User Manual

Revision 2.102
English

M-Bus / RS232 - Converter

(Order Codes: HD67021-B2-20, HD67021-B2-40, HD67021-B2-80, HD67021-B2-160, HD67021-B2-250)

M-Bus / RS485 - Converter

(Order Codes: HD67022-B2-20, HD67022-B2-40, HD67022-B2-80, HD67022-B2-160, HD67022-B2-250)

for Website information:
  www.adfweb.com?Product=HD67021
  www.adfweb.com?Product=HD67022

for Price information:
  www.adfweb.com?Price=HD67021-B2-20
  www.adfweb.com?Price=HD67021-B2-40
  www.adfweb.com?Price=HD67021-B2-80
  www.adfweb.com?Price=HD67021-B2-160
  www.adfweb.com?Price=HD67021-B2-250

  www.adfweb.com?Price=HD67022-B2-20
  www.adfweb.com?Price=HD67022-B2-40
  www.adfweb.com?Price=HD67022-B2-80
  www.adfweb.com?Price=HD67022-B2-160
  www.adfweb.com?Price=HD67022-B2-250

Benefits and Main Features:

⬥ Very easy to configure

⬥ Triple electrical isolation

⬥ Temperature range: -40°C / 70°C (-40°F / 158°F)

User Manual

For other M-Bus products see also the following link:

Gateway M-Bus / Modbus RTU
www.adfweb.com?Product=HD67029M-232   **(on RS232)**
www.adfweb.com?Product=HD67029M-485   **(on RS485)**

Converter M-Bus to
www.adfweb.com?Product=HD67030   **(Ethernet)**

Analyzer & Scanner M-Bus
www.adfweb.com?Product=HD67031

Extender and Repeater, M-Bus
www.adfweb.com?Product=HD67032

Gateway M-Bus / Modbus TCP
www.adfweb.com?Product=HD67044M

Gateway M-Bus Concentrator
www.adfweb.com?Product=HD67054M

Gateway M-Bus / PROFIBUS
www.adfweb.com?Product=HD67053M

Gateway M-Bus Slave / Modbus RTU master
www.adfweb.com?Product=HD67059M-232

Do you need to choose a device? do you want help?

Ask it to the following link: www.adfweb.com?Cmd=helpme

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
+ 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
2.012	04/04/2013	Nt	All	Added new chapters
2.100	21/01/2016	Ff	All	Added new hardware version
2.101	06/12/2016	Ff	All	Revision
2.102	17/12/2018	Ff	All	New hardware version

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Industrial Electronic Devices

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.

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CONNECTION SCHEMES:

Connector5:
RS232 port

PIN2 = RX
PIN3 = TX
PIN5 = GND* (to
Isolated Ground)

CABLE Side A FEM
CABLE Side B FEM

Led5:
Green
Link Ethernet

Connector3:
Ethernet Port
(RJ45 Plug)

Power Supply
0V +V
15...21V AC
18...35V DC

M-Bus
Q.n. - - - -

OFF 1 ON

LED

Device state
Serial comm.
M-Bus Master comm.
M-Bus error

www.ADFweb.com
M-Bus Master / RS232 - Converter
HD67021-B2-20
MAC: 10-64-E2-07-AC-E6
Serial Nr.: F1932

RS232

ETHERNET

Led1:
Green
Device state

Led2:
Yellow
Serial comm.

Led3:
Yellow
M-Bus comm.

Led4:
Yellow
M-Bus error

Connector1:
Power Supply

0V = Ground
+V = Positive wire

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

0V +V

Connector2:
M-Bus master
(unpolaryzed)

Dip-Switch A:
-Dip1 – Functioning Mode

OFF 1 ON = Normal Mode

OFF 1 ON = Boot Mode

Figure 1a: Connection scheme for HD67021-B2-xxx

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Connector6:
RS485 port

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

Dip-Switch B:
-Dip1 – Termination RS485 line

= Open   = 120 ohm

Led5:
Green
Link Ethernet

Connector3:
Ethernet Port
(RJ45 Plug)

+ - S

Power Supply   M-Bus   Q.n. - - - -
0V +V   Master
15...21V AC   port
18...35V DC

www.ADFweb.com

M-Bus Master / RS485 - Converter
HD67022-B2-20

MAC: 10-64-E2-07-CD-F6
Serial Nr.: G0396

+ - S
RS485 port

Device state
Serial comm.
M-Bus Master comm.
M-Bus error

LED
ETHERNET

Dip-Switch A

Dip-Switch B

Led1:
Green
Device state

Led2:
Yellow
Serial comm.

Led3:
Yellow
M-Bus comm.

Led4:
Yellow
M-Bus error

Connector1:
Power Supply

0V = Ground
+V = Positive wire

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

0V +V

Connector2:
M-Bus master
(unpolaryzed)

Dip-Switch A:
-Dip1 – Functioning Mode

= Normal Mode

= Boot Mode

Figure 1b: Connection scheme for HD67022-B2-xxx

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Industrial Electronic Devices

CHARACTERISTICS:

The HD67021 and HD67022 series are M-Bus / Serial converters with the following features:

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

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

- HD67021-B2-20 and HD67022-B2-20 support up to 20 M-Bus devices;
- HD67021-B2-40 and HD67022-B2-40 support up to 40 M-Bus devices;
- HD67021-B2-80 and HD67022-B2-80 support up to 80 M-Bus devices;
- HD67021-B2-160 and HD67022-B2-160 support up to 160 M-Bus devices;
- HD67021-B2-250 and HD67022-B2-250 support up to 250 M-Bus devices.

⚠ In the case of HD67021-B2-250 and HD67022-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 SW67021 software on your PC in order to perform the following:

- Define the communication parameters of the M-Bus;
- Define the communication parameters of the RS232/RS485;
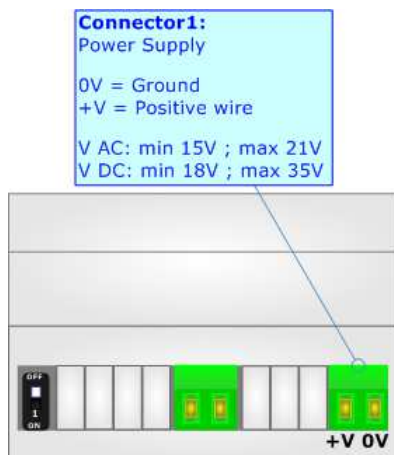- Update Firmware.

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]*
HD67021-B2-20 / HD67022-B2-20		4
HD67021-B2-40 / HD67022-B2-40		5
HD67021-B2-80 / HD67022-B2-80	3.5	8
HD67021-B2-160 / HD67022-B2-160		14
HD67021-B2-250 / HD67022-B2-250		30

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

Connector1:
Power Supply

0V = Ground
+V = Positive wire

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

+V 0V

Caution: Do not reverse the polarity power

+V   0V

HD67021-B2-xxx / HD67022-B2-xxx

Industrial Electronic Devices
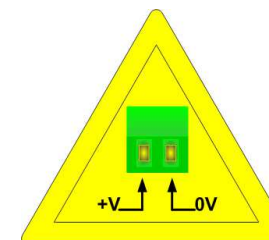
FUNCTION MODES:

The device has got two functions mode depending of the position of the 'Dip1 of Dip-Switch A' of HD67021-B2-xxx / HD67022-B2-xxx:

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

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

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

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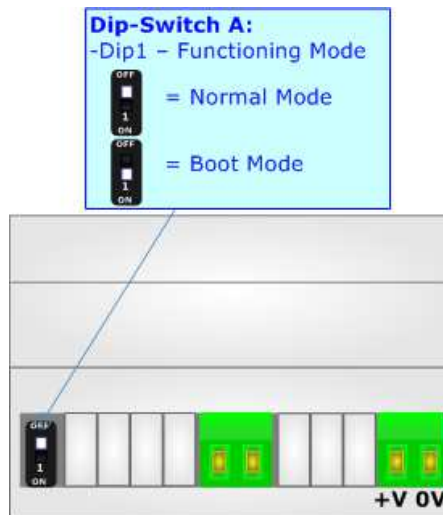
LEDS:

The HD67021-B2-xxx / HD67022-B2-xxx device has got five LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: Device State (green)	Blinks slowly (~1Hz)	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
2: Serial communication (yellow)	Blinks when a M-Bus request on serial is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
3: M-Bus communication (yellow)	Blinks when a M-Bus response on M-Bus is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: M-Bus error (yellow)	**ON**: error on M-Bus response **OFF**: error not present	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
5: Ethernet Link (green)	**ON:** Ethernet cable connected **OFF:** Ethernet cable disconnected	**ON:** Ethernet cable connected **OFF:** Ethernet cable disconnected

Industrial Electronic Devices
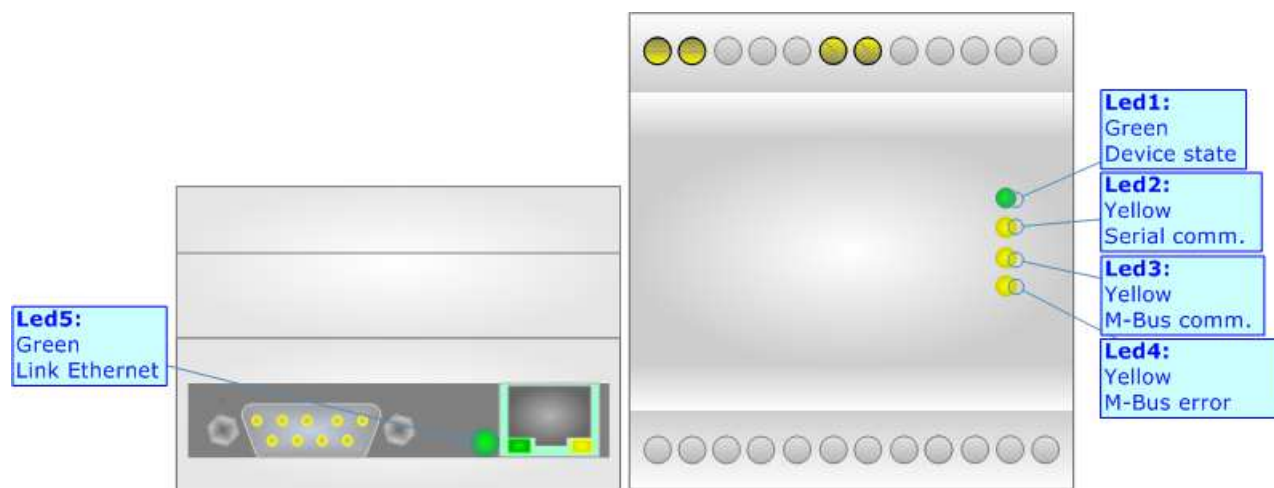
M-BUS:

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)*
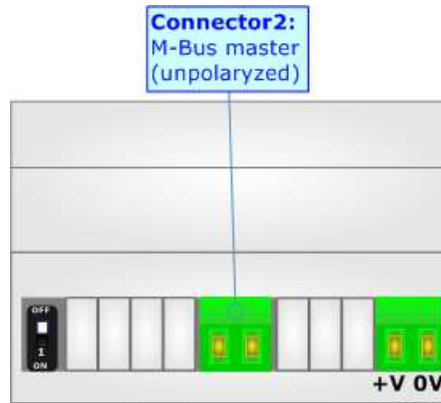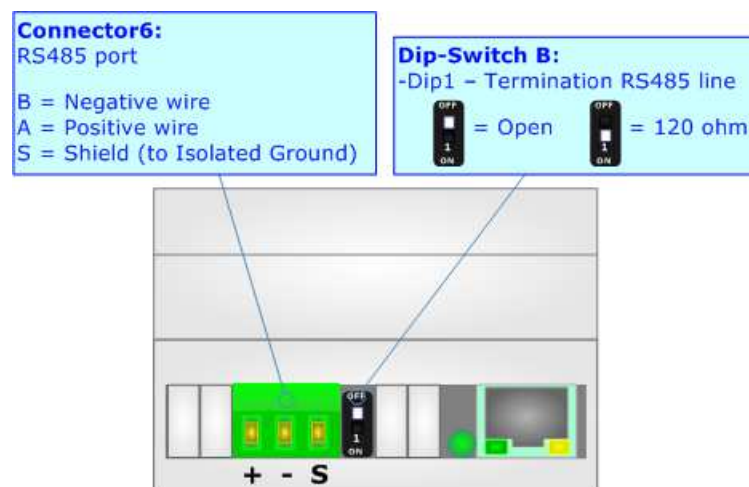

RS232 (for HD67021):

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

RS485 (for HD67022):

To terminate the RS485 line with a 120Ω resistor, it is necessary to put dip 1 ON, like in figure.

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

Here some codes of cables:

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

Industrial Electronic Devices

ETHERNET (for HD67021/22-B2-xxx):

The Ethernet port is used for programming the device.
The Ethernet connection must be made using Connector2 of HD67021/22-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.

Industrial Electronic Devices
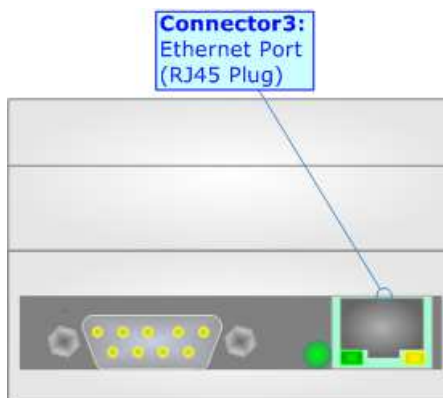
USE OF COMPOSITOR SW67021:

To configure the Converter, use the available software that runs with Windows called SW67021. It is downloadable from the site www.adfweb.com and its operation is described in this document *(this manual is referenced to the last version of the software present on our web site)*. The software works with MSWindows (XP, Vista, Seven, 8; 10; 32/64bit).

When launching the SW67021, the window below appears (Fig. 2).

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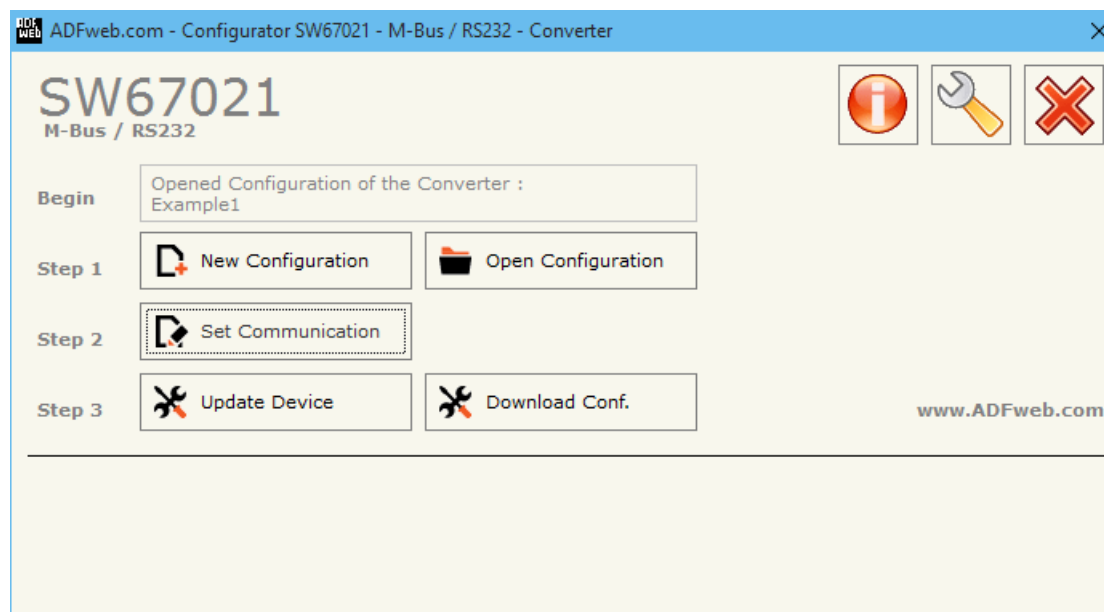   It is necessary to have installed .Net Framework 4.

Figure 2: Main window for SW67021

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NEW CONFIGURATION / OPEN CONFIGURATION:

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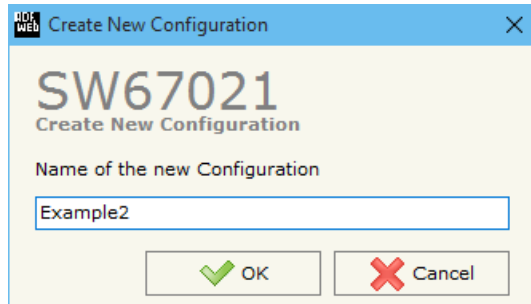
A device's configuration can also be imported or exported:

→ To clone the configurations of a Programmable "M-Bus / RS232 / RS485 - 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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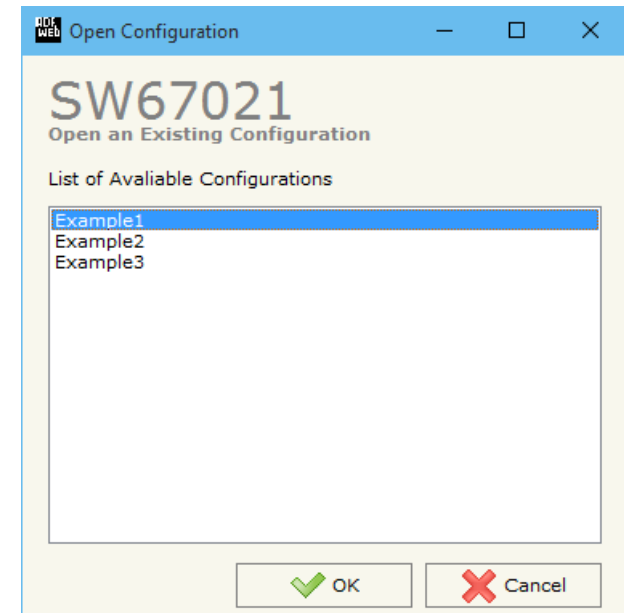
SOFTWARE OPTIONS:

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.
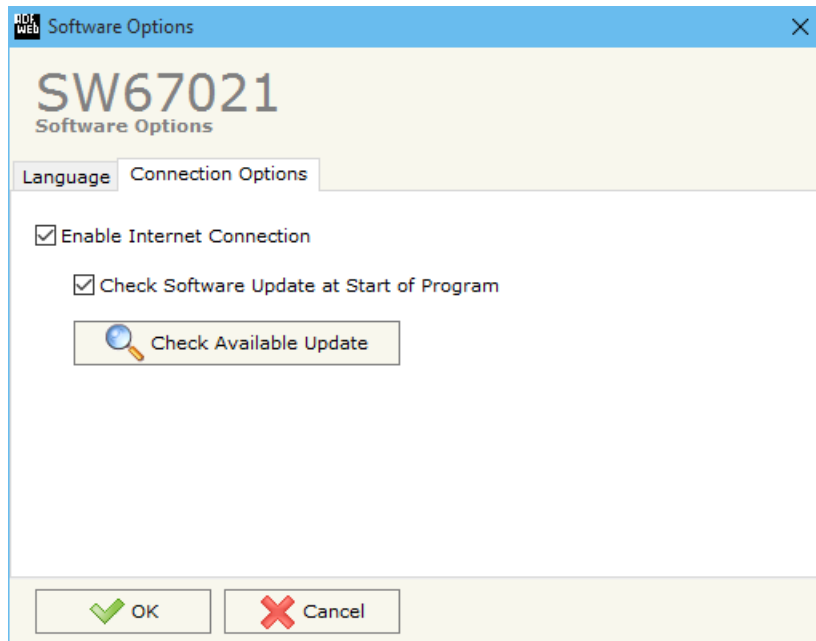
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67021 check automatically if there are updatings when it is launched.

Industrial Electronic Devices

SET COMMUNICATION:

This section define the fundamental communication parameters of the M-Bus buses.

By Pressing the "**Set Communication**" button from the main window for SW67021 (Fig. 2) the window "Set Communication" appears (Fig. 3). The window is divided in two sections.

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

- HD67021M / HD67022M;
- HD67021M-40/80/160/250 / HD67022M-40/80/160/250;
- HD67021-B2 / HD67022-B2.

The means of the fields for "Serial" are:

- If the field "**Auto Baudrate**" is enabled, the baud rate on serial side will be detected automatically;
- In the field "**Baudrate**" it is possible to select the baud rate of the M-Bus lines;
- In the field "**Parity**" it is possible to select the parity of the lines.

The means of the fields for "M-Bus" are:

- In the field "**Baudrate**" it is possible to select the baud rate of the M-Bus lines;
- In the field "**Parity**" it is possible to select the parity of the lines.

The means of the fields for the "Ethernet" section are (only for HD67021/22-B2):

- In the fields "**IP ADDRESS**" insert the IP address that you want to give to the Converter;
- In the fields "**SUBNET Mask**" insert the SubNet Mask;
- In the fields "**GATEWAY**" insert the default gateway that you want to use. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net.
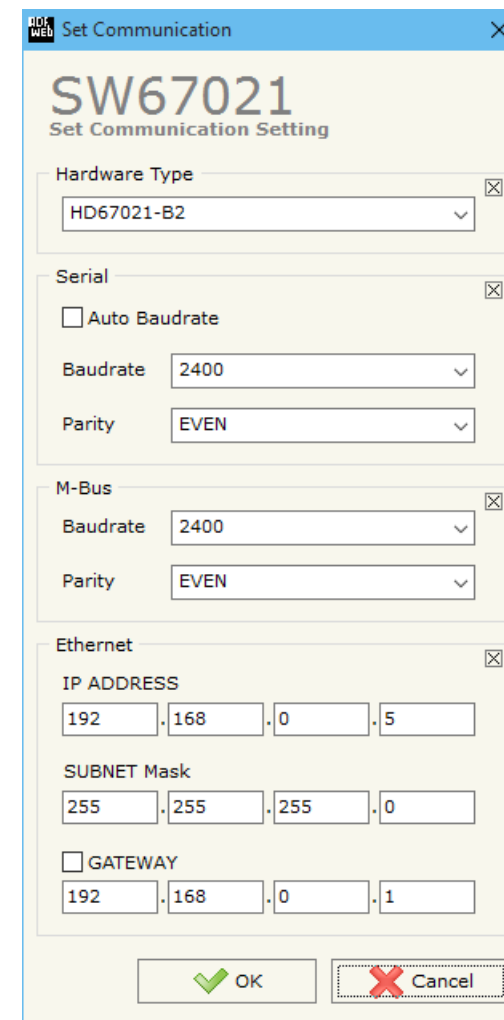
These informations are used for programming the Converter.

Figure 3: "Set Communication" window

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Industrial Electronic Devices

UPDATE DEVICE (for HD67021M / HD67022M):

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

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

- Turn OFF the Device;
- Connect the RS232 cable from your PC to the Converter;
- Insert Jumper1;
- Select the "**COM port**" and press the "**Connect**" button;
- Turn on the device;
- Check the "Device state" Led. It must blink quickly (see "LEDS" section);
- Press the "**Next**" button;
- Select which operations you want to do.
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" turn off the device;
- Remove Jumper1;
- Disconnect the RS232 cable;
- Turn ON the device.

Update Device by Serial

SW67021
Update Device Using the Serial Port

Follow these steps to update from RS232:
1 - Turn OFF the Device
2 - Use the Dip-Switch to set the Boot Mode
3 - Select the COM Port for the Update

COM1

4 - Turn ON the Device

Cancel   Next

Update Device by Serial

SW67021
Update Device Using the Serial Port

Update Device Options
☑ Firmware
   ☑ Read Firmware After Write
☑ Configuration
   ☑ Read Configuration After Write

Execute Update Firmware

SW67032 Serial Update

INIT : **Waiting...**   Ver. 1.101

FIRMWARE : **Waiting...**

PROJECT : **Waiting...**

Figure 4: "Update via Serial" windows

Industrial Electronic Devices

UPDATE DEVICE (for HD67021-B2-xxx / HD67022-B2-xxx):

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

If you don't know the actual IP address of the device you have to use this procedure:

- Turn off the Device;
- Put Dip1 of 'Dip-Switch A' in ON position;
- Turn on the device
- Connect the Ethernet cable;
- Insert the IP "**192.168.2.205**";
- Press the "**Ping**" button, "Device Found! must appear";
- Press the "**Next**" button;
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" turn off the Device;
- Put Dip1 of 'Dip-Switch A' in OFF position;
- Turn on the device.

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

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

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

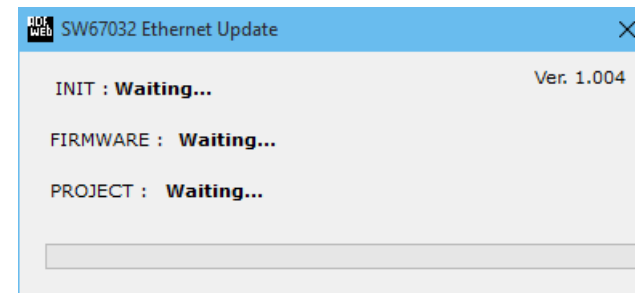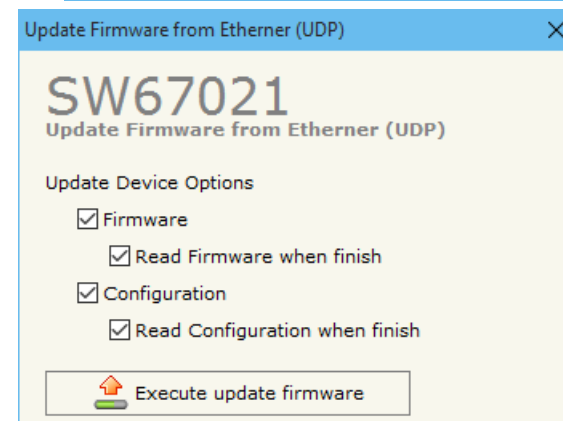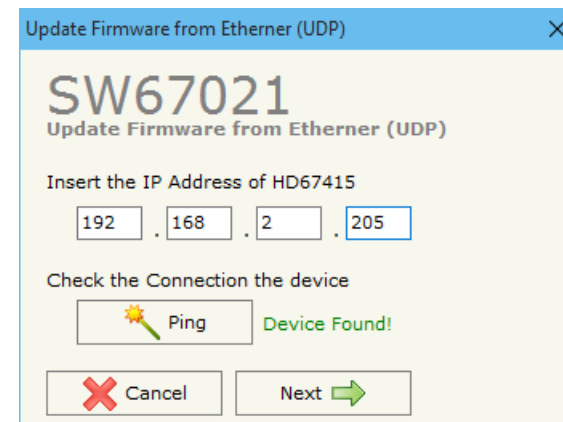*Figure 5: "Update via Ethernet" windows*

Note:
When you install a new version of the software, if it is the first time it is better you do the update of the Firmware in the HD67021/22 device.

Note:

When you receive the device, for the first time, you also have to update the Firmware in the HD67021/22 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;
- If you are using a USB←→RS232 converter try with a native COM port or change the converter;
- Try to repeat the operations for the updating;
- Try with another PC;
- Try to restart the PC;
- Check the LAN settings;
- If you are using the program inside a Virtual Machine, try to use in the main Operating System;
- If you are using Windows Seven, Vista, 8 and 10 make sure that you have the administrator privileges;
- In case you have to program more than one device, using the "UDP Update", you have to cancel the ARP table every time you connect a new device on Ethernet. For do this you have to launch the "Command Prompt" and write the command "arp -d". Pay attention that with Windows Vista, Seven, 8 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

In the case of HD67021/22 you have to use the software "SW67021": www.adfweb.com\download\filefold\SW67021.zip.
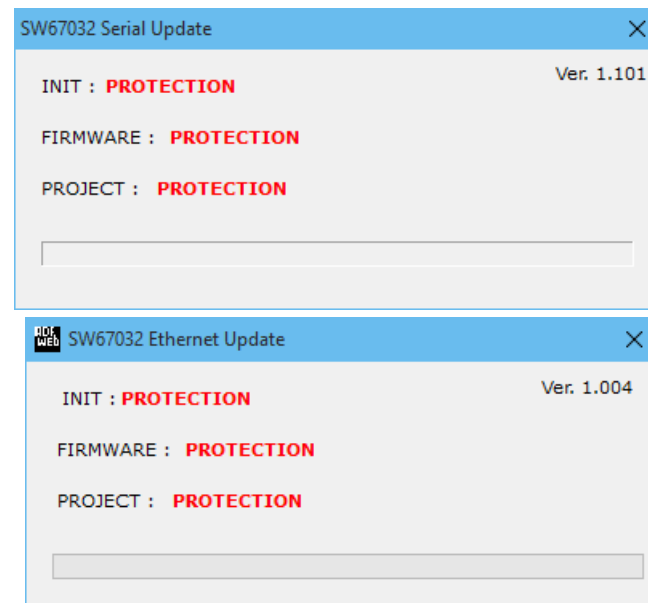
Figure 6: "Protection" window

Industrial Electronic Devices

DOWNLOAD CONF.:

By pressing the "**Download Conf.**" button, it is possible to download the Configuration that is inside the device into the opened project.
After having set the type of hardware used, it is possible to download it by serial (HD67021/22M-20 or HD67021/22M-40/80/160/250) or by Ethernet (HD67021/22-B2).

The procedures for the downloading is the same of the ones for the updating.

MECHANICAL DIMENSIONS:
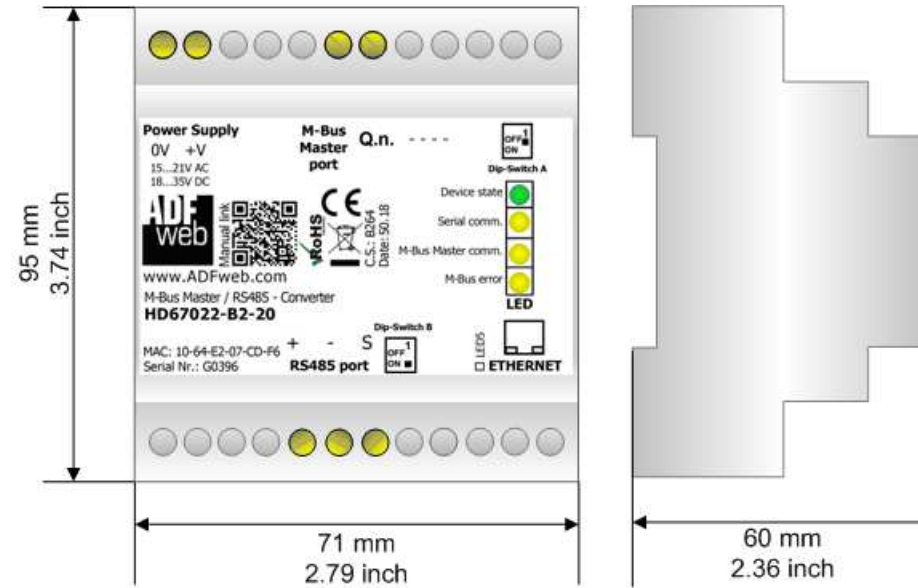
Housing: PVC
Weight: 200g (Approx)

Figure 7a: Mechanical dimensions scheme for HD67021/22-B2-xxx

Industrial Electronic Devices

ORDERING INFORMATIONS:

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

HD6702x − B 2 - xxx

Maximum number of slaves supported
20: up to 20 standard slaves (1.5mA consumption) connected to M-Bus
40: up to 40 standard slaves (1.5mA consumption) connected to M-Bus
80: up to 80 standard slaves (1.5mA consumption) connected to M-Bus
160: up to 160 standard slaves (1.5mA consumption) connected to M-Bus
250: up to 250 standard slaves (1.5mA consumption) connected to M-Bus

Connectors Type
2: Fixed Screw Terminal

Enclosure Type
B: Modulbox 4M DIN Rail mounting

Device Family
HD67021: M-Bus / RS232 – Converter
HD67022: M-Bus / RS485 - Converter

Industrial Electronic Devices

Order Code: **HD67021-B2-20**   -   M-Bus / RS232 – Converter (up to 20 slaves connected to M-Bus)
Order Code: **HD67021-B2-40**   -   M-Bus / RS232 – Converter (up to 40 slaves connected to M-Bus)
Order Code: **HD67021-B2-80**   -   M-Bus / RS232 – Converter (up to 80 slaves connected to M-Bus)
Order Code: **HD67021-B2-160** -   M-Bus / RS232 – Converter (up to 160 slaves connected to M-Bus)
Order Code: **HD67021-B2-250** -   M-Bus / RS232 – Converter (up to 250 slaves connected to M-Bus)

Order Code: **HD67022-B2-20**   -   M-Bus / RS485 – Converter (up to 20 slaves connected to M-Bus)
Order Code: **HD67022-B2-40**   -   M-Bus / RS485 – Converter (up to 40 slaves connected to M-Bus)
Order Code: **HD67022-B2-80**   -   M-Bus / RS485 – Converter (up to 80 slaves connected to M-Bus)
Order Code: **HD67022-B2-160** -   M-Bus / RS485 – Converter (up to 160 slaves connected to M-Bus)
Order Code: **HD67022-B2-250** -   M-Bus / RS485 – Converter (up to 250 slaves connected to M-Bus)

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: **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

Industrial Electronic Devices

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.