Industrial Electronic Devices

User Manual

Revision 1.003
English

DeviceNet Master / Modbus Slave - Converter

(Order Code: HD67151-A1 – HD67151-B2)

for Price information:

► Very easy to configure

► Low cost

► Rail mountable

► Wide supply input range

► Galvanic isolation between two buses

► Industrial temperature range:
  -40°C / 85°C (-40°F / 185°F)

HD67151-A1

HD67151-B2

INDEX:

UPDATED DOCUMENTATION:

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REVISION LIST:

Revision	Date	Author	Chapter	Description
1.000	22/04/2010	Fl	All	First release version
1.001	22/07/2011	Fl	All	Software changed (v1.000)
1.002	20/03/2012	Fl	All	Change Leds description
1.003	13/02/2013	Nt	All	Added new chapters

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SECURITY ALERT:

GENERAL INFORMATION
To ensure safe operation, the device must be operated according to the instructions in the manual. When using the device 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 or give us a call if you need it.

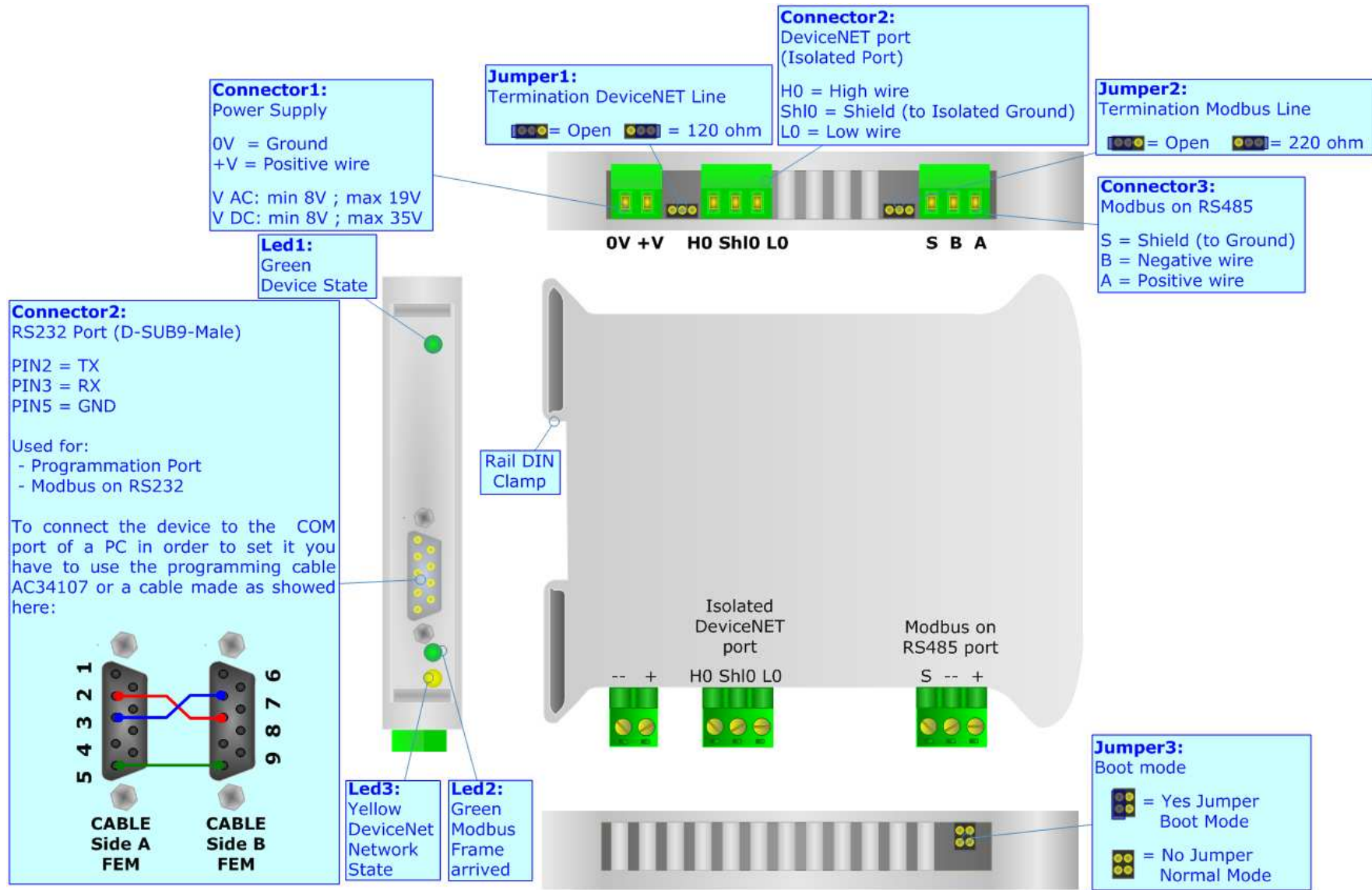*ADFweb.com Srl – IT31010 – Mareno – Treviso*   *INFO:* www.adfweb.com   *Phone +39.0438.30.91.31*

![ADFweb logo]

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CONNECTION SCHEME:

Connector1:
Power Supply

0V = Ground
+V = Positive wire

V AC: min 8V ; max 19V
V DC: min 8V ; max 35V

Led1:
Green
Device State

Connector2:
RS232 Port (D-SUB9-Male)

PIN2 = TX
PIN3 = RX
PIN5 = GND

Used for:
- Programmation Port
- Modbus on RS232

To connect the device to the COM port of a PC in order to set it you have to use the programming cable AC34107 or a cable made as showed here:

CABLE Side A FEM   CABLE Side B FEM

Jumper1:
Termination DeviceNET Line

= Open   = 120 ohm

Connector2:
DeviceNET port
(Isolated Port)

H0 = High wire
Shl0 = Shield (to Isolated Ground)
L0 = Low wire

0V +V   H0 Shl0 L0   S B A

Jumper2:
Termination Modbus Line

= Open   = 220 ohm

Connector3:
Modbus on RS485

S = Shield (to Ground)
B = Negative wire
A = Positive wire

Rail DIN Clamp

Isolated DeviceNET port

-- +   H0 Shl0 L0

Modbus on RS485 port

S -- +

Led3:
Yellow
DeviceNet
Network
State

Led2:
Green
Modbus
Frame
arrived

Jumper3:
Boot mode

= Yes Jumper
Boot Mode

= No Jumper
Normal Mode

Figure 1: Connection scheme for HD67151-A1

Jumper2:
Termination Modbus Line

[icon] = Open   [icon] = 220 ohm

Jumper3:
Boot mode

[icon] = Yes Jumper Boot Mode

[icon] = No Jumper Normal Mode

Led2:
Yellow Modbus Frame arrived

Led3:
Green DeviceNet Network State

Connector3:
Modbus on RS485 (Isolated Port)

S = Shield (to Isolated Ground)
B = Negative wire
A = Positive wire

Jumper1:
Termination DeviceNET Line

[icon] = Open   [icon] = 120 ohm

Connector2:
DeviceNET port (Isolated Port)

H0 = High wire
Shl0 = Shield (to Isolated Ground)
L0 = Low wire

Connector4:
RS232 Port (D-SUB9-Male)

PIN2 = TX
PIN3 = RX
PIN5 = GND

Used for:
- Programmation Port
- Modbus on RS232

To connect the device to the COM port of a PC in order to set it you have to use the programming cable AC34107 or a cable made as showed here:

Connector1:
Power Supply

0V = Ground
+V = Positive wire

V AC: min 8V ; max 19V
V DC: min 8V ; max 35V

Led1:
Green Device State

A B S   L0 Shl0 H0

0V +V

CABLE Side A FEM   CABLE Side B FEM

Figure 2: Connection scheme for HD67151-B2

CHARACTERISTICS:

The Modbus Slave from/to DeviceNet Master Gateway allows the following characteristics:

- Two-directional information between Modbus and DeviceNet bus;
- Electrical isolation between two buses;
- Power supply of 8…19 VAC 4VA or 8…35 VDC 4W;
- 35mm Rail DIN mounting;
- Temperature range -40°C to 85°C.

CONFIGURATION:

You need Compositor SW67151 software on your PC in order to perform the following:

- Define the parameters of Modbus;
- Define the parameters of DeviceNet;
- Define the read/write registers;
- Update the Firmware and/or the Project.

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POWER SUPPLY:

The device 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	W/VA
HD67151-A1	4
HD67151-B2	4

Caution: Not reverse the polarity power

0V ⌐ ¬ +V

+V ⌐ ¬ 0V
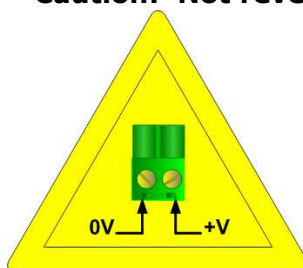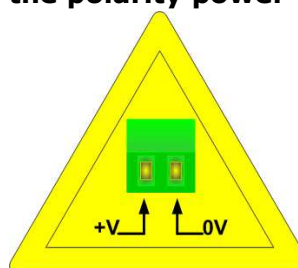
HD67151-A1   HD67151-B2

Connector1:
Power Supply
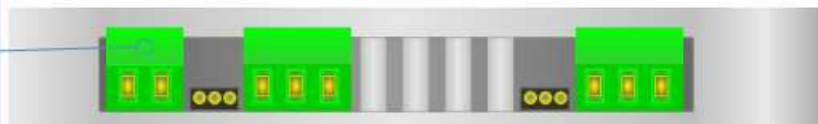
0V = Ground
+V = Positive wire

V AC: min 8V ; max 19V
V DC: min 8V ; max 35V

Connector1:
Power Supply

0V = Ground
+V = Positive wire

V AC: min 8V ; max 19V
V DC: min 8V ; max 35V

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FUNCTION MODES:

The device has got two functions mode depending of the position of the 'Jumper 3':

- The first, with 'Jumper 3' not inserted (factory setting), is used for the normal working of the device.

- The second, with 'Jumper 3' 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).
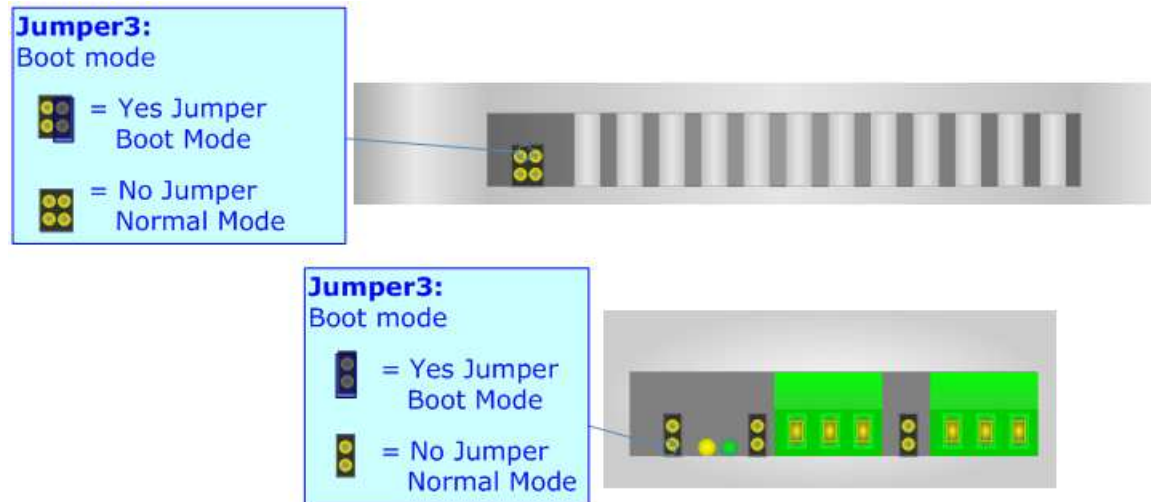
LEDS:

The device has got three green 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	Blink slowly	Blink quickly
2: Modbus Frame Arrived	Change state when a Modbus frame, addressed to the Gateway, arrives	Off
3: DeviceNet Network State	**Off:** All DeviceNet Slaves Nodes are present **On:** At least one DeviceNet Slave Node isn't present	Off

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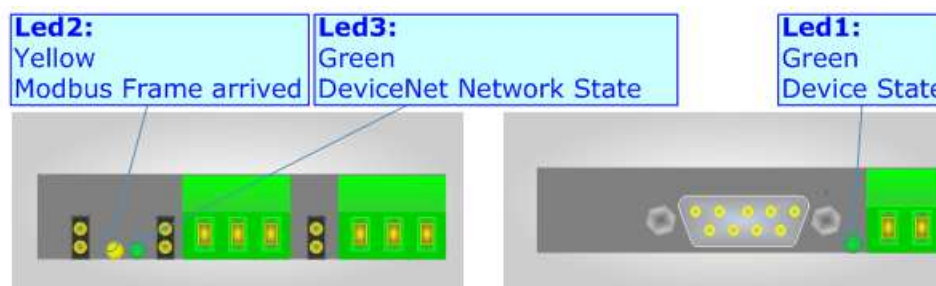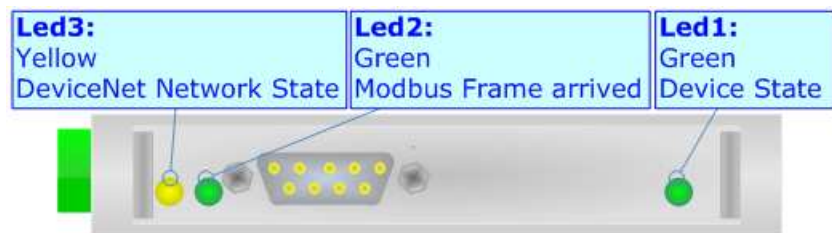
USE OF COMPOSITOR SW67151:

To configure the Gateway, use the available software that runs with Windows, called SW67151. It is downloadable on the site www.adfweb.com and its operation is described in this document.

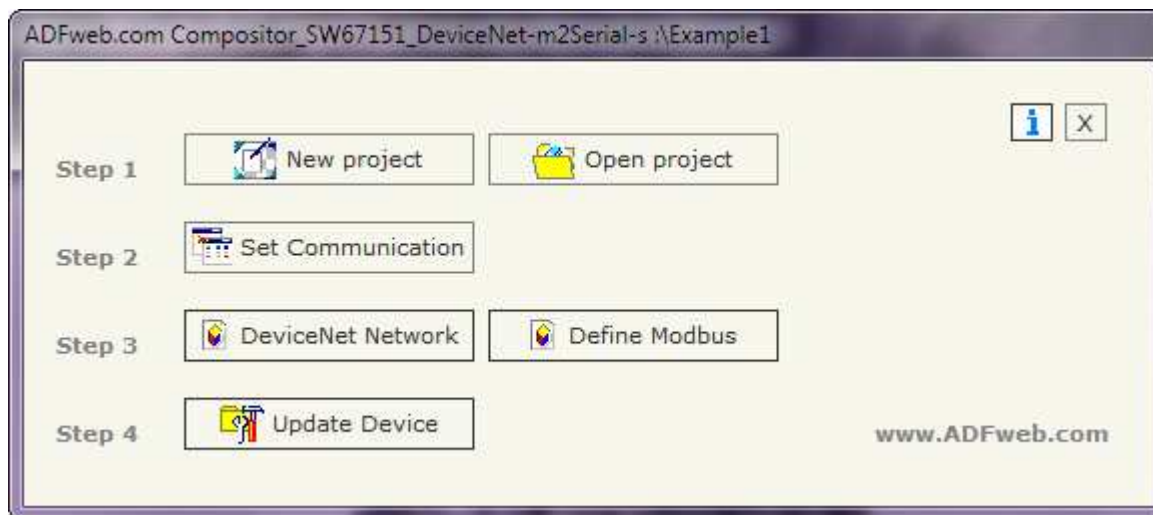When launching the SW67151 the right window appears (Fig. 3).

Figure 3: Main window for SW67151

NEW PROJECT / OPEN PROJECT:

The "**New Project**" button creates the folder which contains the entire device configuration.
A device configuration can also be imported or exported:

+ To clone the configurations of a Programmable Modbus Slave from/to DeviceNet Master Gateway 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 Project**".

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SET COMMUNICATION:

This section defines the fundamental communication parameters of two Buses Modbus and DeviceNet.

By pressing the "**Set Communication**" button from the main window for SW67151 (Fig. 3) the "SET COMMUNICATION" window appears (Fig. 4).

This window is divided in two sections, one for the DeviceNet and the other for the Modbus.

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

- In the "**ID Dev.**" field the Gateway address of the DeviceNet is defined.
- In the "**Baud rate**" field the DeviceNet baud rate is defined.

The means of the fields for "Serial" are:

- If the field "**RS232**" is checked, the serial line in use is the RS232, otherwise if the field "**RS485**" is checked, the serial line in use is the RS485;
- In the field "**Baud Rate**" the baudrate for the serial line is defined;
- In the field "**Parity**" the parity of the serial line is defined;
- In the field "**ID Dev.**" insert the ID of the Modbus Slave device;
- In the subsection "**Protocol**" it is possible to select the protocol that you wish to use between the following:
  - "**Modbus RTU**";
  - "**Modbus ASCII**";
  - "**JBUS**";
  - Simple "**Binary**" Protocol;
  - Simple "**ASCII**" Protocol.

Figure 4: "Set Communication" window

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DEVICENET NETWORK:

By pressing the "**DeviceNet Network**" button from the main window for SW67151 (Fig. 3) the window "DeviceNet Network" appears (Fig. 5).

Here it is possible to define the Slaves DeviceNet Devices with their ID, number of Input and number of Output bytes.

The data of the columns have the following meanings:
- In the field "**ID**" the ID of a slave DeviceNet device is defined;
- In the field "**N BYTE IN**" the number of input byte of the slave DeviceNet is defined;
- In the field "**N BYTE OUT**" the number of output byte of the slave DeviceNet is defined;
- In the field "**Mnemonic**" is possible to insert a description. It isn't necessary compiling this field, is only a label.
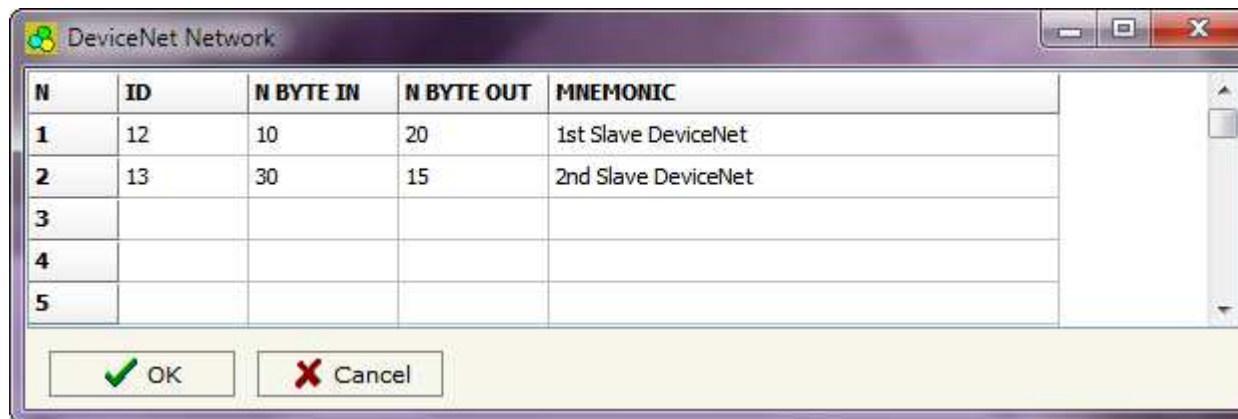
N	ID	N BYTE IN	N BYTE OUT	MNEMONIC
1	12	10	20	1st Slave DeviceNet
2	13	30	15	2nd Slave DeviceNet
3				
4				
5				

Figure 5: "Set Access" window

![ADFweb logo] Industrial Electronic Devices

DEFINE REGISTERS:

By pressing the "**Define Modbus**" button from the main window for SW67151 (Fig. 3) the window "Modbus Registers Definition" appears (Fig. 6).

The window is defined in two sections: the first (Fig. 6) is "**Modbus Register in Read**" and allows to insert the modbus registers that a master read for knowing the values of Output data of a DeviceNet slave device; the second (Fig. 7). is "**Modbus Register in Write**" and allows to insert the Modbus registers that a master writes. The values of these registers going to be the Input data of the Slaves DeviceNet.

MODBUS REGISTER IN READ

In the list "**Correlated**" there are the IDs of the slaves DeviceNet who you have defined in the section "DeviceNet Network" with their number of OUT byte.
In the field "**MODBUS**" there are the Modbus registers that you have created for the selected slave DeviceNet.

After selecting a DeviceNet ID you have to add the various Modbus registers that contains the OUT data of a slave DeviceNet. For doing this you have to fill the fields at the right side of the window; the means of that fields are:

- In the field "**Index Modbus**" the address of the register to be read is defined;
- In the field "**Translate in High MODBUS Byte**" you have to select which DeviceNet byte occupy the highest position of the Modbus Register;
- In the field "**Translate in Low MODBUS Byte**" you have to select which DeviceNet byte occupy the lowest position of the Modbus Register.
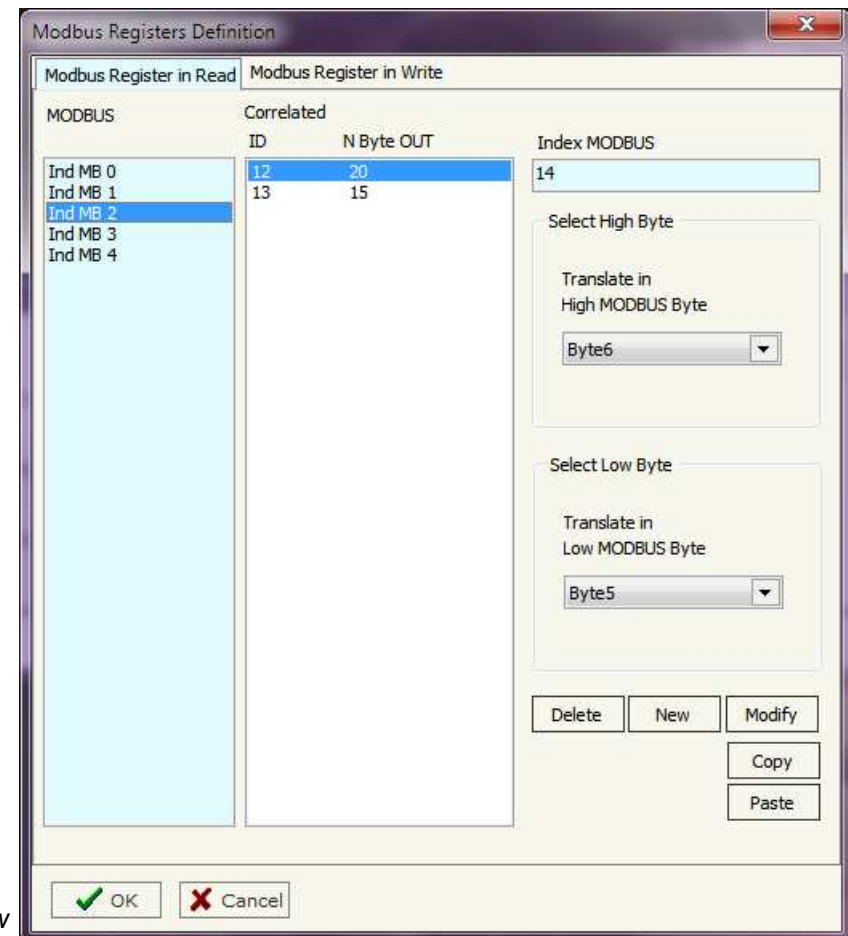

Figure 6: "*Modbus Registers Definition*" *window*

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MODBUS REGISTER IN WRITE

In the field "**Correlated**" there are the IDs of the slaves DeviceNet who you have defined in the section "DeviceNet Network" with their number of IN byte.

In the field "**MODBUS**" there are the Modbus registers that you have created for the selected slave DeviceNet.

After selecting a DeviceNet ID you have to add the various Modbus registers that contains the IN data of a slave DeviceNet. For doing this you have to fill the fields at the right side of the window; the means of that fields are:

➔ In the field "**Index Modbus**" the address of the register to be write is defined;
➔ In the field "**Translate in High MODBUS Byte**" you have to select where the highest position of the Modbus Register go in the DeviceNet IN array;
➔ In the field "**Translate in Low MODBUS Byte**" you have to select where the lowest position of the Modbus Register go in the DeviceNet IN array.
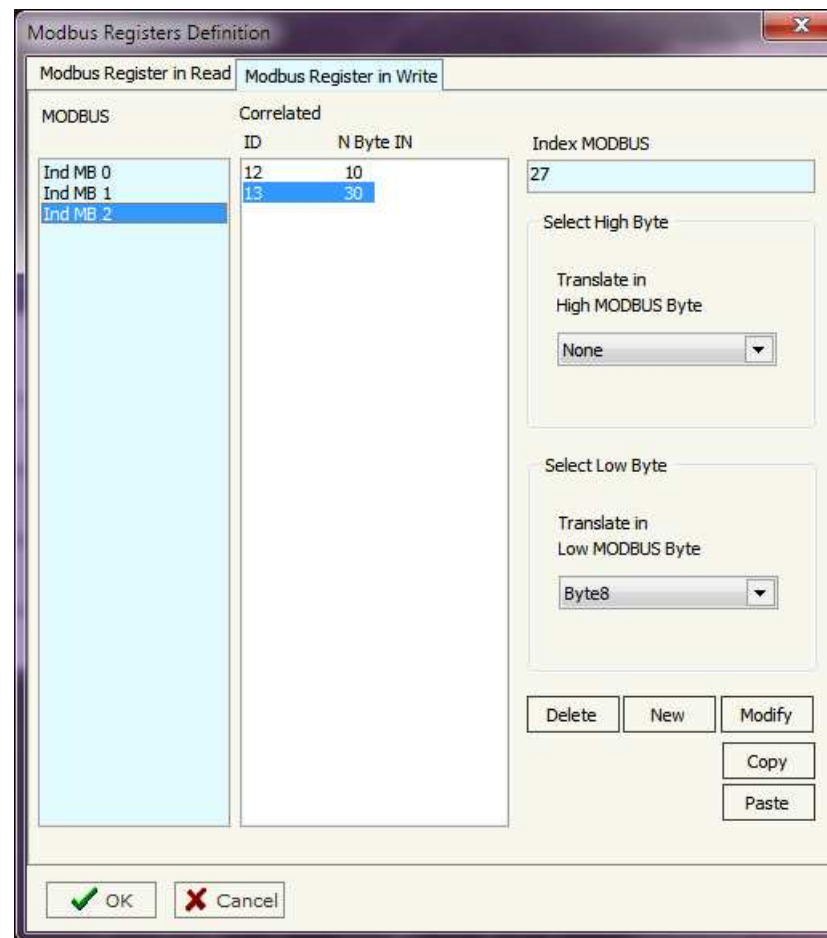
Figure 7: "Define Registers" window

UPDATE DEVICE:

Section "Update Firmware" (Fig. 8):
In order to load the parameters or update the firmware in the device, follow these instructions:

- Turn off the Device;
- Connect the Null Modem Cable form your PC to the Gateway;
- Insert the Boot Jumper (For more info see Fig. 1 or Fig. 2);
- Select the COM port and press the "Connect" button;
- Turn on the device;
- Check the BOOT Led. It must blink quickly (For more info see Fig. 1 or Fig. 2);
- 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;
- Disconnect the Boot jumper;
- Disconnect the RS232 Cable;
- Turn on the device.

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

![Note icon] Note:
    When you install a new version of the software it is better if the first time you do the update of the Firmware in the HD67151-xx device.

![Warning icon] Warning:
    If the Fig. 9 appears when you try to do the Update before require assistance try these points:
- Check if the serial COM port selected is the correct one;
- Check if the serial is connected between the PC and the device;
- Try to repeat the operations for the updating;
- If you are using a dongle try with a native COM port or change the dongle;
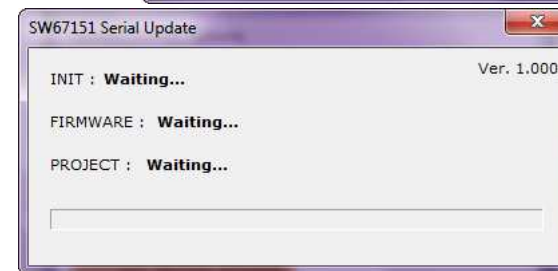- Try with another PC.

Figure 8: "Update Device" windows

Figure 9: "Protection" window

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CHARACTERISTICS OF THE CABLES:

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).
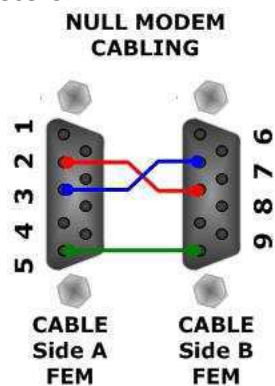It is recommended that the RS232C Cable not exceed 15 meters.

Figure 10: Null modem cabling

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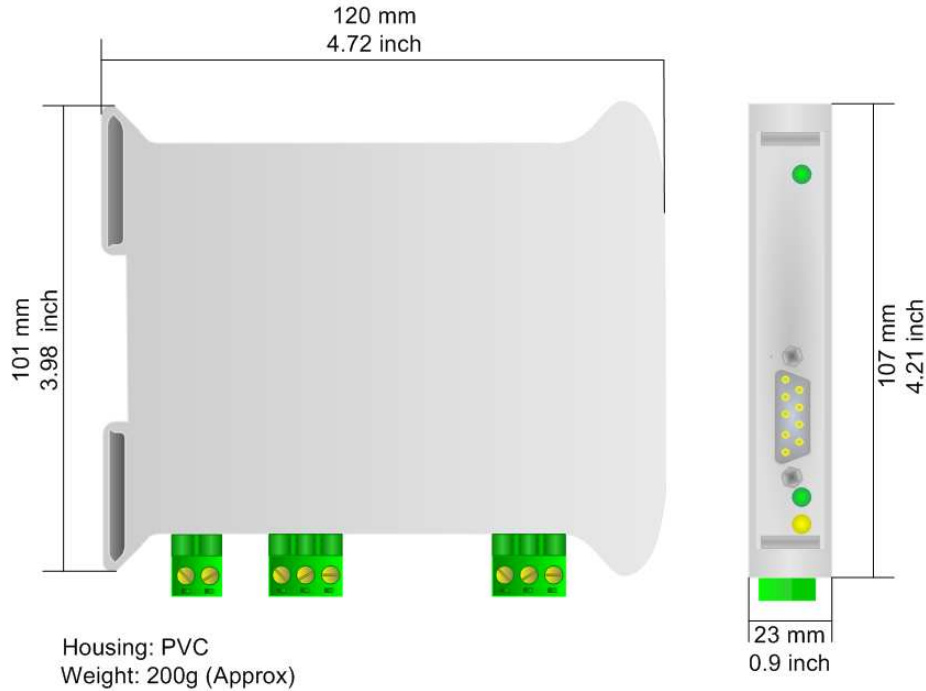
MECHANICAL DIMENSIONS:

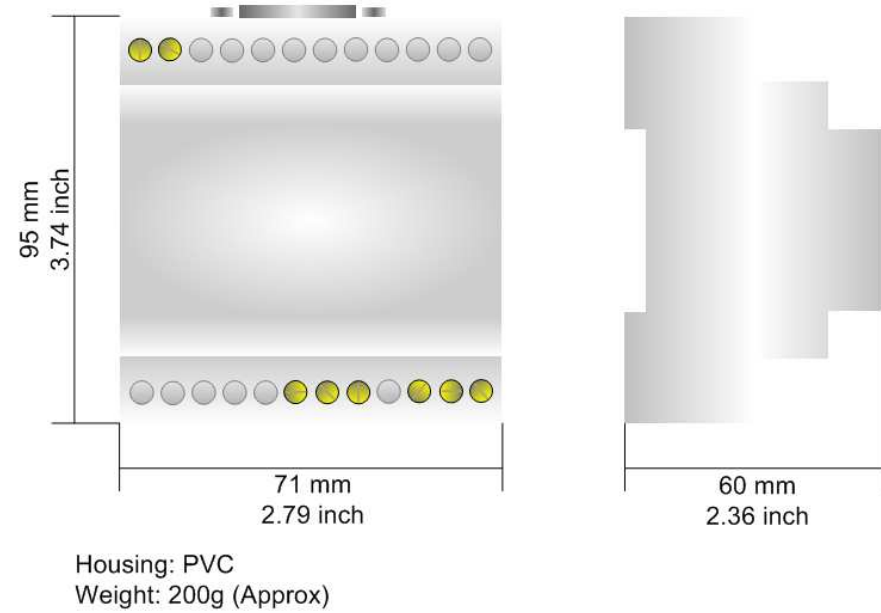*Figure 11: Mechanical dimensions scheme for HD67151-A1*

Figure 12: Mechanical dimensions scheme for HD67151-B2

ORDER CODE:

Order Code: **HD67151-A1-**   DeviceNet Master / Modbus Slave - Converter

Order Code: **HD67151-B2-**   DeviceNet Master / Modbus Slave - Converter

ACCESSORIES:

Order Code: **AC34107**   -   Null Modem Cable Fem/Fem DSub 9 Pin 1,5 m

Order Code: **AC34114**   -   Null Modem Cable Fem/Fem DSub 9 Pin 5 m

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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.

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WARRANTIES AND TECHNICAL SUPPORT:

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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).
3) 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.

PRODUCTS AND RELATED DOCUMENTS:

Part	Description	URL
HD67117	CAN Repeater/Isolator	www.adfweb.com?Product=HD67117
HD67221	Translate CAN bus Gateway	www.adfweb.com?Product=HD67221
HD67316	CAN, CANopen, J1939, DeviceNet, NMEA2000 Analyzer	www.adfweb.com?Product=HD67316