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Industrial Electronic Devices

# User Manual
Revision 1.000
English

## M-Bus / M-Bus Wireless / MQTT - Converter

(Order Code: HD67931-B2-xxx, HD67931-B2-xxxMHz-xxx)

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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:

- Updated
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## REVISION LIST:

| Revision | Date | Author | Chapter | Description |
|---|---|---|---|---|
| 1.000 | 05/12/2017 | Ff | All | First release 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:
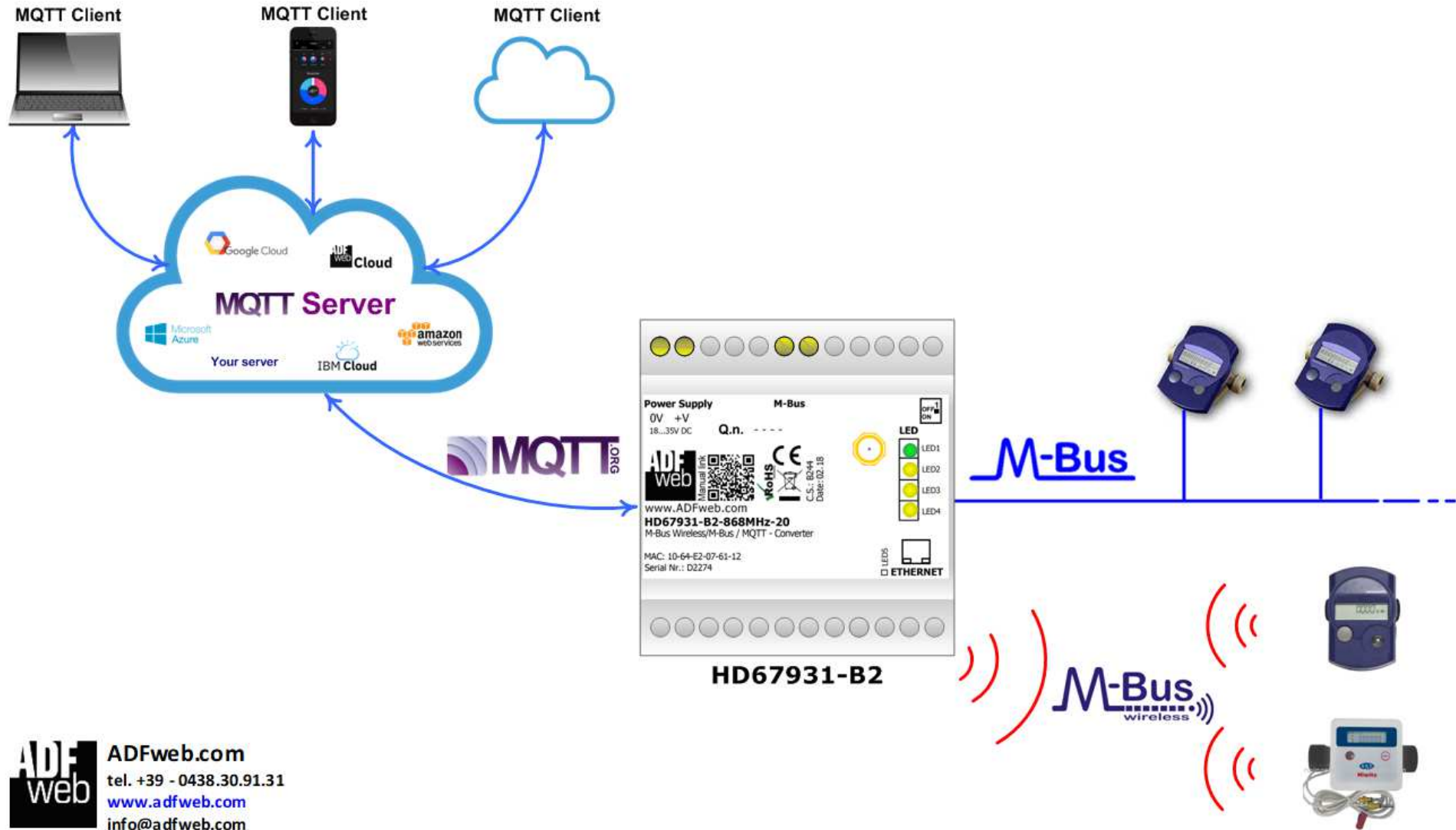
⚠ This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

CE CONFORMITY
The declaration is made by our company. You can send an email to or give us a call if you need it.

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**EXAMPLE OF CONNECTION:**

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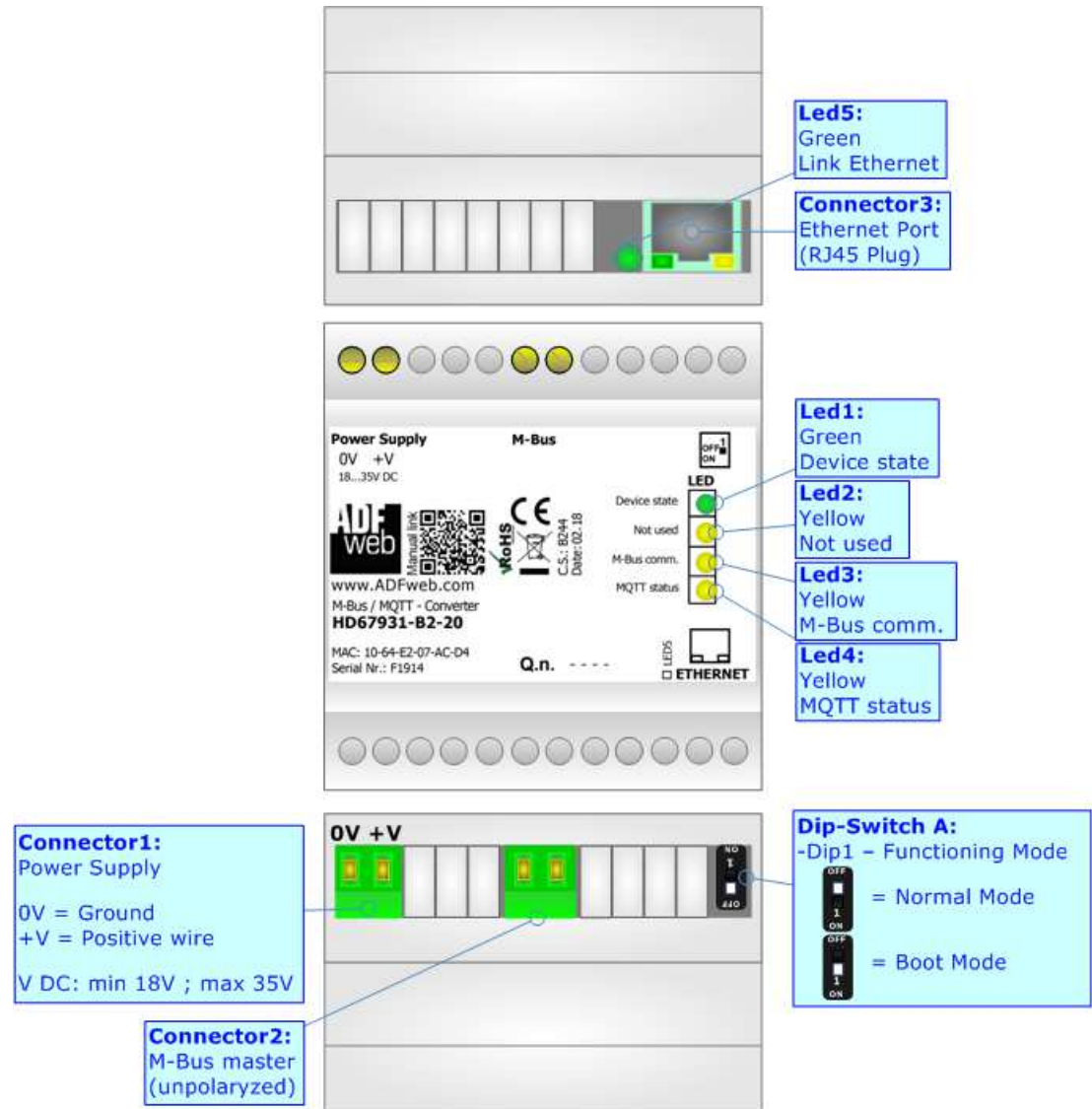
**CONNECTION SCHEME:**



*Figure 1a: Connection scheme for HD67931-B2-xxx*

**Led5:**
Green
Link Ethernet

**Connector3:**
Ethernet Port
(RJ45 Plug)

**Connector4:**
Antenna

**Led1:**
Green
Device state

**Led2:**
Yellow
wM-Bus comm.

**Led3:**
Yellow
Not used

**Led4:**
Yellow
MQTT status

Power Supply
0V  +V
18...35V DC    Q.n. - - - -

www.ADFweb.com
HD67931-B2-868MHz-0
M-Bus Wireless / MQTT - Converter

MAC: 10-64-E2-07-A3-01
Serial Nr.: E9143

LED
LED1
LED2
LED3
LED4

□ LEDS
□ ETHERNET

C.S.: B244
Date: 02.18

**Connector1:**
Power Supply

0V = Ground
+V = Positive wire

V DC: min 18V ; max 35V

0V +V

**Dip-Switch A:**
-Dip1 – Functioning Mode

= Normal Mode

= Boot Mode

*Figure 1b: Connection scheme for HD67931-B2-xxxMHz-0*

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**Led5:**
Green
Link Ethernet

**Connector3:**
Ethernet Port
(RJ45 Plug)

**Connector4:**
Antenna

**Led1:**
Green
Device state

**Led2:**
Yellow
wM-Bus comm.

**Led3:**
Yellow
M-Bus comm.

**Led4:**
Yellow
MQTT status

Power Supply        M-Bus
0V  +V
18...35V DC    Q.n. - - - -

www.ADFweb.com
HD67931-B2-868MHz-20
M-Bus Wireless/M-Bus / MQTT - Converter

MAC: 10-64-E2-07-61-12
Serial Nr.: D2274

**Connector1:**
Power Supply

0V = Ground
+V = Positive wire

V DC: min 18V ; max 35V

**Connector2:**
M-Bus master
(unpolaryzed)

**Dip-Switch A:**
-Dip1 – Functioning Mode

= Normal Mode

= Boot Mode

*Figure 1c: Connection scheme for HD67931-B2-xxxMHz-xxx*

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**CHARACTERISTICS:**

The HD67931-B2-xxx is a M-Bus / M-Bus Wireless / MQTT Converter.

It allows the following characteristics:

- Electrical isolation between Ethernet and M-Bus;
- Mountable on 35mm Rail DIN;
- Wide power supply input range: 18…35V DC;
- Wide temperature range:  -40°C / 85°C [-40°F / +185°F].

**CONFIGURATION:**

You need Compositor SW67931 software on your PC in order to perform the following:

- Define the parameter of MQTT;
- Define the parameter of M-Bus line;
- Define the parameter of M-Bus Wireless line;
- Define which M-Bus variables are sent to MQTT Server;
- Update the device.

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**POWER SUPPLY:**

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

| VDC $=\!=\!=$ | |
|:---:|:---:|
| **Vmin** | **Vmax** |
| **18V** | **35V** |

Consumption at 24V DC:

| Device | [W/VA] |
|:---:|:---:|
| HD67931-B2-xxxMHz-0 | 3.5 |

| Device | No Load [W/VA] | Full Load [W/VA]* |
|:---|:---:|:---:|
| HD67931-B2-xxxMHz-20, HD67931-B2-20 | | 4 |
| HD67931-B2-xxxMHz-40, HD67931-B2-40 | | 5 |
| HD67931-B2-xxxMHz-80, HD67931-B2-80 | 3.5 | 8 |
| HD67931-B2-xxxMHz-160, HD67931-B2-160 | | 14 |
| HD67931-B2-xxxMHz-250, HD67931-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 (wired side)



**Connector1:**
Power Supply

0V = Ground
+V = Positive wire

V DC: min 18V ; max 35V

+V 0V
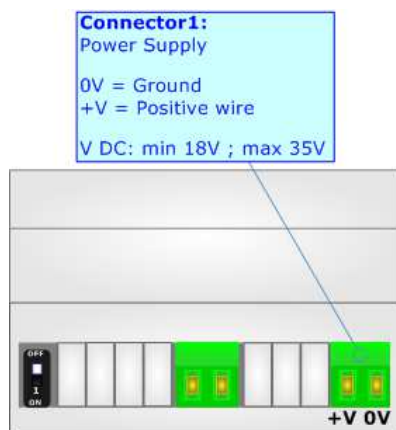
**Caution:  Not reverse the polarity power**



+V   0V

HD67931-B2

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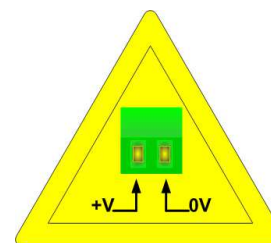
**FUNCTION MODES:**

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 uploading the Project and/or Firmware.

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

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

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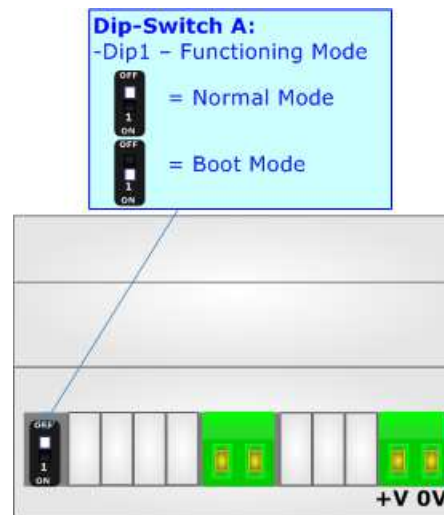
**LEDS:**

The device has got two 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<br>**Blinks very slowly (~0.5Hz):** update in progress |
| 2: wM-Bus comm. (yellow) | Blinks quickly when a M-Bus Wireless message is received (only if M-Bus Wireless is present) | **Blinks quickly:** Boot state<br>**Blinks very slowly (~0.5Hz):** update in progress |
| 3: M-Bus comm. (yellow) | Blinks quickly when a reply to a M-Bus request arrives (only if M-Bus is present) | **Blinks quickly:** Boot state<br>**Blinks very slowly (~0.5Hz):** update in progress |
| 4: MQTT status (yellow) | **ON:** MQTT not connected<br>**OFF:** MQTT connected<br>**Blinking:** MQTT communication | **Blinks quickly:** Boot state<br>**Blinks very slowly (~0.5Hz):** update in progress |
| 5: Ethernet Link (green) | **ON:** Ethernet cable connected<br>**OFF:** Ethernet cable disconnected | **ON:** Ethernet cable connected<br>**OFF:** Ethernet cable disconnected |

*Industrial Electronic Devices*
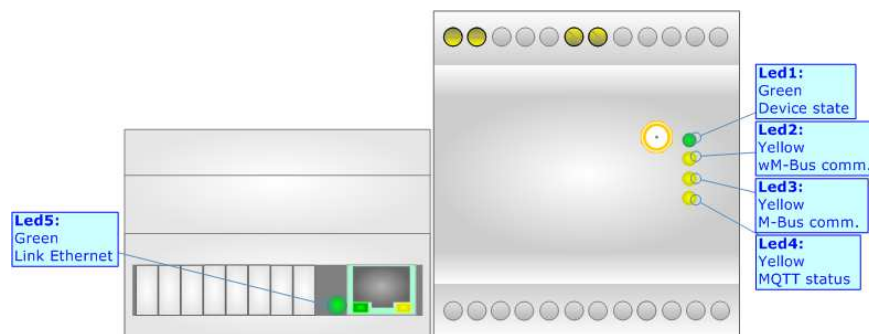
**ETHERNET:**

The Ethernet connection must be made using Connector3 of HD67931-B2 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.
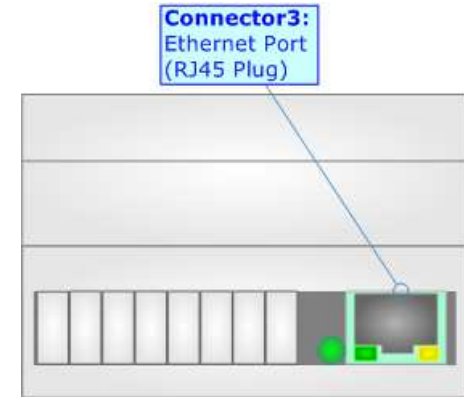


**M-BUS:**

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)*

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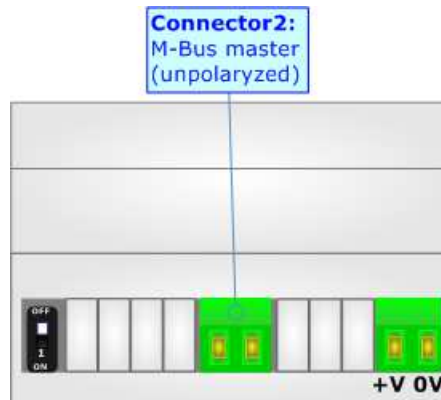
**M-BUS WIRELESS:**

The standards of M-Bus Wireless are specified in EN 13757-4. The signal is @ 169 MHz or 433 MHz or 868 MHz (in relation to the order code).
The Antenna connector is a SMA Female ('Female Outer Shell' and 'Female Receptacle') so the Antenna must have a SMA Male connector.

Connector4:
Antenna

Industrial Electronic Devices
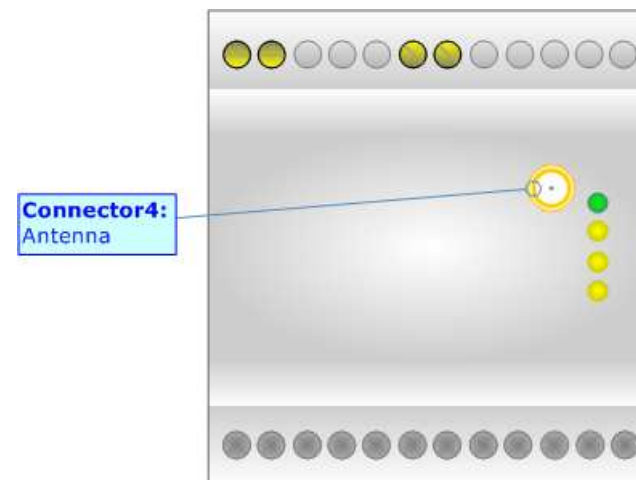
**USE OF COMPOSITOR SW67931:**

To configure the Converter, use the available software that runs with Windows called SW67931. It is downloadable on the site www.adfweb.com and its operation is described in this document. The software works with MS Windows (XP, Vista, Seven, 8, 10; 32/64bit).

When launching the SW67931, the window below appears (Fig. 2).
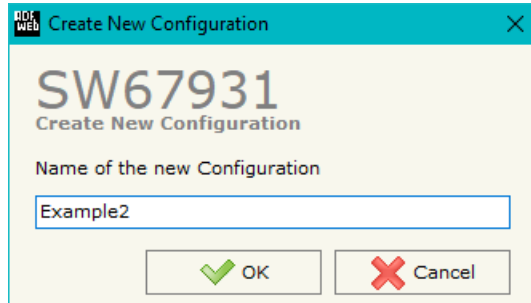
Note:
It is necessary to have installed .Net Framework 4.
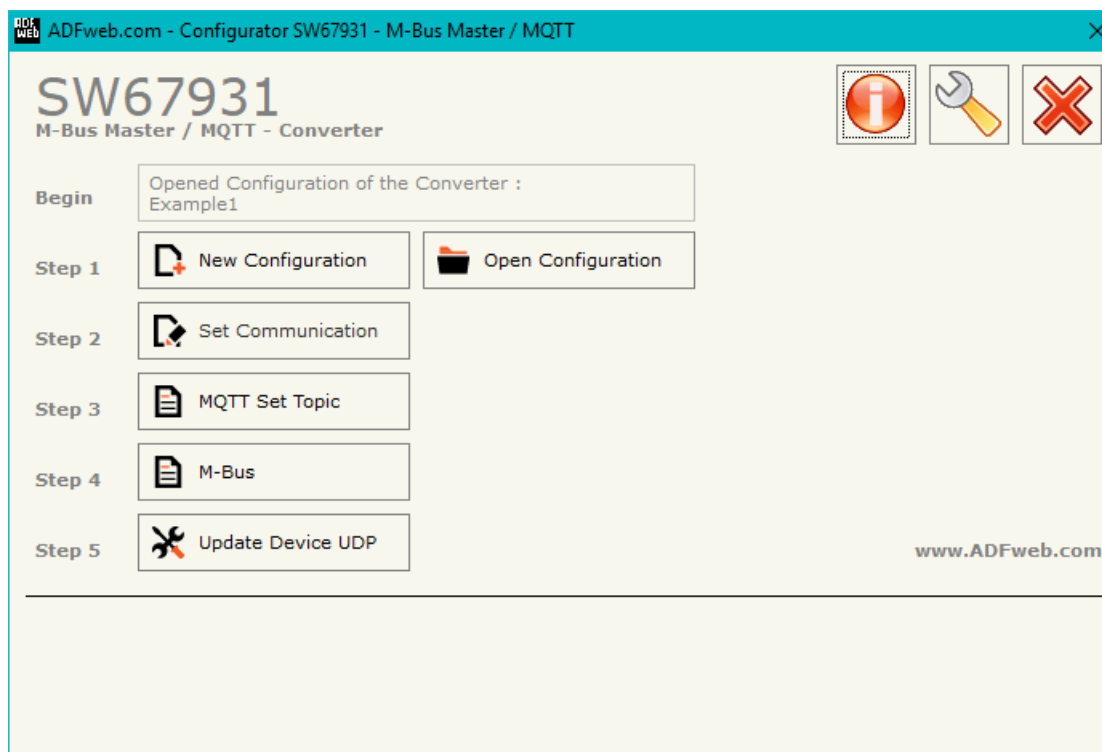


*Figure 2: Main window for SW67931*

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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 / M-Bus Wireless / MQTT - 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**".

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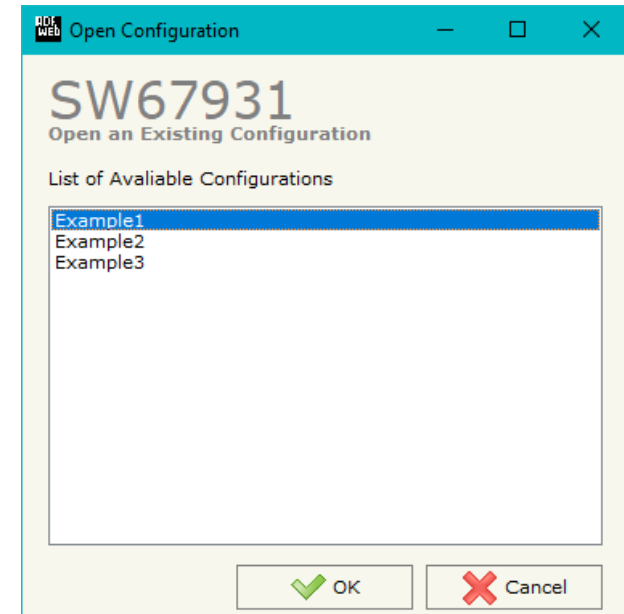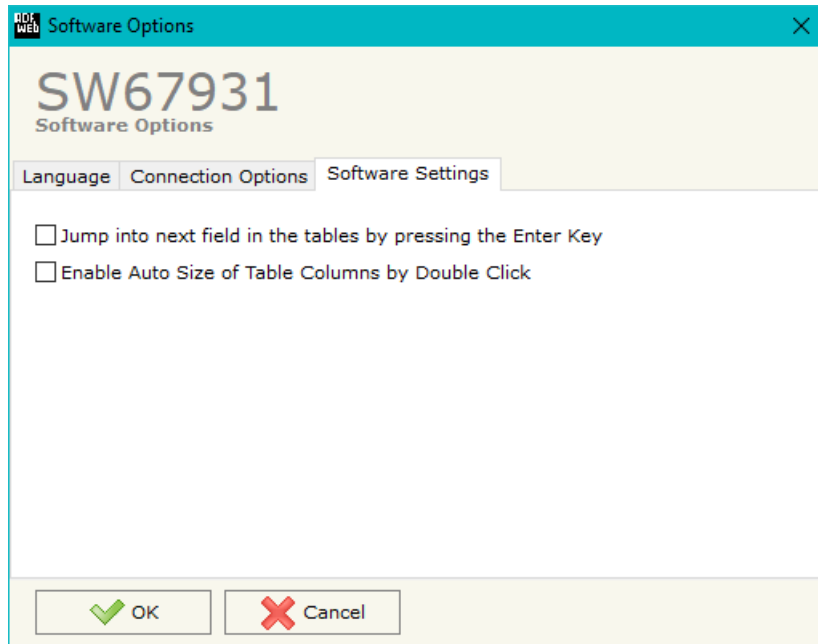
**SOFTWARE OPTIONS:**

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.
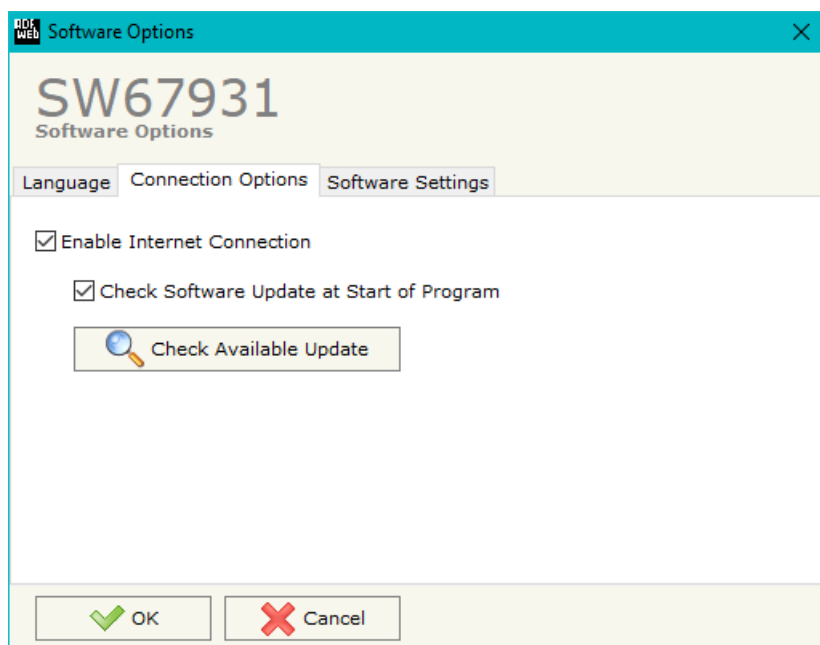
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67931 check automatically if there are updatings when it is launched.

**Software Options**

# SW67931
**Software Options**

Language | Connection Options | Software Settings

☐ Jump into next field in the tables by pressing the Enter Key

☐ Enable Auto Size of Table Columns by Double Click

✓ OK     ✗ Cancel

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:

By Pressing the "**Set Communication**" button from the main window for SW67931 (Fig. 2) the window "Set Communication" appears (Fig. 3).

The window is divided in different sections in order to define the different parameters of the converter:

- Working Mode
- M-Bus
- M-Bus Wireless
- MQTT
- Ethernet
- Wi-Fi
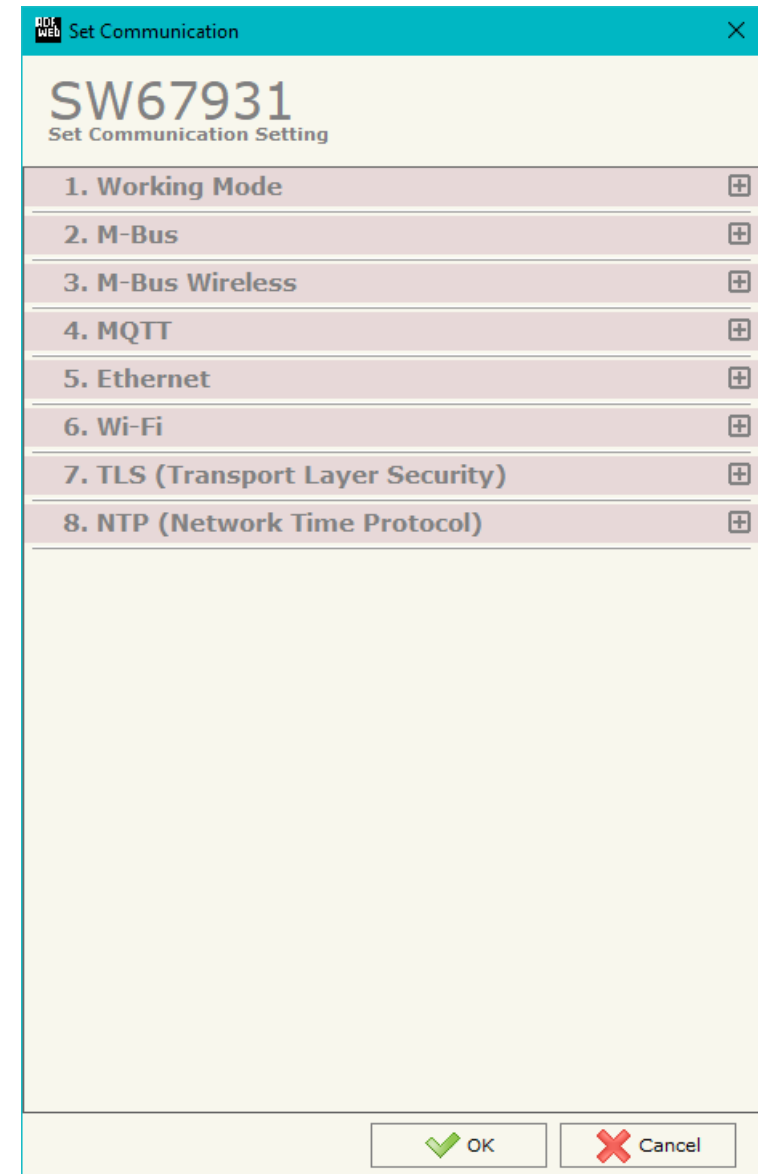- TLS (Transport Layer Security)
- NTP (Network Time Protocol)



*Figure 3a: "Set Communication" window*

**WORKING MODE:**

This section is used to define the working mode of MQTT side of the converter. It is possible to define:



*Figure 3b: "Set Communication → Working Mode" window*

- **Standard Mode**: on MQTT side, the data inside the payload of the messages are already readable and coded in relation to the user definition.
- **Raw Mode**: on MQTT side, it is possible to see the M-Bus responses in raw, without any decoding.

**M-BUS:**

This section is used to define the main parameters of M-Bus line. The means of the fields are:



- In the field "**M-Bus on Wire**" it is possible to define if the port is present or not;
- 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;
- If the field "**Cyclic Delay**" the delay (expressed in seconds) between two M-Bus scanning 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 Gateway doesn't find the interrogated M-Bus slave.

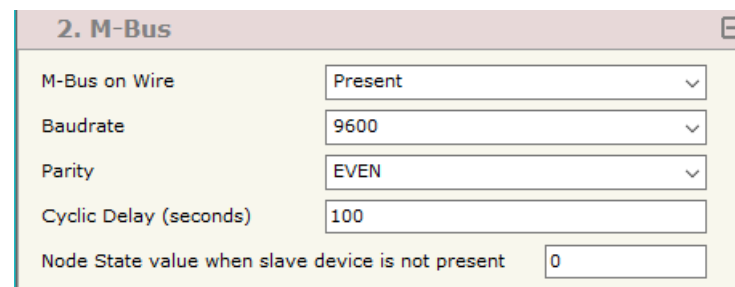*Figure 3c: "Set Communication → M-Bus" window*

**M-BUS WIRELESS:**

This section is used to define the main parameters of M-Bus Wireless line. The means of the fields are:



- In the field "**M-Bus on Wireless**" it is possible to define if the port is present or not;
- In the field "**Mode**" the communication mode is defined;
- In the field "**Radio Channel**" the radio channel is defined (only for 169 MHz).
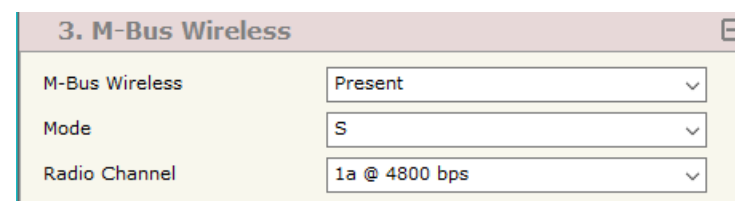
*Figure 3d: "Set Communication → M-Bus Wireless" window*

**MQTT:**

This section is used to define the main parameters of MQTT line. The means of the fields are:

- In the field "**Server URL**" the URL or the IP Address of the MQTT Server is defined;
- In the field "**Server Port**" the port used for MQTT communication is defined;
- In the field "**Client ID**" the Client ID of the converter is defined (if ned);
- In the field "**Keep Alive (seconds)**" the delay with which the Keep Alive message is sent on MQTT is defined;
- If the field "**Clean Session**" is checked, the last MQTT messages are deleted by the Server and the Client in case of missing ACK. If unchecked, the Server and the Client hold the last MQTT messages and, in case of incorrect disconnection or missing ACK, they try to send again them since all the ACK messages are exchanged correctly (valid only for QoS 1 and QoS 2);
- If the field "**Will Flag**" is checked, the converter will publish the Will topic at the connection to the Server. With this feature, in case of incorrect disconnection, the Server will publish this topic to all the MQTT Clients that subscribed it;
- In the field "**Topic Name Will**" the topic used for Will message is defined;
- In the field "**Message Will**" the payload of the Will message is defined;
- In the field "**Retained Will**" the converter will send the Will message with Retain flag enabled. In this way, the Server will hold the last Will message;
- In the field "**QoS Will**" the QoS type for Will message is defined;
- Im the field "**Username**" the username for the connection to the MQTT server is defined;
- In the field "**Password**" the password for the connection to the MQTT server is defined;
- In the field "**Template String**" the structure of payload for the MQTT messages with the data from M-Bus is defined. See page 38 for more info.



*Figure 3e: "Set Communication → MQTT" window*

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**ETHERNET:**

This section is used to define the general parameters of Ethernet. The means of the fields are:

➔ In the field "**Ip Address**" the IP address of the converter is defined;
➔ In the field "**SubNet Mask**" the Subnet Mask of the converter is defined;
➔ In the field "**Gateway**" the default gateway of the 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;
➔ In the field "**DNS**" the DNS address is defined. This field is required if the server address is define by URL and not IP Address.
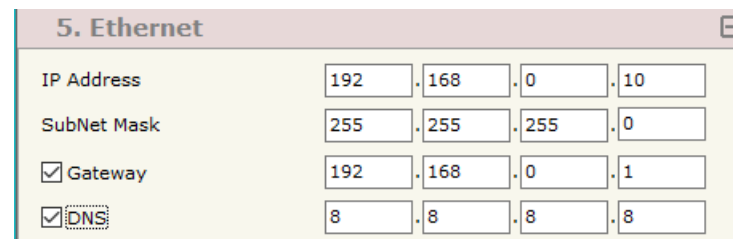


*Figure 3f: "Set Communication → Ethernet" window*

**WI-FI:**

This section is used to define the general parameters of Wi-Fi. It is possible to defined the type of Wi-Fi communication:
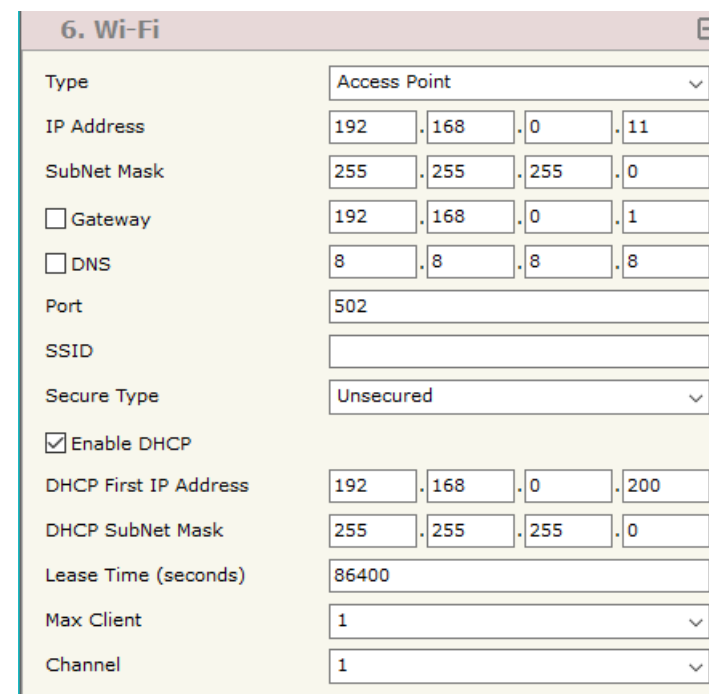
➔ Access Point;
➔ Client.

The means of the fields for Access Point configuration are:

➔ In the field "**IP Address**" the IP address of the converter is defined;
➔ In the field  "**Subnet Mask**" the SubNet Mask of the converter is defined;
➔ In the field "**GATEWAY**" the default gateway of the 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;
➔ In the field "**DNS**" the DNS address is defined. This field is required if the server address is define by URL and not IP Address.
➔ In the field "**Port**" the port used for MQTT communication is defined;
➔ In the field "**SSID**" the name of the Wi-Fi network to create is defined;
➔ In the field "**Password**" the password used for Wi-Fi connection is defined;
➔ In the field "**Type**" the type of security protocol used by the Wi-Fi network is defined;



*Figure 3g: "Set Communication → Wi-Fi" window*

- If the field "**Enable DHCP**" is checked, the converter acts as DHCP Server for the Clients connected. If the option is enabled, in the fields "**DHCP First IP Address**" and "**DHCP SUBNET Mask**" the IP Addresses range used for DHCP is defined. In the field "**Lease Time (seconds)**" the required time for the renewing of the IP Address assigned to the Client is defined;
- In the field "**Max Client**" the maximum number of Wi-Fi Clients accepted is defined;
- In the field "**Channel**" the channel for Wi-Fi communication is defined.

The means of the fields for Client configuration are:

- If the field "**Obtain an IP Address automatically**" is checked, the converter gets the IP Address using DHCP. Otherwise, the IP Address is defined as static;
- In the field "**IP Address**" the IP address of the converter is defined;
- In the field "**Subnet Mask**" the SubNet Mask of the converter is defined;
- In the field "**GATEWAY**" the default gateway of the 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;
- In the field "**DNS**" the DNS address is defined. This field is required if the server address is define by URL and not IP Address.
- In the field "**Port**" the port used for MQTT communication is defined;
- In the field "**SSID**" the name of the Wi-Fi network to connect is defined;
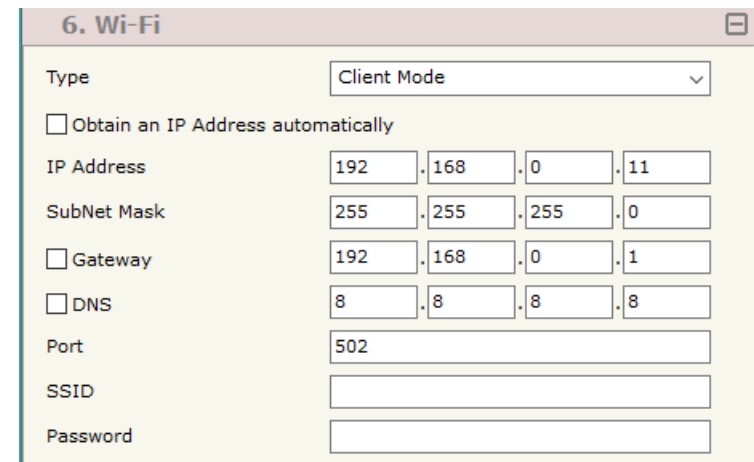- In the field "**Password**" the password used to connect to the Wi-Fi network is defined.



*Figure 3h: "Set Communication → Wi-Fi" window*

**TLS (TRANSPORT LAYER SECURITY):**

This section is used to define the parameters of TLS protocol. The means of the fields are:

+ If the field "**Enable TLS**" is checked, the TLS protocol for secure connection is enabled;
+ If the field "**Server Authentication**" is checked, the authentication of the Server using TLS is enabled. If enabled, in the field "**Server Certificate**" the certificate from the Server is defined;
+ If the field "**Client Authentication**" is checked, the authentication of the Client using TLS is enabled. If enabled:
    o in the field "**Client Certificate**" the certificate from the Client is defined;
    o in the field "Client Key" the private key of the Client is defined;
    o in the field "Client Key Password" the password for the private key of the Client is defined.



*Figure 3j: "Set Communication → TLS" window*

**NTP (NETWORK TIME PROTOCOL):**

This section is used to define the parameters of NTP protocol. The means of the fields are:

+ In the field "**Server URL**" the URL or the IP Address of the NTP Server is defined;
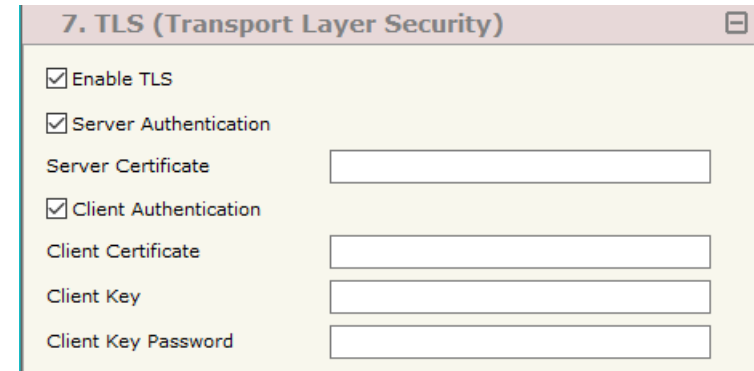+ In the field  "**Poll Time (seconds)**" the polling time for the time synchronization is defined.



*Figure 3k: "Set Communication → NTP" window*

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**MQTT SET TOPIC:**

By Pressing the "**MQTT Set Topic**" button from the main window for SW67931 (Fig. 2) the window "Set MQTT Topics" appears (Fig. 4).
This section is used to define the MQTT topics where the converter will publish the data from M-Bus.



*Figure 3k: "Set MQTT Topics" window*

The means of the fields are:

- In the field "**Topic**" the MQTT topic is defined;
- If the field "**Retained**" is defined, the retained flag is enabled. The MQTT server will hold the last topic published;
- In the field "**QoS**" the QoS level is defined;
- In the field "**Mnemonic**" a description of the topic is defined.

**M-BUS**

By Pressing the "**M-Bus**" button from the main window for SW67931 (Fig. 2) the window "M-Bus Network" appears (Fig. 5).

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.
➤ In the field "**M-Bus Type**" it is possible to select if the node uses M-Bus (on wire) or wM-Bus.

### 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 "**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.
➤ 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 30 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.
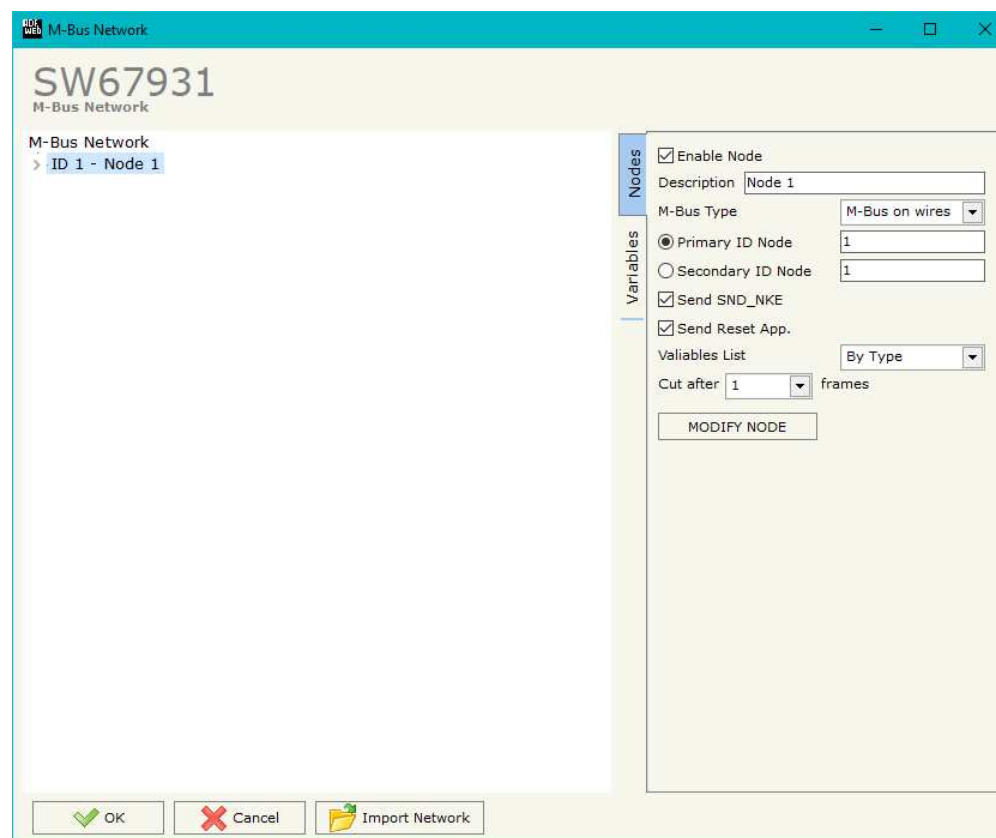


*Figure 5a: "M-Bus Network" window*

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**SECTION NODES (WM-BUS NODES):**

➤ In the field "**Manufacturer ID**" it is necessary to define the Manufacturer ID of the wM-Bus node.

➤ In the field "**Address**" it is necessary to define the ID of the wM-Bus node.

➤ If the field "**Version**" it is necessary to define the version of the wM-Bus node.

➤ In the field "**Device Type**" it is possible to define the Type of the wM-Bus node.

➤ The field "**Key Enable**" is used to decode the M-Bus frame sent by the wM-Bus node if it uses encrypted communication. In the following 16 fields, you have to

➤ In the field "**Variables List**" it is necessary 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 30 for more information).

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.
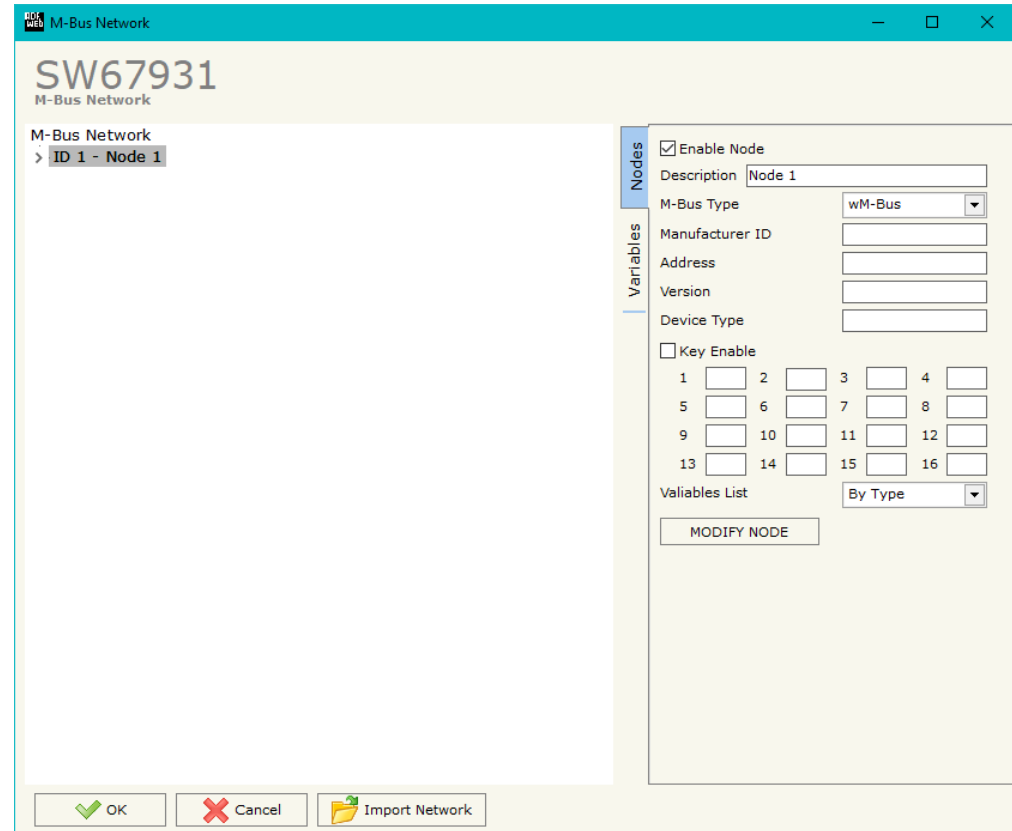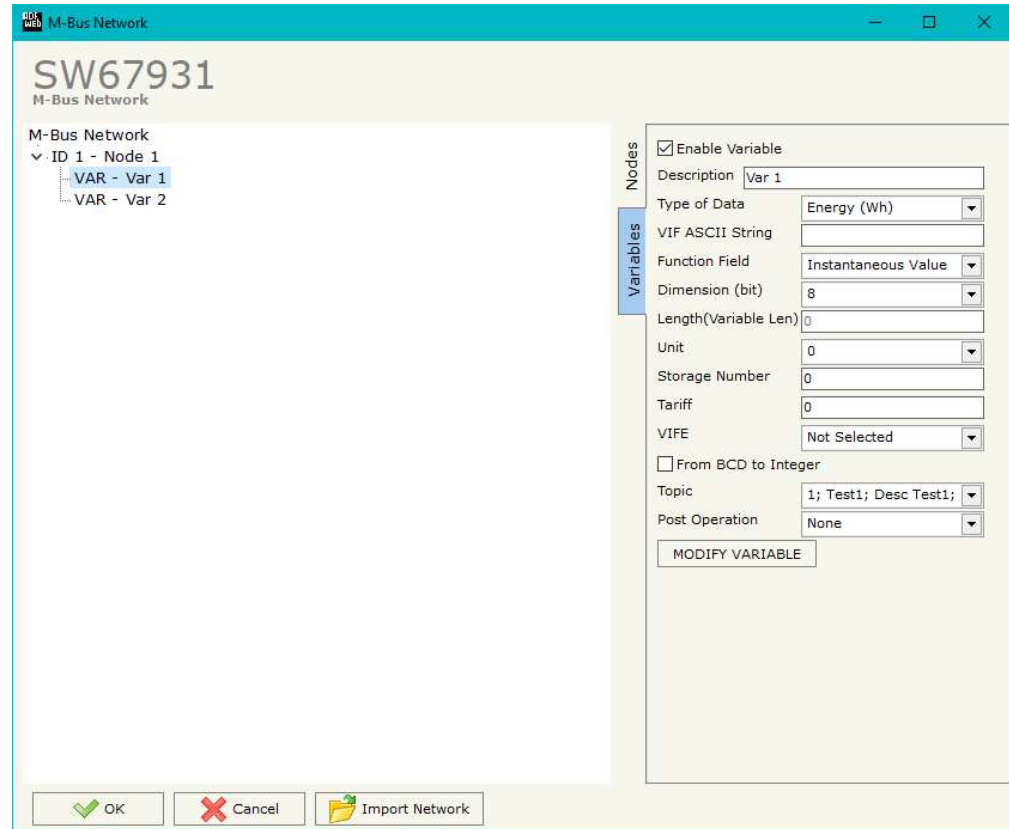


Figure 5b: "M-Bus Network" window

**S**ECTION **V**ARIABLES **(B**Y **T**YPE**):**

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 "**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.

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- In the field "**Topic**" the MQTT topic to link to the variable is defined.
- In the field "**Post Operation**" it is possible to define an operation on the data read before mapping it in the topic.
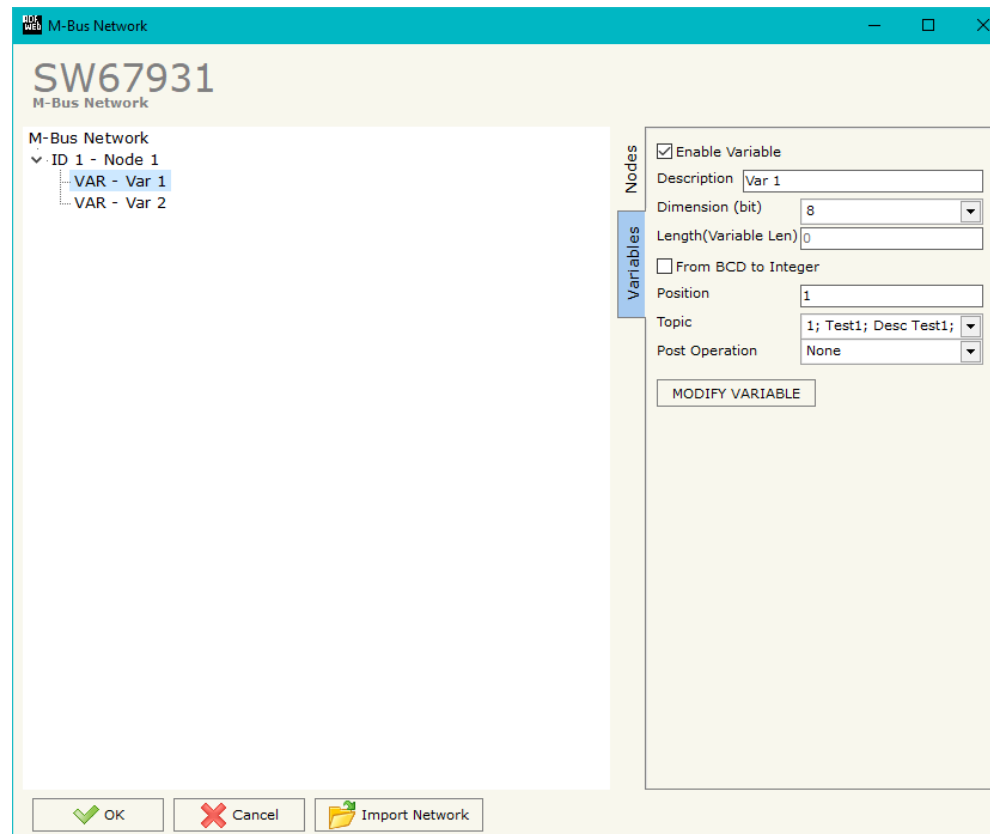
Having completed this fields, to add the variable the button "**ADD VARIABLE**" must be pressed.

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";

- 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.

- In the field "**Position**" insert the number of the variable that you want on MQTT.

- In the field "**Topic**" the MQTT topic to link to the variable is defined.

- In the field "**Post Operation**" it is possible to define an operation on the data read before mapping it in the topic.

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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Example:

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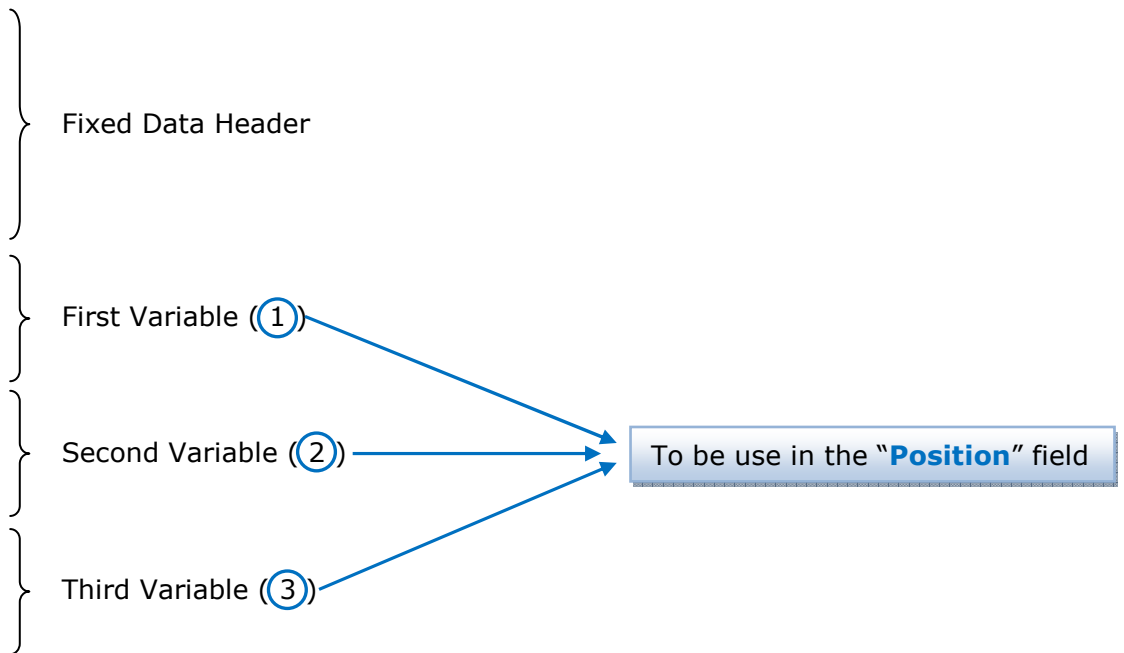0x08 - C Field
0x02 - A Field
0x72 - CI Field

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)

Fixed Data Header

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

First Variable (①)

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

Second Variable (②)

0x44 - DIF
0x06 - VIF            Energy
0x00 - Data (Byte 4Of4)
0x00 - Data (Byte 3Of4)
0x00 - Data (Byte 2Of4)
0x00 - Data (Byte 1Of4)

Third Variable (③)

...    Other Variables
...
0x55 - Check Sum
0x16 - Stop Byte

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

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**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.
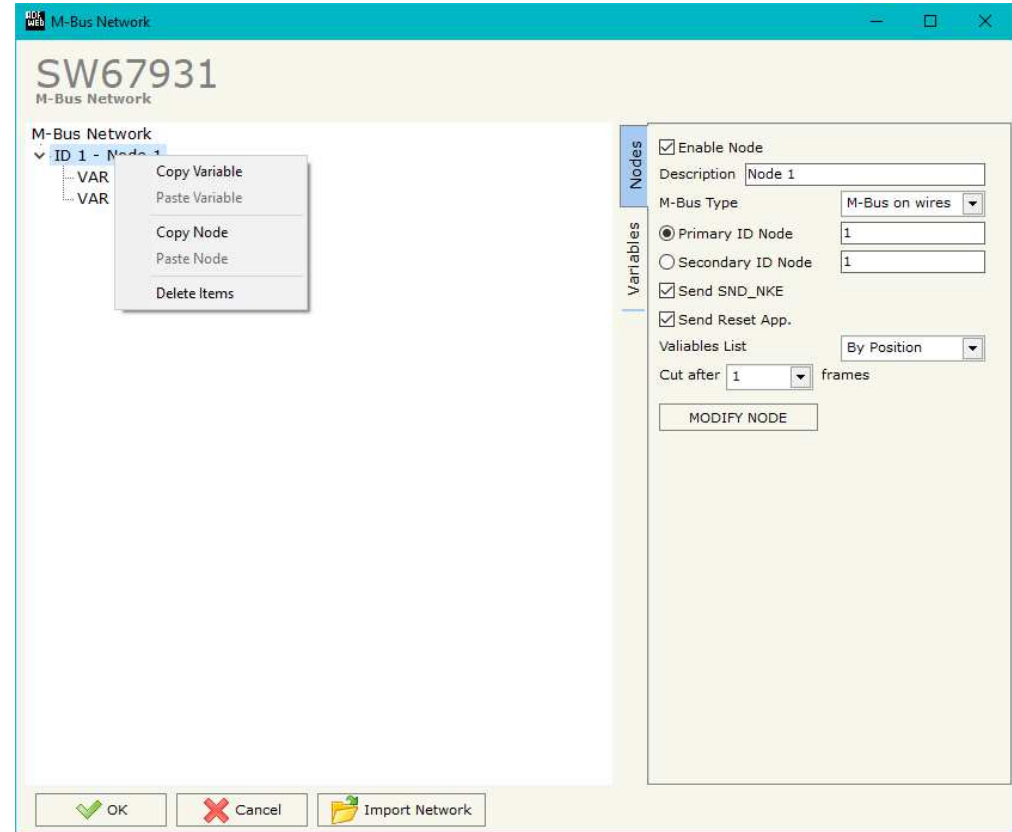
Possible choices for the fields used to create a variable:

**Type of Data:**
|_Energy (Wh)
|_Energy (J)
|_Volume (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

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**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

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|_ 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 currection factor
|_ Additive correction constant * unit of VIF (offset)
|_ Moltiplicative 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

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**UPDATE DEVICE:**

By pressing the "**Update Device**" button, it is possible to load the created Configuration into the device; and also the Firmware, if necessary. 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.
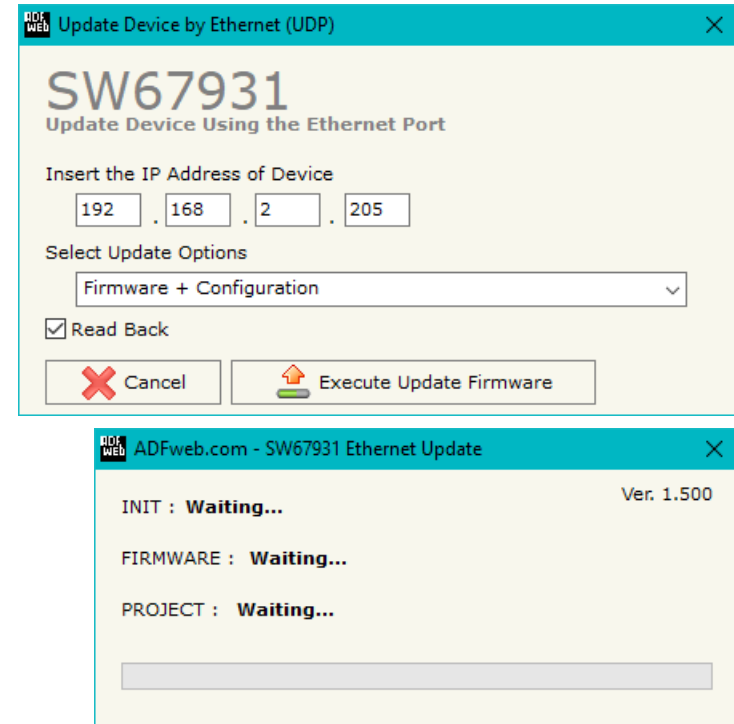
*Figure 6: "Update device" windows*

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**Note:**
When you receive the device, for the first time, you also have to update the Firmware in the HD67931 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;
→ 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, 10 you have to launch the "Command Prompt" with Administrator Rights;
→ Pay attention at Firewall lock.
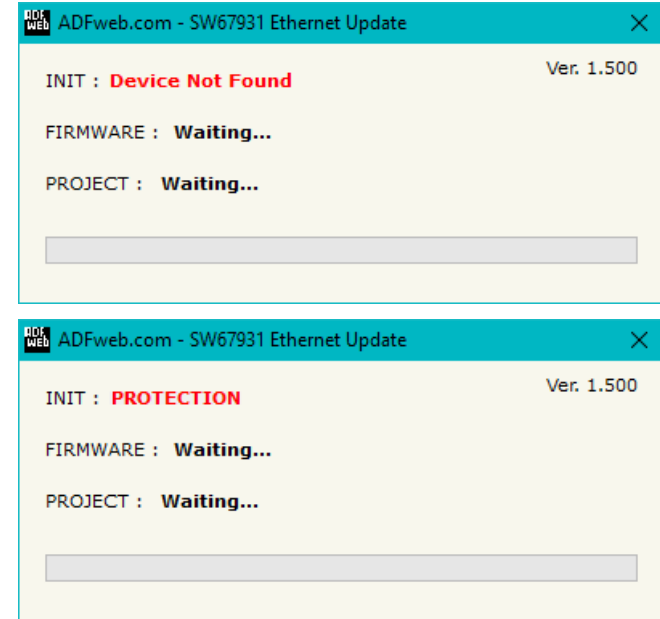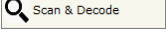
*Figure 7: "Error" window*

**Warning:**
In the case of HD67931 you have to use the software "SW67931": www.adfweb.com\download\filefold\SW67931.zip.

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**SCAN & DECODE FUNCTION:**

"SCAN & DECODE" functions are integrated in the configurator software SW67931. 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

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**TEMPLATE STRING: DEFINITION OF MQTT PAYLOAD**

In the section "Set Communication" of the SW67931, if "Standard Mode" is selected, it is possible to define a Template string for the MQTT messages. The template is necessary in order to define the structure of the payload of the MQTT message and the info contained.
It is possible to have a simple text format or a JSON format.

The definition of the template can be done using Key words, used to link a specific information of the M-Bus node/variables. The key words used and their meanings are:

- PRIMARY: Primary Address of the M-Bus of the meter
- SECONDARY: Secondary Address of the M-Bus meter
- DESC: description for the M-Bus meter (defined in the section "M-Bus")
- NODE_STATE: Node State of the M-Bus meter
- ACCESS_NUMBER: Access number of the M-Bus meter (number of polling received)
- RSSI: power of M-Bus Wireless signal (only for M-Bus Wireless meters)
- VALUE: value of the M-Bus variable
- UNIT1: type of M-Bus variable
- UNIT2: type of M-Bus variable, if VIFE code is present
- DIF: DIF code of the variable (Hex)
- DIFE: DIFE code of the variable (Hex)
- VIF: VIF code of the variable (Hex)
- VIFE: VIFE code of the variable (Hex)
- DATA: data of the variable (Hex)
- TIME: date and time of the M-Bus reading

⚠ Warning:
  The key words must be defined between "$" chars in order to be recognized (Ex.: $DATA$).

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Example

We have a project for a M-Bus node with this parameters:

**Primary Address**: 1
**Secondary Address**: 12345678
**Description**: Energy meter

Variables:
**Var.1**: Type: Energy (Wh), Dimension: 32 bit, Value: 300000, Scale factor: 1
**Var.2**: Type: Power (W), Dimension: 24 bit, Value: 2567, Scale Factor: $10^3$
**Var.3**: Type: Flow Temperature (°C), Dimension: 16 bit, Value: 209, Scale Factor: $10^{(-1)}$
**Var.4**: Type: Return Temperature (°C), Dimension: 16 bit Value: 197, Scale Factor: $10^{(-1)}$

We define a template string in this way:

*Description: $DESC$, Primary Address: $PRIMARY$, Secondary Address: $SECONDARY$, Type of variable: $UNIT1$, Data: $VALUE$*

The output of MQTT will be:

**Var.1**
*Description: Energy meter, Primary Address: 1, Secondary Address: 12345678, Type of variable: Energy [Wh], Data: 300000*

**Var.2**
*Description: Energy meter, Primary Address: 1, Secondary Address: 12345678, Type of variable: Power [W], Data: 2567000*

**Var.3**
*Description: Energy meter, Primary Address: 1, Secondary Address: 12345678, Type of variable: Flow Temperature [°C], Data: 20,9*

**Var.4**
*Description: Energy meter, Primary Address: 1, Secondary Address: 12345678, Type of variable: Return Temperature [°C], Data: 19,7*

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It is also possible to define the template as JSON format, like this:

```
{
 "description": "$DESC$",
 "primary address": "$PRIMARY$",
 "secondary address": "$SECONDARY$",
 "measure unit 1": "$UNIT1$",
 "value": "$VALUE$"
}
```

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**MECHANICAL DIMENSIONS:**
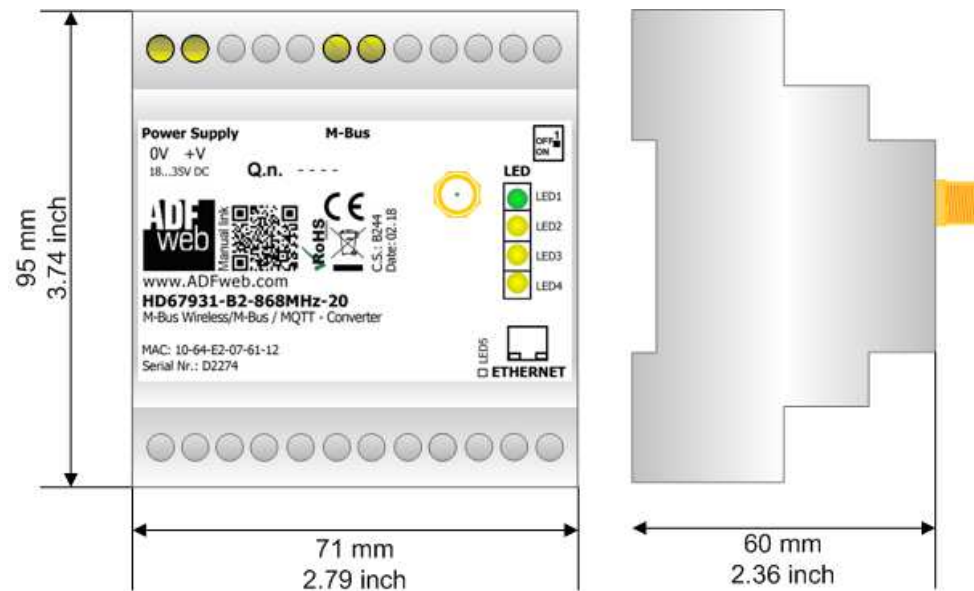


Housing: PVC
Weight: 200g (Approx)

*Figure 8: Mechanical dimensions scheme for HD67931-B2-xxxMHz-xxx*

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**ORDERING INFORMATIONS:**

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

**HD67931 – B 2 – xxxMHz - xxx**

**Maximum number of slaves supported**
0: M-Bus port (wired) not present
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

**M-Bus Wireless Frequency**
169: 169 MHz
433: 433 MHz
868: 868 MHz
Field not present: only M-Bus port (on wire)

**Connectors Type**
2: Fixed Screw Terminal

**Enclosure Type**
B: Modulbox 4M, 35mm DIN Rail mounting

**Device Family**
HD67931: M-Bus / MQTT  - Converter

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Order Code: **HD67931-B2-20**          -          M-Bus / MQTT – Converter (up to 20 M-Bus slaves)
Order Code: **HD67931-B2-40**          -          M-Bus / MQTT – Converter (up to 40 M-Bus slaves)
Order Code: **HD67931-B2-80**          -          M-Bus / MQTT – Converter (up to 80 M-Bus slaves)
Order Code: **HD67931-B2-160**          -          M-Bus / MQTT – Converter (up to 160 M-Bus slaves)
Order Code: **HD67931-B2-250**          -          M-Bus / MQTT – Converter (up to 250 M-Bus slaves)

Order Code: **HD67931-B2-169MHz-0**          -          M-Bus Wireless / MQTT – Converter (wM-Bus @ 169MHz)
Order Code: **HD67931-B2-433MHz-0**          -          M-Bus Wireless / MQTT – Converter (wM-Bus @ 433MHz)
Order Code: **HD67931-B2-868MHz-0**          -          M-Bus Wireless / MQTT – Converter (wM-Bus @ 868MHz)

Order Code: **HD67931-B2-169MHz-20**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 20 M-Bus slaves - wM-Bus @ 169MHz)
Order Code: **HD67931-B2-169MHz-40**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 40 M-Bus slaves - wM-Bus @ 169MHz)
Order Code: **HD67931-B2-169MHz-80**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 80 M-Bus slaves - wM-Bus @ 169MHz)
Order Code: **HD67931-B2-169MHz-160**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 160 M-Bus slaves - wM-Bus @ 169MHz)
Order Code: **HD67931-B2-169MHz-250**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 250 M-Bus slaves - wM-Bus @ 169MHz)

Order Code: **HD67931-B2-433MHz-20**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 20 M-Bus slaves - wM-Bus @ 433MHz)
Order Code: **HD67931-B2-433MHz-40**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 40 M-Bus slaves - wM-Bus @ 433MHz)
Order Code: **HD67931-B2-433MHz-80**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 80 M-Bus slaves - wM-Bus @ 433MHz)
Order Code: **HD67931-B2-433MHz-160**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 160 M-Bus slaves - wM-Bus @ 433MHz)
Order Code: **HD67931-B2-433MHz-250**          -          M-Bus/M-Bus Wireless / MQTT – Converter
(up to 250 M-Bus slaves - wM-Bus @ 433MHz)

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Order Code: **HD67931-B2-868MHz-20**      -      M-Bus/M-Bus Wireless / MQTT – Converter
(up to 20 M-Bus slaves - wM-Bus @ 868MHz)

Order Code: **HD67931-B2-868MHz-40**      -      M-Bus/M-Bus Wireless / MQTT – Converter
(up to 40 M-Bus slaves - wM-Bus @ 868MHz)

Order Code: **HD67931-B2-868MHz-80**      -      M-Bus/M-Bus Wireless / MQTT – Converter
(up to 80 M-Bus slaves - wM-Bus @ 868MHz)

Order Code: **HD67931-B2-868MHz-160**      -      M-Bus/M-Bus Wireless / MQTT – Converter
(up to 160 M-Bus slaves - wM-Bus @ 868MHz)

Order Code: **HD67931-B2-868MHz-250**      -      M-Bus/M-Bus Wireless / MQTT – Converter
(up to 250 M-Bus slaves - wM-Bus @ 868MHz)


**ACCESSORIES:**

Order Code: **APW020**    -    Power Supply for M-Bus Master device that supports up to 20 Slaves
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: **APW0160**    -    Power Supply for M-Bus Master device that supports up to 160 Slaves
Order Code: **APW0250**    -    Power Supply for M-Bus Master device that supports up to 250 Slaves

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## 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.

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.

**ADFweb.com S.r.l.**
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