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Industrial Electronic Devices

User Manual
Revision 1.000
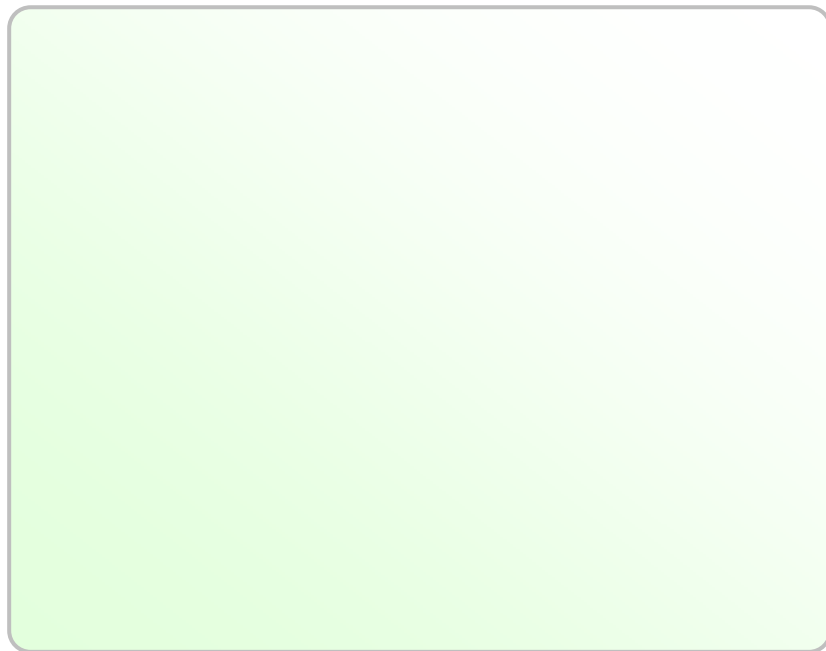English

EnOcean / NMEA2000 - Converter

(Order Code: HD67C73-B2)

Benefits and Main Features:

Very easy to configure

Power Supply 18...35V DC and 8...24 V AC

Temperature range: -40°C/+85°C (-40°F/+185°F)

⊕

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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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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
1.000	05/12/2019	Ff	All	First release version

WARNING:

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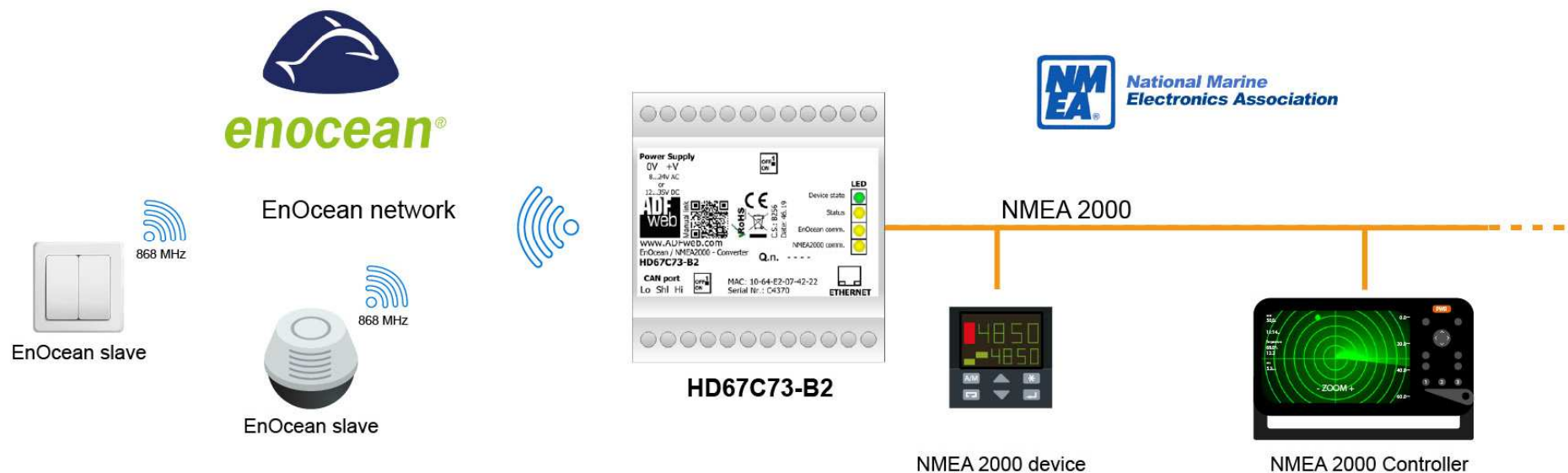
This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

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:

EnOcean / NMEA 2000 - Converter
HD67C73-B2

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CONNECTION SCHEME:

Connector7:
CAN port

L = Low wire
S = Shield (to Isolated Ground)
H = High wire

Dip-Switch C:
-Dip1 – Termination CAN line
= Open   = 120 ohm

Connector2:
Ethernet Port
(RJ45 Plug)

Led1:
Green
Device state

Led2:
Yellow
NMEA2000 comm.

Led3:
Yellow
EnOcean comm.

Led4:
Yellow
Error state

Connector5:
Antenna

Connector1:
Power Supply

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

Dip-Switch A:
-Dip1 – Functioning Mode
= Normal Mode
= Boot Mode

Figure 1: Connection scheme for HD67C73-B2

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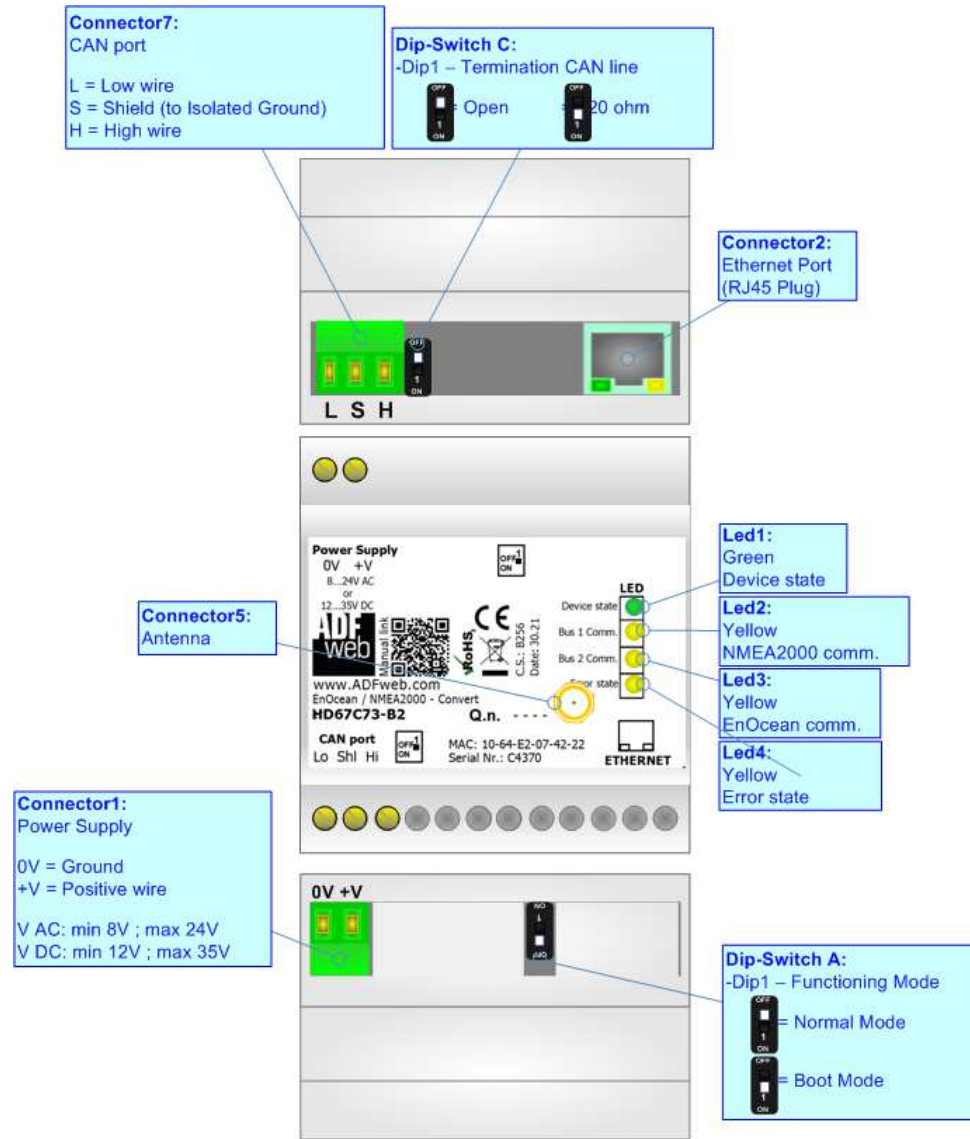
CHARACTERISTICS:

The HD67C73-B2 is a EnOcean / NMEA2000 Converter.

It allows the following characteristics:

- Electrical isolation between EnOcean and Power Supply;
- Mountable on 35mm Rail DIN;
- Wide power supply input range: 18…35V DC and 8…24V AC;
- Wide temperature range: -40°C / 85°C [-40°F / +185°F].

CONFIGURATION:

You need Compositor SW67C73 software on your PC in order to perform the following:

- Define the parameter of NMEA2000line;
- Define the parameter of EnOcean line;
- Define NMEA2000 messages in rx and tx;;
- Update the device.

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POWER SUPPLY:

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

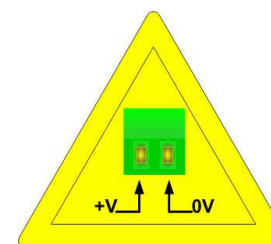| VAC 〜		VDC ▬▬	
Vmin	**Vmax**	**Vmin**	**Vmax**
8V	**24V**	**12V**	**35V**

Consumption at 24V DC:

Device	Consumption [W/VA]
HD67C73-B2	3.5

Connector1:
Power Supply

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

V+ 0V

Caution: Not reverse the polarity power

+V   0V

HD67C73-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 upload 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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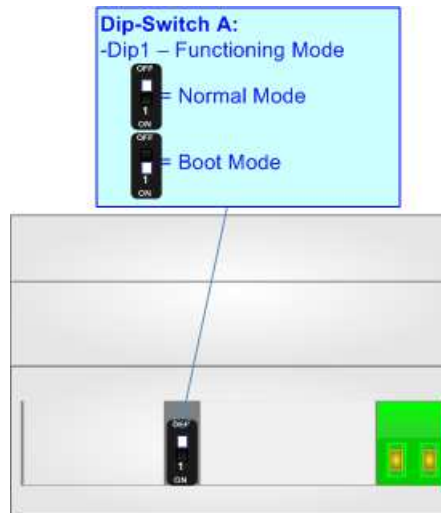
LEDS:

The device has got 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: NMEA2000 communication (yellow)	Blinks when a NMEA2000 message is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
3: EnOcean communication (yellow)	Blinks when EnOcean data is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: Error state (yellow)	**ON:** An error in the communication busses occurs **OFF:** No errors are present	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress

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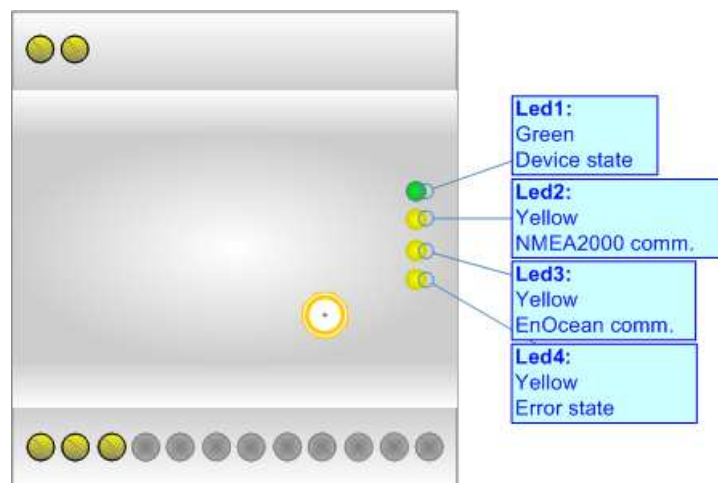
ETHERNET:

The Ethernet port is used for programming the device.

The Ethernet connection must be made using Connector2 of HD67C73-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 is recommended the use of a cross cable.

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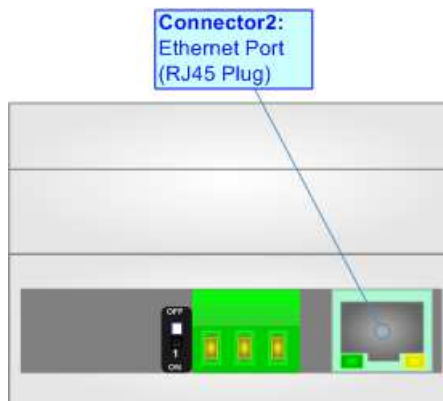
CAN:

For terminating the CAN line with a 120Ω resistor it is necessary that the Dip1 of 'Dip-Switch C' is at ON position.
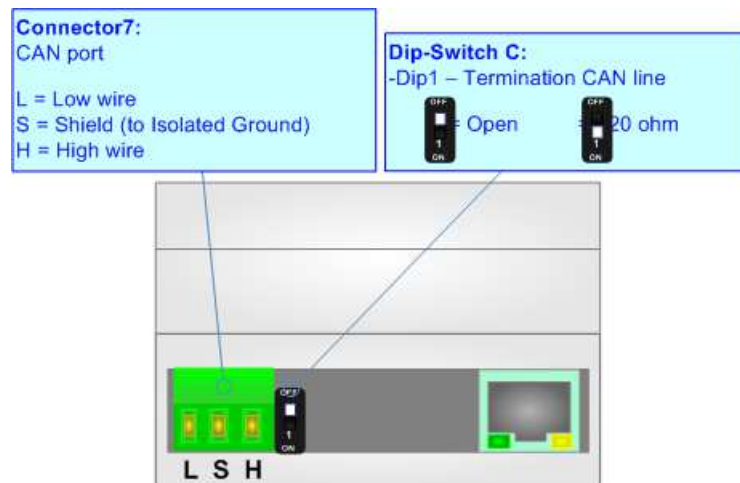
Cable characteristics:

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

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ENOCEAN:

EnOcean is a protocol designed for energy harvesting devices communication. The main fields of application are building automation and domotics, but it can also be potentially used in the industrial field.

EnOcean products include solutions for environment monitoring, smart metering and lighting. Each device uses a unique ID for identification and one of the standardized profiles (EEPs) for data transmission. Communication process may be secure or unsecure and may be unidirectional or bidirectional (for devices that support Smart Acknowledge operating mode).

EnOcean is based on wireless communication on 868.3 MHz ASK.

It is possible to connect up to 100 EnOcean devices to a single converter, where up to 32 can be in Secure Mode and up to 19 with Smart Acknowledge.

The Antenna connector is a SMA Female ('Female Outer Shell' and 'Female Receptacle') so the Antenna must have a SMA Male connector.

Connector5:
Antenna

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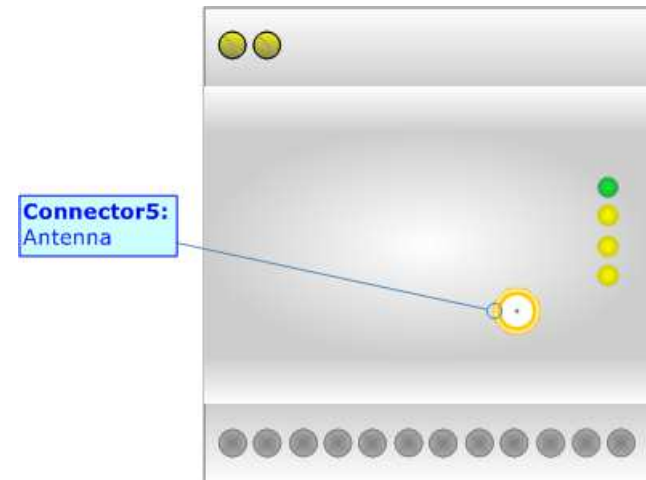
USE OF COMPOSITOR SW67C73:

To configure the Converter, use the available software that runs with Windows called SW67C73. 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 SW67C73, the window below appears (Fig. 2).

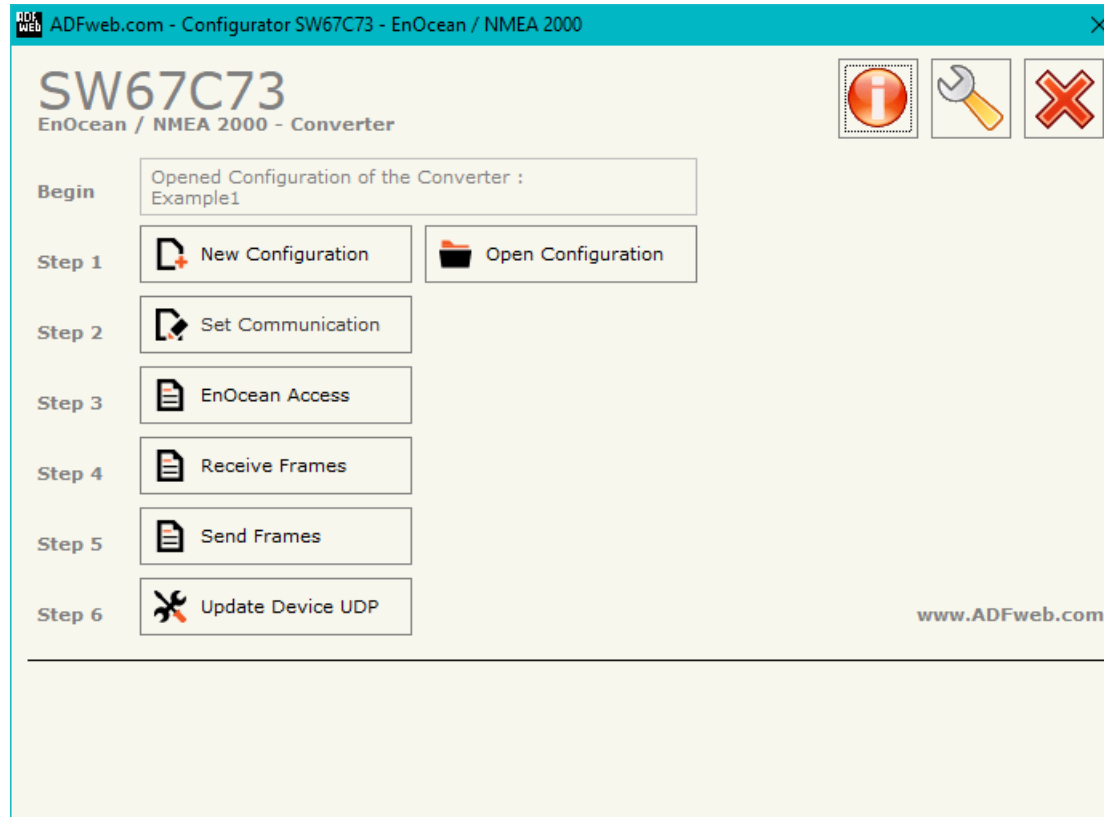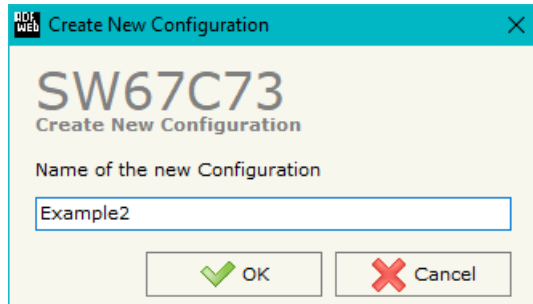Note:
    It is necessary to have installed .Net Framework 4.


Figure 2: Main window for SW67C73

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 "EnOcean / NMEA2000 - 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**".
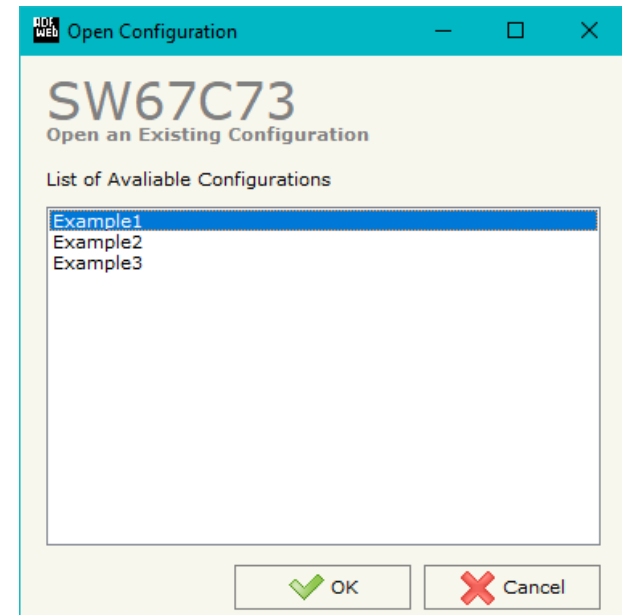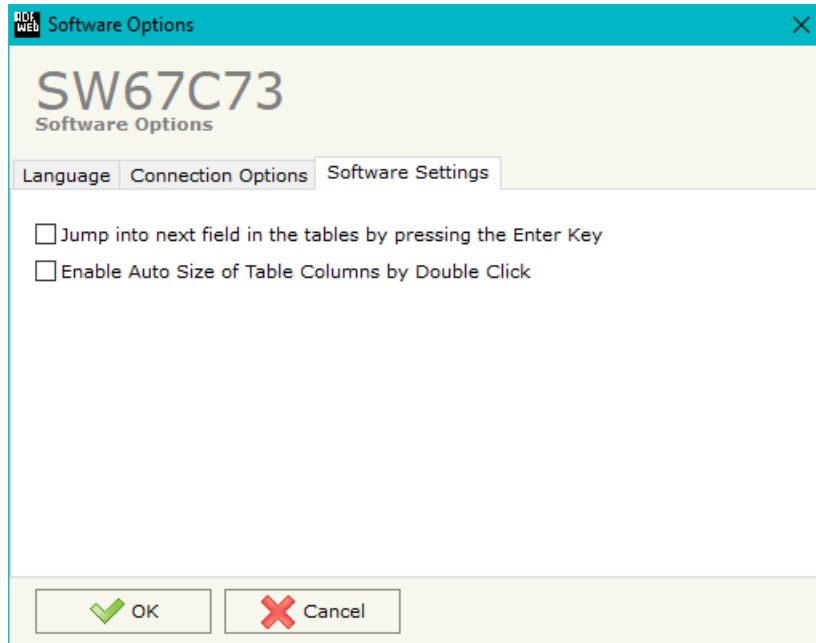
SOFTWARE OPTIONS:

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.
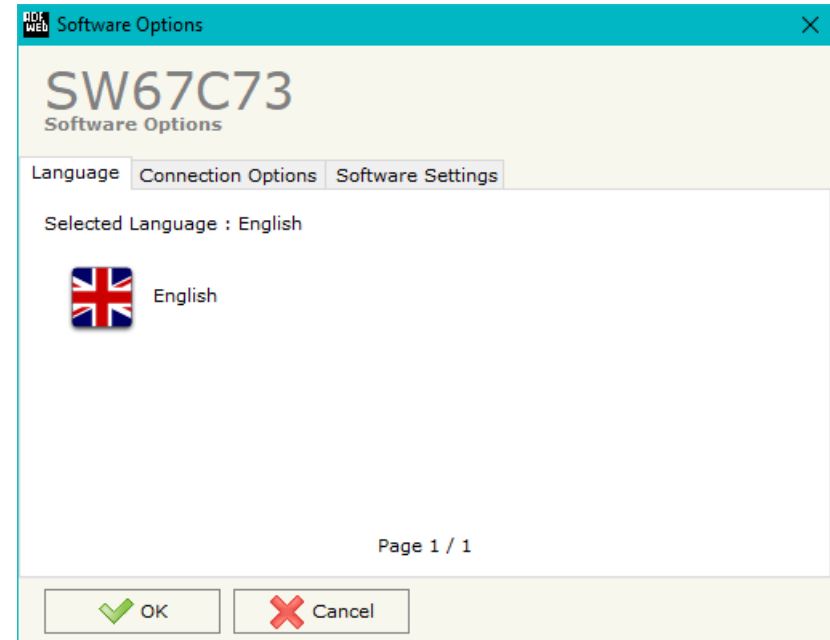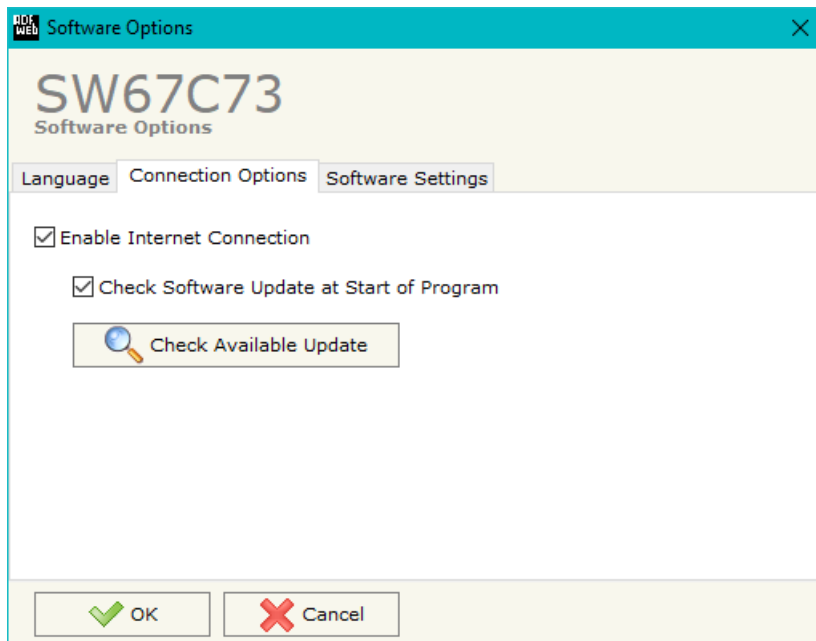
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67C73 check automatically if there are updatings when it is launched.

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Software Options   ×

SW67C73

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:

By Pressing the "**Set Communication**" button from the main window for SW67C73 (Fig. 2) the window "Set Communication" appears (Fig. 3).

The means of the fields for "NMEA 2000" are:

- In the field "**Baudrate**" the data rate of NMEA2000 is defined;
- In the field "**TimeOut Data**" a time is defined. When a NMEA2000 message is not received in this time, the data on OPC UA side are set to 0xFF;
- If the field "**Enable Peer to Peer**" is checked, the gateway will mask the Source Address of the NMEA2000 messages received.

The means of the fields for "Ethernet" are:

- In the fields "**IP Address**" the IP address for Ethernet side of the converter is defined;
- In the fields "**SubNet Mask**" the SubNet Mask for Ethernet side of the converter is defined;
- In the fields "**Gateway**" the default gateway of the net is defined. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net.

Figure 3: "Set Communication" window

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ENOCEAN ACCESS:

By Pressing the "**EnOcean Set Access**" button from the main window for SW67C73 (Fig. 2) the window "EnOcean Set Access" appears (Fig. 4). This section is used to define the list of the EnOcean devices to read/write.
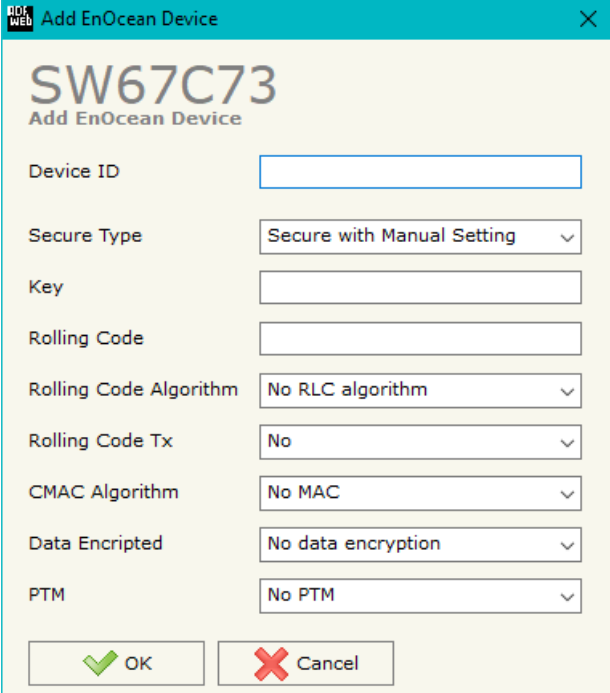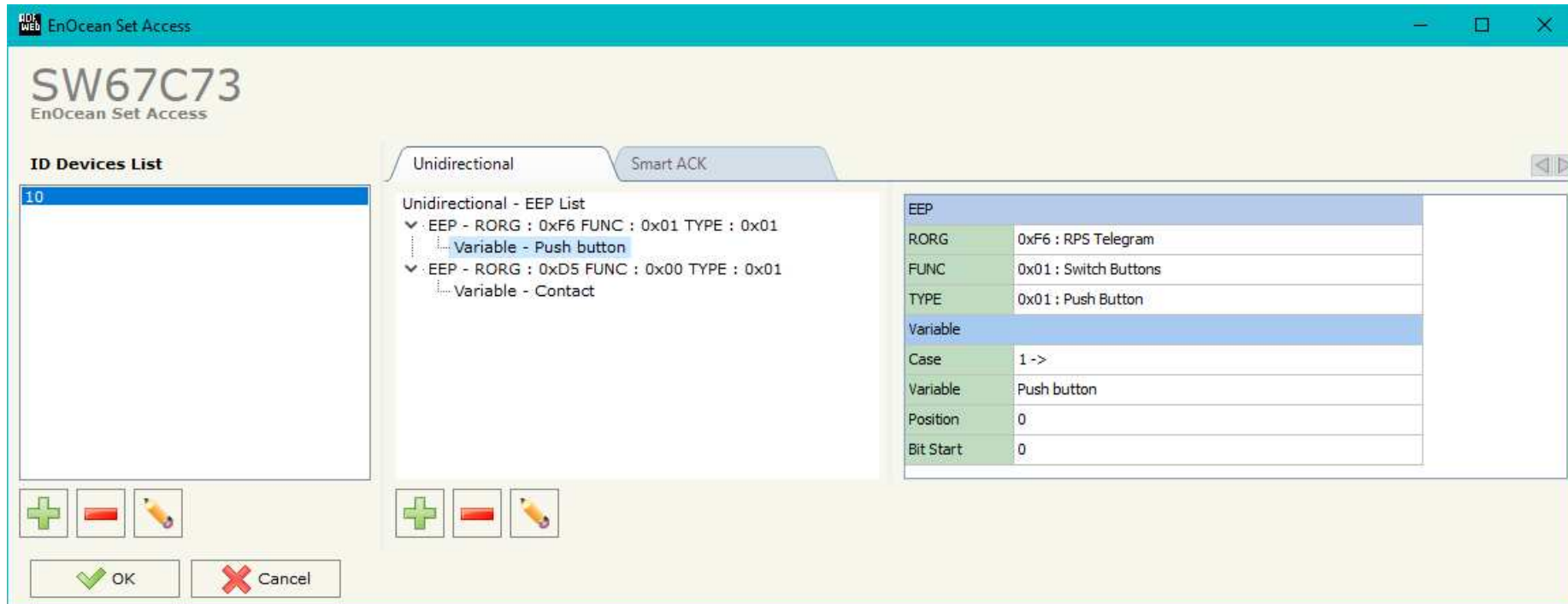
Figure 4: "EnOcean Access" window

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By clicking on "**+**" or "**Modify**" under "ID Devices List", it is possible to add/modify a new EnOcean device inserting its characteristics. The window "Add/Modify EnOcean device" appears (Fig. 5).

The means of the fields are:

- In the field "**Device ID**" the ID of the EnOcean device is defined;
- In the field "**Secure Type** " the type of EnOcean communication is defined;
- In the field "**Key**" the key used for encryption of frames in Secure Mode is defined;
- In the field "**Rolling Code**" the Rolling Code for the EnOcean communication is defined;
- In the field "**Rolling Code Algorithm**" the type of Rolling Code is defined;
- In the field "**Rolling Code Tx**" the transmission of the Rolling Code is enabled/disabled;
- In the field "**CMAC Algorithm**" the MAC field at the end of the EnOcean frame is defined;
- In the field "**Data Encrypted**" the encryption of the data is enabled/disabled;
- In the field "**PTM**" the type of EnOcean device is defined.

Figure 5: "Add/Modify EnOcean device" window

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By clicking on "**+**" or "**Modify**", it is possible to add/modify a new variable for the selected ID. The window "Add/Modify EnOcean variable" appears (Fig. 6).

The means of the EEP fields are:

- In the field "**Rorg**" the type of EnOcean telegram is defined;
- In the field "**Func**" the type of EnOcean instance is defined;
- In the field "**Type**" the type of event is defined.

The means of the Variable fields are:

- In the field "**Case**" the format of the EnOcean telegram is defined;
- In the field "**Variable**" the variable to read/write is defined;
- In the field "**Position**" the starting byte of the internal array where mapping/taking the variable is defined;
- In the field "**Bit Start**" the starting bit of the defined Position where mapping/taking the variable is defined.

Figure 6: "Add/Modify EnOcean variable" window

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RECEIVE FRAMES:

By pressing the "**Receive Frames**" button from the main window for SW67C73 (Fig. 2) the "Receive NMEA2000 Frames" window appears (Fig. 7).
The COB inserted in this table contains the data to write on EnOcean side. These frames are accepted by the converter.
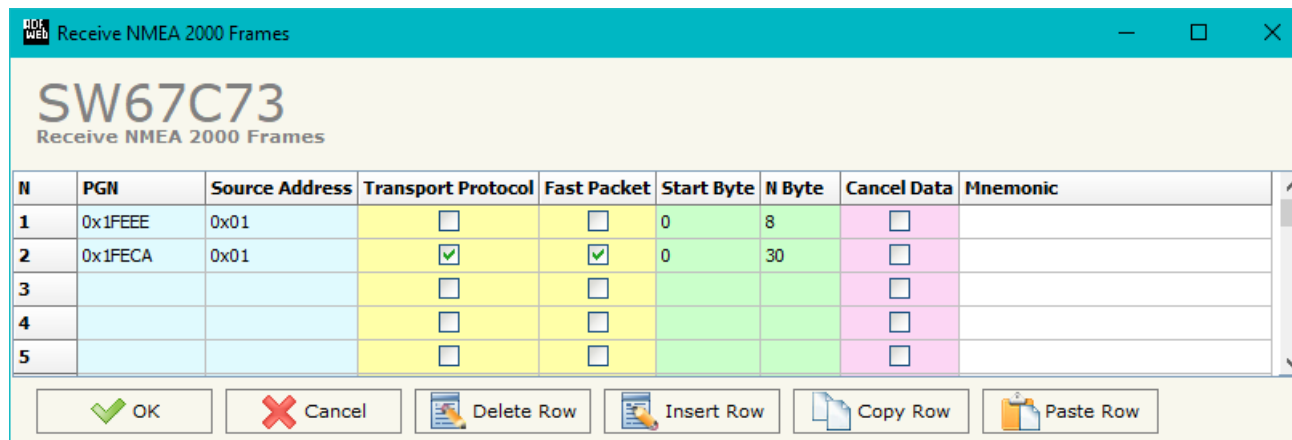

Figure 7: "Receive NMEA2000 Frames Set Access" window

The data of the columns have the following meanings:

- If the field "**Enable**" is checked, the NMEA2000 frame is enabled;
- In the field "**Cob-ID**" the COB of the NMEA2000 frame is defined;
- In the field "**Type**" the type of NMEA2000 packet use for the Cob-ID is defined (2.0A (11 bits) or 2.0B (29 bits));
- In the field "**Dimension**" the number of byte of the COB (from 1 to 8) is defined;
- The field "**TimeOut**" is used for put at zero the data into internal array if the NMEA2000 frame arrives with a frequency less than the time expressed in the field. If the value in the field is '0', it means that you don't want to use this feature;
- In the field "**Byte1**" insert the byte of the internal array where saving 1st byte of the NMEA2000 message;
- In the field "**Byte2**" insert the byte of the internal array where saving 2nd byte of the NMEA2000 message;
- In the field "**Byte3**" insert the byte of the internal array where saving 3rd byte of the NMEA2000 message;
- In the field "**Byte4**" insert the byte of the internal array where saving 4th byte of the NMEA2000 message;

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- In the field "**Byte5**" insert the byte of the internal array where saving 5th byte of the NMEA2000 message;
- In the field "**Byte6**" insert the byte of the internal array where saving 6th byte of the NMEA2000 message;
- In the field "**Byte7**" insert the byte of the internal array where saving 7th byte of the NMEA2000 message;
- In the field "**Byte8**" insert the byte of the internal array where saving 8th byte of the NMEA2000 message;
- In the field "**Mnemonic**" a brief description is defined.

SEND FRAMES:

By pressing the "**Send Frames**" button from the main window for SW67C73 (Fig. 2) the "Send NMEA2000 frames" window appears (Fig. 8).
The COB inserted in this table contains the data received from EnOcean side. These frames are sent by the converter.
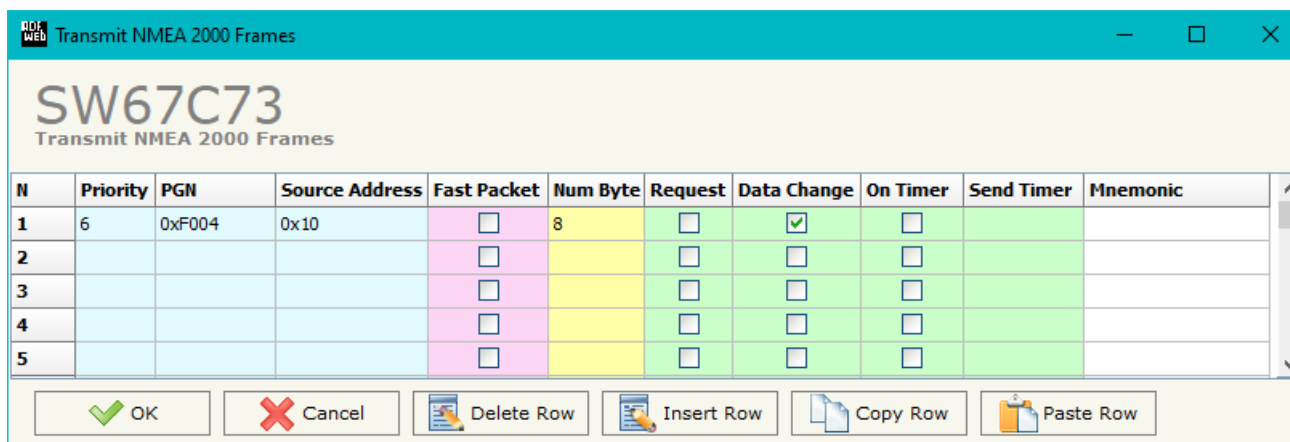

Figure 8: "Transmit NMEA2000 Frames Set Access" window

The data of the columns have the following meanings:

- If the field "**Enable**" is checked, the NMEA2000 frame is enabled;
- In the field "**Cob-ID**" the COB of the NMEA2000 frame is defined;
- In the field "**Type**" the type of NMEA2000 packet use for this Cob-ID is defined (2.0A (11 bits) or 2.0B (29 bits));
- In the field "**Dimension**" the number of byte of the COB (from 1 to 8) is defined;
- If the field "**OnChange**" is checked, the frame is sent when the data from EnOcean change;
- If the field "**OnCMD**" is checked, the frame is sent when a EnOcean message is received;
- If the field "**OnTimer**" is checked, the frame is sent cyclically with the delay defined in the field "**Time**" (expressed in ms);
- In the field "**Byte1**" insert the byte of the internal array where taking 1st byte of the NMEA2000 message;
- In the field "**Byte2**" insert the byte of the internal array where taking 2nd byte of the NMEA2000 message;
- In the field "**Byte3**" insert the byte of the internal array where taking 3rd byte of the NMEA2000 message;
- In the field "**Byte4**" insert the byte of the internal array where taking 4th byte of the NMEA2000 message;
- In the field "**Byte5**" insert the byte of the internal array where taking 5th byte of the NMEA2000 message;

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- In the field "**Byte6**" insert the byte of the internal array where taking 6th byte of the NMEA2000 message;
- In the field "**Byte7**" insert the byte of the internal array where taking 7th byte of the NMEA2000 message;
- In the field "**Byte8**" insert the byte of the internal array where taking 8th byte of the NMEA2000 message;
- In the field "**Mnemonic**" it is possible to insert a brief description.

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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.

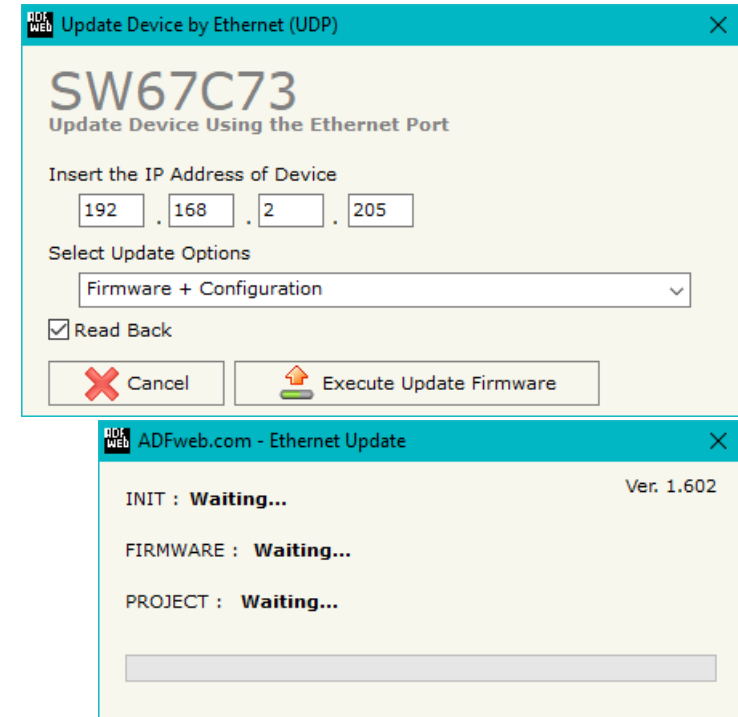At this point the configuration/firmware on the device is correctly updated.

Figure 7: "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 HD67C73 device.

Warning:

If Fig. 8 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 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.

Warning:
In the case of HD67C73 you have to use the software "SW67C73":
www.adfweb.com\download\filefold\SW67C73.zip.

Figure 8: "Error" window

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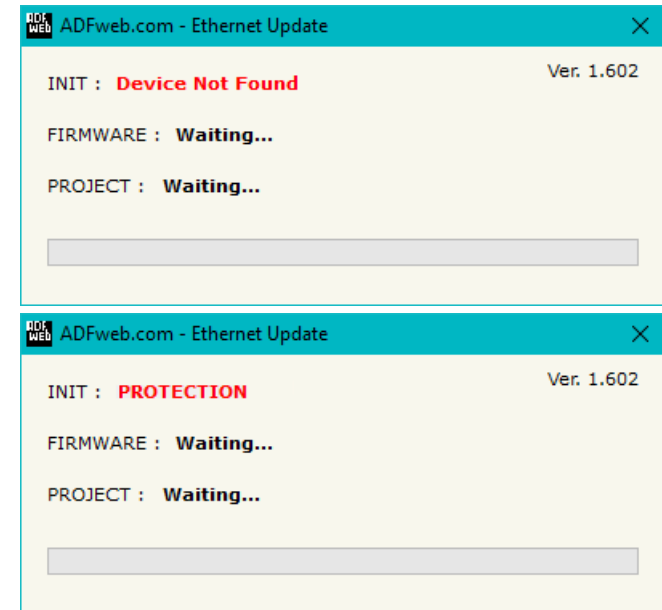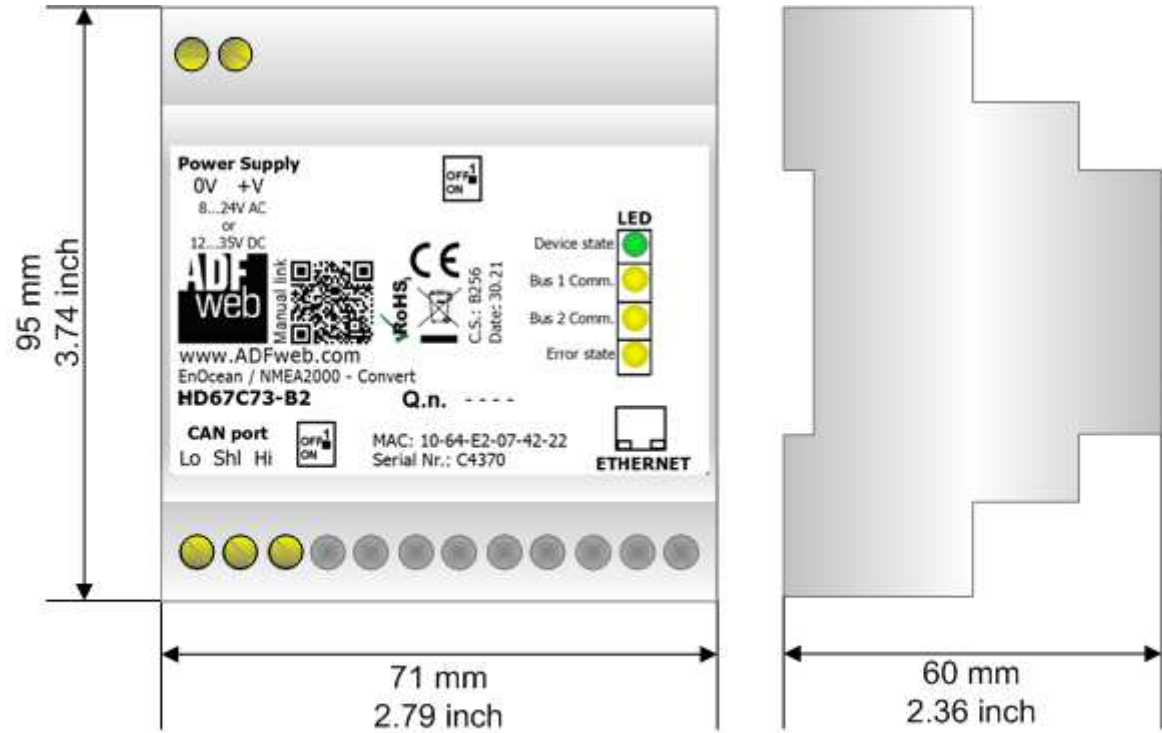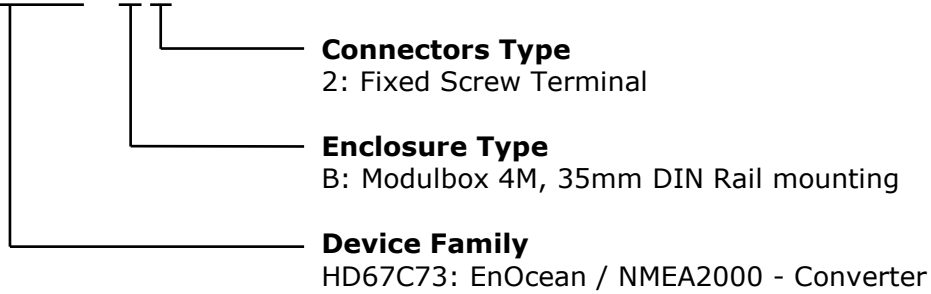
MECHANICAL DIMENSIONS:

Housing: PVC
Weight: 200g (Approx)

Figure 9: Mechanical dimensions scheme for HD67C73-B2

ORDERING INFORMATIONS:

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

HD67C73 – B 2

Connectors Type
2: Fixed Screw Terminal

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

Device Family
HD67C73: EnOcean / NMEA2000 - Converter

Order Code: **HD67C73-B2**   **-**   EnOcean / NMEA2000 – Converter

ACCESSORIES:

Order Code: **AC34011**   **-**   35mm Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V DC

Order Code: **AC34012**   **-**   35mm Rail DIN - Power Supply 220/240V AC 50/60Hz – 24 V DC

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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.