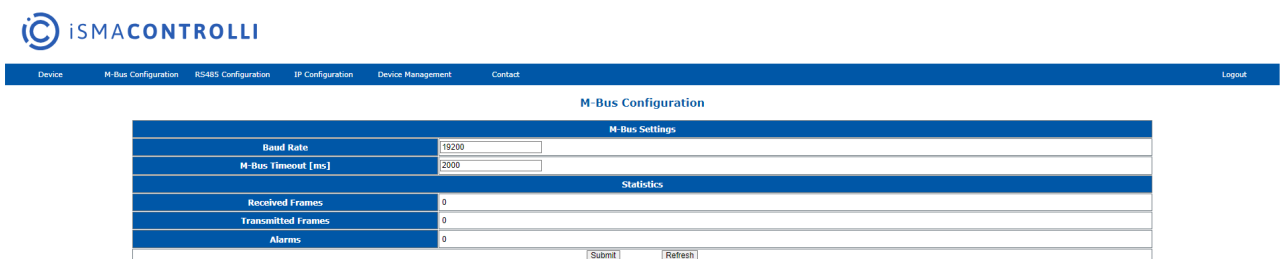

Figure 19. M-Bus configuration page

This page allows to set parameters such as:

- **Baud Rate:** read/write, the M-Bus bus baud rate from 300 up to 38400;
- **M-Bus Timeout:** read/write, the timeout for M-Bus messages;
- **Received Frames:** read-only, the number of received frames;
- **Transmitted Frames:** read-only, the number of transmitted frames;
- **Alarms:** read-only, the number of M-Bus alarms.

> WARNING! To save changes, please use the Submit button.

8.4 RS485 Configuration

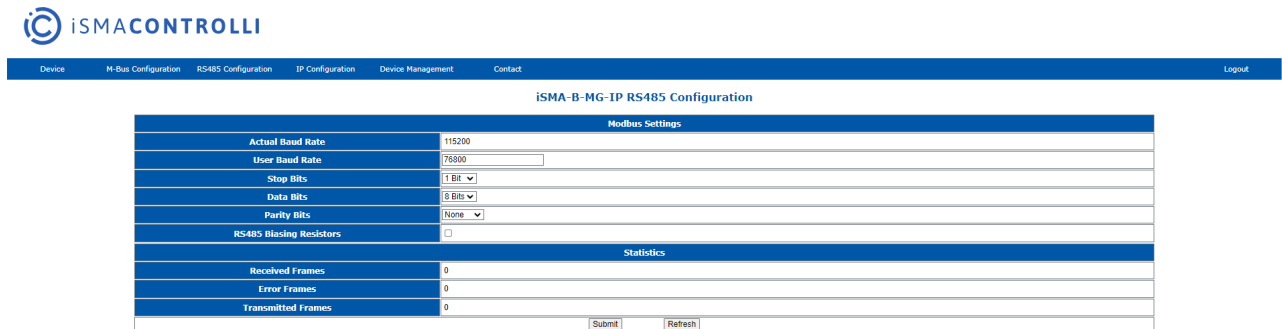This page allows to enter configuration parameters and show information of the device's COM1 port.

Figure 20. RS485 configuration page

This page allows to set parameters such as:

- **Actual Baud Rate** (read-only): the RS485 baud rate within the range from 2400 to 115200;
- **User Baud Rate** (read/write): allows to set the baud rate by the user; the value overwrites the baud rate set on the DIP switch;
- **Stop Bits:** read/write, the number of stop bits (1 or 2);
- **Data Bits:** read/write, the number of data bits transmitted in a single byte (7 or 8);
- **Parity Bits:** read/write, transmission protection as a parity bit added before stop bit (bits);
- **RS485 Biasing Resistors**: read/write, activation of the biasing resistors;
- **Received Frames:** read-only, the number of received frames;
- **Error Frames:** read-only, the number of error frames
- **Transmitted Frames:** read-only, the number of transmitted frames.

> WARNING! To save changes, please use the Submit button.

8.5 IP Configuration

This page allows to change parameters of the Ethernet port, Modbus TCP IP, M-Bus TCP IP, and M-Bus UDP IP.

Figure 21. IP configuration page

This page allows to set parameters such as:

- **DHCP:** (read/write): enables address setting by the DHCP server; If enabled, the IP, Mask, and Gateway parameters become empty; it is required to insert own static values before clicking the Submit button;
- **IP Address:** read/write, the controller's Ethernet interface IP address;
- **Mask:** read/write, the network mask;
- **Gateway:** read/write, the network default gateway;
- **Http Port:** read/write, the http port;
- **Mac Address:** read-only, the Ethernet interface MAC address;
- **M-Bus TCP Port:** read/write, the M-Bus TCP port number, default 6021;
- **M-Bus UDP Port:** read/write, the M-Bus UDP port umber, default 10002;
- **Protocol Type:** read-only, the DIP switch protocol selection;
- **Modbus TCP Port:** read/write, the Modbus TCP port number, default 502;
- **Modbus Address:** read-only, the Modbus device address set by rotary switches;
- **Modbus TCP Connection Timeout:** read/write, the timeout for TCP/IP messages;
- **Free Modbus TCP Sockets** (read-only): the number of available TCP connections;
- **RS485 Timeout:** read/write, the timeout for Modbus RTU/ASCII messages;
- **Send Modbus Errors:** read/write, enables or disables sending of Modbus error messages.

> **WARNING!** To save changes, please use the Submit button.

8.6 Device Management

This page allows to change password and remotely reboot device.

Figure 22. Device management page

Procedure of changing the device password:

- Enter the current device password in the Current Device Password field.
- Enter the new device password in the New Device Password field.
- Enter the new device password again in the Confirm New Device Password field.
- To confirm the password change, please click the Submit button.
- Log out and log in again using the new password.

> WARNING! To reset password to default refer to "Restoring default settings".

8.7 Contact

This page displays information about the Manufacture's website and e-mail to technical support.

Figure 23. Contact page

9 List of Modbus Registers

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
30001	0	0x00	VERSION AND DEVICE TYPE	Read-only	
30002	1	0x01	DEVICE ADDRESS (state of switch)	Read-only	
30003	2	0x02	BAUD RATE AND PROTOCOL (state of switch)	Read-only	
30004	3	0x03	MODBUS RECEIVED FRAMES COUNTER (32-bit)	Read-only	Default state is 0. Reset at the device start and change of transmission parameters.
30006	5	0x05	MODBUS ERROR FRAMES COUNTER 32-bit)	Read-only	Default state is 0. Reset at the device start and change of transmission parameters.
30008	7	0x07	MODBUS TRANSMITTED FRAMES COUNTER (32-bit)	Read-only	Default state is 0. Reset at the device start and change of transmission parameters.
30012	11	0x0B	UP TIME		Up device time in sec
30015	14	0x0E	M-BUS RECEIVED FRAMES COUNTER	Read-only	Default state is 0. Reset at the device start and change of transmission parameters.
30017	16	0x10	M-BUS TRANSMITTED FRAMES COUNTER	Read-only	Default state is 0. Reset at the device start and change of transmission parameters.
30019	18	0x12	M-BUS ALARMS COUNTER	Read-only	Default state is 0. Reset at the device start and change of transmission parameters.
30130	129	0x81	HARDWARE_VERSION	Read-only	The current hardware version of a device
30131	130	0x82	MAC_ADDRESS (48-bit)	Read-only	The MAC address of a device
40001	0	0x00	DEVICE ACTIONS	Read/write	Allows to enable 1 of 3 device actions

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40023	22	0x16	M-BUS BAUD RATE (32-bit)	Read/write memory	Baud rate for M-Bus (default 2400 bps)
40025	24	0x18	M-BUS CONNECTION TIMEOUT (32-bit)	Read/write memory	Timeout of M-Bus connection (default 2000 ms)
40136	135	0x87	BAUD RATE	Read/write memory	Transmission speed is defined by the user calculated using the formula: The value is considered only when sections 1, 2 and 3 of S3 switch is in the OFF position The default value is 7680 (76800 bps)
40137	136	0x88	STOP BITS	Read/write memory	Supported values are 1 and 2. The default value 1. Bit No. 8 activates RS485 biasing resistors in order to pull-up the voltage on the RS485 bus.
40138	137	0x89	DATA BITS	Read/write memory	Supported values are 7 and 8. The default value 8.
40139	138	0x8A	PARITY BIT	Read/write memory	Parity Bit (40139) The default value is 0 (no parity) Allowed values: (see table below)
40140	139	0x8B	RESPONSE DELAY	Read/write memory	Delay in ms before sending response. The default value is 0.

Allowed values for PARITY BIT (40139):

Value	Description
0 (default)	none
1	Odd
2	Even
3	Always 1
4	Always 0

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
30293	292	0x124	COUNTER OF FREE MODBUS TCP SOCKETS	Read-only	Number of available Modbus TCP sockets

Table 11. List of Modbus registers