ADFweb

Industrial Electronic Devices

User Manual

Revision 2.101
English

CAN / Modbus Slave – Converter

(Order Code: HD67412)

For Website information:
www.adfweb.com?Product=HD67412

For Price information:
www.adfweb.com?Price=HD67412

Benefits and Main Features:

⊕ Very easy to configure

⊕ Wide supply input range

⊕ Electrical isolation

⊕ Industrial temperature range:

⊕ -40°C / 105°C (-40°F / 221°F)

User Manual

For other Gateways / Bridges:
CAN from/to Modbus
See also the following links:

www.adfweb.com?product=HD67012	(Modbus RTU Slave)
www.adfweb.com?product=HD67514	(Modbus TCP Master)
www.adfweb.com?product=HD67515	(Modbus TCP Slave)

CANopen from/to Modbus
See also the following links:

www.adfweb.com?product=HD67001	(Modbus RTU Master)
www.adfweb.com?product=HD67502	(Modbus RTU Slave)
www.adfweb.com?product=HD67504	(Modbus TCP Master)
www.adfweb.com?product=HD67505	(Modbus TCP Slave)

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

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
2.000	24/08/2012	Fl	All	New mechanical dimensions
2.001	07/02/2013	Nt	All	Added new chapters
2.100	04/08/2016	Ff	All	New hardware version
2.101	13/03/2017	Ff	All	Revision

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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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EXAMPLE OF CONNECTION:

Industrial Electronic Devices
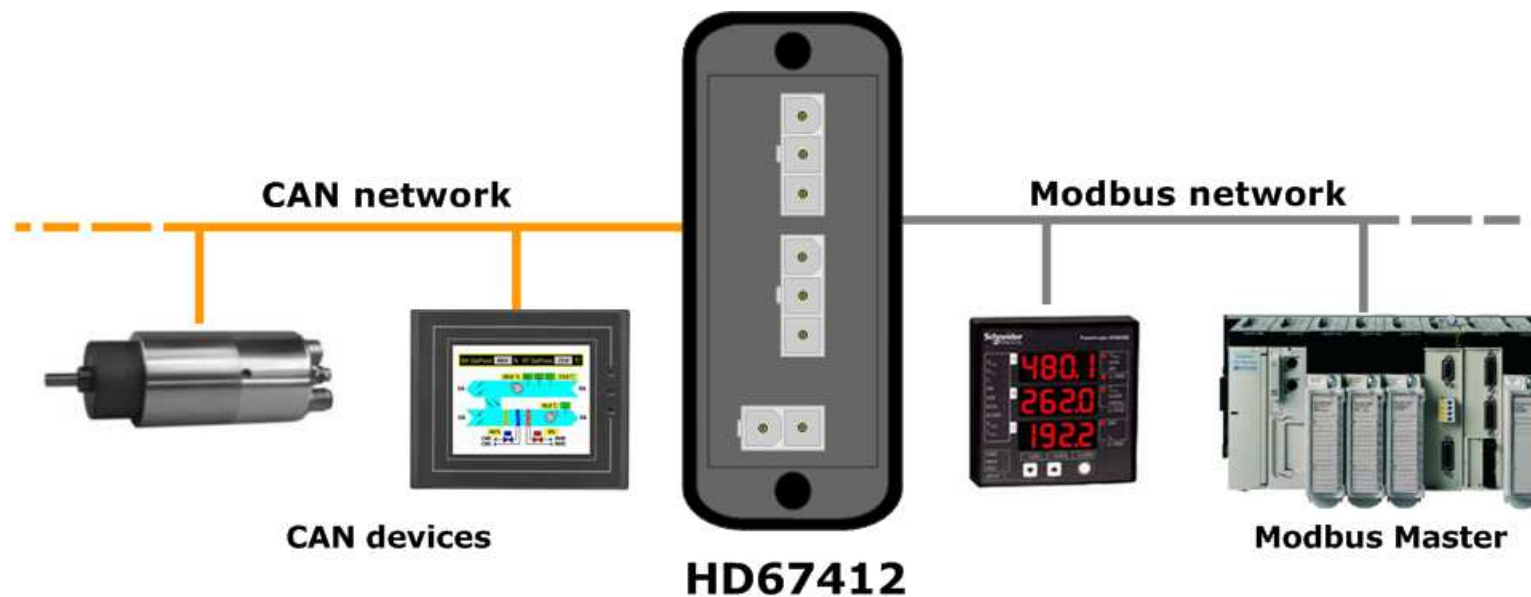
CONNECTION SCHEME:

Figure 1a: Connection scheme for HD67412-E4x-xxx

Industrial Electronic Devices
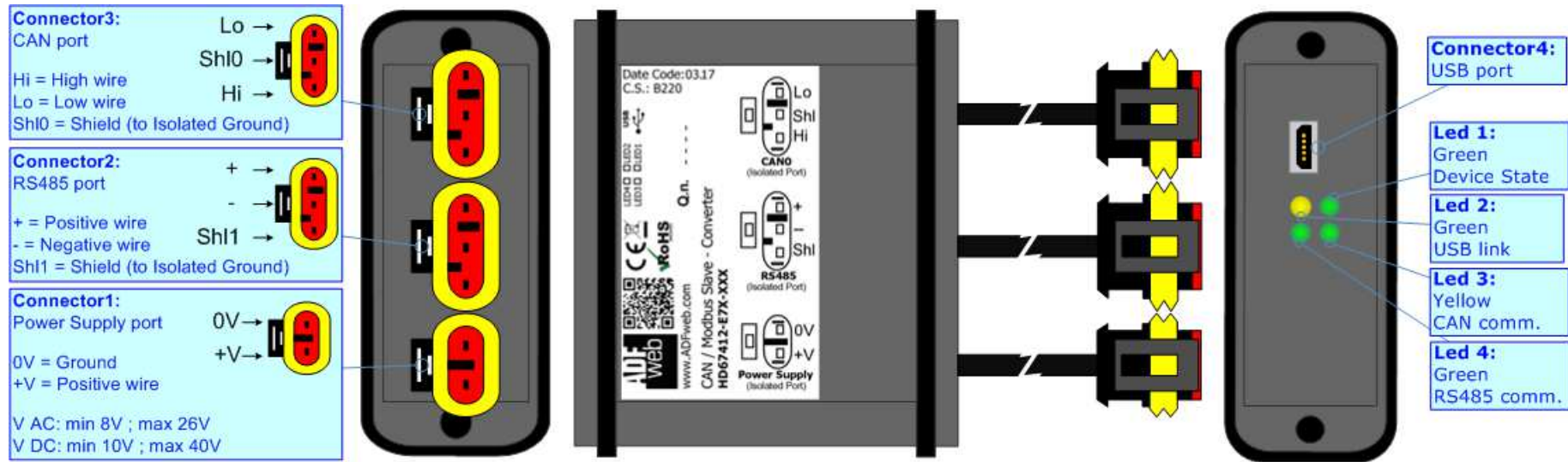
Figure 1b: Connection scheme for HD67412-E7x-xxx

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CHARACTERISTICS:

The "HD67412" series are rugged devices used to interface CAN devices with Modbus Master.
With his particular enclosure, equipped with four fixing lugs, makes available the mounting of the device in any plane surface (horizontal, vertical, oblique).
It is possible to have the device varnished or totally resined and also in both cases with "Mini-Fit®" connectors or "AMP SuperSeal 1.5" connectors. If is resined, the enclosure, like the "AMP SuperSeal 1.5" connectors, is waterproof.

All the four series have these characteristics:

- Triple 4kV isolation between Power Supply / RS485 / CAN;
- Varnished / Resined (optionally);
- Wide power supply input range: 8…26V AC | 10…40V DC;
- Mini-Fit® / AMP SuperSeal 1.5 connectors;
- Metal enclosure with fixing lugs;
- Possibility to use Metal hose clamps for fixing it without using lugs;
- Microprocessor for data control;
- Wide temperature range: -40°C / 105°C (-40°F / 221°F).

CONFIGURATION:

You need Compositor SW67412 software on your PC in order to perform the following:

- Define the CAN frames read from Converter;
- Define the CAN frames write from the Converter;
- Define the Modbus registers readable by the Master;
- Define the Modbus registers writeable by the Master;
- Update the device.

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POWER SUPPLY:

The devices can be powered between a wide range of tensions. For more details see the two tables below.

	VAC 〜		VDC ▬▬	
	Vmin	**Vmax**	**Vmin**	**Vmax**
HD67412-Exx-xxx	**8V**	**26V**	**10V**	**40V**

Consumption at 24V DC:

Device	W/VA
HD67412-Exx-xxx	4

⚠ **Caution: Not reverse the polarity power**

HD67412-E4x-xxx

HD67412-E7x-xxx
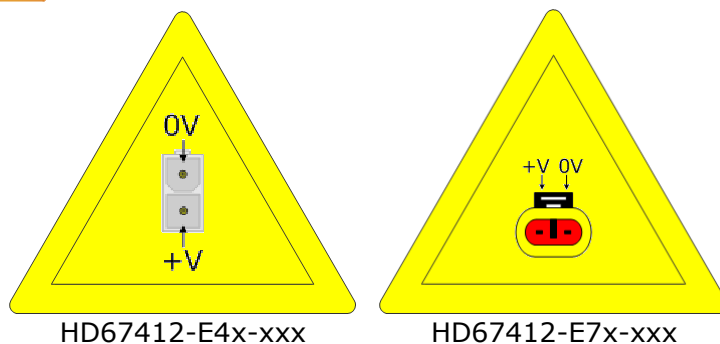
✎ Note: It is possible to use also negative tensions. In this case the polarity must be inverted.

Industrial Electronic Devices
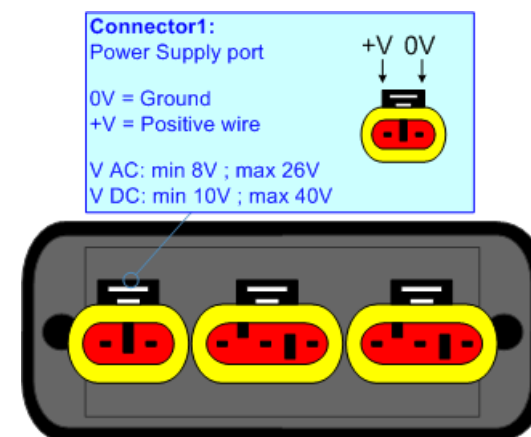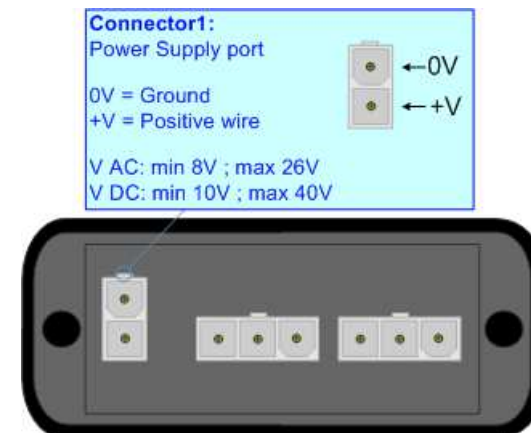
LEDS:

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: Device state (green)	Blinks slowly (~1Hz)	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
2: USB link (yellow)	**ON**: USB cable inserted **OFF**: USB cable not inserted	**ON**: USB cable inserted **OFF**: USB cable not inserted
3: CAN Communication (green)	Blinks when CAN frames are received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: RS485 communication (green)	Blinks when a Modbus request is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress

Led 1:
Green
Device State

Led 3:
Green
CAN comm.

Led 2:
Yellow
USB link

Led 4:
Green
RS485 comm.

Industrial Electronic Devices
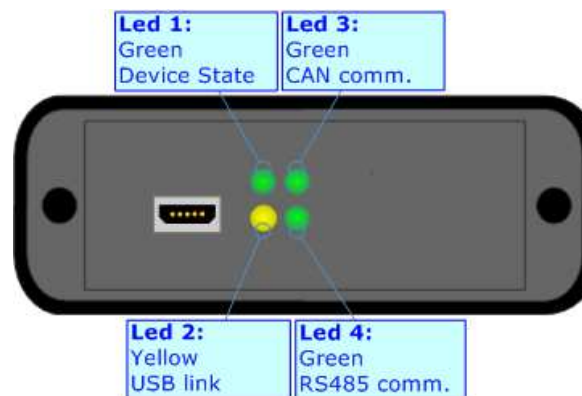
RS485:

The connection of the RS485 in the HD67412-E4x-xxx device must be made with a 3way MiniFit Female connector. The pinout of Male MiniFit connector of the board is at right side of the page.
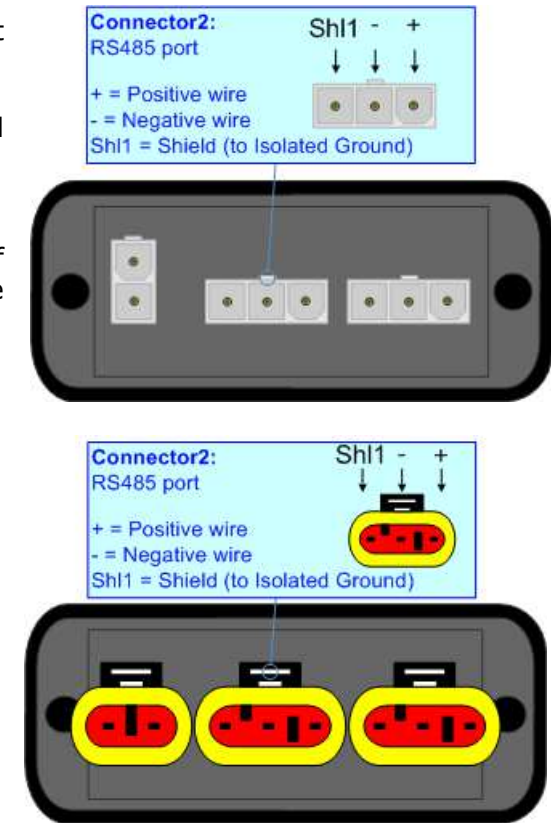
The connection of the RS485 in the HD67412-E7x-xxx device must be made with a AMP SuperSeal 1.5 Male connector. The pinout of Female connector of the board is at right side of the page.

The termination of RS485 line, with a 220Ω resistor, in the HD67412-Exx-xxx is made internally of the device; when the order is performed. If the device have the RS485 terminated the code is the follow: HD67412-Exx-xYx; otherwise is this other: HD67412-Exx-xNx.

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.

Link for Mini-Fit® connectors: http://www.molex.com/molex/products/group?key=minifit_products&channel=products
Link for SuperSeal 1.5 connectors: http://www.te.com/catalog/cinf/en/c/10876/956

CAN:

The connection of the CAN in the HD67412-E4x-xxx device must be made with a 3way MiniFit Female connector. The pinout of Male MiniFit connector of the board is at right side of the page.

The connection of the CAN in the HD67412-E7x-xxx device must be made with a AMP SuperSeal 1.5 Male connector. The pinout of Female connector of the board is at right side of the page.

The termination of CAN line, with a 120Ω resistor, in the HD67412-Exx-xxx is made internally of the device; when the order is performed. If the device have the CAN terminated the code is the follow: HD67412-Exx-Yxx; otherwise is this other: HD67412-Exx-Nxx.

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

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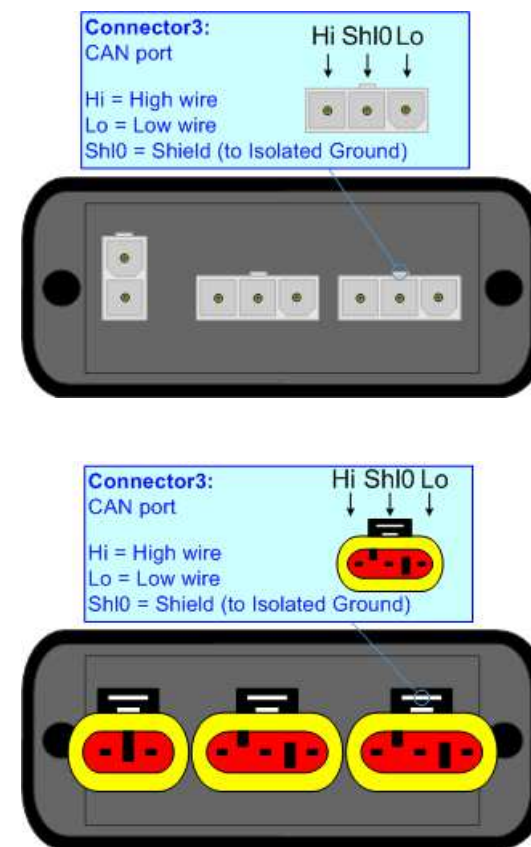
USB:

The USB port is used to start the converter in Boot Mode and to program the converter. It is necessary to use a Micro USB type B cable.
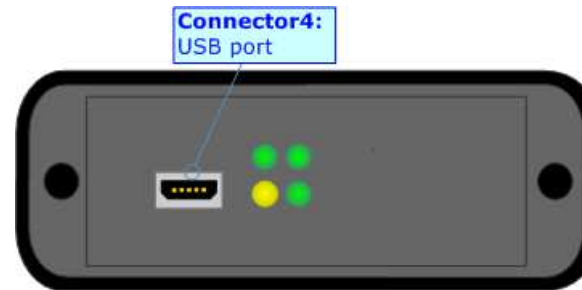
USE OF COMPOSITOR SW67412:

To configure the Converter, use the available software that runs with Windows called SW67412. It is downloadable on the site www.adfweb.com and its operation is described in this document. *(This manual is referenced to the last version of the software present on our web site)*. The software works with MSWindows (XP, Vista, Seven, 8, 10; 32/64bit).

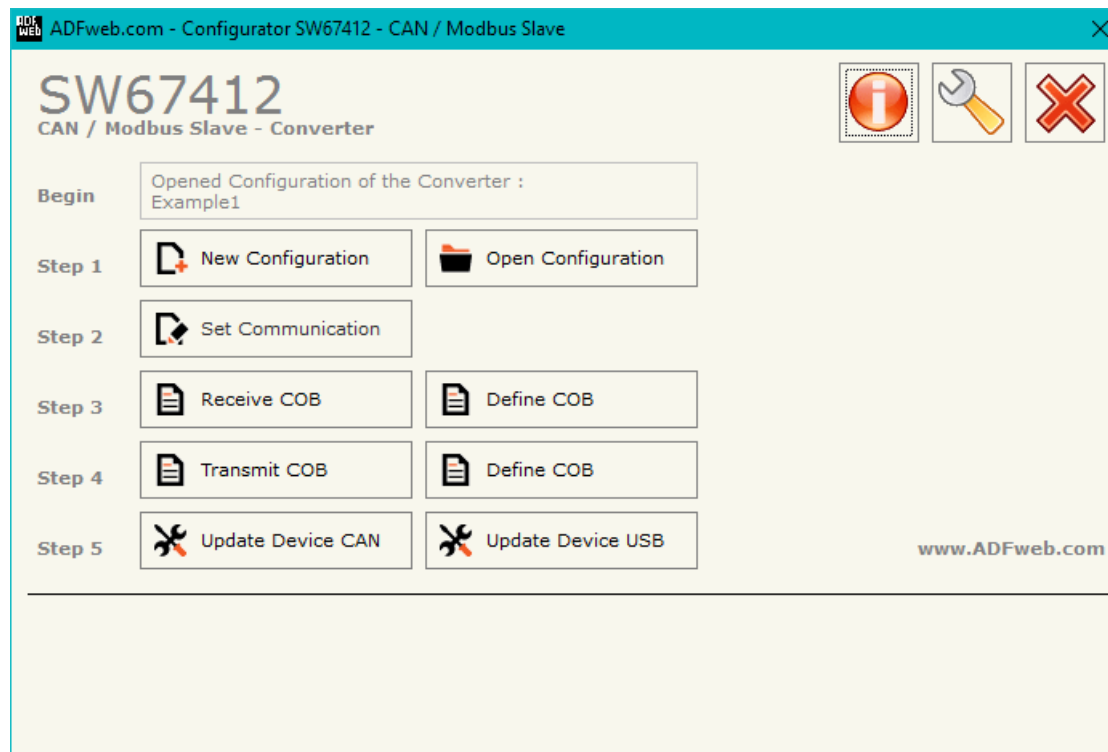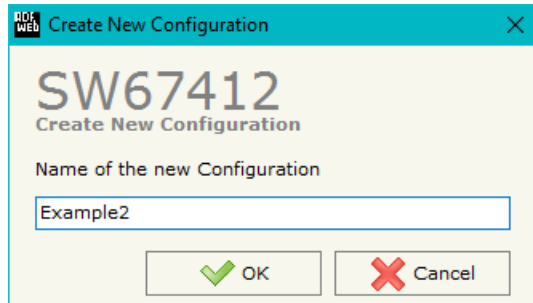When launching the SW67412, the window below appears (Fig. 2).


Figure 2: Main window for SW67412

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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 "CAN / 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**".
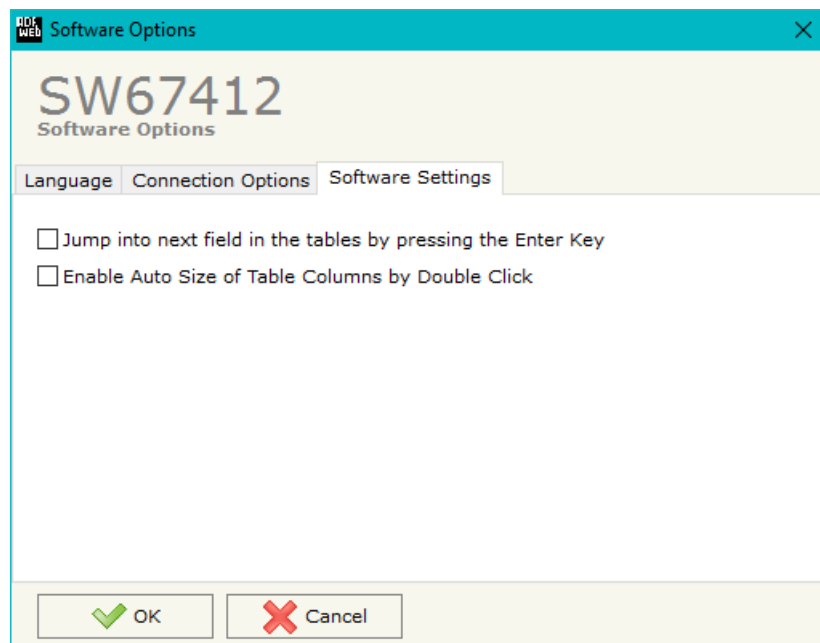
Industrial Electronic Devices
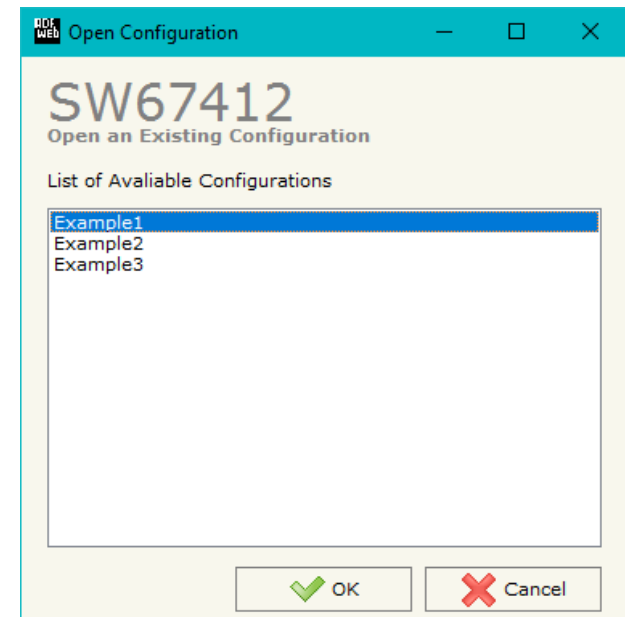
SOFTWARE OPTIONS:

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.
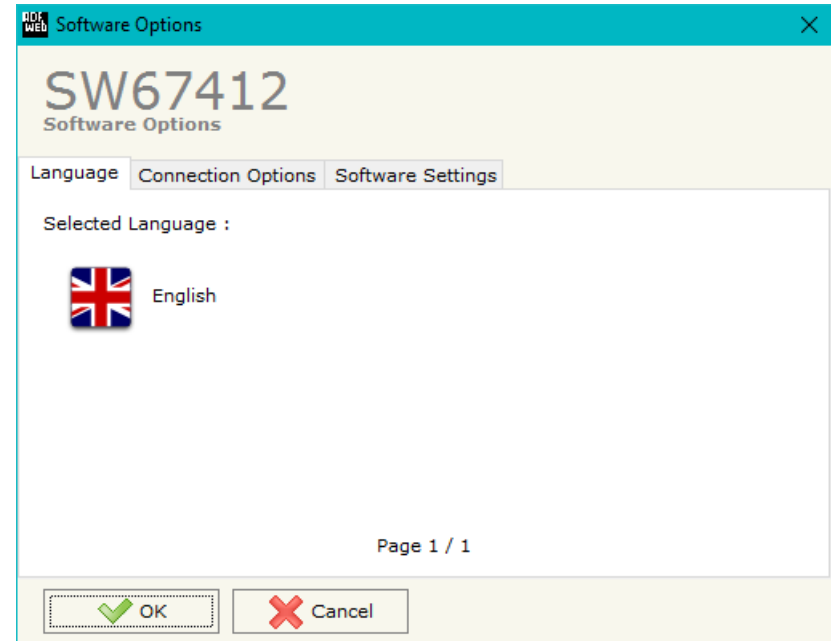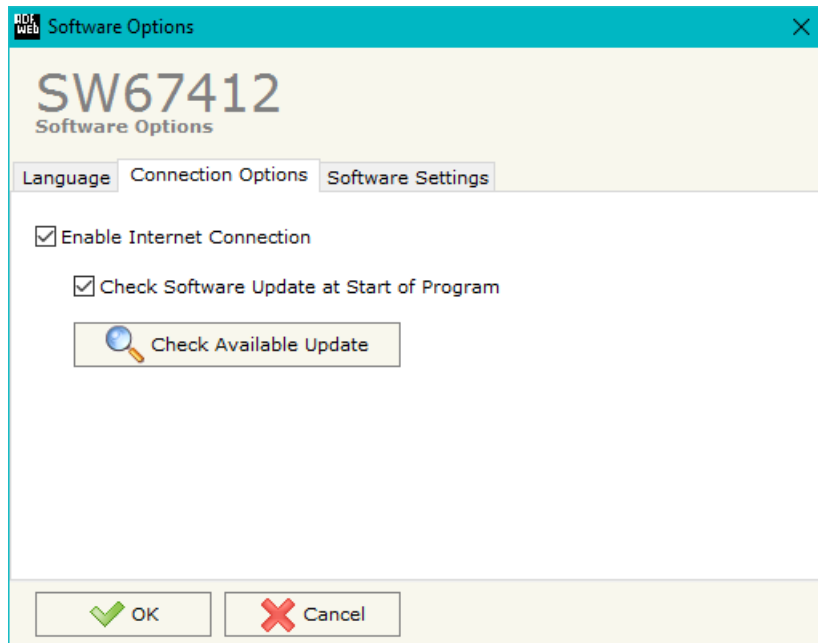
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67412 checks automatically if there are updatings when it is launched.

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Software Options

SW67412
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.

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SET COMMUNICATION:

This section defines the fundamental communication parameters of two buses, CAN and Modbus.

By pressing the "**Set Communication**" button from the main window for SW67412 (Fig. 2) the window "Set Communication Setting" appears (Fig. 3).

The meaning of the fields of "CAN" are:

- In the field "**Baudrate**" the data rate of the CAN bus is defined;
- In the field "**TimeOut (seconds)**" the maximum time that the device attends for the CAN frames is defined;
- In the field "**Modbus Register TO**" the value of Modbus register in which saving the status of the CAN communication is defined. '1' means that the communication is good and '0' means that at least one CAN frame is not received into the timeout defined;
- If the field "**Enable Write CAN on Request**" is checked, the CAN messages in transmission are sent when a specific Modbus register is written by the Master.

The meaning of the fields of "Modbus Slave" are:

- In the field "**Baudrate**" the data rate of the RS485 bus is defined;
- In the field "**Parity**" the serial parity is defined;
- In the field "**ID Device**" the Modbus ID is defined;
- If the field "**Cancel Data after Read**" is checked, the data for the CAN messages in reception will be erased after the Modbus reading request;
- If the field "**Not Cancel if read Input Registers**" is checked, the data for the CAN messages in reception are not erased if the Modbus function 04 is used.
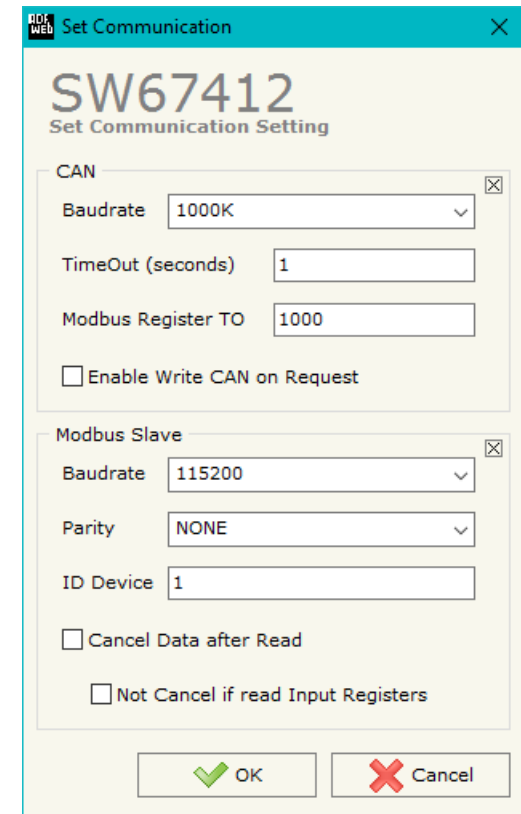

Figure 3: "Set Communication" window

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RECEIVE COB:

By pressing the "**Receive COB**" button from the main window of SW67412 (Fig. 2) the window "Receive CAN Frames Definition" appears (Fig. 4). This section is used to define the CAN messages accepted by the converter.
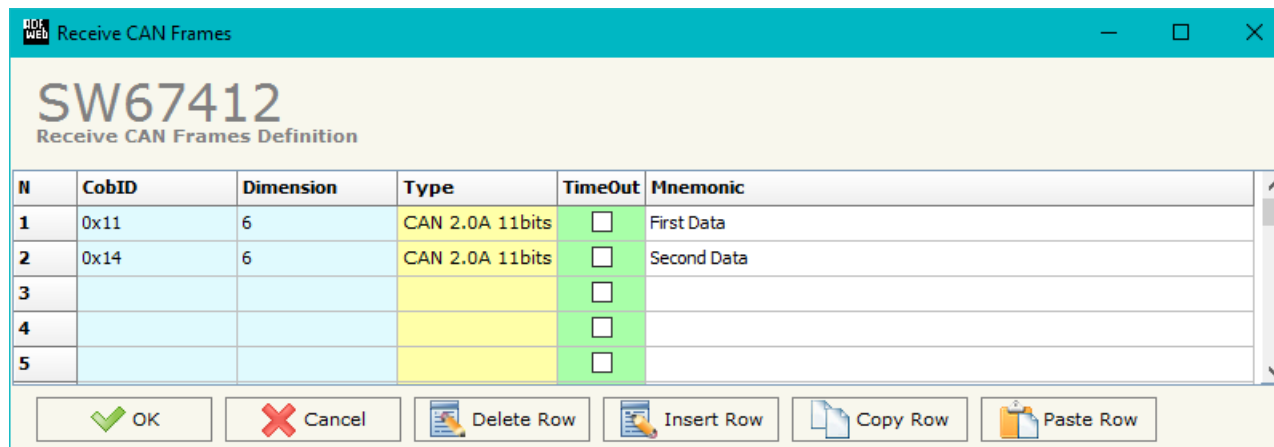

Figure 4: "Receive CAN Frames Definition" window

The means of the fields of the table are:

- In the field "**Cob-ID**" the COB-ID of the CAN frame is defined;
- In the field "**Dimension**" the number of bytes of the CAN frame (from 1 to 8) is defined;
- In the field "**Type**" the type of CAN message received is defined ('2.0A (11bits)' or '2.0B (29bits)');
- If the field "**TimeOut**", if the CAN frame is not received in the timeout defined, all the data of the CAN frame will be set to zero on Modbus;
- In the field "**Mnemonic**" a brief description is defined.

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DEFINE COB:

By pressing the "**Define COB**" button near "Receive COB" from the main window for SW67412 (Fig. 2) the window "Define Modbus Registers for Receive CAN Frames" appears (Fig. 5):

- In the field "**List of Receive CAN Frames**" there is the list of CAN frames that you inserted in "Receive COB" Section
- In the field "**List of Modbus Registers**" there are the Modbus words.
- In the field "**Create/Modify a Modbus Register**" you can define the index of the Modbus register and the bytes of the can frame that you map in.

For example:

Click on the frame, insert the valid address in the field "Index of Modbus Register", select the byte position (Byte 1 in High Modbus byte and Byte 3 in Low Modbus byte), click the "Create" button, in the field "List of Modbus Registers" appears the new Modbus register created with the data that it contains.
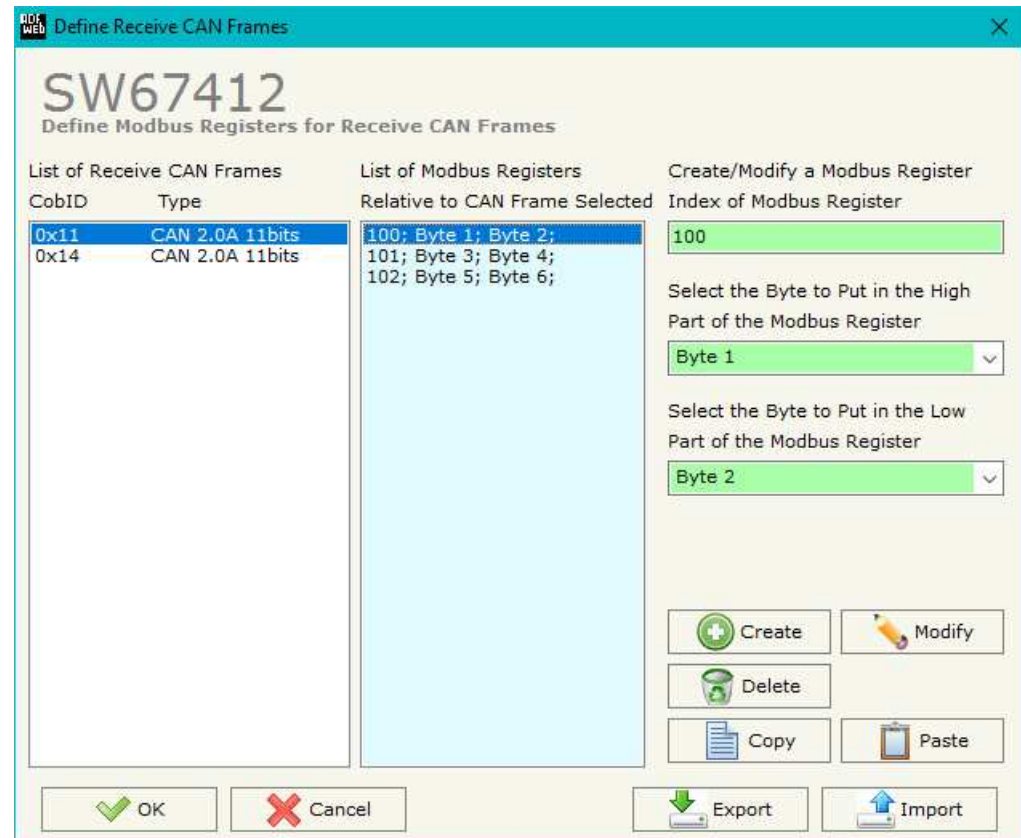

Figure 5: "Define Modbus Registers for Receive CAN Frames" window

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TRANSMIT COB:

By pressing the "**Transmit COB**" button from the main window of SW67412 (Fig. 2) the window "Transmit CAN Frames" appears (Fig. 6).
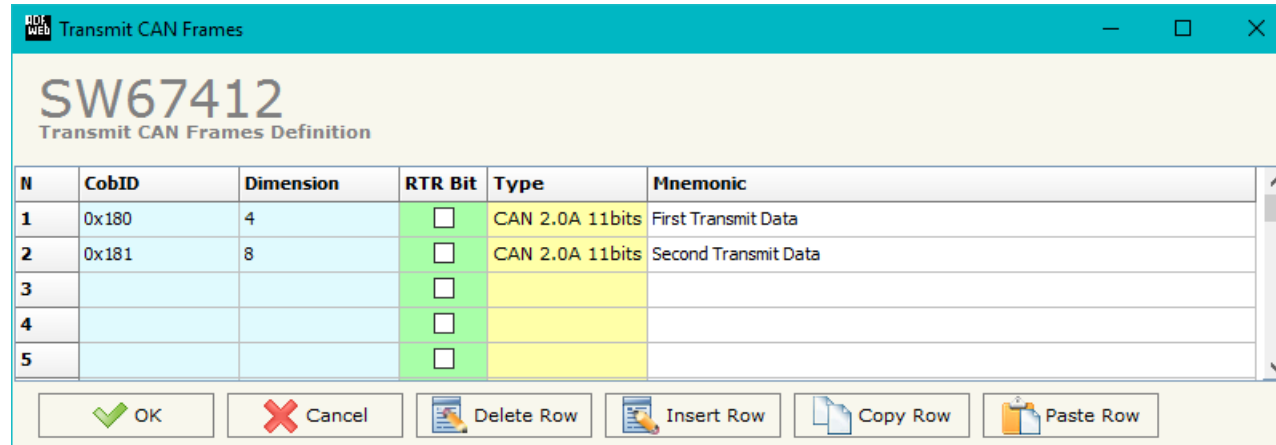This section is used to define the CAN messages sent by the converter.

N	CobID	Dimension	RTR Bit	Type	Mnemonic
1	0x180	4	☐	CAN 2.0A 11bits	First Transmit Data
2	0x181	8	☐	CAN 2.0A 11bits	Second Transmit Data
3			☐		
4			☐		
5			☐		

Figure 6: "Transmit CAN Frames" window

The means of the fields of the table are:

- In the field "**Cob-ID**" the COB-ID of the CAN frame is defined;
- In the field "**Dimension**" the number of bytes of the CAN frame (from 1 to 8) is defined;
- If the field "**RTR Bit**" is enabled, the RTR bit is set;
- In the field "**Type**" the type of CAN message sent is defined ('2.0A (11bits)' or '2.0B (29bits)');
- In the field "**Mnemonic**" a brief description is defined.

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DEFINE COB

By pressing the "**Define COB**" button near "Transmit COB" from the main window for SW67412 (Fig. 2) the window "Define Modbus Registers for Transmit CAN Frames" appears (Fig. 7):

➜ In the field "**List of Transmit CAN Frames**" there is the list of CAN frames that you inserted in "Transmit COB" Section.

➜ In the field "**List of Modbus Registers**" there are the Modbus words.

➜ In the field "**Create/Modify a Modbus Register**" you can define the index of the Modbus register and the bytes of the CAN frame where you write it.

➜ With the field "**Send CAN frame on Modbus Write**" it is possible to decide when to send the CAN frame. If a Modbus word has written "False "in this field, the CAN frame is not sent immediately but it is sent when another word that have this field "True" is written.

For example:

Click on the frame, insert the 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), click the "Create" button, in the field "List of Modbus Registers" appears the new Modbus register created.
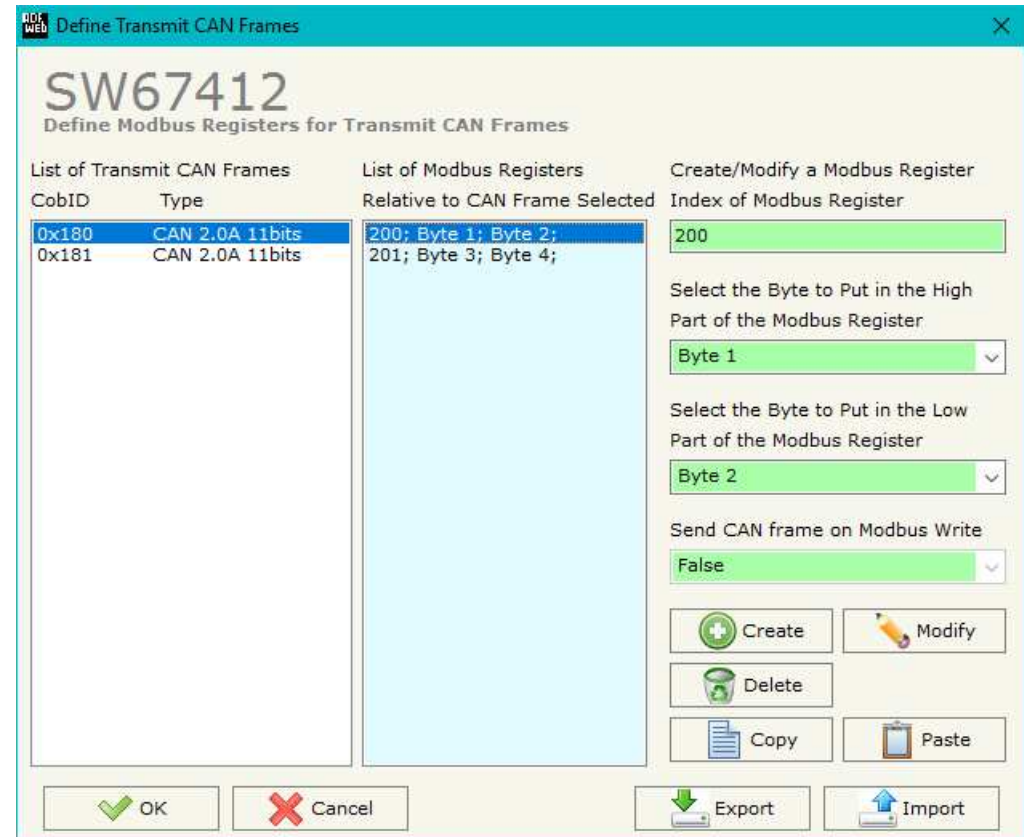

Figure 7: "Define Modbus Registers for Transmit CAN Frames" window

Industrial Electronic Devices

UPDATE DEVICE (ONLY FOR THE HARDWARE WITHOUT USB PORT):

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

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

- Connect the AC67400 to the PC;
- Connect the CAN port of AC67400 to CAN port of HD67412;
- Feed the HD67412;
- Turn on the device;
- Select the "**COM port**" and press the "*Connect*" button;
- 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;
- Disconnect the AC67400;
- Turn on the device.

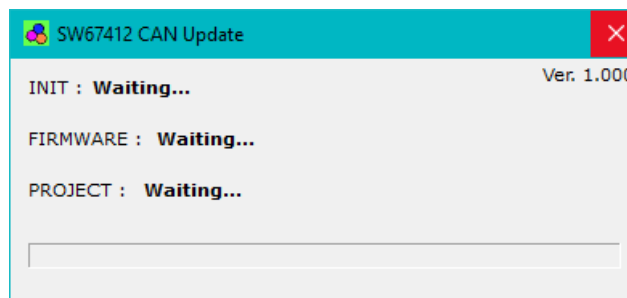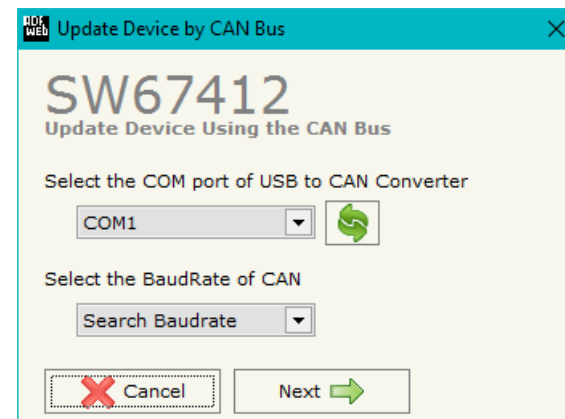At this point the configuration/firmware on the device is correctly update.

Figure 8: "Update Device CAN" windows

![ADFweb logo] **Industrial Electronic Devices**

UPDATE DEVICE USB:

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

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

- Connect the USB cable from your PC to the Converter;
- Select the "**COM port**";
- Select which operations you want to do.
- Press the "**Execute update firmware**" button to start the upload;
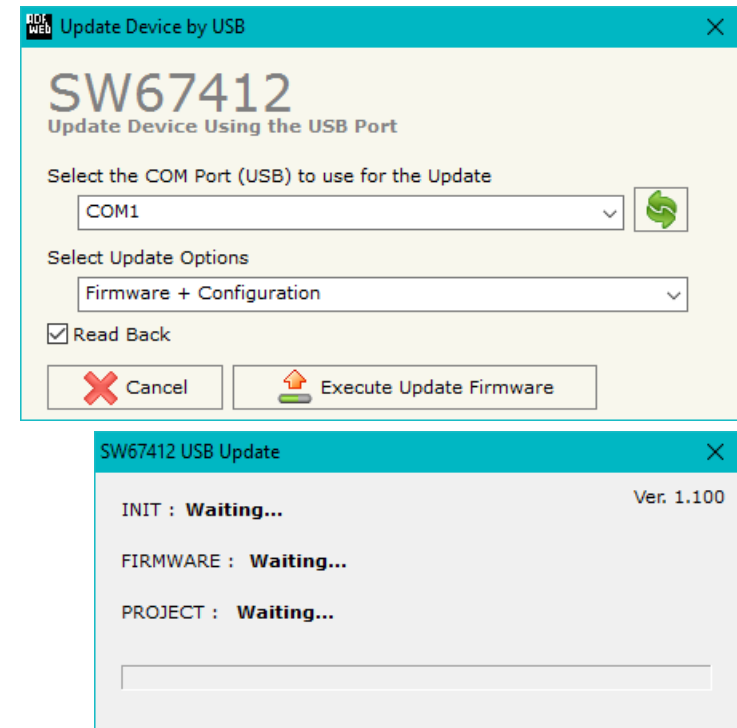- When all the operations are "OK", disconnect the USB cable;

Figure 9 "Update Device" windows

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Note:
When you install a new version of the software it is better if the first time you do the update of the Firmware in the HD67412 device.

Note:
When you receive the device, for the first time, you have to update also the Firmware in the HD67412 device.
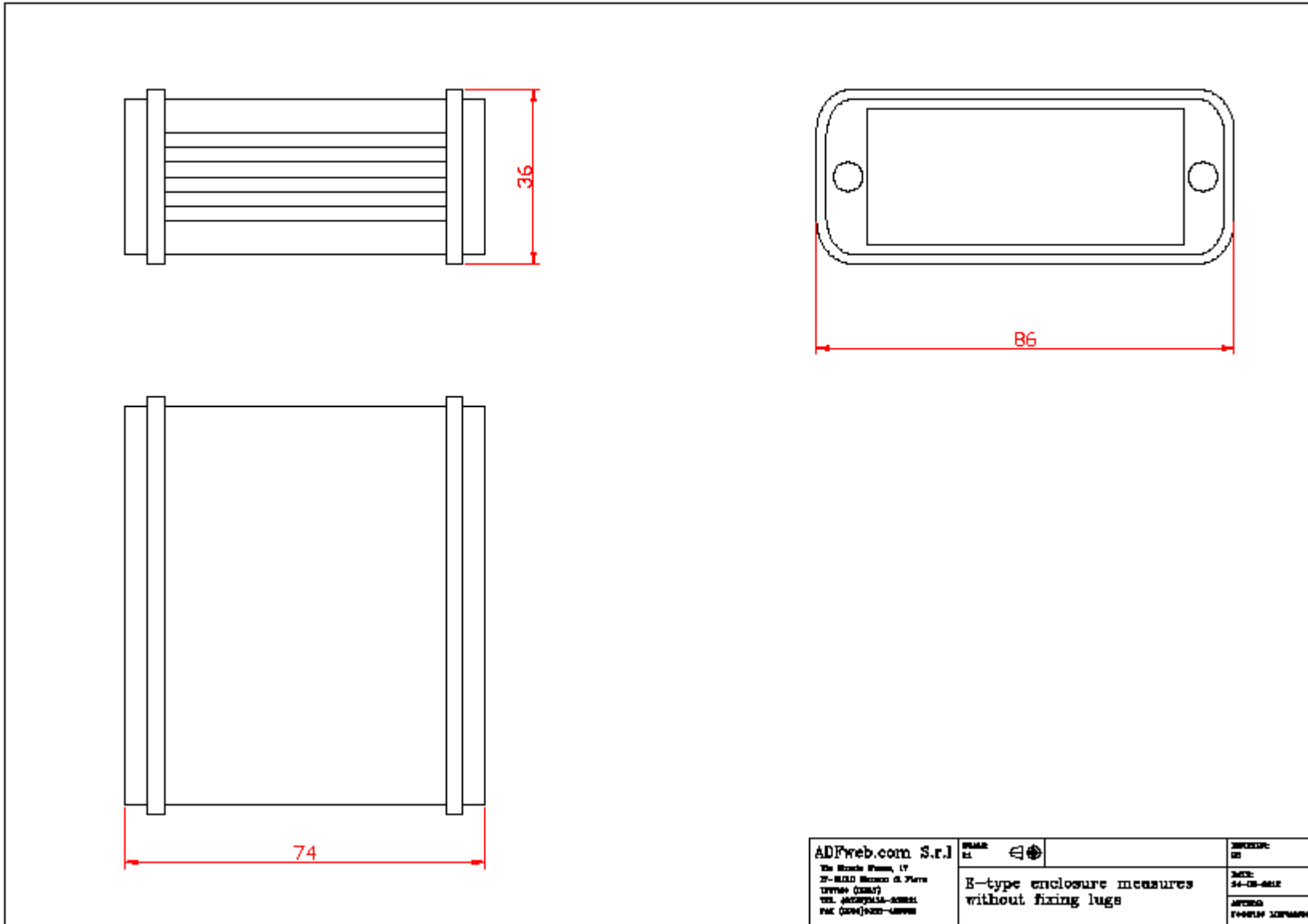
Warning:
If the Fig. 10 appears when you try to do the Update before require assistance try these points:
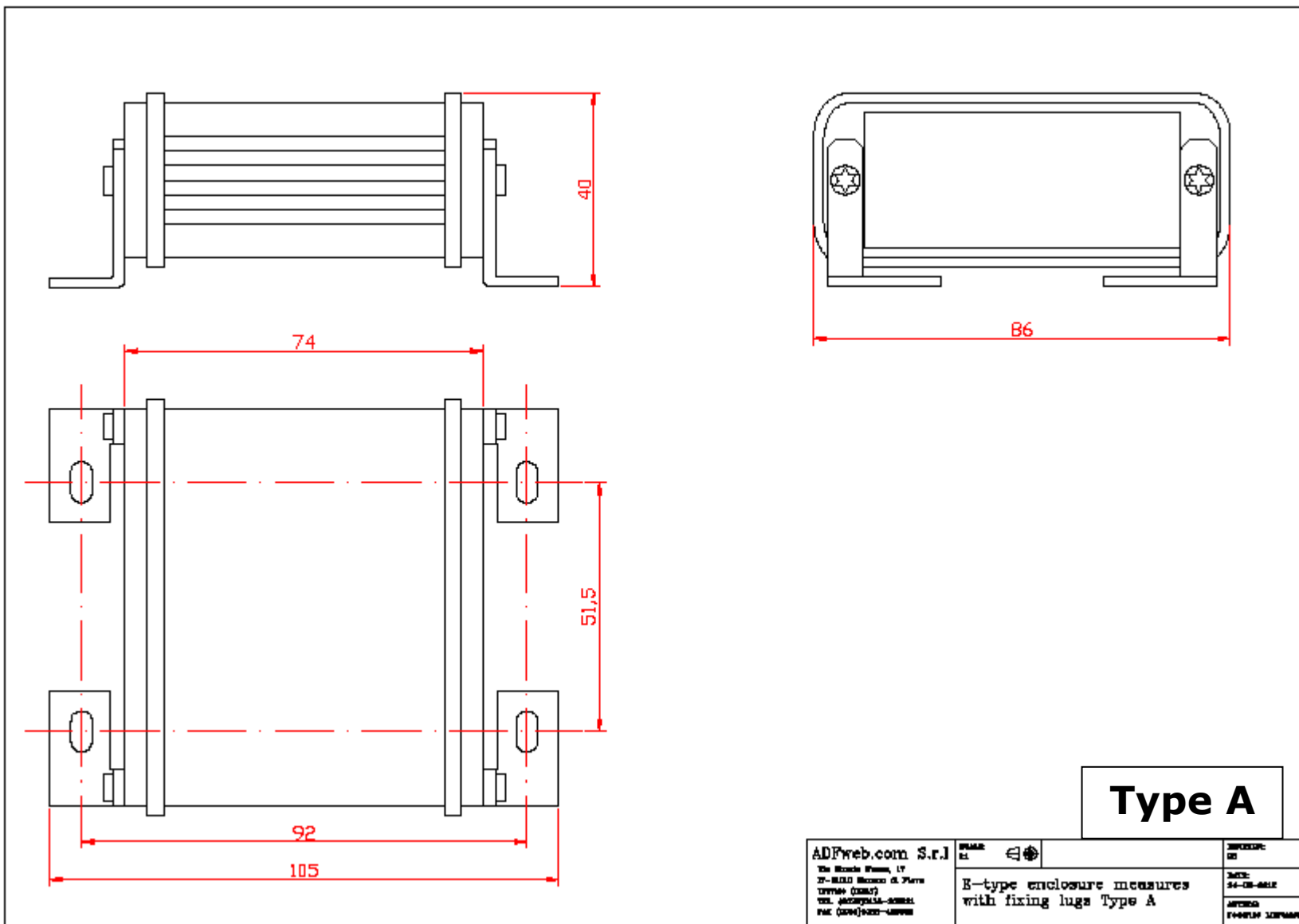
→ Check if the serial COM port selected is the correct one;
→ Check if the AC67400 is connected between the PC and the device;
→ Check if the USB cable is connected between the PC and the device;
→ Try to repeat the operations for the updating;
→ Try with another PC;
→ Try to restart the PC;
→ If you are using the program inside a Virtual Machine, try to use in the main Operating System;
→ If you are using Windows Seven or Vista or 8 or 10, make sure that you have the administrator privileges;
→ Pay attention to Firewall lock.

SW67412 USB Update

Ver. 1.100

INIT : **PROTECTION**

FIRMWARE : **PROTECTION**

PROJECT : **PROTECTION**

Figure 10: "Protection" window

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MECHANICAL DIMENSIONS:

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Type A

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E-type enclosure measures
with fixing lugs Type A

ADF web

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40

112,5

95

60

83

Type B

ADFweb.com S.r.l

E-type enclosure measures with fixing lugs Type B

Industrial Electronic Devices

40

112,5

95

92

105

Type C

ADFweb.com S.r.l

E-type enclosure measures
with fixing lugs Type C

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ORDERING INFORMATIONS:

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

HD67412 – E y z – s d f

Fixing lugs
A: Type 1
B: Type 2
C: Type 3
D: without fixing lugs

RS485 Termination
Y = Terminated with 220Ω
N = Not terminated

CAN Termination
Y = Terminated with 120Ω
N = Not terminated

Varnished/Resinated
V = Varnished
R = Resined

Connectors Type
4 = MiniFit
7 = SuperSeal 1.5

Enclosure Type
E: Metal enclosure

Device Family
HD67412 = CAN / Modbus Slave - Converter

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ACCESSORIES:

Order Code: **AC34001**   -   Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V AC

Order Code: **AC34002**   -   Rail DIN - Power Supply 110V AC 50/60Hz – 12 V AC

Order Code: **AC67402**   -   Cable Super Seal 1.5 MALE 2-pole - 1.0 Meter

Order Code: **AC67402-3** -   Cable Super Seal 1.5 MALE 2-pole - 3.0 Meters

Order Code: **AC67403**   -   Cable Super Seal 1.5 MALE 3-pole - 1.0 Meter

Order Code: **AC67403-3** -   Cable Super Seal 1.5 MALE 3-pole - 3.0 Meters

Order Code: **AC67410**   -   Accessory Automotive Devices - Support for rail DIN

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.

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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.