

User Manual

Revision 3.101
English

M-Bus Master / PROFIBUS DP Slave - Converter

(Order Code: HD67053-B2-40, HD67053-B2-80,
HD67053-B2-160, HD67053-B2-250)



Benefits and Main Features:

- ✦ Very easy to configure
- ✦ Electrical isolation
- ✦ Industrial temperature range:
-40°C / 105°C (-40°F / 221°F)

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UPDATED DOCUMENTATION:

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

- ✚ Updated
- ✚ Related to the product you own

To obtain the most recently updated document, note the “document code” that appears at the top right-hand corner of each page of this document.

With this “Document Code” go to web page www.adfweb.com/download/ and search for the corresponding code on the page. Click on the proper “Document Code” and download the updates.

REVISION LIST:

Revision	Date	Author	Chapter	Description
2.002	18/02/2013	Nt	All	Added new chapters
3.000	23/01/2014	Fl	All	New hardware version
3.100	23/10/2017	Ff	All	New hardware version
3.101	16/11/2017	Ff	All	Scan & Decode function

WARNING:

ADFweb.com reserves the right to change information in this manual about our product without warning.
ADFweb.com is not responsible for any error this manual may contain.

TRADEMARKS:

All trademarks mentioned in this document belong to their respective owners.

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:

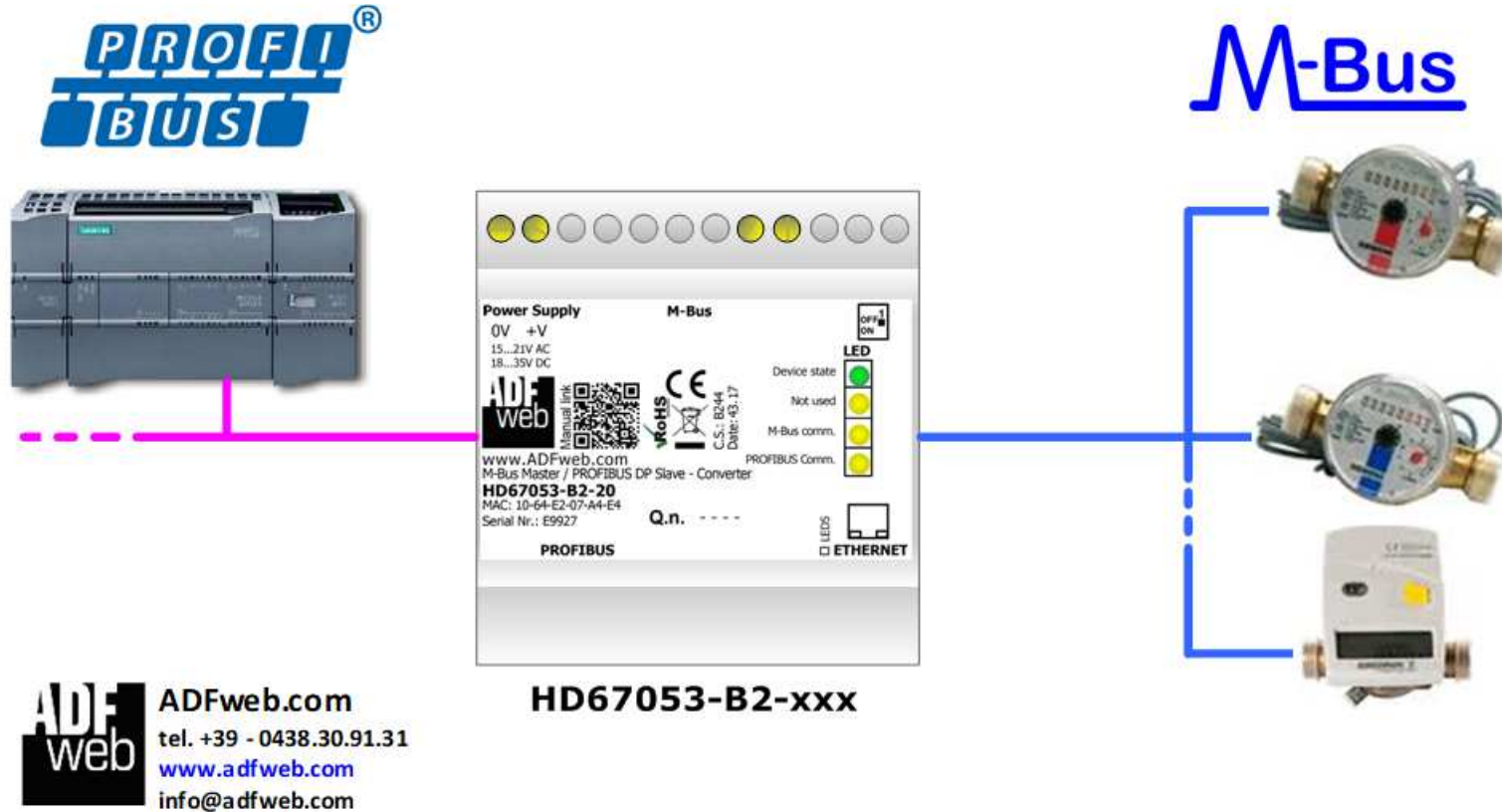


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

CE CONFORMITY

The declaration is made by our company. You can send an email to support@adfweb.com or give us a call if you need it.

EXAMPLE OF CONNECTION:



CONNECTION SCHEME:

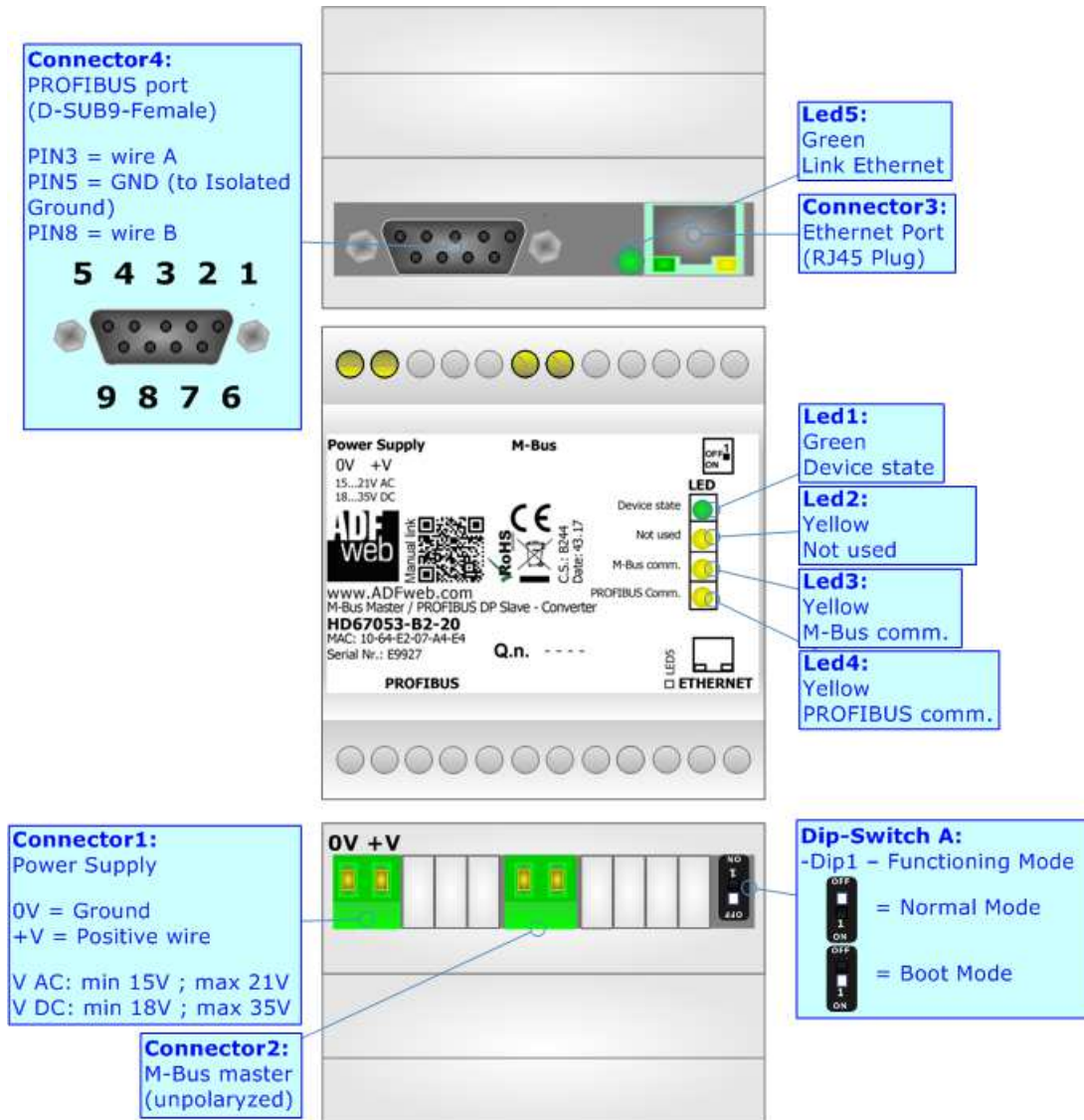


Figure 1: Connection scheme for HD67053-B2-xxx


CHARACTERISTICS:


The "HD67053-B2-xxx" is a converter M-Bus Master from/to PROFIBUS DP line. They have the following characteristics:

- Electrical isolation between PROFIBUS and M-Bus;
- Mountable on 35mm DIN Rail;
- Temperature range -40°C to +85°C.

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

- HD67053-B2-40 support up to 40 M-Bus devices;
- HD67053-B2-80 support up to 80 M-Bus devices;
- HD67053-B2-160 support up to 160 M-Bus devices;
- HD67053-B2-250 support up to 250 M-Bus devices.

 In the case of HD67053-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 HD67053-B2-250 the device must be mounted on 35mm DIN rail which is horizontally mounted on a wall or cabinet back-plate. This unit 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.

CONFIGURATION:

You need Compositor SW67053 software on your PC in order to perform the following:

- Define the parameter of PROFIBUS and M-Bus lines;
- Define the M-Bus devices on the line and select the desired values;
- Create the GSD file to import on your PROFIBUS Master;
- Update the device.

POWER SUPPLY:

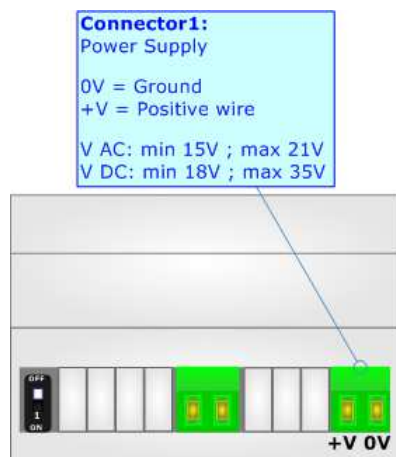
The devices can be powered at 15...21V AC and 18...35V DC. The consumption depends to the code of the device. For more details see the two tables below.

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

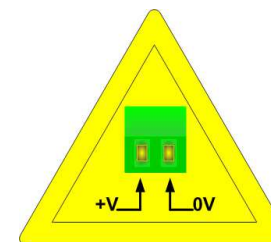
Consumption at 24V DC:

Device	No Load [W/VA]	Full Load [W/VA]*
HD67053-B2-40	3.5	5
HD67053-B2-80		8
HD67053-B2-160		14
HD67053-B2-250		30

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



Caution: Do not reverse the polarity power



HD67053-B2-xxx

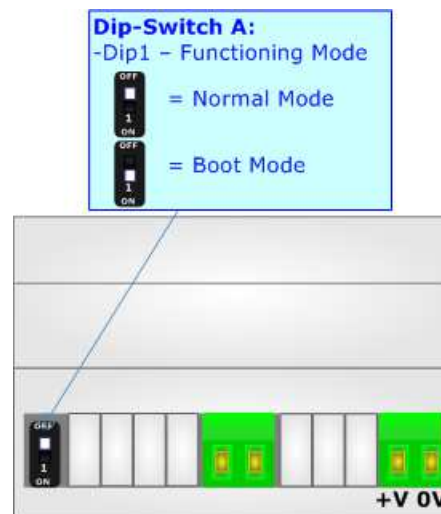
FUNCTION MODES:

The device has got two functions mode depending of the position of the 'Dip1 of Dip-Switch A' of HD67053-B2-xxx:

- 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).

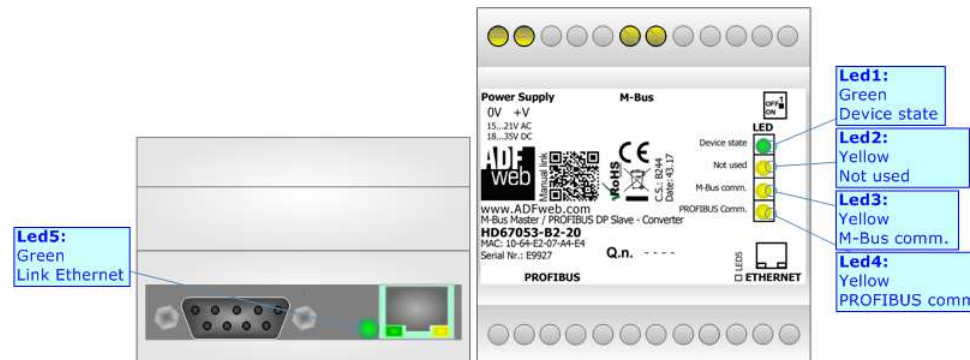
According to the functioning mode, the LEDs will have specifics functions (see 'LEDS' section).



LEDS:

The HD67053-B2 device has got four 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: Not used (yellow)	OFF	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
3: M-Bus comm. (yellow)	Blinks when a correct M-Bus response is received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
4: PROFIBUS communication (yellow)	Blinks when PROFIBUS communication is working	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
5: Ethernet link (green)	ON: Ethernet cable inserted OFF: USB cable not inserted	ON: Ethernet cable inserted OFF: USB cable not inserted

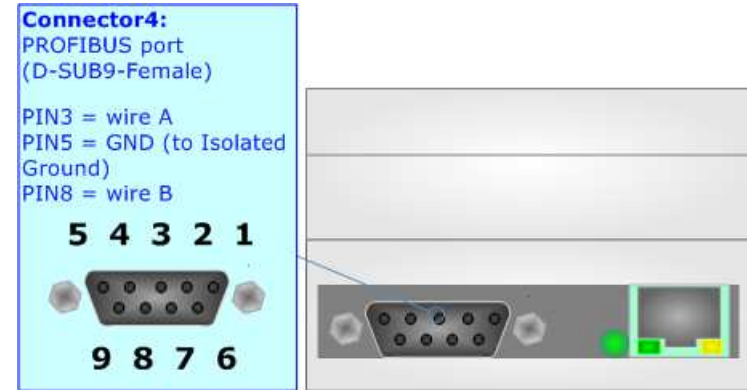


PROFIBUS:

The PROFIBUS uses a 9-pin D-SUB connector. The pin assignment is defined like in the right figure.

Here some codes of cables:

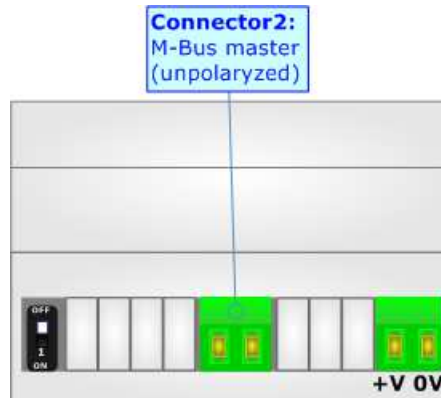
- Belden: p/n 183079A - Continuous Armor DataBus® ISA/SP-50 PROFIBUS Cable;



M-BUS:

The M-Bus is a unpolarized bus.

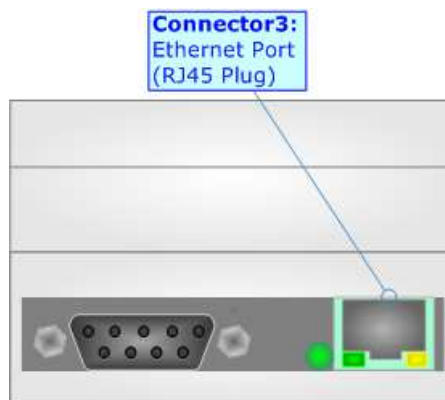
A two wire standard telephone cable (JYStY N*2*0.8 mm) is used as the transmission medium for the M-Bus. The maximum distance between a slave and the repeater is 350m; this length corresponds to a cable resistance of up 29Ω. This distance applies for the standard configuration having Baud rates between 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)*



ETHERNET:

The Ethernet port is used for programming the device.

The Ethernet connection must be made using Connector2 of HD67053-B2-xxx 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 an Hub/Switch is recommended the use of a straight cable, to connect the device to a PC/PLC/other is recommended the use of a cross cable.



USE OF COMPOSITOR SW67053:

To configure the Converter, use the available software that runs with Windows called SW67053. It is downloadable on 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 SW67053, the window below appears (Fig. 2).

**Note:**

It is necessary to have installed .Net Framework 4.

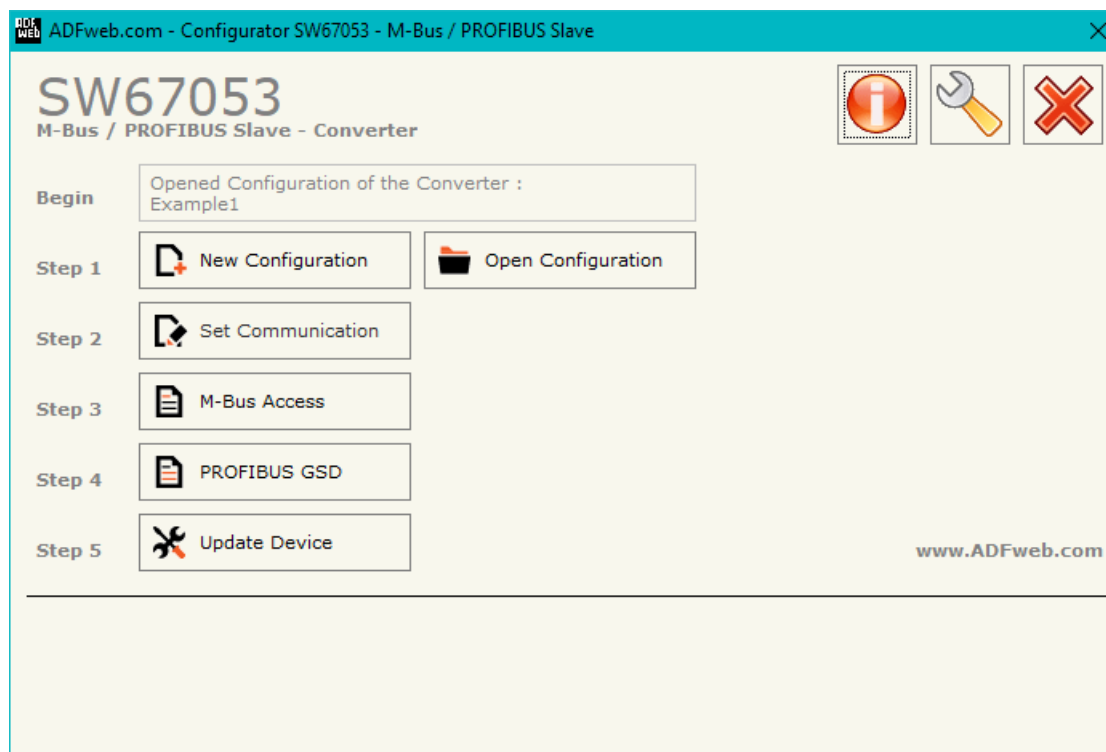
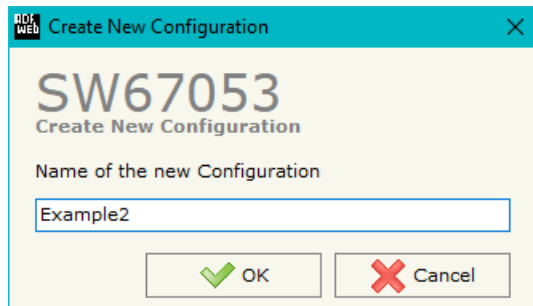


Figure 2: Main window for SW67053

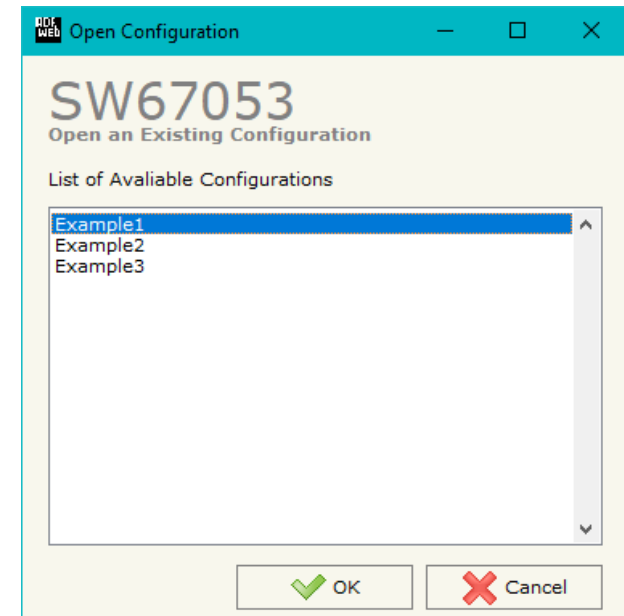
NEW CONFIGURATION / OPEN CONFIGURATION:

The “**New Configuration**” button creates the folder which contains the entire device’s configuration.




A device’s configuration can also be imported or exported:

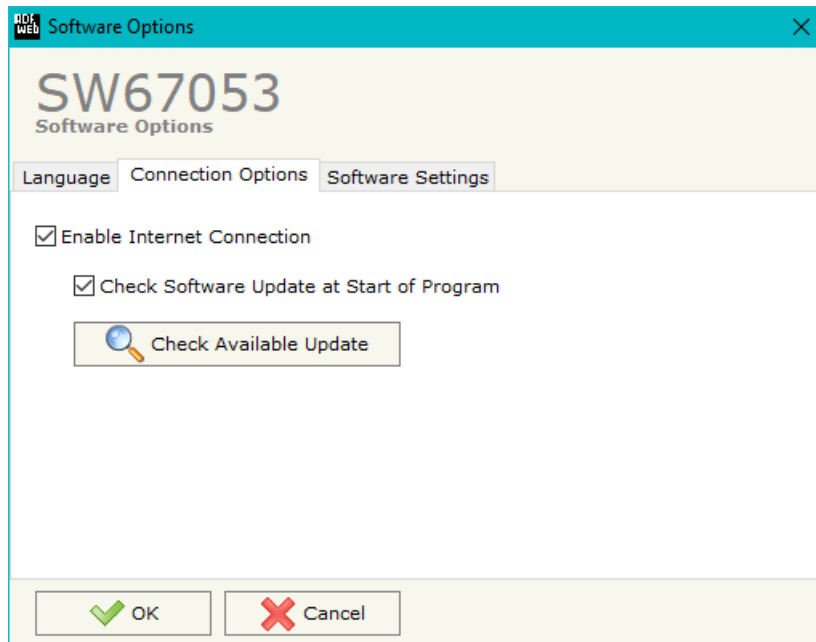
- To clone the configurations of a programmable “M-Bus Master / PROFIBUS DP Slave - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button “**Open Configuration**”.



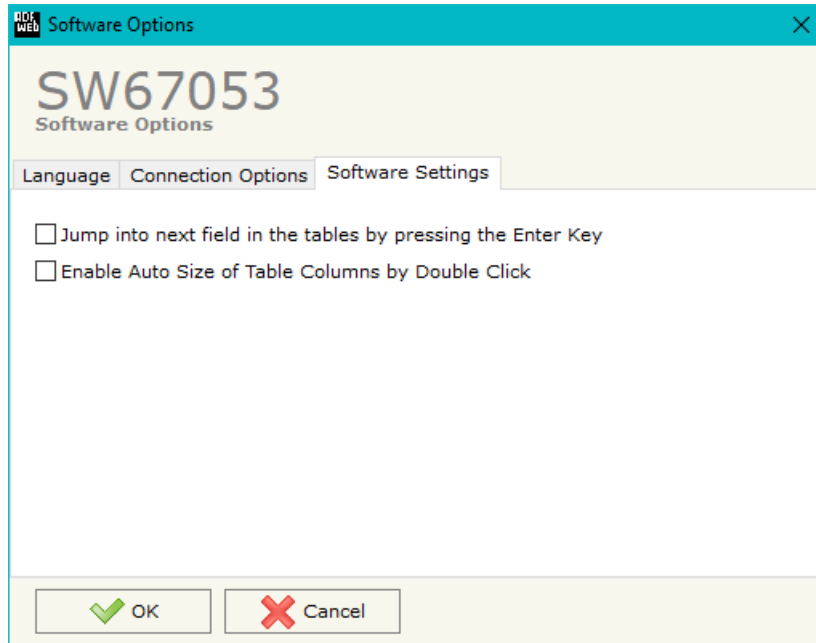
SOFTWARE OPTIONS:

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 SW67053 checks automatically if there are updatings when it is launched.



In the section "Software Settings", it is possible to enable/disable some keyboard's commands for an easier navigation inside the tables contained in the different sections of the software.

SET COMMUNICATION:

This section defines the fundamental communication parameters of two buses, PROFIBUS and M-Bus.

By Pressing the **"Set Communication"** button from the main window for SW67053 (Fig. 2), the window **"Set Communication"** appears (Fig. 3).

The window is divided in three sections, one for the PROFIBUS, one for the M-Bus and the last for Ethernet (if present).

In the section **"Select Device"** it is possible to define the hardware used:

- HD67053M;
- HD67053-B2 (without Ethernet port);
- HD67053-B2 (with Ethernet port).

The meanings of the fields for PROFIBUS are:

- In the field **"ID Device"** the ID for the PROFIBUS side is defined;
- In the field **"Baudrate"** the data rate of PROFIBUS is defined (fixed to **"Auto Baudrate"**);
- In the field **"N Byte"** the number of input byte of PROFIBUS is defined;
- If the field **"Create a module for each variable"** is checked, the GSD file will be created in many modules as there are variables defined in the **"M-Bus"** section; otherwise it will be created modules with the maximum size of 64 byte;
- If the field **"Enable Tx in M-Bus"** is checked, it is possible to send M-Bus frames by writing the output bytes of PROFIBUS;
- In the field **"N Byte"** the number of output byte of PROFIBUS is defined;
- If **"Normal Mode"** is checked, the 244 bytes of PROFIBUS are used for storing the data of all M-Bus slaves; otherwise, if **"Single Slave Mode"** is checked, all 244 bytes are used for storing the data of a single slave (see section **"Single Slave Mode Functioning"** at page 33 for more details).

Figure 3: **"Set Communication"** window

The meanings of the fields for M-Bus are:

- In the field "**Baudrate**" the data rate of the M-Bus line is defined;
- In the field "**Parity**" the parity of the M-Bus line is defined;
- In the field "**Delay for Cyclic (s)**" the time (expressed in seconds) between two M-Bus scans is defined;
- In the field "**Node State value when slave device is not present**" it is possible to insert the value to assign to the "Node State" when the converter doesn't find the interrogated M-Bus slave.

The means of the fields for the "Ethernet" section are:

- In the fields "**IP ADDRESS**" the IP address to assign to the converter is defined;
- In the fields "**SUBNET Mask**" the SubNet Mask to assign to the converter is defined;
- In the fields "**GATEWAY**" the default gateway of the net is defined. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net.

These informations are used for programming the Converter.

M-BUS

By Pressing the **"M-Bus"** button from the main window for SW67053 (Fig. 2) the window "M-Bus Network" appears (Fig. 4).

In the section "Nodes" it is possible to create the nodes of M-Bus line:

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

SECTION NODES (M-BUS 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.
- If the field **"Node State"** is checked the gateway reserves one byte at the starting of internal data array and saves the status of the counter.
- If the field **"Identification Number"** is checked the gateway reserves four bytes at the starting of internal data array and saves the Secondary Address of the device.
- 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 29) of this document for select the swap mode.
- If the field **"Send SND_NKE"** is checked, the Converter sends the "SND_NKE" frame to start the communication.
- In the field **"Send Reset App."** Is checked the Converter sends the "Application Reset" command to the slave.

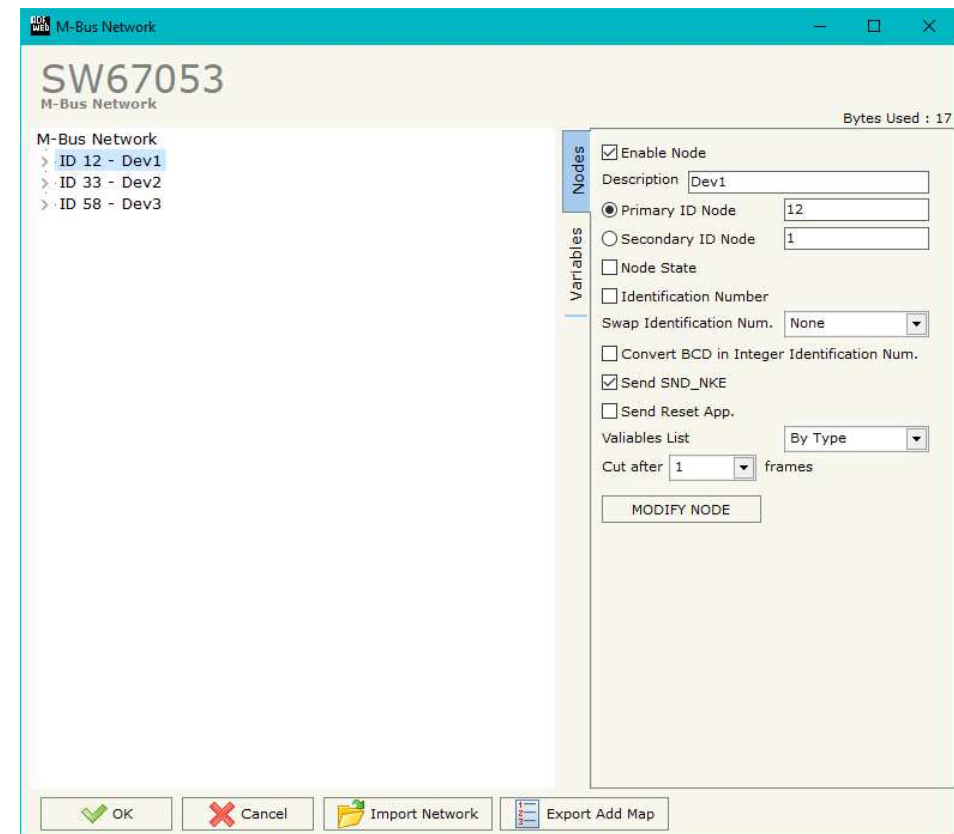


Figure 4: "M-Bus Network" window

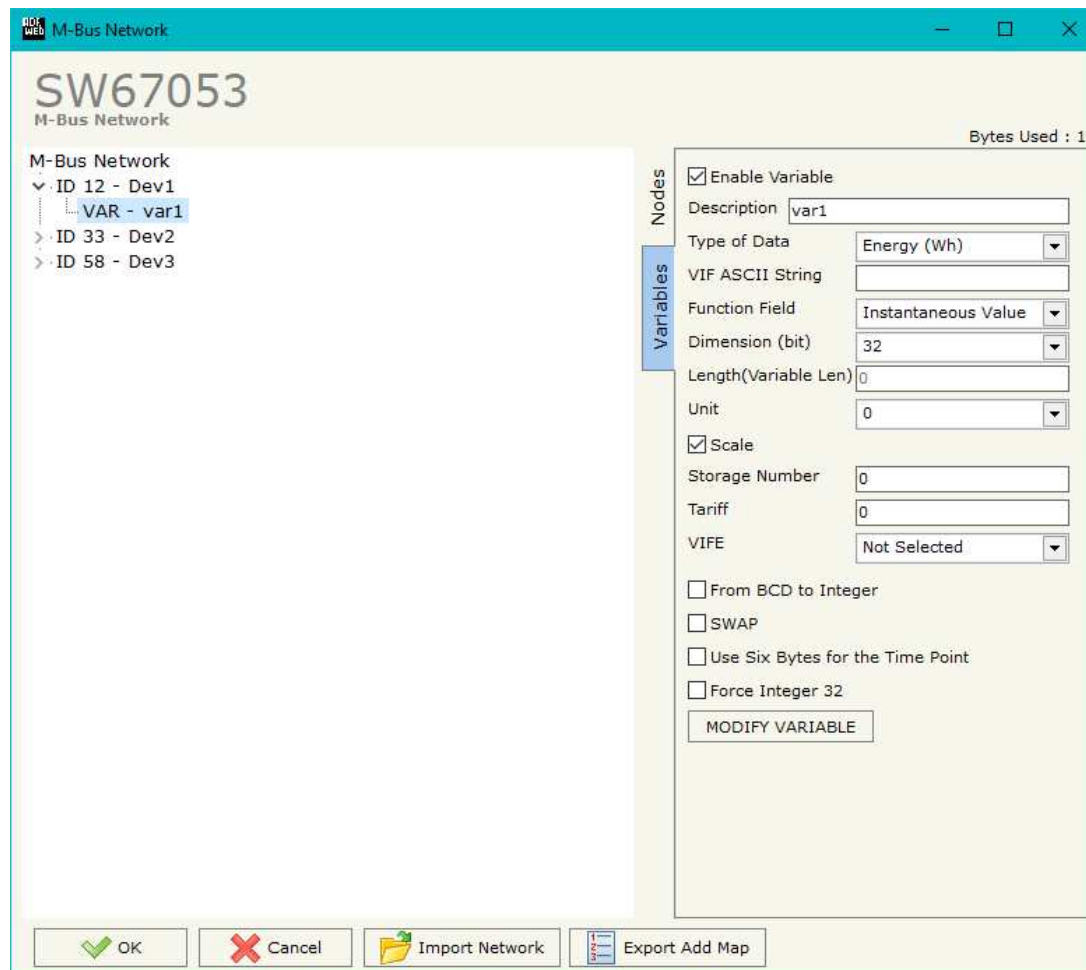
- In the field "**Variables List**" it is possible to select which type of variables definition to use. If is selected "By Type" it is necessary to fill all fields, in the section Variables, with the correct values; otherwise if "By Position" is selected you can insert the progressive number of the variable 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.

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.

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;
- If the field "**Scale**" is checked, the scale of the variable is saved (1 byte) (see page 30 for more info);
- 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;



- 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 "**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 "**SWAP**" is checked the Converter swaps the Data Bytes;
- If the field "**Use Six Byte for the Time Point**" 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 bytes (if not selected the values are the same of the reply of the slave device, so coded with a determinate structure);
- If the field "**Force Integer 32**" is checked, the variable is mapped in 4 consecutive bytes on PROFIBUS side.

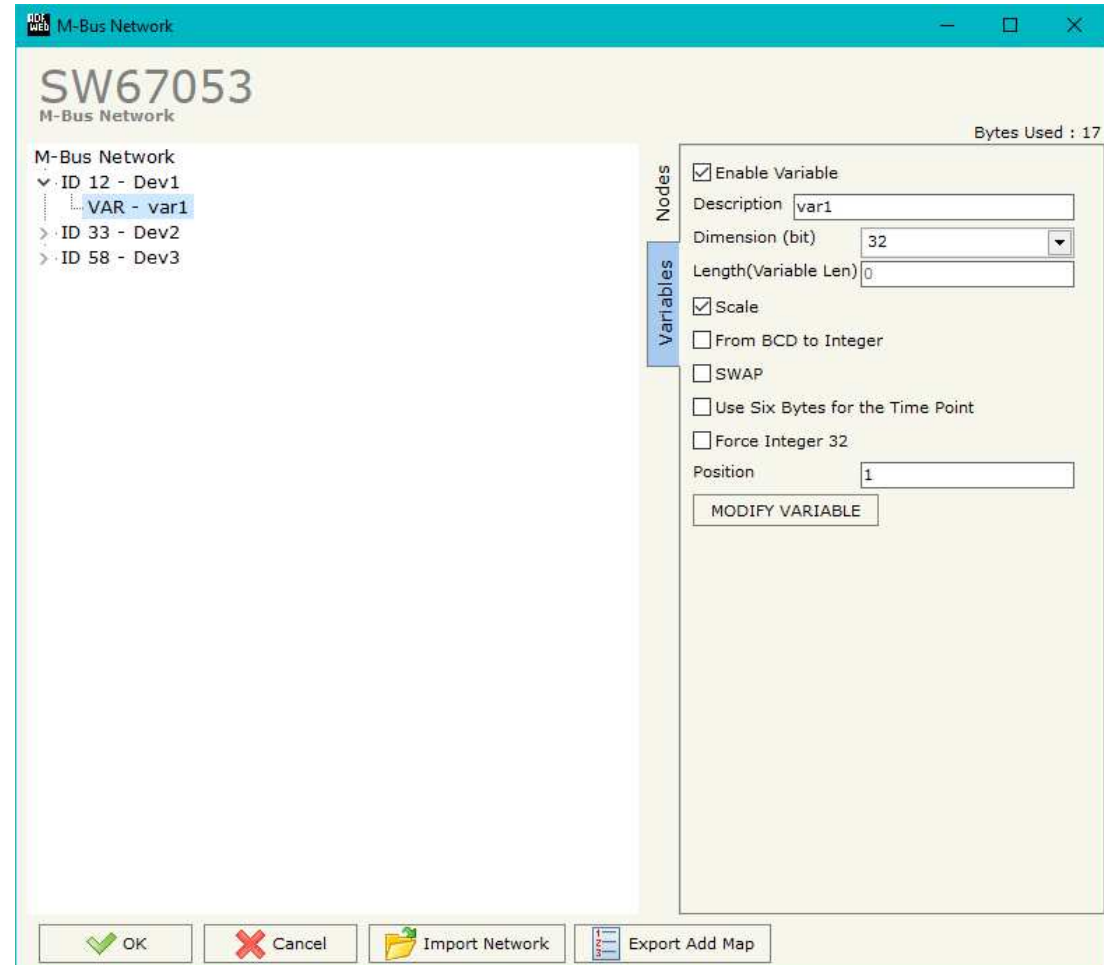
Having completed this fields, to add the variable the button "**ADD VARIABLE**" must be pressed.

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.

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";
- If the field "**Scale**" is checked, the scale of the variable is saved (1 byte) (see page 30 for more info);
- 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 "**SWAP**" is checked the Converter swaps the Data Bytes;
- If the field "**Use Six Byte for the Time Point**" 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 bytes (if not selected the values are the same of the reply of the slave device, so coded with a determinate structure);
- If the field "**Force Integer 32**" is checked, the variable is mapped in 4 consecutive bytes on PROFIBUS side;
- In the field "**Position**" insert the number of the variable that you want on PROFIBUS.



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.

Example:

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

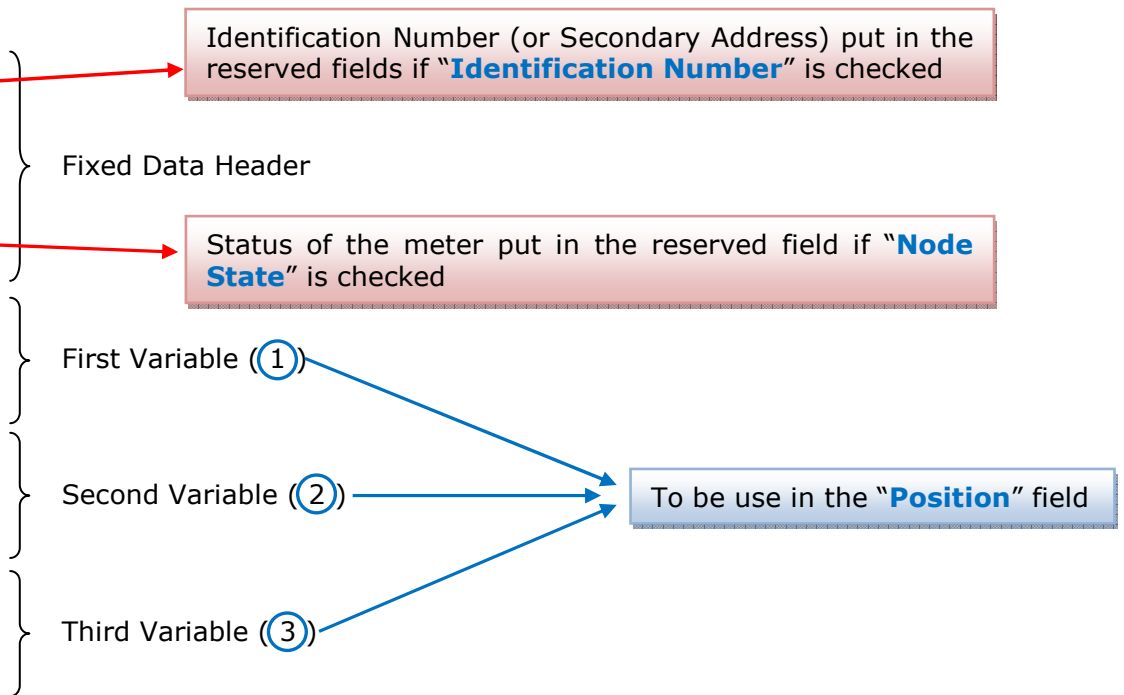
0x71 - Identification Number (Byte 4of4)
 0x65 - Identification Number (Byte 3of4)
 0x45 - Identification Number (Byte 2of4)
 0x28 - Identification Number (Byte 1of4)
 0x4D - Manufacturer (Byte 2of2)
 0x6A - Manufacturer (Byte 1of2)
 0x81 - Version
 0x04 - Medium
 0x3E - Access Number
 0x27 - Status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



COPY, PASTE AND DELETE ITEMS:

By pressing the right button of the mouse over an item (Variable or Node) it is possible to Copy, Paste and Delete.

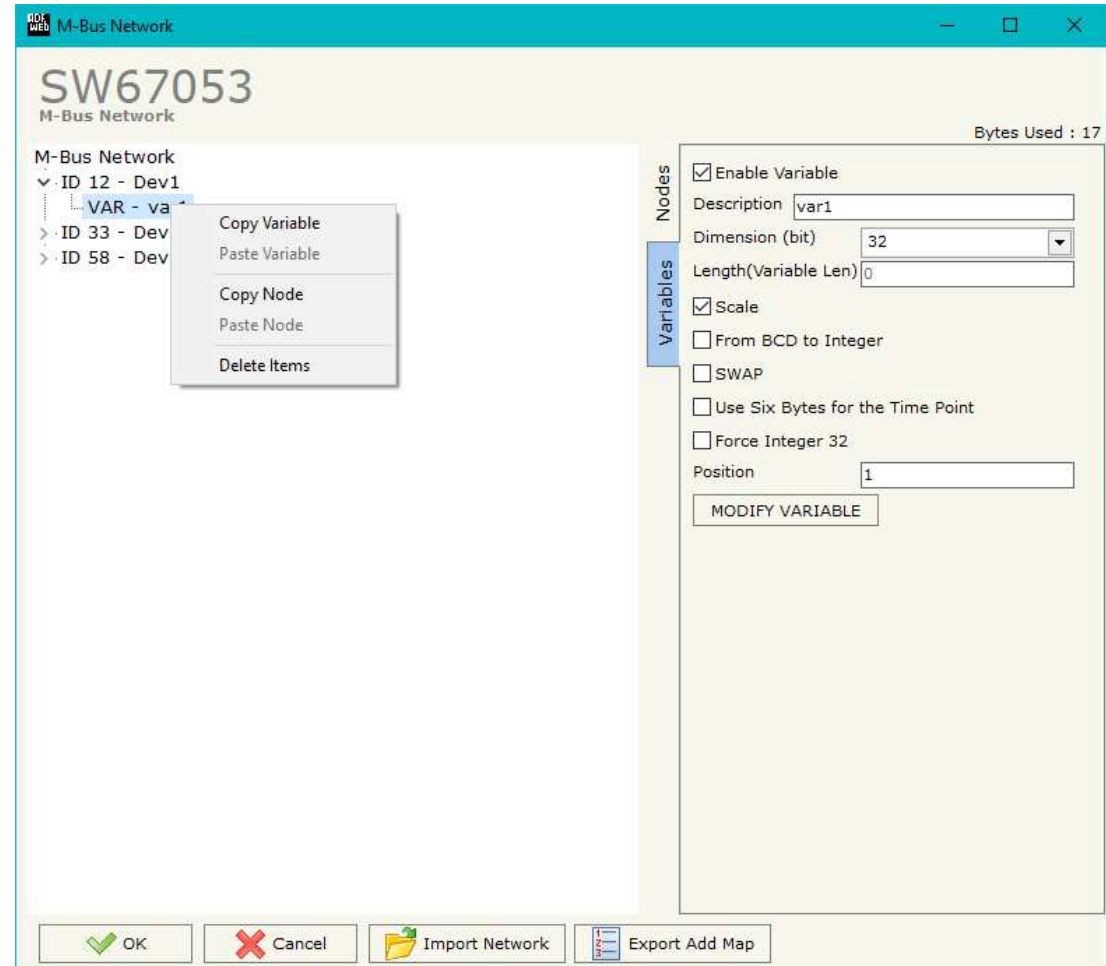
It is possible to Copy a variable from a Node and copy it to another Node, or copy a Variable from a project and paste in another one.

It is also possible to copy an entire Node with all its Variables.



Note:

By pressing the **“Import Network”** button is possible to import the file generated by the Analyzer HD67031.



Possible choices for the fields used to create a variable:

Type of Data:

- |_Energy (Wh)
- |_Energy (J)
- |_Volume (m³)
- |_Mass (Kg)
- |_On Time
- |_Operating Time
- |_Power (W)
- |_Power (J/h)
- |_Volume Flow (m³/h)
- |_Volume Flow Ext. (m³/min)
- |_Volume Flow Ext. (m³/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 feet³
- 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
- 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 m³
- _ per kg
- _ per K (Kelvin)
- _ per kWh
- _ per GJ
- _ per kW
- _ per (K*I)(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 currection factor
- _ Additive correction constant * unit of VIF (offset)
- _ Multiplicative correction factor: 10³
- _ 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

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): 28456571; Convert BCD in Integer Identification Num. Not checked.

None	Type 1
0x28	0x65
0x45	0x71
0x65	0x28
0x71	0x45

- Identification Number (Secondary Address): 28456571; Convert BCD in Integer Identification Num. Checked.

None	Type 1
0x01	0x36
0xB2	0x7B
0x36	0x01
0x7B	0xB2

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

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
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).

For example, if you have defined:

- Type of Data= Energy (J);
- Function Field=Instantaneous Value;
- Dimension = 32 bit;
- Scale field =checked.

At the PROFIBUS array you read 0x00, 0x04, 0x56, 0x78 and 0x06. The first 4 bytes are the 32bit of variable, the last is the scale.

Then you have to take the 0x045678 and following the table at page 24 of the manual do the operation:

$284280 \times 10^{(6)}$ J.

Now you have the correct value (the one that you read on the display of the meter, for example).

FUNCTIONING OF ENABLE TX IN M-BUS:

When the field "Enable Tx in M-Bus" is checked from "Set Communication" it is necessary to follow these instructions for writing something in M-Bus.

Example of PROFIBUS IN array (data that a master PROFIBUS receive)

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
SO	RIS	Data ...	...	...	...	... Data

Example of PROFIBUS OUT array (data that a master PROFIBUS send)

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
LEN	WRITE	Data to write...	...	...	...	Data to write

The field "**SO**" is the Operation State. It can assume four values:

- \$00: Idle;
- \$01: Writing;
- \$02: Writing executed, waiting reply;
- \$03: Now is possible to read the RIS.

The field "**RIS**" is the result of the writing operation. It can assume these values:

- \$00: Idle;
- \$FF: The slave hasn't replied;
- Any other value: The first byte of the reply of the slave (usually the slave reply with a single byte \$E5).

In the field "**LEN**" you have to insert the length of the frame that you want to send.

The field "**WRITE**" can assume two values:

- \$00: Idle;
- \$01: Write;
- Any other value is not considered.

From Byte 2 to Byte 2+N Byte-2 you have to insert the frame to send.

When the gateway starts the SO and RIS are in "Idle". The PROFIBUS master has to set the LEN and all the "Data to Write". Then it is possible to set the "WRITE" from 0 to 1. When the gateway complete the operations it set the SO to \$03 and the RIS with a value; in this moment (SO is \$03) it is possible to take the RIS like 'correct'. Now the master PROFIBUS has to set the "WRITE" from 1 to 0 and the gateway put in "Idle" the SO and RIS. Now it is possible to repeat the writing operation.

SINGLE SLAVE MODE FUNCTIONING:

By checking the field "Single Slave Mode" it is possible to save 240 bytes of data for a single M-Bus Slave Device.

With this mode selected it isn't possible to use the "Create a module for each variable", so are created modules with the maximum size of 64 byte.

It is necessary to insert in the field "N Byte" under "Enable Tx in M-Bus" at least the value 4.

For having the data it is necessary that the Master PROFIBUS writes the first four bytes of his Output Data with the Primary or Secondary Address of the slave which want to receive the data.

Example of PROFIBUS OUT array (data that a master PROFIBUS send) using the Primary Address of the Slave M-Bus

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
0x00	0x00	0x00	0x3A	Empty or other values	Empty or other values	Empty or other values

Example of PROFIBUS OUT array (data that a master PROFIBUS send) using the Secondary Address of the Slave M-Bus

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
0x28	0x45	0x65	0x71	Empty or other values	Empty or other values	Empty or other values

If the address is defined in the section M-Bus and the reply frame of the slave interrogated is received, the gateway puts the requested address in the first four bytes, if the "Enable Tx in M-Bus" is unchecked, or in the third, fourth, fifth and sixth if the field "Enable Tx in M-Bus" is unchecked. Then follow the normal data of the selected slave.

Example of PROFIBUS IN array (data that a master PROFIBUS receive) using the Primary Address of the Slave M-Bus without "Enable Tx in M-Bus" checked

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
0x00	0x00	0x00	0x3A	Data ...	...	... Data

Example of PROFIBUS IN array (data that a master PROFIBUS receive) using the Secondary Address of the Slave M-Bus with "Enable Tx in M-Bus" checked

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
SO	RIS	0x28	0x45	0x65	0x71	Data ...	...	... Data

EXAMPLES:

1)

In “Set Communication” the field “Create a module for each variable” and “Enable Tx in M-Bus” are unchecked, “N Byte” is 30, “Node State” and “Identification Number” are unchecked.

There was defined these variables: **Var.1**: 32 bit, No Scale; **Var.2**: 48 bit, No Scale; **Var.3**: 16 bit, Si Scale; **Var.4**: 64 bit, Si scale.

The PROFIBUS array is the follow:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
Var.1	Var.1	Var.1	Var.1	Var.2	Var.2	Var.2	Var.2	Var.2	Var.2
Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19
Var.3	Var.3	Var.3 Scale	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4
Byte 20	Byte 21	Byte 22	Byte 23	Byte 24	Byte 25	Byte 26	Byte 27	Byte 28	Byte 29
Var.4	Var.4 Scale								

2)

In “Set Communication” the field “Create a module for each variable” is checked, “Enable Tx in M-Bus” is unchecked, “Node State” and “Identification Number” are unchecked.

There was defined these variables: **Var.1**: 24 bit, No Scale; **Var.2**: 32 bit, Yes Scale; **Var.3**: 16 bit, No Scale; **Var.4**: 64 bit, Yes scale; **Var.5**: 8 bit, Yes scale.

The PROFIBUS array is the follow:

Byte 0	Byte 1	Byte 2							
Var.1	Var.1	Var.1							
Byte 3	Byte 4	Byte 5	Byte 6	Byte 7					
Var.2	Var.2	Var.2	Var.2	Var.2 Scale					
Byte 8	Byte 9								
Var.3	Var.3								
Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	
Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4 Scale	
Byte 19	Byte 20								
Var.5	Var.5 Scale								

3)

In "Set Communication" the field "Create a module for each variable" and "Enable Tx in M-Bus" are unchecked, "N Byte" is 30, "Node State" and "Identification Number" are checked.

There was defined these variables: **Var.1**: 32 bit, No Scale; **Var.2**: 48 bit, No Scale; **Var.3**: 16 bit, Si Scale; **Var.4**: 64 bit, Si scale.

The PROFIBUS array is the follow:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
Status	Ident.Num1	Ident.Num2	Ident.Num3	Ident.Num4	Var.1	Var.1	Var.1	Var.1	Var.2
Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19
Var.2	Var.2	Var.2	Var.2	Var.2	Var.3	Var.3	Var.3 Scale	Var.4	Var.4
Byte 20	Byte 21	Byte 22	Byte 23	Byte 24	Byte 25	Byte 26	Byte 27	Byte 28	Byte 29
Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4 Scale			

4)

In "Set Communication" the field "Create a module for each variable" is checked, "Enable Tx in M-Bus" is unchecked, "Node State" and "Identification Number" are checked.

There was defined these variables: **Var.1**: 24 bit, No Scale; **Var.2**: 32 bit, Yes Scale; **Var.3**: 16 bit, No Scale; **Var.4**: 64 bit, Yes scale; **Var.5**: 8 bit, Yes scale.

The PROFIBUS array is the follow:

Byte 0									
Status									
Byte 1	Byte 2	Byte 3	Byte 4						
Ident.Num1	Ident.Num2	Ident.Num3	Ident.Num4						
Byte 5	Byte 6	Byte 7							
Var.1	Var.1	Var.1							
Byte 8	Byte 9	Byte 10	Byte 11	Byte 12					
Var.2	Var.2	Var.2	Var.2	Var.2 Scale					
Byte 13	Byte 14								
Var.3	Var.3								
Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	
Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4 Scale	
Byte 24	Byte 25								
Var.5	Var.5 Scale								

5)

In "Set Communication" the field "Create a module for each variable" is unchecked, "Enable Tx in M-Bus" is checked, "N Byte" is 30, "Node State" is unchecked and "Identification Number" is checked.

There was defined these variables: **Var.1**: 32 bit, No Scale; **Var.2**: 48 bit, No Scale; **Var.3**: 16 bit, Si Scale; **Var.4**: 64 bit, Si scale.

The PROFIBUS array is the follow:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
SO	RIS	Ident.Num1	Ident.Num2	Ident.Num3	Ident.Num4	Var.1	Var.1	Var.1	Var.1
Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19
Var.2	Var.2	Var.2	Var.2	Var.2	Var.2	Var.3	Var.3	Var.3 Scale	Var.4
Byte 20	Byte 21	Byte 22	Byte 23	Byte 24	Byte 25	Byte 26	Byte 27	Byte 28	Byte 29
Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4 Scale		

6)

In "Set Communication" the field "Create a module for each variable" and "Enable Tx in M-Bus" are checked, "Node State" is checked and "Identification Number" is unchecked.

There was defined these variables: **Var.1**: 24 bit, No Scale; **Var.2**: 32 bit, Yes Scale; **Var.3**: 16 bit, No Scale; **Var.4**: 64 bit, Yes scale; **Var.5**: 8 bit, Yes scale.

The PROFIBUS array is the follow:

Byte 0	Byte 1							
SO	RIS							
Byte 2								
Status								
Byte 3	Byte 4	Byte 5						
Var.1	Var.1	Var.1						
Byte 6	Byte 7	Byte 8	Byte 9	Byte 10				
Var.2	Var.2	Var.2	Var.2	Var.2 Scale				
Byte 11	Byte 12							
Var.3	Var.3							
Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20	Byte 21
Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4	Var.4 Scale
Byte 22	Byte 23							
Var.5	Var.5 Scale							

UPDATE VIA USB:

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 USB/RS232 port.

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

- Turn OFF the Device;
- Connect the USB/RS232 cable from your PC to the Converter;
- Put Dip2 of 'Dip-Switch A' in ON position;
- Select the **"COM port"** and press the **"Connect"** button;
- Turn ON the device;
- Check the "Device state" Led. It must blink quickly;
- 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 Dip2 of 'Dip-Switch A' in OFF position;
- Disconnect the USB/RS232 cable;
- Turn ON the device.

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

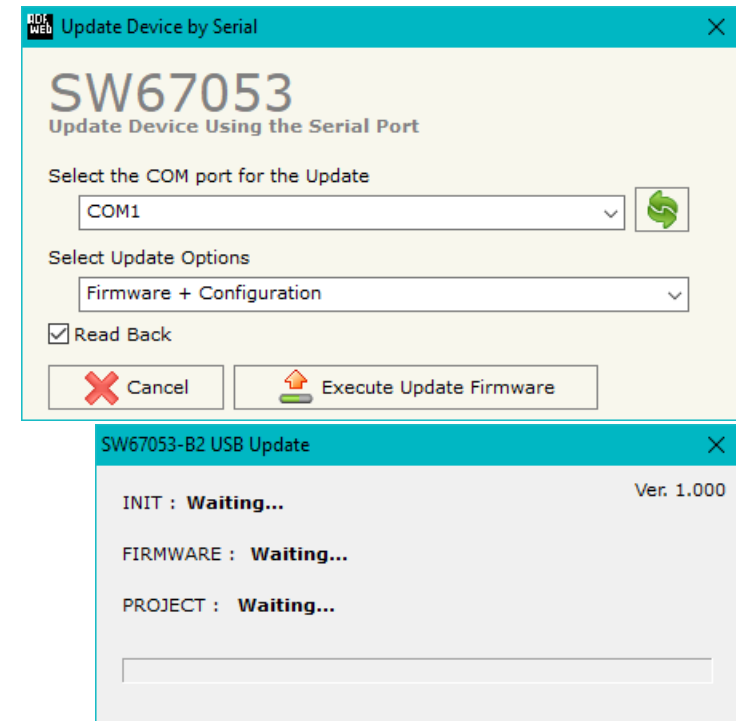


Figure 5a: "Update Device" windows

UPDATE VIA ETHERNET:

By pressing the **“Update Device”** button, it is possible to load the created Configuration into the device; and also the Firmware, if necessary. This by using the Ethernet port.

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”**;
- 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;
- 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.

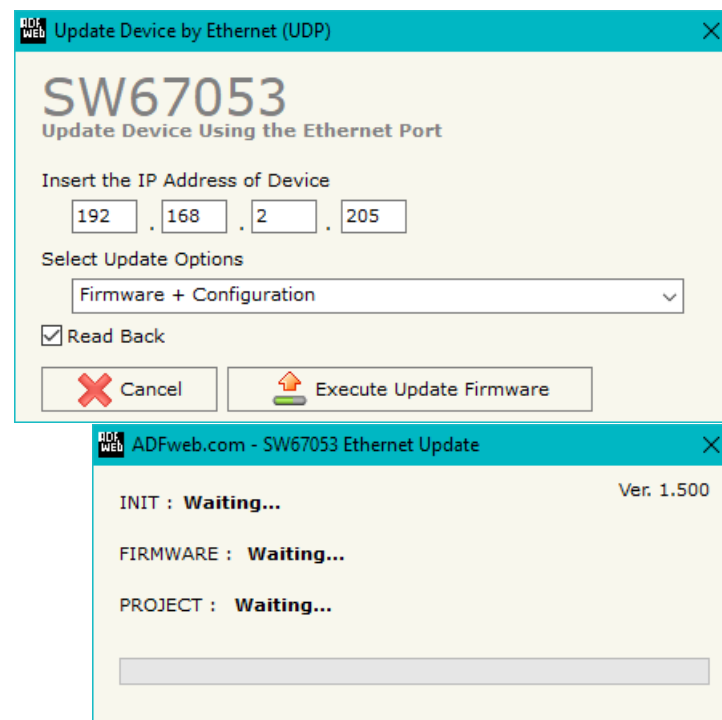


Figure 5b: "Update device" windows

**Note:**

When you receive the device, for the first time, you also have to update the Firmware in the HD67053 device.

**Warning:**

If Fig. 6 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;
- 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 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

**Warning:**

In the case of HD67053 you have to use the software "SW67053": www.adfweb.com/download/filefold/SW67053.zip.

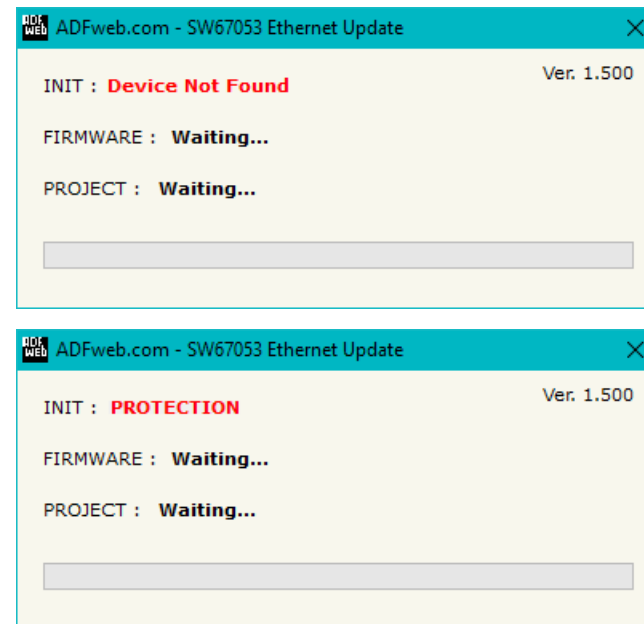



Figure 6: "Error" window

SCAN & DECODE FUNCTION:

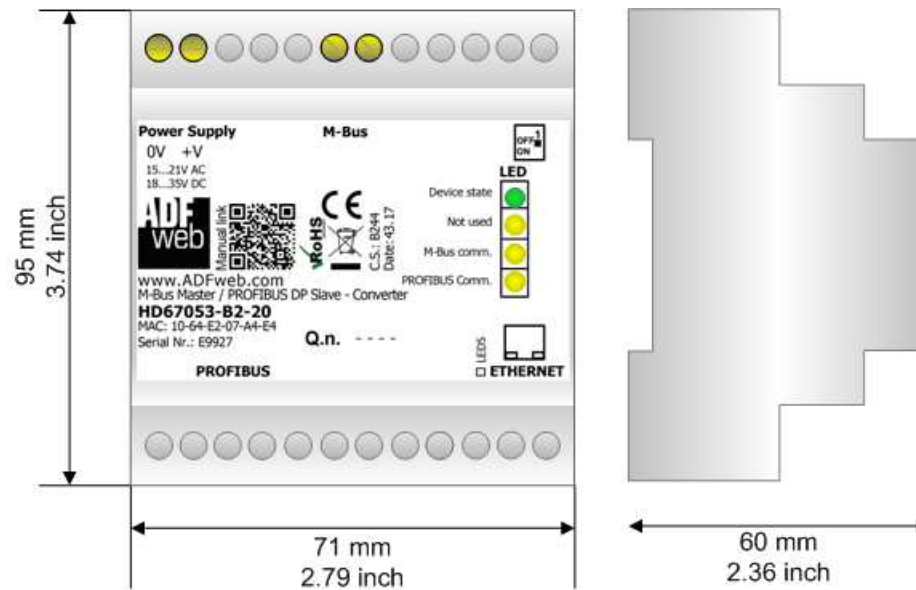
“SCAN & DECODE” functions are integrated in the configurator software SW67053. It is possible to access to these functions by simple click on the “ Scan & Decode” button.

It has the following characteristics:

- Possibility to scan M-Bus network;
- Automatic decode of M-Bus telegrams;
- Easy connection directly through the Ethernet port of the converters.

For the description of the function, it is possible to refer to this manual: www.adfweb.com/download/filefold/SCAN&DECODE_ENG.pdf

MECHANICAL DIMENSIONS:



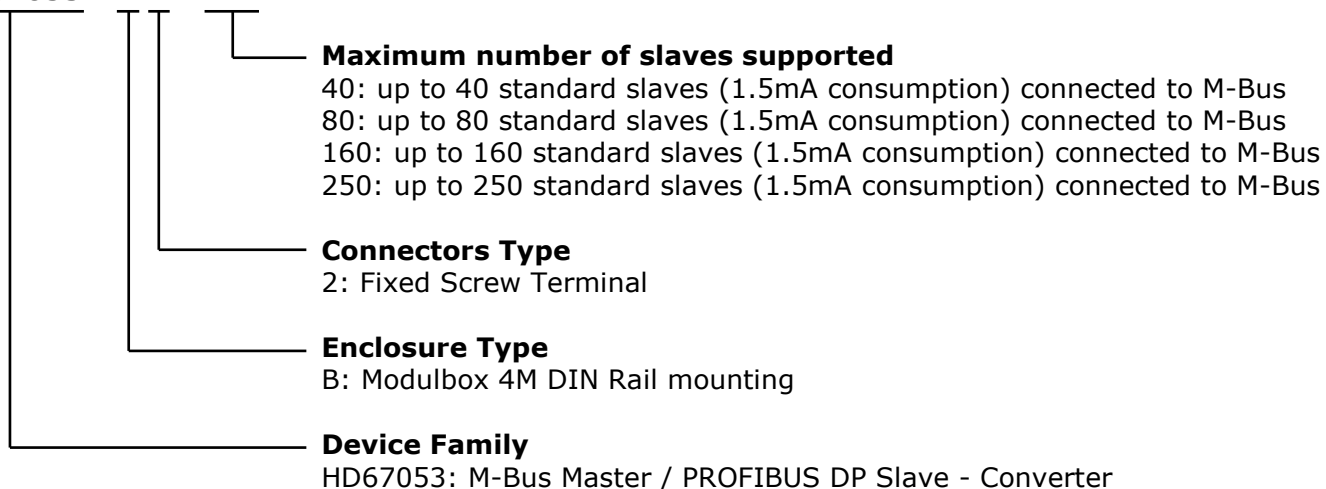
Housing: PVC
Weight: 200g (Approx)

Figure 7: Mechanical dimensions scheme for HD67053-B2-xxx

ORDERING INFORMATIONS:

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

HD67053 - B 2 - xxx



Order Code:	HD67053-B2-40	-	M-Bus Master / PROFIBUS DP Slave – Converter (up to 40 slaves connected to M-Bus)
Order Code:	HD67053-B2-80	-	M-Bus Master / PROFIBUS DP Slave – Converter (up to 80 slaves connected to M-Bus)
Order Code:	HD67053-B2-160	-	M-Bus Master / PROFIBUS DP Slave – Converter (up to 160 slaves connected to M-Bus)
Order Code:	HD67053-B2-250	-	M-Bus Master / PROFIBUS DP Slave – Converter (up to 250 slaves connected to M-Bus)

ACCESSORIES:

Order Code:	APW040	-	Power Supply for M-Bus Master device that supports up to 40 Slaves
Order Code:	APW080	-	Power Supply for M-Bus Master device that supports up to 80 Slaves
Order Code:	APW160	-	Power Supply for M-Bus Master device that supports up to 160 Slaves
Order Code:	APW250	-	Power Supply for M-Bus Master device that supports up to 250 Slaves

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. ADFweb.com S.r.l. will not be liable for accidental loss of use or inability to use this product, such as loss of business income. ADFweb.com S.r.l. 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).

CE MARKING

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

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.