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Industrial Electronic Devices

User Manual

Revision 1.100
English

M-Bus Multi-Master / Modbus Slave on RS232
(Order Code: HD67063-232-B2-20, HD67063-232-B2-40,
   HD67063-232-B2-80, HD67063-232-B2-160, HD67063-232-B2-250)

M-Bus Multi-Master / Modbus Slave on RS485
 (Order Code: HD67063-485-B2-20, HD67063-485-B2-40,
   HD67063-485-B2-80, HD67063-485-B2-160, HD67063-485-B2-250)

Benefits and Main Features:

  Very easy to configure

  Electrical isolation

  Industrial temperature range: -40°C / 70°C (-40°F / 158°F)

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INDEX:

UPDATED DOCUMENTATION:

Dear customer, we thank you for your attention and we remind you that you need to check that the following document is:

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REVISION LIST:

Revision	Date	Author	Chapter	Description
1.001	17/02/2011	Fl	All	Revision
1.010	05/07/2012	Fl	All	Software changed (v1.111)
1.011	15/02/2013	Nt	All	Added new chapters
1.100	13/05/2017	Ff	All	New hardware version

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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.

RESIDUAL 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:
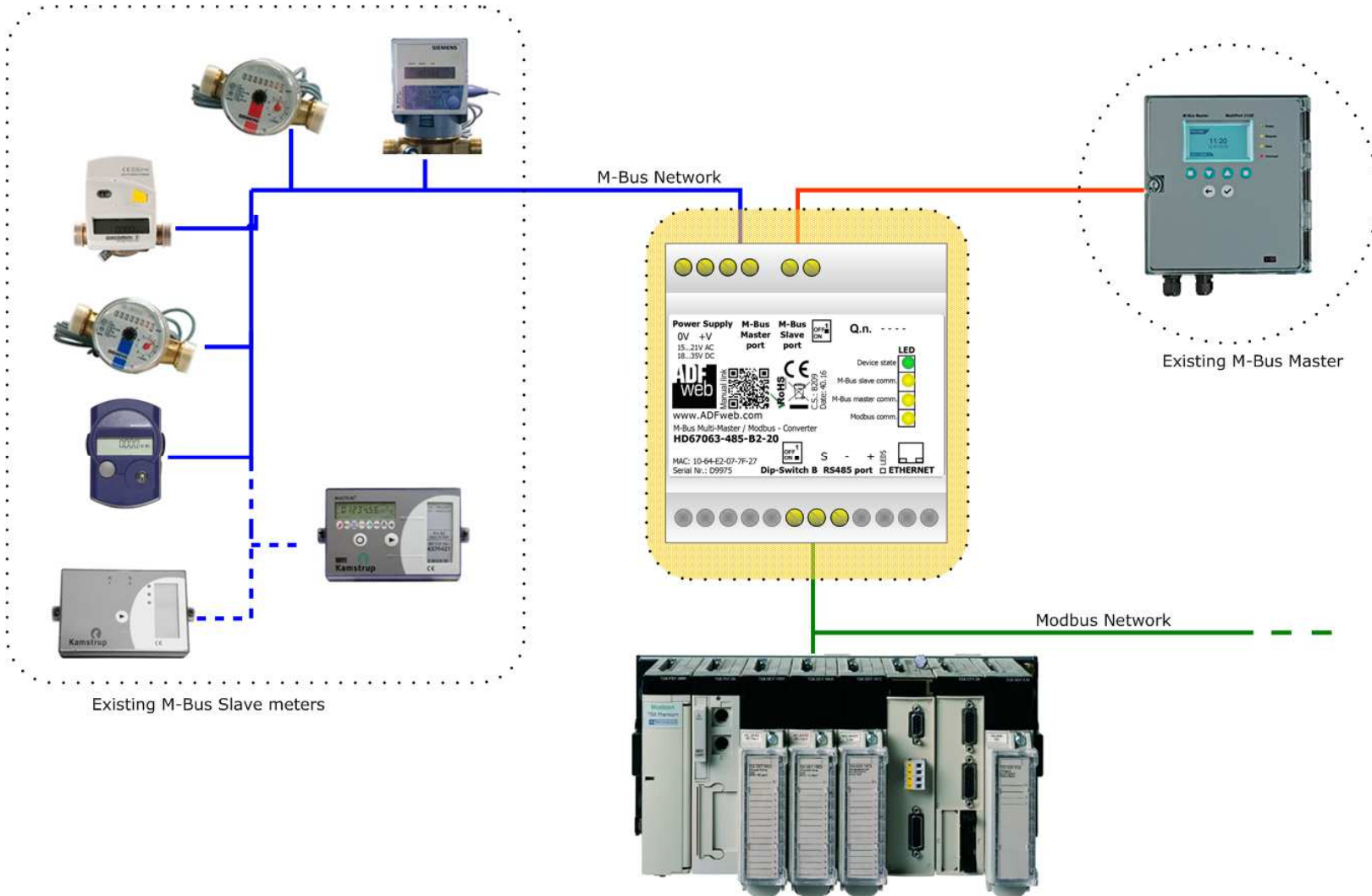
⚠️ This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

CE CONFORMITY
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EXAMPLE OF CONNECTION:

M-Bus Network

Existing M-Bus Master

Existing M-Bus Slave meters

Modbus Network

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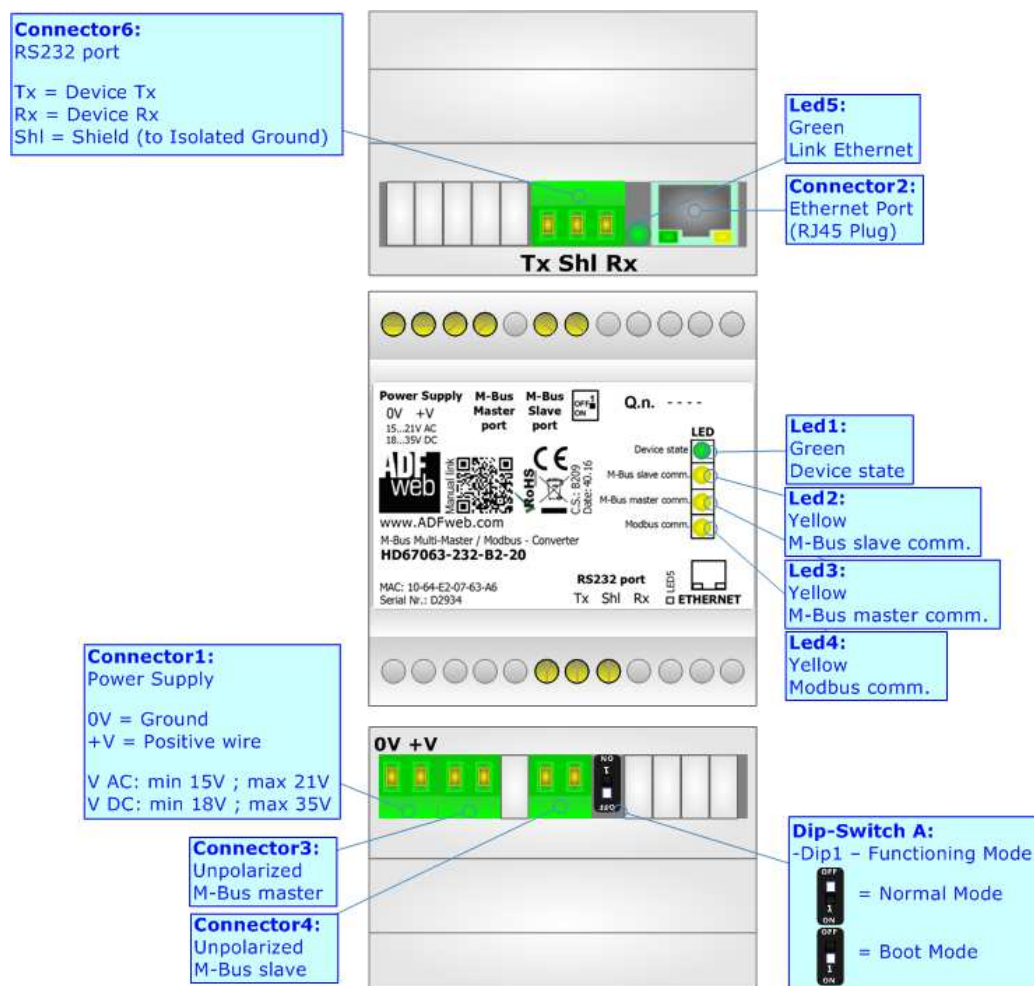
CONNECTION SCHEME:

Figure 1a: Connection scheme for HD67063-232-B2-xxx

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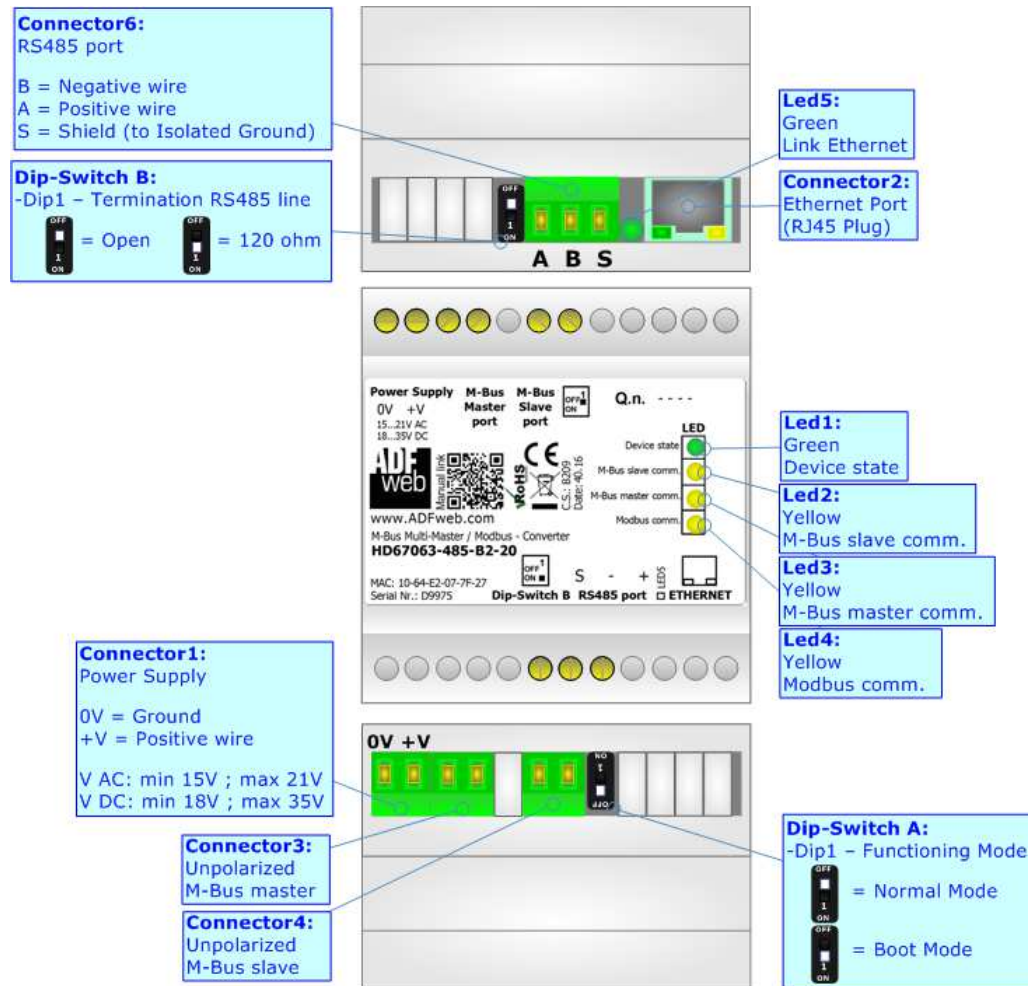
Figure 1b: Connection scheme for HD67063-485-B2-xxx

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CHARACTERISTICS:

The HD67063-232-B2-xxx / HD67063-485-B2-xxx is a Gateway Multi-Master M-Bus from/to Modbus Slave.
They allows the following characteristics:

- Electrical isolation between RS232C/RS485 and M-Bus;
- Baud Rate and Parity changeable with software;
- Mountable on Rail DIN;
- Power Supply 15…21V AC or 18…35V DC;
- Temperature range -40°C to 70°C.

At the Gateway can be connected up to 250 standard M-Bus devices. This number depends of the code expressed by the xxx number:

- HD67063-232-B2-20 or HD67063-485-B2-20 support up to 20 M-Bus devices;
- HD67063-232-B2-40 or HD67063-485-B2-40 support up to 40 M-Bus devices;
- HD67063-232-B2-80 or HD67063-485v-80 support up to 80 M-Bus devices;
- HD67063-232-B2-160 or HD67063-485-B2-160 support up to 160 M-Bus devices;
- HD67063-232-B2-250 or HD67063-485-B2-250 support up to 250 M-Bus devices.

⚠️ In the case of HD67063-232-B2-160 and or HD67063-485-B2-160 the device must be mounted on 35mm DIN rail which is horizontally mounted on a wall or cabinet back-plate. To avoid obstructions to the airflow around the unit it is recommended to not cover the paths of air.

⚠️ In the case of HD67063-232-B2-250 and or HD67063-485-B2-250 the device must be mounted on 35mm DIN rail which is horizontally mounted on a wall or cabinet back-plate. These units have a fan in the top of the enclosure. To avoid obstructions to the airflow around the unit it is recommended to not cover the paths of air. Take care to not cover the fan. It is recommended to put the device into a ventilated cabinet.

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CONFIGURATION:

You need Compositor SW67063 software on your PC in order to perform the following:

- Define the parameter of Modbus line;
- Define the parameter of M-Bus line;
- Define which Modbus register contain the M-Bus information;
- Update the device.

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POWER SUPPLY:
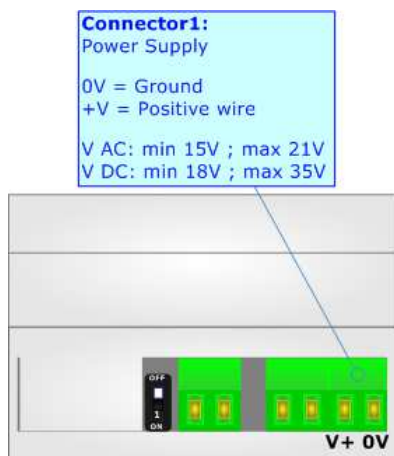
The devices can be powered at 15…21V AC and 18…35V DC. The consumption depends to the code of the device. For more details see the two tables below.

VAC		VDC	
Vmin	Vmax	Vmin	Vmax
15V	21V	18V	35V

Consumption at 24V DC:

Device	No Load [W/VA]	Full Load [W/VA]*
HD67063-232-B2-20 / HD67063-485-B2-20		4
HD67063-232-B2-40 / HD67063-485-B2-40		5
HD67063-232-B2-80 / HD67063-485-B2-80	3.5	8
HD67063-232-B2-160 / HD67063-485-B2-160		14
HD67063-232-B2-250 / HD67063-485-B2-250		30

* This value is with all the Slave M-Bus devices of the code (20, 40, 80, 160, 250) connected to the line

Connector1:
Power Supply

0V = Ground
+V = Positive wire

V AC: min 15V ; max 21V
V DC: min 18V ; max 35V

V+ 0V

Caution: Not reverse the polarity power

+V   0V

HD67063-232-B2-xxx   HD67063-485-B2-xxx

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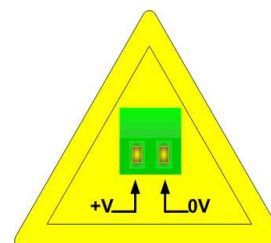
FUNCTION MODES:

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.

For the operations to follow for the updating (see 'UPDATE DEVICE' section).
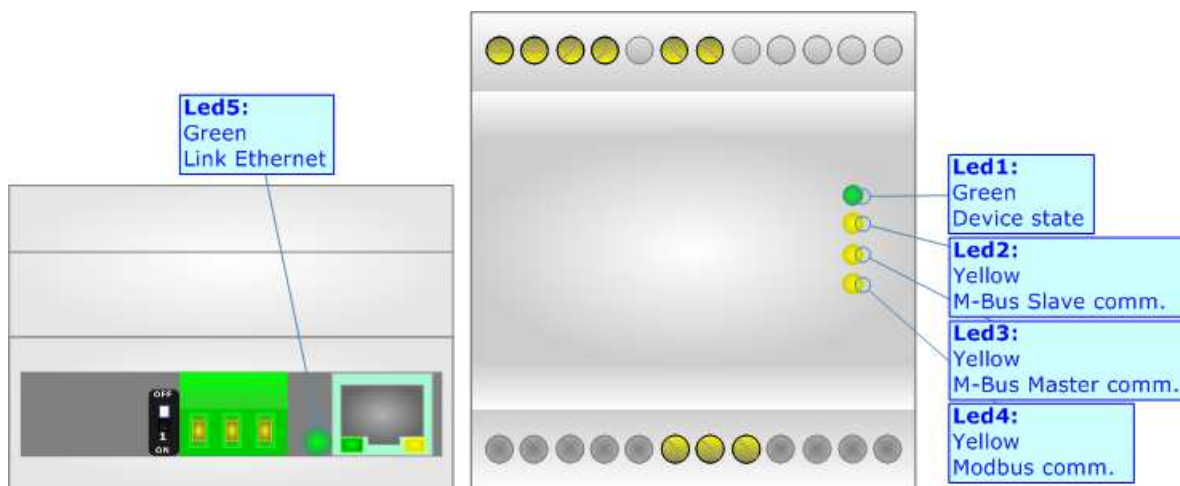
According to the functioning mode, the LEDs will have specifics functions (see 'LEDS' section).

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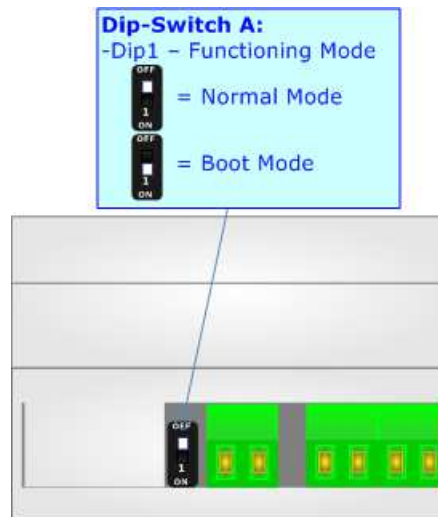
LEDS:

The device has 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: M-Bus Slave communication (yellow)	Blinks when correct M-Bus request is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
3: M-Bus Master communication (yellow)	Blinks when correct M-Bus response is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: Modbus communication (yellow)	Blinks when correct Modbus request is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
5: Ethernet Link (green)	**ON:** Ethernet cable connected **OFF:** Ethernet cable disconnected	**ON:** Ethernet cable connected **OFF:** Ethernet cable disconnected

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M-BUS:

The M-Bus is a unpolarized bus.

A two wire standard telephone cable (JYStY N*2*0.8 mm) is used as the transmission medium for the M-Bus. The maximum distance between a slave and the repeater is 350m; this length corresponds to a cable resistance of up 29Ω. This distance applies for the standard configuration having Baud rates between 300 and 9600 Baud, and a 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 in a segment fall below 12V, because of the remote powering of the slaves. In the standard configuration the total cable length should not exceed 1000m, in order to meet the requirement of a maximum cable capacitance of 180nF. *(Taken from M-Bus specifics)*
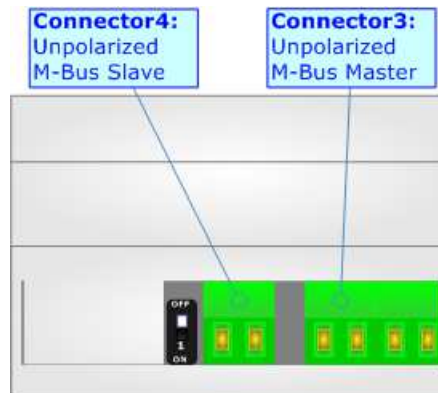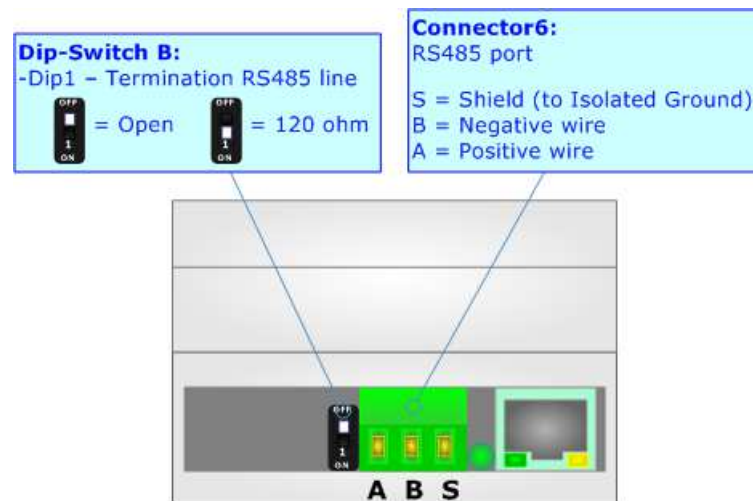
RS485:

For terminate the RS485 line with a 220Ω resistor it is necessary that the Dip1 of Dip-Switch B is at ON position.

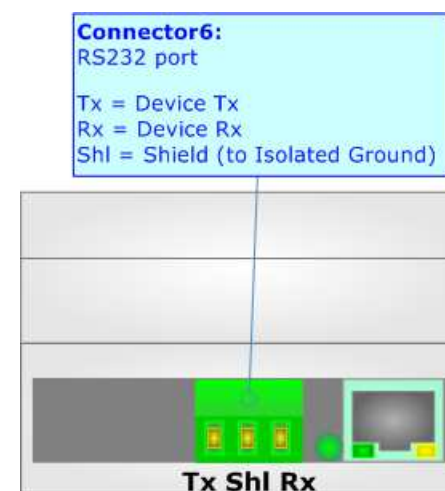The maximum length of the cable should be 1200m (4000 feet).

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.

Dip-Switch B:
-Dip1 – Termination RS485 line
= Open   = 120 ohm

Connector6:
RS485 port

S = Shield (to Isolated Ground)
B = Negative wire
A = Positive wire

A B S

RS232:

The connection from RS232 socket to a serial port (example one from a personal computer) must be made with a Null Modem cable (a serial cable where the pins 2 and 3 are crossed). It is recommended that the RS232C Cable not exceed 15 meters.

Connector6:
RS232 port

Tx = Device Tx
Rx = Device Rx
Shl = Shield (to Isolated Ground)

Tx Shl Rx

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USE OF COMPOSITOR SW67063:

To configure the Converter, use the available software that runs with Windows called SW67063. It is downloadable from the site www.adfweb.com and its operation is described in this document *(this manual is referenced to the last version of the software present on our web site)*. The software works with MSWindows (XP, Vista, Seven, 8; 10; 32/64bit).

When launching the SW67063, the window below appears (Fig. 2).

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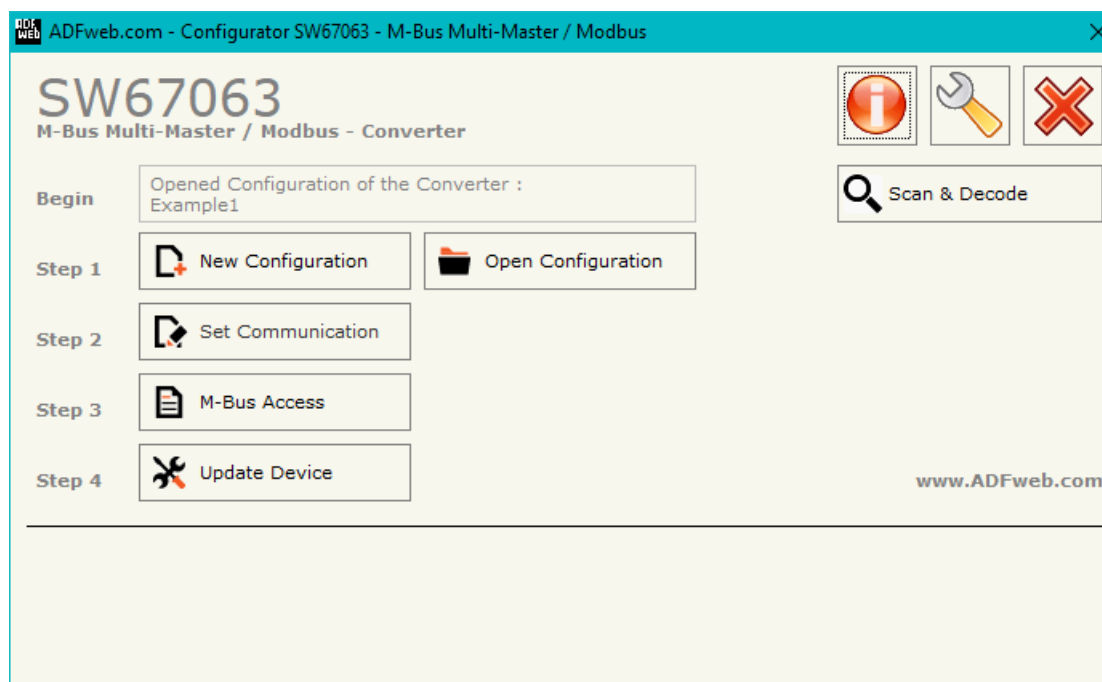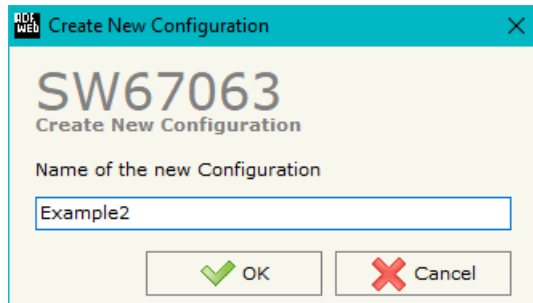   It is necessary to have installed .Net Framework 4.

Figure 2: Main window for SW67063

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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 "M-Bus Multi-Master / Modbus Slave - 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**".
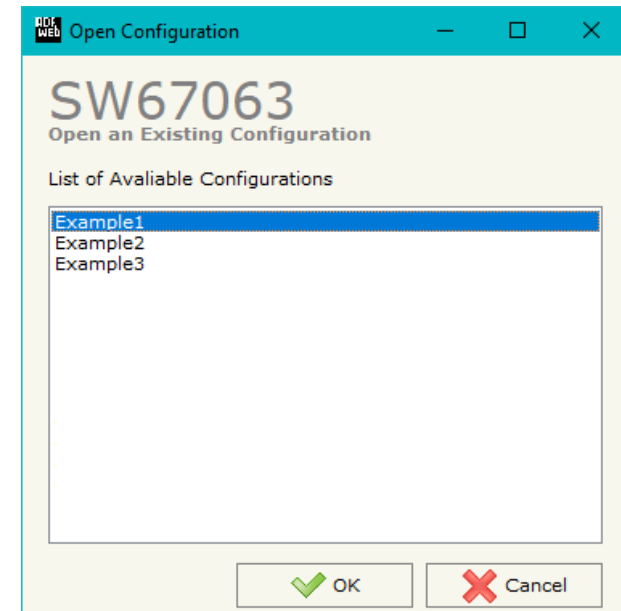
SOFTWARE OPTIONS:

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

In the section "Language" it is possible to change the language of the software.
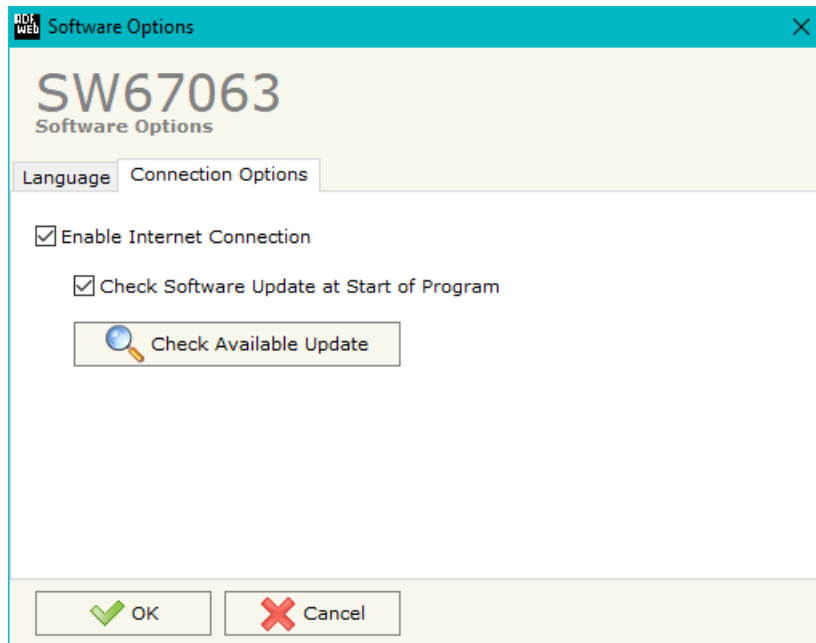
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67063 check automatically if there are updatings when it is launched.

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SET COMMUNICATION:

By Pressing the "**Set Communication**" button from the main window for SW67063 (Fig. 2) the window "Set Communication" appears (Fig. 3). The window is divided in two sections.

In the section "Hardware Type" it is possible to define the hardware used:

- HD67063-B2 without Ethernet port;
- HD67063-B2 with Ethernet port.

The means of the fields for "Modbus Slave" are:

- In the field "**Serial**" the serial port used for the Modbus Communication (RS232 or RS485) is defined;
- In the field "**Baudrate**" the data rate of the Modbus line is defined;
- In the field "**Parity**" the parity of the Modbus line is defined;
- In the field "**Stop Bits**" the number of Stop bits of the Modbus line is defined;
- In the field "**ID Device**" the Modbus ID to assign to the converter is defined.
- In the field "**Protocol**" it is possible to select the protocol to use in Modbus line from the following:
  - **Modbus RTU**;
  - **Modbus ASCII**;
  - **JBUS**;
  - **Binary**: simple protocol defined by Us, whose functions are described in the document "Simple Protocol" downloadable at www.adfweb.com/download/filefold/Simple_Protocol_ENG.pdf;
  - **ASCII**: simple protocol defined by Us, whose functions are described in the document "Simple Protocol" downloadable at www.adfweb.com/download/filefold/Simple_Protocol_ENG.pdf.
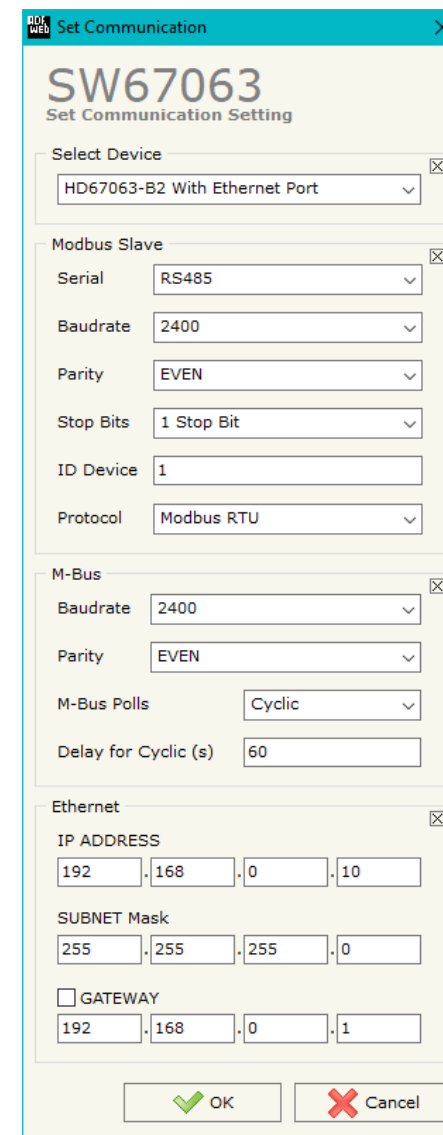

Figure 3: "Set Communication" window

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The means of the fields for M-Bus are:

➔ In the field "**Baudrate**" the data rate of the M-Bus net is defined;

➔ In the field "**Parity**" the parity of the M-Bus line is defined;

➔ If the field "**M-Bus Poll on request**" is checked, the converter makes the request only if a Modbus register is requested; otherwise if "**Cyclic request**" is checked, the converter makes the request in M-bus network with the delay defined; otherwise if "**Passive Mode**" is checked, the converter doesn't do any request in M-bus network, it waits that the existing Master do it and analyze the reply;

➔ In the field "**Delay for Cyclic (s)**" a time expressed in seconds is defined. This time is used for the "Cyclic request".

If "HD67063-B2 with Ethernet port" is selected, the means of the fields for "Ethernet" are (programming port):

➔ In the field "**IP ADDRESS**" the IP address to assign to the converter is defined;

➔ In the field "**SUBNET Mask**" the SubNet Mask to assign to the converter is defined;

➔ In the field "**GATEWAY**" the default gateway of the net is defined. This feature can be enabled of disabled pressing the Check Box field.

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M-BUS ACCESS:

By Pressing the "**M-Bus Access**" button from the main window for SW67063 (Fig. 2) the window "M-Bus Network" appears (Fig. 4).

SECTION NODES:

- In order to create a new node it is necessary to select which address use, selecting "**Primary ID**" or "**Secondary ID**", to makes the requests and then insert the "Primary Address" (from 1 to 250) or the Secondary Address" (from 0 to 99999999) of M-Bus device.

- In the field "**Description**" it is possible to write a short description of the node.

- In the field "**Node State**" it is possible to insert an address Modbus that contain the Status of the M-Bus device. If you don't need to know this, put this register at 0.

- In the field "**Identification Number**" it is possible to insert an address Modbus that contain the Identification Number of the M-Bus device. You have to read two consecutive registers for knowing the value. If you don't need to know this, put this register at 0.

- If the field "**Convert BCD in Integer Identification Num.**" is checked the Converter converts the Identification Number that is normally expressed in BCD in a Integer.

- In the field "**Swap Identification Num**." it is possible to select the swap mode of the Identification Number. If swap isn't necessary you have to select "None"; otherwise see the section "Swap Identification" (page 30) of this document for select the swap mode.

- If the field "**Send SND_NKE**" is checked, the Converter send the "SND_NKE" frame to start the communication.

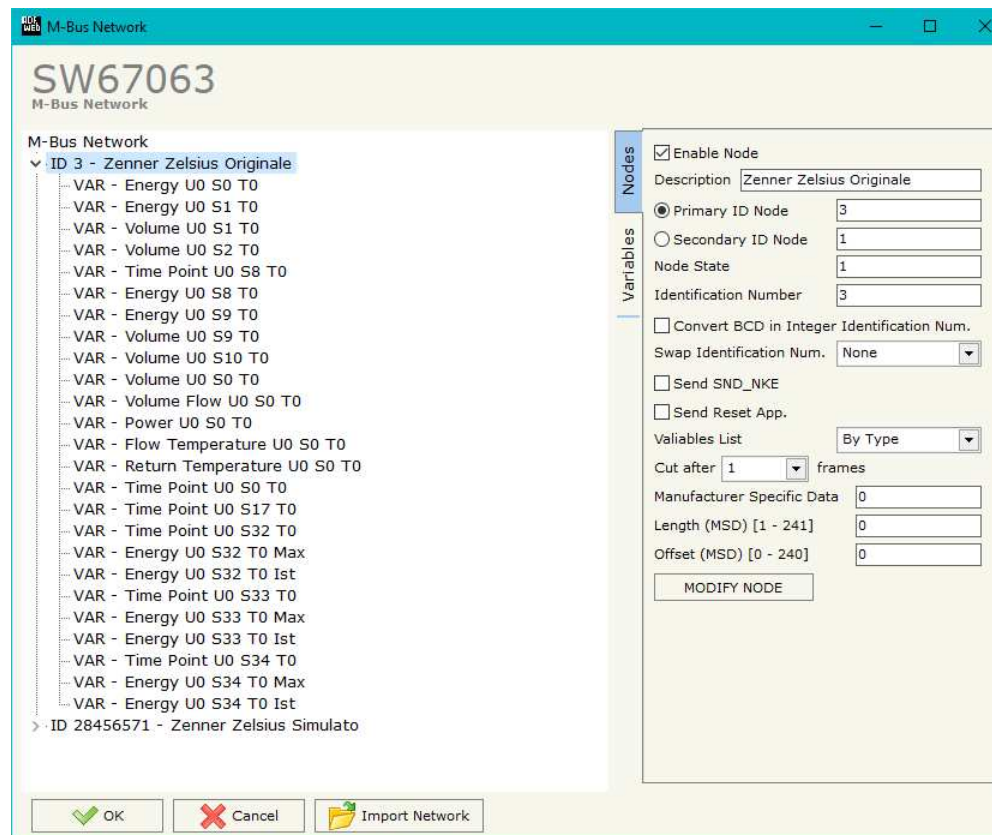- In the field "**Send Reset App**." Is checked the Converter send the "Application Reset" command to the slave.

Figure 4: "M-Bus Network" window

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- In the field "**Variables List**" it is possible to select which type of variables definition to use. If is selected "By Type" it is necessary to fill all fields, in the section Variables, with the correct values; otherwise if "By Position" is selected you can insert the progressive number of the variable that you need (page 26 for more information).
- In the field "**Cut after**" it is possible to select after how many frames stops data requests. It is used when the slave has got many data frames and you don't need to read all them.
- In the field "**Manufacturing Specific Data**" is possible to insert the starting address Modbus from which you want to save the information of Manufacturer Specific (after DIF=0x0F or DIF=0x1F).
- In the field "**Length (MSD) [1 - 241]**" is possible to insert the length of the data you need to save.
- In the field "**Offset (MSD) [0 - 240]**" is possible to insert the offset from where save the data.
- For more information about "Manufacturer Specific Data" functions, see page 32.

After that, pressing the "**ADD NODE**" button, a new node appears in the left side of the window. In order to modify a created node it is necessary to select the desired node, change the wrong items and then press the "**MODIFY NODE**" button.

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SECTION VARIABLES (BY TYPE):

Selecting the desired node it is possible to add a variable. In order to create a new variable it is necessary to fill these items:

- To use the created variable the field "**Enable Variable**" must be checked. If you have created a variable but for the moment it is unused it is possible to uncheck the field "Enable Variable" without delete it;

- In the field "**Description**" it is possible to write a description of the variable (it isn't a necessary information,

- it helps the readability of the tree of network);

- The field "**Type of Data**" is used to select the unit of measure;

- In the field "**VIF ASCII String**" insert the string of VIF. It is possible to use this field only if the "Type of Data" is "VIF is in ASCII";

- In the field "**Function Field**" it is necessary to select the type of data;

- The field "**Dimension**" is used to select the dimension of the variable (8, 16, 24, 32, 32 real, 48, 64 bit, Variable Length);

- In the field "**Length(Variable Len)**" insert the length of the data in the case of the dimension is "Variable Length";

- In the field "**Unit**" if it is necessary it is possible to select the unit of that variable. The Unit is used for indicates from which device the data come;

- In the field "**Modbus Register**" it is necessary to insert the value of Modbus Register that contains the data of the M-Bus device. It is possible to insert from Modbus Register "1" to "60000";

- In the field "**Modbus Re Scale**" it is necessary to insert the value of Modbus Register that contains the value of measure scale. If the scale is not necessary, you have to insert the number "0" in this field. It is possible to insert from Modbus Register "1" to "60000";

- In the field "**Storage Number**" if it is necessary it is possible to insert the value of storage counter of that variable. With this field the slave can indicate and transmit various stored counter states or historical values, in the order in which they occur;

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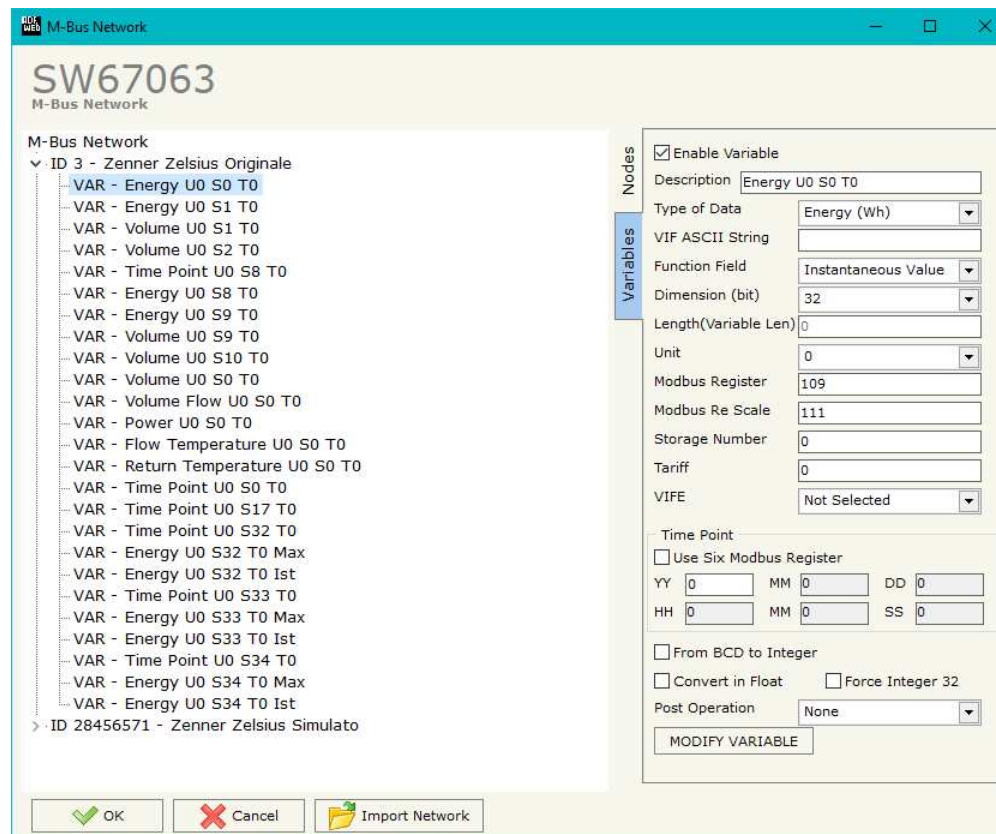
- In the field "**Tariff**" if it is necessary it is possible to insert the value of the tariff of that variable. The Tariff is used for indicates from which device the data come;
- In the field "**VIFE**" it is possible to select a sub-type of "Type of Data";
- If the field "**Use Six Modbus Register**" and the "Type of Data" is "Time Point" it is possible to read the information of Year, Month, Day, Hour, Minutes, Seconds on six consecutive Modbus registers without decoding the data (if not selected the values are the same of the reply of the slave device, so coded with a determinate structure). You have to insert the first Modbus Register.
- If the field "**From BCD to Integer**" is checked the Converter converts the BCD value of variable in Integer format. This happens only if the variable is in BCD format; if it isn't nothing changes.
- If the field "**Convert in Float**" is checked the Converter converts the data into Float type. Every variable occupies two consecutive Modbus Registers and the first one is the one defined in "Modbus Register". In this case the float value is multiplied by the "Modbus Re Scale" automatically.
- In the field "**Post Operation**" it is possible to select to do a math operation to the value. The possibilities are: :10, :100, :1000, :10000, :100000, :1000000, *10, *100, *1000, *10000, *100000, *1000000.
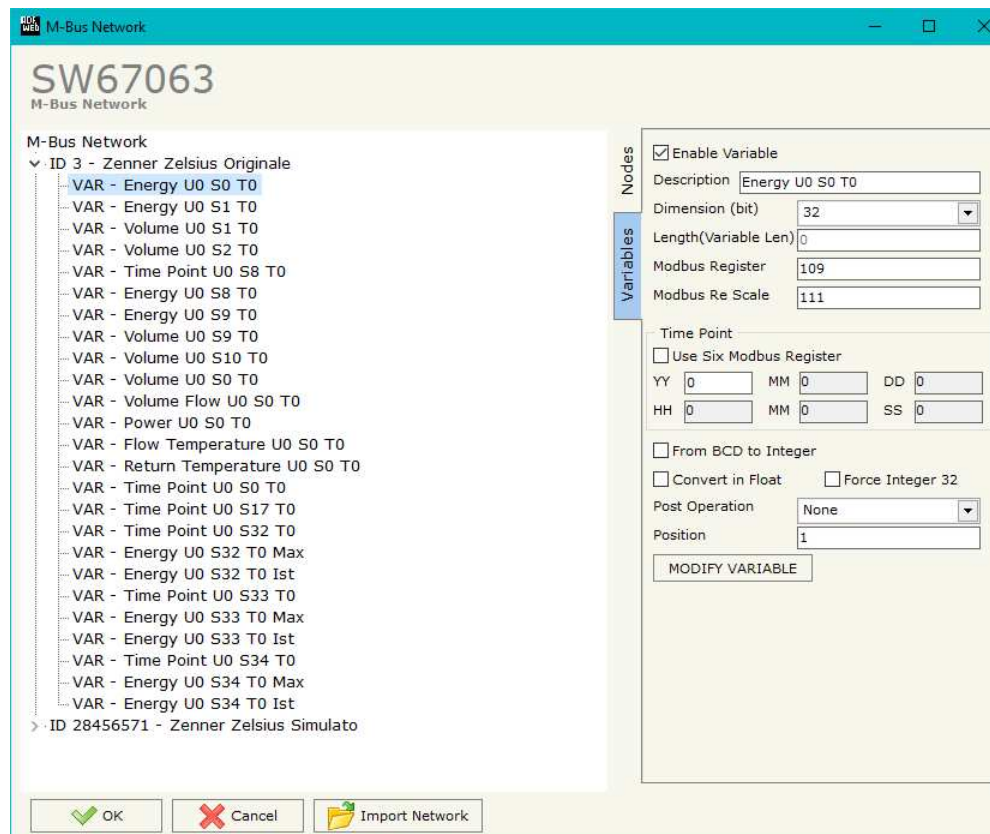
Having completed this fields, to add the variable the button "**ADD VARIABLE**" must be pressed.

In order to modify a created variable it is necessary to select the desired variable, change the wrong items and then press the "**MODIFY VARIABLE**" button.

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SECTION VARIABLES (BY POSITION):

Selecting the desired node it is possible to add a variable. In order to create a new variable it is necessary to fill these items:

⇒ To use the created variable the field "**Enable Variable**" must be checked. If you have created a variable but for the moment it is unused it is possible to uncheck the field "Enable Variable" without delete it;

⇒ In the field "**Description**" it is possible to write a description of the variable (it isn't a necessary information, it helps the readability of the tree of network);

⇒ The field "**Dimension**" is used to select the dimension of the variable (8, 16, 24, 32, 32 real, 48, 64 bit, Variable Length);

⇒ In the field "**Length(Variable Len)**" insert the length of the data in the case of the dimension is "Variable Length";

⇒ In the field "**Modbus Register**" it is necessary to insert the value of Modbus Register that contains the data of the M-Bus device. It is possible to insert from Modbus Register "1" to "60000";

⇒ In the field "**Modbus Re Scale**" it is necessary to insert the value of Modbus Register that contains the value of measure scale. If the scale is not necessary, you have to insert the number "0" in this field. It is possible to insert from Modbus Register "1" to "60000";

⇒ If the field "**Use Six Modbus Register**" and the "Type of Data" is "Time Point" it is possible to read the information of Year, Month, Day, Hour, Minutes, Seconds on six consecutive Modbus registers without decoding the data (if not selected the values are the same of the reply of the slave device, so coded with a determinate structure (page 22 for more information)). You have to insert the first Modbus Register.

⇒ If the field "**From BCD to Integer**" is checked the Converter converts the BCD value of variable in Integer format. This happens only if the variable is in BCD format; if it isn't nothing changes;

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- If the field "**Convert in Float**" is checked the Converter converts the data into Float type. Every variable occupies two consecutive Modbus Registers and the first one is the one defined in "Modbus Register". In this case the float value is multiplied by the "Modbus Re Scale" automatically.
- In the field "**Post Operation**" it is possible to select to do a math operation to the value. The possibilities are: :10, :100, :1000, :10000, :100000, :1000000, *10, *100, *1000, *10000, *100000, *1000000.
- In the field "**Position**" insert the number of the variable that you want on Modbus.

Example:

```
0x68 - Start Byte
0xBD - L Fied
0xBD - L Field
0x68 - Start Byte
0x08 - C Field
0x02 - A Field
0x72 - CI Field

0x71 - Identification Number (Byte 4of4)
0x65 - Identification Number (Byte 3of4)
0x45 - Identification Number (Byte 2of4)
0x28 - Identification Number (Byte 1of4)
0x4D - Manufacturer (Byte 2of2)
0x6A - Manufacturer (Byte 1of2)
0x81 - Version
0x04 - Medium
0x3E - Access Number
0x27 - Status
0x00 - Signature (Byte 2of2)
0x00 - Signature (Byte 1of2)

0x04 - DIF
0x79 - VIF            Identification
0x00 - Data (Byte 4of4)
0x00 - Data (Byte 3of4)
0x00 - Data (Byte 2of4)
0x00 - Data (Byte 1of4)

0x04 - DIF
0x06 - VIF            Energy
0x00 - Data (Byte 4of4)
0x00 - Data (Byte 3of4)
0x00 - Data (Byte 2of4)
0x00 - Data (Byte 1of4)

0x44 - DIF
0x06 - VIF            Energy
0x00 - Data (Byte 4Of4)
0x00 - Data (Byte 3Of4)
0x00 - Data (Byte 2Of4)
0x00 - Data (Byte 1Of4)
…
…   Other Variables
…
0x55 - Check Sum
0x16 - Stop Byte
```
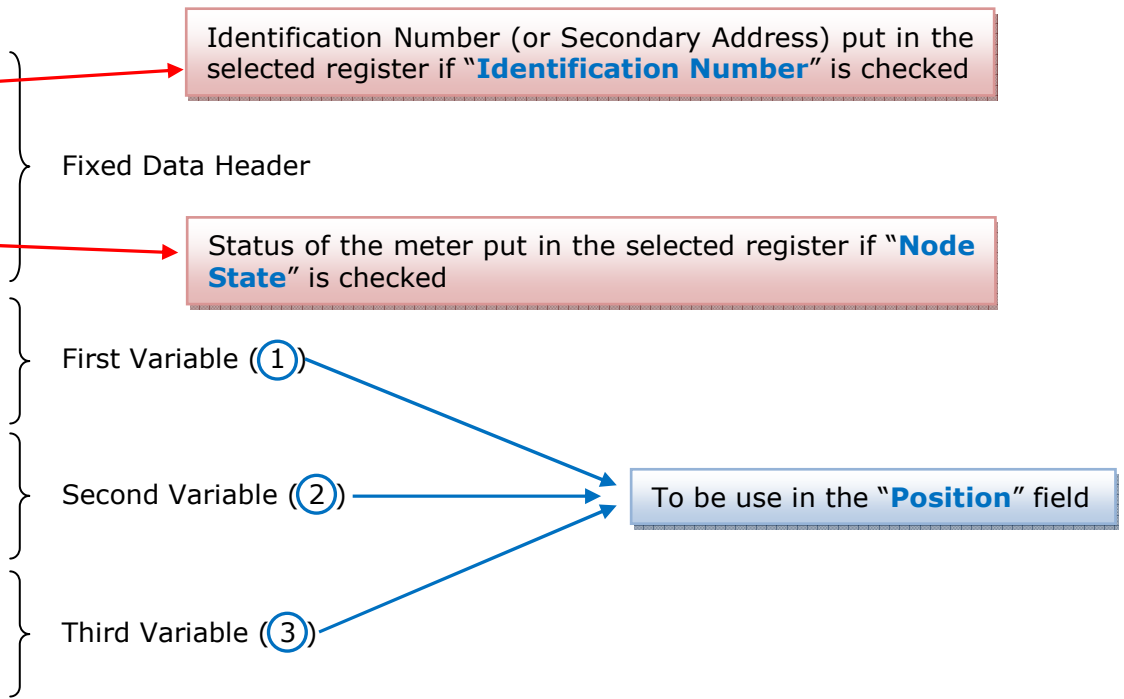
Identification Number (or Secondary Address) put in the selected register if "**Identification Number**" is checked

Fixed Data Header

Status of the meter put in the selected register if "**Node State**" is checked

First Variable (①)

Second Variable (②)

Third Variable (③)

To be use in the "**Position**" field

Industrial Electronic Devices

COPY / PASTE / DELETE:

Is possible to copy/paste/delete a node or a variable, simply by going with the right button of mouse on the desired item.

Industrial Electronic Devices
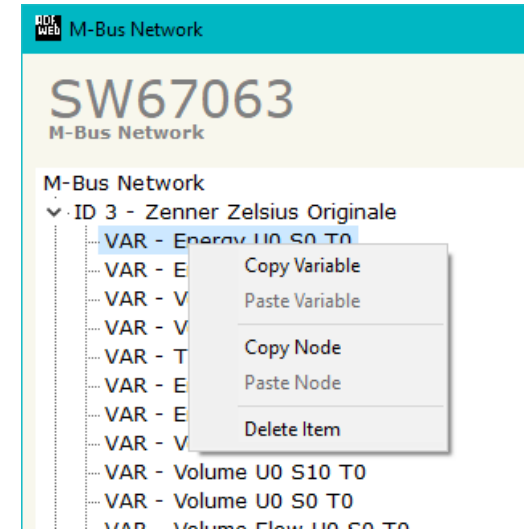
Possible choices for the fields used to create a variable:

Type of Data:
 |_Energy (Wh)
 |_Energy (J)
 |_Volume (m^3)
 |_Mass (Kg)
 |_On Time
 |_Operating Time
 |_Power (W)
 |_Power (J/h)
 |_Volume Flow (m^3/h)
 |_Volume Flow Ext. (m^3/min)
 |_Volume Flow Ext. (m^3/s)
 |_Mass Flow (Kg/h)
 |_Flow Temperature (°C)
 |_Return Temperature (°C)
 |_Temperature Difference (K)
 |_External Temperature (°C)
 |_Pressure (bar)
 |_Averaging Duration
 |_Actuality Duration
 |_Type of data in VIFE
 |_Time Point
 |_VIF is in ASCII
 |_Unit for H.C.A.
 |_Fabrication No
 |_(Enhaced) Identification
 |_Bus Address

Function Field:
 |_Instantaneous Value
 |_Minimum Value
 |_Maximum Value
 |_Value During Error State

Dimension (bit):
 |_8
 |_16
 |_24
 |_32
 |_32 real
 |_48
 |_64
 |_Variable Length

VIFE:

|_ Not Selected
|_ Credit of the nominal local legal currency units
|_ Debit of the nominal local legal currency units
|_ Access Number (transmission count)
|_ Medium (as in fixed header)
|_ Manufacturer (as in fixed header)
|_ Parameter set identification
|_ Model/Version
|_ Hardware Version #
|_ Firmware Version #
|_ Software Version #
|_ Customer Location
|_ Customer
|_ Access Code User
|_ Access Code Operator
|_ Access Code System Operator
|_ Access Code Developer
|_ Password
|_ Error flags (binary)
|_ Error mask
|_ Digital Output (binary)
|_ Digital Input (binary)
|_ Baudrate [Baud]
|_ response delay time [bittimes]
|_ Retry
|_ First storage # for cyclic storage
|_ Last storage # for cyclic storage
|_ Size of storage block
|_ Storage interval [sec(s)..day(s)]
|_ Storage interval month(s)
|_ Storage interval year(s)
|_ Duration since last readout[sec(s)..day(s)]
|_ Start (date/time) of tariff
|_ Duration of tariff (nn=01..11:min to day)
|_ Period of tariff [sec(s) to day(s)]

|_ Period of tariff months(s)
|_ Period of tariff year(s)
|_ dimensionless/ no VIF
|_ Volts
|_ Ampere
|_ Reset counter
|_ Comulation counter
|_ Control signal
|_ Day of week
|_ Week number
|_ Time point of day change
|_ State of parameter activation
|_ Special supplier information
|_ Duration since last comulation [hour(s)..year(s)]
|_ Operation time battery [hour(s)..year(s)]
|_ Date and time of battery change
|_ Energy MWh
|_ Energy GJ
|_ Volume
|_ Mass
|_ Volume 0,1 feet^3
|_ Volume 0,1 American gallon
|_ Volume 1 American gallon
|_ Volume flow 0,001 American gallon/min
|_ Volume flow 1 American gallon/min
|_ Volume flow 1 American gallon/h
|_ Power MW
|_ Power GJ/h
|_ Flow Temperature
|_ Return Temperature
|_ Temperature Difference
|_ External Temperature
|_ Cold/Warm Temperature Limit °F
|_ Cold/Worm Temperature Limit °C
|_ Cumul. count max power

Industrial Electronic Devices

|_ per second
|_ per minute
|_ per hour
|_ per day
|_ per week
|_ per month
|_ per year
|_ per revolution/measurement
|_ increment per input pulse on input channel
|_ increment per output pulse on output channel
|_ per liter
|_ per m^3
|_ per kg
|_ per K (Kelvin)
|_ per kWh
|_ per GJ
|_ per kW
|_ per (K*l)(Kelvin*liter)
|_ per V (Volt)
|_ per A (Ampere)
|_ multiplied by sek
|_ multiplied by sek/V
|_ multiplied by sek/A
|_ start date(/time) of
|_ VIF contains uncorrected unit instead of corrected unit
|_ Accumulation only if positive contributions
|_ Accumulation of abs value only if negative contributions
|_ upper/lower limit value
|_ # of exceeds of lower/upper limit
|_ Date(/time) of begin/end of first/last lower/upper limit exceed
|_ Duration of limit exceed
|_ Duration of first/last
|_ Date(/time) of first/last begin/end
|_ Multiplicative correction factor
|_ Additive correction constant * unit of VIF (offset)
|_ Multiplicative correction factor: 10^3

|_ future value
|_ next VIFE's and data of this block are manufacturer specific
|_ None
|_ Too many DIFE's
|_ Storage number not implemented
|_ Unit number not implemented
|_ Tariff number not implemented
|_ Function not implemented
|_ Data class not implemented
|_ Data size not implemented
|_ Too many VIFE's
|_ Illegal VIF-Group
|_ Illegal VIF-Exponent
|_ VIF/DIF mismatch
|_ Unimplemented action
|_ No data available (undefined value)
|_ Data overflow
|_ Data underflow
|_ Data error
|_ Premature end of record
|_ Security Key
|_ Remote control (device specific e.g. gas valve)
|_ Operator specific data
|_ Time point second (0 to 59)
|_ Data container for wireless M-Bus protocol
|_ Period of nominal data transmissions [sec(s) to day(s)]
|_ RF level units: dBm
|_ Daylight savings (beginning, ending, deviation) data type K
|_ Listening window management data type L
|_ Remaining battery life time (days)
|_ Number times the meter was stopped
|_ Reactive energy
|_ Apparent energy
|_ Energy
|_ Reactive power
|_ Relative humidity

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|_ Volume
|_ Phase U-U (volt. to volt.)
|_ Phase U-I (volt. to current)
|_ Frequency
|_ Apparent power
|_ Reserved for alternate non-metric unit system
|_ Value at base conditions

|_ Value during lower (u= 0), upper (u = 1) limit exceed
|_ Leakage values
|_ Overflow values

Industrial Electronic Devices

Swap Identification:

This field is used for select the Swap mode of Identification Number.

At the moment there are these possibilities:

+ None;
+ Type 1.

Examples:

- Identification Number (Secondary Address): 12345678; Address Register 1000; Convert BCD in Integer Identification Num. not checked.

None	Type 1
1000: 0x1234	1000: 0x5678
1001: 0x5678	1001: 0x1234

- Identification Number (Secondary Address): 12345678; Address Register 1000; Convert BCD in Integer Identification Num. checked.

None	Type 1
1000: 0x00BC	1000: 0x614E
1001: 0x614E	1001: 0x00BC

Industrial Electronic Devices

To know the meaning of value read in the "Modbus Re Scale" field, you must follow this table (x = Value read in Modbus Re Scale):

Description	Range Coding		Range
Energy	$10^{(x-3)}$	Wh	0.001 Wh to 10000 Wh
Energy	$10^{(x)}$	J	0.001 kJ to 10000 kJ
Volume	$10^{(x-6)}$	m^3	0.001 l to 10000 l
Mass	$10^{(x-3)}$	kg	0.001 kg to 10000 kg
On Time	x = 0 Seconds x = 1 Minutes x = 2 Hours x = 3 Days		
Operating Time	coded like On Time		
Power	$10^{(x-3)}$	W	0.001 W to 10000 W
Power	$10^{(x)}$	J/h	0.001 kJ/h to 10000 kJ/h
Volume Flow	$10^{(x-6)}$	m^3/h	0.001 l/h to 10000 l/h
Volume Flow Ext.	$10^{(x-7)}$	m^3/min	0.0001 l/min to 1000 l/min
Volume Flow Ext.	$10^{(x-9)}$	m^3/s	0.001 ml/s to 10000 ml/s
Mass Flow	$10^{(x-3)}$	kg/h	0.001 kg/h to 10000 kg/h
Flow Temperature	$10^{(x-3)}$	°C	0.001 °C to 1 °C
Return Temperature	$10^{(x-3)}$	°C	0.001 °C to 1 °C
Temperature Difference	$10^{(x-3)}$	K	1 mK to 1000 mK
External Temperature	$10^{(x-3)}$	°C	0.001 °C to 1 °C
Pressure	$10^{(x-3)}$	bar	1 mbar to 1000 mbar
Averaging Duration	coded like On Time		
Actuality Duration	coded like On Time		
Time Point	x = 0 Date x = 1 Time&Date		Data type G Data type F Data type J Data type I
Unit for H.C.A.			dimensionless

Data type F:

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8
2^{23}	2^{22}	2^{21}	2^{20}	2^{19}	2^{18}	2^{17}	2^{16}
2^{31}	2^{30}	2^{29}	2^{28}	2^{27}	2^{26}	2^{25}	2^{24}

Min (0 … 59);
Hour (0 … 23);
Day (1 … 31);
Month (1 … 12);
Year (0 … 99);
Time Invalid (0=Valid, 1=Invalid);
Summer Time (0=Standard Time, 1=Summer Time);
Reserved (0).

Data type G:

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8

Day (1 … 31);
Month (1 … 12);
Year (0 … 99).

Data type I:

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8
2^{23}	2^{22}	2^{21}	2^{20}	2^{19}	2^{18}	2^{17}	2^{16}
2^{31}	2^{30}	2^{29}	2^{28}	2^{27}	2^{26}	2^{25}	2^{24}
2^{39}	2^{38}	2^{37}	2^{36}	2^{35}	2^{34}	2^{33}	2^{32}
2^{47}	2^{46}	2^{45}	2^{44}	2^{43}	2^{42}	2^{41}	2^{40}

Sec (0 … 59);
Min (0 … 59);
Hour (0 … 23);
Day (1 … 31);
Month (1 … 12);
Year (0 … 99);
Time Invalid (0=Valid, 1=Invalid);
Summer Time (0=Standard Time, 1=Summer Time);
Day of week (1 … 7)
Week (1 … 53)

Data type J:

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8
2^{23}	2^{22}	2^{21}	2^{20}	2^{19}	2^{18}	2^{17}	2^{16}

Sec (0 … 59);
Min (0 … 59);
Hour (0 … 23).

For example, if you have defined:
- Type of Data= Energy (J); Function Field=Instantaneous Value; Dimension= 32 bit;
  Modbus Register=150 (Register 151 declared implicitly because the dimension is 32 bit); Modbus Re Scale=152.

After the request, in Modbus register 150 you read 0x0004, in 151 you read 0x5678 and in register 152 is write 0x0006. The value obtained is: 284280 x10$^{(6)}$ J.

Industrial Electronic Devices

MANUFACTURER SPECIFIC DATA

Using this function is possible to save into Modbus registers the part of M-Bus frame that is coded like Manufacturer Specific Data. Usually these data are at the end of the frame and after a DIF byte with the value 0x0F of 0x1F.

Here an example of the frame and the mentioned data (hexadecimal):

68 20 20 68 08 01 72 78 56 34 12 86 04 05 00 08 00 00 00 0C 78 78 56 34 12 0F 11 22 33 44 55 66 77 88 99 AA 74 16

If you want to save all ten bytes from Modbus register 200 you have to compile the fields "Manufacturer Specific Data", "Length (MSD) [1 – 241]" and Offset (MSD) [0 - 240] in this way: Manufacturer Specific Data: 200 | Length: 10 | Offset: 0.
On Modbus you will have this result: reg.200=1122h, reg.201=3344h, reg.202=5566h, reg.203=7788h, reg.204=99AAh

If you want to save only the byte 33 and 44 in the Modbus register 200 you have to compile the fields "Manufacturer Specific Data", "Length (MSD) [1 – 241]" and Offset (MSD) [0 - 240] in this way: Manufacturer Specific Data: 200 | Length: 2 | Offset: 2.
On Modbus you will have this result: reg.200=3344h

If you want to save only the byte 66 in the Modbus register 200 you have to compile the fields "Manufacturer Specific Data", "Length (MSD) [1 – 241]" and Offset (MSD) [0 - 240] in this way: Manufacturer Specific Data: 200 | Length: 1 | Offset: 5.
On Modbus you will have this result: reg.200=6600h

Industrial Electronic Devices

UPDATE DEVICE (for "HD67063-B2 without Ethernet port"):

By pressing the "**Update Device**" button it is possible to load the created Configuration into the device, and also the Firmware if is necessary, using the RS232 port.

In order to load the parameters or update the firmware in the device, follow these instructions:

- Turn OFF the Device;
- Connect the RS232 cable from your PC to the Converter;
- Insert Jumper1;
- Select the "**COM port**" and press the "**Connect**" button;
- Turn ON the device;
- Check the "Device state" Led. It must blink quickly (see "LEDS" section);
- 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;
- Remove Jumper1;
- Disconnect the RS232 cable;
- Turn ON the device.
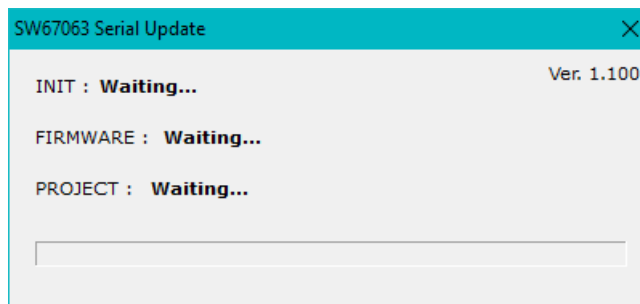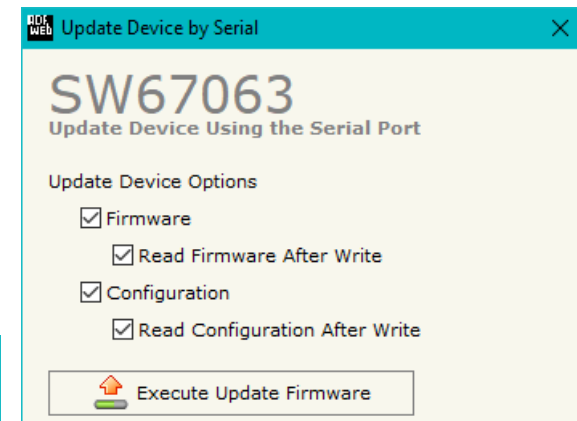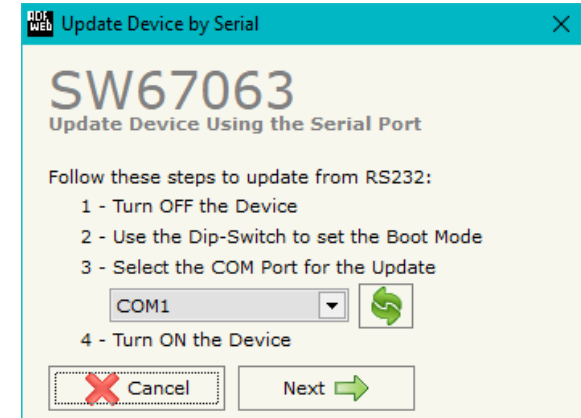
Figure 5: "Update via Serial" windows

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Industrial Electronic Devices

UPDATE DEVICE (for "HD67063-B2 with Ethernet port"):

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;
- 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' in 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.

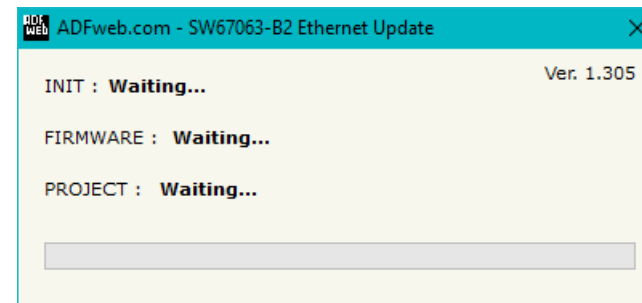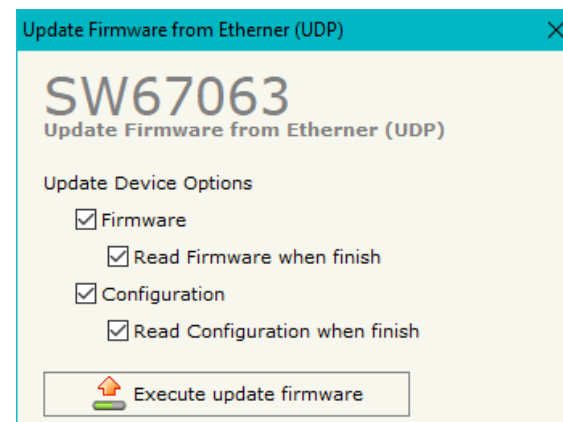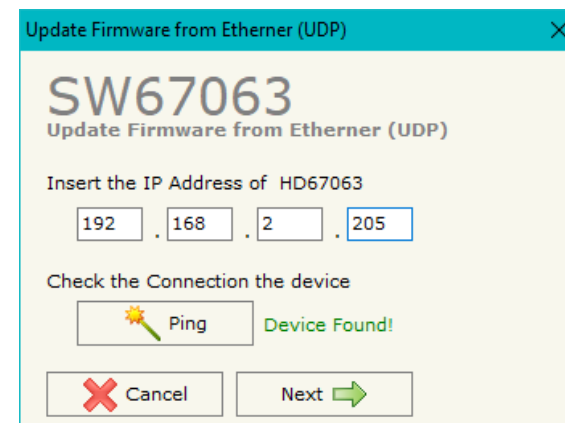At this point the configuration/firmware on the device is correctly updated.

Figure 6: "Update via UDP" windows

Industrial Electronic Devices

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 HD67063 device.

Note:
When you receive the device, for the first time, you also have to update the Firmware in the HD67063 device.

Warning:
If Fig. 7 appears when you try to do the Update try these points before seeking assistance:

- Check if the serial COM port selected is the correct one;
- Check if the serial cable is connected between the PC and the device;
- Try to repeat the operations for the updating;
- If you are using a USB←→RS232 converter try with a native COM port or change the converter;
- 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 and 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, 10 you have to launch the "Command Prompt" with Administrator Rights;
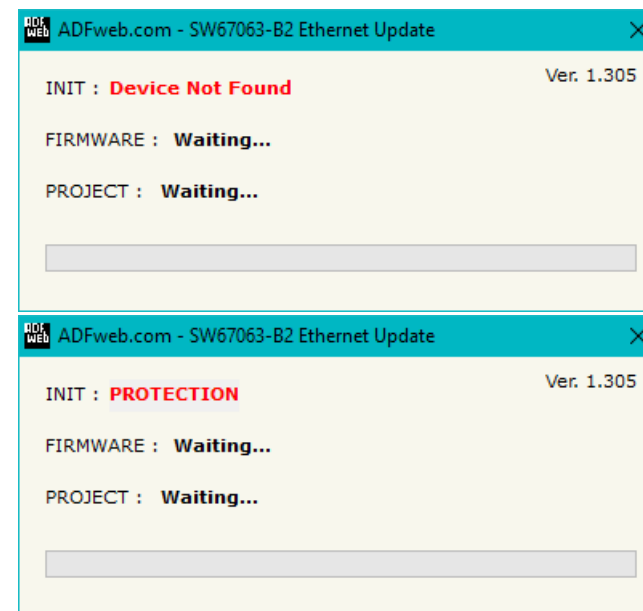- Pay attention at Firewall lock.

In the case of HD67063 you have to use the software "SW67063": www.adfweb.com\download\filefold\SW67063.zip.

Figure 7: "Protection" window

SCAN & DECODE:

Preliminary operations to do before press the "**Scan & Decode**" button:

- Compile the fields of "Set Communication" form;
- Update the device.

By Pressing the "**Scan & Decode**" button from the main window for SW67063 (Fig. 2) the window "Scan & Decode" appears (Fig. 8a).

With this tool is possible to do a scan of the M-Bus network connected to the HD67063 in order to create the project with nodes and variables.

- In the field "**Scan By**" is possible to select to perform the scan by Primary or Secondary Address;
- In the field "**IP Address**" insert the IP address of converter. By default the value is the one given on "Set Communication" form;
- In the field "**Baudrate**" select the baudrate of the M-Bus net used for the scan;
- In the field "**Parity**" select the parity of the M-Bus line used for the scan;
- By selecting the field "Send Application Reset", during the scan is send the Application Reset message to the slaves;
- By selecting the "Send SND NKE" field, during the scan is send the SND_NKE message to the slaves;
- In the field "**Cut After**" define the number of frames after which the converter stops data requests. It is used when the slave has got many data frames and you don't need to read all them.

By Pressing the "**Start Scan**" button the scan will be started and appears the window of figure 8b.

Figure 8a: "Scan & Decode" window

When the scan is finished, appears the window of figure 8c, where there are all the nodes found during the scan with all the variables.
Is possible to select which node export to the configuration, and also which variables of the node.

By pressing the "**New Scan**" button is possible to do a new scan of the network. All devices that were find in the previous scan will be deleted.

By pressing the "**Save Conf.**" button the devices and variables that have the mark in the box will be saved into the configuration of device.
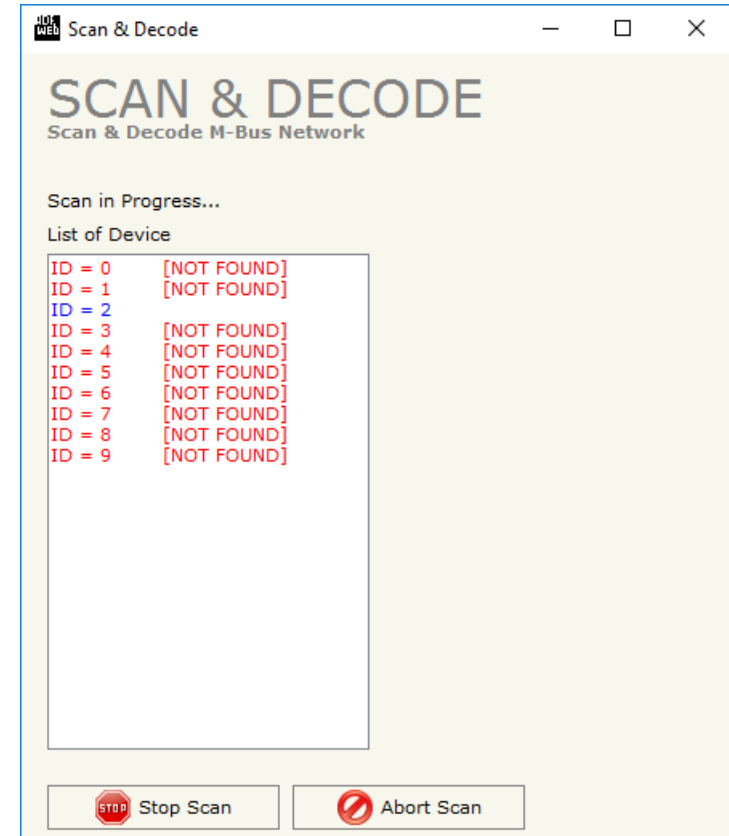

Figure 8b: "Scan & Decode" *window*
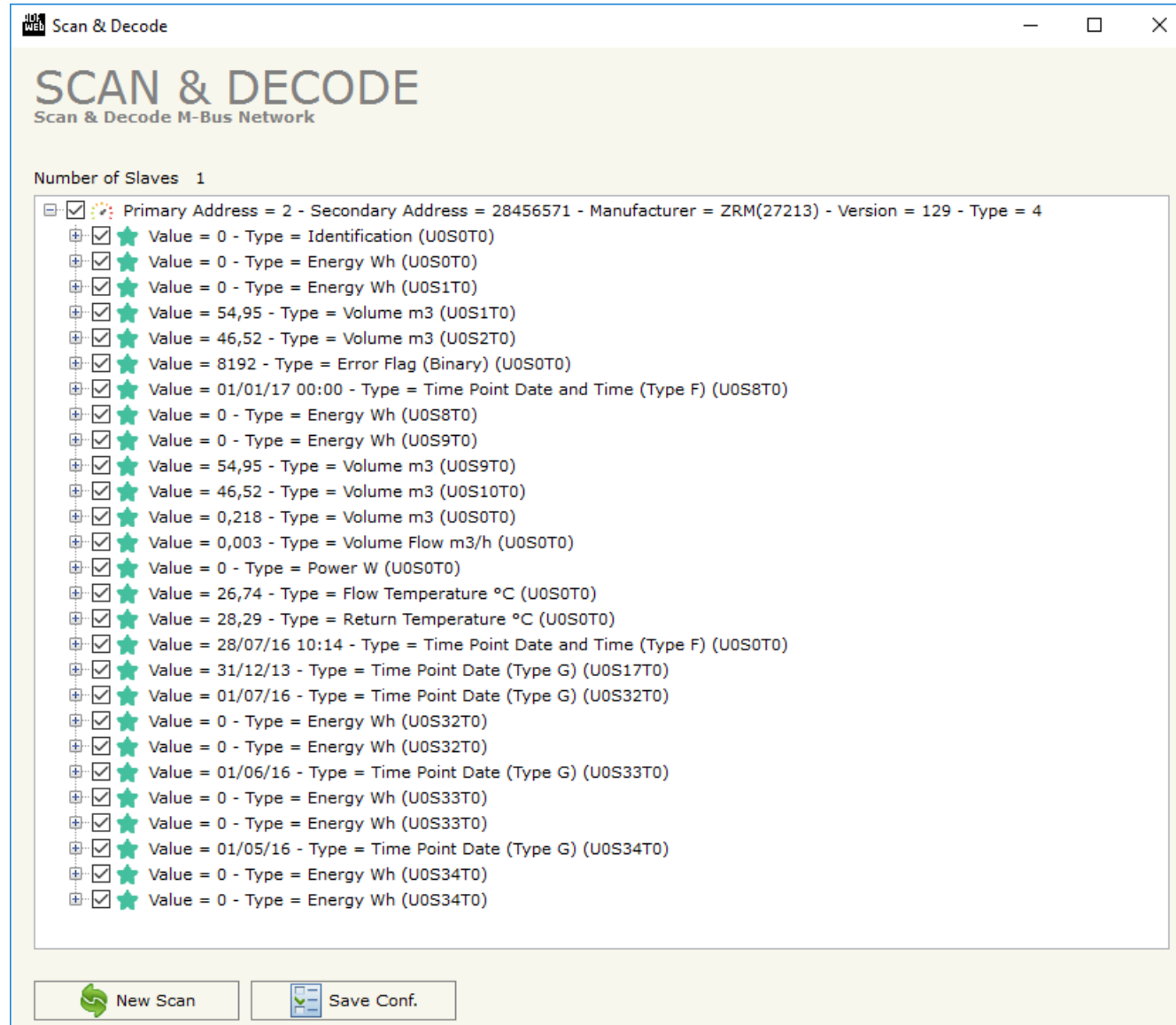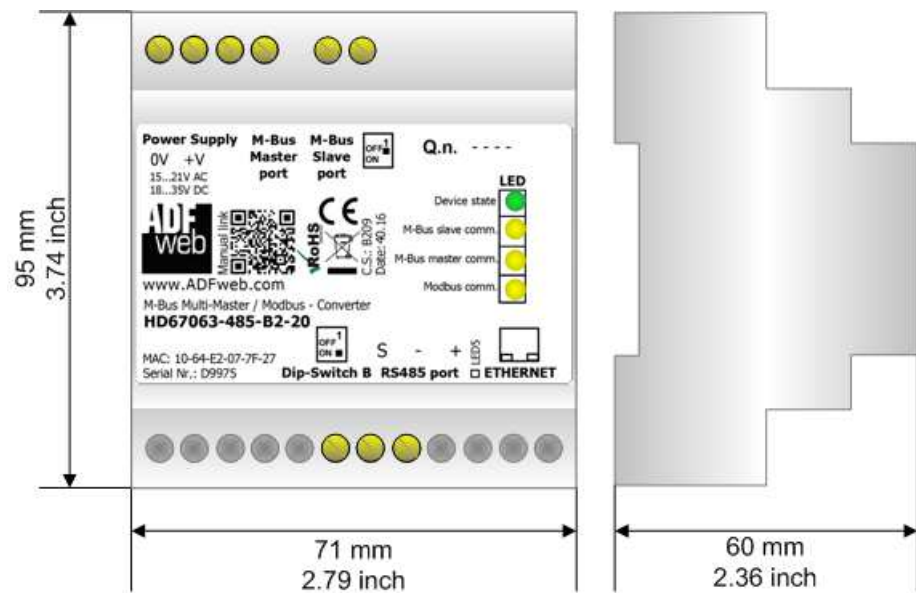
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Industrial Electronic Devices

Figure 8c: "Scan & Decode" *window*

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MECHANICAL DIMENSIONS:

Housing: PVC
Weight: 200g (Approx)

Figure 9: Mechanical dimensions scheme for HD67063-xxx-B2-xxx

Industrial Electronic Devices

ORDERING INFORMATIONS:

The ordering part number is formed by a valid combination of the following:

HD67063 – yyy - B 2 – xxx
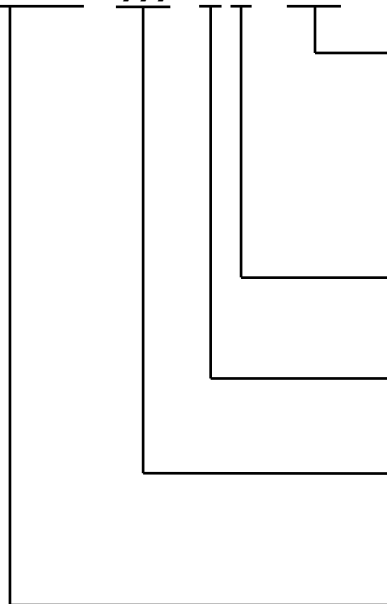
Maximum number of slaves supported
20: up to 20 standard slaves (1.5mA consumption) connected to M-Bus
40: up to 40 standard slaves (1.5mA consumption) connected to M-Bus
80: up to 80 standard slaves (1.5mA consumption) connected to M-Bus
160: up to 160 standard slaves (1.5mA consumption) connected to M-Bus
250: up to 250 standard slaves (1.5mA consumption) connected to M-Bus

Connectors Type
2: Fixed Screw Terminal

Enclosure Type
B: Modulbox 4M DIN Rail mounting

Modbus Port
232: RS232
485: RS485

Device Family
HD67063: M-Bus Multi Master / Modbus Slave - Converter

- **HD67063-232-B2-20**   -   M-Bus Multi-Master / Modbus Slave on RS232 - Converter (up to 20 slaves connected to M-Bus)

- **HD67063-232-B2-40**   -   M-Bus Multi-Master / Modbus Slave on RS232 - Converter (up to 40 slaves connected to M-Bus)

- **HD67063-232-B2-80**   -   M-Bus Multi-Master / Modbus Slave on RS232 - Converter (up to 80 slaves connected to M-Bus)

- **HD67063-232-B2-160**   -   M-Bus Multi-Master / Modbus Slave on RS232 - Converter (up to 160 slaves connected to M-Bus)

- **HD67063-232-B2-250**   -   M-Bus Multi-Master / Modbus Slave on RS232 - Converter (up to 250 slaves connected to M-Bus)

- **HD67063-485-B2-20**   -   M-Bus Multi-Master / Modbus Slave on RS485 - Converter (up to 20 slaves connected to M-Bus)

- **HD67063-485-B2-40**   -   M-Bus Multi-Master / Modbus Slave on RS485 - Converter (up to 40 slaves connected to M-Bus)

Industrial Electronic Devices

- **HD67063-485-B2-80**   **-**   M-Bus Multi-Master / Modbus Slave on RS485 - Converter (up to 80 slaves connected to M-Bus)
- **HD67063-485-B2-160**   **-**   M-Bus Multi-Master / Modbus Slave on RS485 - Converter (up to 160 slaves connected to M-Bus)
- **HD67063-485-B2-250**   **-**   M-Bus Multi-Master / Modbus Slave on RS485 - Converter (up to 250 slaves connected to M-Bus)

ACCESSORIES:

- **APW020**   -   Power Supply for M-Bus Master device that supports up to 20 Slaves
- **APW040**   -   Power Supply for M-Bus Master device that supports up to 40 Slaves
- **APW080**   -   Power Supply for M-Bus Master device that supports up to 80 Slaves
- **APW160**   -   Power Supply for M-Bus Master device that supports up to 160 Slaves
- **APW250**   -   Power Supply for M-Bus Master device that supports up to 250 Slaves
- **AC34107**   **-**   Null Modem Cable Fem/Fem DSub 9 Pin 1,5 m
- **AC34114**   -   Null Modem Cable Fem/Fem DSub 9 Pin 5 m

Industrial Electronic Devices

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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).

CE MARKING

The product conforms with the essential requirements of the applicable EC directives.

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Industrial Electronic Devices

WARRANTIES AND TECHNICAL SUPPORT:

For fast and easy technical support for your ADFweb.com SRL products, consult our internet support at www.adfweb.com.
Otherwise contact us at the address support@adfweb.com

RETURN POLICY:

If while using your product you have any problem and you wish to exchange or repair it, please do the following:

- Obtain a Product Return Number (PRN) from our internet support at www.adfweb.com. Together with the request, you need to provide detailed information about the problem.
- Send the product to the address provided with the PRN, having prepaid the shipping costs (shipment costs billed to us will not be accepted).

If the product is within the warranty of twelve months, it will be repaired or exchanged and returned within three weeks. If the product is no longer under warranty, you will receive a repair estimate.

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