

User Manual

Revision 1.100
English

RS485 – Isolator – Repeater – Extender bus line

(Order Code: HD67149-A1 - HD67149-B2)

for Website information:

www.adfweb.com?Product=HD67149

for Price information:

www.adfweb.com?Price=HD67149-A1

www.adfweb.com?Price=HD67149-B2

Benefits and Main Features:

- ✦ Rail mountable
- ✦ Galvanic isolation between two RS485 ports
- ✦ Temperature range: -40°C/85°C (-40°F/185°F)



User Manual

For others Repeaters:

CAN Repeaters

See also the following links:

www.adfweb.com?Product=HD67180

(For DeviceNET)

www.adfweb.com?Product=HD67181

(For CAN 2.0A & 2.0B)

www.adfweb.com?Product=HD67182

(For J1939)

Optic Fibres Repeaters

See also the following links:

www.adfweb.com?Product=HD67117FS

(For CANopen)

www.adfweb.com?Product=HD67180FS

(For DeviceNET)

www.adfweb.com?Product=HD67181FS

(For CAN 2.0A & 2.0B)

www.adfweb.com?Product=HD67182FS

(For J1939)

www.adfweb.com?Product=HD67221FS

(Copper Bridge)

For others Converter / Adapter:

See also the following link:

www.adfweb.com?Product=HD67118

(RS232 / RS485)

www.adfweb.com?Product=HD67119

(USB / RS485)

Do you have an your customer protocol?

See the following links:

www.adfweb.com?Product=HD67003

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

Ask it to the following link:

www.adfweb.com?Cmd=helpme

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UPDATED DOCUMENTATION:

Dear customer, we thank you for your attention and we remind you that you need to check that the following document is:

- ✦ Updated
- ✦ Related to the product you own

To obtain the most recently updated document, note the “document code” that appears at the top right-hand corner of each page of this document.

With this “Document Code” go to web page www.adfweb.com/download/ and search for the corresponding code on the page. Click on the proper “Document Code” and download the updates.

REVISION LIST:

Revision	Date	Author	Chapter	Description
1.002	20/05/2010	Dp	All	Revision
1.003	13/02/2013	Nt	All	Added new chapters
1.010	10/10/2013	Fl	All	Software changed (1.100)
1.100	12/03/2024	Ln	All	New hardware

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 are required for each individual application, legal and safety regulation. The same applies also when using accessories.

INTENDED USE

Machines and systems must be designed so the faulty conditions do not lead to a dangerous situation for the operator (i.e. independent limit switches, mechanical interlocks, etc.).


QUALIFIED PERSONNEL

The device can be used only by qualified personnel, strictly in accordance with the specifications.

Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and who have appropriate qualifications for their job.

RESIDUAL RISKS

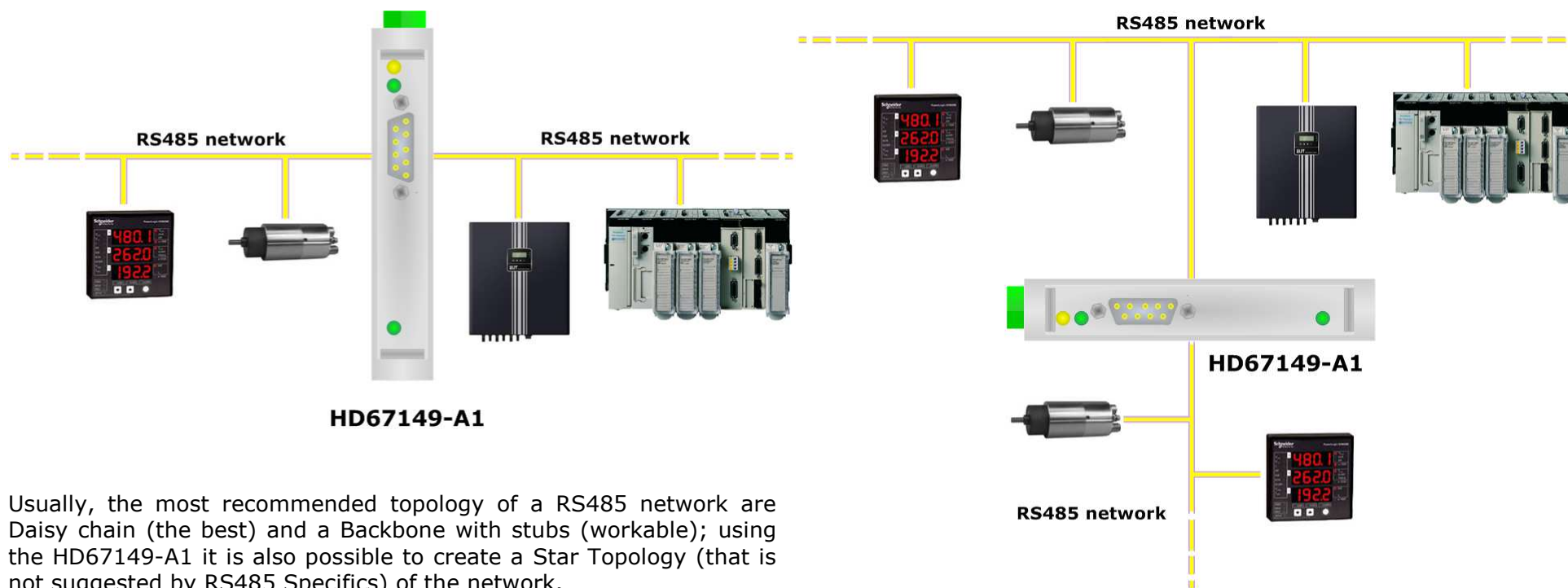
The device is state of the art and is safe. The instrument can represent a potential hazard if they are inappropriately installed and operated by personnel untrained. These instructions refer to residual risks with the following symbol:

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

CE CONFORMITY

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

EXAMPLES OF CONNECTION:



Usually, the most recommended topology of a RS485 network are Daisy chain (the best) and a Backbone with stubs (workable); using the HD67149-A1 it is also possible to create a Star Topology (that is not suggested by RS485 Specifics) of the network.

CONNECTION SCHEME:

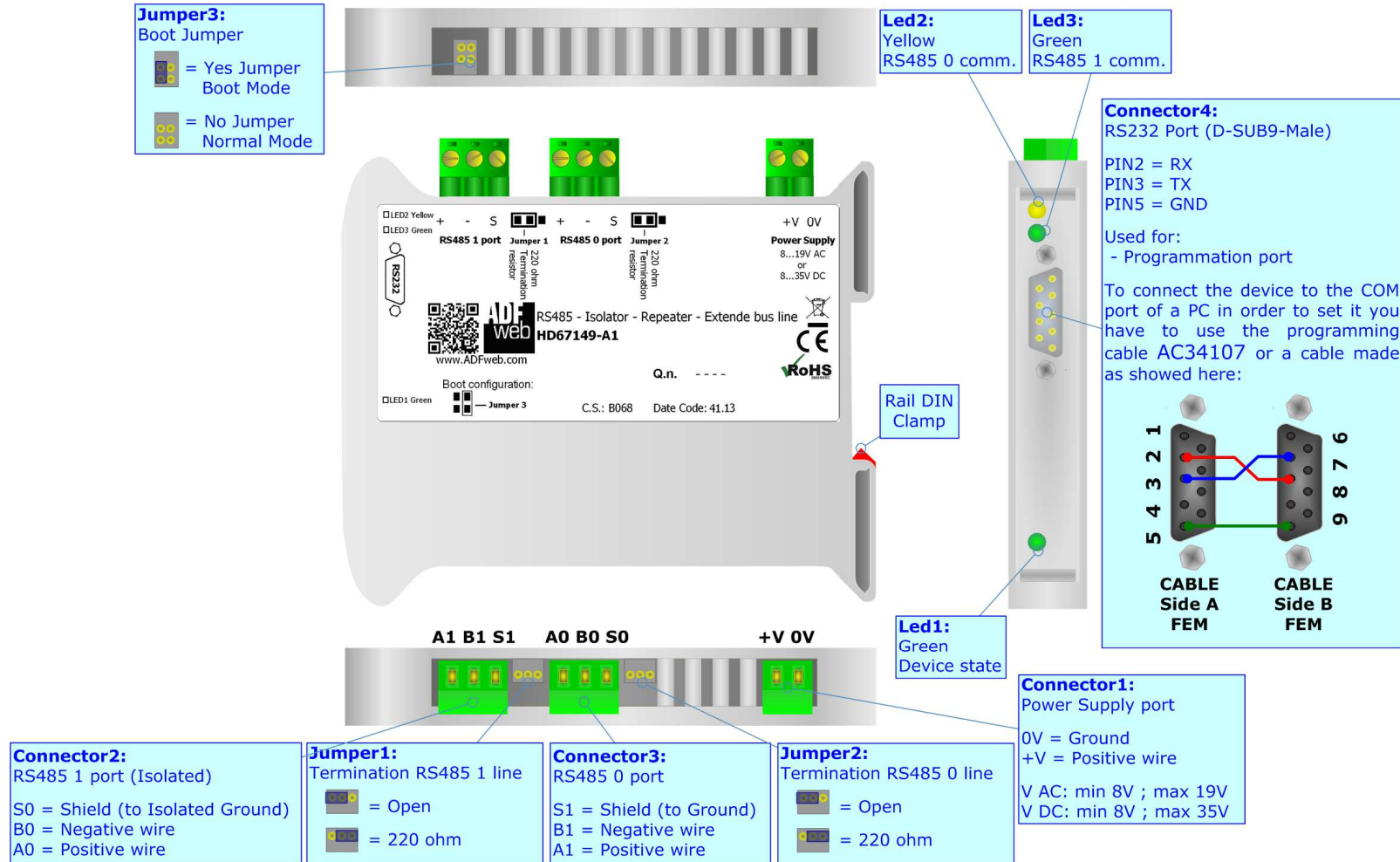


Figure 1a: Connection scheme for HD67149-A1

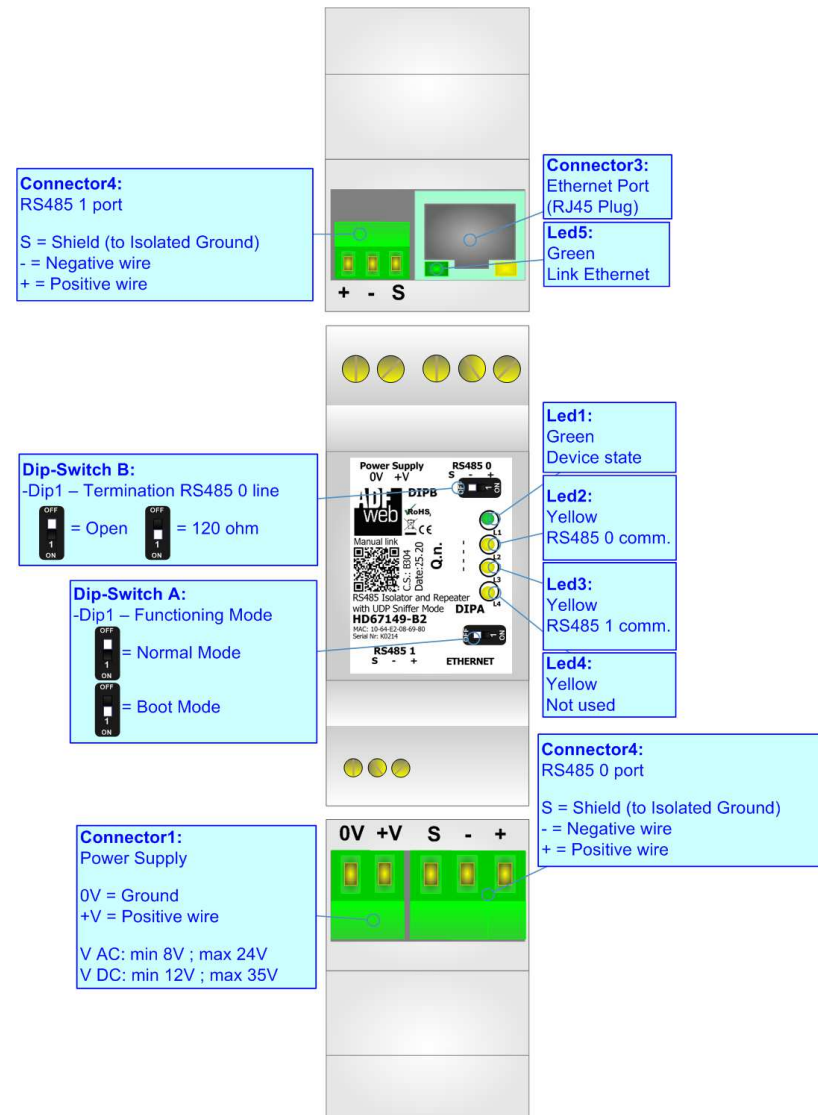


Figure 1b: Connection scheme for HD67149-B2

CHARACTERISTICS:

The RS485 Isolator - Repeater has the following characteristics:

- Electrical isolation between two Buses;
- Baud Rate, Parity, StopBit changeable with software;
- Mountable on 35mm Rail DIN;
- Wide power supply input range: 8...19V AC or 8...35V DC;
- Wide temperature range: -40°C / 85°C [-40°F / +185°F].

This product is suitable for solving various problems of a RS485 line, extensions of the line, increasing the nodes number, galvanic isolation, to get a strong protection from the sparks noise and electrostatic charges or simply to change the baud rate of the communication.

CONFIGURATION:

You need Compositor SW67149 software on your PC in order to perform the following:

- Define the parameter of RS485 0;
- Define the parameter of RS485 1;
- Update the Firmware.

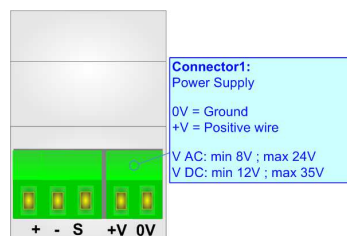
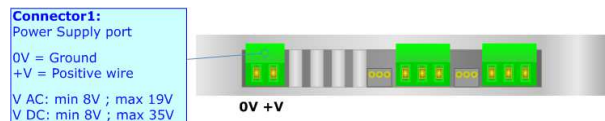
POWER SUPPLY:

The devices can be powered at 8...19V AC and 8...35V DC. For more details see the two tables below.

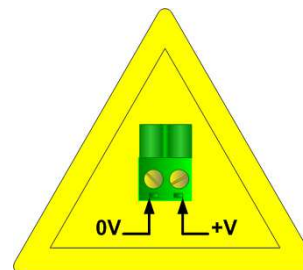
VAC		VDC	
Vmin	Vmax	Vmin	Vmax
8V	19V	8V	35V

Consumption at 24V DC:

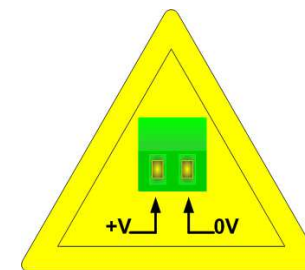
Device	Consumption [W/VA]
HD67149-A1	4
HD67149-B2	4



Caution: Not reverse the polarity power



HD67149-A1



HD67149-B2

FUNCTION MODES:

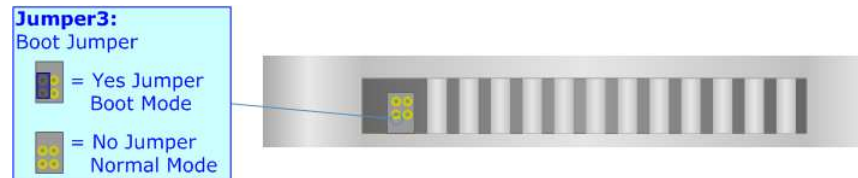
HD67149-A1

The device has got two functions mode depending of the position of the 'Jumper3':

- The first, without any jumper inserted, is used for the normal working of the device;
- The second, with jumper inserted, 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.



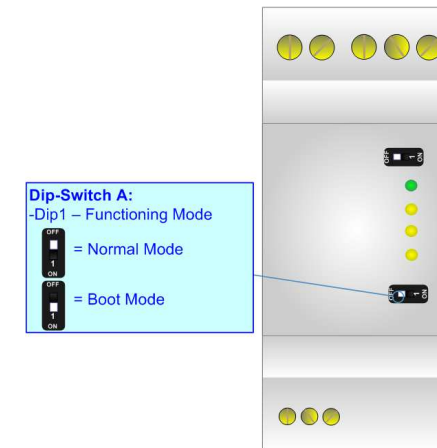
HD67149-B2

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

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

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

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



LEDS:

HD67149-A1

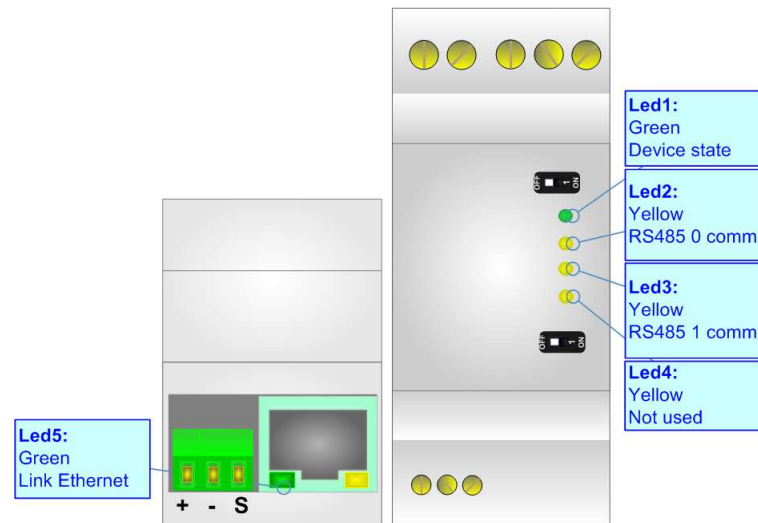
The device has got three LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: Device state (green)	Blinks slowly (~1Hz)	Blinks quickly
2: RS485 0 comm. (yellow)	Blinks when receives a byte on RS485 0	OFF
3: RS485 1 comm. (green)	Blinks when receives a byte on RS485 1	OFF



HD67149-B2

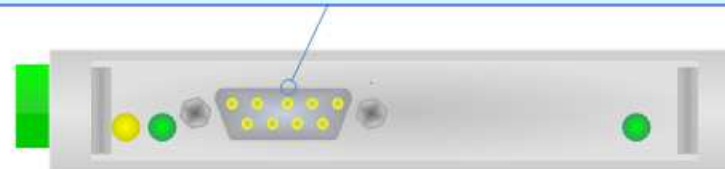
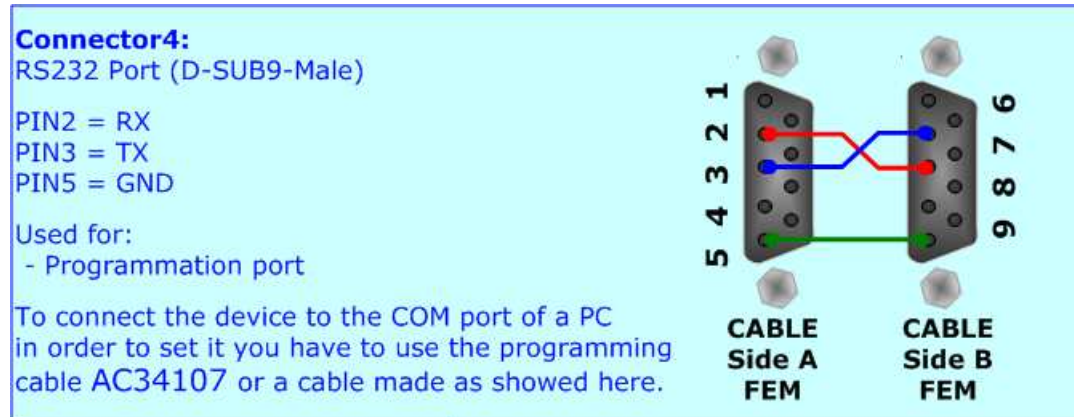
LED	Normal Mode	Boot Mode
1: Device State (green)	Blinks slowly (~1Hz)	ON: Device powered OFF: Device not powered
2: RS485 0 communication (yellow)	Blinks when receives a byte on RS485 0	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
3: RS485 1 communication (yellow)	Blinks when receives a byte on RS485 1	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
4: Not used (yellow)	OFF	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
5: Ethernet Link (green)	ON: Ethernet cable connected OFF: Ethernet cable disconnected	ON: Ethernet cable connected OFF: Ethernet cable disconnected



RS232:

The connection from RS232 socket to a serial port (example one from a personal computer) must be made with a NULL MODEM cable (a serial cable where the pins 2 and 3 are crossed).

It is recommended that the RS232 cable not exceed 15 meters.



RS485:

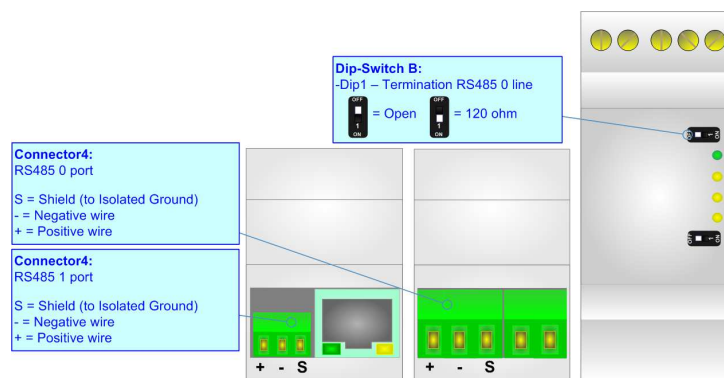
HD67149-A1

For terminate the RS485 line with a 220Ω resistor it is necessary to put the 'Jumper1' AND 'Jumper2' like in figure.



HD67149-B2

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



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

Here some codes of cables:

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

USE OF COMPOSITOR SW67149:

To configure the Converter, use the available software that runs with Windows, called SW67149. It is downloadable on the site www.adfweb.com and its operation is described in this document. (*This manual is referenced to the last version of the software present on our web site*). The software works with MSWindows (MS 2000, XP, Vista, Seven, 8, 10 or 11; 32/64bit).

When launching the SW67149 the right window appears (Fig. 2).



Note:

It is necessary to have installed .Net Framework 4.

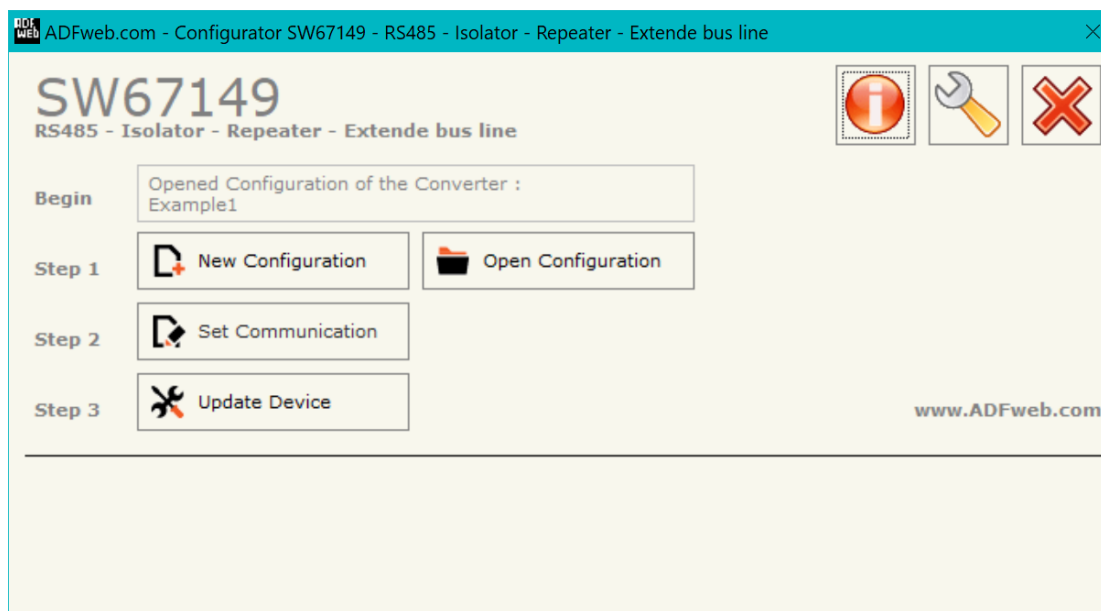


Figure 2: Main window for SW67149

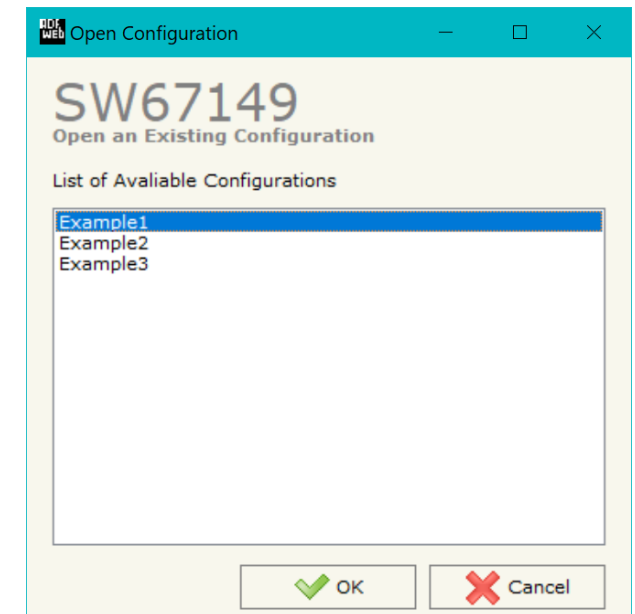
NEW CONFIGURATION / OPEN CONFIGURATION:

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




A device configuration can also be imported or exported:

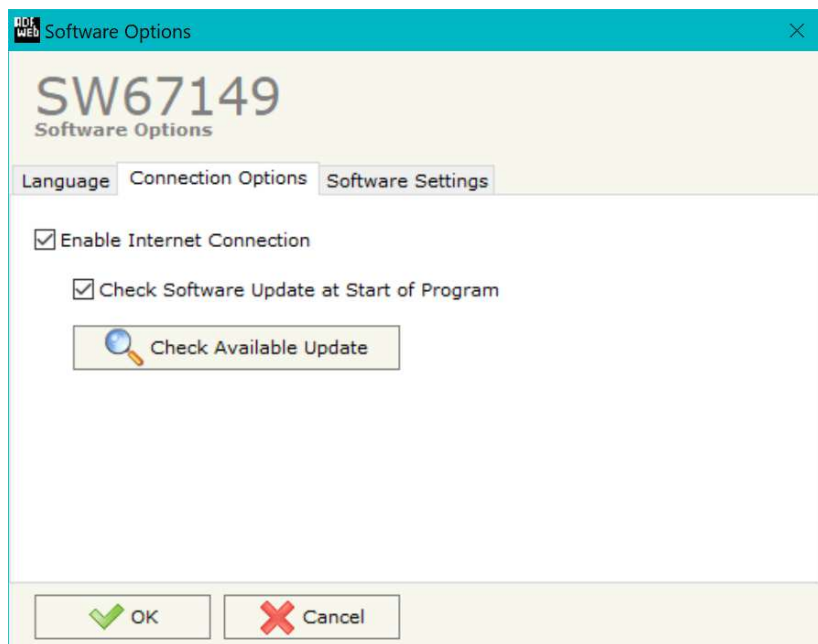
- To clone the configurations of a programmable “RS485 Repeater / Isolator” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button “**Open Configuration**”.



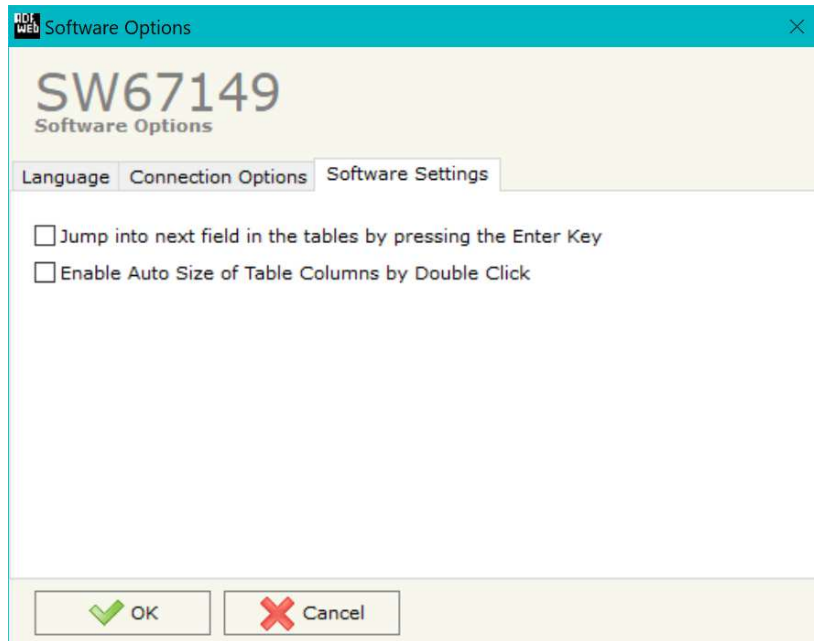
SOFTWARE OPTIONS:

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 SW67149 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 SW67149 (Fig. 2) the window **“Set Communication”** appears (Fig. 3).

In the section **“Hardware Type”** is possible to select the type of converter used:

- HD67149-A1 (with Jumper);
- HD67149-B2 (with Dip-Switch).

The means of the fields for **“Serial - RS485 - 0”** section are:

- In the field **“Baudrate”** the baud rate for the RS485 0 side is defined;
- In the field **“Parity”** the parity for the RS485 0 side is defined.
- In the field **“Stop Bits”** the number of Stop Bits of the serial line is defined;
- In the field **“Data Bits”** the number of data bits used for the serial line communication is defined.

The means of the fields for **“Serial - RS485 - 1”** section are:

- In the field **“Baudrate”** the baud rate for the RS485 1 side is defined;
- In the field **“Parity”** the parity for the RS485 1 side is defined.
- In the field **“Stop Bits”** the number of Stop Bits of the serial line is defined;
- In the field **“Data Bits”** the number of data bits used for the serial line communication is defined;
- If the field **“Enable End-Line Resistor”** is checked, the termination resistor for DMX line is inserted.

The screenshot shows the 'Set Communication' window for device SW67149. It is divided into four main sections:

- 1. Hardware Type:** A dropdown menu for 'Type' is set to 'HD67149-B2'.
- 2. Serial - RS485 - 0:** Fields for 'Baudrate' (115200), 'Parity' (NONE), 'Stop Bits' (1 Stop Bits), and 'Data Bits' (8 Data Bits).
- 3. Serial - RS485 - 1:** Fields for 'Baudrate' (115200), 'Parity' (NONE), 'Stop Bits' (1 Stop Bits), and 'Data Bits' (8 Data Bits). There is also an unchecked checkbox for 'Enable End-Line Resistor'.
- 4. Ethernet:** Fields for 'IP Address' (192.168.0.5), 'SubNet Mask' (255.255.255.0), 'Gateway' (192.168.0.1), and 'UDP Port' (10001). There is an unchecked checkbox for 'Frame Mode'.

At the bottom right, there are 'OK' and 'Cancel' buttons.

Figure 3: Main window for SW67149

Only for the HD67149-B2

The means of the fields for "Ethernet" section 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;
- If the field "**GATEWAY**" is checked, it is possible to insert the IP Address of the default gateway of the network used for going out to the net;
- In the field "**UDP Port**" the UDP port used for sniffer is defined (see page 23);
- If the field "**Frame Mode**" is checked, the data sent over UDP will be packet in frames; otherwise, they are sent byte to byte.

UPDATE DEVICE WITH SERIAL (ONLY FOR HD67149-A1 WITH JUMPER):

The functions described above shall be made when the device is in Boot. For more details about Boot see "Connection Scheme" (Fig. 1).

If is necessary to update the firmware the button "Update Firmware" must be pressed.

In order to update the firmware in the board, follow these instructions:

- Turn off the device;
- Insert the Boot Jumper (see Fig. 1 for more info);
- Turn on the device;
- Press the "**Update Firmware**" button to start the upload;
- When all the operations are "OK" turn off the device;
- Disconnect the Boot jumper;
- Turn on the Device.

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

UPDATE DEVICE VIA ETHERNET (ONLY FOR HD67149-B2 WITH DIP-SWITCHES):

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

If you don't know the actual IP address of the device you have to use this procedure:

- Turn OFF the Device;
- Put Dip2 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 Dip2 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.

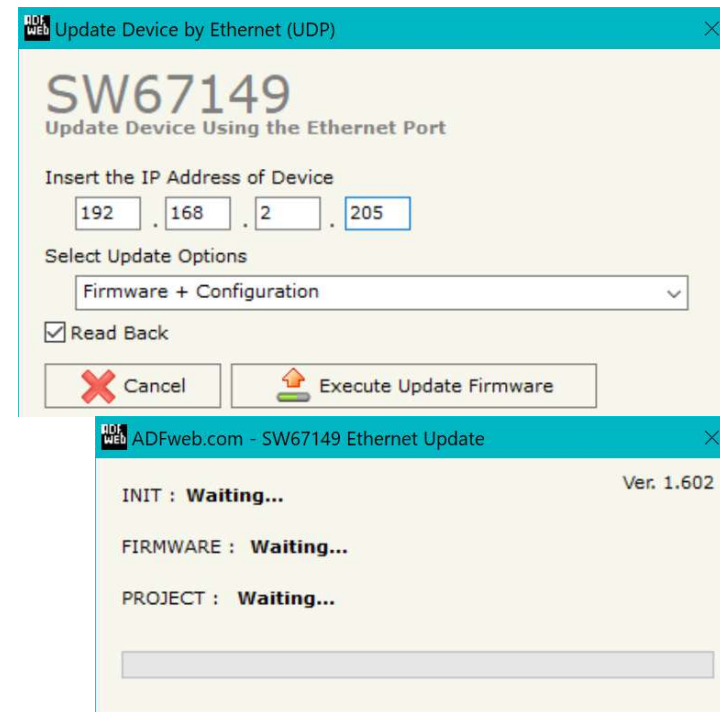





Figure 4: "Update via Ethernet" windows

 **Note:**
When you install a new version of the software, if it is the first time it is better you do the update of the Firmware in the HD67149 device.

 **Note:**
When you receive the device, for the first time, you also have to update the Firmware in the HD67149 device.

 **Warning:**
If Fig. 5 appears when you try to do the Update try these points before seeking assistance:

- Try to repeat the operations for the updating;
- Try with another PC;
- Try to restart the PC;
- Check the LAN settings;
- If you are using the program inside a Virtual Machine, try to use in the main Operating System;
- If you are using Windows Seven, Vista, 8, 10 or 11 make sure that you have the administrator privileges;
- In case you have to program more than one device, using the "UDP Update", you have to cancel the ARP table every time you connect a new device on Ethernet. For do this you have to launch the "Command Prompt" and write the command "arp -d". Pay attention that with Windows Vista, Seven, 8, 10 or 11 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

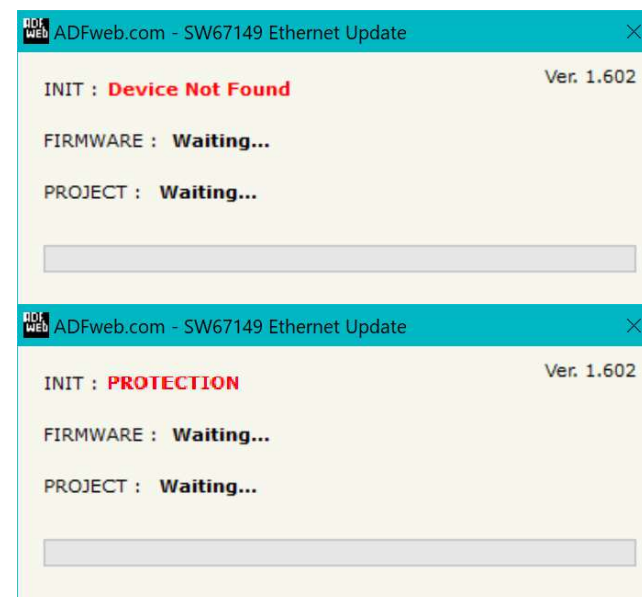


Figure 5: Error windows

In the case of HD67149 you have to use the software "SW67149": www.adfweb.com/download/filefold/SW67149.zip.

UDP SNIFFER

This feature is used to monitor the RS485 traffic from UDP side in case of debug of the communication. In relation to the "Frame Mode" option in section "Set Communication", it is possible to check the bytes separately (an UDP message for each byte) or by frame (an UDP message for each serial frame).

Frame Mode disabled

REQUEST

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Hex	0x45	0x4E	0x41	0x42	0x4C	0x45
Text	E	N	A	B	L	E



Note:

This command must be sent to the UDP port set in "Set Communication".

RESPONSE

	Byte 0	Byte 1	Byte 2	Byte 3
Text	n	.	h	h

Where:

n = number of RS485 port from which the data is received (allowed values: 0 or 1)

h = Hex value for the data received (allowed values: 0 to F)

Frame Mode enabled

REQUEST

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Hex	0x45	0x4E	0x41	0x42	0x4C	0x45
Text	E	N	A	B	L	E



Note:

This command must be sent to the UDP port set in "Set Communication".

RESPONSE

	Byte 0	Byte 1	Byte 2	Byte 3	...	Byte n
Text	n	.	h	h	...	h

Where:

n = number of RS485 port from which the data is received (allowed values: 0 or 1)

h = Hex value for the data received (allowed values: 0 to F)

MECHANICAL DIMENSIONS:

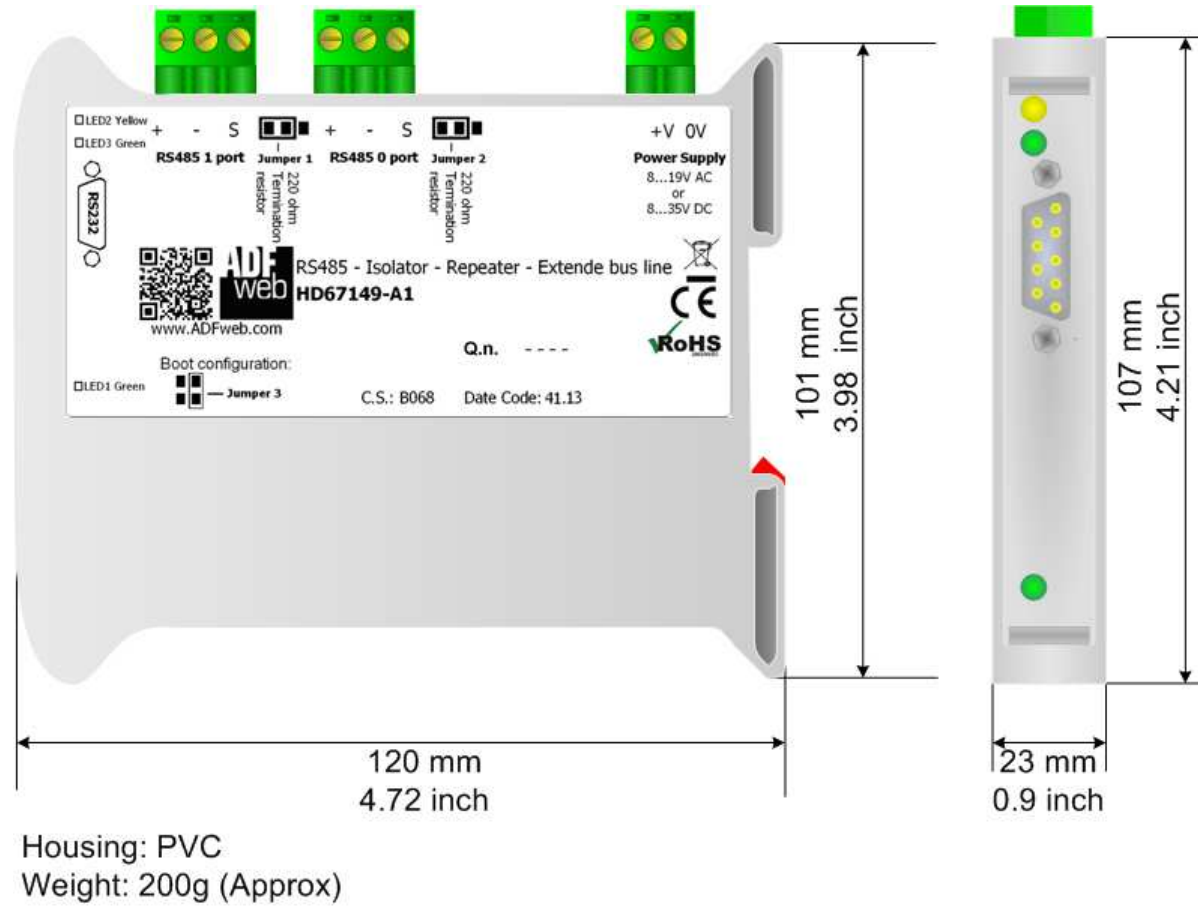
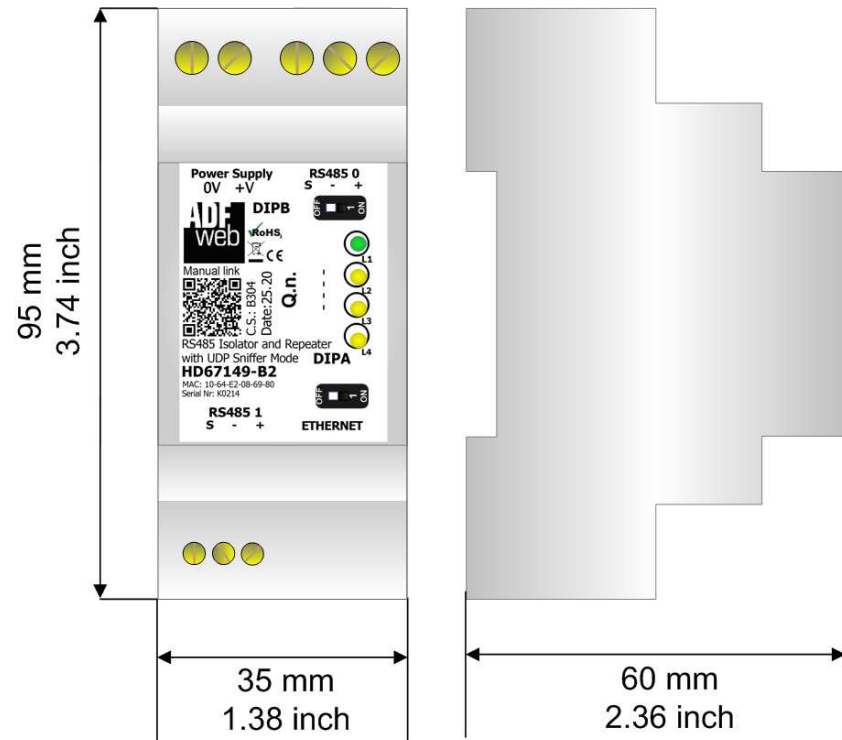


Figure 6: Mechanical dimensions scheme for HD67149-A1



Housing: PVC
 Weight: 200g
 (Approx)

Figure 7: Mechanical dimensions scheme for HD67149-B2

ORDER CODE:

- Order Code: **HD67149-A1** - RS485 - Isolator – Repeater – Extender bus line
Order Code: **HD67149-B2** - RS485 - Isolator – Repeater – Extender bus line

ACCESSORIES:

- Order Code: **AC34107** - Null Modem Cable Fem/Fem DSub 9 Pin 1,5 m
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 human health, which could otherwise be caused by inappropriate disposal. The recycling of materials will help to conserve natural resources. For more information about recycling this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE



The device respects the 2002/95/EC Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (commonly referred to as Restriction of Hazardous Substances Directive or RoHS).

CE MARKING



The product conforms with the essential requirements of the applicable EC directives.

WARRANTIES AND TECHNICAL SUPPORT:

For fast and easy technical support for your ADFweb.com SRL products, consult our internet support at www.adfweb.com. Otherwise contact us at the address support@adfweb.com

RETURN POLICY:

If while using your product you have any problem and you wish to exchange or repair it, please do the following:

- 1) Obtain a Product Return Number (PRN) from our internet support at www.adfweb.com. Together with the request, you need to provide detailed information about the problem.
- 2) Send the product to the address provided with the PRN, having prepaid the shipping costs (shipment costs billed to us will not be accepted).

If the product is within the warranty of twelve months, it will be repaired or exchanged and returned within three weeks. If the product is no longer under warranty, you will receive a repair estimate.