User Manual

Revision 1.200
English

J1939 / Modbus Slave - Converter

(Order Code: HD67212)

For Website information:
www.adfweb.com?Product=HD67212

For Price information:
www.adfweb.com?Price=HD67212

Benefits and Main Features:

- Modbus RTU on Serial RS232/485
- RS232/485 selection
- Galvanic isolation
- Industrial temperature range: -40°C / +85°C (-40°F / +185°F)

For others Gateways / Bridges:

J1939 to Modbus

See also the following links:
www.adfweb.com?Product=HD67215 (Modbus TCP)

CANopen to Modbus

See also the following links:
www.adfweb.com?Product=HD67001 (Modbus RTU Master)
www.adfweb.com?Product=HD67002 (Modbus RTU Slave)
www.adfweb.com?Product=HD67004 (Modbus TCP Master)
www.adfweb.com?Product=HD67005 (Modbus TCP Slave)

For others Gateways / Bridges:
For **CAN bus 2.0A** and/or **CAN bus 2.0B** to **Modbus**

See also the following links:
www.adfweb.com?Product=HD67011 (Modbus RTU Slave)
www.adfweb.com?Product=HD67012 (Modbus RTU Master)
www.adfweb.com?Product=HD67014 (Modbus TCP Slave)
www.adfweb.com?Product=HD67015 (Modbus TCP Master)

Do you have an your customer protocol?
See the following links:
www.adfweb.com?Product=HD67003

Do you need to choose a device? do you want help?
Ask it to the following link:
www.adfweb.com?Cmd=helpme

User Manual

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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
1.103	11/05/2010	Dp	All	Revision
1.104	13/02/2013	Nt	All	Added new chapters
1.200	30/07/2025	Mdb	All	New design

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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 are required for each individual application, legal and safety regulation. 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

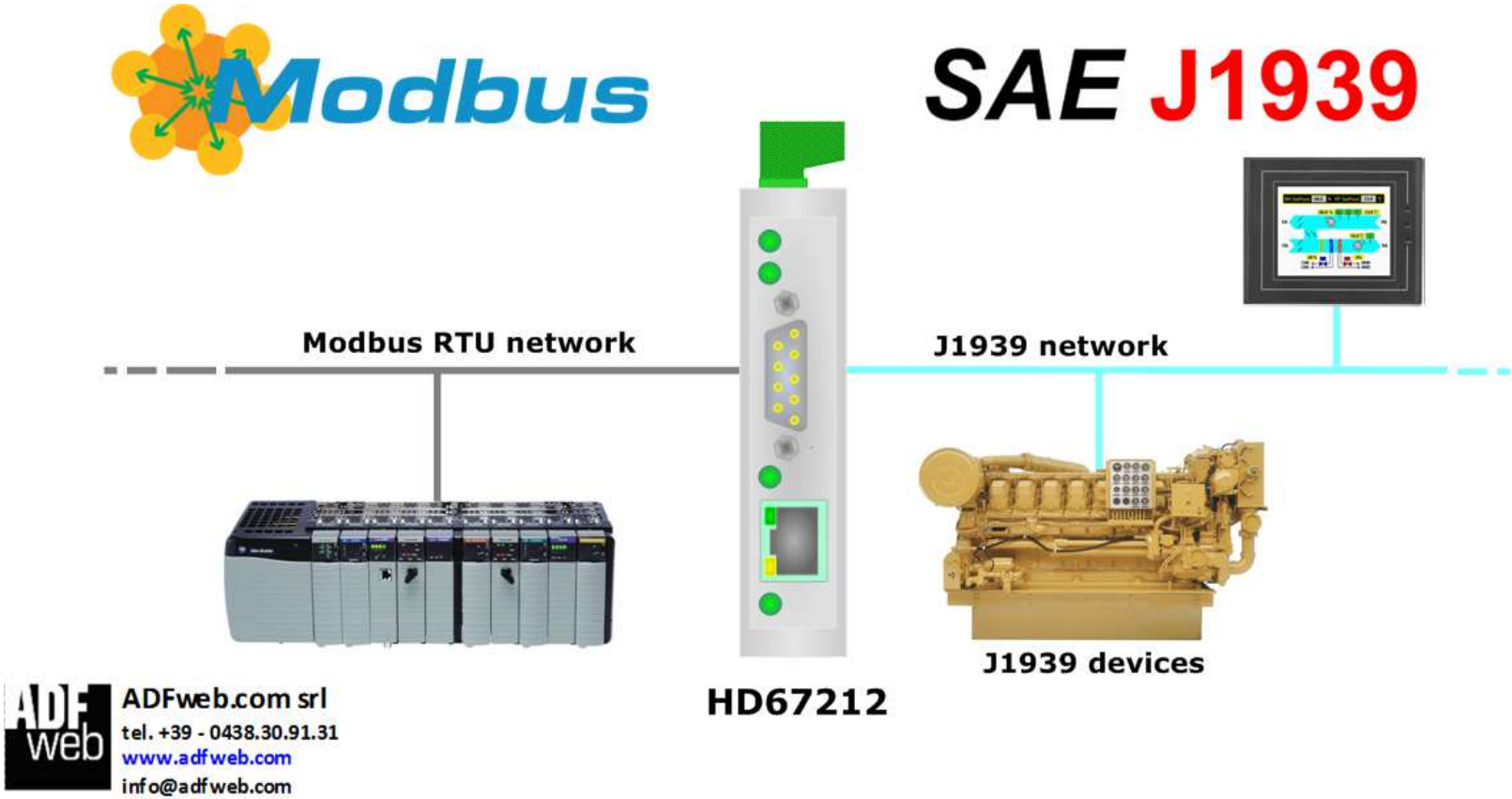
The device is state of the art and is safe. The instrument can represent a potential hazard if they are inappropriately installed and operated by personnel untrained. These instructions refer to residual risks with the following symbol:

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

CE CONFORMITY

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

EXAMPLE OF CONNECTION:



CONNECTION SCHEME:

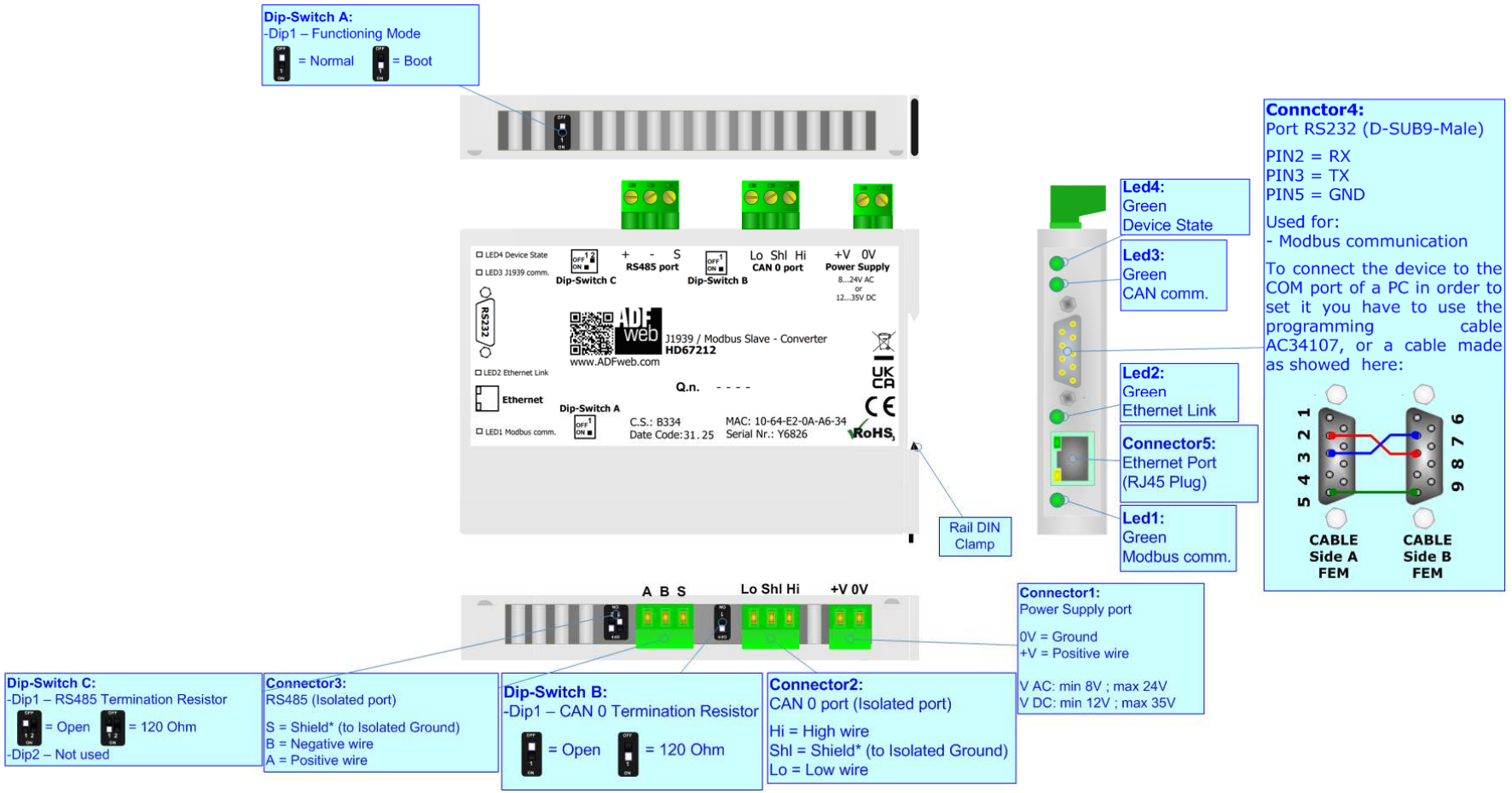


Figure 1: Connection scheme for HD67212

CHARACTERISTICS:

The HD67212-A1 is a J1939 / Modbus Slave Converter.

It has the following characteristics:

- Triple isolation between J1939 - Power Supply, J1939 - Modbus, Modbus - Power Supply;
- Two-directional information between Modbus bus and J1939 bus;
- Mountable on 35mm Rail DIN;
- Wide power supply input range: 8…24V AC or 12…35V DC;
- Wide temperature range: -40°C / +85°C [-40°F / +185°F].

CONFIGURATION:

You need Compositor SW67212 software on your PC in order to perform the following:

- Define the parameters of J1939 line;
- Define the parameters of Modbus line;
- Define the J1939 frames that contains the data that are readable by a Modbus master;
- Define the J1939 frames that are sent with the data that arrives from a Modbus master;
- Update the device.

POWER SUPPLY:

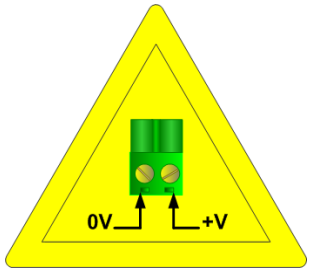
The devices can be powered at 8…24V AC and 12…35V DC. The consumption depends to the code of the device. For more details see the two tables below.

	VAC ~		VDC ⎓	
	Vmin	**Vmax**	**Vmin**	**Vmax**
HD67212-A1	**8V**	**24V**	**12V**	**35V**

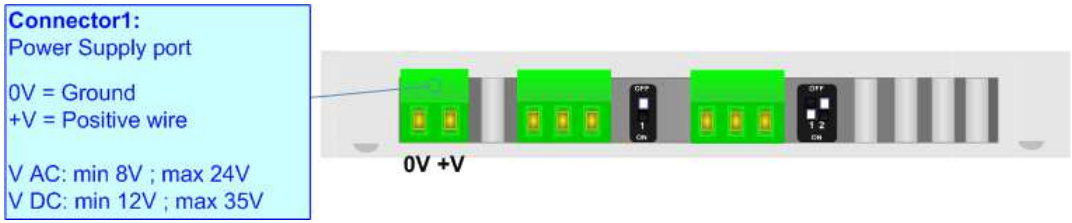
Consumption at 24V DC:

Device	W/VA
HD67212-A1	4

Caution: Not reverse the polarity power



HD67212-A1



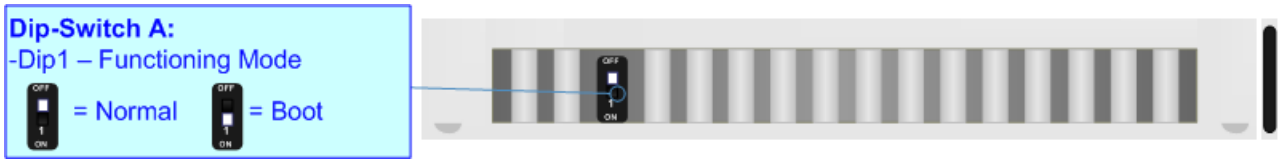
FUNCTION MODES:

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

- The first, with Dip1 in Off position (factory setting), is used for the normal working of the device.
- The second, with Dip1 in On position, is used for upload the Project/Firmware.

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

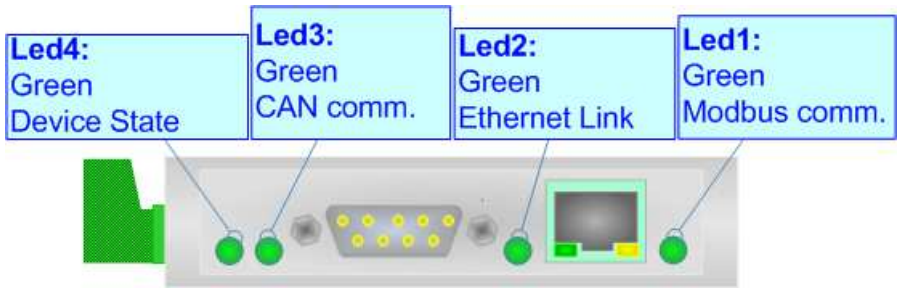
According to the functioning mode, the LEDs will have specifics functions (see 'LEDS' section).



LEDS:

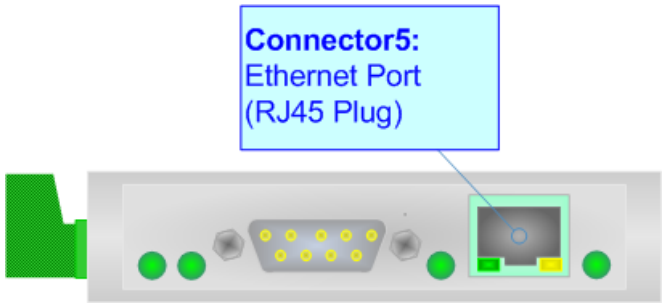
The device has got four LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: Modbus comm. (green)	It blinks when a correct Modbus frame is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
2: Ethernet Link (green)	**ON**: Ethernet cable connected **OFF**: Ethernet cable disconnected	**ON**: Ethernet cable connected **OFF**: Ethernet cable disconnected
3: CAN comm. (green)	Blinks when a correct CAN frame is received	**ON**: Ethernet cable connected **OFF**: Ethernet cable disconnected
4: Device State (green)	Blink slowly	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress



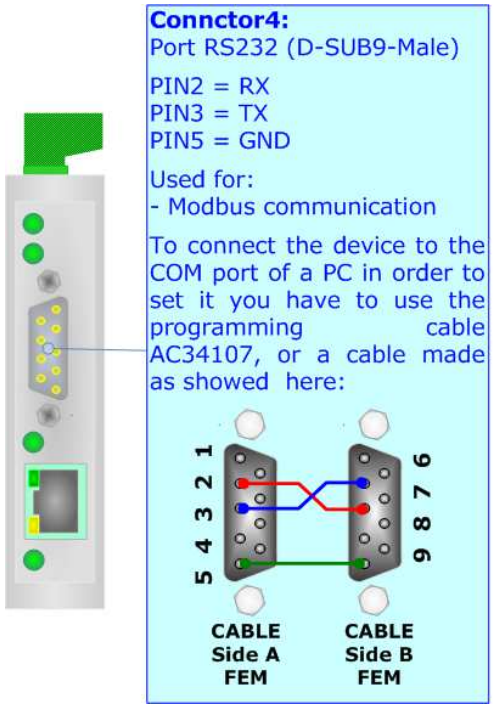
ETHERNET:

The Ethernet connection must be made using Connector5 of HD67212-A1 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.



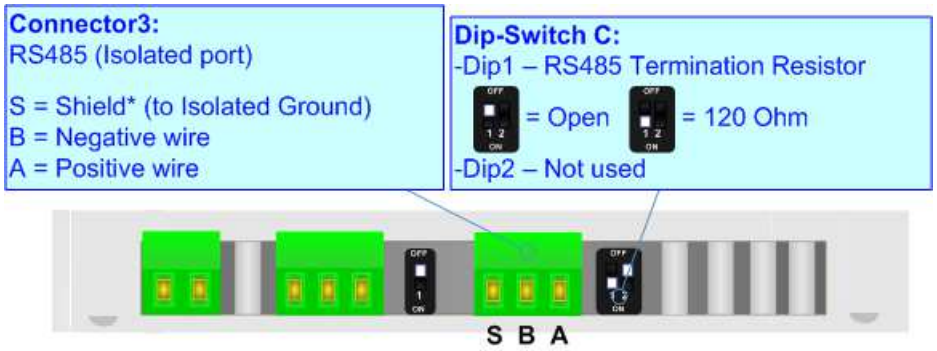
RS232:

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



RS485:

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



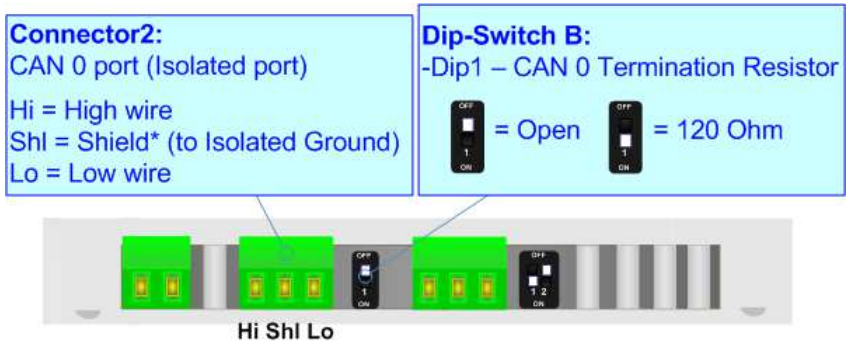
The maximum length of the cable should be 1200m (4000 feet).

Here some codes of cables:

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

J1939:

To terminate the J1939 line with a 120Ω resistor it is necessary that the Dip1 of 'Dip-Switch B' is at ON position.



Cable characteristics:

DC parameter:		Impedance	70 Ohm/m
AC parameters:		Impedance	120 Ohm/m
		Delay	5 ns/m

Length		**Baud Rate [bps]**	**Length MAX [m]**
		10 K	5000
		20 K	2500
		50 K	1000
		100 K	650
		125 K	500
		250 K	250
		500 K	100
		800 K	50
		1000 K	25

USE OF COMPOSITOR SW67212:

To configure the Converter, use the available software that runs with Windows called SW67212. 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 or 11; 32/64bit).

When launching the SW67212, the window below appears (Fig. 2).

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

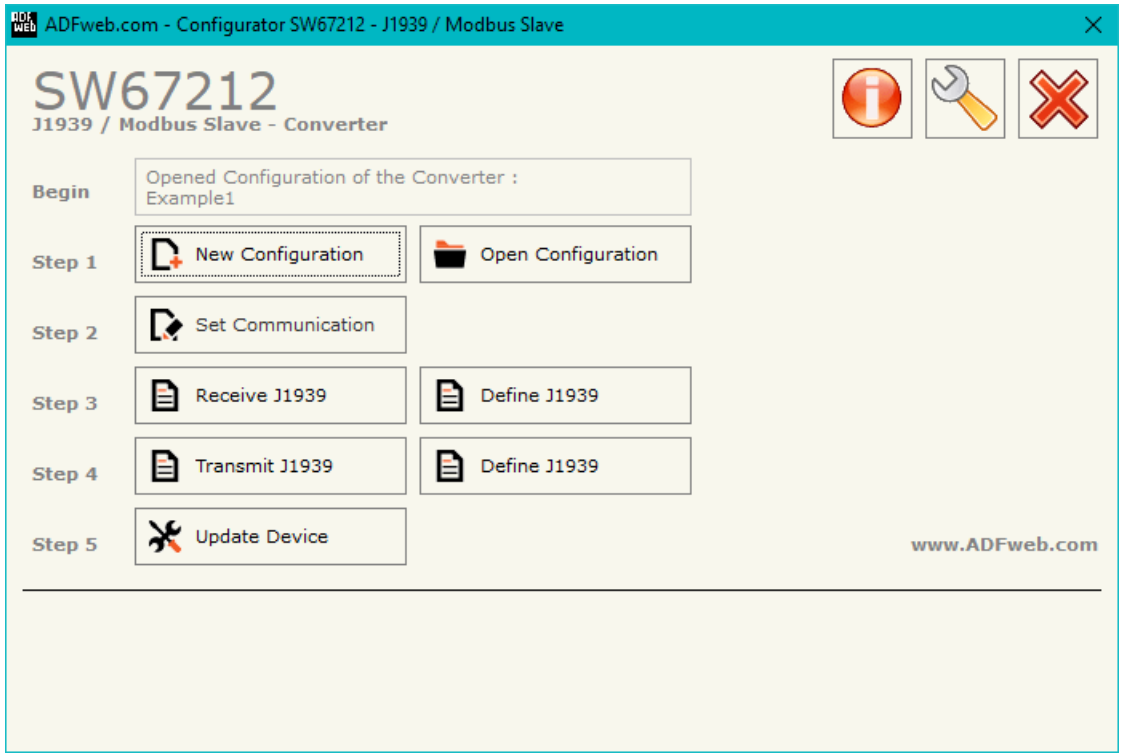
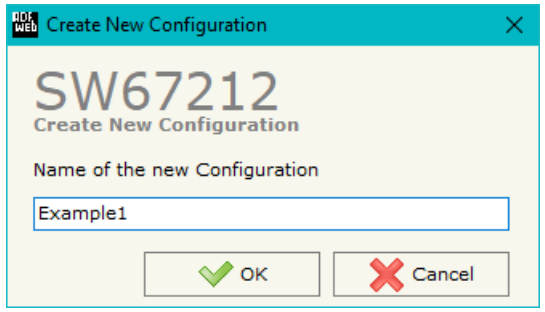


Figure 2: Main window for SW67212

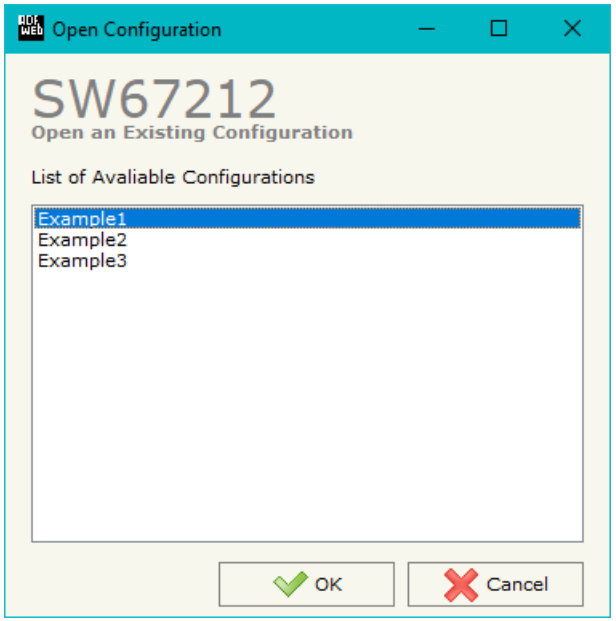
NEW CONFIGURATION / OPEN CONFIGURATION:

The "**New Configuration**" button creates the folder which contains the entire device's configuration.



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

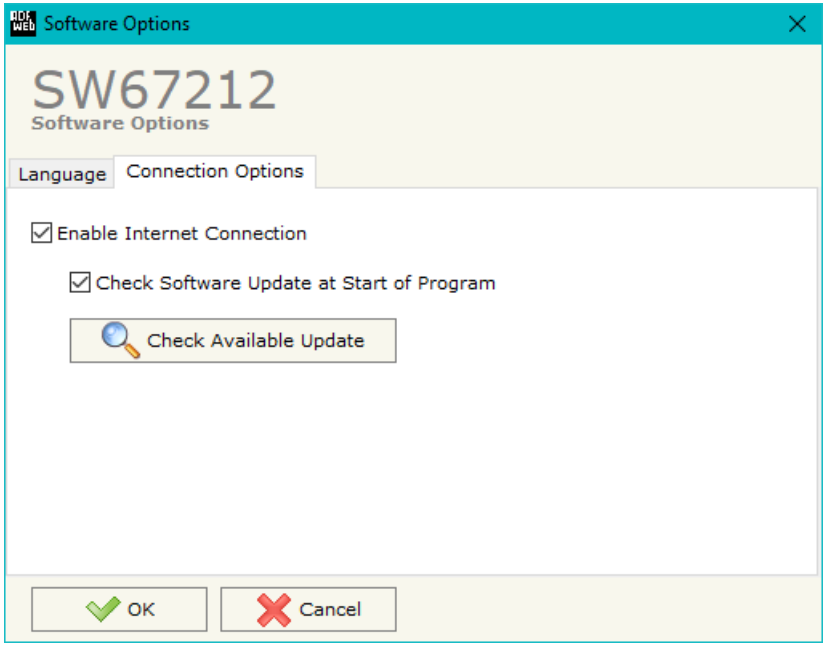
- To clone the configurations of a programmable "J1939 / Modbus Slave - Converter" in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button "**Open Configuration**".



SOFTWARE OPTIONS:

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

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

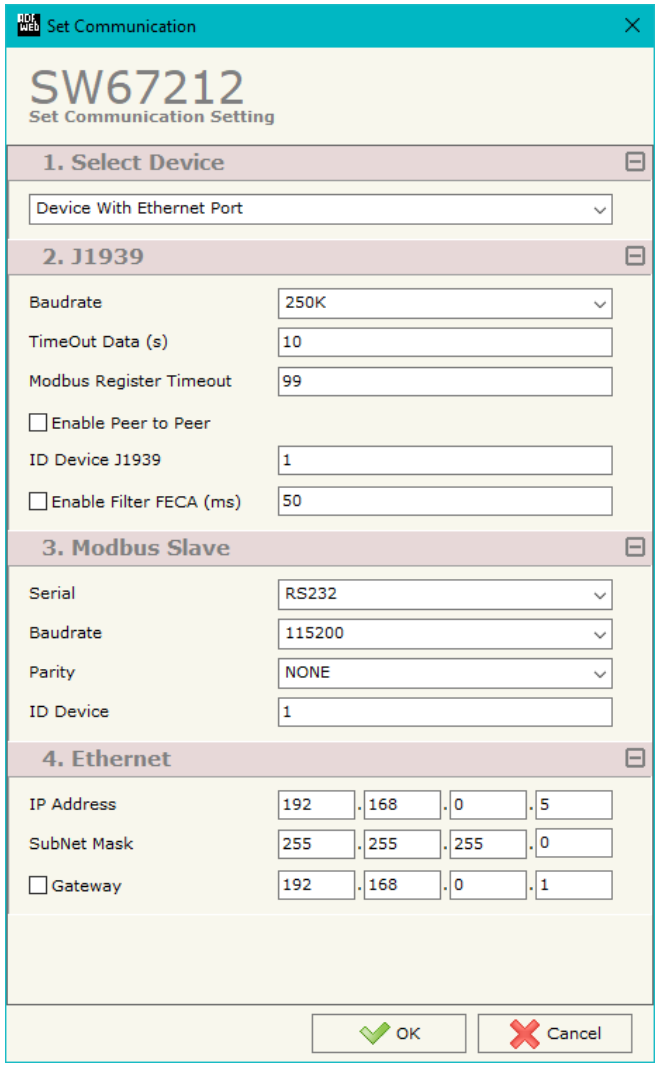


In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67212 check automatically if there are updatings when it is launched.

SET COMMUNICATION:

This section define the fundamental communication parameters of two buses, J1939 and Modbus.

By Pressing the "**Set Communication**" button from the main window of SW67212 (Fig. 2) the window "Set Communication" appears (Fig. 3).



The meaning of the fields of "J1939" are:

- In the field "**Baudrate**", the velocity of J1939 is defined;
- In the field "**TimeOut Data (s)**" insert a time, when this time is elapsed the data isn't reliable;
- In the field "**Modbus Register Timeout**" it is possible to insert a Modbus register for mapping the status of the J1939 communication. If the communication is ok on Modbus register it will show 1. If the converter doesn't receive data from at least 1 of J1939 devices, on Modbus register defined it will show 0;
- If the field "**Enable Peer to Peer**" is cheked, the converter accept any ID that have the PGN inserted in the section "Receive J1939";
- In the field "**ID Device J1939**" the J1939 address of the converter is defined;
- If the field "Enable **Filter FECA (ms)**" is checked there is a filter to the alarms with PGN 0xFECA. If the device send first a message with PGN 0xFECA, after it would send a Transport Protocol frame for sending the alarms. If this frame arrives within the mS write in the box, the frame with 0xFECA is discarded and the Transport Protocol frame is held. Otherwise the frame with PGN 0xFECA is hold.

The meaning of the fields of "J1939" are:

- In the field "**Serial**" the serial to use is defined (RS232, RS485 or RS422);
- In the field "**Baudrate**" the baudrate for the serial line is defined;
- In the field "**Parity**" the parity of the serial line is defined;
- In the field "**ID Device**" the address of the Modbus side is defined.

The meaning of the fields of "Ethernet" are:

- In the field "**IP Address**" insert the IP address that you want to give to the Converter; *Figure 3: "Set Communication" windows*
- In the field "**SubNet Mask**" insert the SubNet Mask;
- In the field "**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.

RECEIVE J1939:

By pressing the "**Receive J1939**" button from the main window of SW67212 (Fig. 2) the window "Receive J1939 Frames" appears (Fig. 4).

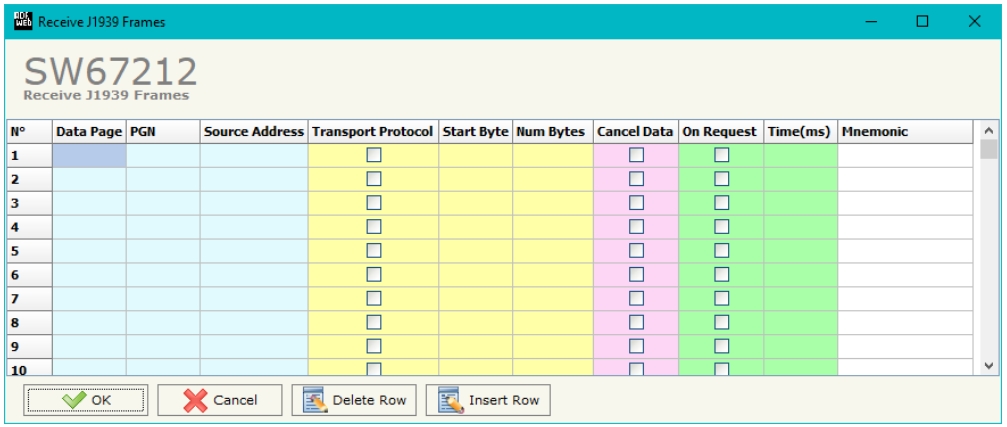


Figure 4: "Receive J1939 Frames" window

The meaning of the fields of the table are:

- In the field "**Data Page**" insert the data page, the value is 0 or 1 (usually is 0);
- In the field "**PGN**" insert the PGN of the data you would to read from Ethernet to J1939. (in the J1939 protocol the PGN is an identifier);
- In the field "**Source Address**" insert the address of the device that send the frame;
- If the field "**Transport Protocol**" is checked the frame use Transport Protocol functions;
- In the field "**Start Byte**" insert the byte which you would start read, this field is enable only when the field Transport Protocol is checked;
- In the field "**Num Bytes**" insert the number of byte you would read, for example your Start Byte is 20 an Num Bytes is 10, you can read the byte from 20 to 30;

- If the field "**Cancel Data**" is checked, when the data is older of the time inserted in the "time out data", you visualize "FFFF" as data for this PGN in the Ethernet array;
- If the field "**On Request**" is checked, the converter send the request frame to the related PGN in order to receive the frame with the data;
- In the field "**Time (ms)**" is possible to insert the interval used to send the frame "On Request";
- In the field "**Mnemonic**" the description for the frame is defined.

DEFINE RECEIVE J1939

By pressing the "**Define J1939**" button, near "Receive J1939" from the main window of SW67212 (Fig. 2) the window "Define Receive J1939" appears (Fig. 5).

The meaning of the fields of the table are:

- In the field "**List of Receive J1939 Frames**" there is the list of frames J1939 who you inserted in "Receive J1939" Section;
- In the field "**List of Modbus Registers**" there is the list of Modbus registers you have defined for the selected J1939 frame;
- In the field "**Index of Modbus Register**" insert a value for the Modbus register;
- In the field "**Selecet the Byte to put in the High Part of Modbus Register**" insert which byte of the J1939 frame you want to save in the high part of Modbus register;
- In the field "**Selecet the Byte to put in the Low Part of Modbus Register**" insert which byte of the J1939 frame you want to save in the low part of Modbus register.

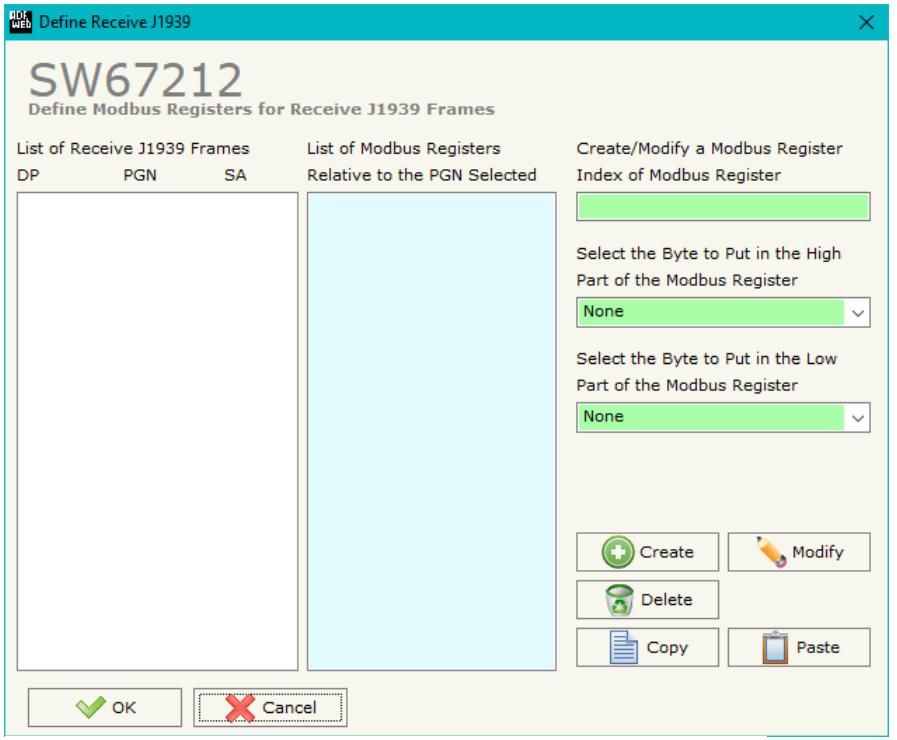


Figure 5: "Define Receive J1939" window

For example:

Select one of the J1939 frames you have defined, insert a valid address in the field "Index of Modbus Register", select the byte position (Byte 1 in high Modbus byte and Byte 2 in low MODBUS byte), press the "**Create**" button. In the field "List of Modbus Registers" appears the modbus register you have defined.

Note:
With some Modbus master there is the necessity to insert an offset of +1 from what is defined in the Compositor and what you request. i.e. if in the Compositor you have defined register 114 you have to require the 115.

TRANSMIT J1939

By pressing the "**Transmit J1939**" button from the main window of SW67212 (Fig. 2) the window "Transmit J1939 Frames" appears (Fig. 6).

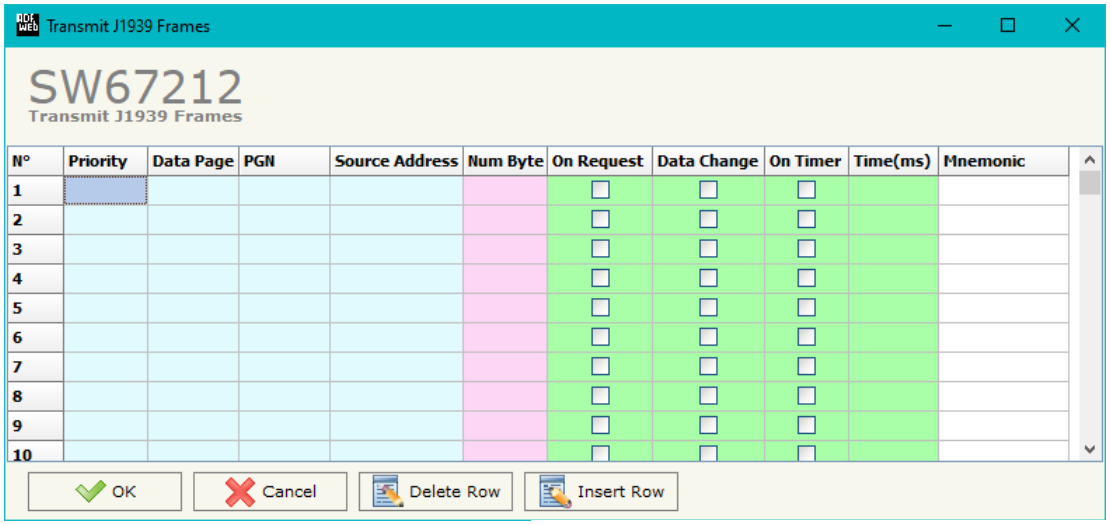


Figure 6: "Transmit J1939" window

The meaning of the fields of the table are:

- In the field "**Priority**" insert the priority of the frame, in J1939 protocol is a number among 0,1,2,3,4,5,6,7. The number 0 is the highest priority and 7 is the lowest;
- In the field "**Data Page**" insert the data page, in the J1939 protocol is 0 or 1;
- In the field "**PGN**" insert the PGN of the data you would to write from modbus to J1939. (in the J1939 protocol the PGN is an identifier);
- In the field "**Source Address**" you insert the ID of device that send the frame;
- In the field "**Num Byte**" the dimension of J1939 PGN is defined;
- If the field "**On Request**" is checked, the frame is sent when the converter receives the "On Request" command;
- If the field "**Data Change**" is checked, the frame is sent when the data changes;
- If the field "**On Timer**" is cheched, the frame is send cyclically;
- In the field "**Time (ms)**" insert the interval used to send the frame with the option "On Timer";
- In the field "**Mnemonic**" the description for the frame is defined.

Note:
If is selected "Device with Jumper, the fields "On Request", "Data Change", "On Timer" and "Time (ms)" are not available.

DEFINE TRANSMIT J1939

By pressing the "**Define J1939**" button, near "Transmit J1939" from the main window of SW67212 (Fig. 2) the window "Define Transmit J1939" appears (Fig. 7).

The meaning of the fields of the table are:

- In the field "**List of Transmit J1939 Frames**" there is the list of frames J1939 who you inserted in "Transmit J1939" Section;
- In the field "**List of Modbus Registers**" there is the list of Modbus registers you have defined for the selected J1939 frame;
- In the field "**Index of Modbus Register**" insert a value for the Modbus register;
- In the field "**Selecet the Byte to put in the High Part of Modbus Register**" select which byte of the J1939 frame you want to save in the high part of Modbus register;
- In the field "**Selecet the Byte to put in the Low Part of Modbus Register**" select which byte of the J1939 frame you want to save in the low part of Modbus register;
- In the field "**Send J1939 frame on Modbus Write**" is possible to decide if the J1939 frame is sent when the related Modbus register is written by the Modbus master.

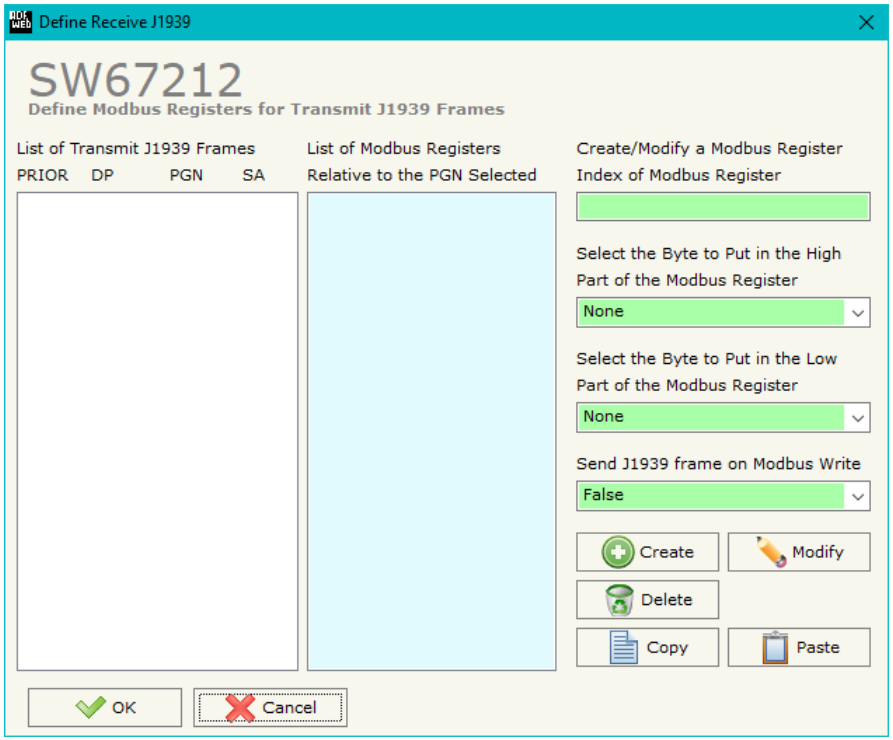


Figure 7: "Define Transmit J1939" window

For example:

Select one of the J1939 frames you have defined, insert a valid address in the field "Index of Modbus Register", select the byte position (Byte 1 in high Modbus byte and Byte 2 in low Modbus byte), press the "**Create**" button. In the field "List of Modbus Registers" appears the modbus register you have defined.

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.

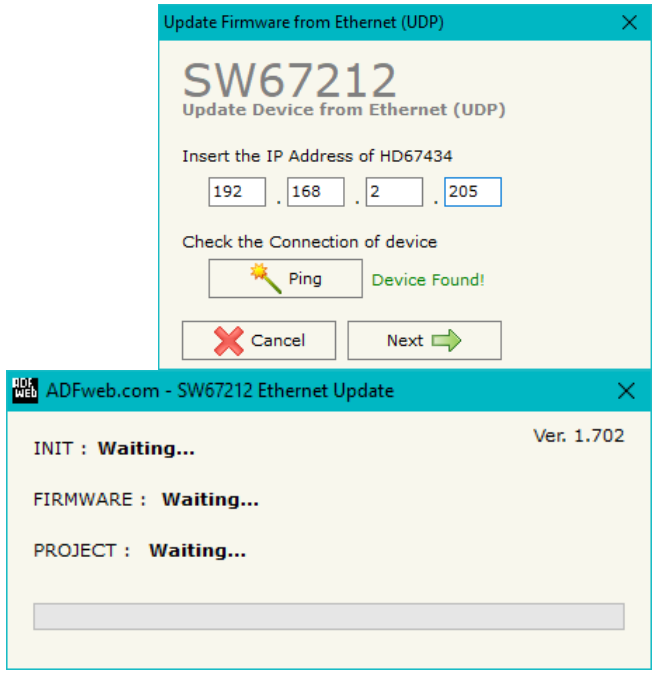


Figure 8: "Update device" windows

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

Note:
When you receive the device, for the first time, you also have to update the Firmware in the HD67212 device.

Warning:
If Fig. 9 appears when you try to do the Update try these points before seeking assistance:

- Try to repeat the operations for the updating;
- Try with another PC;
- Try to restart the PC;
- Check the LAN settings;
- If you are using the program inside a Virtual Machine, try to use in the main Operating System;
- If you are using Windows Seven, Vista, 8, 10 or 11 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 or 11 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

Figure 9: "Error" window

Warning:
In the case of HD67212 you have to use the software "HD67212": www.adfweb.com\download\filefold\SW67212.zip.

MECHANICAL DIMENSIONS:

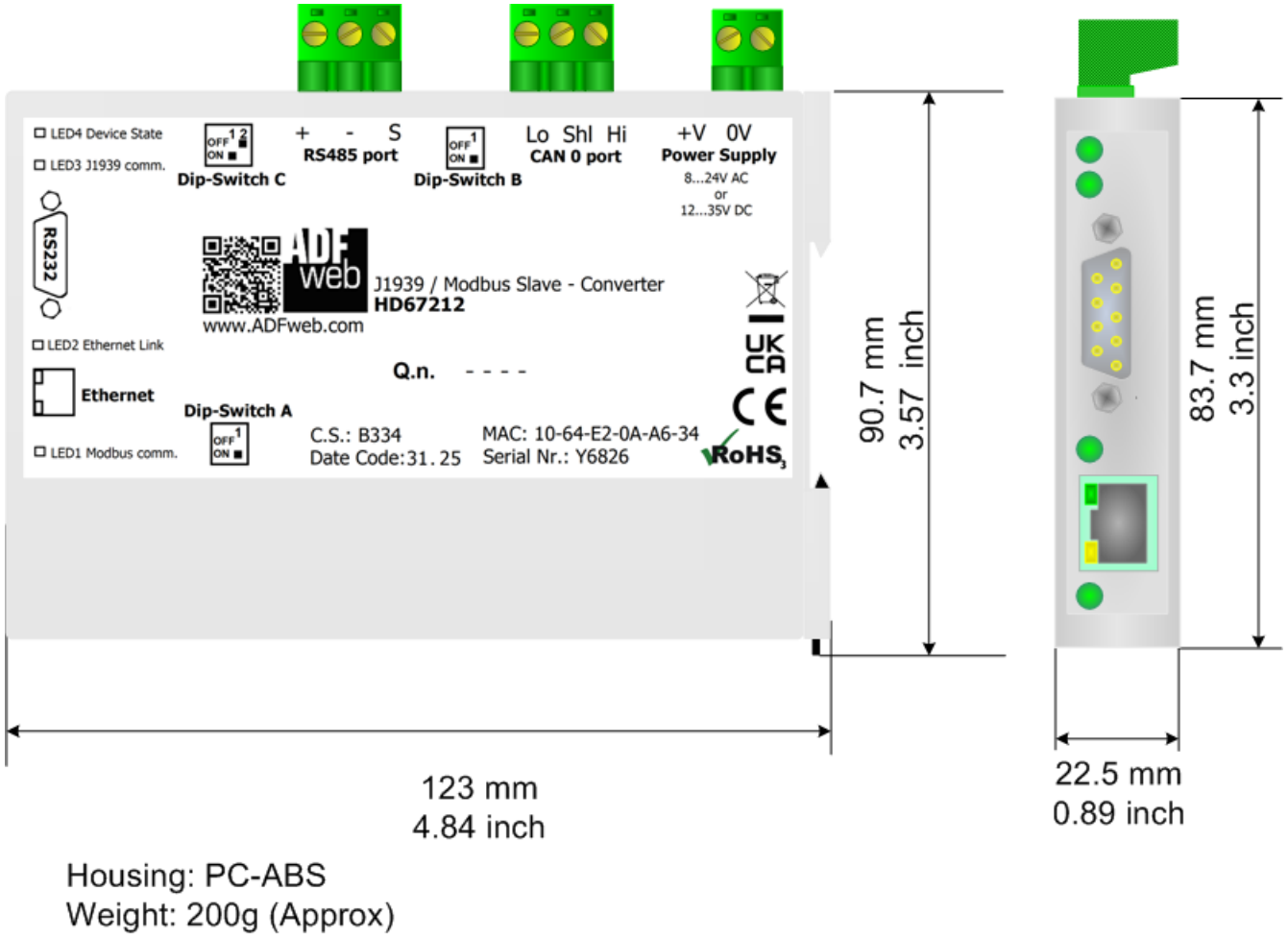


Figure 10: Mechanical dimensions scheme for HD67212

ORDERING INFORMATIONS:

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

HD67212 – x x

Connectors Type
1: Removable 5mm Screw Terminal
2: Fixed 5mm Screw Terminal

Enclosure Type
A: 1M, 35mm DIN Rail mounting
B: 4M, 35mm DIN Rail mounting

Device Family
HD67212: J1939 / Modbus slave - Converter

Order Code: **HD67212-A1** - J1939 / Modbus slave - Converter

ACCESSORIES:

Order Code: **AC34011** - Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V DC
Order Code: **AC34012** - Rail DIN - Power Supply 220/240V AC 50/60Hz – 24 V DC

DISCLAIMER

All technical content within this document can be modified without notice. The content of the document content is a recurring audit.
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 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:

1) 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.
2) 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.
Via Strada Nuova, 17
IT-31010 Mareno di Piave
TREVISO (Italy)
Phone +39.0438.30.91.31
Fax +39.0438.49.20.99
www.adfweb.com