ADFweb

Industrial Electronic Devices

User Manual
Revision 1.000
English

J1939 / CAN - Converter
(Order Code: HD67047-A1)

for Website information:
www.adfweb.com?Product=HD67047

for Price information:
www.adfweb.com?Price=HD67047-A1

Benefits and Main Features:

⬥ Very easy to configure

⬥ Electrical isolation

⬥ Temperature range: -40°C/85°C (-40°F/185°F)

User Manual

For others Gateways / Bridges:

J1939 to Modbus

See also the following links:
www.adfweb.com?Product=HD67215 (Modbus TCP)

CANopen to Modbus

See also the following links:
www.adfweb.com?Product=HD67001 (Modbus RTU Master)
www.adfweb.com?Product=HD67002 (Modbus RTU Slave)
www.adfweb.com?Product=HD67004 (Modbus TCP Master)
www.adfweb.com?Product=HD67005 (Modbus TCP Slave)

For others Gateways / Bridges:
For **CAN bus 2.0A** and/or **CAN bus 2.0B** to **Modbus**

See also the following links:
www.adfweb.com?Product=HD67011 (Modbus RTU Slave)
www.adfweb.com?Product=HD67012 (Modbus RTU Master)
www.adfweb.com?Product=HD67014 (Modbus TCP Slave)
www.adfweb.com?Product=HD67015 (Modbus TCP Master)

Do you have an your customer protocol?

See the following links:
www.adfweb.com?Product=HD67003

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

Ask it to the following link:
www.adfweb.com?Cmd=helpme

INDEX:

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
1.000	21/06/2016	Ff	All	First release version

WARNING:

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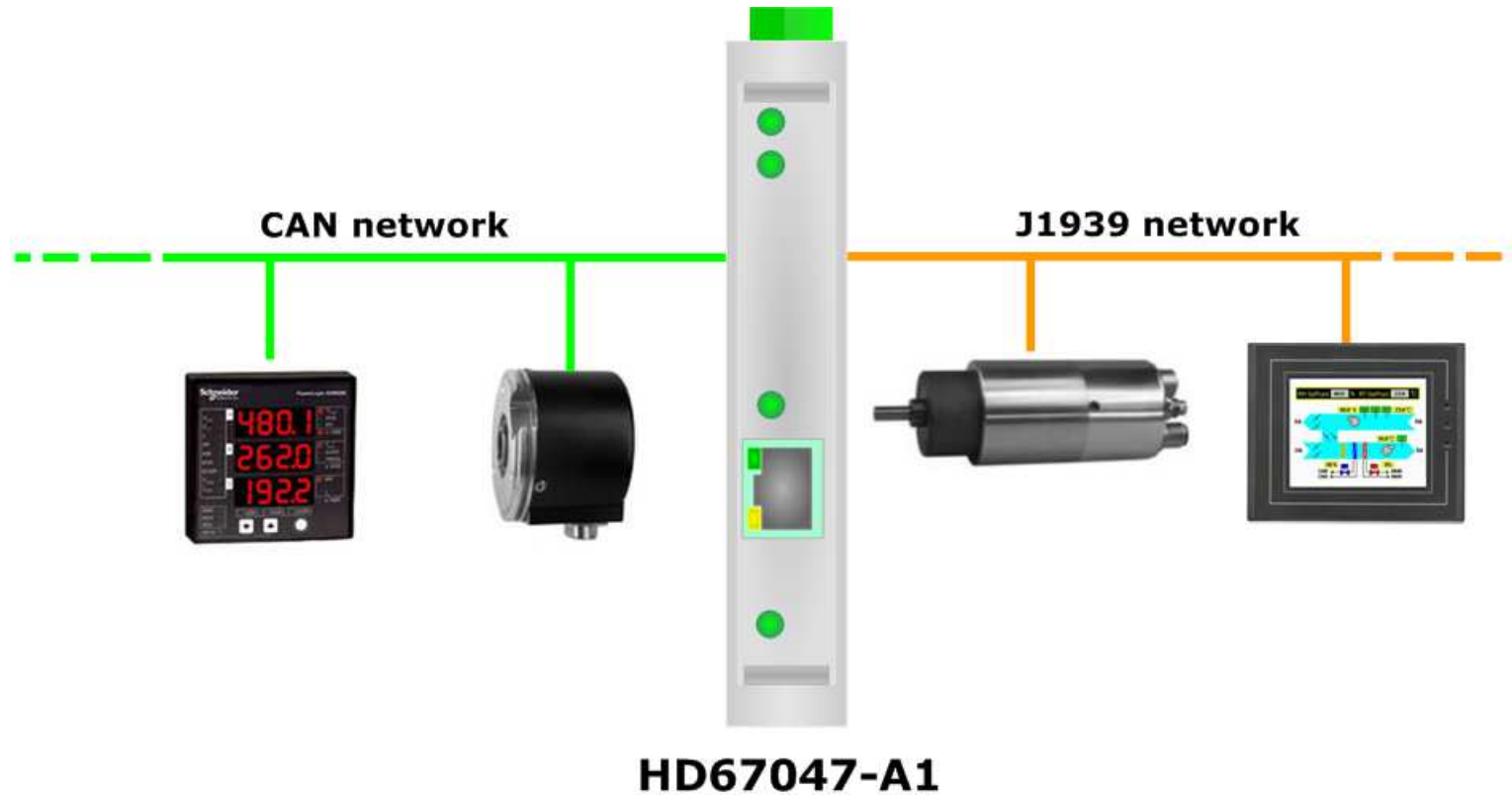
⚠️ This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

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.
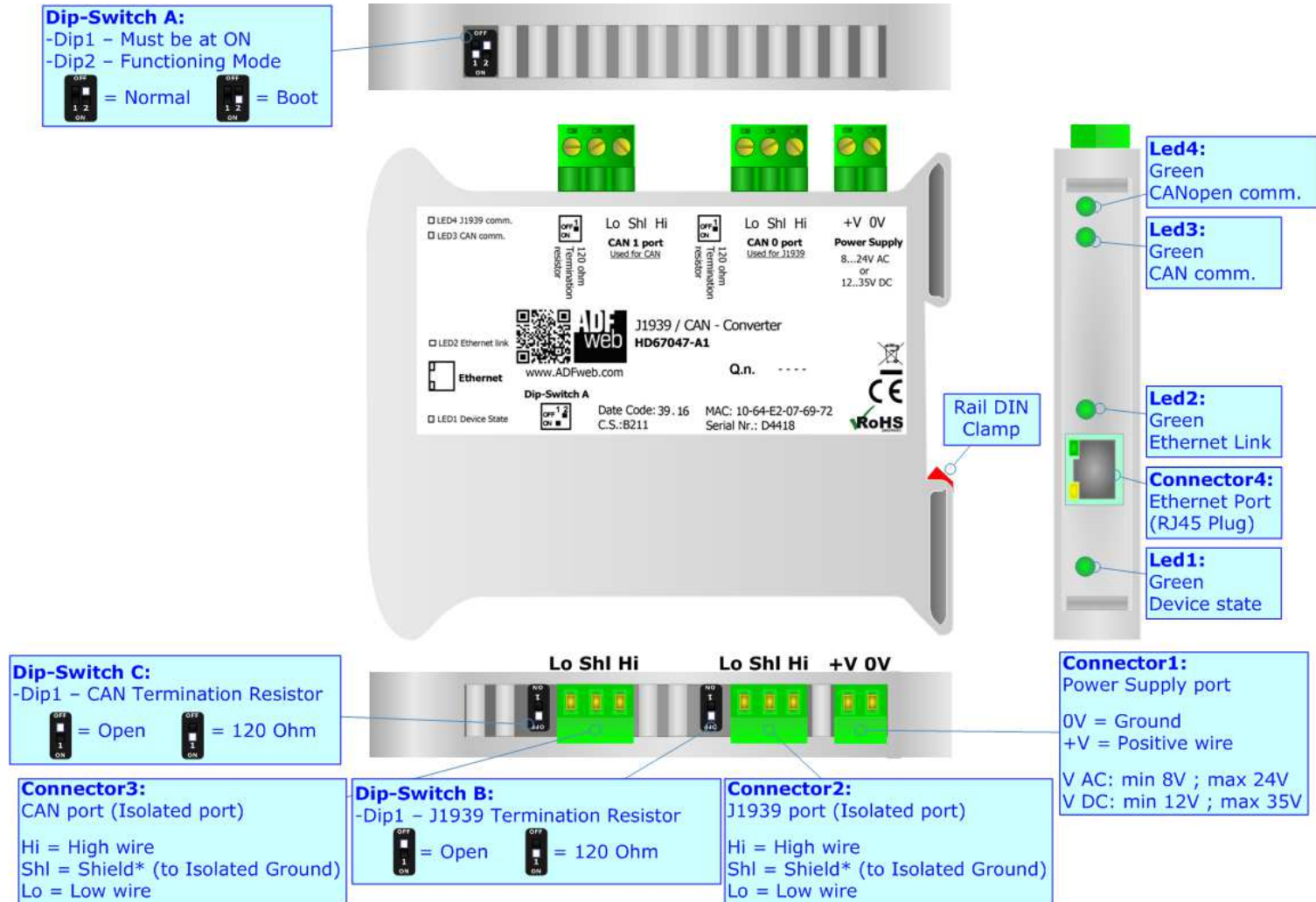
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EXAMPLE OF CONNECTION:

HD67047-A1

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CONNECTION SCHEME:

Dip-Switch A:
-Dip1 – Must be at ON
-Dip2 – Functioning Mode

= Normal   = Boot

☐ LED4 J1939 comm.
☐ LED3 CAN comm.

120 ohm Termination resistor   Lo Shl Hi
CAN 1 port
Used for CAN

120 ohm Termination resistor   Lo Shl Hi
CAN 0 port
Used for J1939

+V 0V
Power Supply
8...24V AC
or
12..35V DC

☐ LED2 Ethernet link

Ethernet

J1939 / CAN - Converter
HD67047-A1

www.ADFweb.com   Q.n.   - - - -

Dip-Switch A

☐ LED1 Device State   Date Code: 39 . 16   MAC: 10-64-E2-07-69-72
C.S.:B211   Serial Nr.: D4418

RoHS

Led4:
Green
CANopen comm.

Led3:
Green
CAN comm.

Led2:
Green
Ethernet Link

Connector4:
Ethernet Port
(RJ45 Plug)

Led1:
Green
Device state

Rail DIN Clamp

Dip-Switch C:
-Dip1 – CAN Termination Resistor

= Open   = 120 Ohm

Lo Shl Hi   Lo Shl Hi   +V 0V

Connector1:
Power Supply port

0V = Ground
+V = Positive wire

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

Connector3:
CAN port (Isolated port)

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

Dip-Switch B:
-Dip1 – J1939 Termination Resistor

= Open   = 120 Ohm

Connector2:
J1939 port (Isolated port)

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

Figure 1: Connection scheme for HD67047-A1

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CHARACTERISTICS:

The HD67047 is a J1939 / CAN Converter.

They have the following characteristics:

➜ Triple isolation between CAN - Power Supply, CAN – J1939, J1939 - Power Supply;
➜ Two-directional information between J1939 bus and CAN 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 SW67047 software on your PC in order to perform the following:

➜ Define the parameters of CAN line;
➜ Define the parameters of J1939 line;
➜ Define the CAN messages in reception and in which J1939 PGNs they will be mapped;
➜ Define the CAN messages in transmission and from which J1939 PGNs they will be taken;
➜ 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]
HD67047-A1	3.5

Caution: Do not reverse the polarity power

Connector1:
Power Supply port

0V = Ground
+V = Positive wire

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

0V +V

HD67047-A1

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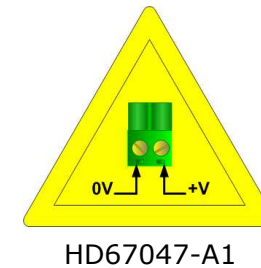
FUNCTION MODES:

The device has got two function modes depending on the position of the 'Dip2 of Dip-Switch A':

- The first, with 'Dip2 of Dip-Switch A' at "OFF" position, is used for the normal working of the device.
- The second, with 'Dip2 of Dip-Switch A' at "ON" position, is used for uploading 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 specific functions, see 'LEDS' section.

Warning:
Dip1 of 'Dip-Switch A' must be at ON position to work even if the Ethernet cable is not inserted.

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LEDS:

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

LED	Normal Mode	Boot Mode
1: Device state	Blinks slowly (~1Hz)	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
2: Ethernet Link	**ON:** Ethernet cable connected **OFF:** Ethernet cable disconnected	**ON:** Ethernet cable connected **OFF:** Ethernet cable disconnected
3: CAN communication	Blinks when a CAN frame is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: J1939 communication	Blinks when a J1939 frame is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
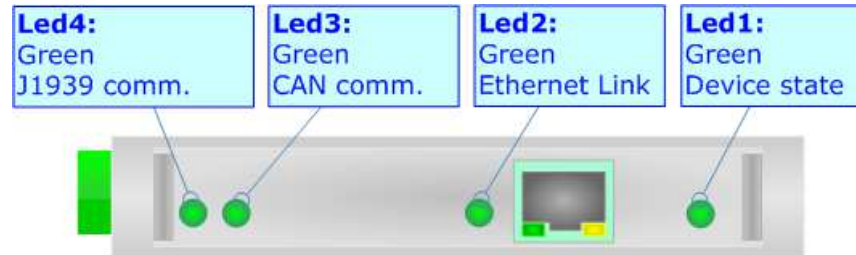
J1939:

To terminate the J1939 line with a 120Ω resistor it is necessary that the Dip1 of 'Dip-Switch B' is at ON position.
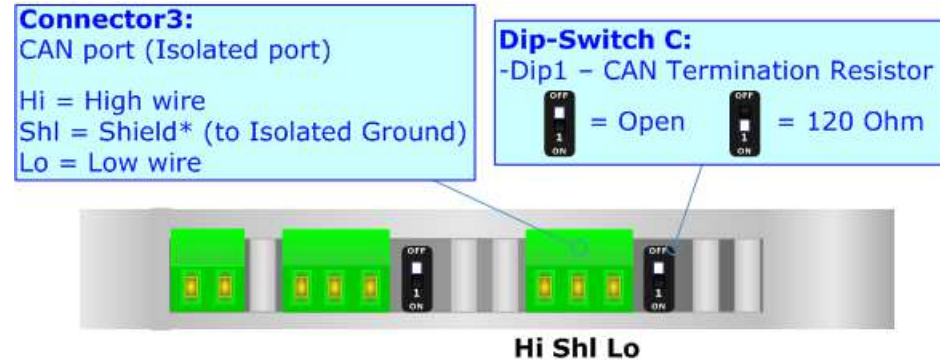
Cable characteristics:

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

Here some codes of cable:

  ➧ Belden: p/n 3105A - 1x 22WG stranded twisted pairs conductor + foil shield + braid shield.

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CAN:

To terminate the CAN line with a 120Ω resistor it is necessary that the Dip1 of 'Dip-Switch C' is at ON position.

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

Here some codes of cable:

➡ Belden: p/n 3105A - 1x 22WG stranded twisted pairs conductor + foil shield + braid shield.

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ETHERNET:

The Ethernet connection must be made using Connector4 HD67047 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.

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USE OF COMPOSITOR SW67047:

To configure the Converter, use the available software that runs with Windows called SW67047. It is downloadable from 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; 32/64bit).

When launching the SW67047, the window below appears (Fig. 2).

Note:
   It is necessary to have installed .Net Framework 4.
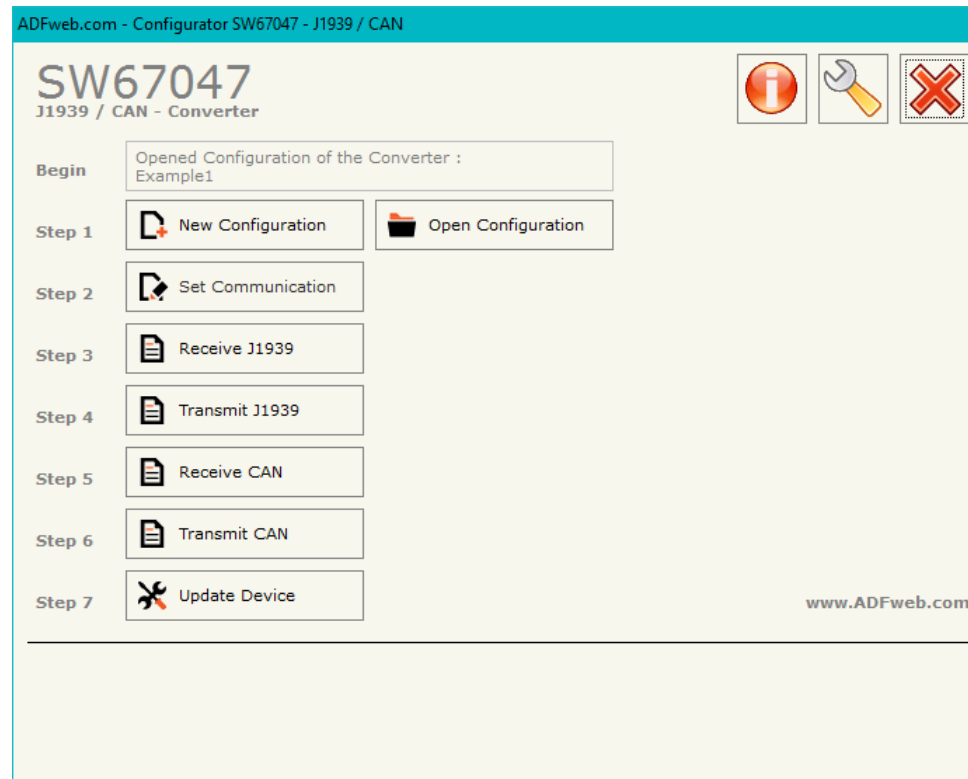
Figure 2: Main window for SW67047

NEW CONFIGURATION / OPEN CONFIGURATION:

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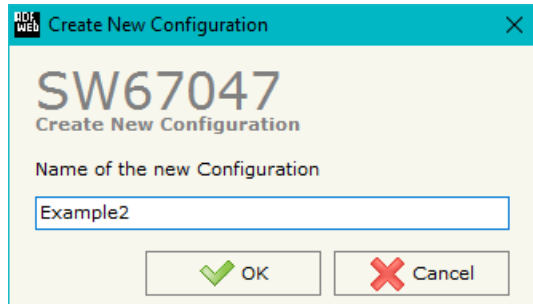
A device's configuration can also be imported or exported:

➜ To clone the configurations of a Programmable "J1939 / CAN - 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**".
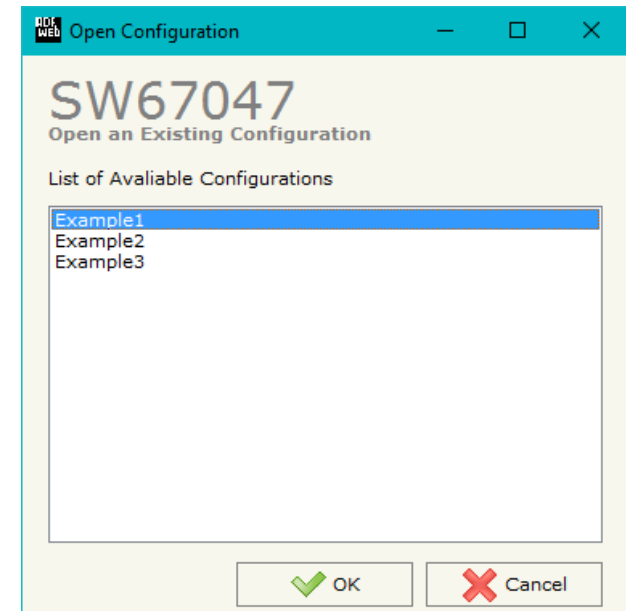
SOFTWARE OPTIONS:

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.
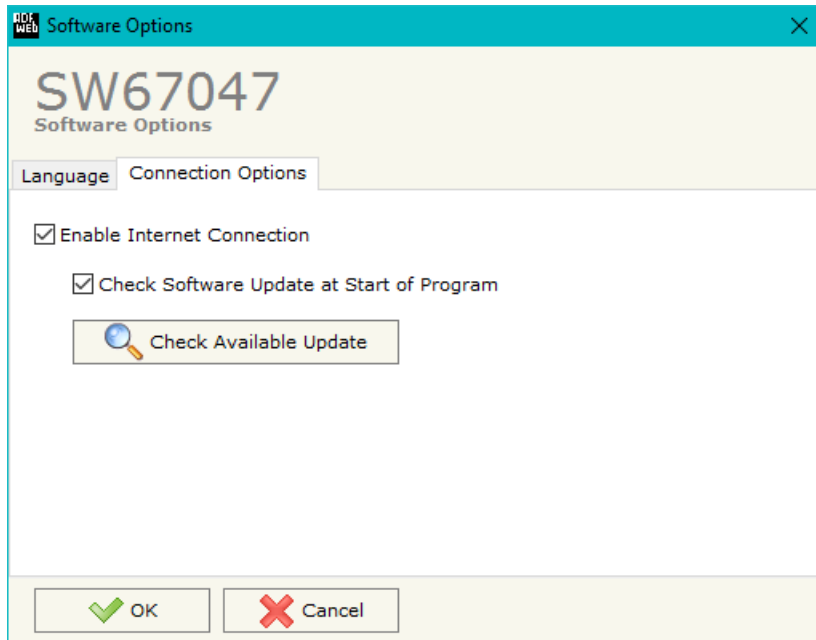
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67047 check automatically if there are updatings when it is launched.

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SET COMMUNICATION:

This section define the fundamental communication parameters of two buses, CAN and J1939.

By Pressing the "**Set Communication**" button from the main window for SW67047 (Fig. 2) the window "Set Communication" appears (Fig. 3).

The means of the fields for "J1939" section are:

- In the field "**Baudrate**" the data rate of the J1939 is defined;
- In the field "**TimeOut Data (s)**" the timeout of the data is defined. If the CAN frame is not received in this time, on J1939 side the value of the data of the CAN frame become "0xFF";
- If the field "**Enable Peer to Peer**" is checked, the converter accept any ID that have the PGN inserted in the section "Receive J1939";
- In the field "**Device ID J1939**" the ID of the J1939 side of the converter is defined.

The means of the fields for "CAN" are:

- In the field "**Baudrate**" the data rate of the CAN is defined;

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

- In the field "**IP ADDRESS**" the IP address of the converter is defined;
- In the field "**SUBNET Mask**" the Subnet Mask of the converter is defined;
- If the field "**GATEWAY**" is checked, it is possible to insert the IP Address of the default gateway of the network used for going out to the net.
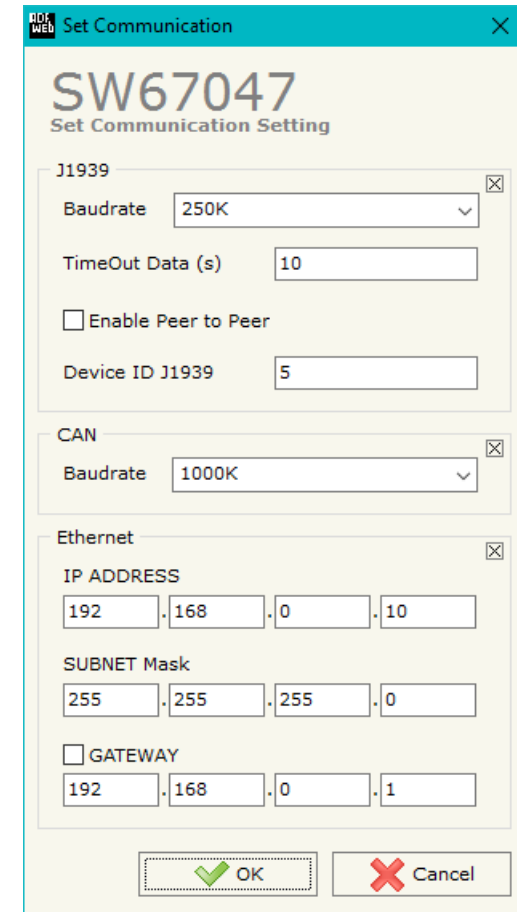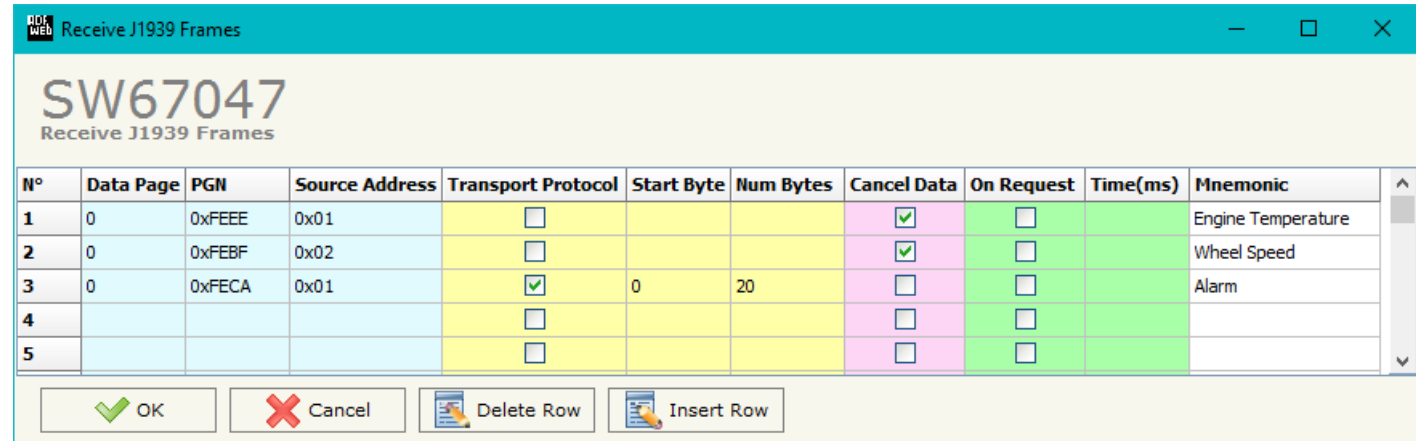
Figure 3: "Set Communication" windows

RECEIVE J1939:

By pressing the "**Receive J1939**" button from the main window of SW67047 (Fig. 2) the window "Receive J1939 Frames" appears (Fig. 4).

The meaning of the fields of the table are:

Figure 4: "Receive J1939 Frames" window

- In the field "**Data Page**" insert the data page, the value is 0 or 1 (usually it is 0);
- In the field "**PGN**" insert the PGN of the data you would to read from CAN to J1939 (in the J1939 protocol the PGN is an identifier);
- In the field "**Source Address**" insert the address of the device that send the frame;
- If the field "**Transport Protocol**" is checked the frame uses Transport Protocol functions;
- In the field "**Start Byte**" insert the byte which you would start read, this field is enable only when the field Transport Protocol is checked;
- In the field "**Num Bytes**" insert the number of byte you would read, for example your Start Byte is 20 an Num Bytes is 10, you can read the byte from 20 to 30;
- If the field "**Cancel Data**" is checked, when the data is oldest of the time inserted in the "TimeOut Data (s)" in the section "Set Communication", the Data for the PGN is set to "0xFF";
- If the field "**On Request**" is checked, the converter sends the request frame to the related PGN in order to receive the frame with the data;
- In the field "**Time (ms)**" is possible to insert the interval used to send the request frame;
- In the field "**Mnemonic**" the description for the frame is defined.

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TRANSMIT J1939

By pressing the "**Transmit J1939**" button from the main window of SW67047 (Fig. 2) the window "Transmit J1939 Frames" appears (Fig. 6).

The meaning of the fields of the table are:

- In the field "**Priority**" insert the priority of the frame, in J1939 protocol it is a number among 0,1,2,3,4,5,6,7. The number 0 is the highest priority and 7 is the lowest;
- In the field "**Data Page**" insert the data page, in the J1939 protocol it is 0 or 1;
- In the field "**PGN**" insert the PGN of the data you would to write from CAN to J1939 (in the J1939 protocol the PGN is an identifier);
- In the field "**Source Address**" insert the ID of device that send the frame;

Figure 5: "Transmit J1939 Frames" window

- If the field "**On Request**" is checked, the frame is sent when the converter receives the "On Request" command;
- If the field "**Data Change**" is checked, the frame is sent when the data changes;
- If the field "**On Timer**" is checked, the frame is sent cyclically;
- In the field "**Time (ms)**" insert the interval used to send the frame with the option "On Timer";
- In the field "**Mnemonic**" the description for the frame is defined.

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RECEIVE CAN:

By pressing the "**Receive CAN**" button from the main window for SW67047 (Fig. 2) the window "Receive CAN Frames" appears (Fig. 6). In this section, it is possible to define the CAN frames that the converter will receive from CAN network.
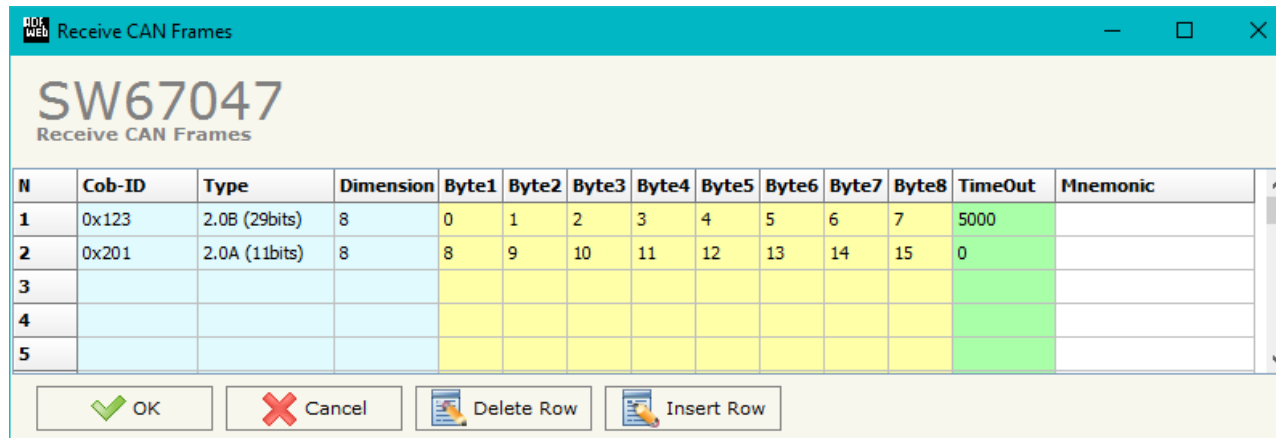
The window appears like below:

N	Cob-ID	Type	Dimension	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	TimeOut	Mnemonic
1	0x123	2.0B (29bits)	8	0	1	2	3	4	5	6	7	5000	
2	0x201	2.0A (11bits)	8	8	9	10	11	12	13	14	15	0	
3													
4													
5													

Figure 6: "Receive CAN Frame" window

- In the field "**Cob-ID**" insert the Cob-ID of the CAN frame;
- In the field "**Type**" insert the type of the CAN protocol used for each frame (CAN 2.0A (11 bits) or CAN 2.0B (29 bits));
- In the field "**Dimension**" insert the number of bytes of the CAN frame (the maximum dimension is 8 Bytes);
- In the fields "**ByteN**" insert the bytes of the internal array of the converter where mapping each byte of the CAN frame;
- If the field "**TimeOut**" insert the TimeOut; if the CAN frame is not received in the timeout defined, the value of the data on J1939 side become "0xFF";
- In the field "**Mnemonic**" a description of the frame is defined.

TRANSMIT CAN:

By pressing the "**Transmit CAN**" button from the main window of SW67047 the window "Transmit CAN Frames" appears (Fig. 7): in this section, it is possible to define the CAN frames that the converter will send to the CAN network.
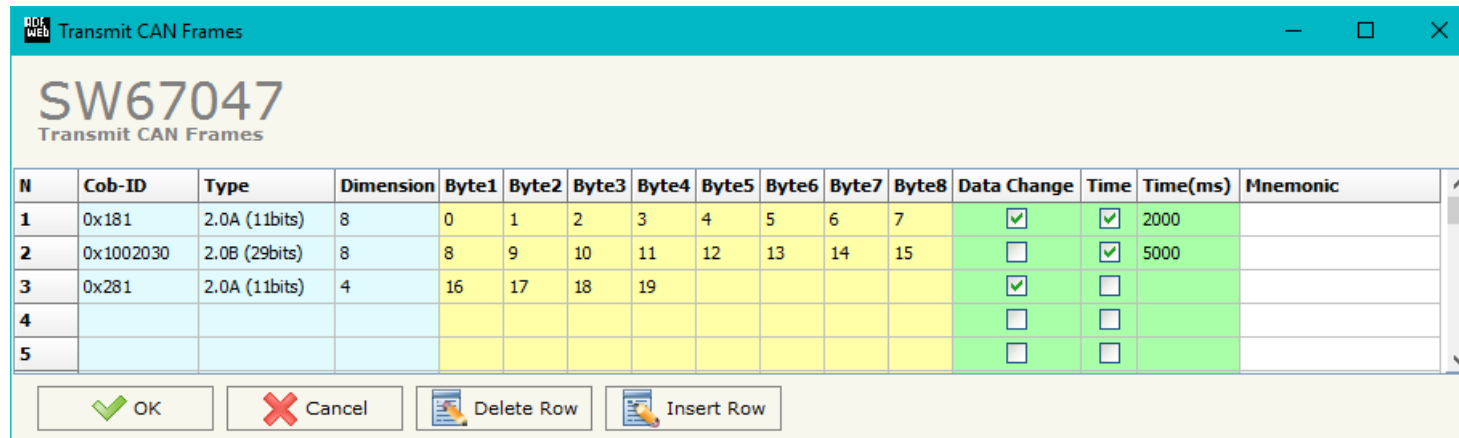
The window appears like below:

| N	Cob-ID	Type	Dimension	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	Data Change	Time	Time(ms)	Mnemonic
1	0x181	2.0A (11bits)	8	0	1	2	3	4	5	6	7	☑	☑	2000	
2	0x1002030	2.0B (29bits)	8	8	9	10	11	12	13	14	15	☐	☑	5000	
3	0x281	2.0A (11bits)	4	16	17	18	19					☑	☐		
4												☐	☐		
5												☐	☐		

Figure 7: "Transmit CAN Frames" window

- In the field "**Cob-ID**" insert the Cob-ID of the CAN frame;
- In the field "**Type**" insert the type of the CAN protocol used for each frame (CAN 2.0A (11 bits) or CAN 2.0B (29 bits));
- In the field "**Dimension**" insert the number of bytes of the CAN frame (the maximum dimension is 8 Bytes);
- If the field "**On Change**" is checked the CAN frame is sent when the data of the PGN linked change;
- If the field "**On Timer**" is checked the CAN frame is sent cyclically;
- In the field "**Timer (ms)**" insert the cyclic delay for the "On Timer" option;
- In the field "**Mnemonic**" the description for the frame is defined.

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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 Dip2 of 'Dip-Switch A' in ON position;
- Turn on the device
- Connect the Ethernet cable;
- Insert the IP "**192.168.2.205**";
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" turn off the Device;
- Put Dip2 of 'Dip-Switch A' in OFF position;
- Turn ON the device.
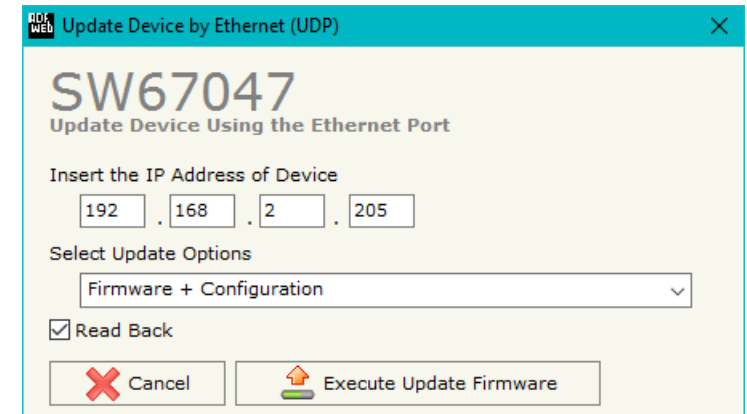
If you know the actual IP address of the device, you have to use this procedure:

- Turn on the Device with the Ethernet cable inserted;
- Insert the actual IP of the Converter;
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" the device automatically goes at Normal Mode.
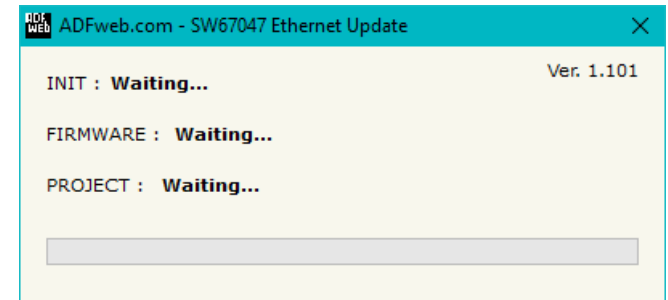
At this point the configuration/firmware on the device is correctly updated.

Figure 8: "Update via Ethernet" windows

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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 HD67047 device.

Note:
When you receive the device, for the first time, you also have to update the Firmware in the HD67047 device.

⚠️ **Warning:**

If Fig. 9 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 and 10 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 you have to launch the "Command Prompt" with Administrator Rights;
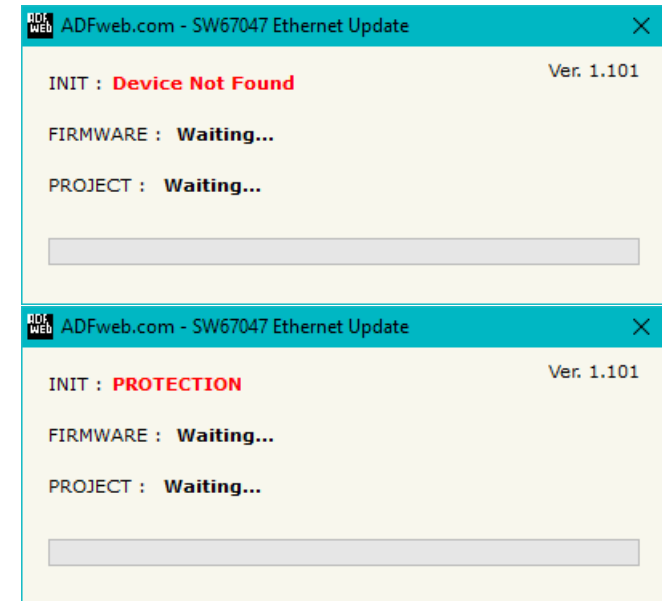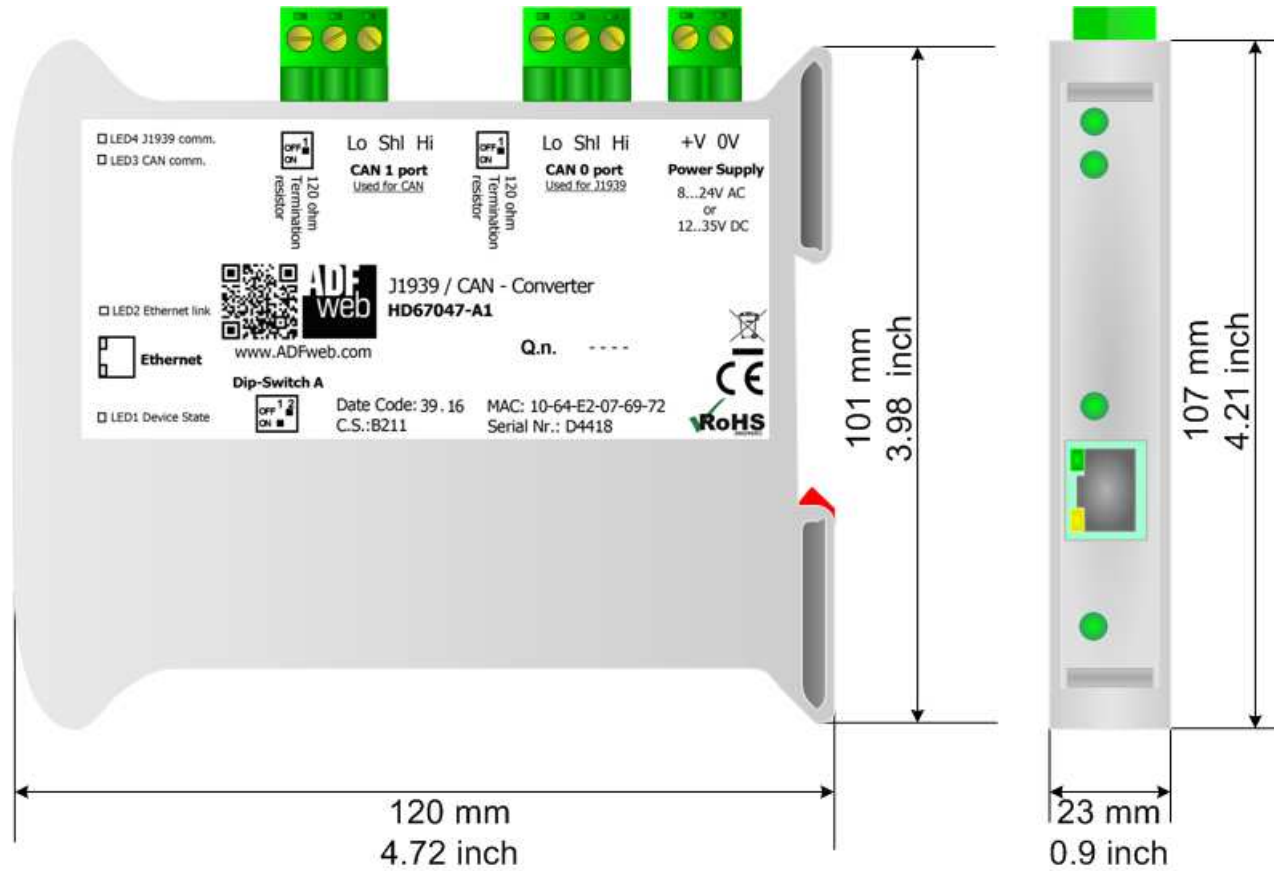+ Pay attention at Firewall lock.

In the case of HD67047 you have to use the software "SW67047":
www.adfweb.com\download\filefold\SW67047.zip.

Figure 9: Error windows

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MECHANICAL DIMENSIONS:

Figure 10: Mechanical dimensions scheme for HD67047-A1

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ORDERING INFORMATIONS:

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

HD67047 – A 1

Connectors Type
1: Removable 5mm Screw Terminal

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

Device Family
HD67047: J1939 / CAN – Converter
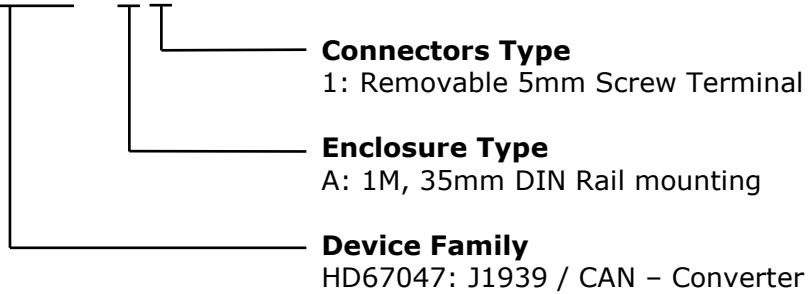
Order Code: **HD67047-A1**   -   J1939 / CAN – Converter (Terminal Blocks connectors)

ACCESSORIES:

Order Code: **AC34001**   -   35mm Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V AC

Order Code: **AC34002**   -   35mm Rail DIN - Power Supply 110V AC 50/60Hz – 12 V AC

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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 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 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.

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