User Manual

Revision 1.100
English

Modbus Master / KNX - Converter

(Order Code: HD67812-KNX-232-B2, HD67812-KNX-485-B2)

For Website information:
www.adfweb.com?Product=HD67812

For Price information:
www.adfweb.com?Price=HD67812-KNX-232-B2
www.adfweb.com?Price=HD67812-KNX-485-B2

Benefits and Main Features:

- Very easy to configure
- Electrical isolation
- Temperature range: -40°C/+85°C (-40°F/+185°F)



For others KNX products, see also the following links:

Converter KNX to

www.adfweb.com?Product=HD67801	**(BACnet Master)**
www.adfweb.com?Product=HD67802	**(BACnet Slave)**
www.adfweb.com?Product=HD67803	**(CAN)**
www.adfweb.com?Product=HD67804	**(CANopen)**
www.adfweb.com?Product=HD67807	**(EtherNet/IP)**
www.adfweb.com?Product=HD67808	**(DeviceNet Master)**
www.adfweb.com?Product=HD67809	**(DeviceNet Slave)**
www.adfweb.com?Product=HD67810	**(J1939)**
www.adfweb.com?Product=HD67811	**(M-Bus Master/wM-Bus)**
www.adfweb.com?Product=HD67813	**(Modbus Slave)**
www.adfweb.com?Product=HD67814	**(Modbus TCP Master)**
www.adfweb.com?Product=HD67815	**(Modbus TCP Slave)**
www.adfweb.com?Product=HD67818	**(PROFINET Slave)**
www.adfweb.com?Product=HD67820	**(SNMP)**
www.adfweb.com?Product=HD67821	**(DMX)**

Do you have an your customer protocol?
www.adfweb.com?Product=HD67003

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

User Manual

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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	25/06/2015	Ff	All	Revision
1.003	26/02/2016	Nt	All	Revision
1.100	28/04/2026	Ln	All	Revision

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:

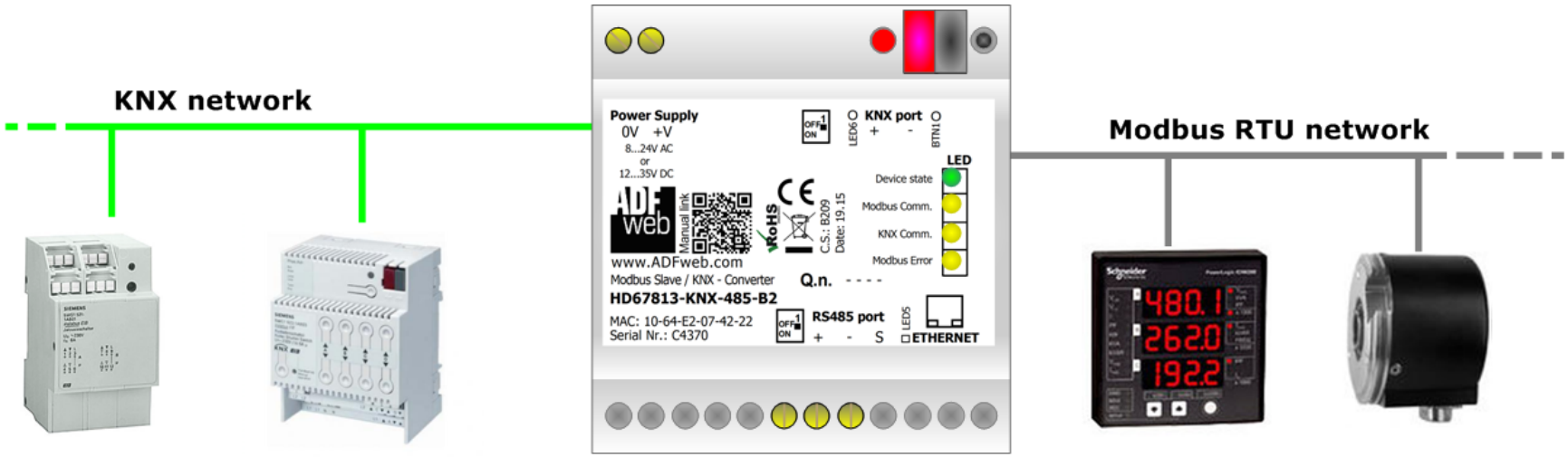


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

CE CONFORMITY

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

EXAMPLE OF CONNECTION:



CONNECTION SCHEME:

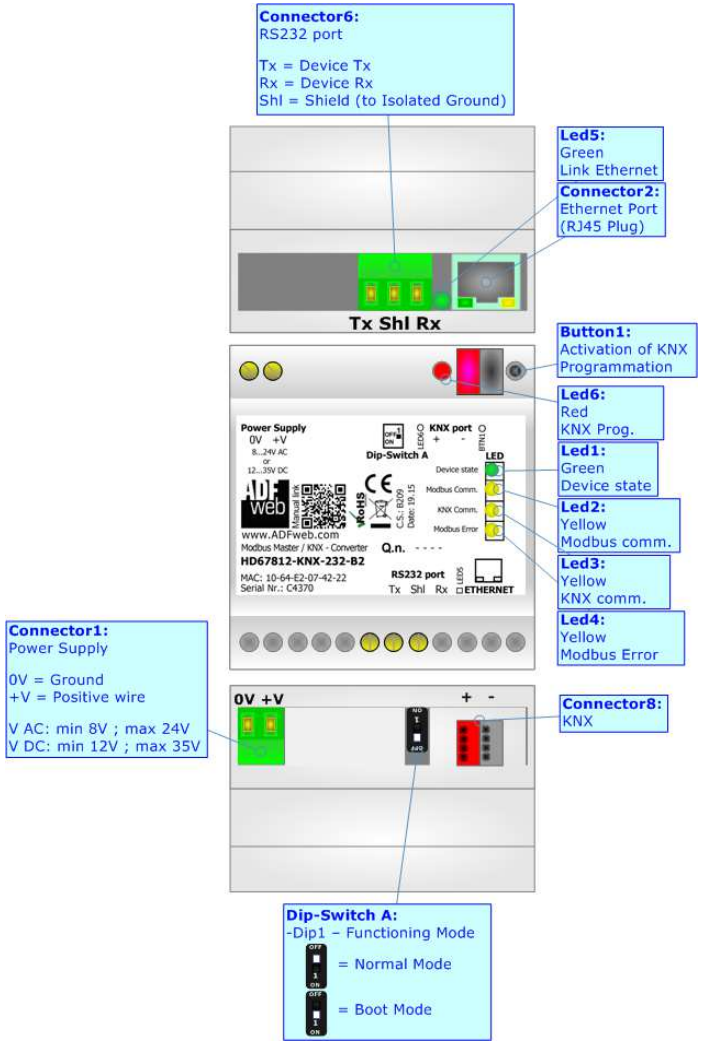


Figure 1a: Connection scheme for HD67812-KNX-232-B2

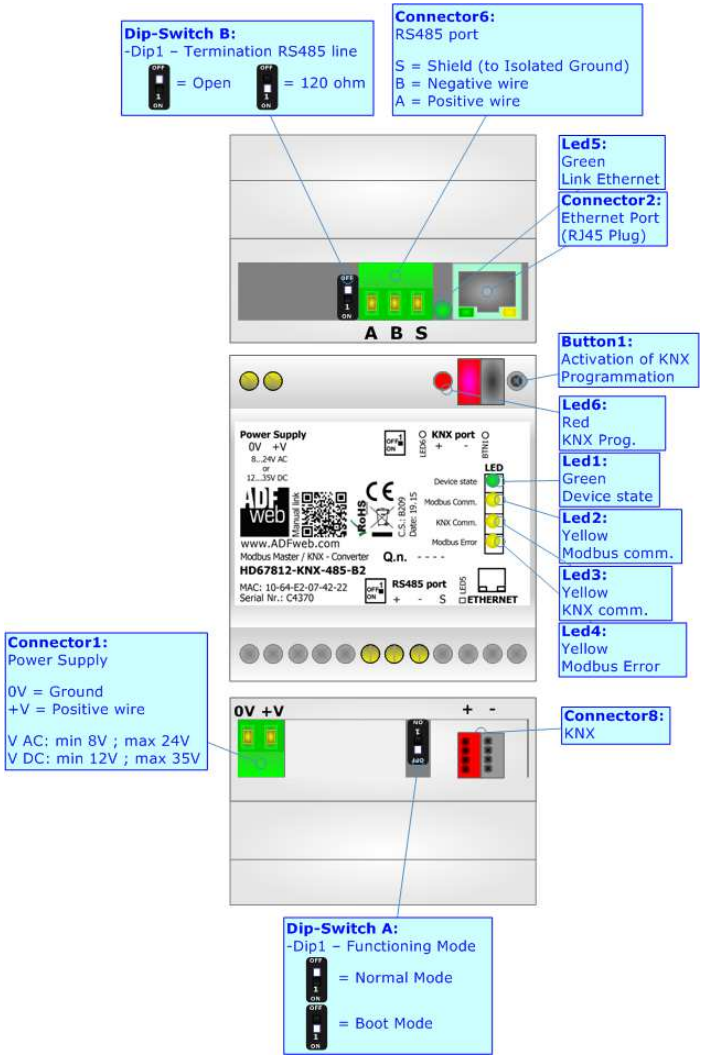


Figure 1b: Connection scheme for HD67812-KNX-485-B2

CHARACTERISTICS:

The HD67812 is a Modbus Master / KNX Converter.

It has the following characteristics:

- Up to 1440 bytes in reading and 1440 bytes in writing;
- Triple isolation between KNX - Power Supply, KNX – Serial, Power Supply - Serial.
- Two-directional information between KNX bus and Modbus bus;
- Mountable on 35mm Rail DIN;
- Wide power supply input range: 8…24V AC or 12…35V DC;
- Wide temperature range: -40°C / +85°C [-40°F / +185°F].

CONFIGURATION:

You need Compositor SW67812 software on your PC in order to perform the following:

- Define the parameter of Modbus line;
- Define the parameter of KNX line;
- Define the KNX messages that the Converter can accept;
- Define the KNX frames that the Converter sends trough the KNX line;
- Define the map of KNX byte that must be written in the Modbus side;
- Define the map of which Modbus registers must be written in KNX messages;
- Update the device.

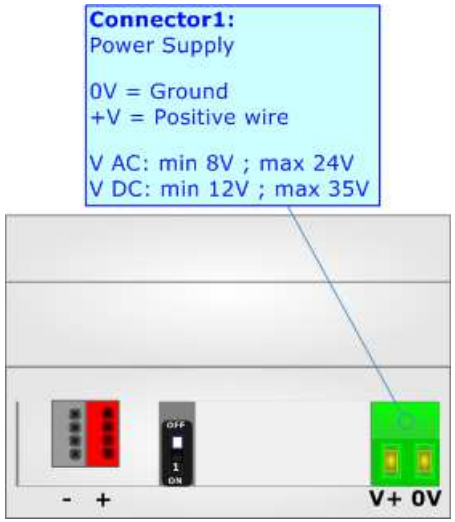
POWER SUPPLY:

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

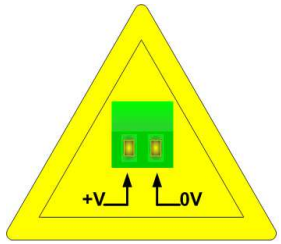
VAC ~		VDC ⎓	
Vmin	**Vmax**	**Vmin**	**Vmax**
8V	**24V**	**12V**	**35V**

Consumption at 24V DC:

Device	Consumption [W/VA]
HD67812-KNX-232-B2	3.5
HD67812-KNX-485-B2	3.5



Caution: Not reverse the polarity power



HD67812-KNX-232-B2
HD67812-KNX-485-B2

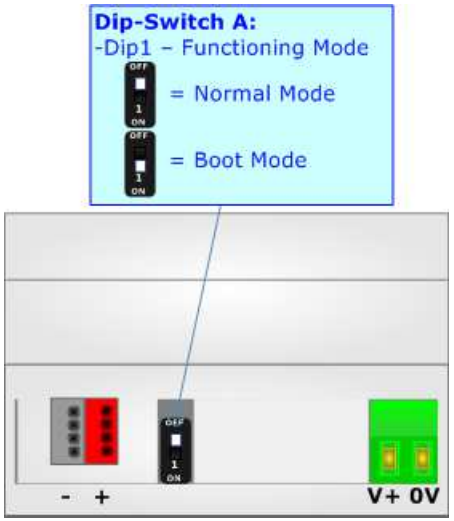
FUNCTION MODES:

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.

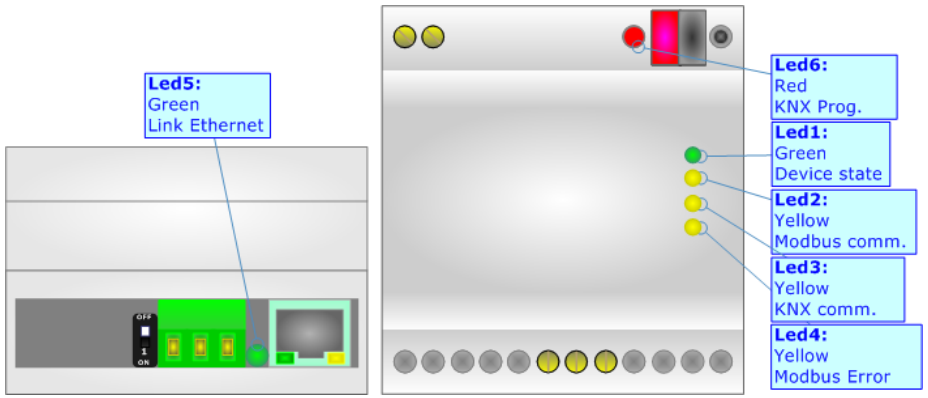
According to the functioning mode, the LEDs will have specifics functions, see 'LEDS' section.



LEDS:

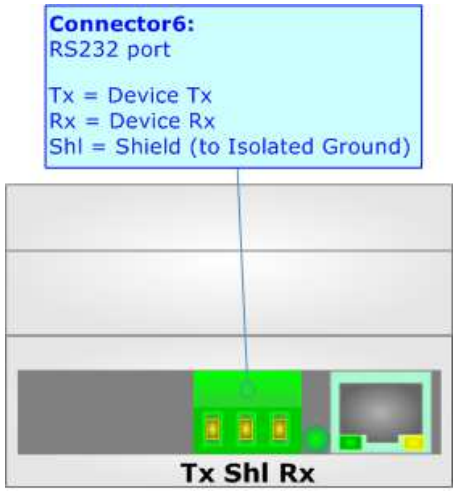
The device has got six LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: Device State (green)	Blinks slowly (~1Hz)	**ON:** Device powered **OFF:** Device not powered
2: Modbus comm. (yellow)	Blinks when Modbus frame (RS232/RS485) is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
3: KNX comm. (yellow)	Blinks when KNX frame is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: Modbus error (yellow)	**ON:** At least one Modbus request hasn't a correct response **OFF:** No errors are present	**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
6: KNX Programmation (red)	**ON:** KNX Programmation activated **OFF:** KNX Programmation not activated	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress



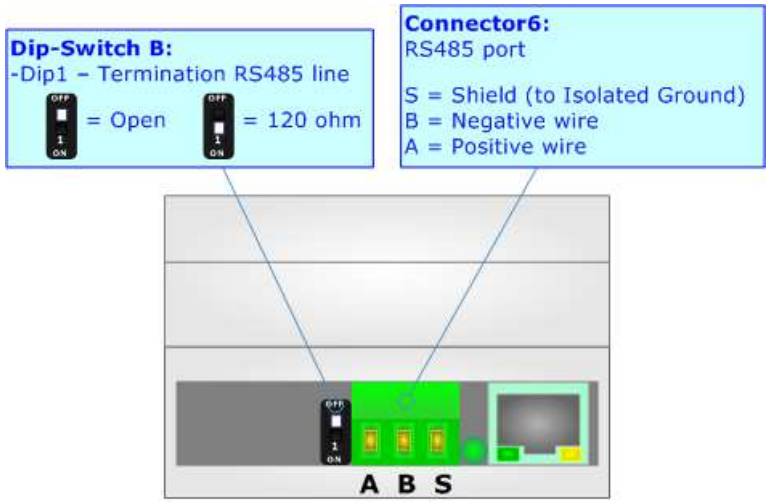
RS232:

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:

For terminate the RS485 line with a 220Ω resistor it is necessary to put ON dip 1, like in figure.



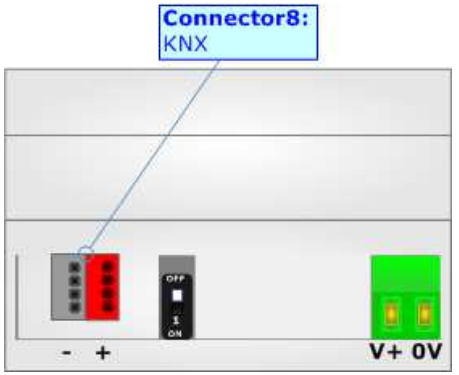
The maximum length of the cable should be 1200m (4000 feet).

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.

KNX:

KNX is the standard that allows the automated and decentralized management of the technologic plans of a big typology of structures: commercial buildings, factories, houses, public locals, schools and so on.
KNX can be used in all the applications and functions for the building automations: from lighting to control dampers, to the security, to the heating monitoring, to the conditioning, to the hydric control and alarms, to energy management and so on.

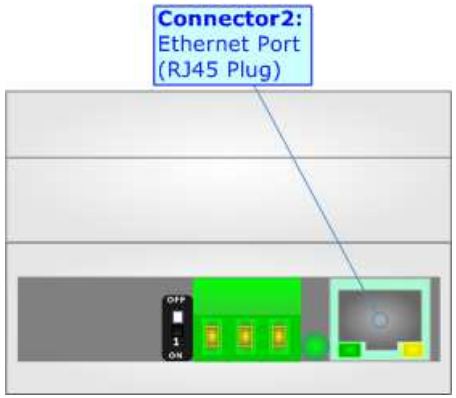


Characteristics	Description TP1-256
Medium	Shielded Twisted Pair
Topology	Linear, Star, Tree or mixed
Baudrate	9600 bps
Device supplying	Normal: bus powered devices Optional: remote powered devices
Device power consumption	3 mA- 12 mA
Power Supply Unit (PSU)	DC 30 V
Number of PSU's per physical Segment	Max. 2
Number of connectable devices per physical Segment	Max. 256
Number of addressable devices per physical Segment	Max. 255
Total cable length per physical Segment	Max. 1000 m
Distance between two devices	Max. 700 m

(*) Taken from KNX specifications

ETHERNET (PROGRAMMING PORT):

The Ethernet ports are used for programming the device.
The Ethernet connection must be made using Connector2 of HD67812-KNX-xxx-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 SW67812:

To configure the Converter, use the available software that runs with Windows called SW67812. It is downloadable on the site www.adfweb.com and its operation is described in this document. *(This manual is referenced to the last version of the software present on our web site)*. The software works with MSWindows (XP, Vista, Seven, 8, 10 or 11; 32/64bit).

When launching the SW67812, the window below appears (Fig. 2).

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

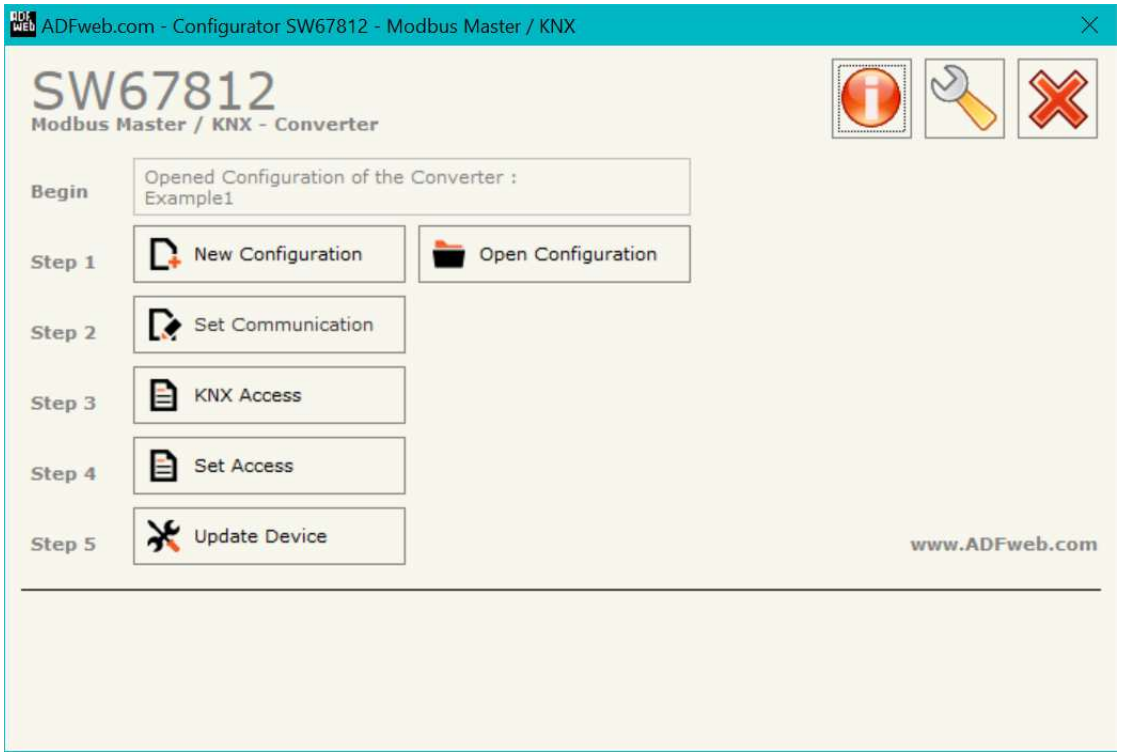
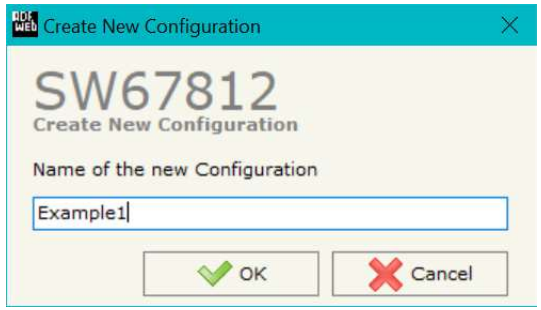


Figure 2: Main window for SW67812

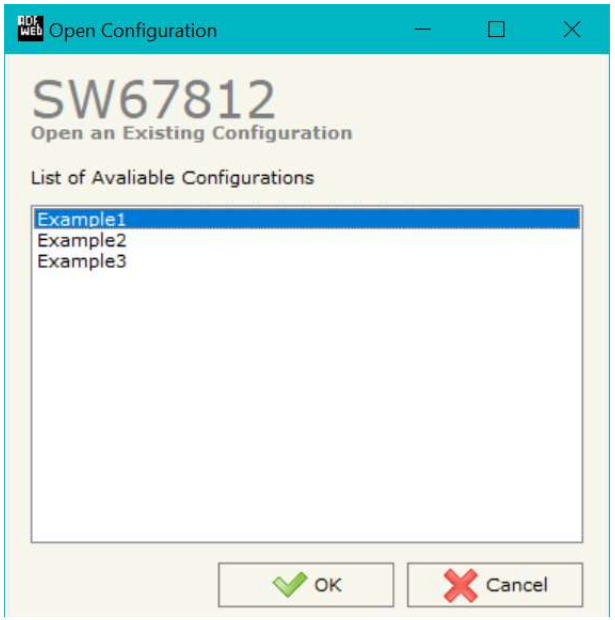
NEW CONFIGURATION / OPEN CONFIGURATION:

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 "Modbus Master / KNX - 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**".

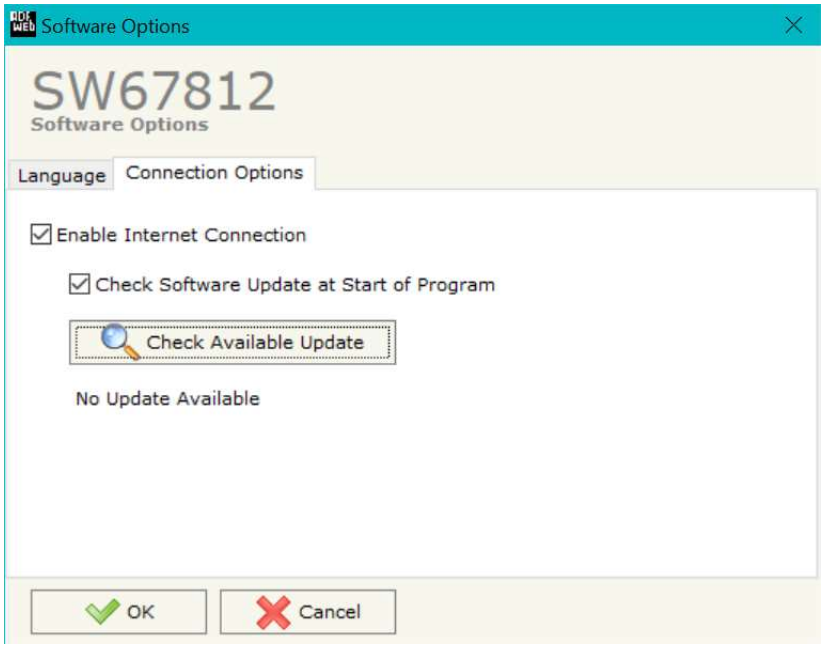


SOFTWARE OPTIONS:

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 SW67812 check automatically if there are updatings when it is launched.

SET COMMUNICATION:

This section define the fundamental communication parameters of two buses, KNX and Modbus.

By Pressing the "**Set Communication**" button from the main window for SW67812 (Fig. 2) the window "Set Communication" appears (Fig. 3).
The window is divided in three sections, one for the KNX, one for the Modbus and the other for Ethernet.

The means of the fields for "KNX" are:

- In the field "**Type**" the type of KNX is defined (fixd to 'KNX TP');
- In the field "**ID Device**" the ID of the KNX side of the converter is defined.

The means of the fields for the "Modbus Master" section are:

- In the field "**Serial**" the serial to use is defined (RS232 or RS485);
- In the field "**Baudrate**" the baudrate for the serial line is defined;
- In the field "**Parity**" the parity of the serial line is defined;
- In the field "**Data Bits**" the number of data bits used for the serial line communication is defined;
- In the field "**Stop Bits**" the number of Stop Bits of the serial line is defined;
- In the field "**TimeOut (ms)**" there is the maximum time that the device attends for the answer from the Slave interrogated;
- In the field "**Cyclic Delay (ms)**" the delay (idle time) between two Modbus requests is defined;
- In the field "**Modbus Type**" is possible to set the Ethernet protocol used (TCP or UDP).

The means of the fields for "Ethernet" are:

- In the fields "**IP ADDRESS**" insert the IP address that you want to give to the Converter;
- In the fields "**SUBNET Mask**" insert the SubNet Mask;
- In the fields "**GATEWAY**" insert the default gateway that you want to use. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net.

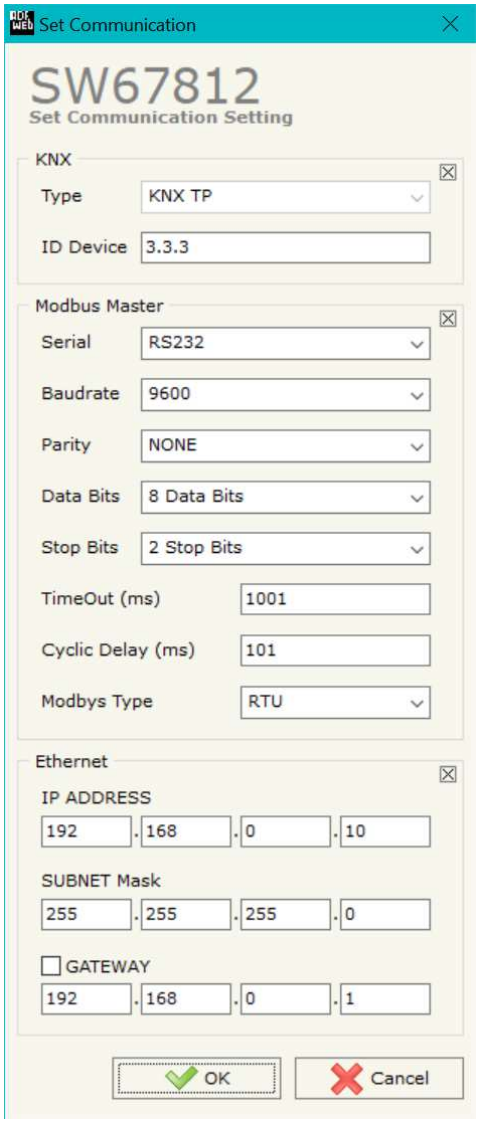


Figure 3: "Set Communication" window

KNX ACCESS:

By pressing the "**KNX Access**" button from the main window for SW67812 (Fig. 2) the "KNX Access" window appears (Fig. 4).

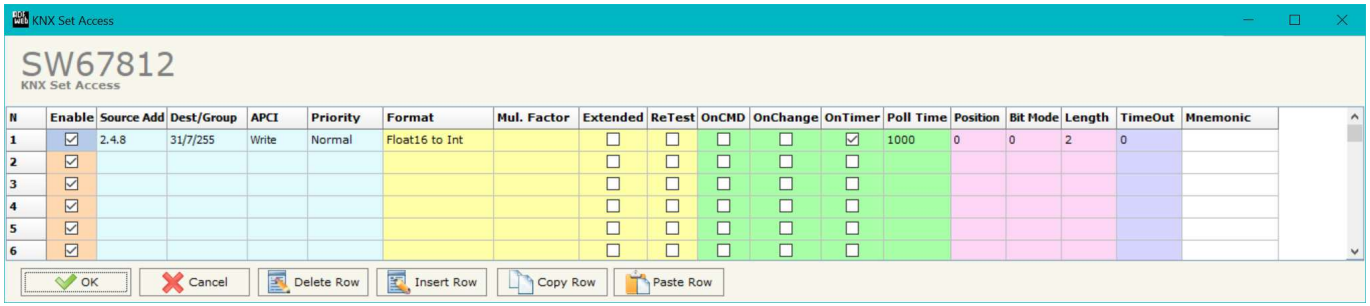


Figure 4: "KNX Access" window

The means of the fields are:

- If the field "**Enable**" is checked, the KNX message is enabled;
- In the field "**Source Address**" the Source Address to assign to the KNX message is defined;
- In the field "**Dest/Group** the Group address (2 level structure, 3 level structure or free address structure) or the device address is defined. In case of Group address, the levels must be separated by '/', in case of Device address, the parts of the address must be separated by '.';
- In the field "**APCI**" the APCI of the KNX message is defined. You can choose between the following:
  - Read: it is used to send a reading request to a KNX device;
  - Write: it is used to send a writing request to a KNX device;
  - Specific value (edited manually).
- In the field "**Priority**" the Priority of the KNX message is defined. You can choose between the following:
  - System (Highest);
  - Urgent;
  - Normal;
  - Low (Lowest).
- In the field "**Format**" the data format of the KNX message is defined;
- In the field "**Mul. Factor**" a Multiply Factor for the data is defined;
- If the field "**Extended**" is checked, the extended format of the KNX message is used;
- If the field "**ReTest**" is checked, the KNX message is re-sent in case of not correct response;
- If the field "**OnCMD**" is checked, the KNX request is sent when a Modbus request is received;
- If the field "**On Change**" is checked, the gateway sends the KNX command when the data on Modbus change the value;
- If the field "**On Timer**" is checked, the gateway sends the KNX command cyclically;

- In the field "**Poll Time**" the delay in ms between two KNX commands is defined (if "On Timer" is checked);
- In the field "**Position**" insert the address of the internal array where placing the information;
- In the field "**Bit Mode**" insert the start bit of the first byte of the field "Position" where start to insert the data read;
- In the field "**Lenght**" the dimension of the KNX message is defined;
- In the field "**Timeout**" the timeout in ms for KNX data point is defined. If the data point is not received for the time defined, the data on Modbus side are set to '0';
- In the field "**Mnemonic**" the description for the request is defined.

Note:
If the field "On change" is checked and the "Poll Time" is different from 0, the converter sends the KNX command cyclically and also when the data is changed.

Note:
If the field "OnCMD", "OnChange" and "OnTimer" are not checked, the converter only sniffs the bus in order to monitor the status of the KNX message.

SET ACCESS:

By pressing the "**Set Access**" button from the main window for SW67812 (Fig. 2) the window "Set Access" appears.

This window is divided in two parts, the "Modbus Read" (Fig. 5a) and the "Modbus Write " (Fig. 5b).
The first part "Modbus Read" is used to read the data from the Modbus slaves, and make them available on KNX network.
The second part "Modbus Write " is used to write the data that arrives from the KNX system into the Modbus slaves.

MODBUS READ

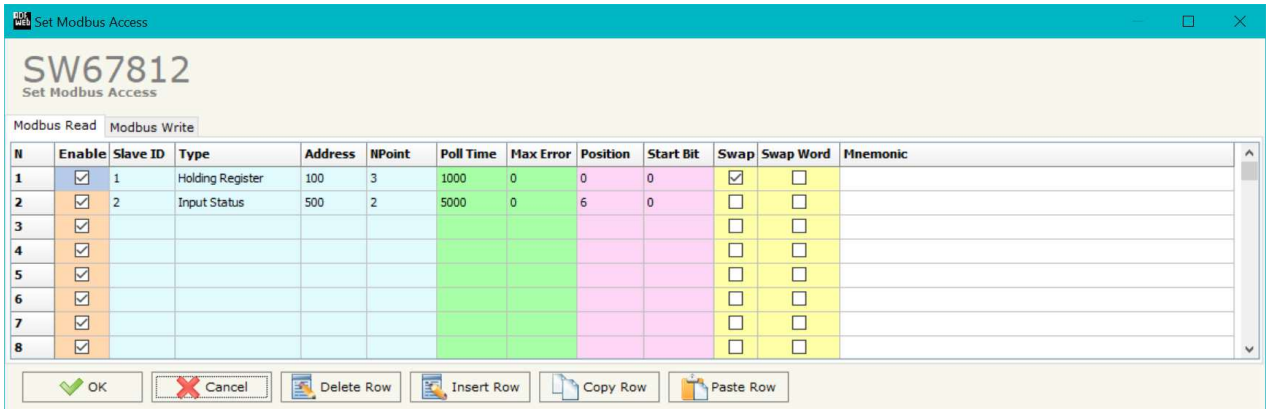


Figure 5a: "Set Access --> Modbus Read" window

The means of the fields are:

- If the field "**Enable**" is checked, the Modbus Request is enabled;
- In the field "**Slave ID**" the address of the Modbus device you have to read is defined;
- In the field "**Type**" insert the data type of the register you would like to read. You can choose between the following:
  - Coil Status;
  - Input Status;
  - Holding Register;
  - Input Register.
- In the field "**Address**" the start address of the register to be read is defined;
- In the field "**NPoint**" insert the number of consecutive registers to be read;
- In the field "**Poll Time**" insert the time to make this request;
- In the field "**Max Error**" is the number of errors continues that the gateway waits before suspending the poll until the next reboot. If is set to zero this function is disabled;
- In the field "**Position**" insert the address of the internal array where placing the information;
- In the field "**Start Bit**" insert the start bit of the first byte of the field "Position" where start to insert the data read. Valid only for the "Coil Status" and "Input Status";
- If the field "**Swap**" is checked, the data of the Modbus registers are swapped;

- If the field "**Swap Word**" is checked, the Modbus words are swapped;
- In the field "**Mnemonic**" the description for the request is defined.

MODBUS WRITE

The means of the fields are:

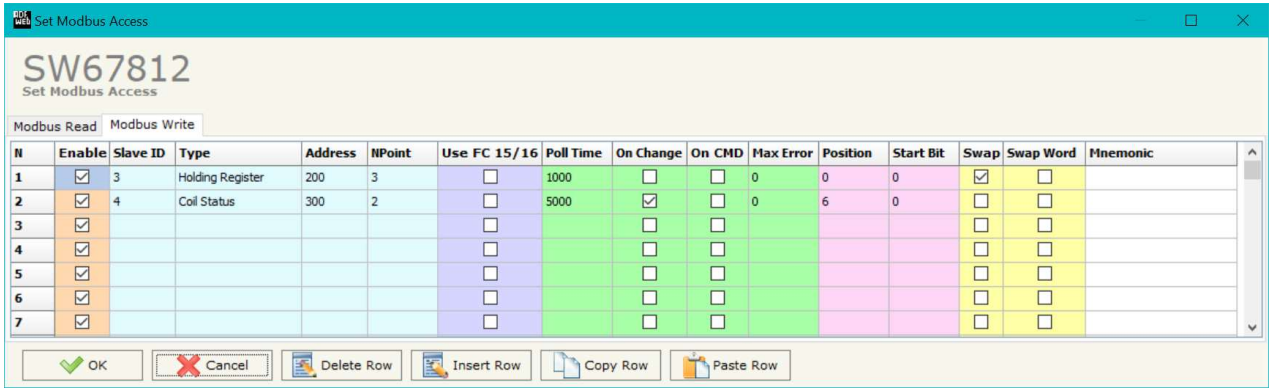


Figure 5b: "Set Access→Modbus Write" window

- If the field "**Enable**" is checked, the Modbus Request is enabled;
- In the field "**Slave ID**" the address of the Modbus device that you have to write is defined;
- In the field "**Type**" insert the data type of the register you would like to read. You can choose between the following:
  - Coil Status;
  - Holding Register.
- In the field "**Address**" the start address of the register to be written is defined;
- In the field "**NPoint**" insert the number of consecutive registers to be written;
- If the field "**Force FC16**" is checked, the Modbus writing function used will be in any case 15 (for Coil Status) or 16 (for Holding Register);
- In the field "**Poll Time**" insert the time to make this request;
- If the field "**On Change**" is checked, the gateway send the Write request in Modbus when the data change the value;
- If the field "**On CMD**" is checked, the converter sends the writing request when the data from KNX is received;
- In the field "**Max Error**" is the number of errors continues that the gateway waits before suspending the poll until the next reboot. If is set to zero this function is disabled;
- In the field "**Position**" insert the address of the internal array where read the information;
- In the field "**Start Bit**" insert the start bit of the first byte of the field "Position" where start to read the data to write. Valid only for the "Coil Status";
- If the field "**Swap**" is checked, the data from the Modbus registers are swapped;
- If the field "**Swap Word**" is checked, the Modbus words are swapped;
- In the field "**Mnemonic**" the description for the request is defined.

Note:
If you want that the converter sends the data only "On change" the "Poll Time" must be at 0.

Note:
If the field "On change" is checked and the "Poll Time" is different from 0, the converter sends the Write request cyclically and also when the data is changed.

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.

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**";
- Press the "**Ping**" button, "Device Found!" must appear;
- Press the "**Next**" button;
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" turn off the Device;
- Put Dip1 of 'Dip-Switch A' at OFF position;
- Turn on the device.

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

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;
- Press the "**Ping**" button, must appear "Device Found!";
- Press the "**Next**" button;
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" the device automatically goes at Normal Mode.



Figure 6: "Update device" windows

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

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 HD67812 device.

Note:
When you receive the device, for the first time, you also have to update the Firmware in the HD67812 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;
- If you are using the program inside a Virtual Machine, try to use in the main Operating System;
- If you are using Windows Seven or Vista or 8, 10 or 11, make sure that you have the administrator privileges;
- Take attention at Firewall lock;
- Check the LAN settings.

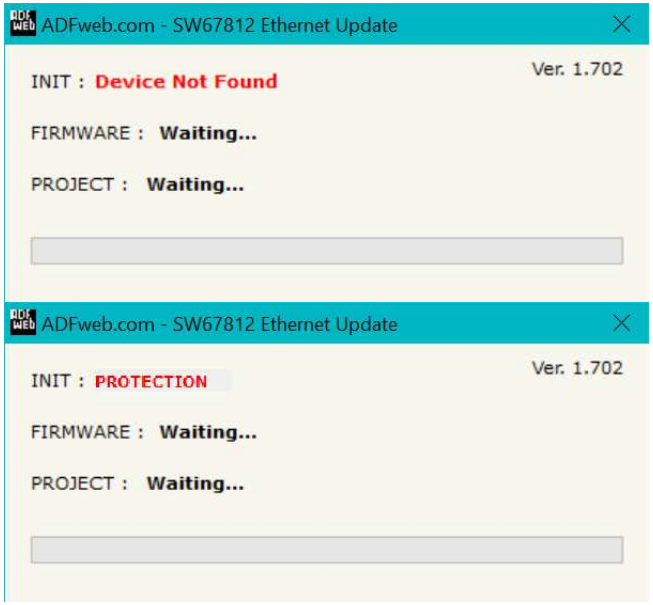


Figure 7: "Protection" window

In the case of HD67812 you have to use the software "SW67812": www.adfweb.com\download\filefold\SW67812.zip.

MECHANICAL DIMENSIONS:

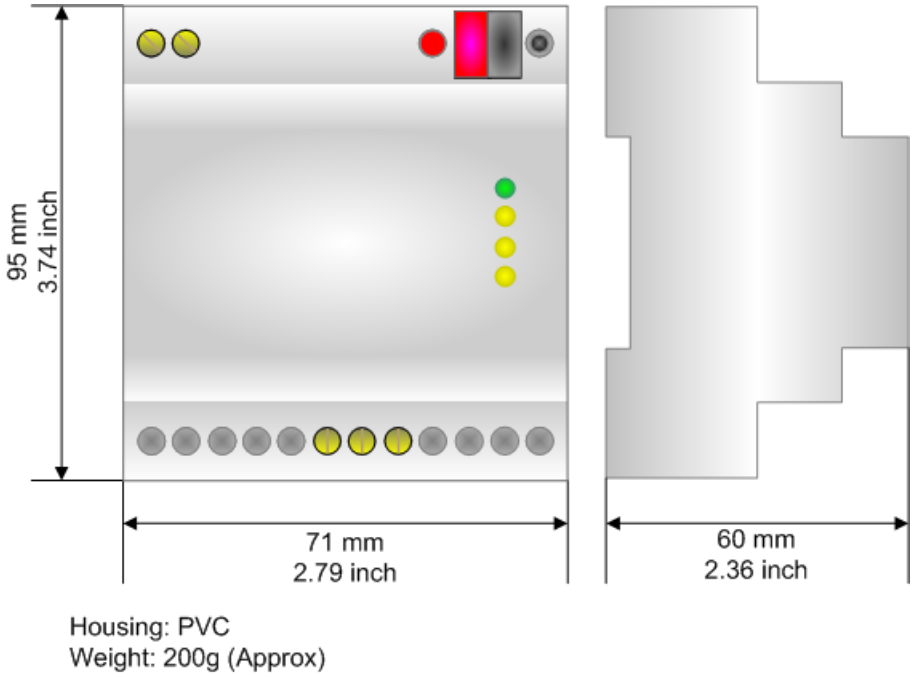


Figure 8: Mechanical dimensions scheme for HD67812-KNX-xxx-B2

ORDERING INFORMATIONS:

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

HD67812 – KNX – xxx – B 2

Connectors Type
2: Fixed 5mm Screw Terminal

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

Serial Type
232: RS232
485: RS485

Device Family
HD67812-KNX: Modbus Master / KNX - Converter

Order Code: **HD67812-KNX-232-B2** - Modbus Master / KNX – Converter (Modbus port: RS232)
Order Code: **HD67812-KNX-485-B2** - Modbus Master / KNX – Converter (Modbus port: RS485)

ACCESSORIES:

Order Code: **AC34011** - Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V DC
Order Code: **AC34012** - 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 2011/65/EU + 2015/863 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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