

# User Manual

Revision 1.100

English

## DALI / MQTT - Converter

(Order Code: HD67941-B2-Y, HD67941-B2-N)

For Website information:

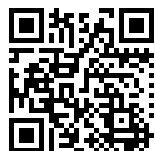
[www.adfweb.com?Product=HD67941-B2](http://www.adfweb.com?Product=HD67941-B2)

For Price information:

[www.adfweb.com?Price=HD67941-B2](http://www.adfweb.com?Price=HD67941-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)



User Manual

For others MQTT products, see also the following links:

#### Converter MQTT to

[www.adfweb.com?Product=HD67747](http://www.adfweb.com?Product=HD67747)  
[www.adfweb.com?Product=HD67774](http://www.adfweb.com?Product=HD67774)  
[www.adfweb.com?Product=HD67910](http://www.adfweb.com?Product=HD67910)  
[www.adfweb.com?Product=HD67930](http://www.adfweb.com?Product=HD67930)  
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[www.adfweb.com?Product=HD67B42](http://www.adfweb.com?Product=HD67B42)  
[www.adfweb.com?Product=HD67C70](http://www.adfweb.com?Product=HD67C70)

**(IEC61850 Server)**  
**(IEC61850 Client)**  
**(HART)**  
**(Ethernet)**  
**(M-Bus)**  
**(Serial)**  
**(Modbus Master)**  
**(Modbus Slave)**  
**(Modbus TCP Master)**  
**(Modbus TCP Slave)**  
**(BACnet Master)**  
**(BACnet Slave)**  
**(CAN)**  
**(CANopen)**  
**(DeviceNet Master)**  
**(DeviceNet Slave)**  
**(DMX)**  
**(EtherNet/IP Slave)**  
**(J1939)**  
**(KNX)**  
**(NMEA 0183)**  
**(NMEA 2000)**  
**(PROFIBUS Master)**  
**(PROFIBUS Slave)**  
**(PROFINET)**  
**(SNMP Manager)**  
**(SNMP Agent)**  
**(EtherNet/IP Master)**  
**(OPC UA Client)**  
**(OPC UA Server)**  
**(EnOcean)**

Do you have an your customer protocol?

[www.adfweb.com?Product=HD67003](http://www.adfweb.com?Product=HD67003)

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

[www.adfweb.com?Cmd=helpme](http://www.adfweb.com?Cmd=helpme)

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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/](http://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    | 05/12/2017 | Ff     | All     | First release version |
| 1.100    | 10/05/2020 | Ff     | All     | Added DALI 2 tables   |
|          |            |        |         |                       |
|          |            |        |         |                       |

**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.

**TRADEMARKS:**

All trademarks mentioned in this document belong to their respective owners.

**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:

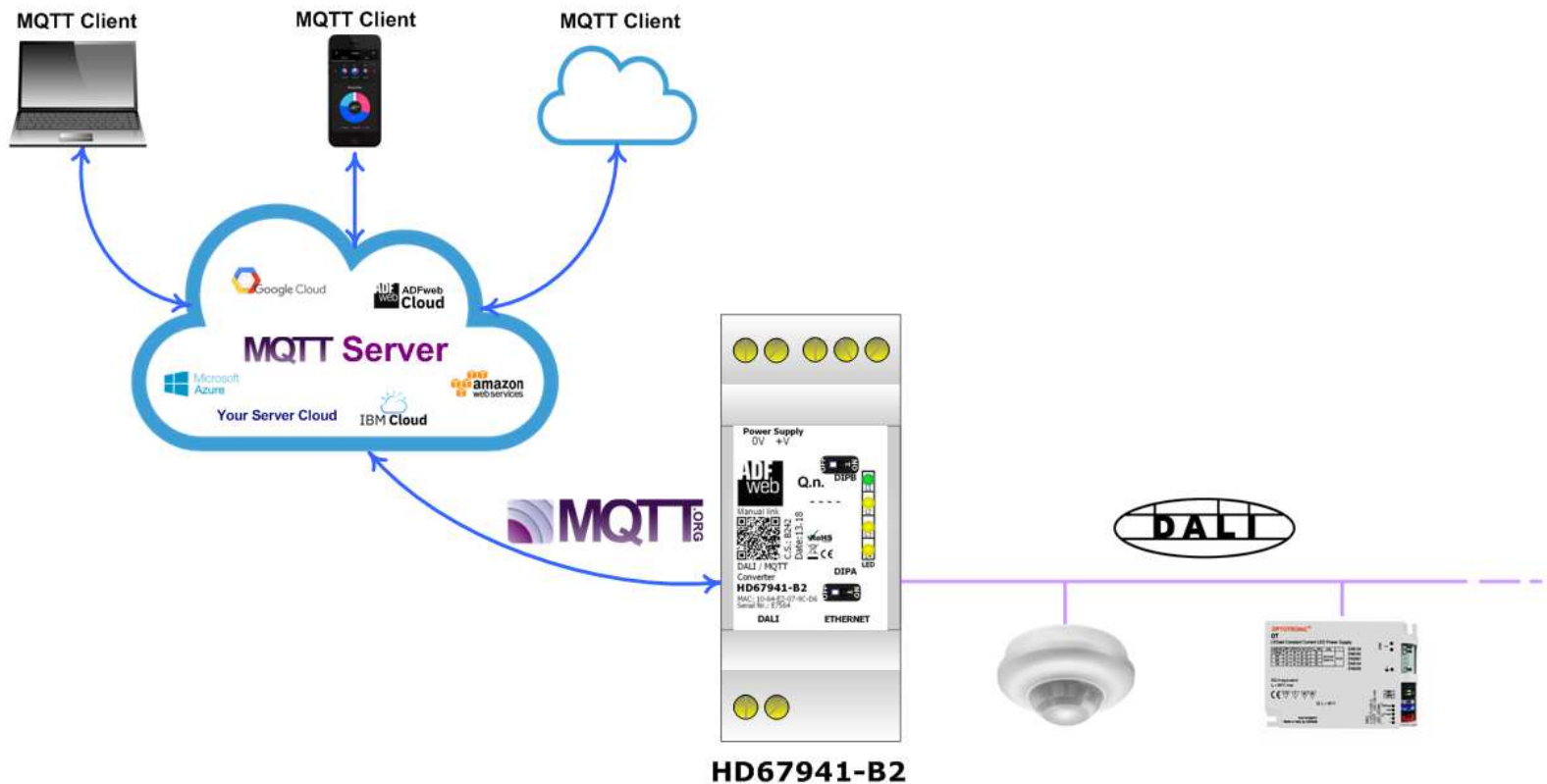


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

**CE CONFORMITY**

The declaration is made by our company. You can send an email to [support@adfweb.com](mailto:support@adfweb.com) or give us a call if you need it.

**EXAMPLE OF CONNECTION:**



**ADFweb** ADFweb.com  
 tel. +39 - 0438.30.91.31  
 www.adfweb.com  
 info@adfweb.com



**CHARACTERISTICS:**

The HD67941-B2 is a DALI / MQTT Converter.

It allows the following characteristics:

- Electrical isolation between Ethernet and DALI;
- 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 SW67941 software on your PC in order to perform the following:

- Define the parameter of MQTT;
- Define the parameter of DALI line;
- Define the MQTT topics to be published/subscribed in the MQTT Server;
- Define the list of DALI nodes connected;
- Update the device.

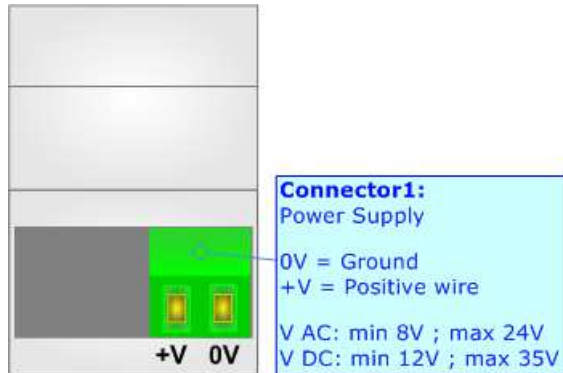
**POWER SUPPLY:**

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

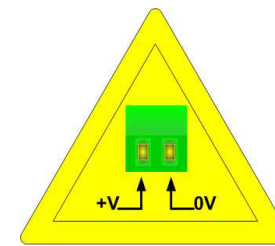
| VAC  |      | VDC  |      |
|---|------|---|------|
| Vmin  | Vmax | Vmin  | Vmax |
| 8V  | 24V  | 12V   | 35V  |

Consumption at 24V DC:

| Device     | Consumption [W/VA] |
|------------|--------------------|
| HD67941-B2 | 3.5                |



**Caution: Not reverse the polarity power**



HD67941-B2

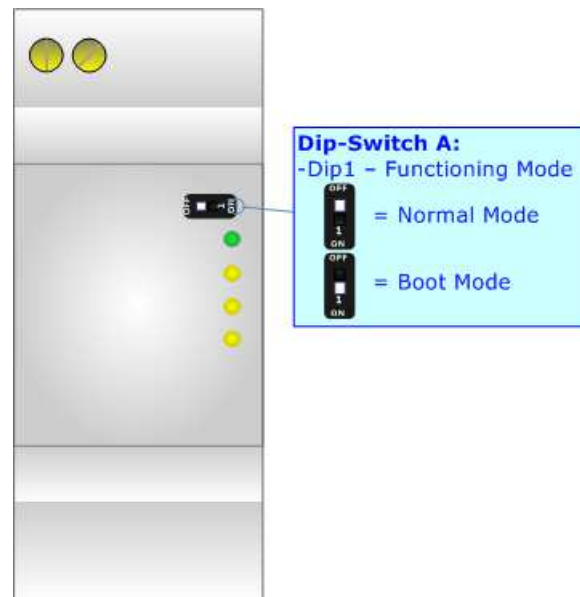
**FUNCTION MODES:**

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.

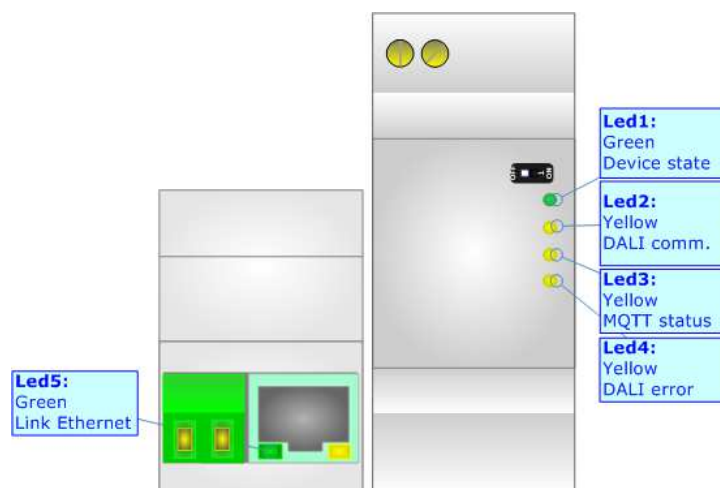




**LEDS:**

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

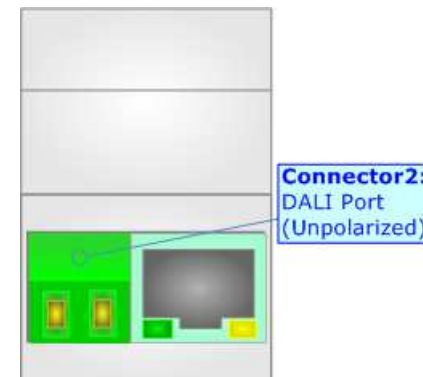
| LED                            | Normal Mode  | Boot Mode   |
|--------------------------------|--|---|
| 1: Device State (green)        | Blinks slowly (~1Hz)   | <b>Blinks quickly:</b> Boot state<br><b>Blinks very slowly (~0.5Hz):</b> update in progress |
| 2: DALI communication (yellow) | Blinks when DALI communication is running  | <b>Blinks quickly:</b> Boot state<br><b>Blinks very slowly (~0.5Hz):</b> update in progress |
| 3: MQTT status (yellow)        | <b>ON:</b> MQTT not connected<br><b>OFF:</b> MQTT connected<br><b>Blinking:</b> MQTT communication | <b>Blinks quickly:</b> Boot state<br><b>Blinks very slowly (~0.5Hz):</b> update in progress |
| 4: DALI error (yellow)         | <b>ON:</b> at least one DALI node is not answering<br><b>OFF:</b> no errors                        | <b>Blinks quickly:</b> Boot state<br><b>Blinks very slowly (~0.5Hz):</b> update in progress |
| 5: Ethernet Link (green)       | <b>ON:</b> Ethernet cable connected<br><b>OFF:</b> Ethernet cable disconnected                     | <b>ON:</b> Ethernet cable connected<br><b>OFF:</b> Ethernet cable disconnected              |



## DALI

DALI stands for “Digital Adressable Lighting Interface” and it is an interface protocol for digital communication between electronic lighting equipment (electronic ballasts, transformers, etc.).

With the right choice of individual DALI components an extremely wide range of requirements can be met, from operating the lighting system from a simple light switch to lighting management systems for entire office complexes with thousands of light sources. Using ADFweb.com’s DALI converters, any light source, including incandescent lamps, fluorescent lamps, high-intensity discharge lamps and even LEDs, can be controlled irrespective of whether they are installed in an office, a restaurant or a street light.

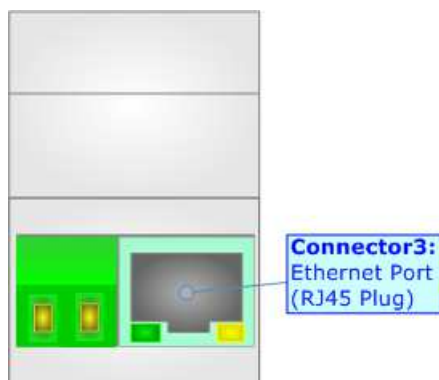


| Characteristics                | Description                      |
|--------------------------------|----------------------------------|
| Medium                         | Shielded Twisted Pair            |
| Topology                       | Linear, Star or mixed            |
| Device power consumption       | Max 250 mA                       |
| DALI voltage                   | 9.5 V – 22.5 V (typical 16 V)    |
| Maximum cable length           | 300 m (1.5 mm <sup>2</sup> wire) |
| Maximum number of DALI devices | 64                               |
| Baud rate                      | 1200 bps                         |
| Maximum number of DALI groups  | 16                               |
| Maximum number of DALI scenes  | 16                               |

**ETHERNET:**

The Ethernet port is used for programming the device and for MQTT communication.

The Ethernet connection must be made using Connector2 of HD67941-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.



**USE OF COMPOSITOR SW67941:**

To configure the Converter, use the available software that runs with Windows called SW67941. It is downloadable on the site [www.adfweb.com](http://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 SW67941, the window below appears (Fig. 2).

**Note:**

It is necessary to have installed .Net Framework 4.

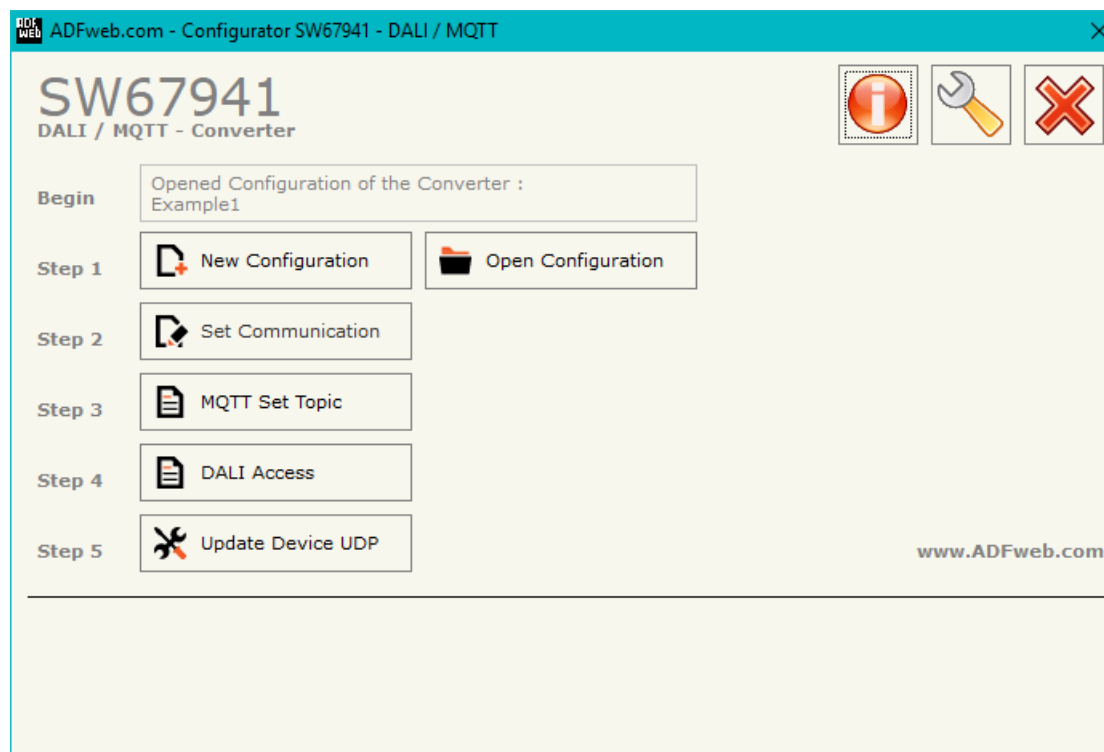
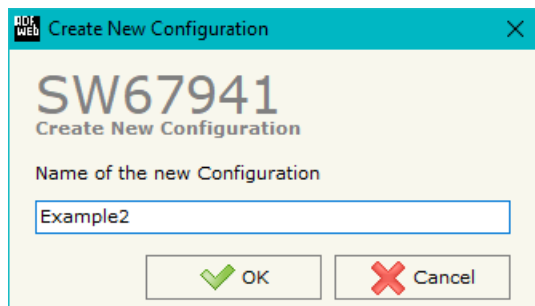


Figure 2: Main window for SW67941

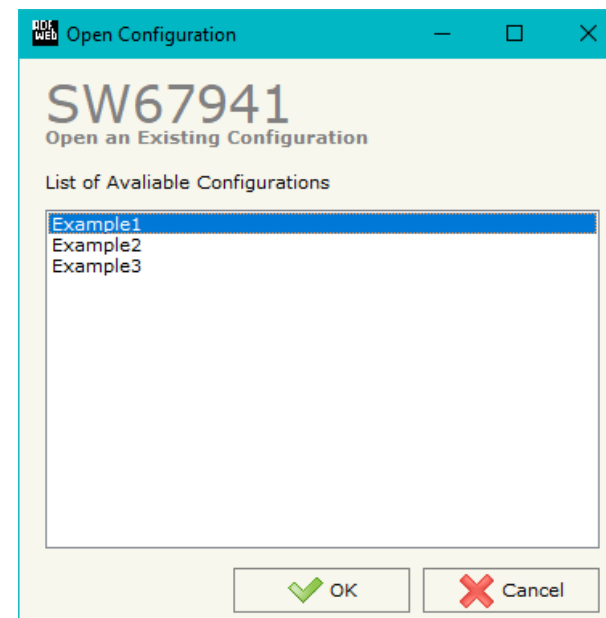
**NEW CONFIGURATION / OPEN CONFIGURATION:**

The “**New Configuration**” button creates the folder which contains the entire device’s configuration.




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

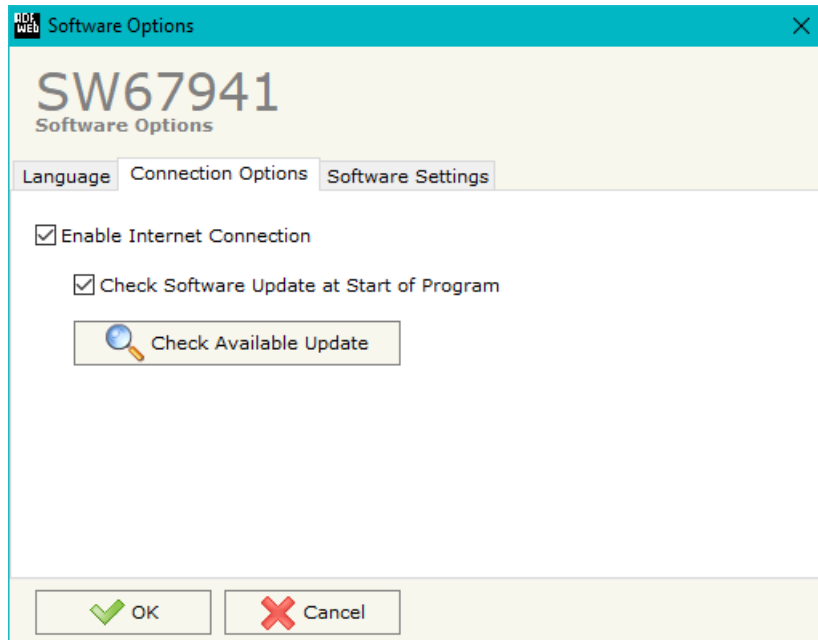
- To clone the configurations of a Programmable “DALI / MQTT - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the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



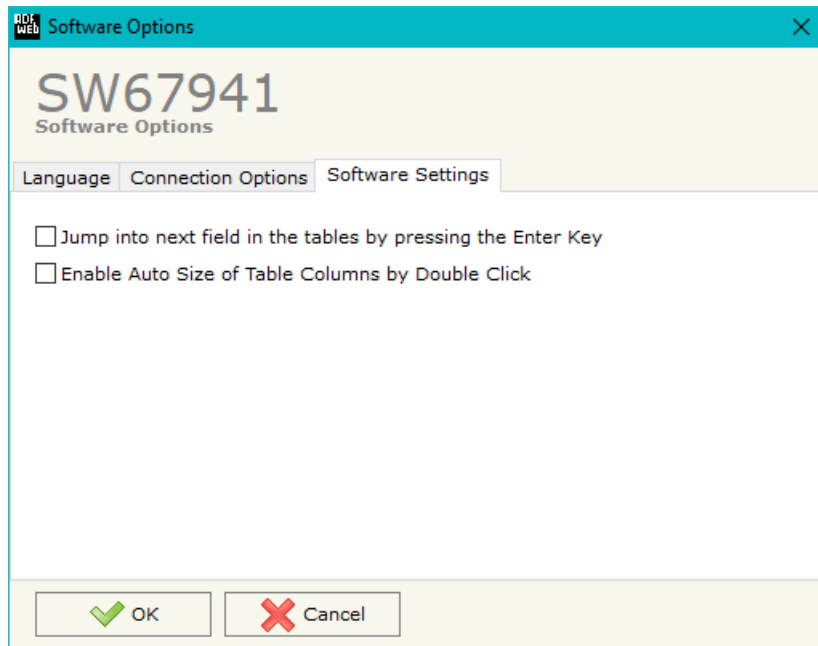
**SOFTWARE OPTIONS:**

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 SW67941 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 SW67941 (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:

- ➔ DALI
- ➔ MQTT
- ➔ Ethernet
- ➔ Wi-Fi
- ➔ TLS (Transport Layer Security)
- ➔ NTP (Network Time Protocol)

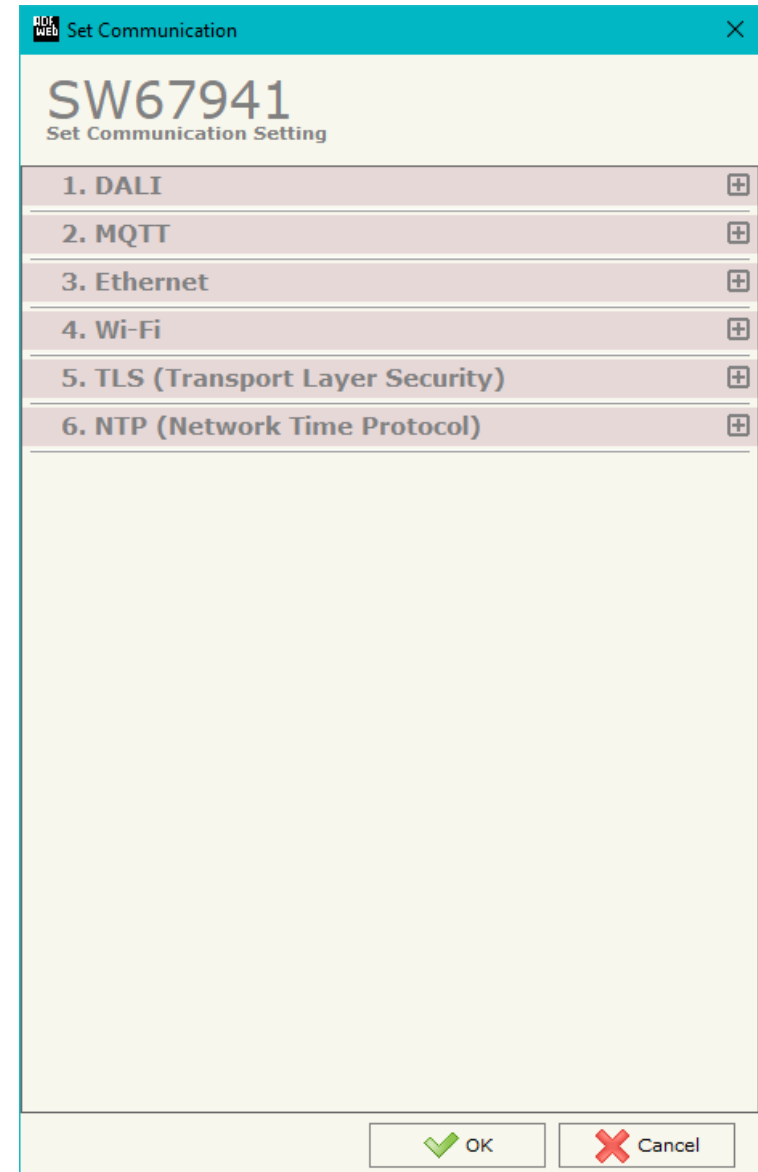


Figure 3a: "Set Communication" window



## **DALI:**

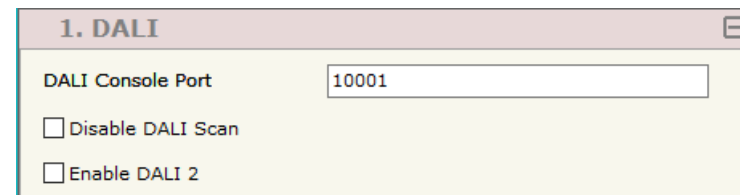
This section is used to define the main parameters of DALI line. The means of the fields are:

- In the field "**DALI Console Port**" the Ethernet port used for the communication with "DALI Console" software is defined;
- If the field "**Disable DALI Scan**" is checked, the automatic scan of DALI network is disabled;
- If the field "**Enable DALI 2**" is checked, DALI 2 protocol is enabled.

## **MQTT:**

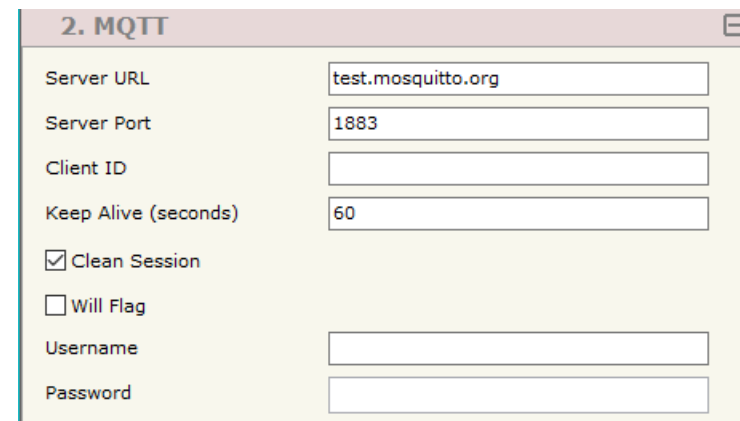
This section is used to define the main parameters of MQTT line. The means of the fields are:

- 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;



|  |       |
|--|-------|
| <b>1. DALI</b>                             |       |
| DALI Console Port                          | 10001 |
| <input type="checkbox"/> Disable DALI Scan |       |
| <input type="checkbox"/> Enable DALI 2     |       |

Figure 3b: "Set Communication → DALI" window



|   |                    |
|---|--------------------|
| <b>2. MQTT</b>                                    |                    |
| Server URL  | test.mosquitto.org |
| Server Port                                       | 1883               |
| Client ID   |                    |
| Keep Alive (seconds)                              | 60                 |
| <input checked="" type="checkbox"/> Clean Session |                    |
| <input type="checkbox"/> Will Flag                |                    |
| Username  |                    |
| Password  |                    |

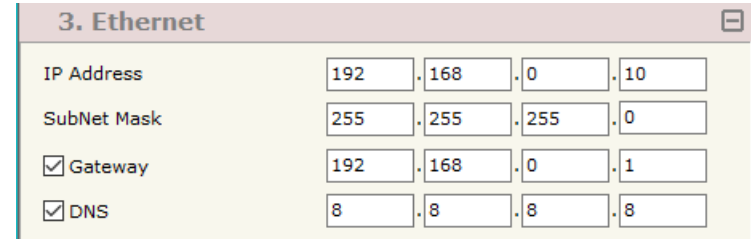
Figure 3c: "Set Communication → MQTT" window

- 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.



The screenshot shows a configuration window titled "3. Ethernet". It contains four rows of input fields:

| Field                                       | Value 1 | Value 2 | Value 3 | Value 4 |
|---|---------|---------|---------|---------|
| IP Address                                  | 192     | 168     | 0       | 10      |
| SubNet Mask                                 | 255     | 255     | 255     | 0       |
| <input checked="" type="checkbox"/> Gateway | 192     | 168     | 0       | 1       |
| <input checked="" type="checkbox"/> DNS     | 8       | 8       | 8       | 8       |

Figure 3d: "Set Communication → Ethernet" window

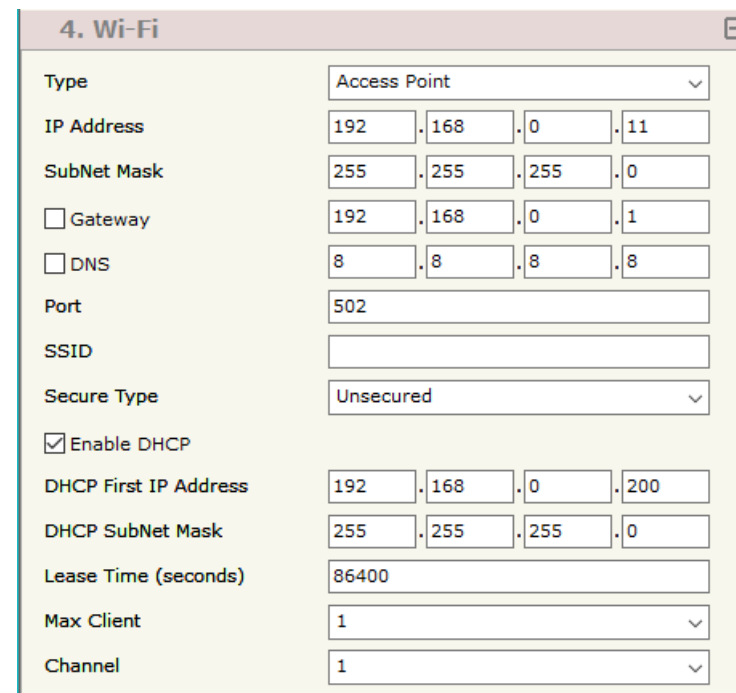
### **Wi-Fi:**

This section is used to define the general parameters of Wi-Fi. It is possible to defined the type of Wi-Fi communication:

- Access Point;
- Client.

The means of the fields for Access Point configuration 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.
- In the field "**Port**" the port used for MQTT communication is defined;
- In the field "**SSID**" the name of the Wi-Fi network to create is defined;
- In the field "**Password**" the password used for Wi-Fi connection is defined;
- In the field "**Type**" the type of security protocol used by the Wi-Fi network is defined;
- If the field "**Enable DHCP**" is checked, the converter acts as DHCP Server for the Clients connected. If the option is enabled, in the fields "**DHCP First IP Address**" and "**DHCP SUBNET Mask**" the IP Addresses range used for DHCP is defined. In the field "**Lease Time (seconds)**" the required time for the renewing of the IP Address assigned to the Client is defined;
- In the field "**Max Client**" the maximum number of Wi-Fi Clients accepted is defined;
- In the field "**Channel**" the channel for Wi-Fi communication is defined.



|   |                     |
|---|---------------------|
| Type  | Access Point        |
| IP Address                                      | 192 . 168 . 0 . 11  |
| SubNet Mask                                     | 255 . 255 . 255 . 0 |
| <input type="checkbox"/> Gateway                | 192 . 168 . 0 . 1   |
| <input type="checkbox"/> DNS                    | 8 . 8 . 8 . 8       |
| Port  | 502                 |
| SSID  |                     |
| Secure Type                                     | Unsecured           |
| <input checked="" type="checkbox"/> Enable DHCP |                     |
| DHCP First IP Address                           | 192 . 168 . 0 . 200 |
| DHCP SubNet Mask                                | 255 . 255 . 255 . 0 |
| Lease Time (seconds)                            | 86400               |
| Max Client                                      | 1                   |
| Channel   | 1                   |

Figure 3e: "Set Communication → Wi-Fi" window

The means of the fields for Client configuration are:

- If the field "**Obtain an IP Address automatically**" is checked, the converter gets the IP Address using DHCP. Otherwise, the IP Address is defined as static;
- 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.
- In the field "**Port**" the port used for MQTT communication is defined;
- In the field "**SSID**" the name of the Wi-Fi network to connect is defined;
- In the field "**Password**" the password used to connect to the Wi-Fi network is defined.

|   |                     |
|---|---------------------|
| Type  | Client Mode         |
| <input type="checkbox"/> Obtain an IP Address automatically |                     |
| IP Address  | 192 . 168 . 0 . 11  |
| SubNet Mask   | 255 . 255 . 255 . 0 |
| <input type="checkbox"/> Gateway                            | 192 . 168 . 0 . 1   |
| <input type="checkbox"/> DNS                                | 8 . 8 . 8 . 8       |
| Port  | 502                 |
| SSID  |                     |
| Password  |                     |

Figure 3f: "Set Communication → Wi-Fi" 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.

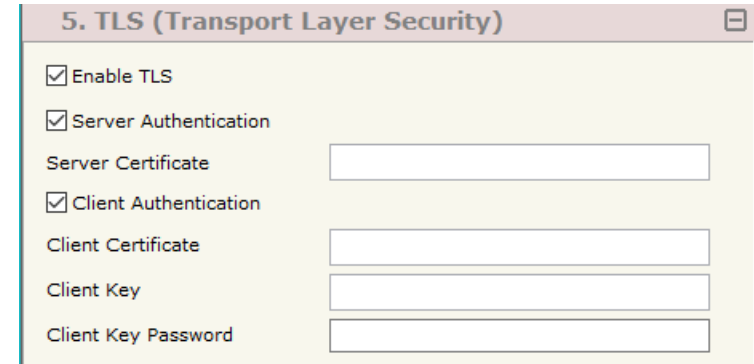


Figure 3g: “Set Communication → TLS” window

**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 3h: “Set Communication → NTP” window

### MQTT SET TOPIC:

By Pressing the **"MQTT Set Topic"** button from the main window for SW67941 (Fig. 2) the window "Set MQTT Topics" appears (Fig. 4). This section is used to define the MQTT topics where the converter will publish the data read from DALI and the topic that the converter will subscribes for writing the data to DALI.

### MQTT PUBLISH

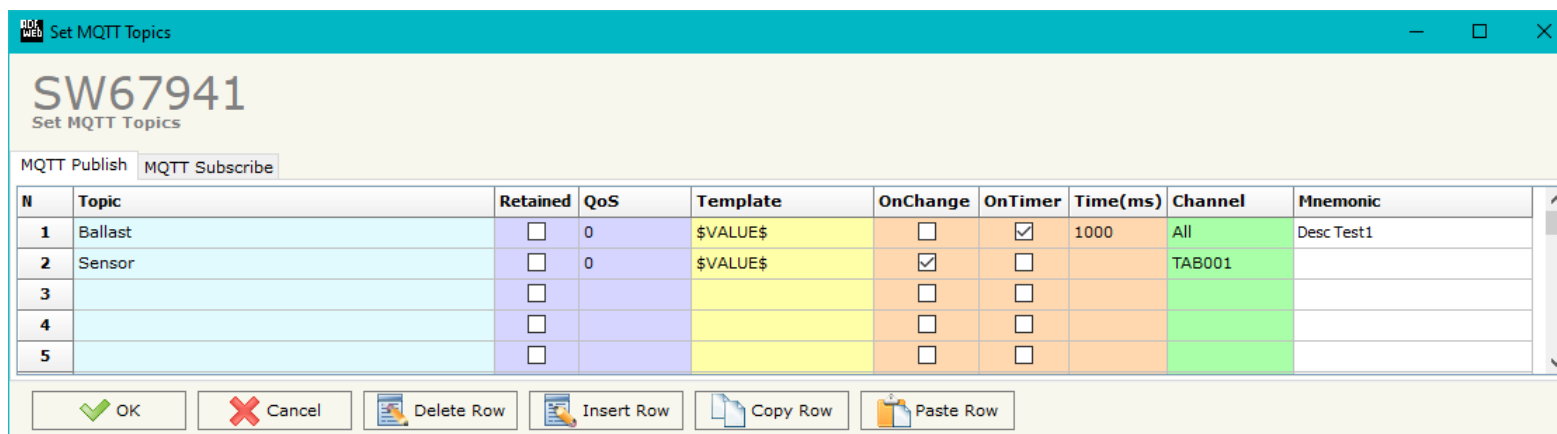


Figure 4a: "Set MQTT Topics → MQTT Publish" window

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 **"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 MQTT are changed;
- If the field **"On CMD"** is checked, the converter publishes the topic when a new response from MQTT 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 **"Channel"** it is possible to link the DALI ballast/sensor/group to the MQTT topic. If selected 'All', all the ballast are linked to the same topic. In order to link the sensors, it is possible to indicate the 'TABXXX' to select the line of the "Set Access" table;
- In the field **"Mnemonic"** a description of the topic is defined.

**MQTT SUBSCRIBE**

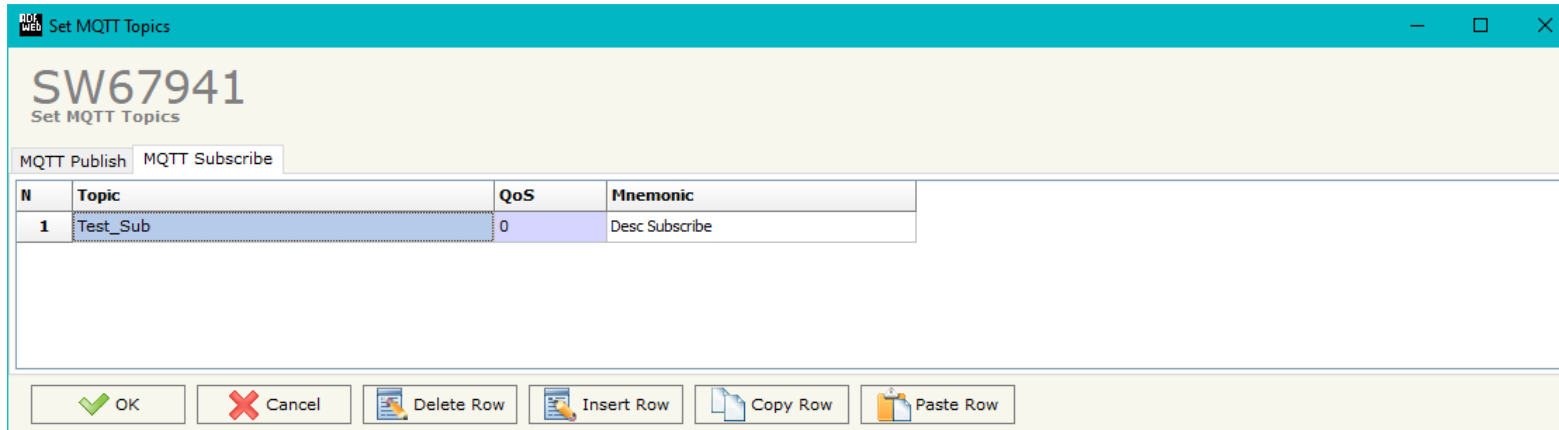


Figure 4b: "Set MQTT Topics → MQTT Subscribe" window

The means of the fields are:

- In the field "**Topic**" the MQTT topic is defined;
- In the field "**QoS**" the QoS level is defined;
- In the field "**Mnemonic**" a description of the topic is defined.

**DALI ACCESS:**

By pressing the “**DALI Access**” button from the main window for SW67941 (Fig. 2) the window “Select the DALI Device Present in the Network” appears (Fig. 5).

This section is composed by three tables used to define the list of DALI devices to control, the DALI sensors to read and the DALI router’s functions.

**SELECT DEVICE**

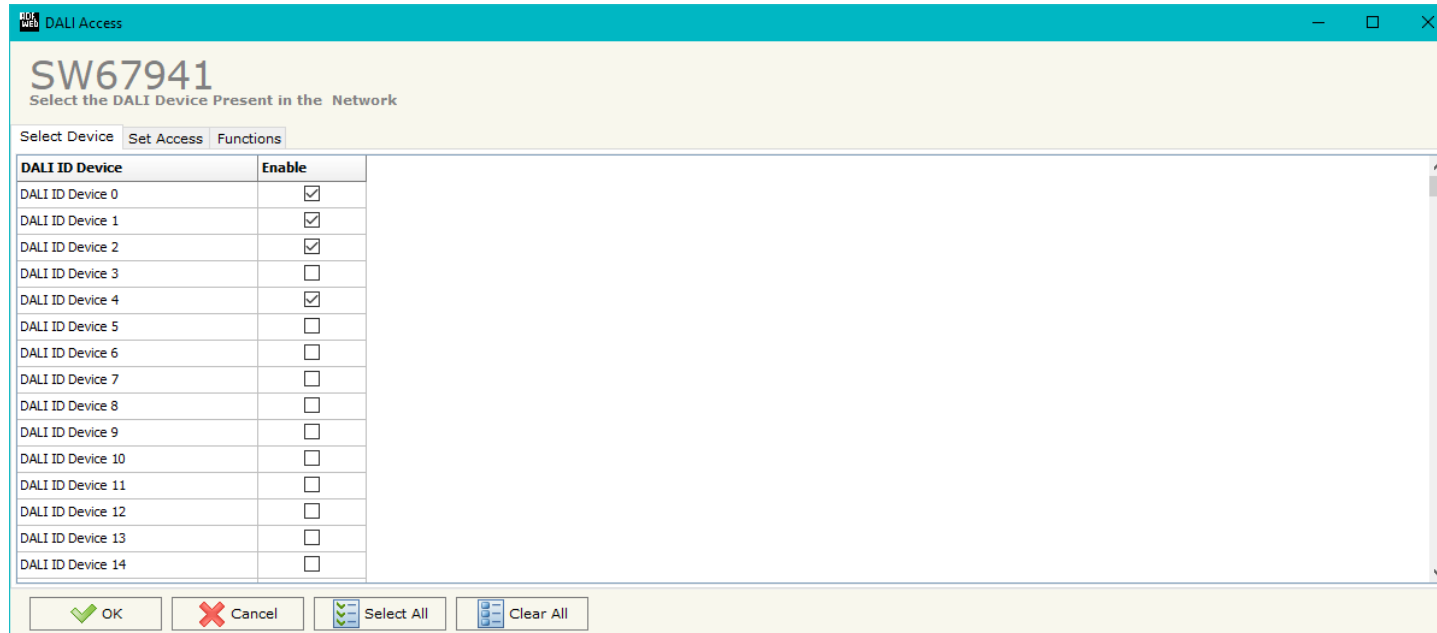


Figure 5a: "Select Device" window

The “**Select Device**” section (Fig. 5a) is used to list the DALI ballast to read/write. The means of the fields are:

- If the field “**Enable**” is checked, the DALI ballast is present in the network and connected to the converter.



## SET ACCESS

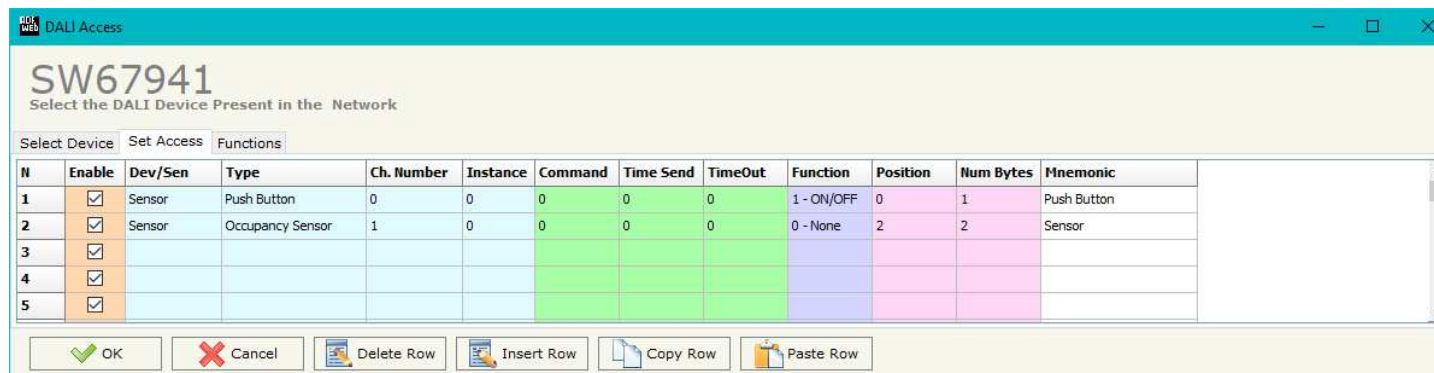


Figure 5b: "Set Access" window

The "Set Access" section (Fig. 5b) is used to list the DALI sensors to read and the DALI commands to send to the DALI ballasts. The means of the fields are:

- If the field "Enable" is checked, the DALI device/sensor is enabled;
- In the field "Dev/Sen" the DALI node is defined;
- In the field "Type" the type of DALI node to read/write is defined;
- In the field "Ch. Number" the ID of the DALI node is defined;
- In the field "Instance" the instance of the DALI node is defined;
- In the field "Command" the command code to send is defined. If not used, this column can be set to '0';
- In the field "Time Send" the delay in ms between the commands is defined. If not used, this column can be set to '0';
- In the field "Timeout" the timeout in ms for the reception of the response is defined. If not used, this column can be set to '0';
- In the field "Function" the DALI function to recall is define. This feature is used to control DALI ballasts automatically from a DALI 2 device as a DALI router;
- In the field "Position" the byte of the internal memory array where mapping the data is defined;
- In the field "Num Bytes" the dimension of the data is defined;
- In the field "Mnemonic" a description of the row is defined.

**Note:**

This table is not required if the HD67941-B2 is used to communicate with DALI 1 devices only.

**Note:**

The 'Position' field represents a byte of the internal memory array of the converter.

**FUNCTIONS**

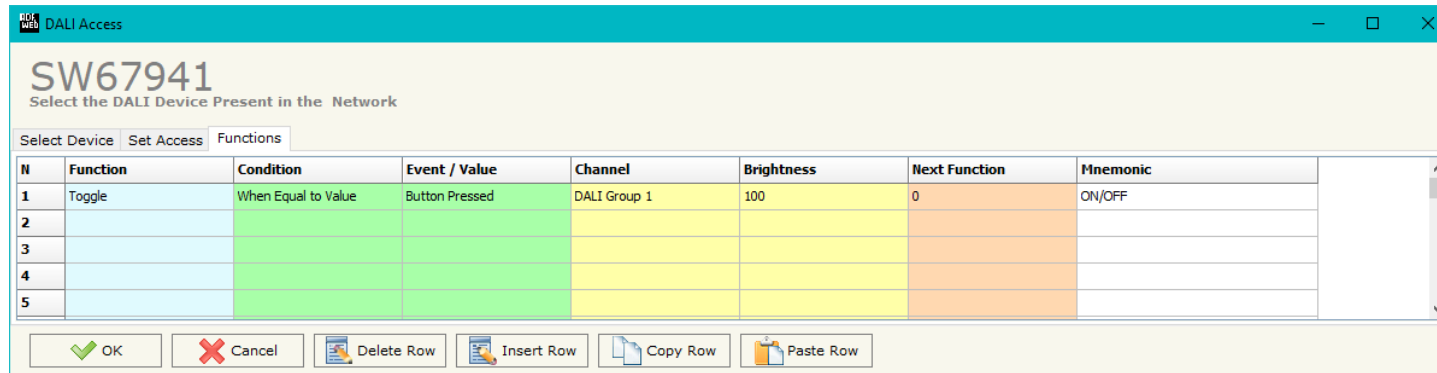


Figure 5c: "Functions" window

The "Functions" section (Fig. 5c) is used to list the DALI function to control the DALI ballasts in relation to the data from DALI 2 devices (buttons, sensors, exc.) like a DALI router. The means of the fields are:

- In the field "Function" the DALI operation to execute is defined;
- In the field "Condition" the logic operation to apply on the data is defined;
- In the field "Event / Value" the type of event received from the DALI 2 devices is defined;
- In the field "Channel" the DALI ballast/group to control is defined;
- In the field "Brightness" the light level to command is defined;
- In the field "Next Function" it is possible to concatenate another function;
- In the field "Mnemonic" a description of the row 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.

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.

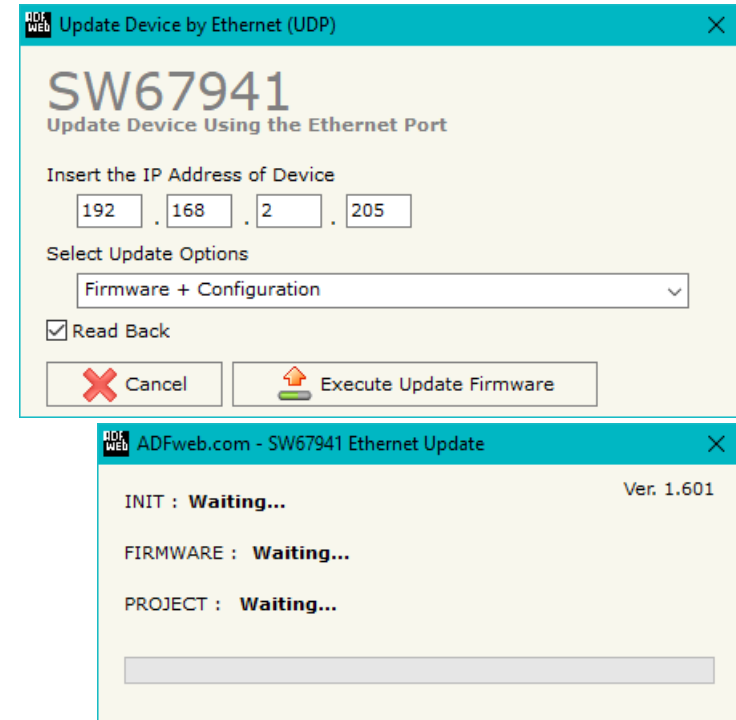


Figure 6: “Update device” windows

**Note:**

When you receive the device, for the first time, you also have to update the Firmware in the HD67941 device.

**Warning:**

If Fig. 7 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 HD67941 you have to use the software "SW67941":  
[www.adfweb.com/download/filefold/SW67941.zip](http://www.adfweb.com/download/filefold/SW67941.zip).

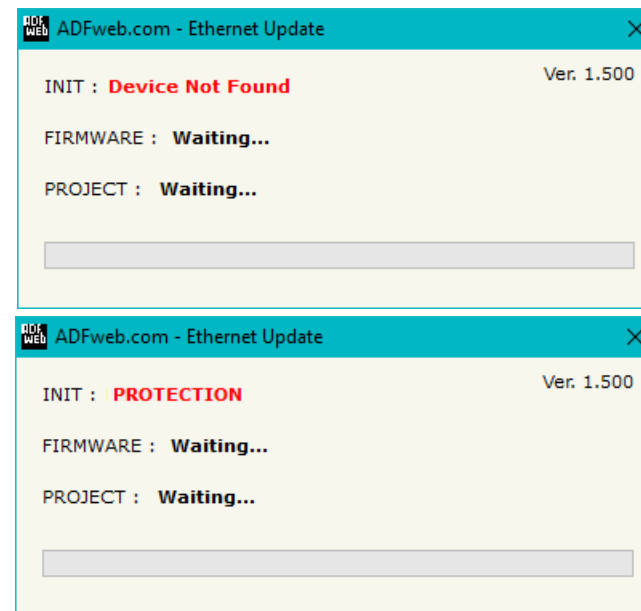


Figure 7: "Error" window

**USE OF DALI CONSOLE SOFTWARE:**

To configure DALI network and test the communication, it is possible to use the available software that runs with Windows called "DALI Console". It is downloadable on the site [www.adfweb.com](http://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 DALI Console, the window below appears (Fig. 8).

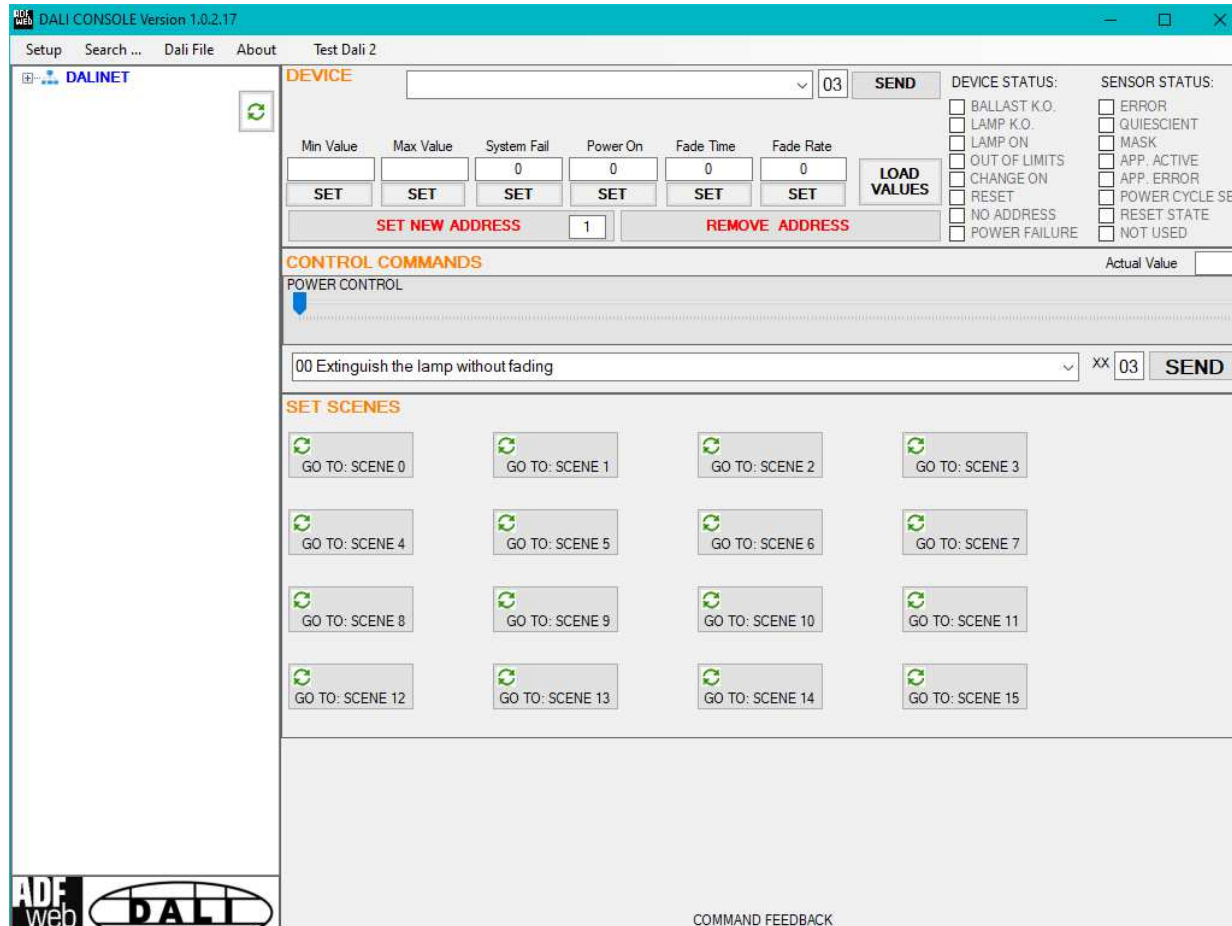
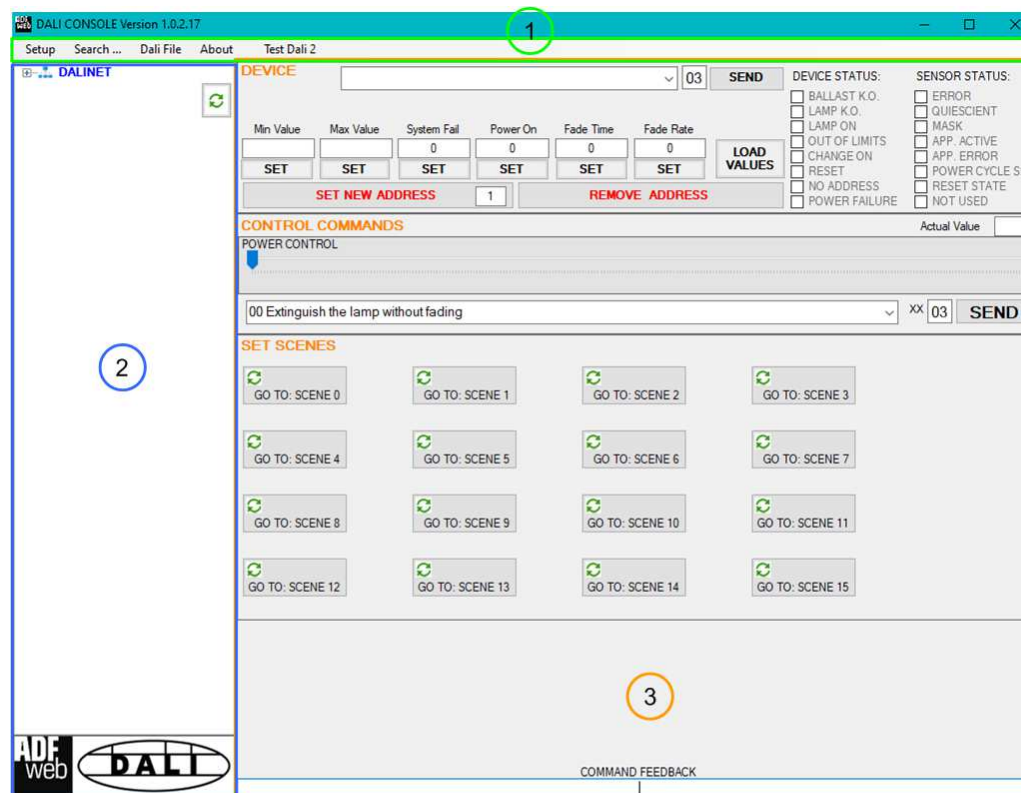


Figure 8: Main window for DALI Console

## STRUCTURE OF THE SOFTWARE:

The software layout is very simple and it is structured in this way:

- **"Menu bar"** (Fig. 9, Point 1): it is possible to open the setup window ("Setup" menu), scan the DALI network and program automatically the IDs ("Search..." menu), export/import the results of the communication ("Dali File" menu), see the informations about the DALI Console software ("About" menu) and test DALI 2 communication ("Test Dali 2" menu).
- **"Network view"** (Fig. 9, Point 2): it is possible to see all the DALI devices/sensors connected to the HD67941 converter, the groups and the scenes set;
- **"Settings / commands view"** (Fig. 9, Point 3): it is possible to set and manage the parameters to the single DALI device/sensor, to the groups or for the full network.



(1) Menu bar

(2) Network view

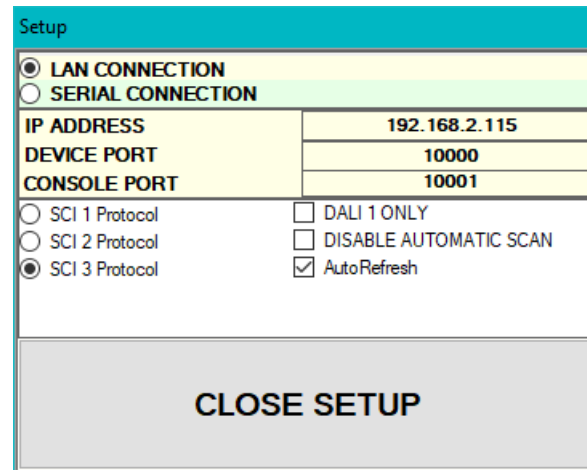
(3) Settings / commands view

Figure 9: Structure of DALI Console software

## SETUP:

This section defines the parameters of the HD67941 converter.

By Pressing the **Setup** button from the menu bar of the DALI Console software, the "SETUP" window appears (Fig. 10).



| Setup   |   |
|---|---|
| <input checked="" type="radio"/> LAN CONNECTION |   |
| <input type="radio"/> SERIAL CONNECTION         |   |
| IP ADDRESS                                      | 192.168.2.115                                   |
| DEVICE PORT                                     | 10000   |
| CONSOLE PORT                                    | 10001   |
| <input type="radio"/> SCI 1 Protocol            | <input type="checkbox"/> DALI 1 ONLY            |
| <input type="radio"/> SCI 2 Protocol            | <input type="checkbox"/> DISABLE AUTOMATIC SCAN |
| <input checked="" type="radio"/> SCI 3 Protocol | <input checked="" type="checkbox"/> AutoRefresh |
| <b>CLOSE SETUP</b>                              |   |

Figure 10: "Setup" window

The means of the fields for the "SETUP" window are:

- In the field **"DEVICE IP ADDRESS"** the IP address set inside the converter is defined;
- In the field **"DEVICE PORT"** the communication port is defined. It is fixed to '10000';
- In the field **"CONSOLE PORT"** the communication port for the DALI commands is defined. It is the one defined in the field "DALI Console Port" of the section "Set Communication" of SW67941;
- In the fields **"SCI x Protocol"** the type of Ethernet communication used is defined. It is possible to leave the default setting;
- If the field **"DALI 1 ONLY"** is checked, the converter will manage just DALI 1 communication;
- If the field **"DISABLE AUTOMATIC SCAN"** is checked, the converter will stop the automatic scan of DALI network;
- If the field **"AutoRefresh"** is checked, the converter automatically refreshes the data when a command is sent.



**SEARCH:**

This section is used to scan the DALI network, discover the devices and address them consecutively. The options available under this menu are different:

- Full Device Search: this function will scan and address all the DALI devices;
- Partial Device Search: this function will scan and address only the DALI devices without ID;
- Full Sensor Search: this function will scan and address all the DALI sensors;
- Partial Sensor Search: this function will scan and address only the DALI sensors without ID;
- Scan Devices and Sensors: this function will read the data from all available DALI devices/sensors;
- Disable Polling: this function will stop the DALI readings;
- Enable Polling: this function will start the DALI readings.

**TEST DALI 2:**

This section is used to monitor the DALI 2 messages received by the converter. It allows to see the sensor that is communicating, the instance and the information available in the event.

### NETWORK SETTING:

By pressing the button in the Network view, it is possible to read the converter and check the DALI devices/sensors discovered, the groups set and the scenes configured.

By selecting the single DALI devices found, the single groups, the single scene or the entire DALI network, it is possible to manage and test the functioning of the network.

### DEVICES:

The means of the fields for "DEVICE INFO" are:

- In the field "**Device Type**" the type of DALI device is printed;
- In the field "**Software version**" the software version of the DALI device is printed;
- In the fields "**Power Range**" Min value, Actual value, Max value, System Fail value, Power On value, Fade Time and Fade Rate of the DALI device is defined. It is possible to read the actual value and set a new value;
- In the fields "**DEVICE STATUS**" the actual status of the DALI device is printed;
- In the field "**SET NEW ADDRESS**" it is possible to program a new ID to the DALI node;
- In the field "**REMOVE ADDRESS**" it is possible to delete the ID from the DALI node.

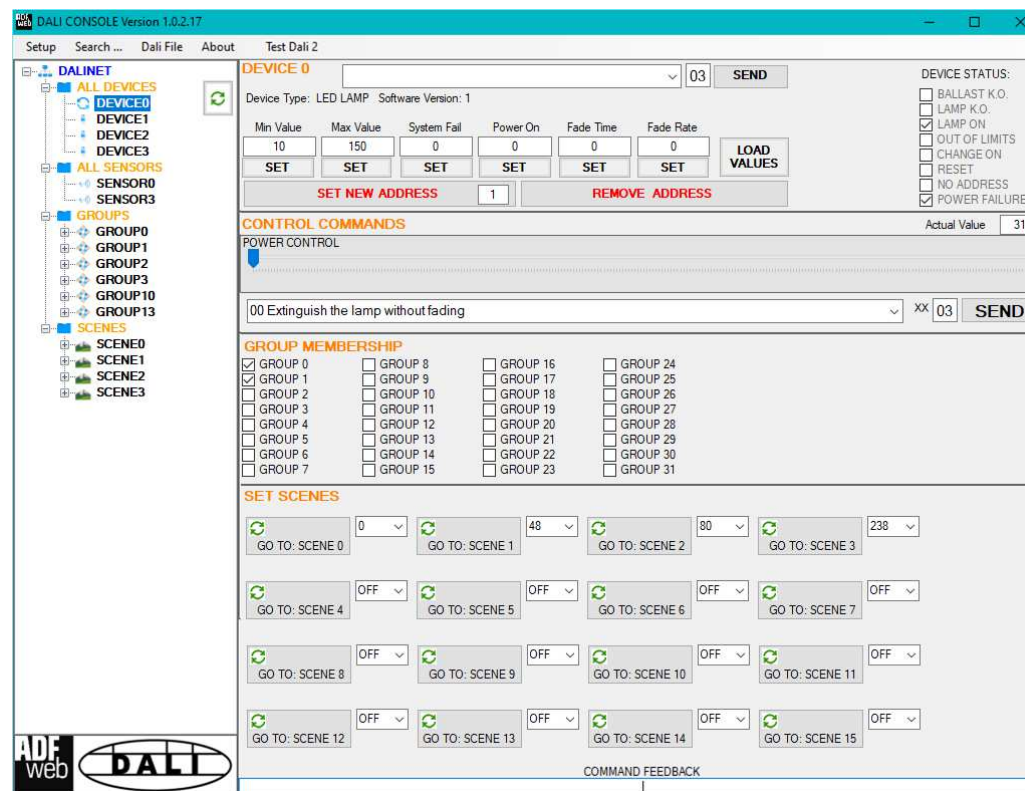


Figure 11: "Device settings" window

The means of the fields for the "CONTROL COMMANDS" section are:

- In the "**POWER CONTROL**" bar it is possible to change the actual ADV of the selected DALI device;
- In the field "**COMMAND**" it is possible to select a DALI command to send to the selected DALI device. For set commands, it is possible to insert the value to set in the field "**xx**". As soon as the command to send is selected, the command is sent: in order to send the same command more times, it is possible to press the "**SEND COMMAND**" button;
- In the field "**COMMAND FEEDBACK**" the response from the DALI device is printed.



**Note:**

This section is used to test the functioning of the DALI device in the network and to set specific parameters if needed (like new Minimum or Maximum ADV value).

In the "GROUP MEMBERSHIP" section it is possible to see the Groups which the selected DALI device is in. The checked checkboxes mean that the device is in the correspondent groups, the unchecked checkboxes mean that the device is not included in the correspondent groups. It is possible to change the group settings for the selected DALI device by checking/unchecking the correspondent checkboxes.

In the "SET SCENES" section it is possible to see the programmed scenes of the selected DALI device, program new ones and activate them:

- By pressing the buttons "**GO TO: SCENE X**" it is possible to activate the correspondent scene inside the selected DALI device; the programmed ADV for the selected scene is defined in the drop-down list on the right;
- By selecting a value into the drop-down lists next to the "GO TO: SCENE x" buttons, it is possible to set the ADV associated to the correspondent scene. It is possible to select:
  - Value between 0 and 255: the scene will have the defined value of ADV;
  - ACT: the scene will take the programmed ADV value into the "POWER CONTROL" bar;
  - OFF: the scene is disabled.

**SENSORS:**

The means of the fields for "SENSOR INFO" are:

- In the field "**Software version**" the software version of the DALI sensor is printed;
- In the field "**COMMAND**" it is possible to select a DALI command to send to the selected DALI sensor. For set commands, it is possible to insert the value to set in the field "**xx**". As soon as the command to send is selected, the command is sent: in order to send the same command more times, it is possible to press the "**SEND**" button;
- In the fields "**SENSOR STATUS**" the actual status of the DALI sensor is printed;
- In the field "**SET NEW ADDRESS**" it is possible to program a new ID to the DALI sensor;
- In the field "**REMOVE ADDRESS**" it is possible to delete the ID from the DALI sensor.

In the "GROUP MEMBERSHIP" section it is possible to see the Groups which the selected DALI sensor is in. The checked checkboxes mean that the device is in the correspondent groups, the unchecked checkboxes mean that the device is not included in the correspondent groups.

It is possible to change the group settings for the selected DALI sensor by checking/unchecking the correspondent checkboxes.

In the "SET INSTANCES" section it is possible to program the parameters for each instance available in the sensor. Each sensor's type has specific parameters defined in DALI 2 specifications.

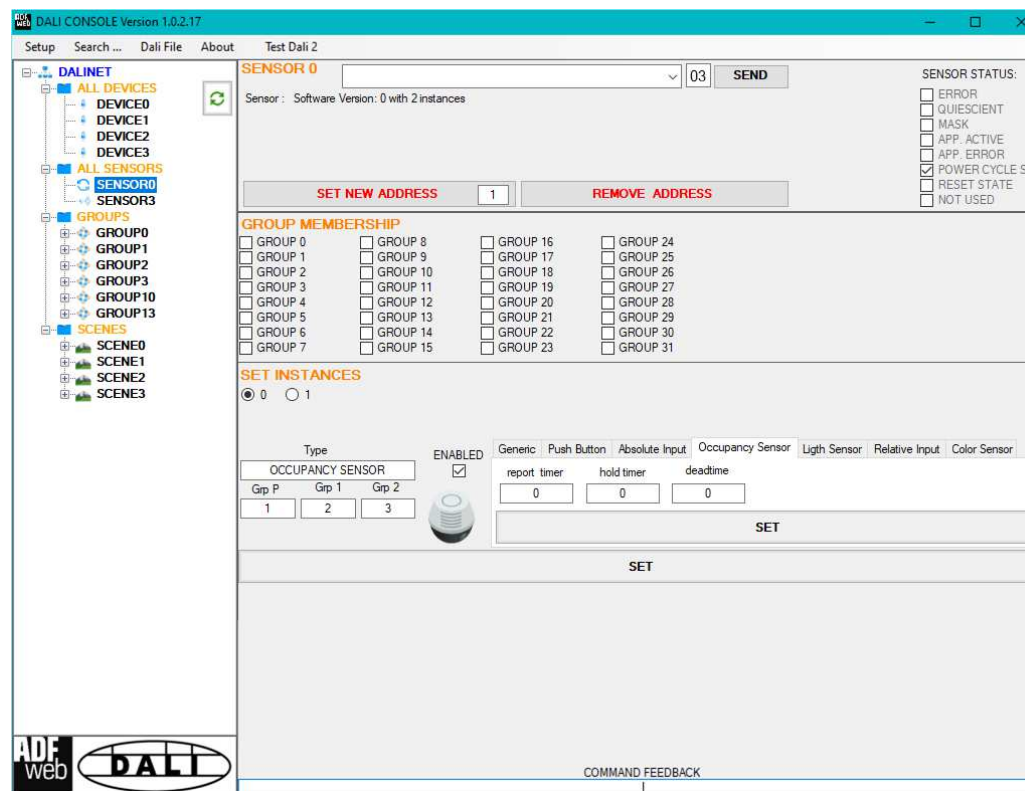


Figure 12: "Sensors settings" window

**GROUPS:**

The means of the fields for the "CONTROL COMMANDS" section are:

- In the "POWER CONTROL" bar it is possible to change the actual ADV of the selected DALI group;
- In the field "COMMAND" it is possible to select a DALI command to send to the selected DALI group. For set commands, it is possible to insert the value to set in the field "xx". As soon as the command to send is selected, the command is sent: in order to send the same command more times, it is possible to press the "SEND COMMAND" button;
- In the field "COMMAND FEEDBACK" the response from the DALI group is printed.



**Note:**

This section is used to test the functioning of the DALI groups in the network.

In the "SET SCENES" section it is possible to activate the programmed scenes to the selected group:

- By pressing the buttons "GO TO: SCENE X" it is possible to activate the correspondent scene inside the selected DALI group.

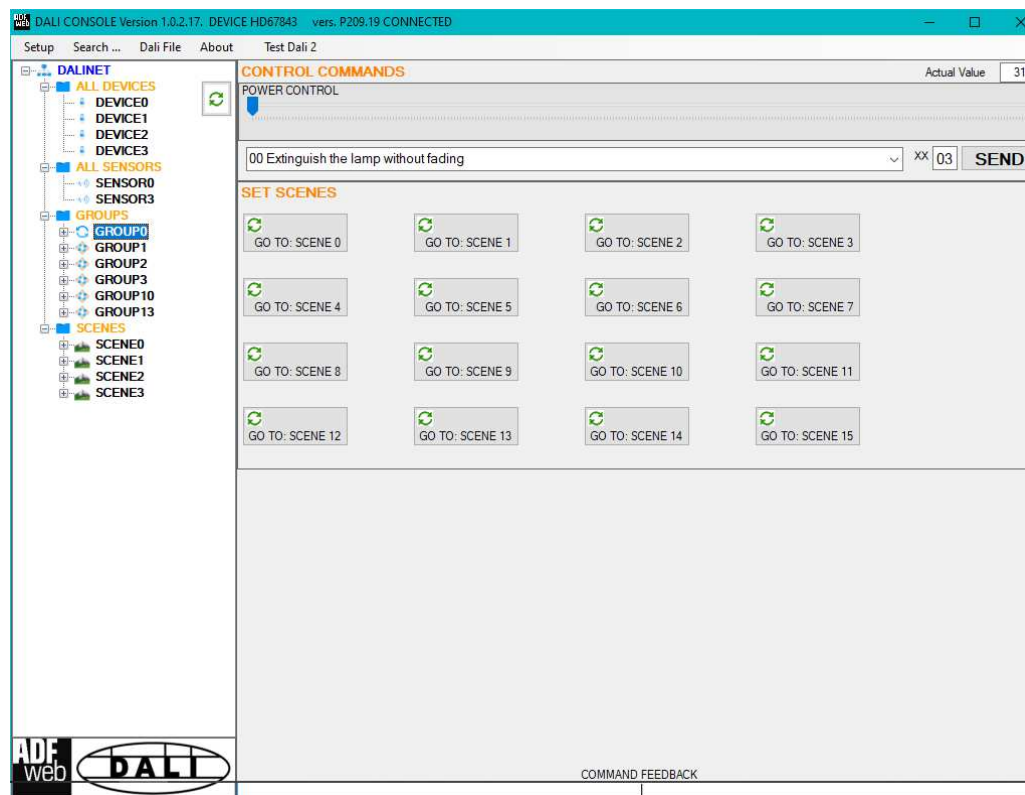


Figure 13: "Groups settings" window

**SCENES:**

By selecting a DALI scene from the Network view, it is possible to see the devices that have programmed the selected scene.

It is also possible to activate it by pressing the **“ACTIVATE SCENE X”** button.

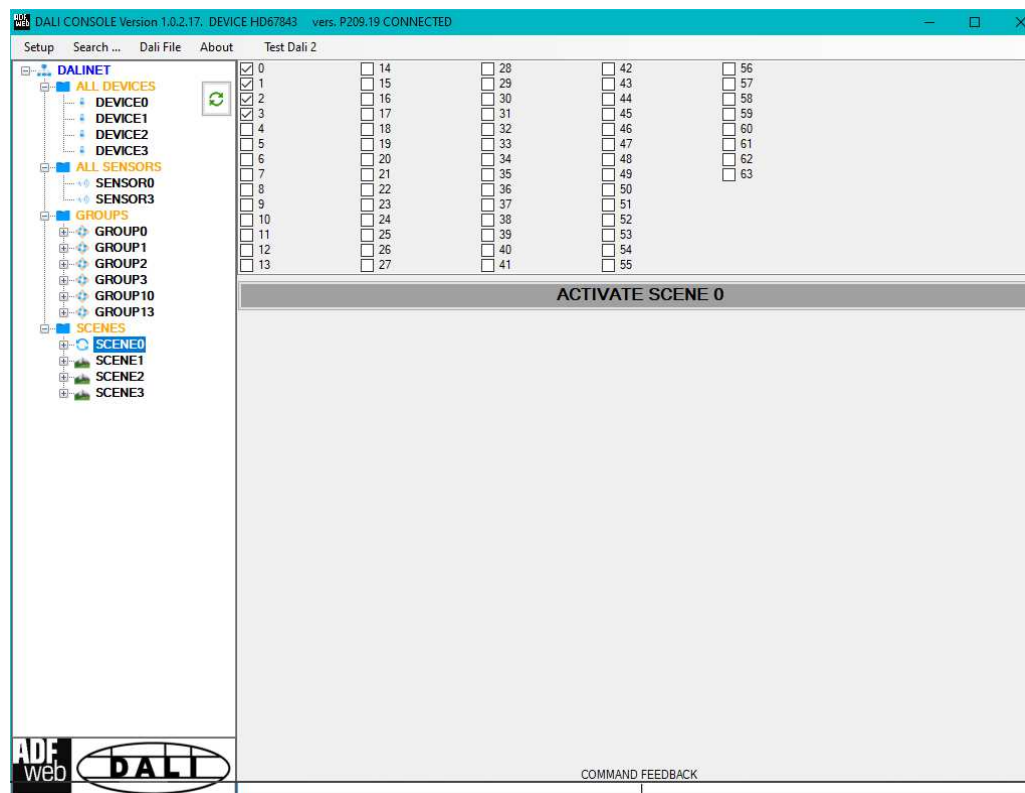


Figure 14: "Scenes settings" window

**ALL DEVICES (BROADCAST):**

The means of the fields for the "CONTROL COMMANDS" section are:

- In the "POWER CONTROL" bar it is possible to change the actual ADV of the entire DALI network;
- In the field "COMMAND" it is possible to select a DALI command to send to the entire DALI network. For set commands, it is possible to insert the value to set in the field "xx". As soon as the command to send is selected, the command is sent: in order to send the same command more times, it is possible to press the "SEND COMMAND" button;
- In the field "COMMAND FEEDBACK" the response from the DALI network is printed.



**Note:**

This section is used to test the functioning of the DALI network.

In the "SET SCENES" section it is possible to activate the programmed scenes into all the DALI devices that have them:

- By pressing the buttons "GO TO: SCENE X" it is possible to activate the correspondent scene in the DALI network. Only the devices that have it will accept the command.

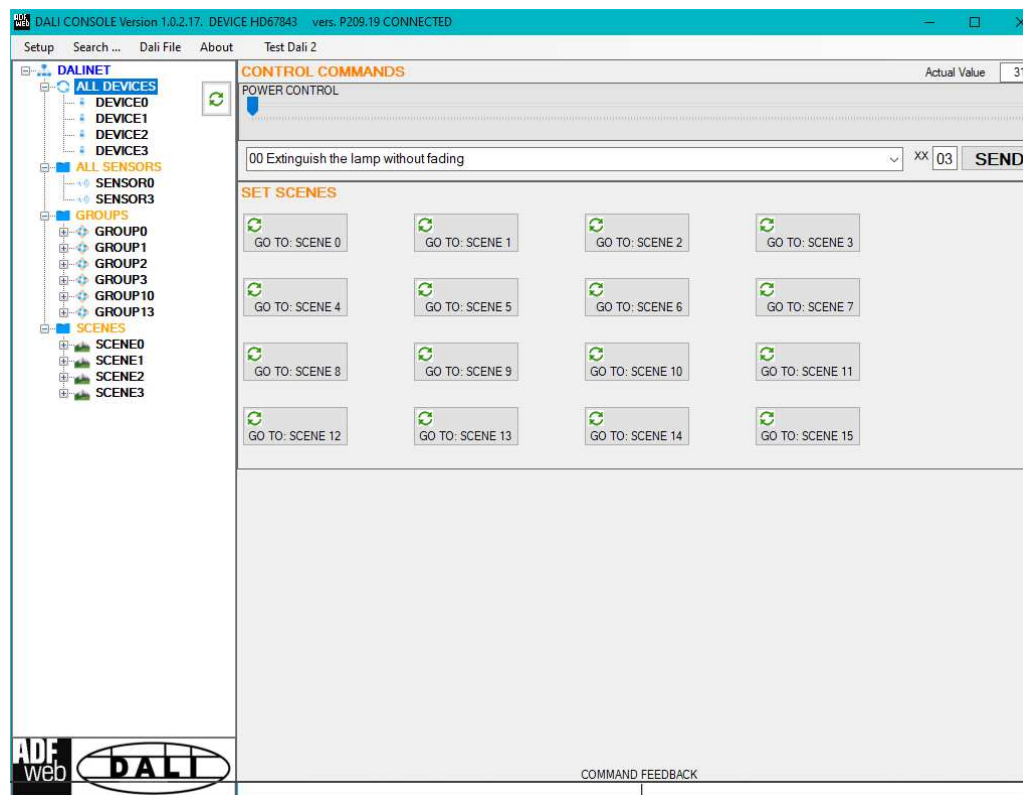


Figure 15: "Broadcast settings" window

## TEMPLATE STRING: DEFINITION OF MQTT PAYLOAD FOR PUBLISHED TOPICS

In the "Set MQTT Access" section, 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 DALI. The key words used and their meanings are different:

- CHANNEL: ID of the DALI ballast/sensor
- STATUS: Status of the DALI ballast
- ADV: level of brightness of DALI ballast
- ANSWER: last answer from the DALI ballast to a DALI command
- TYPE: type of DALI ballast
- VERSION: version of DALI ballast
- MIN: minimum value settable in the DALI ballast
- GRP1: groups' setting 1/1 for DALI ballast
- GRP2: groups' setting 2/2 for DALI ballast
- SENSOR: '0' → Ballast, '1' → Sensor
- INSTANCE: Instance of DALI sensor read
- VALUE: data from DALI sensor/ballast
- TIME: date and time



### Warning:

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



## DALI WRITING

In order to send the DALI commands it is necessary to use a specific MQTT payload.

In this way, the converter can get all the info ned and compose the DALI command. It is necessary to use a JSON format, described below:

```
{  
  "channel": $CHANNEL$,  
  "value": $VALUE$,  
  "command": $COMMAND$  
}
```

Where:

- CHANNEL: ID of the DALI ballast (\*)
- VALUE: value of the ADV or command
- COMMAND: DALI command to send

(\*)

The DALI ID can have different value in relation to the ADV to manage:

- 0 to 63 (0x00 to 0x3F) to manage a single DALI node;
- 64 to 79 (0x40 to 0x4F) to manage the Groups;
- 80 (0x50) for broadcast.

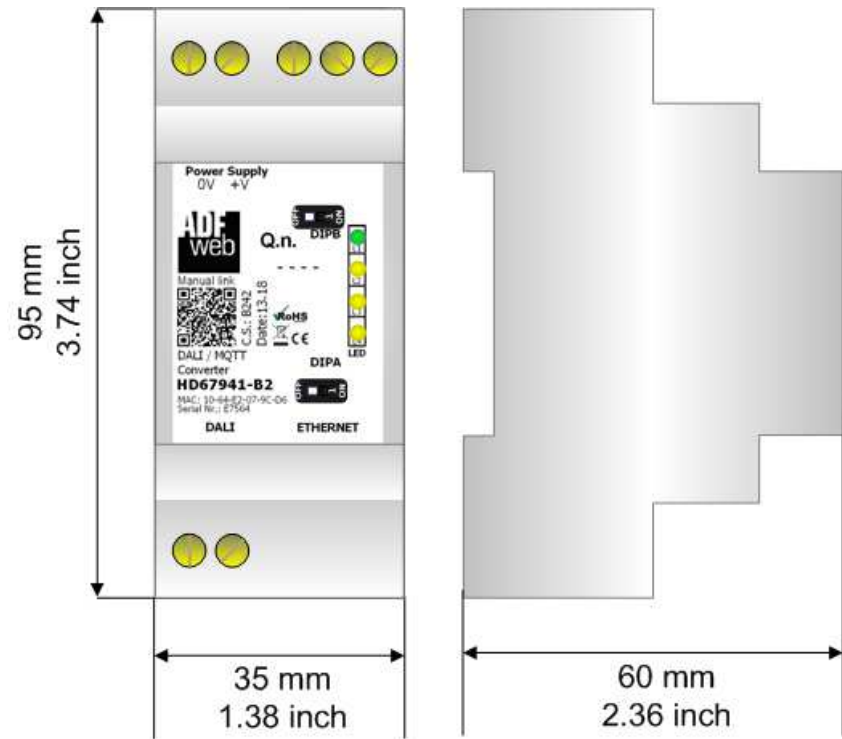


### Note:

In order to control the ADV (brightness of the DALI ballast), it is necessary to remove the "command" line. The JSON command will look like this:

```
{  
  "channel": $CHANNEL$,  
  "value": $VALUE$  
}
```

**MECHANICAL DIMENSIONS:**



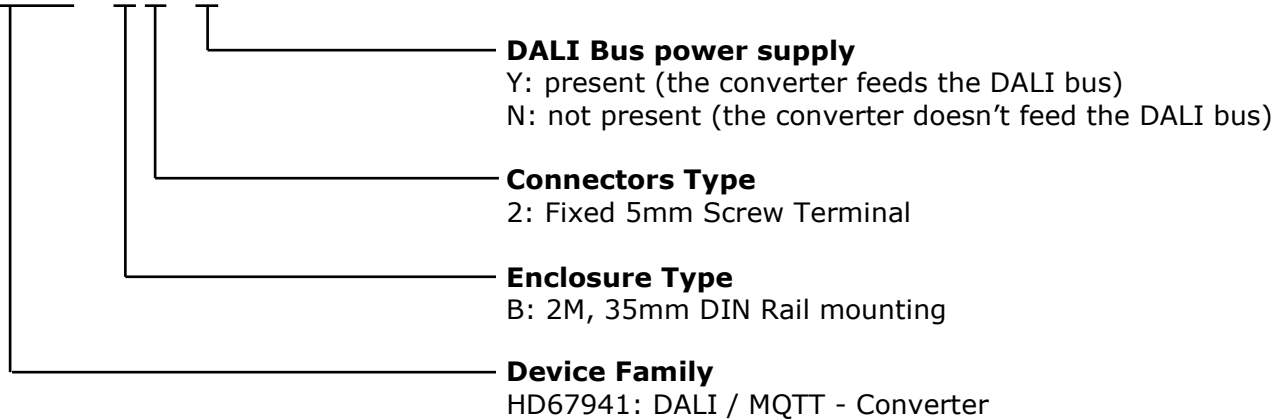
Housing: PVC  
Weight: 200g  
(Approx)

Figure 16: Mechanical dimensions scheme for HD67941-B2

**ORDERING INFORMATIONS:**

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

**HD67941 - B 2 - x**



- Order Code: **HD67941-B2-Y** - DALI / MQTT – Converter (DALI bus power supply present)
- Order Code: **HD67941-B2-N** - DALI / MQTT – Converter (DALI bus power supply not present)

**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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**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](http://www.adfweb.com).  
Otherwise contact us at the address [support@adfweb.com](mailto: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](http://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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