User Manual
Revision 1.100
English

Modbus Slave / Modbus Slave - Converter

(Order Code: HD67147-A1)

For Website information:
www.adfweb.com/?Product=HD67147

For Price information:
www.adfweb.com/?Price=HD67147-A1

Benefits and Main Features:

✦ Modbus up to 115200bps

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

User Manual
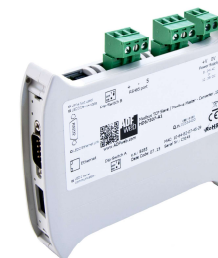
For others Modbus devices, see also the following links:

Modbus Slave from/to …

www.adfweb.com?Product=HD67002	(**CANopen**)
www.adfweb.com?Product=HD67012	(**CAN**)
www.adfweb.com?Product=HD67029	(**M-Bus**)
www.adfweb.com?Product=HD67138	(**DeviceNet Slave**)
www.adfweb.com?Product=HD67151	(**DeviceNet Master**)
www.adfweb.com?Product=HD67212	(**J1939**)
www.adfweb.com?Product=HD67222	(**NMEA 2000**)
www.adfweb.com?Product=HD67510	(**Modbus TCP Master**)
www.adfweb.com?Product=HD67516	(**Modbus TCP Master**)
www.adfweb.com?Product=HD67517	(**DMX**)
www.adfweb.com?Product=HD67580	(**PROFIBUS Master**)
www.adfweb.com?Product=HD67592	(**EtherNet/IP**)
www.adfweb.com?Product=HD67616	(**NMEA0183**)
www.adfweb.com?Product=HD67672	(**BACnet IP Slave**)
www.adfweb.com?Product=HD67712	(**BACnet IP Master**)
www.adfweb.com?Product=HD67734	(**IEC 61850 Server**)
www.adfweb.com?Product=HD67765	(**IEC 61850 Client**)
www.adfweb.com?Product=HD67813	(**KNX**)
www.adfweb.com?Product=HD67843	(**DALI**)
www.adfweb.com?Product=HD67861	(**IO-Link Master**)
www.adfweb.com?Product=HD67934	(**MQTT**)
www.adfweb.com?Product=HD67962	(**IO-Link Slave**)
www.adfweb.com?Product=HD67C52	(**EnOcean**)
www.adfweb.com?Product=HD67D02	(**LoRaWAN**)
www.adfweb.com?Product=HD67E02	(**EtherCAT Slave**)
www.adfweb.com?Product=HD67E52	(**EtherCAT Master**)
www.adfweb.com?Product=HD67F02	(**LoRaWAN Gateway**)

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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
1.001	12/02/2012	Dp	All	Revision
1.002	13/02/2013	Nt	All	Added new chapters
1.100	03/10/2024	Ln	All	New hardware version

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Industrial Electronic Devices

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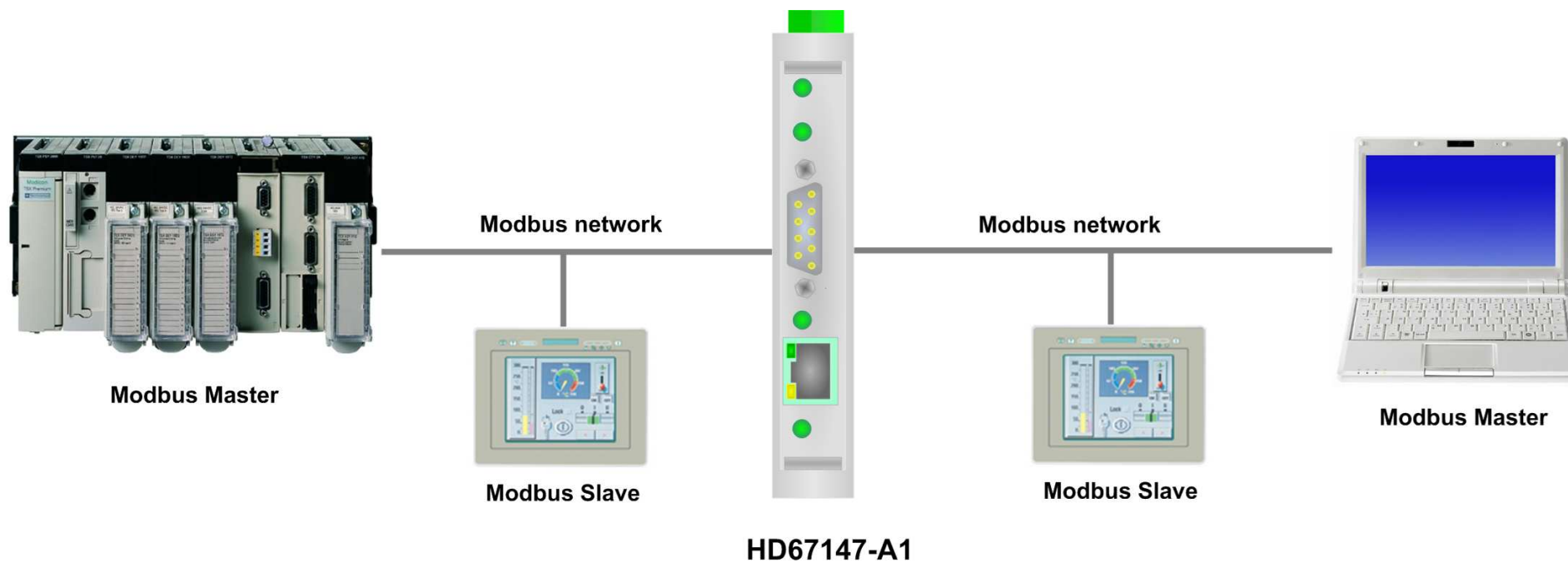
⚠ This symbol indicates that non-observance of the safety instructions is danger for people to serious injury or death and / or the possibility of damage.

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.

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EXAMPLE OF CONNECTION:

HD67147-A1

CONNECTION SCHEME:

Dip-Switch A:
-Dip1 – Functioning Mode

= Normal   = Boot

Connector 4:
RS232 Port (D-SUB9-Male)
(Isolated Port)

PIN2 = RX
PIN3 = TX
PIN5 = GND* (to Isolated Ground)

Used for:
- 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:

Led4:
Green
RS485 0 comm.

Led3:
Green
RS485 1 comm.

Led2:
Green
Ethernet Link

Connector5:
Ethernet Port
(RJ45 Plug)

Led1:
Green
Device state

CABLE
Side A
FEM

CABLE
Side B
FEM

☐ LED4 RS485 0 comm.
☐ LED3 RS485 1 comm.

+   -   S   +   -   S   +V   0V
RS485 1   RS485 0   Power Supply
Dip-Switch B   Dip-Switch C   8...24V AC
                                        or
                                   12...35V DC

Modbus Slave / Modbus slave - Converter
HD67147-A1

www.ADFweb.com

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Dip-Switch A

C.S.: B360   MAC: 10-64-E2-0A-62-1D
Date Code:40.24 Serial Nr.: W9395

☐ LED2 Ethernet Link

Ethernet

☐ LED1 Device state

Rail DIN
Clamp

Dip-Switch B:
-Dip1 – RS485 Termination Resistor

= Open   = 120 Ohm

A B S   A B S   +V 0V

Connector3:
RS485 1 Port (Isolated port)

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

Dip-Switch C:
-Dip1 – RS485 Termination Resistor

= Open   = 120 Ohm

Connector2:
RS485 2 Port (Isolated port)

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

Connector1:
Power Supply port

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

Figure 1: Connection scheme for HD67147-A1

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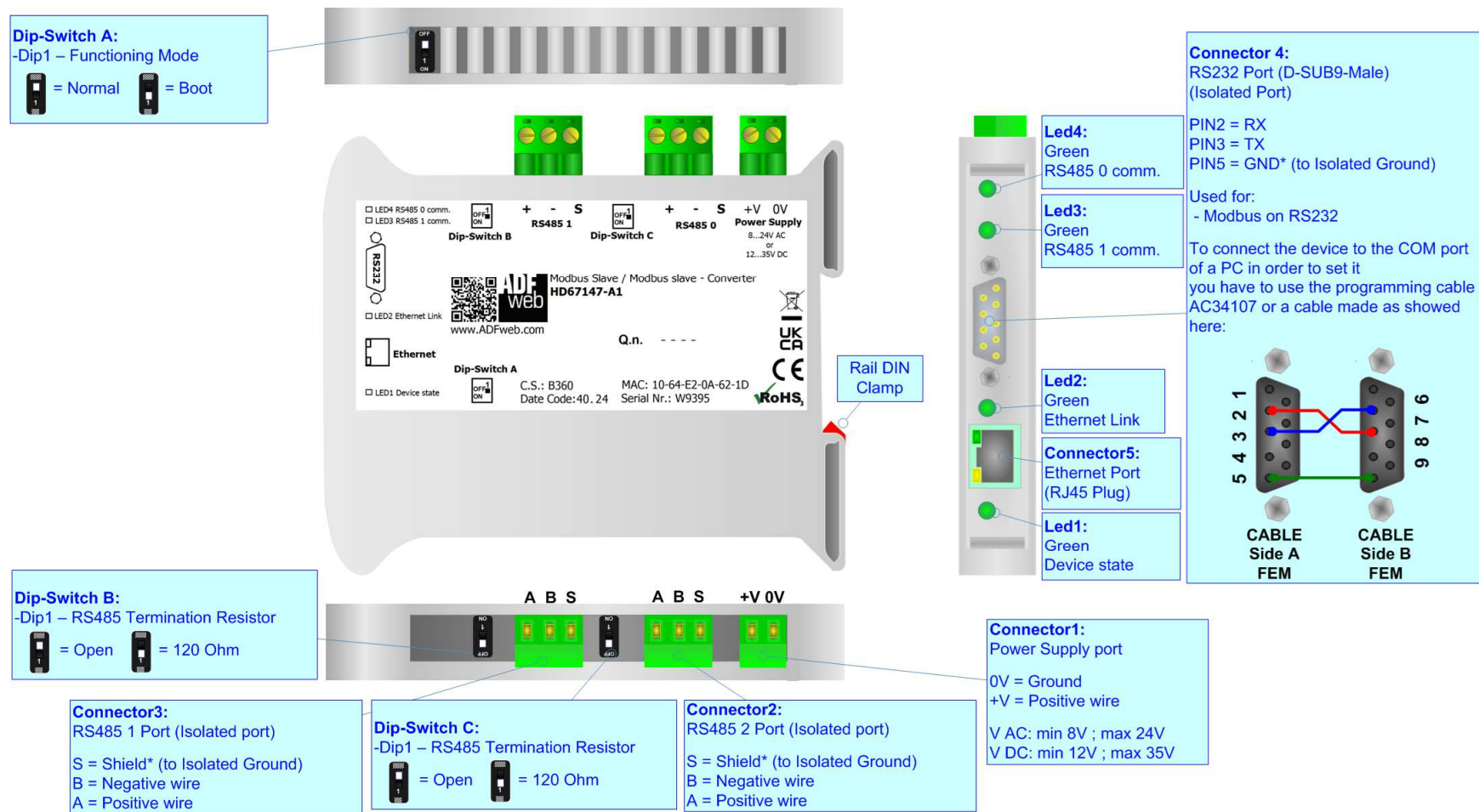
CHARACTERISTICS:

The configurable "Modbus Slave / Modbus Slave - Converter" allows the following characteristics:

- Galvanic isolation between the two Modbus ports.
- 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];
- Up to 4000 Modbus Register;
- Up to 4000 Modbus Staus;

CONFIGURATION:

You need Compositor SW67147 software on your PC in order to perform the following:

- Define the parameter of the Modbus (RS485 Port 0);
- Define the parameter of the Modbus (RS485 Port 1 or RS232);
- Define the Offset of Modbus Register and Status;
- Update the device.

POWER SUPPLY:

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

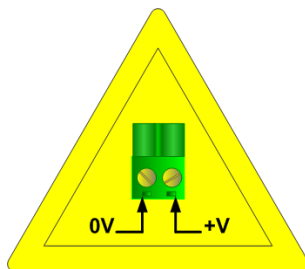|	VAC		VDC	
	Vmin	**Vmax**	**Vmin**	**Vmax**
HD67147-A1	**8V**	**24V**	**12V**	**35V**

Consumption at 24V DC:

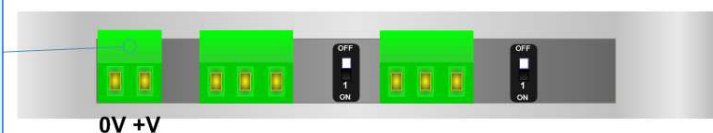| Device	W/VA
HD67147-A1	4

⚠ **Caution: Not reverse the polarity power**

0V   +V

HD67147-A1

Connector1:
Power Supply port

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

0V +V

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FUNCTION MODES:

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).
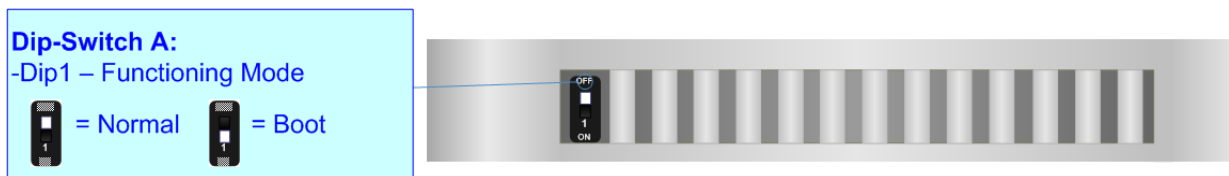
LEDS:

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

LED	Normal Mode	Boot Mode
1: Device State (green)	Blink slowly	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
2: Ethernet Link (green)	**ON**: Ethernet cable connected **OFF**: Ethernet cable disconnected	**ON**: Ethernet cable connected **OFF**: Ethernet cable disconnected
3: RS485 1 comm. (green)	It blinks when a correct Modbus frame is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: RS485 0 comm. (green)	It blinks when a correct Modbus frame is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress

Led4:
Green
RS485 0 comm.

Led3:
Green
RS485 1 comm.

Led2:
Green
Ethernet Link

Led1:
Green
Device state

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ETHERNET:

The Ethernet connection must be made using Connector5 of HD67147-A1 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/PLC/other is recommended the use of a cross cable.

Connector5:
Ethernet Port
(RJ45 Plug)
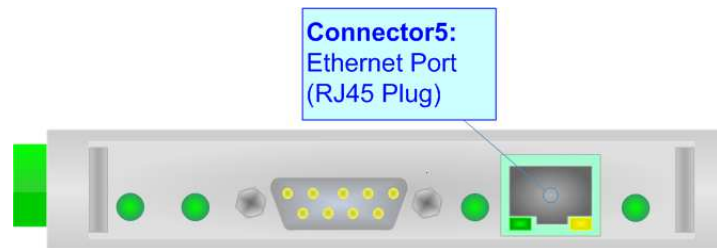
RS232:

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).
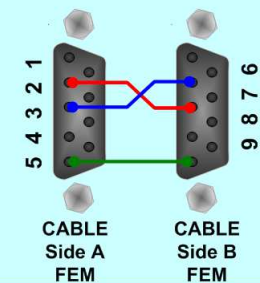It is recommended that the RS232 cable not exceed 15 meters.
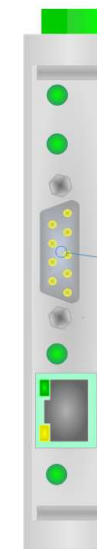
Connector 4:
Port RS232 (D-SUB9-Male)
(Isolated Port)

PIN2 = RX
PIN3 = TX
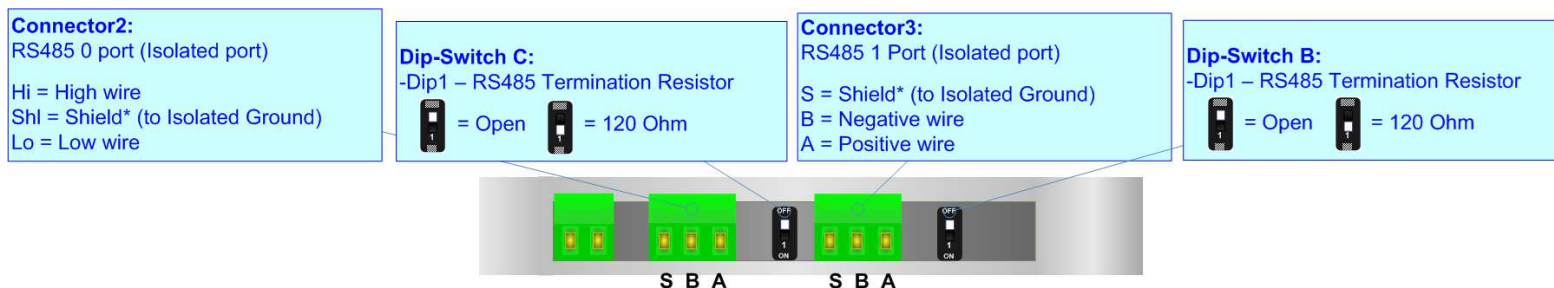PIN5 = GND* (to Isolated Ground)

Used for:
 - 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

RS485:

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

Connector2:
RS485 0 port (Isolated port)

Hi = High wire
Shl = Shield* (to Isolated Ground)
Lo = Low wire

Dip-Switch C:
-Dip1 – RS485 Termination Resistor

= Open   = 120 Ohm

Connector3:
RS485 1 Port (Isolated port)

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

Dip-Switch B:
-Dip1 – RS485 Termination Resistor

= Open   = 120 Ohm

S B A   S B A

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 SW67147:

To configure the Converter, use the available software that runs with Windows called SW67147. 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 SW67147, the window below appears (Fig. 2).

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


Figure 2: Main window for SW67147

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 Slave / Modbus Slave - 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**".
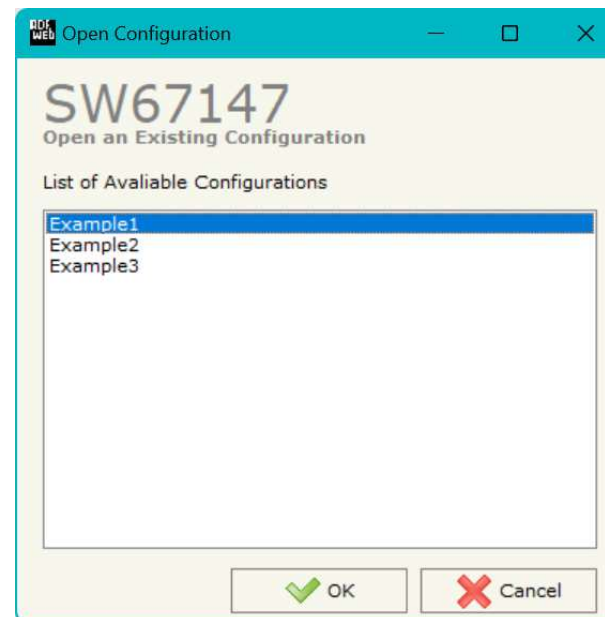
SOFTWARE OPTIONS:

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.
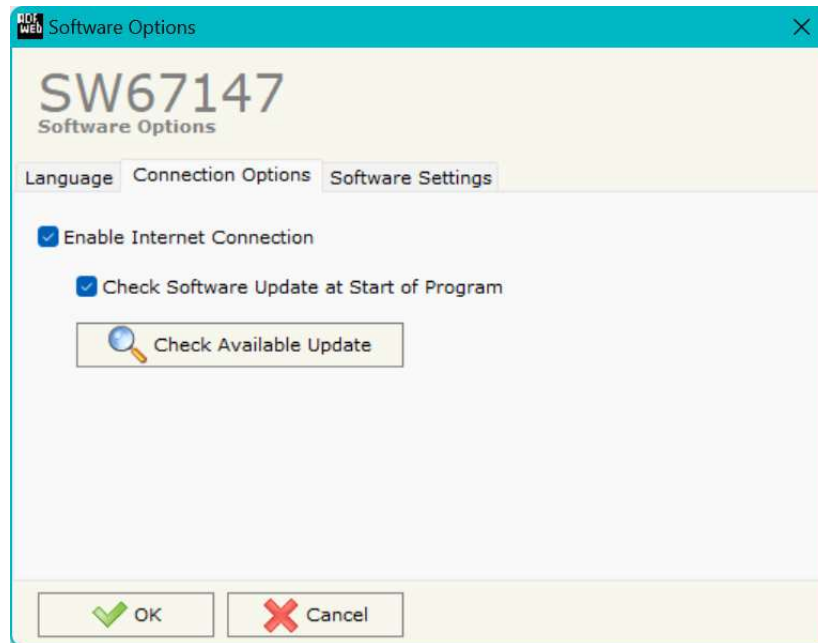
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67147 check automatically if there are updatings when it is launched.

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.

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SET COMMUNICATION:

This section defines the fundamental communication parameter of two ports Modbus.

By pressing the "**Set Communication**" button from the main window for SW67147 (Fig. 2) the window "Set Communication" appears (Fig. 3).

In the section "Device Type" is possible to select the type of Device to use from:

+ Without Ethernet port;
+ With Ethernet port.

The means of the fields for "Port 0 (RS485)" are:

+ In the field "**Baudrate**" the baud rate for the Modbus (Port 0) is defined;
+ In the field "**Parity**" the parity of the Modbus (Port 0) is defined;
+ In the field "**Device ID**" the address of the Modbus (Port 0) is defined;
+ If the option "**Enable Broadcast**" is checked, the requests coming from Broadcast ID are accepted.

The means of the fields for "Select Baudrate to use in serial" are:

+ In the field "**Serial**" the serial to use for the Modbus is defined (RS232 or RS485);
+ In the field "**Baudrate**" the baud rate for the Modbus (Port 1) is defined;
+ In the field "**Parity**" the parity of the Modbus (Port 1) is defined;
+ In the field "**Device ID**" the address of the Modbus (Port 1) is defined;
+ If the option "**Enable Broadcast**" is checked, the requests coming from Broadcast ID are accepted.

The means of the fields for "Options" are:

+ In the fields "**Offset Registers**" insert the Offset of Modbus registers to use with Modbus;
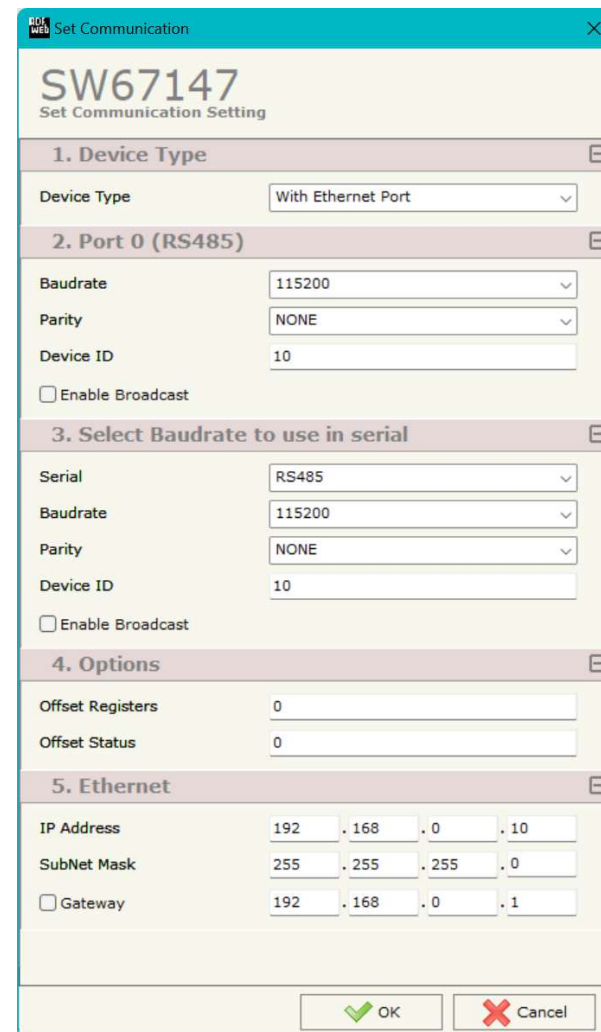+ In the fields "**Offset Status**" insert the Offset of Modbus status to use with Modbus.

Figure 3: "Set Communication" window

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The means of the fields for the "Ethernet" section are:

- In the fields "**IP Address**" the IP address of Ethernet side of the converter is defined;
- In the fields "**Subnet Mask**" the SubNet Mask of Ethernet side of the converter is defined;
- In the fields "**Gateway**" the default gateway of the network is defined. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net.

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.

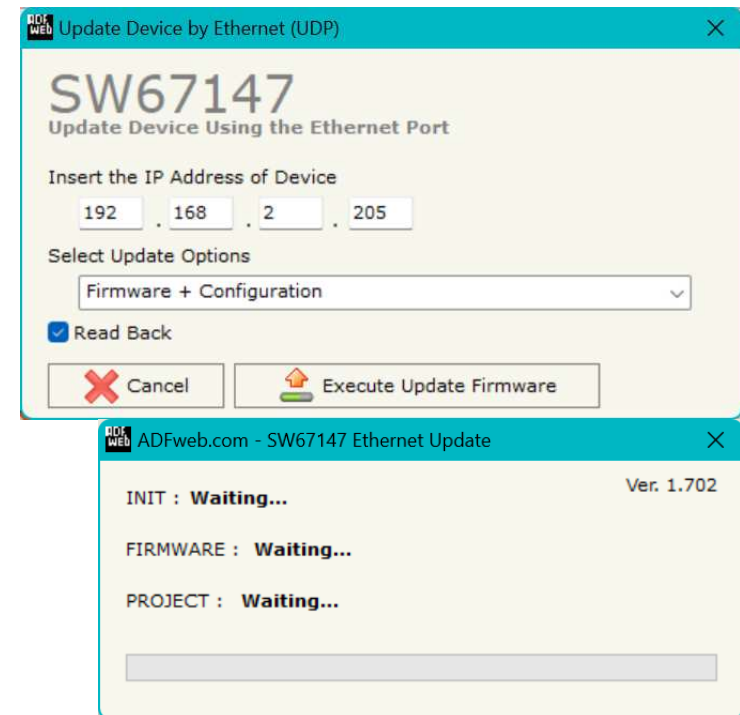At this point the configuration/firmware on the device is correctly updated.

Figure 4: "Update device" windows

Note:
When you receive the device, for the first time, you also have to update the Firmware in the HD67147 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;
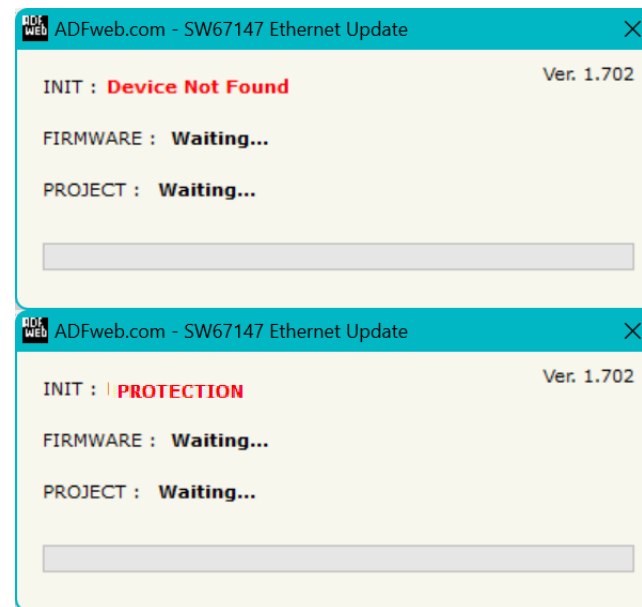- Pay attention at Firewall lock.

Figure 5: "Error" window

Warning:
In the case of HD67147 you have to use the software "SW67147": www.adfweb.com\download\filefold\SW67147.zip.

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MECHANICAL DIMENSIONS:
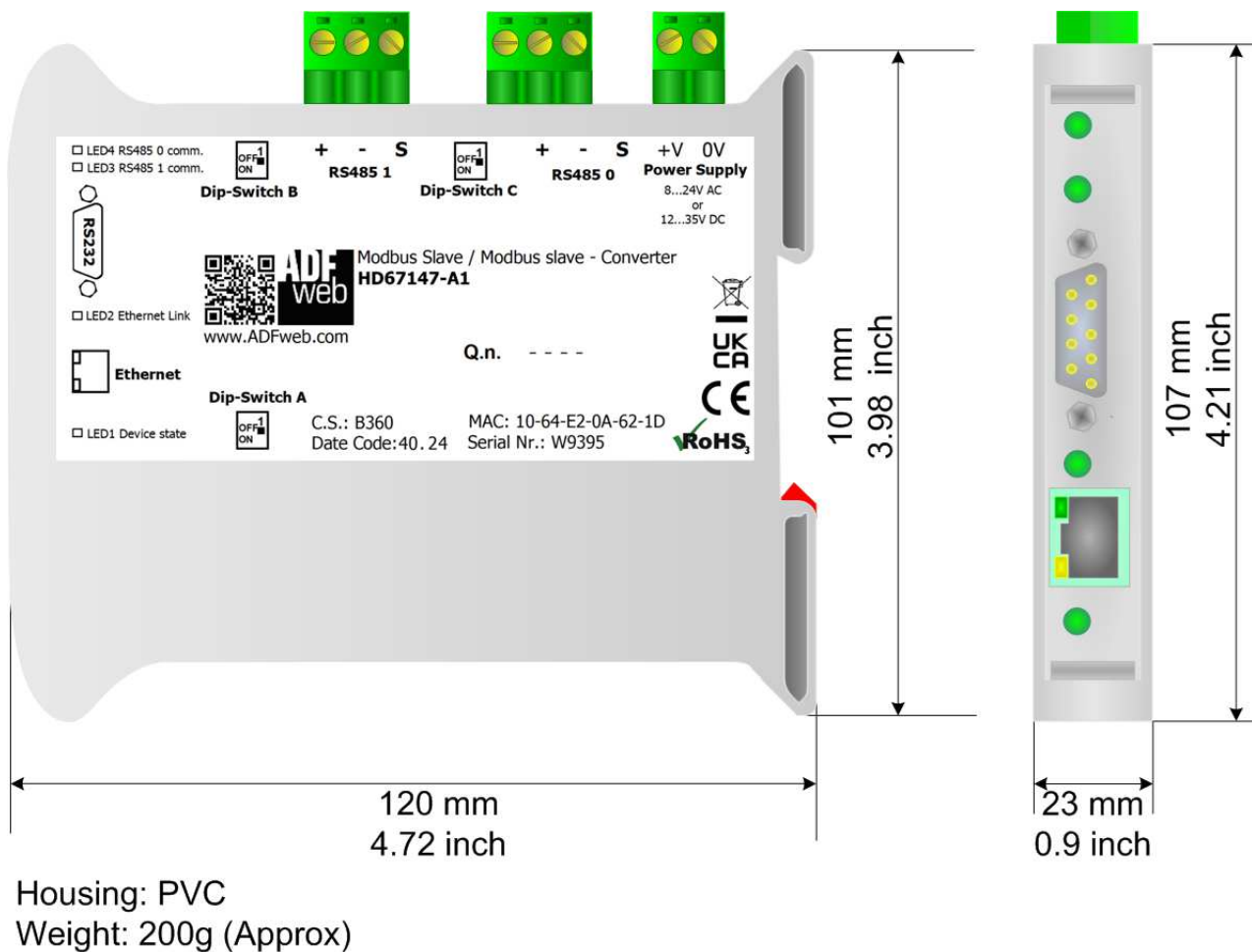
Figure 6: Mechanical dimensions scheme for HD67147-A1

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ORDERING INFORMATIONS:

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

HD67147 – A 1

Connectors Type
1: Removable 5mm Screw Terminal

Enclosure Type
A: 1M, 35mm DIN Rail mounting

Device Family
HD67147: Modbus Slave / Modbus Slave - Converter

Order Code: **HD67147-A1**   -   Modbus Slave / 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
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.

Industrial Electronic Devices

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.