User Manual

Revision 1.000
English

EnOcean / MQTT - Converter

(Order Code: HD67C70-B2)

For Website information:
www.adfweb.com?Product=HD67C70-B2

For Price information:
www.adfweb.com?Price=HD67C70-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)

For others EnOcean products, see also the following links:

Converter EnOcean to

www.adfweb.com?Product=HD67C50	**(Serial)**
www.adfweb.com?Product=HD67C52	**(Modbus Slave)**
www.adfweb.com?Product=HD67C54	**(Modbus TCP Slave)**
www.adfweb.com?Product=HD67C56	**(BACnet Slave)**
www.adfweb.com?Product=HD67C57	**(CAN)**
www.adfweb.com?Product=HD67C58	**(CANopen)**
www.adfweb.com?Product=HD67C61	**(DeviceNet Slave)**
www.adfweb.com?Product=HD67C63	**(EtherNet/IP Slave)**
www.adfweb.com?Product=HD67C65	**(IEC61850 Server)**
www.adfweb.com?Product=HD67C66	**(J1939)**
www.adfweb.com?Product=HD67C67	**(KNX)**
www.adfweb.com?Product=HD67C72	**(NMEA 0183)**
www.adfweb.com?Product=HD67C73	**(NMEA 2000)**
www.adfweb.com?Product=HD67C75	**(PROFIBUS Slave)**
www.adfweb.com?Product=HD67C77	**(PROFINET Slave)**
www.adfweb.com?Product=HD67C79	**(SNMP Agent)**

Do you need to choose a device? Do you want help?
www.adfweb.com?Cmd=helpme

User Manual

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
1.000	05/12/2019	Ff	All	First release version

WARNING:

ADFweb.com reserves the right to change information in this manual about our product without warning.
ADFweb.com is not responsible for any error this manual may contain.

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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

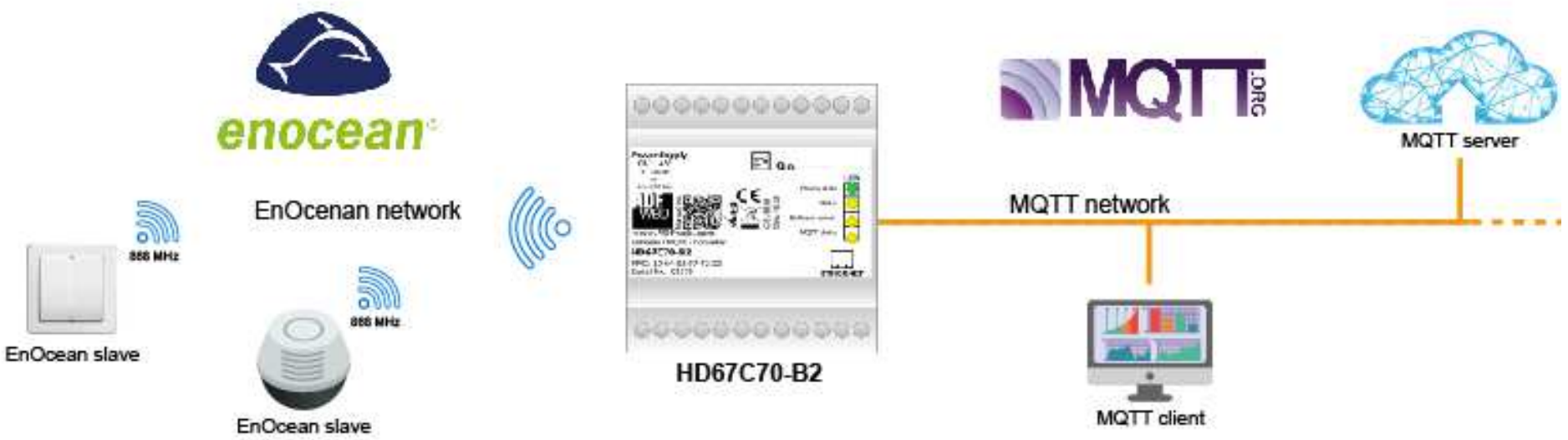
The device is state-of-the-art and is safe. The instruments can represent a potential hazard if they are inappropriately installed and operated by untrained personnel. These instructions refer to residual risks with the following symbol:

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 support@adfweb.com or give us a call if you need it.

EXAMPLE OF CONNECTION:



CONNECTION SCHEME:

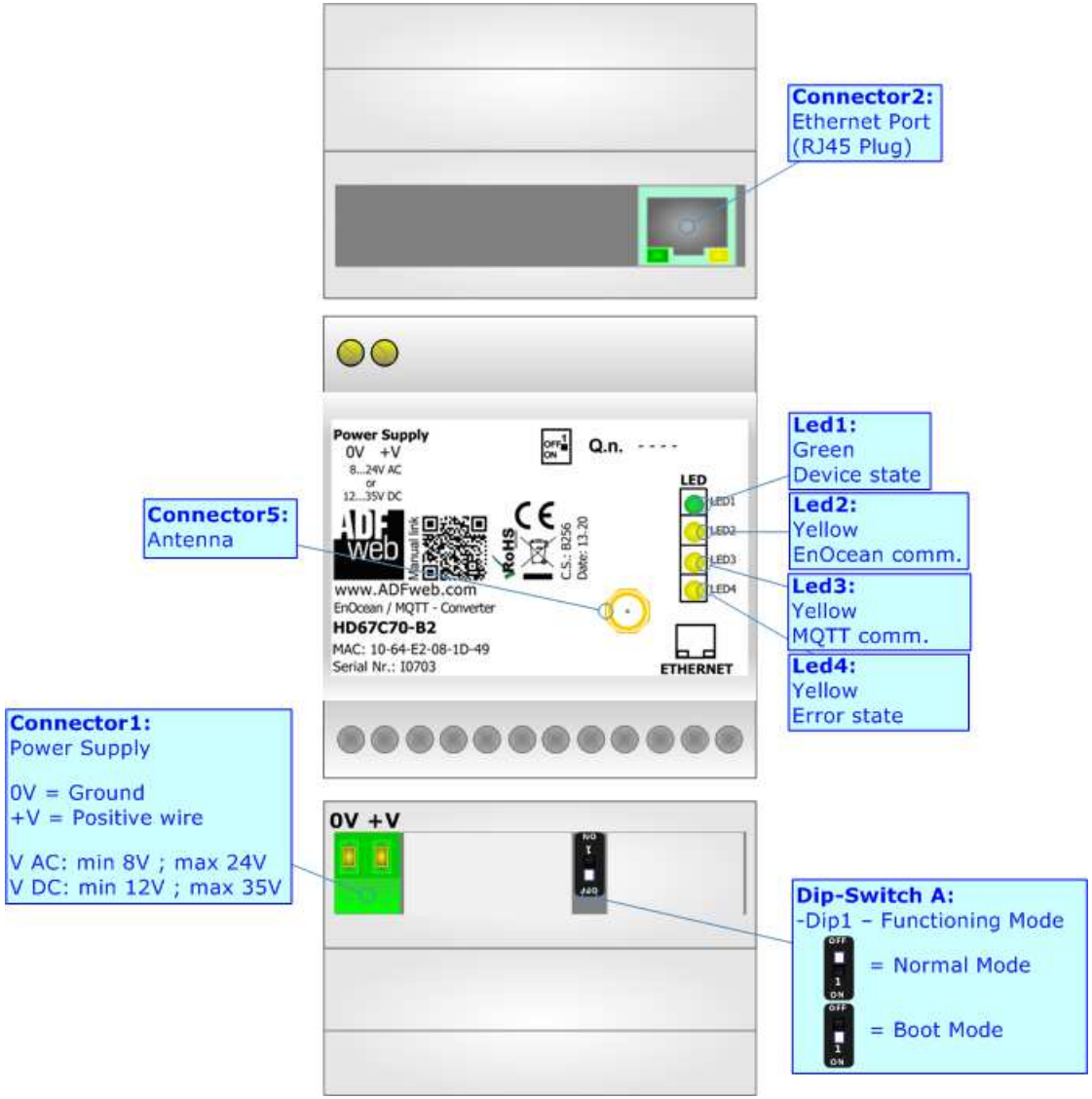


Figure 1: Connection scheme for HD67C70-B2

CHARACTERISTICS:

The HD67C70-B2 is a EnOcean / MQTT Converter.

It allows the following characteristics:

- Electrical isolation between Ethernet 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 SW67C70 software on your PC in order to perform the following:

- Define the parameter of MQTT;
- Define the parameter of EnOcean line;
- Define the list of MQTT topic to publish;
- Define the list of MQTT topic to subscribe;
- Update the device.

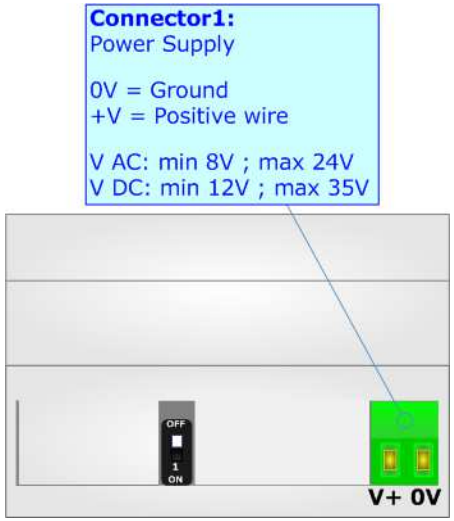
POWER SUPPLY:

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

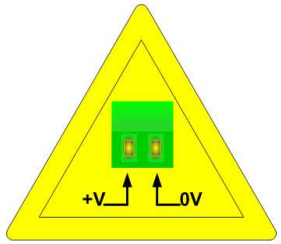
VAC ~		VDC ⎓	
Vmin	**Vmax**	**Vmin**	**Vmax**
8V	**24V**	**12V**	**35V**

Consumption at 24V DC:

Device	Consumption [W/VA]
HD67C70-B2	3.5



Caution: Not reverse the polarity power



HD67C70-B2

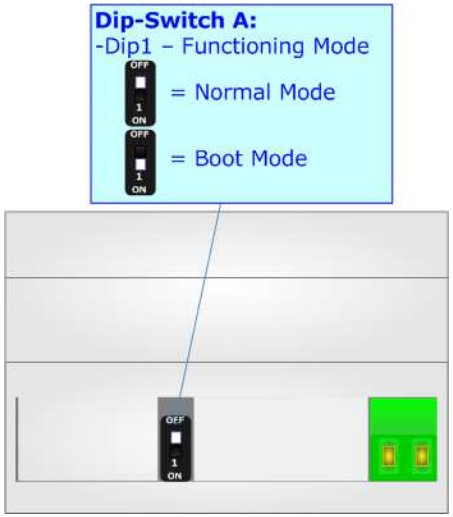
FUNCTION MODES:

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.

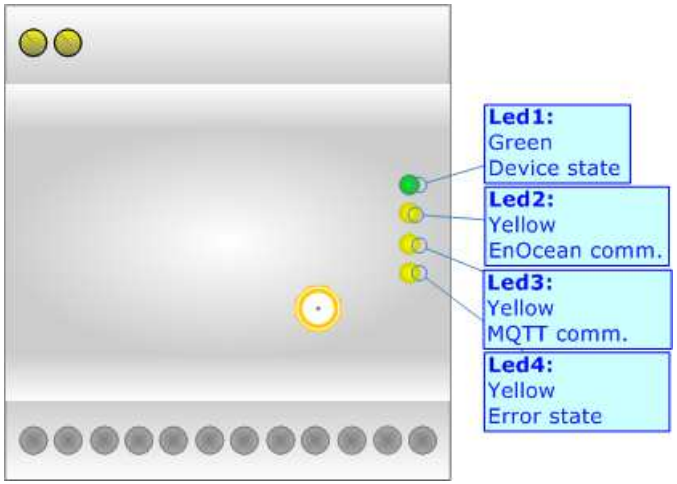
According to the functioning mode, the LEDs will have specifics functions, see 'LEDS' section.



LEDS:

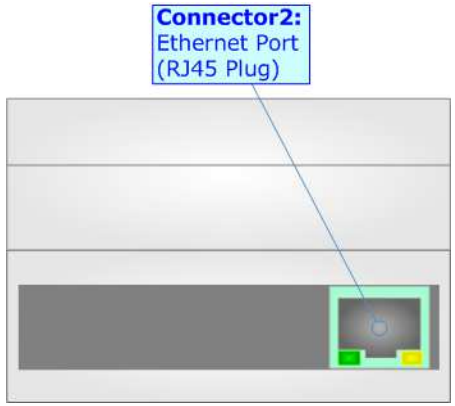
The device has got four LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

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: EnOcean communication (yellow)	Blinks when EnOcean data is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
3: MQTT communication (yellow)	Blinks when MQTT 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



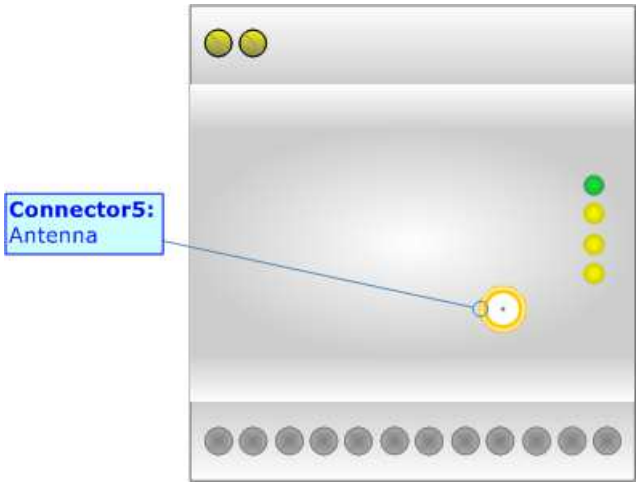
ETHERNET:

The Ethernet port is used for programming the device and for MQTT communication.
The Ethernet connection must be made using Connector2 of HD67C70-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.



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



USE OF COMPOSITOR SW67C70:

To configure the Converter, use the available software that runs with Windows called SW67C70. 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 SW67C70, the window below appears (Fig. 2).

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

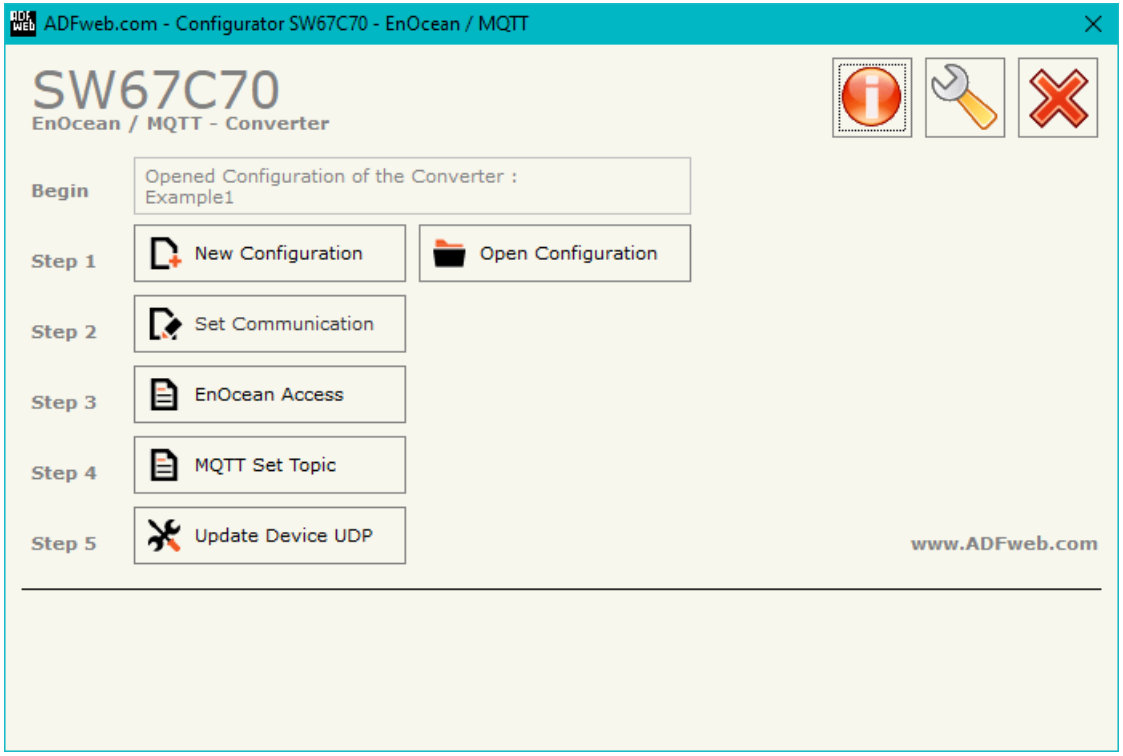
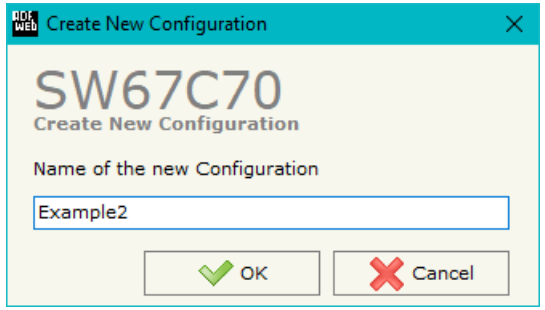


Figure 2: Main window for SW67C70

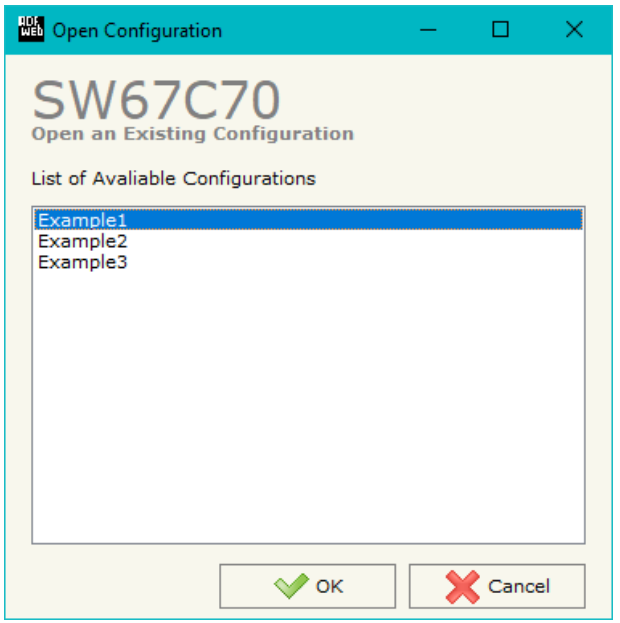
NEW CONFIGURATION / OPEN CONFIGURATION:

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



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

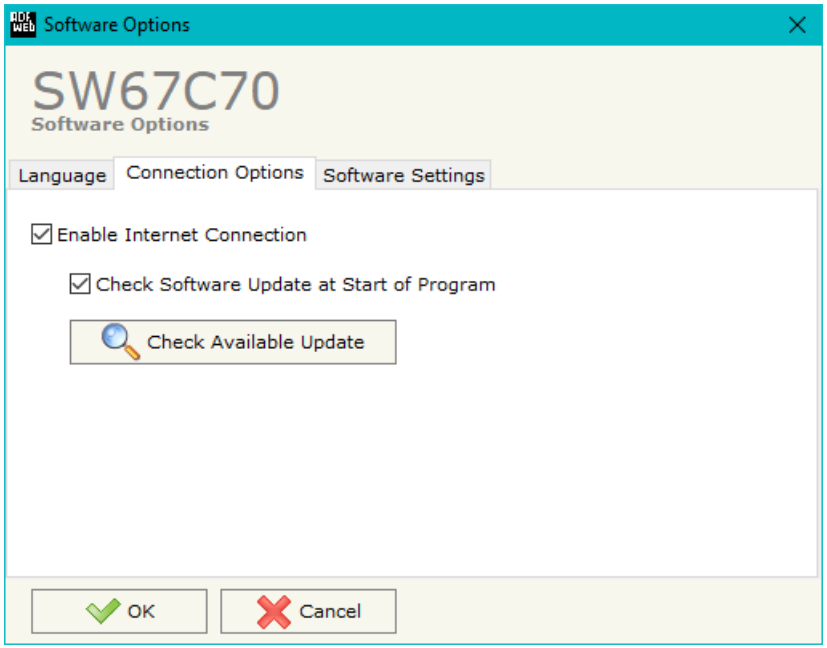
- To clone the configurations of a Programmable "EnOcean / MQTT - Converter" in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate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



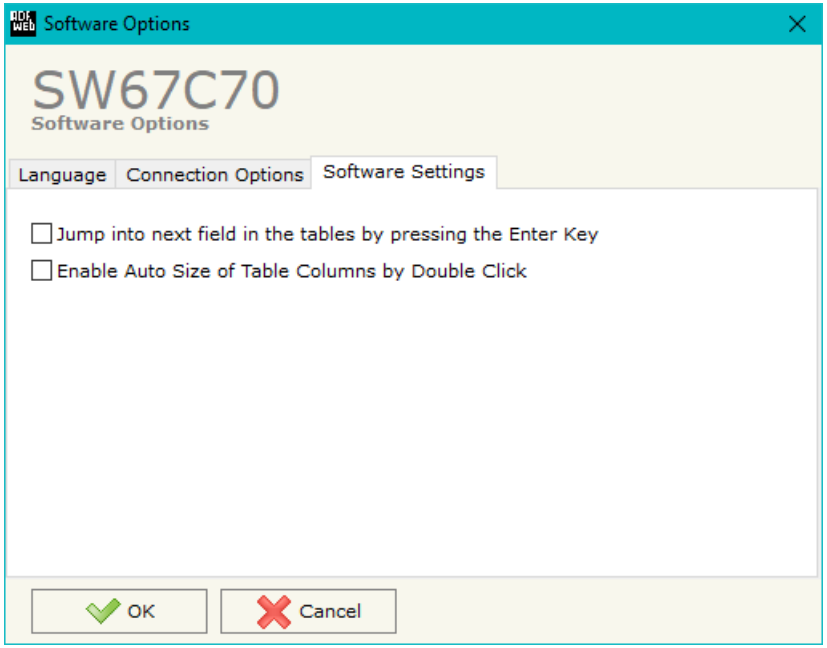
SOFTWARE OPTIONS:

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 SW67C70 check automatically if there are updatings when it is launched.



In the section "Software Settings", it is possible to enable/disable some keyboard's commands for an easier navigation inside the tables contained in the different sections of the software.

SET COMMUNICATION:

By Pressing the "**Set Communication**" button from the main window for SW67C70 (Fig. 2) the window "Set Communication" appears (Fig. 3).

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

- MQTT
- Ethernet
- TLS (Transport Layer Security)
- NTP (Network Time Protocol)

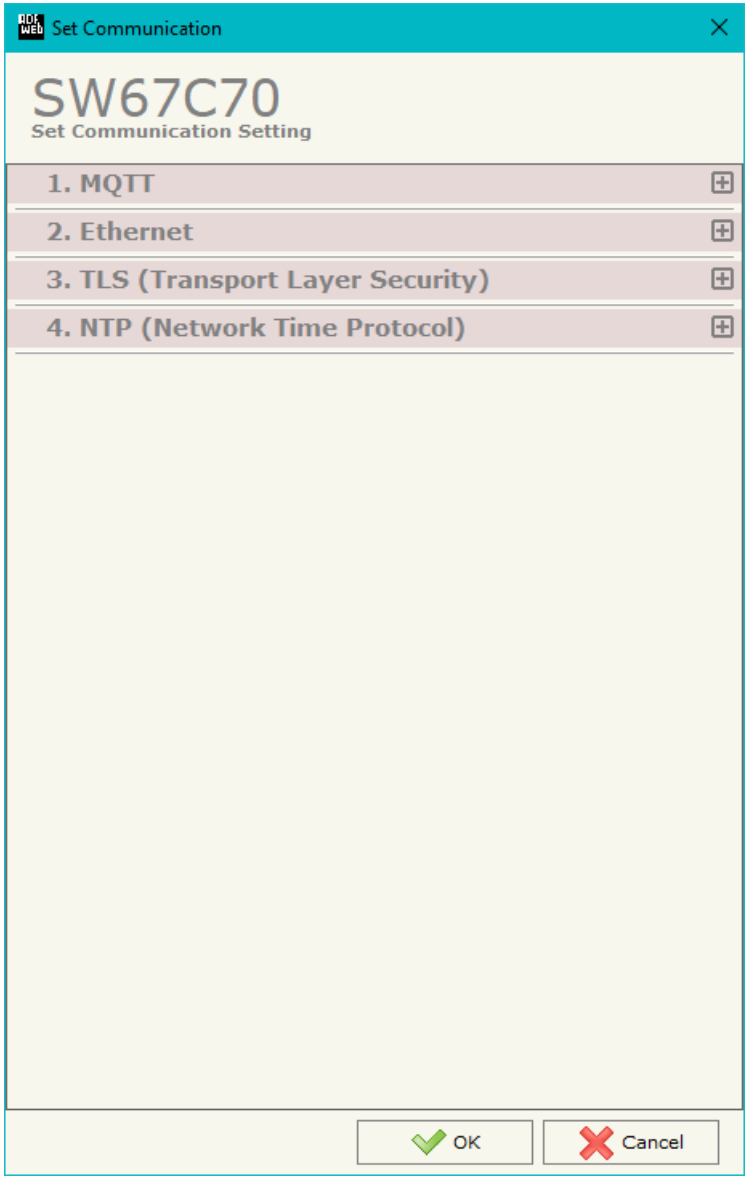


Figure 3a: "Set Communication" window

MQTT:

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

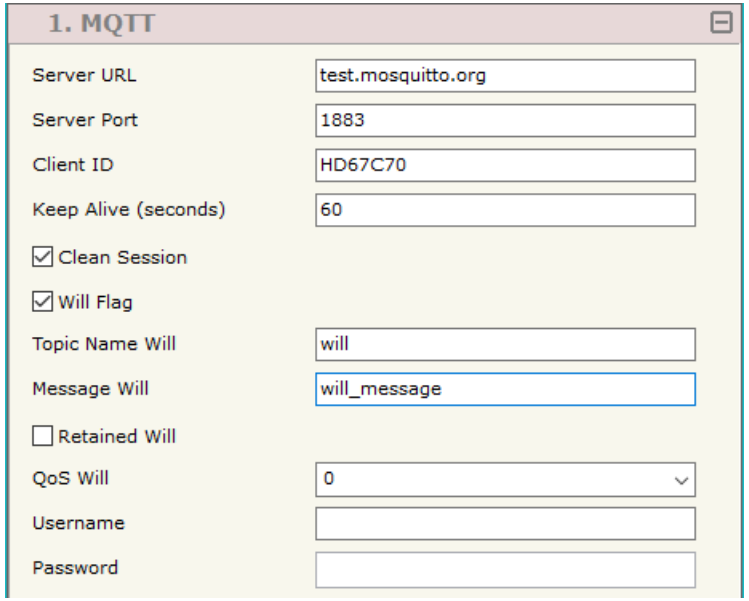


Figure 3b: "Set Communication → MQTT" window

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

ETHERNET:

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

- In the field "**Ip Address**" the IP address of the converter is defined;
- In the field "**SubNet Mask**" the Subnet Mask of the converter is defined;
- In the field "**Gateway**" the default gateway of the net is defined. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net;
- In the field "**DNS**" the DNS address is defined. This field is required if the server address is define by URL and not IP Address.

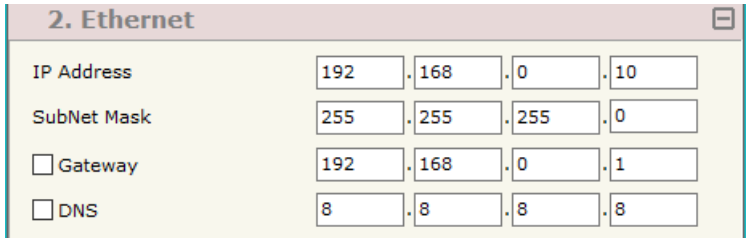


Figure 3c: "Set Communication → Ethernet" window

TLS (TRANSPORT LAYER SECURITY):

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

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

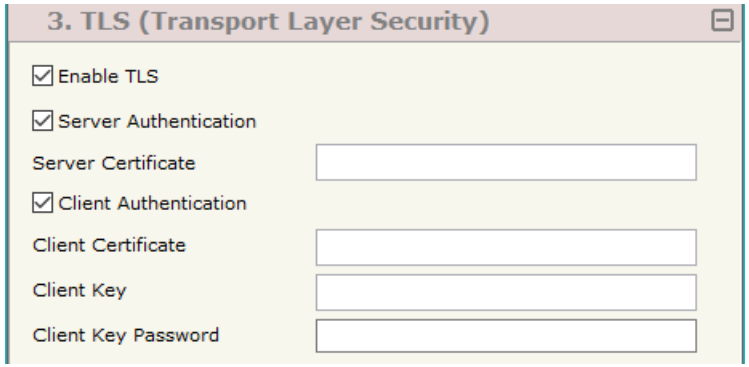


Figure 3d: "Set Communication → TLS" window

NTP (NETWORK TIME PROTOCOL):

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

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

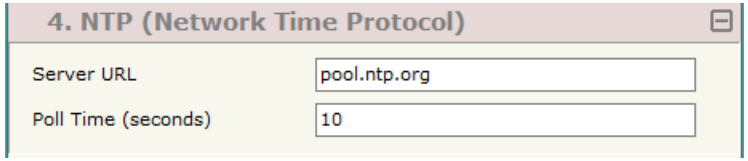


Figure 3e: "Set Communication → NTP" window

ENOCEAN ACCESS:

By Pressing the "**EnOcean Set Access**" button from the main window for SW67C70 (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.

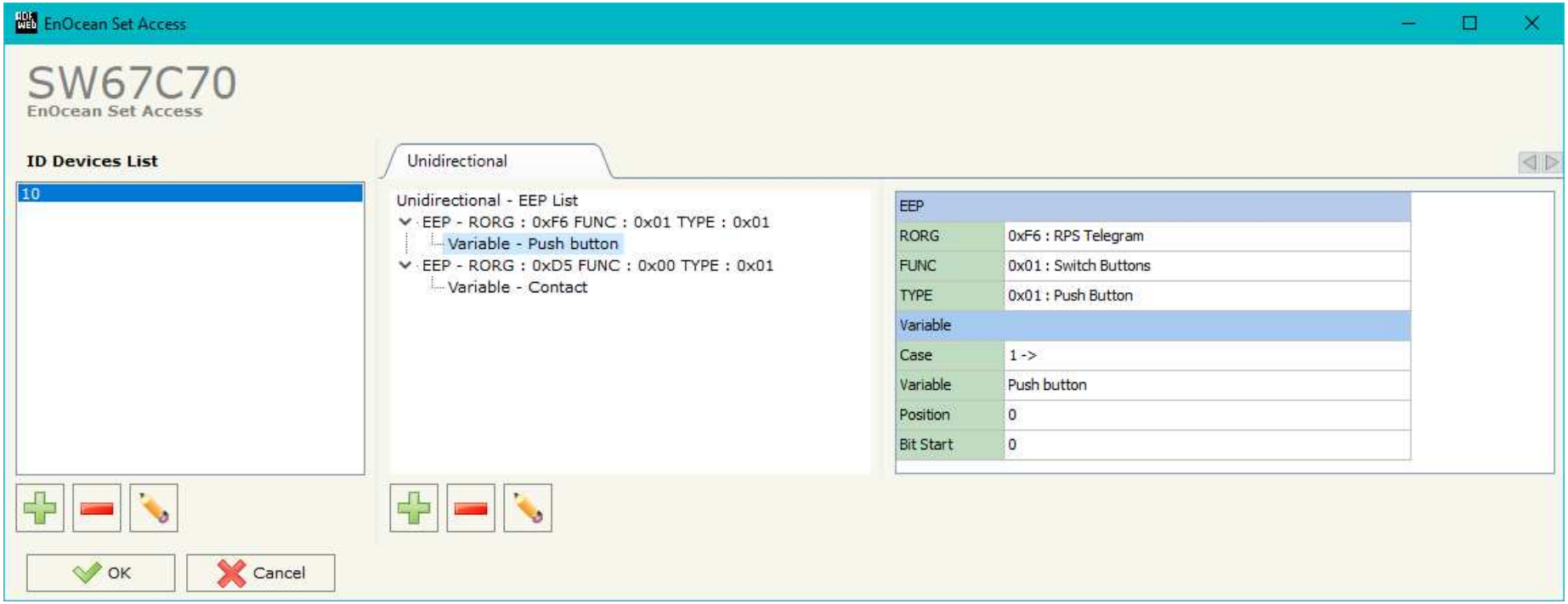


Figure 4: "EnOcean Access" window

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.

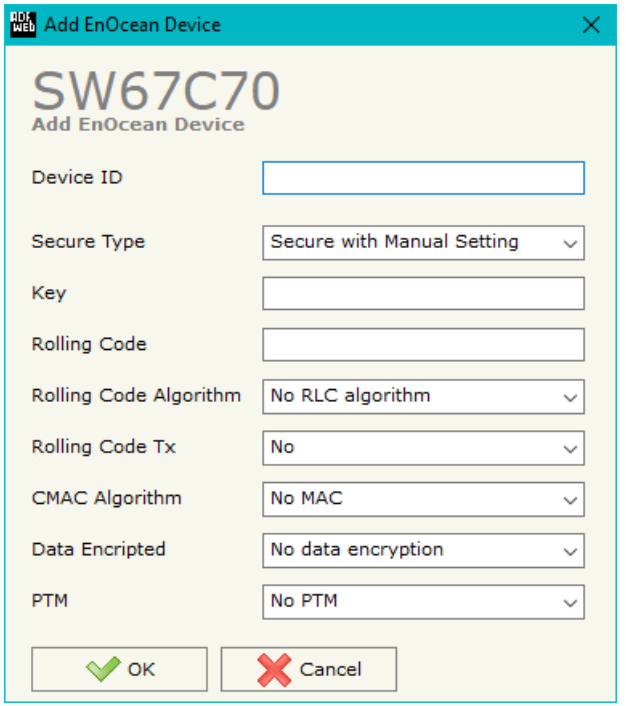


Figure 5: "Add/Modify EnOcean device" window

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.

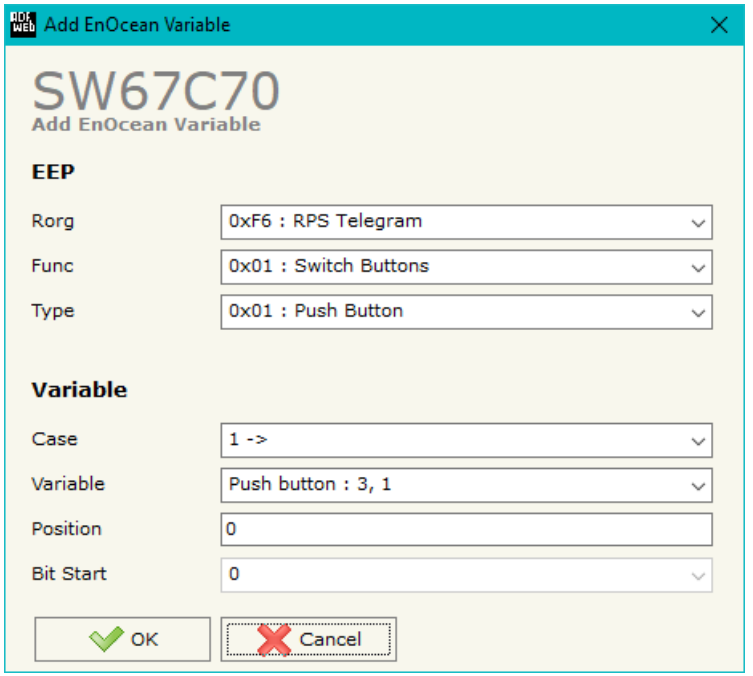


Figure 6: "Add/Modify EnOcean variable" window

MQTT SET TOPIC:

By Pressing the "**MQTT Set Topic**" button from the main window for SW67C70 (Fig. 2) the window "Set MQTT Topics" appears (Fig. 7). This section is used to define the MQTT topics where the converter will publish the data from EnOcean data and the topic that the converter will subscribes for writing the data to EnOcean data.

MQTT PUBLISH

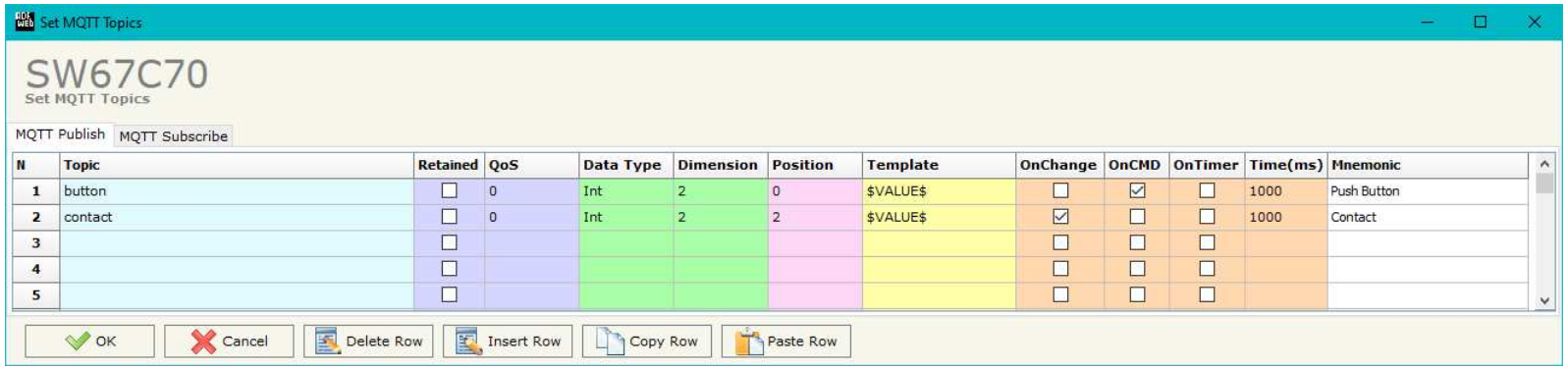


Figure 7a: "Set MQTT Topics → MQTT Publish" window

The means of the fields are:

- In the field "**Topic**" the MQTT topic is defined;
- If the field "**Retained**" is defined, the retained flag is enabled. The MQTT server will hold the last topic published;
- In the field "**QoS**" the QoS level is defined;
- In the field "**Data Type**" the type of data to use is defined;
- In the field "**Dimension**" the dimension in byte of the data is defined;
- In the field "**Position**" the starting byte of the internal memory array where taking the data is defined;
- In the field "**Template**" the structure of the MQTT payload is defined. With a double click on it, it is possible to open a window for editing it;
- If the field "**On Change**" is checked, the converter publishes the topic when the data from EnOcean is changed;
- If the field "**On CMD**" is checked, the converter publishes the topic when data from EnOcean is received;
- If the field "**On Timer**" is checked, the converter publishes the topic cyclically with the delay defined in the field "**Time (ms)**";
- In the field "**Mnemonic**" a description of the topic is defined.

MQTT SUBSCRIBE

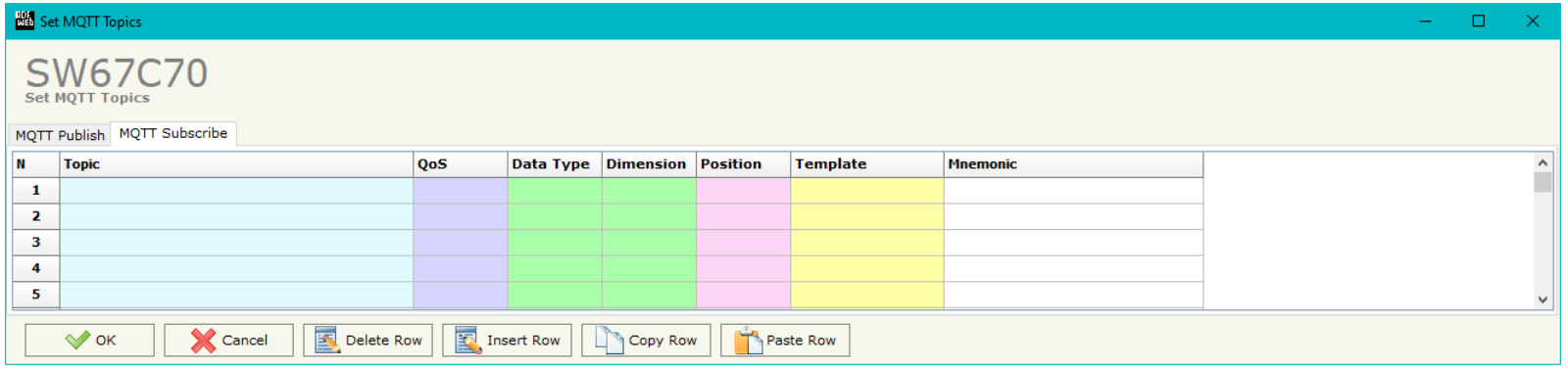


Figure 7b: "Set MQTT Topics → MQTT Subscribe" window

The means of the fields are:

- In the field "**Topic**" the MQTT topic is defined;
- If the field "**Retained**" is defined, the retained flag is enabled. The MQTT server will hold the last topic published;
- In the field "**QoS**" the QoS level is defined;
- In the field "**Data Type**" the type of data to use is defined;
- In the field "**Dimension**" the dimension in byte of the data is defined;
- In the field "**Position**" the starting byte of the internal memory array where placing the data is defined;
- In the field "**Template**" the structure of the MQTT payload is defined. With a double click on it, it is possible to open a window for editing it;
- In the field "**Mnemonic**" a description of the topic is 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.

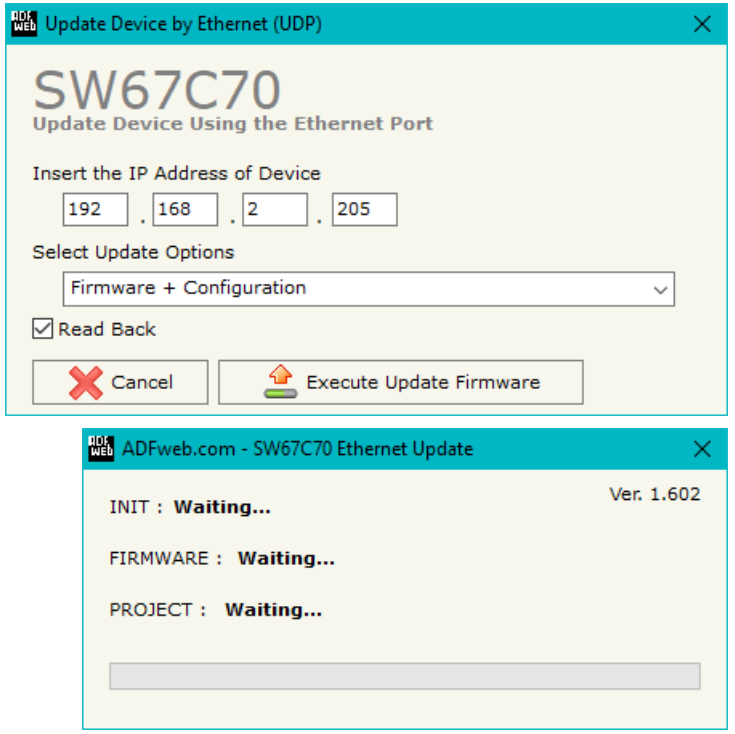


Figure 8: "Update device" windows

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.

Note:
When you receive the device, for the first time, you also have to update the Firmware in the HD67C70 device.

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

- Check if the serial COM port selected is the correct one;
- Check if the serial cable is connected between the PC and the device;
- Try to repeat the operations for the updating;
- Try with another PC;
- Try to restart the PC;
- Check the LAN settings;
- If you are using the program inside a Virtual Machine, try to use in the main Operating System;
- If you are using Windows Seven, Vista, 8 or 10 make sure that you have the administrator privileges;
- In case you have to program more than one device, using the "UDP Update", you have to cancel the ARP table every time you connect a new device on Ethernet. For do this you have to launch the "Command Prompt" and write the command "arp -d". Pay attention that with Windows Vista, Seven, 8, 10 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

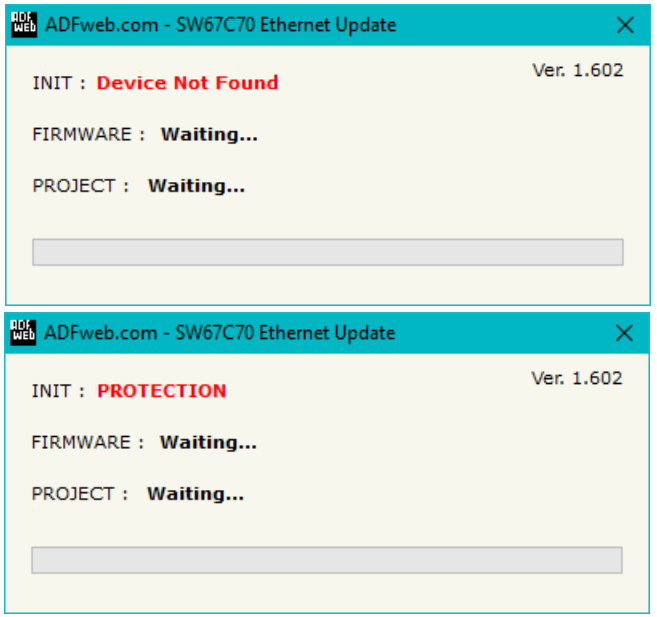


Figure 9: "Error" window

Warning:
In the case of HD67C70 you have to use the software "SW67C70": www.adfweb.com\download\filefold\SW67C70.zip.

TEMPLATE STRING: DEFINITION OF MQTT PAYLOAD

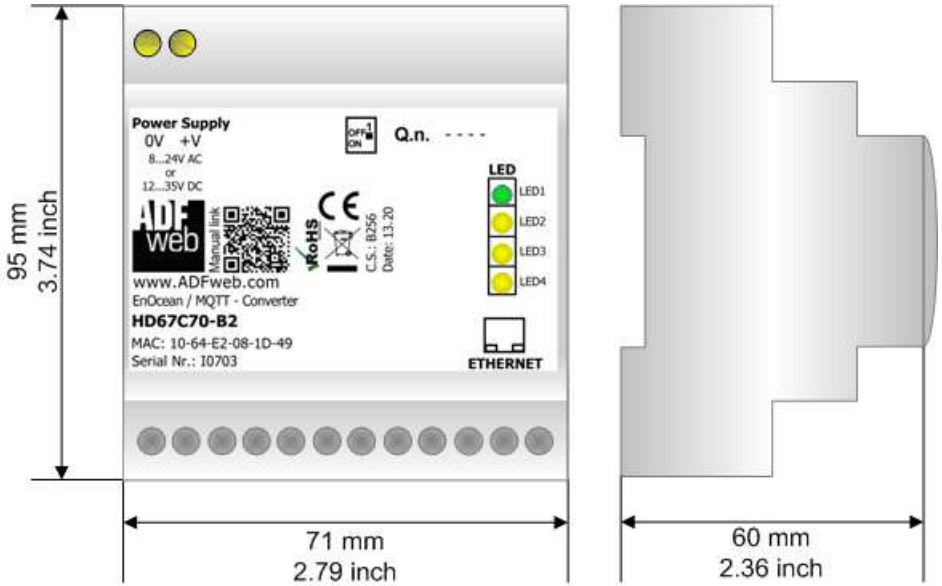
In the section "Set Communication" of the SW67C70, it is possible to define a Template string for the MQTT messages. The template is necessary in order to define the structure of the payload of the MQTT message and the info contained.
It is possible to have a simple text format or a JSON format.

The definition of the template can be done using Key words, used to link a specific information from EnOcean. The key words used and their meanings are:

- VALUE: value of the EnOcean variable
- TIME: date and time of the MQTT message
- DESC: description of the message

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

MECHANICAL DIMENSIONS:



Housing: PVC
Weight: 200g (Approx)

Figure 10: Mechanical dimensions scheme for HD67C70-B2

ORDERING INFORMATIONS:

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

HD67C70 – B 2

Connectors Type
2: Fixed Screw Terminal

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

Device Family
HD67C70: EnOcean / MQTT - Converter

Order Code: **HD67C70-B2** **-** EnOcean / MQTT – 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

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.

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