SIU-SNM-01
User Manual

Revision 0.0
English

Modbus Master / SNMP Agent - Converter

(Order Code: SIU-SNM-01)

Benefits and Main Features:

⊕ Very easy to configure

⊕ Electrical isolation

⊕ Temperature range: -40°C/85°C (-40°F/185°F)

SECURITY ALERT:

GENERAL INFORMATION
To ensure safe operation, the device must be operated according to the instructions in the manual. When using the device, legal and safety regulation are required for each individual application. The same applies also when using accessories.

INTENDED USE
Machines and systems must be designed so the faulty conditions do not lead to a dangerous situation for the operator (i.e. independent limit switches, mechanical interlocks, etc.).

QUALIFIED PERSONNEL
The device can be used only by qualified personnel, strictly in accordance with the specifications.
Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and who have appropriate qualifications for their job.
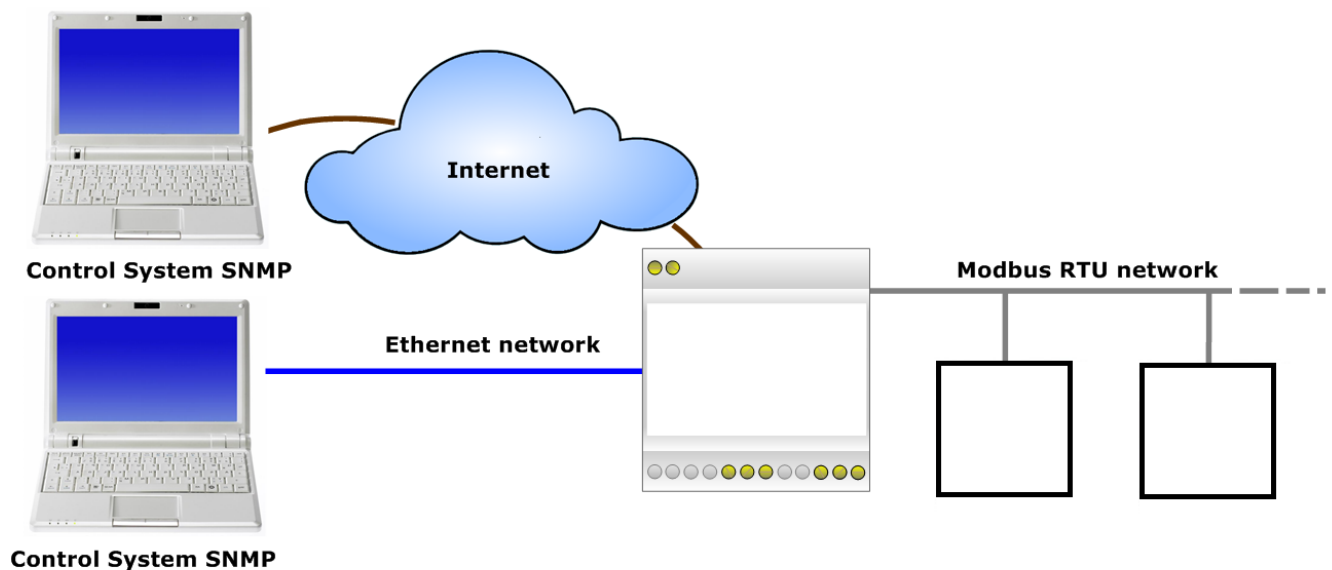
R**ESIDUAL RISKS**
The device is state-of-the-art and is safe. The instruments can represent a potential hazard if they are inappropriately installed and operated by untrained personnel. These instructions refer to residual risks with the following symbol:
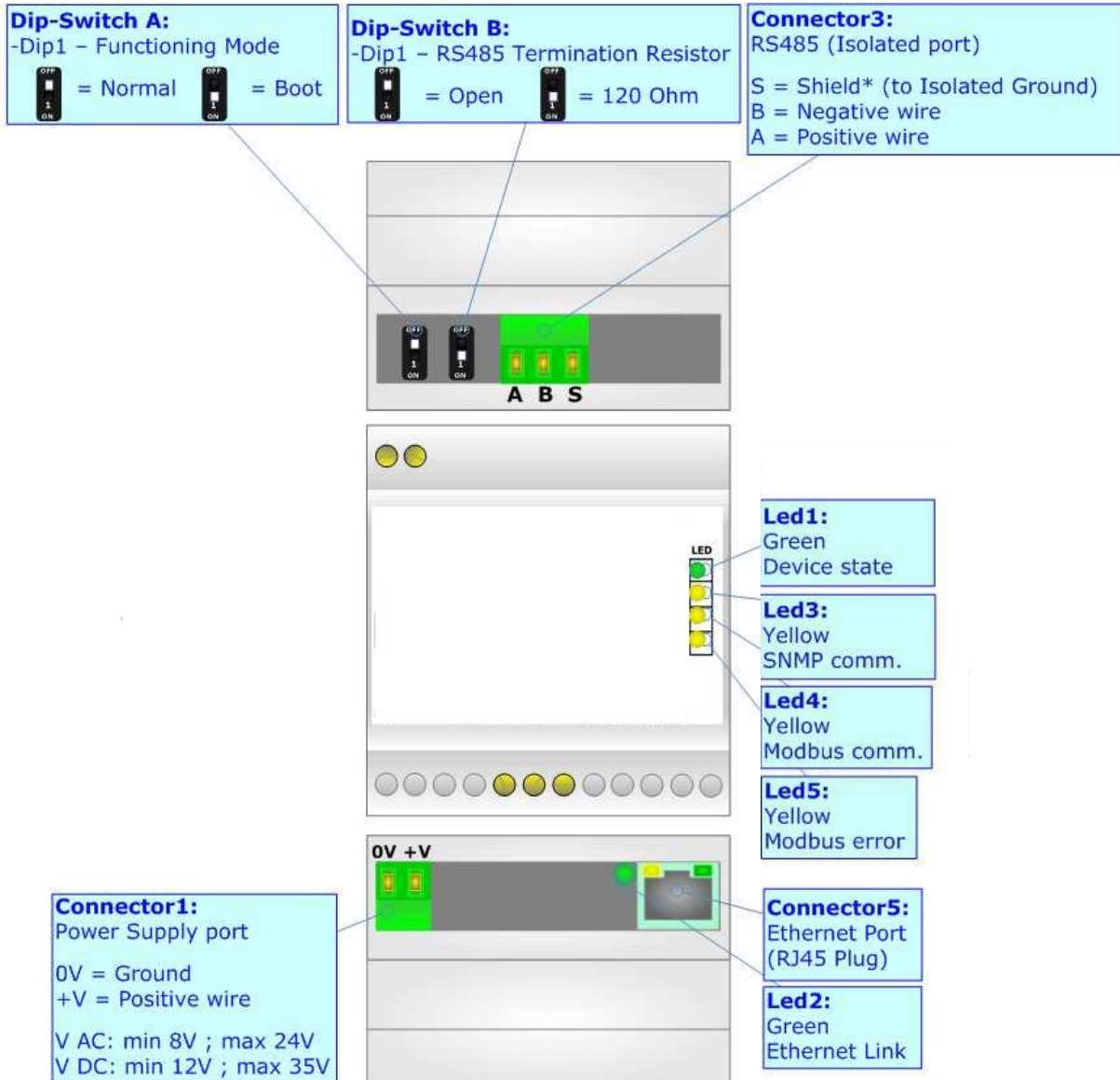
⚠️ This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

EXAMPLE OF CONNECTION

CONNECTION SCHEME

Dip-Switch A:
-Dip1 – Functioning Mode
[OFF] = Normal   [ON] = Boot

Dip-Switch B:
-Dip1 – RS485 Termination Resistor
[OFF] = Open   [ON] = 120 Ohm

Connector3:
RS485 (Isolated port)
S = Shield* (to Isolated Ground)
B = Negative wire
A = Positive wire

A B S

Led1:
Green
Device state

Led3:
Yellow
SNMP comm.

Led4:
Yellow
Modbus comm.

Led5:
Yellow
Modbus error

Connector1:
Power Supply port

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

Connector5:
Ethernet Port
(RJ45 Plug)

Led2:
Green
Ethernet Link

CHARACTERISTICS

The SIU-SNM-01 is a Modbus Master / SNMP Agent - Converter.

It has the following characteristics:

- Up to 1024 bytes in reading and 1024 bytes in writing;
- Triple isolation between Serial - Power Supply, Serial - Ethernet, Power Supply - Ethernet.
- Two-directional information between Modbus bus and SNMP bus;
- Mountable on 35mm Rail DIN;
- Wide power supply input range: 8…24V AC or 12…35V DC;
- Wide temperature range: -40°C / 85°C [-40°F / +185°F].

CONFIGURATION

You need the SIU-SNM software on your PC in order to perform the following:

- Define the parameters of SNMP line;
- Define the parameters of Modbus line;
- Define the Modbus variables to read/write from/to the Modbus slaves;
- Define the SNMP OIDs;
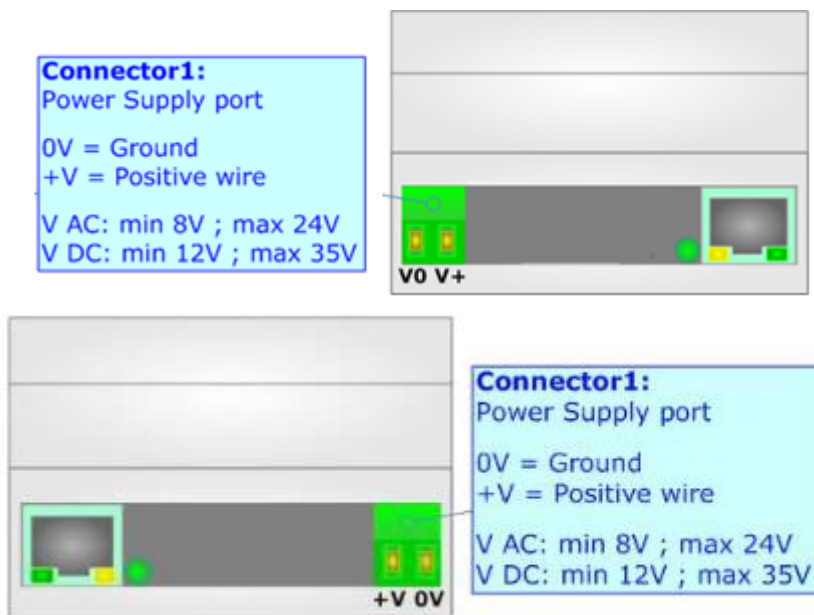- Create the MIB file;
- Update the device.

POWER SUPPLY

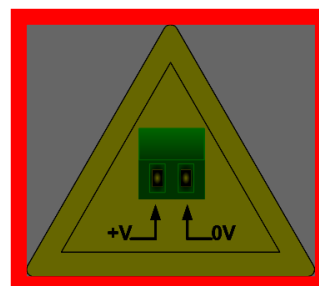The devices can be powered at 8…24V AC and 12…35V DC. For more details see the two tables below.

VAC ~		VDC ▬▬▬	
Vmin	**Vmax**	**Vmin**	**Vmax**
8V	**24V**	**12V**	**35V**

Consumption at 24V DC:

Device	Consumption [W/VA]
SIU-SNM-01	3.5

*Caution: Not reverse the polarity power*

FUNCTION MODES

The device has got two functions mode depending of the position of the 'Dip1 of Dip-Switch A':

+ The first, with 'Dip1 of Dip-Switch A' at "OFF" position, is used for the normal working of the device.
+ The second, with 'Dip1 of Dip-Switch A' at "ON" position, is used for upload the Project and/or Firmware.

For the operations to follow for the updating, see 'UPDATE DEVICE' section.

According to the functioning mode, the LEDs will have specifics functions, see 'LEDS' section.
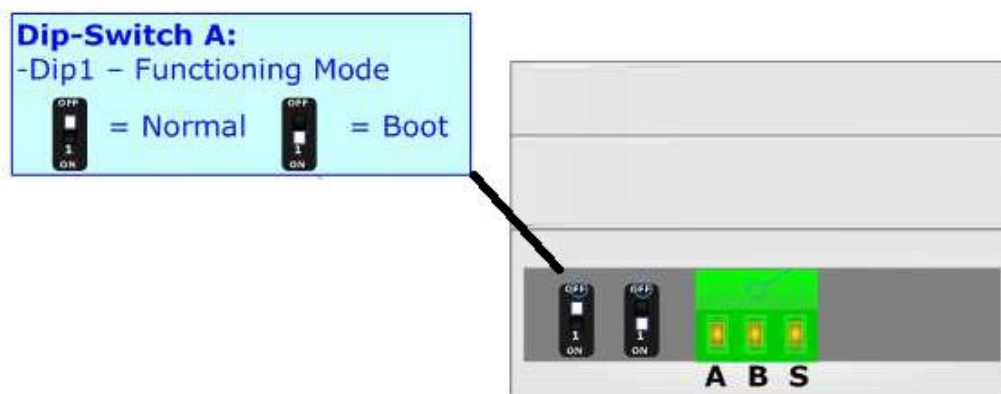

⚠️ Warning: Dip1 of 'Dip-Switch A' must be at ON position for working even if the Ethernet cable isn't inserted.

LEDS

The devices have got five LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: Device state (green)	Blinks slowly (~1Hz)	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
2: Ethernet Link (green)	**ON**: Ethernet cable connected **OFF**: Ethernet cable disconnected	**ON: Ethernet cable connected** **OFF: Ethernet cable disconnected**
3: SNMP communication (green)	Blinks when a SNMP request is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: Modbus communication (green)	Blinks when Modbus frames (RS232/RS485/RS422) are received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
5: Modbus error (yellow)	**ON**: at least one configured Modbus request hasn't correct reply **OFF**: communication is working	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
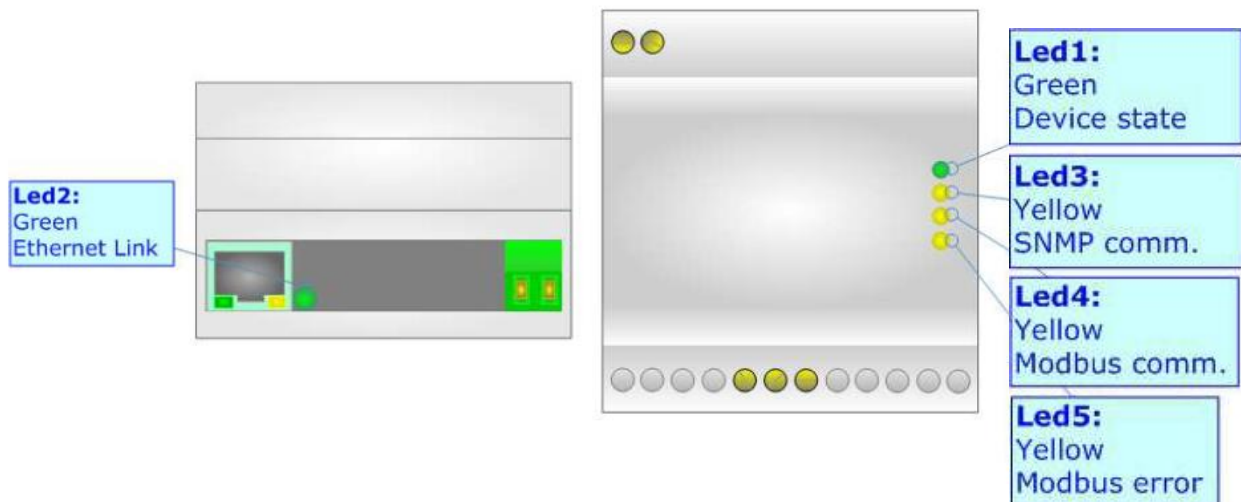
**SNMP**

The SNMP connection must be made using Connector5 with at least a Category 5E cable. The maximum length of the cable should not exceed 100m. The cable has to conform to the T568 norms relative to connections in cat.5 up to 100 Mbps. To connect the device to a Hub/Switch is recommended the use of a straight cable, to connect the device to a PC/other is recommended the use of a cross cable.
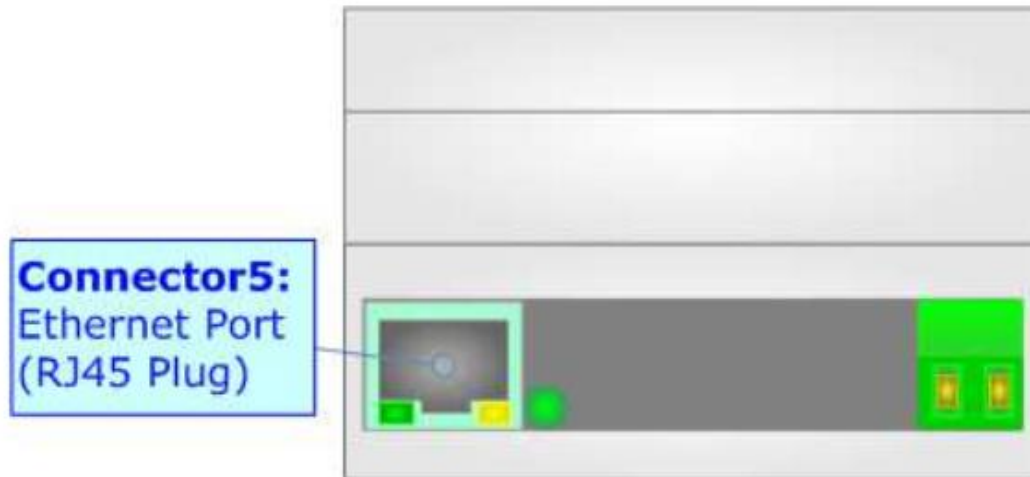
RS485

For terminate the RS485 line with a 120Ω resistor it is necessary to put ON dip 1, like in figure.
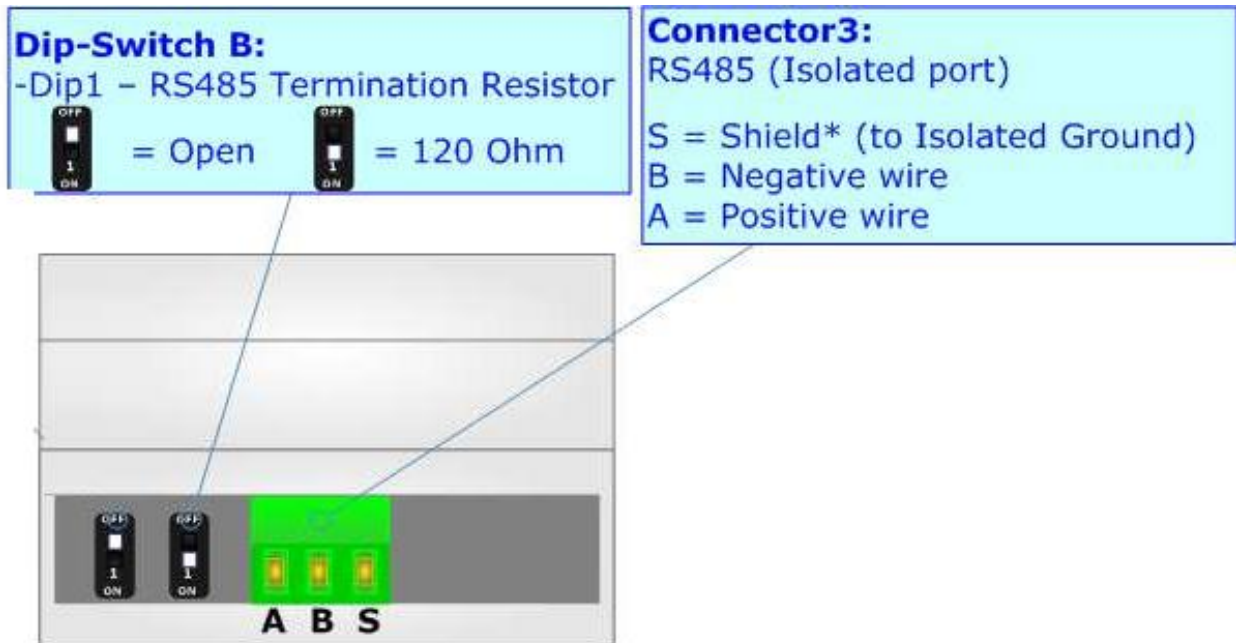
The maximum length of the cable should be 1200m (4000 feet).

Here some codes of cables:

- ✦ Belden: p/n 8132 - 2x 28AWG stranded twisted pairs conductor + foil shield + braid shield;
- ✦ Belden p/n 82842 - 2x 24AWG stranded twisted pairs conductor + foil shield + braid shield;
- ✦ Tasker: p/n C521 - 1x 24AWG twisted pair conductor + foil shield + braid shield;
- ✦ Tasker: p/n C522 - 2x 24AWG twisted pairs conductor + foil shield + braid shield.

USE OF SIU-SNM DESKTOP SOFTWARE

To configure the Converter, use the available software that runs with Windows called SIU-SNM desktop.
When launching the software, the window below appears (Fig. 2).

Note: It is necessary to have installed .Net Framework 4.

Modbus Master / SNMP - Converter

Begin	Opened Configuration of the Converter : Example1

Step 1	New Configuration	Open Configuration

Step 2	Set Communication

Step 3	Set Access

Step 4	Set SNMP Access

Step 5	SNMP MIB

| Step 6	Update Device

NEW CONFIGURATION / OPEN CONFIGURATION

The "**New Configuration**" button creates the folder which contains the entire device's configuration.
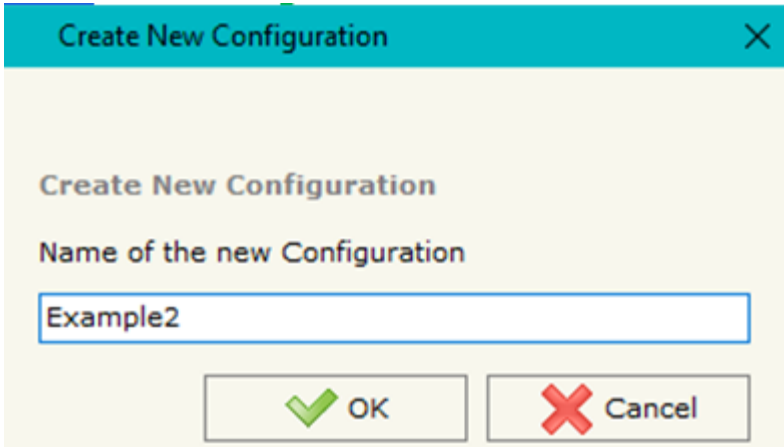
A device's configuration can also be imported or exported:

- ➼ To clone the configurations of a Programmable "Modbus Master / SNMP Agent - Converter" in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;

- ➼ To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button "**Open Configuration**".
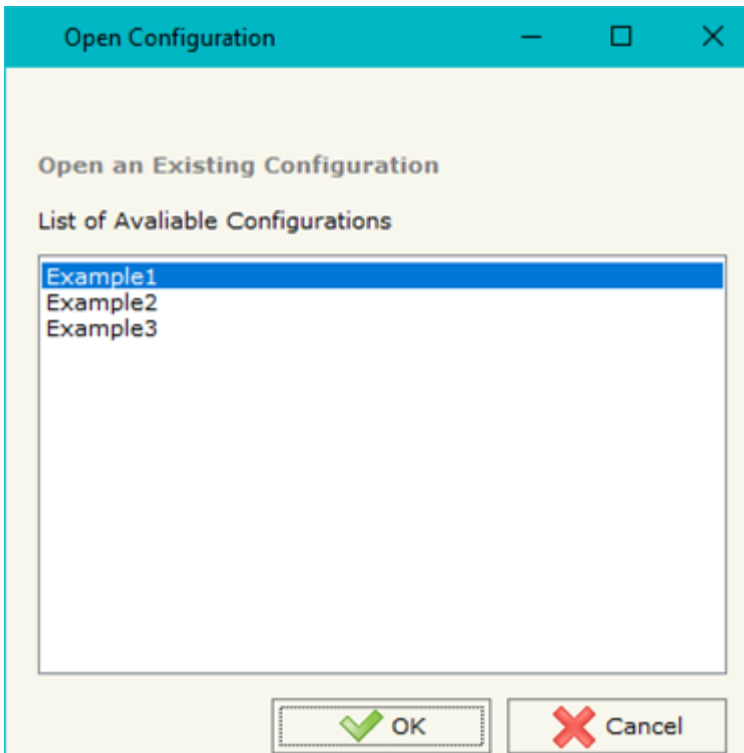
SOFTWARE OPTIONS

By pressing the "**Settings**" ( ) button there is the possibility to change the language of the software and check the updating for the compositor.

In the section "Language" it is possible to change the language of the software.

In the section "Connection Options", it is possible to check if there are some updating of the software compositor in the manufacturer's website.
Checking the option "**Check Software Update at Start of Program**", the software check automatically if there are updating when it is launched.

SET COMMUNICATION

This section defines the fundamental communication parameters of two buses, SNMP and Modbus.
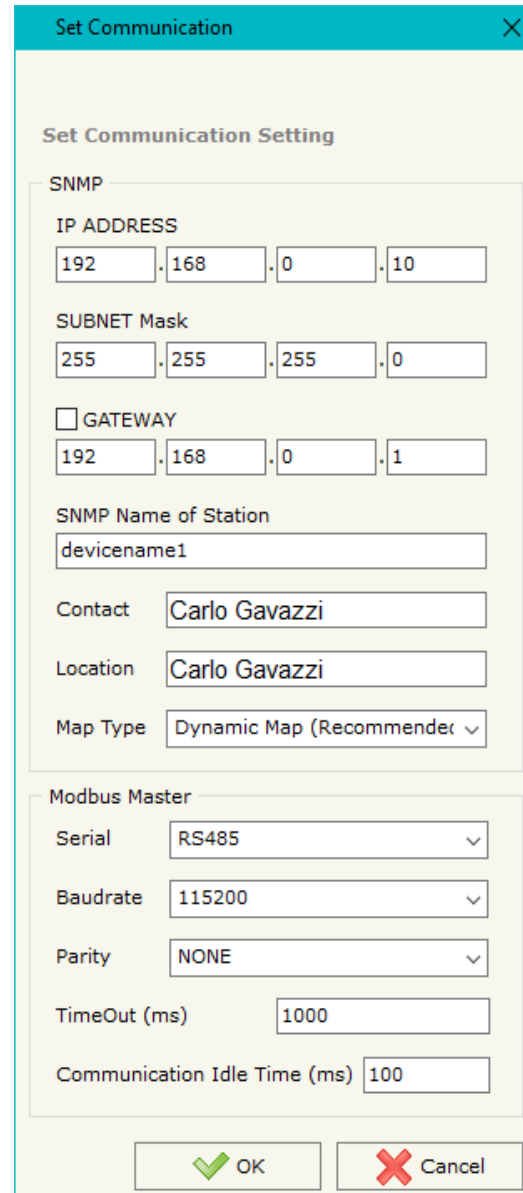
By Pressing the "**Set Communication**" button from the main window (Fig. 2) the window "Set Communication" appears (Fig. 3).
The window is divided in two sections, one for the SNMP and the other for the Modbus Master.

The means of the fields for "SNMP" are:

✦　　In the field "**IP ADDRESS**" the IP address of the converter is defined;

✦　　In the field "**SUBNET Mask**" the SubNet Mask of the converter is defined;

✦　　In the field "**GATEWAY**" the default gateway of the network is defined.

Note: by default, the Gateway IP is disabled. It is necessary to check the relevant box to enable it.

✦　　In the field "**SNMP Name of Station**" the name for SNMP Agent station is defined;

✦　　In the field "**Contact**" the contact for SNMP Agent station is defined;

✦　　In the field "**Location**" the location for SNMP Agent station is defined;

✦　　In the field "**Map Type**" it is possible to select the type of SNMP map to use. It is possible to choose between "Dynamic Map (Recommended)" (see page 25) or "Fixed Map" (see page 30). It is suggested the "Dynamic Map".

The means of the fields for the "Modbus Master" section are:
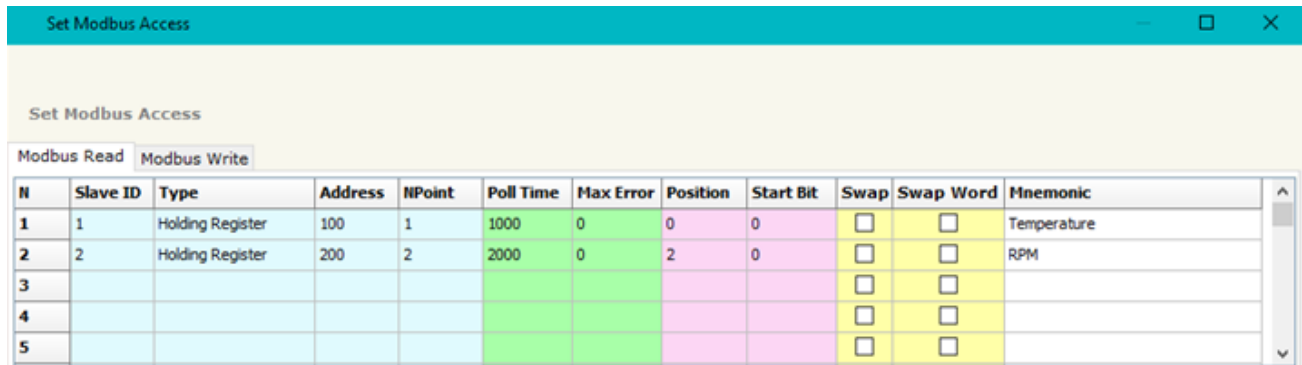
✦　　In the field "**Serial**" the serial to use is defined (RS232, RS485);

✦　　In the field "**Baudrate**" the baudrate for the serial line is defined;

✦　　In the field "**Parity**" the parity of the serial line is defined;

✦　　In the "**TimeOut (ms)**" define the maximum time that the device attends for the answer from the slave interrogated;

✦　　In the field "**Communication Idle Time (ms)**" the minimum delay between two requests is defined.

SET ACCESS

By pressing the "**Set Access**" button from the main window the window "Set Access" appears.

This window is divided in two parts, the "Modbus Read" (Fig. 4a) and the "Modbus Write " (Fig. 4b).
The first part "Modbus Read" is used to read the data from the Modbus slaves, and make them available to read from the SNMP manager.
The second part "Modbus Write " is used to write the data that arrives from the SNMP manager into the slaves Modbus.
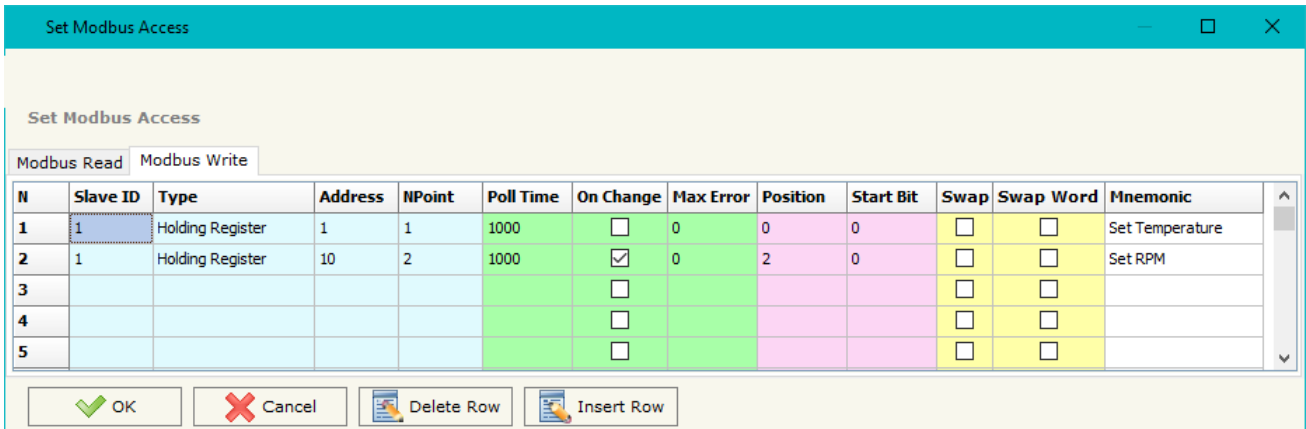

MODBUS READ

The means of the fields are:

- In the field "**Slave ID**" the address of the Modbus device to read is defined;
- In the field "**Type**" the data type of the register to read is defined. It is possible to choose between the following:
  - Coil Status;
  - Input Status;
  - Holding Register;
  - Input Register.
- In the field "**Address**" the starting address of the register to be read is defined (in decimal);
- In the field "**NPoint**" the number of consecutive registers to be read is defined (number of words);
- In the field "**Poll Time**" the delay time to make the request is defined;
- In the field "**Max Error**" the number of consecutive errors that the converter waits before suspending the request until the next reboot is defined. If is set to '0' this function is disabled;
- In the field "**Position**" the address of the SNMP array where placing the information is defined. Each position corresponds to a byte;
- In the field "**Start Bit**" the starting bit of the first byte of the field "Position" is defined. Valid only for the "Coil Status" and "Input Status";
- If the field "**Swap**" is checked, the data from the Modbus registers are swapped;
- If the field "**Swap Word**" is checked, the words of the data read are swapped between them;
- In the field "**Mnemonic**" the description for the request is defined.

MODBUS WRITE

N	Slave ID	Type	Address	NPoint	Poll Time	On Change	Max Error	Position	Start Bit	Swap	Swap Word	Mnemonic
1	1	Holding Register	1	1	1000	☐	0	0	0	☐	☐	Set Temperature
2	1	Holding Register	10	2	1000	☑	0	2	0	☐	☐	Set RPM
3						☐				☐	☐	
4						☐				☐	☐	
5						☐				☐	☐	

The means of the fields are:

+ In the field "**Slave ID**" the address of the Modbus device that you have to write is defined;
+ In the field "**Type**" the data type of the register to write is defined. It is possible to choose between the following:
    o Coil Status;
    o Holding Register.
+ In the field "**Address**" the start address of the register to be written is defined (in decimal);
+ In the field "**NPoint**" the number of consecutive registers to be written is defined (number of words);
+ In the field "**Poll Time**" the delay time to make the request is defined;
+ If the field "**On Change**" is checked, the converter sends the writing request when the data from SNMP side change value.
+ In the field "**Max Error**" the number of consecutive errors that the converter waits before suspending the request until the next reboot is defined. If is set to '0' this function is disabled;
+ In the field "**Position**" the address of the SNMP array where taking the information is defined. Each position corresponds to a byte;
+ In the field "**Start Bit**" the starting bit of the first byte of the field "Position" is defined. Valid only for the "Coil Status" and "Input Status";
+ If the field "**Swap**" is checked, the data written the Modbus registers are swapped;
+ If the field "**Swap Word**" is checked, the words of the data written are swapped between them;
+ In the field "**Mnemonic**" the description for the request is defined.

Note: If you want that the converter sends the data only "On change", the "Poll Time" must be at 0.

Note: If the field "On change" is checked and the "Poll Time" is different from 0, the converter sends the writing request cyclically and also when the data is changed.

SET SNMP ACCESS (only if "Dynamic Map" is used)

By pressing the "**Set SNMP Access**" button from the main window the "Set SNMP Access" window appears (Fig. 5). In this section, it is possible to create the OIDs for SNMP side to read or write using GET and SET commands or to be sent as TRAP messages. The window is divided into two tables, one for SNMP readings and one for SNMP writings.
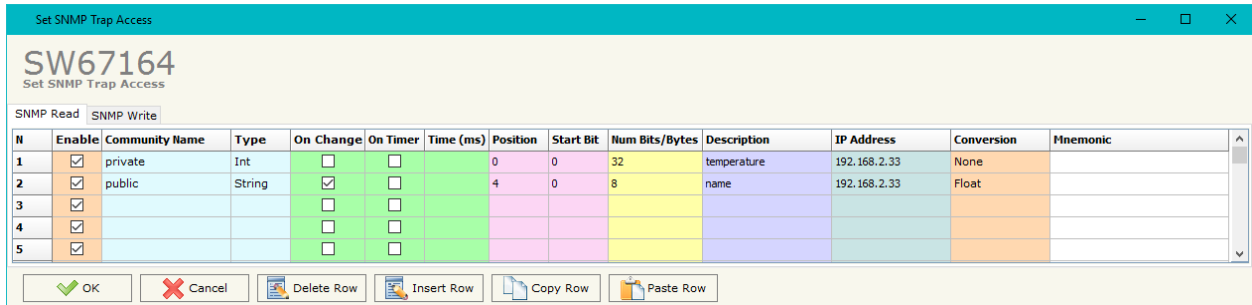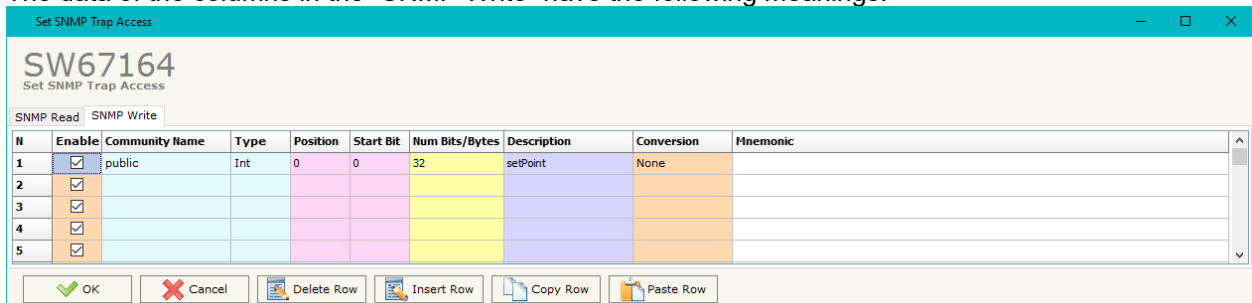

N	Enable	Community Name	Type	On Change	On Timer	Time (ms)	Position	Start Bit	Num Bits/Bytes	Description	IP Address	Conversion	Mnemonic
1	☑	private	Int	☐	☐		0	0	32	temperature	192.168.2.33	None	
2	☑	public	String	☑	☐		4	0	8	name	192.168.2.33	Float	
3	☑			☐	☐								
4	☑			☐	☐								
5	☑			☐	☐								

Figure 5a: "Set SNMP Access -> SNMP Read" window

The data of the columns in the "SNMP Read" have the following meanings:

- If the field "**Enable**" is checked, the SNMP OID is enabled;
- In the field "**Community Name**" the name of the Community is defined;
- In the field "**Type**" the type of data of the OID is defined (Octet String or Integer);
- If the field "**On Change**" is checked, the OID is sent as Trap when the data from Modbus side change;
- If the field "**On Timer**" is checked, the OID is sent as Trap cyclically;
- In the field "**Time (ms)**" the delay time for the Trap send is defined (if "On Timer" option is checked);
- In the field "**Position**" the starting byte of the internal memory array where taking the data is defined (see *Set access* on page 15);
- In the field "**Start Bit**" the starting bit of the selected Position is defined;
- In the field "**Num Bits/Bytes**" the dimension of the OID is defined. For 'Int' type the dimension is in bit, for 'String' type the dimension is in bytes;
- In the field "**Description**" the description/name of the OID is defined;
- In the field "**IP Address**" the IP Address of the SNMP device where addressing the Trap message is defined. This field is used only when 'On Change' or 'On Timer' option is checked;
- In the field "**Conversion**" it is possible to select the data conversion to apply to the data (Float to Int);
- In the field "**Mnemonic**" a brief description of the OID is defined.

The data of the columns in the "SNMP Write" have the following meanings:

N	Enable	Community Name	Type	Position	Start Bit	Num Bits/Bytes	Description	Conversion	Mnemonic
1	☑	public	Int	0	0	32	setPoint	None	
2	☑								
3	☑								
4	☑								
5	☑								

- If the field "**Enable**" is checked, the SNMP OID is enabled;
- In the field "**Community Name**" the name of the Community is defined;
- In the field "**Type**" the type of data of the OID is defined (Octet String or Integer);
- In the field "**Position**" the starting byte of the internal memory array where mapping the data is defined;

- In the field "**Start Bit**" the starting bit of the selected Position is defined;
- In the field "**Num Bits/Bytes**" the dimension of the OID is defined. For 'Int' type the dimension is in bit, for 'String' type the dimension is in bytes;
- In the field "**Description**" the description/name of the OID is defined;
- In the field "**Mnemonic**" a brief description of the OID is defined.

Note: If the fields "On Change" and "On Timer" are disabled, the OID is readable using standard GET command. If one of these fields is enabled, the OID is sent as Trap and it is readable by GET command too.

Note: The field "Description" must start with lowercase letter and it cannot contain special chars (just letters and numbers). All the "Description" fields must be different between them.

SNMP MIB (only if "Dynamic Map" is used)

By pressing the "**SNMP MIB**" button it is possible to save the MIB file for the SNMP Manager.

UPDATE DEVICE

By pressing the "**Update Device**" button, it is possible to load the created Configuration into the device; and also the Firmware, if necessary.
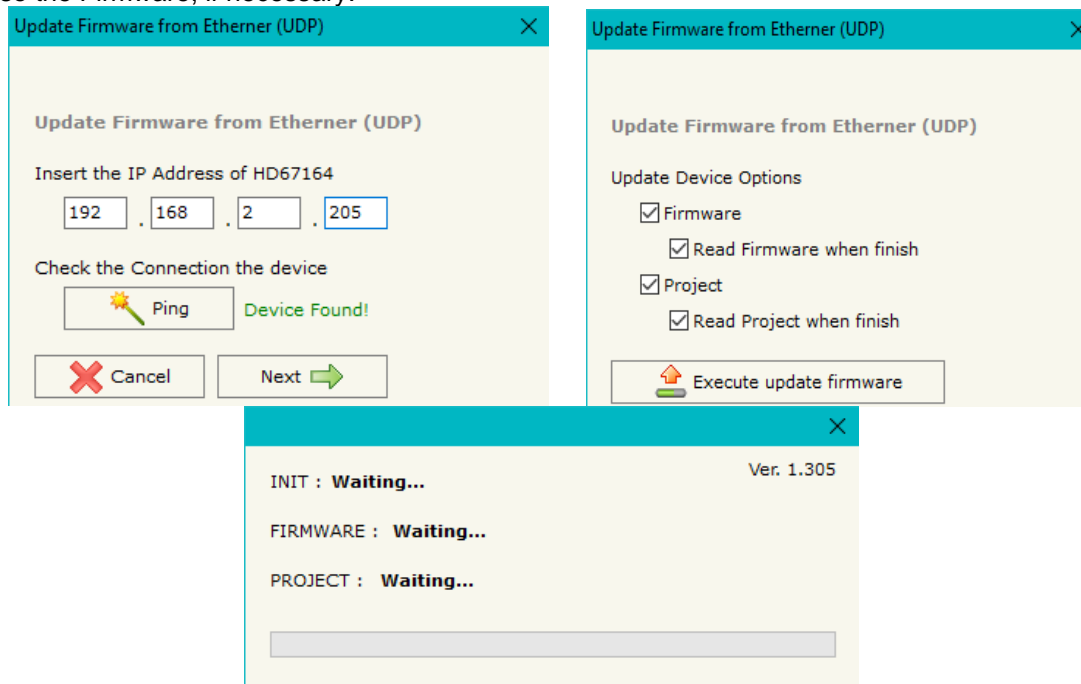
If you don't know the actual IP address of the device you have to use this procedure:

- Turn OFF the Device;
- Put Dip1 of 'Dip-Switch A' in ON position;
- Turn ON the device
- Connect the Ethernet cable point to point between your PC and the SIU-SNM-01, by setting the Ethernet adapter in class 192.168.2.xxx;
- Insert the IP "**192.168.2.205**";
- Press the "**Ping**" button, "Device Found!" must appear;
- Press the "**Next**" button;
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" turn OFF the Device;
- Put Dip1 of 'Dip-Switch A' at OFF position;
- Turn ON the device.

If you know the actual IP address of the device, you have to use this procedure:

- Turn ON the Device with the Ethernet cable inserted;
- Insert the actual IP of the Converter;
- Press the "**Ping**" button, must appear "Device Found!";
- Press the "**Next**" button;
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" the device automatically goes at Normal Mode.

At this point the configuration/firmware on the device is correctly update.

Note: When you install a new version of the software, if it is the first time it is better you do the update of the Firmware in the SIU-SNM-01 device.

Note: When you receive the device, for the first time, you also have to update the Firmware in the SIU-SNM-01 device.

Warning: If case a warning message appears when you try to do the Update try these points before seeking assistance:

- Try to repeat the operations for the updating;
- Try with another PC;
- Try to restart the PC;
- Check the LAN settings;
- If you are using the program inside a Virtual Machine, try to use in the main Operating System;
- If you are using Windows Seven, Vista, 8 or 10 make sure that you have the administrator privileges;
- In case you have to program more than one device, using the "UDP Update", you have to cancel the ARP table every time you connect a new device on Ethernet. For do this you have to launch the "Command Prompt" and write the command "arp -d". Pay attention that with Windows Vista, Seven, 8 or 10 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

TRAP messages from SNMP:

All the OIDs defined in the "Set SNMP Access -> SNMP Read" table can be sent as TRAP messages too.
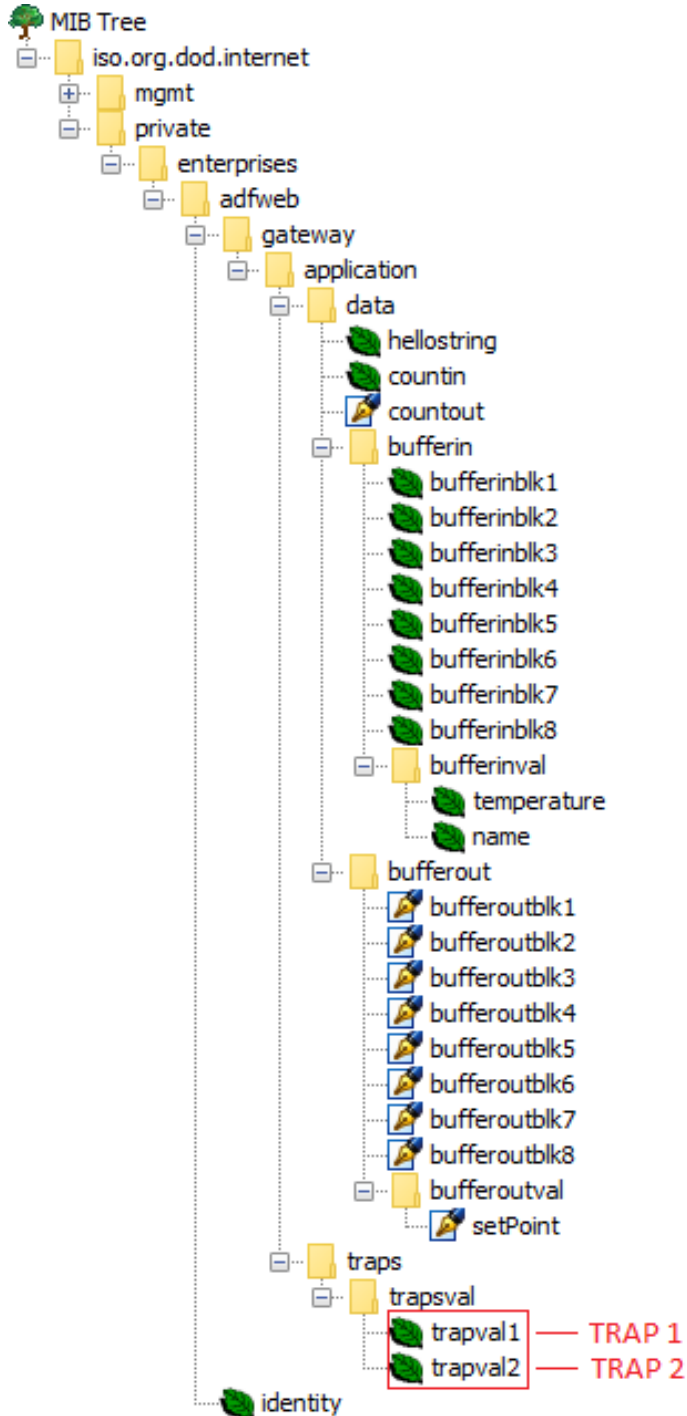
The TRAP messages are contained in the MIB tree and they have these OIDs:

- ⇢ TRAP 1 (first row of "Set SNMP Access -> SNMP Read" table): .1.3.6.1.4.1.49314.1.1.2.1.**1**
- ⇢ TRAP 2 (second row of "Set SNMP Access -> SNMP Read" table): .1.3.6.1.4.1.49314.1.1.2.1.**2**
- ⇢ TRAP X (Xth row of "Set SNMP Access -> SNMP Read" table): .1.3.6.1.4.1.49314.1.1.2.1.**X**

SNMP COMMUNICATION (Fixed Map)

In order to read/write the data from/to Modbus side, it is necessary to use specific SNMP commands in order to see the SNMP Input and write the SNMP Output.

Reading Modbus data from SNMP:

In order to read the data from the SIU-SNM-01 it is necessary to use the "snmpget" command. The Input array is contained to this internal directory: 1.3.6.1.4.1.33118.1.1.1.4.x.0, where 'x' is the number of data block. Each data block has a dimension of 128 bytes.

Example: you want to read information of the data block 3. The structure of the command to send is:

snmpget –v1 –cprivate "IP Address of the converter" 1.3.6.1.4.1.33118.1.1.1.4.**3**.0

Figure 8a: MIB Tree Input

Writing Modbus data from SNMP:

In order to write the data to the converter it is necessary to use the "snmpset" command. The Output array is contained to this internal directory: 1.3.6.1.4.1.33118.1.1.1.4.x.0, where 'x' is the number of data block. Each data block has a dimension of 128 bytes.

Example: you want to write information of the data block 3 with the data '0123456789' (ASCII). The structure of the command to send is:

snmpset –v1 –cprivate "IP Address of the converter" 1.3.6.1.4.1.33118.1.1.1.5.**3**.0 s "0123456789"

Figure 8b: MIB Tree Output

Note: The data blocks from 1 to 8 are used to read/write the entire internal SNMP arrays of the converter. The data are represented in bytes.

Each Modbus request defined in the section "Set Modbus Access" is associated to a specific OID too. In order to read/write a specific Modbus request from SNMP, it is necessary to use the Data Block 9.

The Modbus request in write will be mapped consecutively to the Modbus request in read. So, in the MIB structure, you will find all the Modbus request in read defined and then all the Modbus request in write. See the following example for more information.

Example:

We have defined two Modbus reading requests in the section "Set Modbus Access -> Modbus Read" and two Modbus writing requests in the section "Set Modbus Access -> Modbus Write".

In order to read the data related to the first Modbus reading request (the first raw of the "Modbus Read" table), the OID to require will be 1.3.6.1.4.1.33118.1.1.1.4.**9**.**1** where:

-**9**: Data Block 9
-**1**: First raw of the "Set Modbus Access" section

The Modbus request in write will be mapped consecutively to the Modbus request in read, so, in this example, in order to write the first Modbus writing request (the first raw of the "Modbus Write" table), the OID to require will be 1.3.6.1.4.1.33118.1.1.1.5.**9**.**3** where:
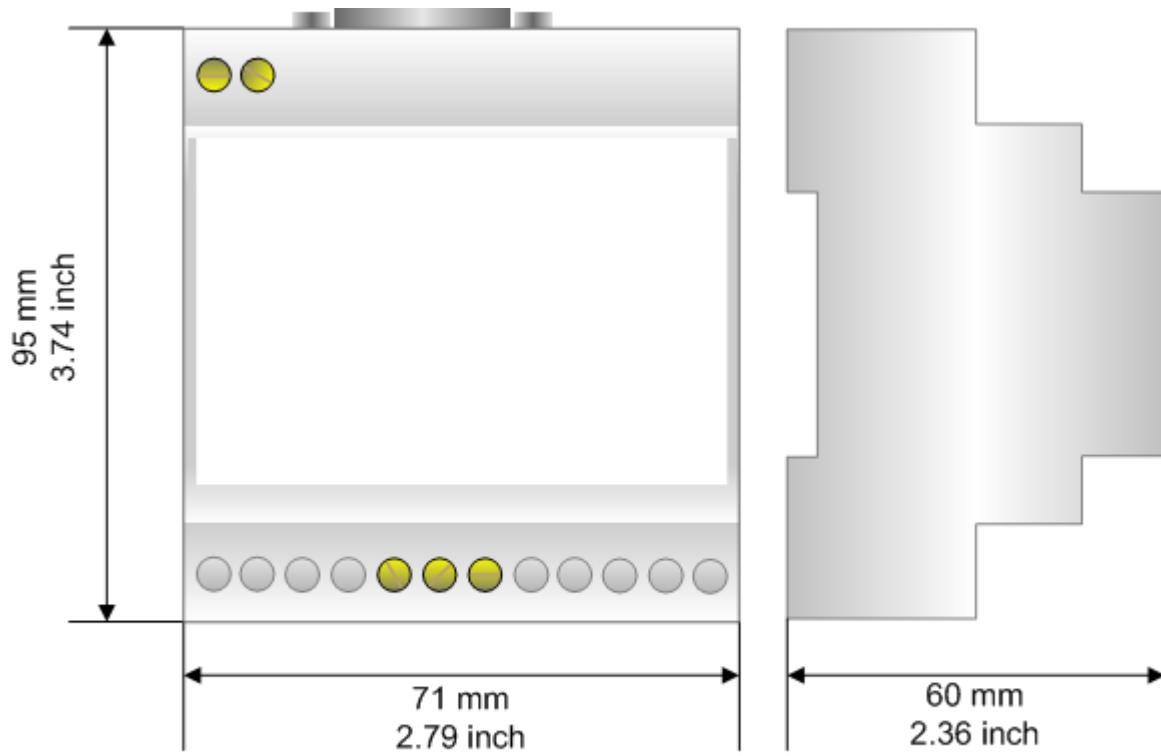
-**9**: Data Block 9
-**3**: n + 1, where 'n' is the last raw number of the "Modbus Read" table.

Note: It is possible to read an entire data block or only a specific byte/value (for the Data Block 1 to 8). It depends on the OID used:

- 1.3.6.1.4.1.33118.1.1.1.4.x.0: entire data block
- 1.3.6.1.4.1.33118.1.1.1.4.x.y: value of the data block/specific byte

MECHANICAL DIMENSIONS:

95 mm
3.74 inch

71 mm
2.79 inch

60 mm
2.36 inch

Housing: PVC
Weight: 200g (Approx)

DISCLAIMER

All technical content within this document can be modified without notice. The content of the document is a under continual renewal.
For losses due to fire, earthquake, third party access or other accidents, or intentional or accidental abuse, misuse, or use under abnormal conditions repairs are charged to the user. The manufacturer will not be liable for accidental loss of use or inability to use this product, such as loss of business income. The manufacturer shall not be liable for consequences of improper use.

OTHER REGULATIONS AND STANDARDS

WEEE INFORMATION

Disposal of old electrical and electronic equipment (as in the European Union and other European countries with separate collection systems).

This symbol on the product or on its packaging indicates that this product may not be treated as household rubbish. Instead, it should be taken to an applicable collection point for the recycling of electrical and electronic equipment. If the product is disposed correctly, you will help prevent potential negative environmental factors and impact of human health, which could otherwise be caused by inappropriate disposal. The recycling of materials will help to conserve natural resources. For more information about recycling this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE

The device respects the 2002/95/EC Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (commonly referred to as Restriction of Hazardous Substances Directive or RoHS).

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