

User Manual

Revision 1.001
English

CANopen / RS232 / RS485 - Converter

(Order Code: HD67291-A1)

for Website information:

<http://www.adfweb.com/?Product=HD67291>

for Price information:

<http://www.adfweb.com/?Price=HD67291-A1>

Benefits and Main Features:

- ▶ Very easy to configure
- ▶ Mountable on Rail DIN
- ▶ RS232 / RS485 serial port changeable with software
- ▶ Industrial temperature range:
-40°C / 85°C (-40°F / 185°F)

For others Converter / Adapter:

CANopen / Ethernet

See also the following link:

www.adfweb.com?Product=HD67503

RS232 / RS485

See also the following link:

www.adfweb.com?Product=HD67118

USB / RS485

See also the following link:

www.adfweb.com?Product=HD67119

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.

To obtain the updated documentation for the product that you own, note the "Document Code" (Abbreviated written "Doc. Code" on the label on the product) and download the updated from our web site www.adfweb.com/download/

REVISION LIST:

Revision	Date	Author	Chapter	Description
1.000	08/11/2012	Dp	All	First release version
1.001	04/03/2013	Dp	All	Added new chapters

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

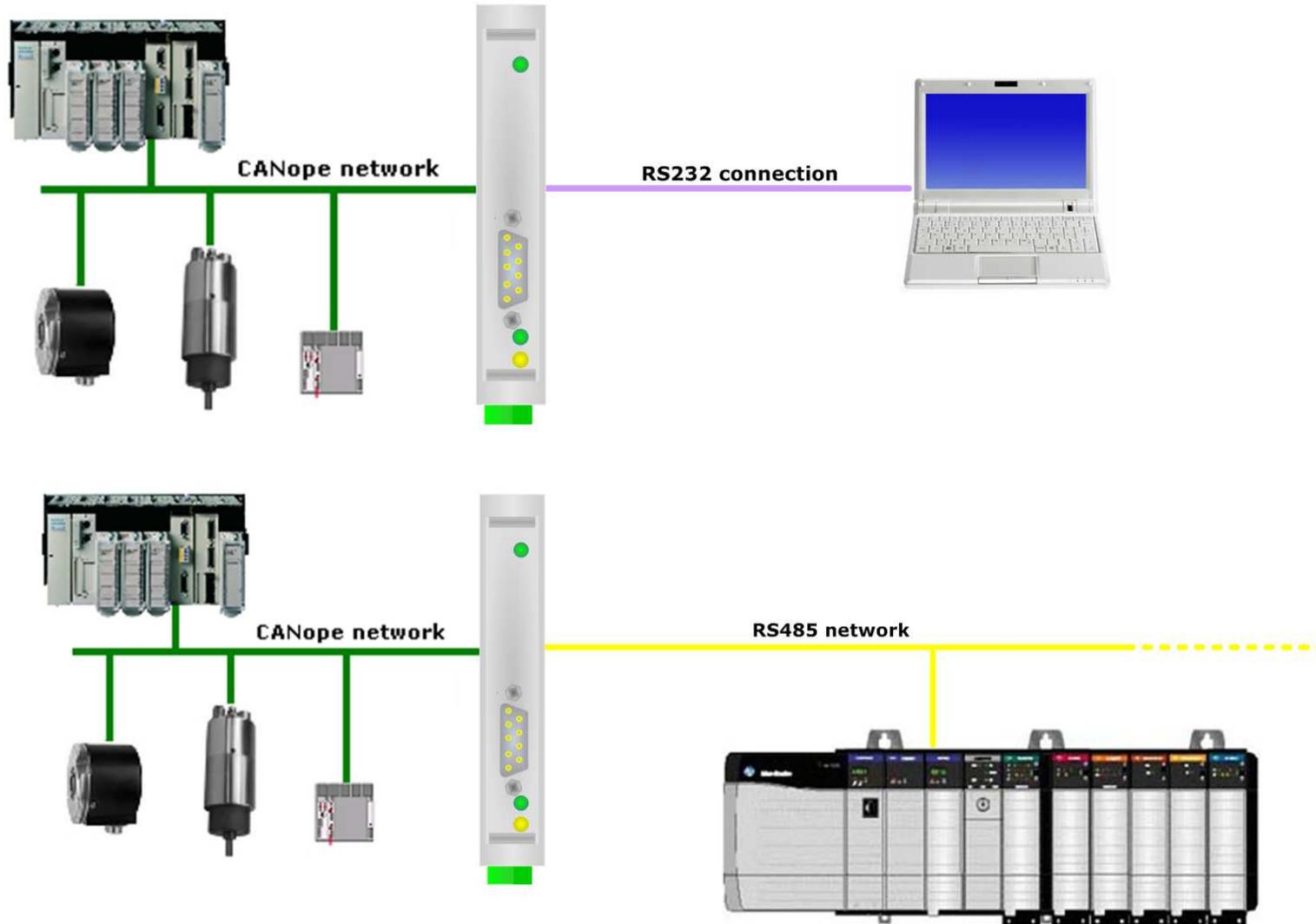
The device is state of the art and is safe. The instrument can represent a potential hazard if they are inappropriately installed and operated by personnel untrained. These instructions refer to residual risks with the following symbol:

 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.

EXAMPLE OF CONNECTION:



CONNECTION SCHEME:

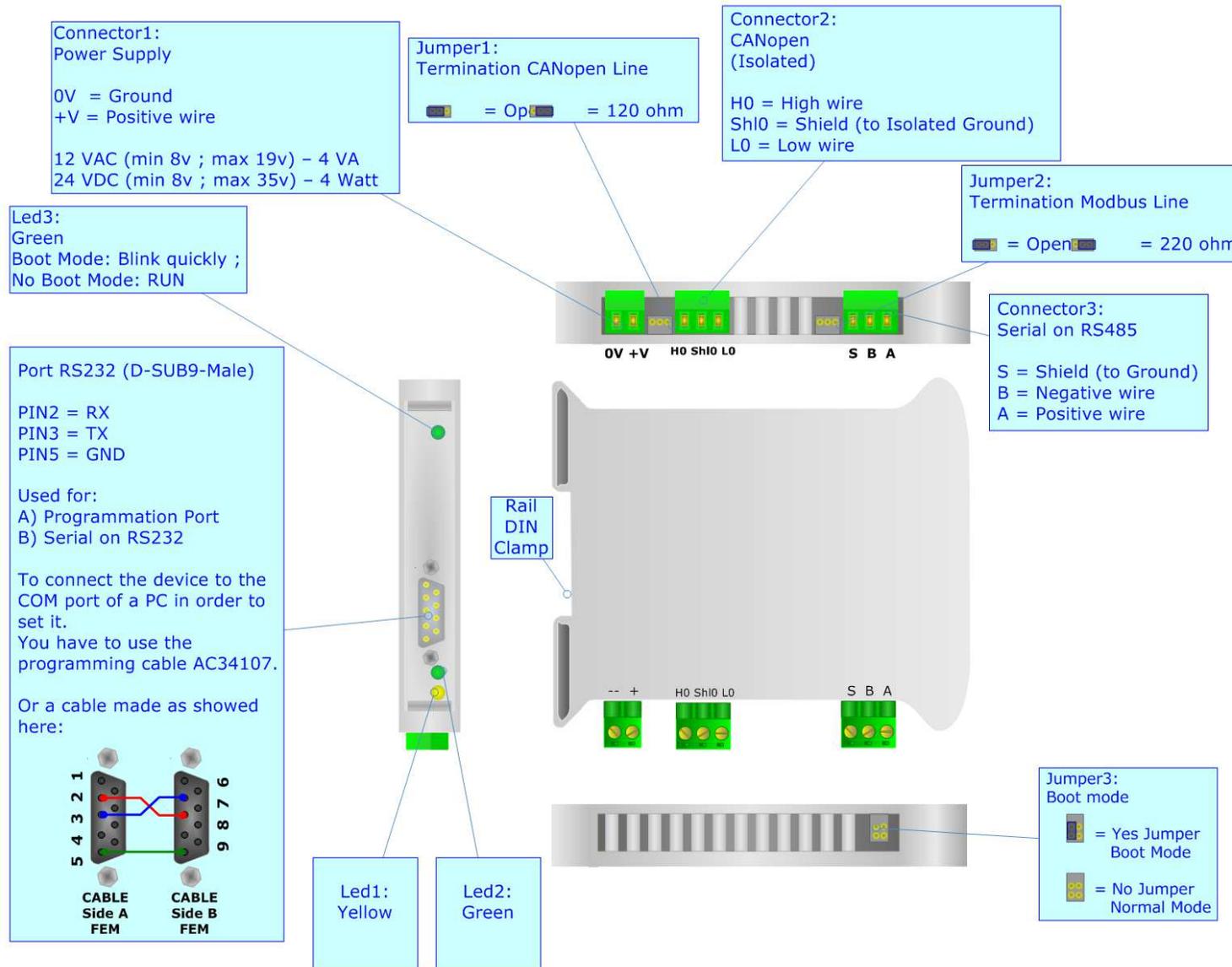


Figure 1: Connection scheme for HD67291-A1

CHARACTERISTICS:

The configurable "PROFIBUS Master / Ethernet" converter allows the following characteristics:

- RS232 or RS485 selectable like serial;
- Mountable on 35mm Rail DIN;
- Power Supply 8...24V AC or 12...35V DC;
- Temperature range -40°C to 85°C.

CONFIGURATION:

You need Compositor SW67291 software on your PC in order to perform the following:

- Define the parameter of the CANopen;
- Define the parameter of the Serial;
- Define the PDOs used.

POWER SUPPLY:

The device can be powered between a wide range of tensions. For more details see the two tables below.

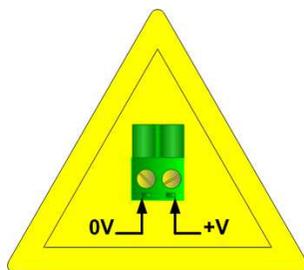
	VAC		VDC	
	Vmin	Vmax	Vmin	Vmax
HD67291-A1	8V	24V	12V	35V

Consumption at 24V DC:

Device	W/VA
HD67291-A1	4

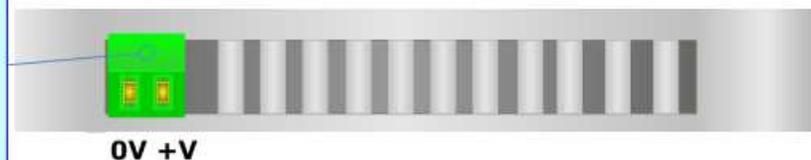


Caution: Not reverse the polarity power



HD67291-A1

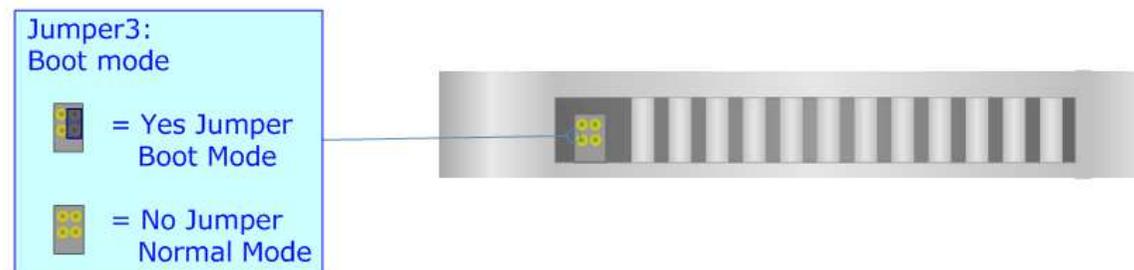
Connector1:
 Power Supply port
 0V = Ground
 +V = Positive wire
 V AC: min 8V ; max 24V
 V DC: min 12V ; max 35V



FUNCTION MODES:*HD67291-A1*

The device has got two functions mode depending of the position of the Dip2 of 'Dip-Switch A':

- The first, with Jumper3 inserted, is used for upload the Project/Firmware.
- The second, with Jumper3 removed (factory setting), is used for the normal working of the device.



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

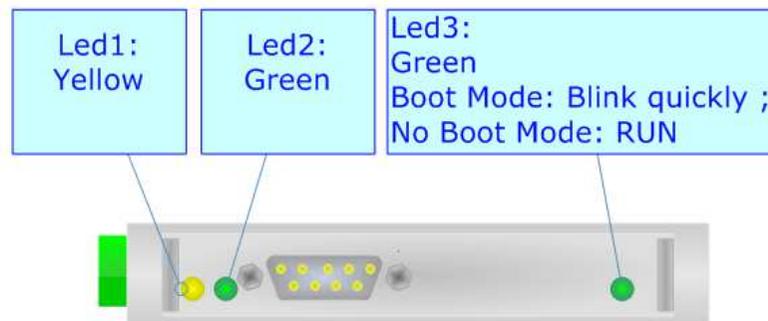
According to the functioning mode, the LEDs will have specifics functions (see 'LEDS' section).

LEDS:

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

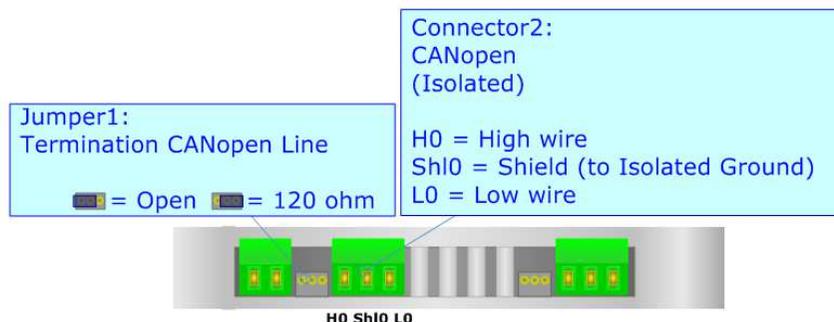
HD67575-A1 WITH C.S. B153

LED	Normal Mode	Boot Mode
1: (Yellow)		
2: (green)		
3: Device State (green)	Blinks slowly (~1Hz)	Blinks quickly



CANopen:

For terminate the CAN line with a 120R resistor it is necessary to insert the Jumper1 near the terminal block, like in figure.

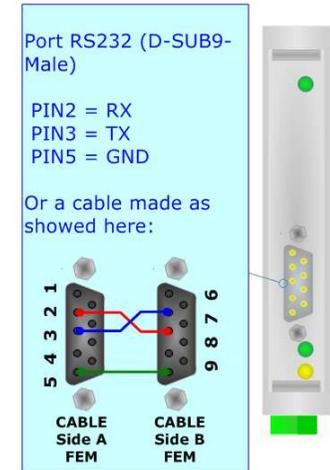


Cable characteristics:

DC parameter:	Impedance	70 Ohm/m
AC parameters:	Impedance	120 Ohm/m
	Delay	5 ns/m
Length	Baud Rate [bps]	Length MAX [m]
	10 K	5000
	20 K	2500
	50 K	1000
	100 K	650
	125 K	500
	250 K	250
	500 K	100
	800 K	50
	1000 K	25

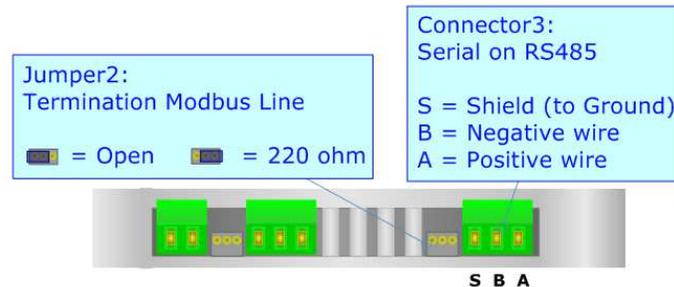
RS232:

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 insert the Jumper2 near the terminal block, 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 SW67291:

To configure the Converter, use the available software that runs with Windows, called SW67291. 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).

When launching the SW67291 the right window appears (Fig. 2).



Figure 2: Main window for SW67291

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 "PROFIBUS Master / Ethernet" 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 Project"**.

SET COMMUNICATION:

This section defines the fundamental communication parameter of two buses, CANopen and Serial.

By pressing the **"Set Communication"** button from the main window for SW67291 (Fig. 2) the window "Set Communication" appears (Fig. 3).

The window is divided in two sections, one for the CANopen and the other for the Serial.

The means of the fields for "CANopen" are:

- In the field **"ID Dev."** the address of the CANopen side is defined;
- In the field **"Baudrate"** the baudrate for the CANopen side is defined;
- In the field **"Set Operational State at Start-Up"** the state of the CANopen is defined. I.e. If it is checked the board start in Operational State, else it start in Pre-Operational;
- In the field **"Network Start at Start-Up"** the state of the CANopen network is defined. I.e. If it is checked the board send a command to set the Operational State of all the devices present in the network, after the time defined in the **"Delay"** field;
- In the field **"Delay"** the delay before send the network command for the CANopen is defined;
- **"SDO Timeout"** is the is the maximum time that the device attends for the answer from the Slave interrogated;

The means of the fields for "Ethernet" are:

- In the field **"Serial"** the physical Serial to use is defined ;
- In the field **"Baudrate"** the baudrate for the Serial side is defined;
- In the field **"Parity"** the parity for the Serial side is defined;

The screenshot shows a dialog box titled "SET COMMUNICATION". It is divided into two main sections: "CANopen" and "Serial".

CANopen section:

- DevID: 10
- Baud rate: 250
- Set Operational State at Start-Up
- Network Start at Start-Up
- Delay: 20 (range 0-255 sec)
- SDO Timeout (1/10 ms): 5000

Serial section:

- Serial: RS232
- Baud rate: 115200
- Parity: NONE

At the bottom, there are two buttons: "OK" (with a green checkmark) and "Cancel" (with a red X).

Figure 3: "Set Communication" window

SET TRANSLATE PDO:

By pressing the "Set Translate PDO" button from the main window for SW67291-A1 (Fig. 2) the window "Receive PDOs" appears (Fig. 4).

The means of the fields are:

- In the field "**COB-ID**" insert the Cob_ID of the CANopen Bus frame;
- In the field "**Dimension**" insert the number of bytes of the CANopen Bus frame (the maximum dimension is 8 bytes);
- In the field "**Mnemonic**" you can insert a brief description.

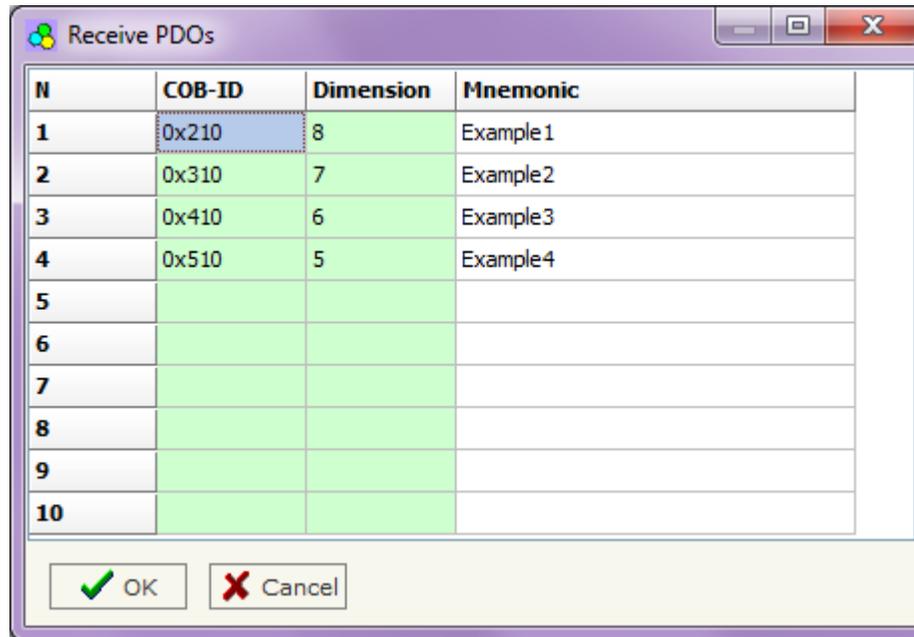


Figure 4: "Receive PDOs" window

SET TRANSMIT PDO:

By pressing the "Set Transmit PDO" button from the main window for SW67291-A1 (Fig. 2) the window "Transmit PDOs" appears (Fig. 5).

The means of the fields are:

- In the field "**COB-ID**" insert the Cob_ID of the CANopen Bus frame;
- In the field "**Dimension**" insert the number of bytes of the CANopen Bus frame (the maximum dimension is 8 bytes);
- In the field "**Mnemonic**" you can insert a brief description.

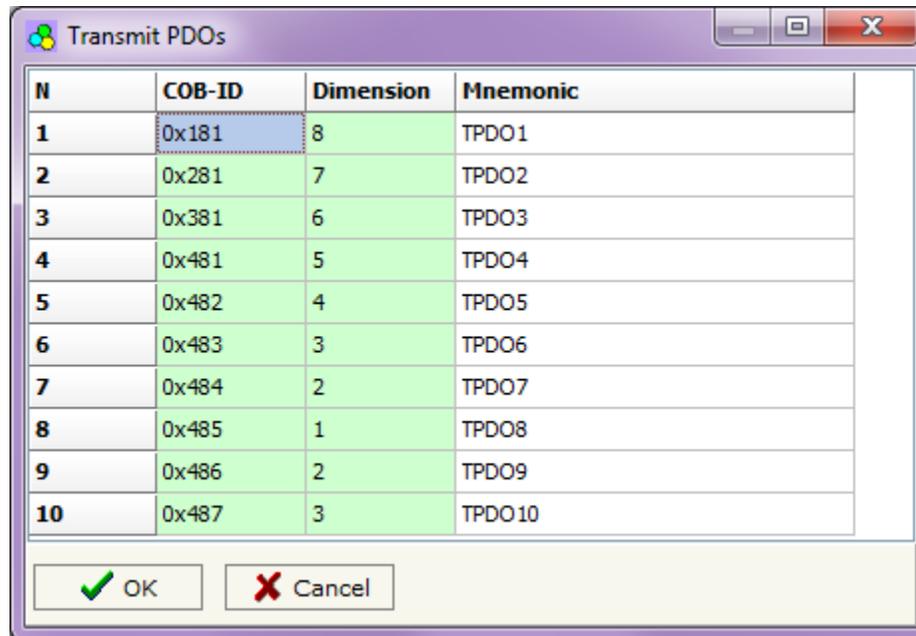


Figure 5: "Transmit PDOs" window

UPDATE DEVICE:

Section "Update device" (Fig. 6):

In order to load the parameters or update the firmware in the gateway, follow these instructions:

- Turn off the Device;
- Connect the Null Modem Cable from your PC to the Gateway;
- Insert the Boot Jumper (For more info see Fig. 1);
- 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);
- Press the "Next" button;
- Select which operations you want to do. You can select only "Firmware", only "Project" or both of them;
- 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 updated.

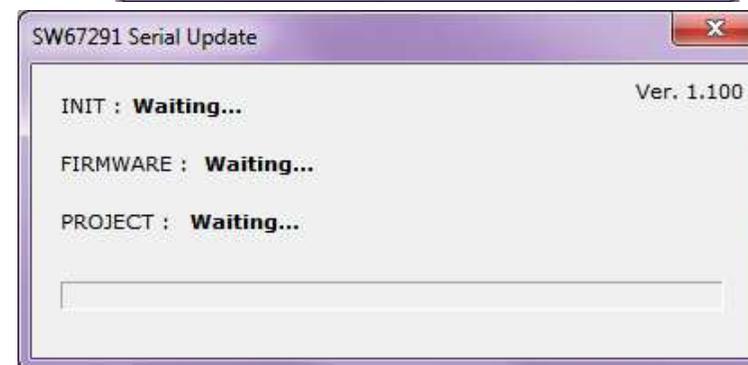


Figure 6: "Update Device" window



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 HD67291-A1 device.



Note:

When you receive the device, for the first time, you have to update also the Firmware in the HD67053-B2-xxx or HD67053M-xxx devices.



Warning:

If the Fig. 7 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 USB or serial cable is connected between the PC and the device;
- Try to repeat the operations for the updating;
- If you are using a USB↔RS232 converter try with a native COM port or change the converter (only for HD67053M series);
- 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, make sure that you have the administrator privileges;
- Take attention at Firewall lock.



Figure 7: "Protection" window



In the case of HD67291-A1 you have to use the software "SW67291": www.adfweb.com/download/filefold/SW67291.zip.

SERIAL PROTOCOL:

For the CANopen it is possible to use two types of data: SDO and PDO. It is possible to have no more than ten PDO, which must be declared in the "SW67291 Compositor", while SDO should not be reported.

Write Frames

Pdo

The transmission of PDO is very simple: it has a fixed structure that consist in a maximum of fourteen bytes:

Byte Number	Description
1	Start Byte (fixed to 0x55)
2	Number of Byte (without CheckSum)
3	Write Identifier (0x02)
4	Type of Data (PDO=0x01)
5	Number of frame to send (number of row of "SW67291 compositor")
6÷n+5	Data
N+6	CheckSum

n=number of byte defined in the Compositor

The respons is compose from four bytes:

Byte Number	Description
1	Start Byte (fixed to 0xAA)
2	Number of Byte (Fixed to 0x01)
3	Ok=0x01 / Error in sending=0x02
4	CheckSum

Example:

We want to write the frame number one of SW67291 Compositor:

- Type of Data: PDO; Number of frame to send: 1; Data: 0x01020304

So the string of hexadecimal numbers is:

REQ:[55][07][02][01][01][01][02][03][04][6A]

RES:[AA][01][01][AC]

Sdo

The transmission of SDO is very simple: it has a fixed structure that consist in a maximum of fourteen bytes.

Byte Number	Description
1	Start Byte (fixed to 0x55)
2	Number of Byte (without CheckSum)
3	Write Identifier (Write=0x02)
4	Type of Data (SDO=0x02)
5	Address of CANopen device connect to the HD67291
6	Index SDO Hi
7	Index SDO Lo
8	SubIndex SDO
9	Number of byte of frame to send (n)
10÷n+9	Data
n+10	CheckSum

n=number of byte defined in the Compositor

The Number of byte of frame to send (Byte 9) can have three values:

- 0x01: Send one byte;
- 0x02: Send two byte;
- 0x04: Send four byte.

The respons is compose from four bytes:

Byte Number	Description
1	Start Byte (fixed to 0xAA)
2	Number of Byte (Fixed to 0x01)
3	Ok=0x01 / Parameter Error=0x02 / Error in sending=0x03
4	CheckSum

Example:

We want to write:

- Address of CANopen device: 0x14; Type of Data: SDO; Index: 0x2000; SubIndex: 0x01; Number of byte of frame to send: 2; Data: 0x1122

So the string of hexadecimal numbers is:

REQ:[55][09][02][02][14][20][00][01][02][11][22][CC]

RES:[AA][01][01][AC]

Read Frames

Pdo

The Bytes that compose the request are six:

Byte Number	Description
1	Start Byte (fixed to 0x55)
2	Number of Byte (without CheckSum)
3	Read Identifier (Read=0x01)
4	Type of Data (PDO=0x01)
5	Number of frame to send (number of row of "SW67291 Compositor")
6	CheckSum

The Bytes that compose the respons are:

Byte Number	Description
1	Start Byte (fixed to 0xAA)
2	Number of Byte (without CheckSum)
3	Ok=0x01 / Parameter Error=0x02
4÷n+3	Data
n+4	CheckSum

n=number of byte declared in the Compositor for the selected frame

Example:

We want to read the first PDO configured in the "SW67291 Compositor". This PDO contains six bytes. So the string of hexadecimal numbers is:

REQ:[55][03][01][01][01][5B]

RES:[AA][07][01][11][22][33][44][55][66][17]

Sdo

The Bytes that compose the request are ten:

Byte Number	Description
1	Start Byte (fixed to 0x55)
2	Number of Byte (without CheckSum)
3	Read Identifier (Read=0x01)
4	Type of Data (SDO=0x02)
5	Address of CANopen device connect to the HD67291
6	Index SDO Hi
7	Index SDO Lo
8	SubIndex SDO
9	Number of byte of frame to read
10	CheckSum

The Byte that compose the respons is:

Byte Number	Description
1	Start Byte (fixed to 0xAA)
2	Number of Byte (without CheckSum)
3	Ok=0x01 / Parameter Error=0x02 / Error in sending=0x03
4÷n+3	Data
n+4	CheckSum

n=number of byte for the selected frame

Example:

We want to read:

- Address of CANopen device: 0x14; Type of Data: SDO; Index: 0x2000; SubIndex: 0x01; Number of byte: 4.

So receive the value 0x1A2B3C4D.

The string of hexadecimal numbers is:

REQ:[55][07][01][02][14][20][00][01][04][98]

RES:[AA][05][01][1A][2B][3C][4D][7E]

CheckSum

To calculate the CheckSum is enough to sum all bytes from the start byte and take the less significative byte like result.

MECHANICAL DIMENSIONS:

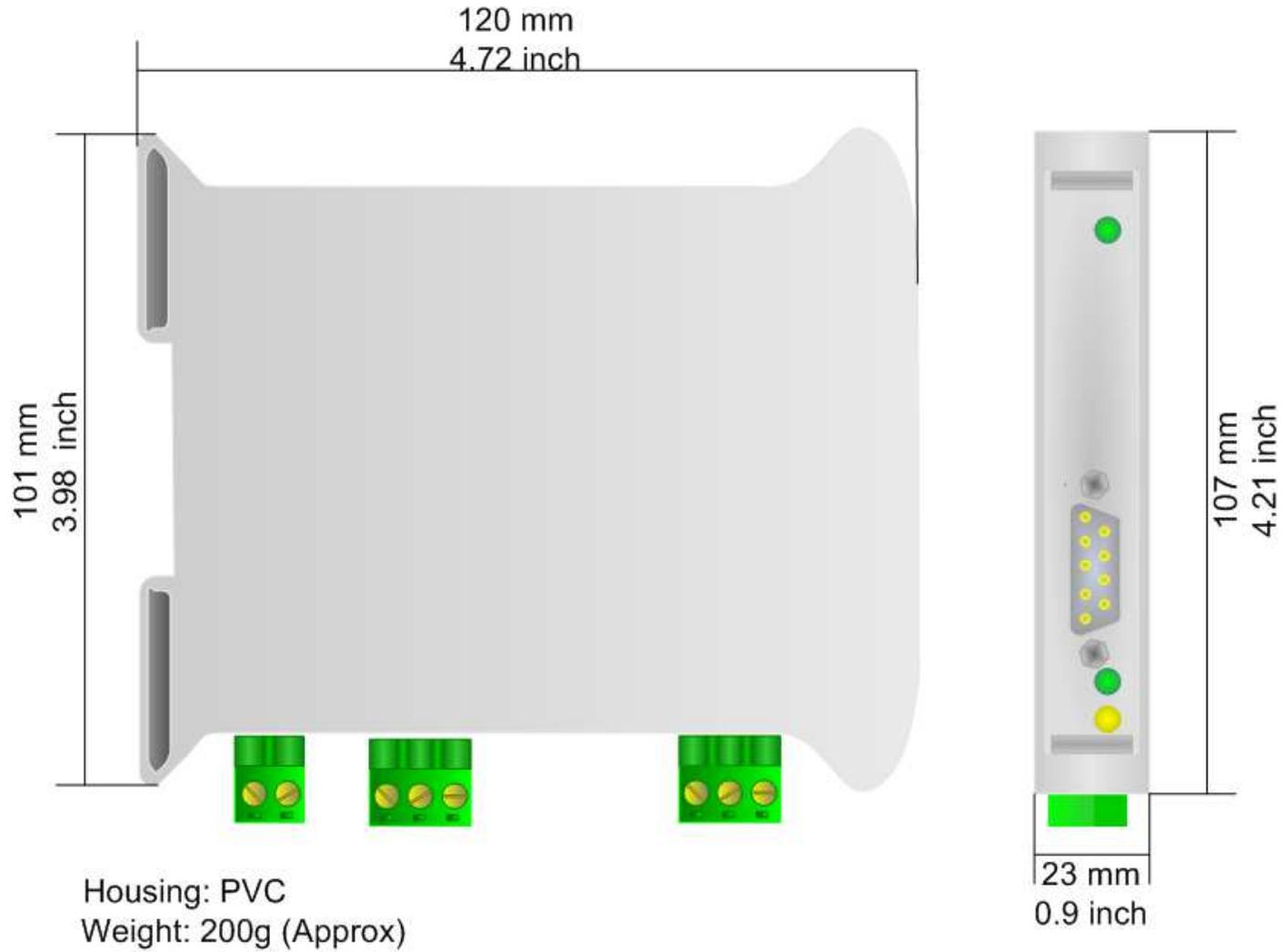
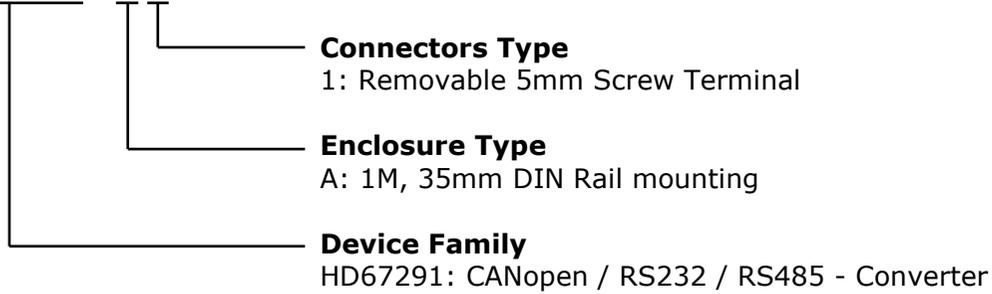


Figure 8: Mechanical dimensions scheme for HD67291-A1

ORDER CODE:

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

HD67291 - A 1



ACCESSORIES:

- Order Code: **AC34001** - Rail DIN - Power Supply 220/240V AC 50/60Hz - 12 V AC
- Order Code: **AC34002** - Rail DIN - Power Supply 110V AC 50/60Hz - 12 V AC

DISCLAIMER

All technical content within this document can be modified without notice. The content of the document content is a recurring audit. 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 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.

PRODUCTS AND RELATED DOCUMENTS:

Part	Description	URL
HD67503-A1	CANopen / Ethernet - Converter	www.adfweb.com?product=HD67503
HD67118	RS232 / RS485 - Converter	www.adfweb.com?product=HD67118
HD67119	USB / RS485 - Converter	www.adfweb.com?product=HD67119
HD67507-A1	Modbus TCP Slave / Modbus Master - Converter	www.adfweb.com?product=HD67507
HD67510-B1	Modbus Slave / Modbus TCP Master - Converter	www.adfweb.com?product=HD67510