

User Manual

Revision 1.100
English

J1939 / Ethernet - Converter

(Order Code: HD67213-A1, HD67213-B2)

For Website information:

www.adfweb.com?Product=HD67213

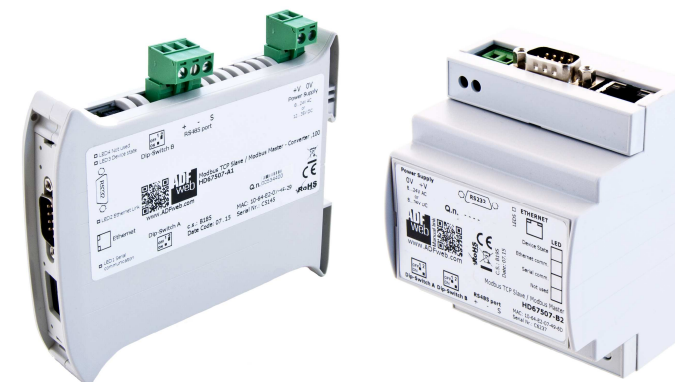
For Price information:

www.adfweb.com?Price=HD67213-A1

www.adfweb.com?Price=HD67213-B2

Benefits and Main Features:

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



For others Converter / Adapter:

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 have an your customer protocol?

See the following link:

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



User Manual

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UPDATED DOCUMENTATION:

Dear customer, we thank you for your attention and we remind you that you need to check that the following document is:

- Updated
- Related to the product you own

To obtain the most recently updated document, note the “document code” that appears at the top right-hand corner of each page of this document.

With this “Document Code” go to web page www.adfweb.com/download/ and search for the corresponding code on the page. Click on the proper “Document Code” and download the updates.

REVISION LIST:

Revision	Date	Author	Chapter	Description
1.001	29/01/2009	Fl	All	Software changed
1.002	17/05/2010	Dp	All	Revision
1.003	13/02/2013	Nt	All	Added new chapters
1.100	15/12/2015	Ff	All	New hardware version

WARNING:

ADFweb.com reserves the right to change information in this manual about our product without warning.
ADFweb.com is not responsible for any error this manual may contain.

TRADEMARKS:

All trademarks mentioned in this document belong to their respective owners.

SECURITY ALERT:**GENERAL INFORMATION**

To ensure safe operation, the device must be operated according to the instructions in the manual. When using the device, legal and safety regulation are required for each individual application. The same applies also when using accessories.

INTENDED USE

Machines and systems must be designed so the faulty conditions do not lead to a dangerous situation for the operator (i.e. independent limit switches, mechanical interlocks, etc.).

QUALIFIED PERSONNEL

The device can be used only by qualified personnel, strictly in accordance with the specifications. Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and who have appropriate qualifications for their job.

RESIDUAL RISKS

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

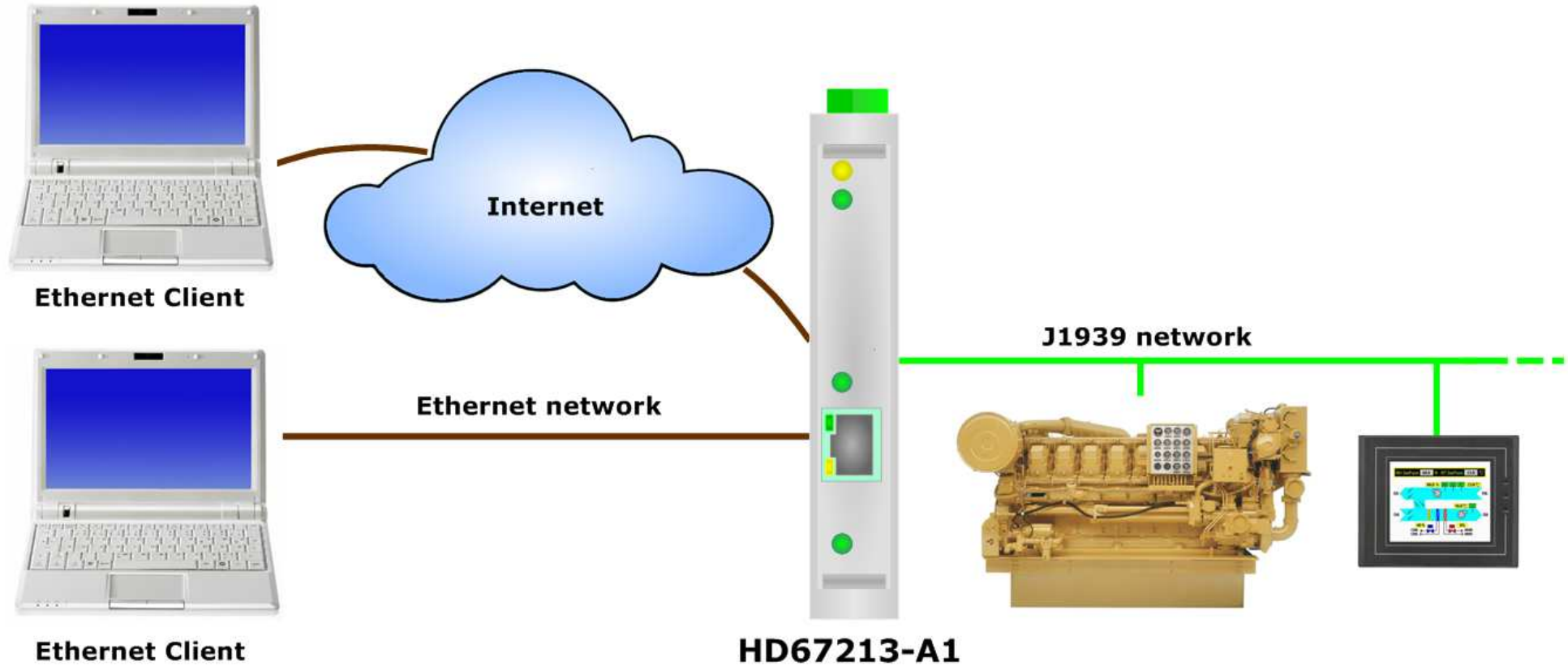


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

CE CONFORMITY

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

EXAMPLE OF CONNECTION:



CONNECTION SCHEME:

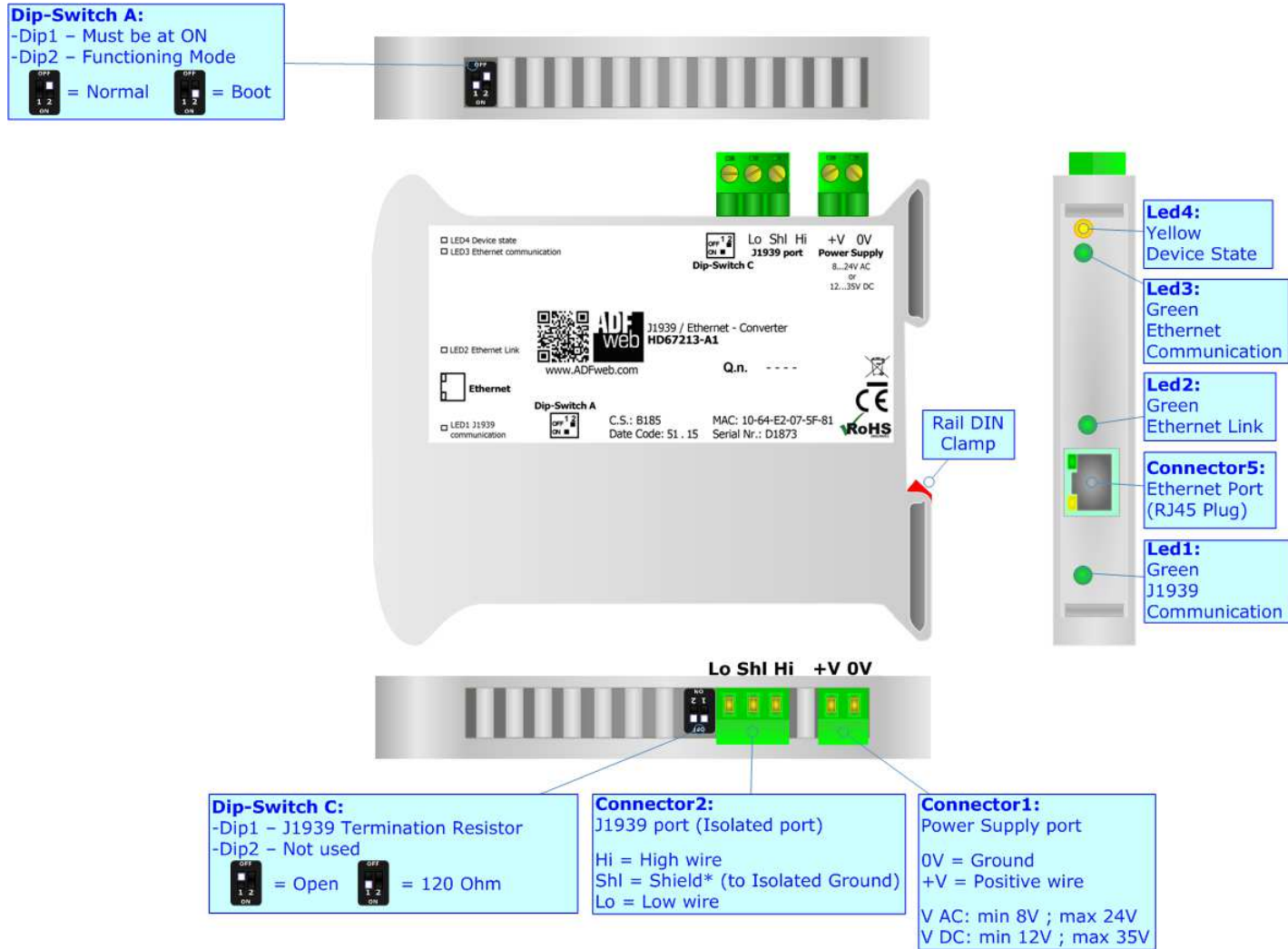


Figure 1a: Connection scheme HD67213-A1

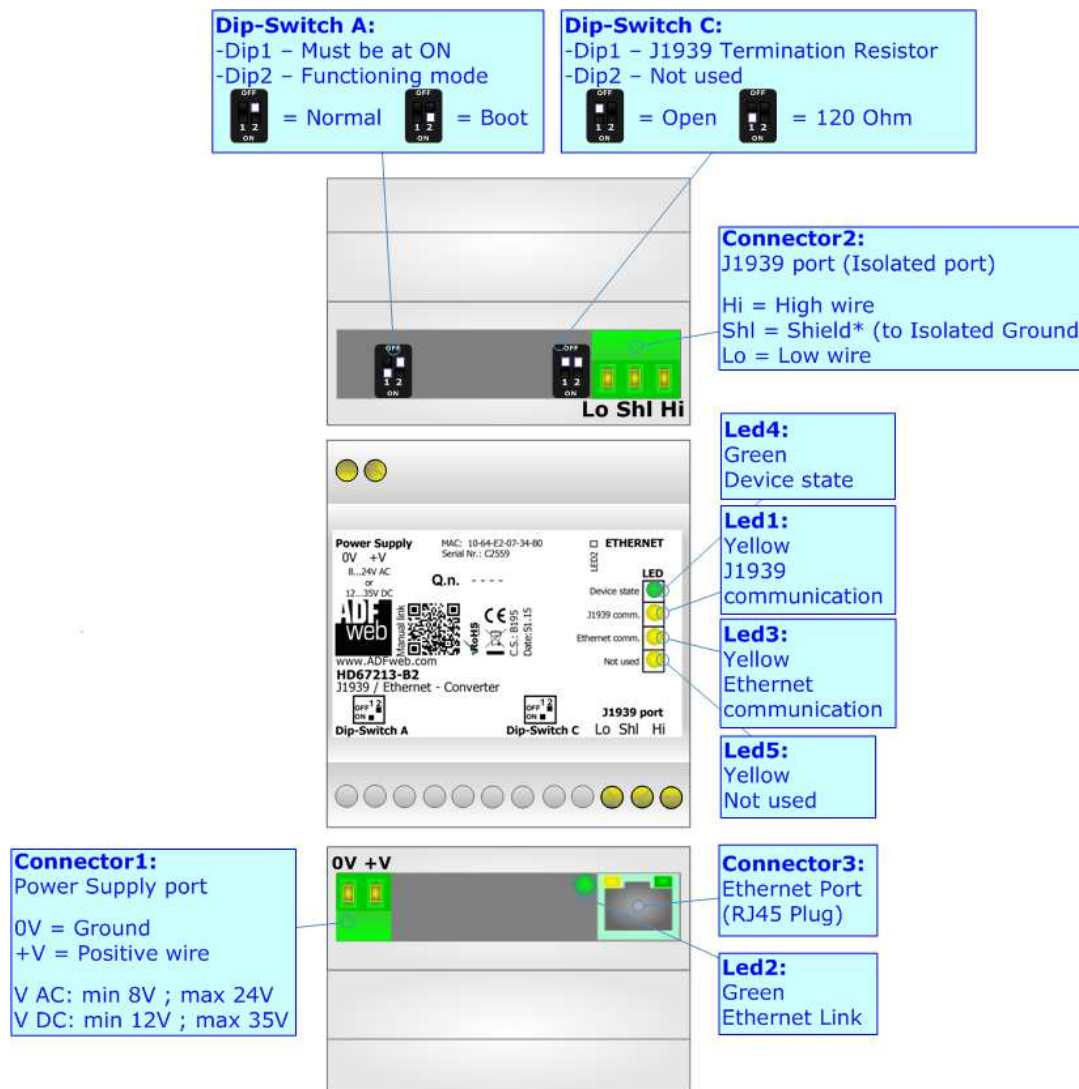


Figure 1b: Connection scheme for HD67213-B2

CHARACTERISTICS:

The HD67213-A1 and HD67213-B2 are J1939 / Ethernet Converters.

They have the following characteristics:

- Triple isolation between J1939 - Power Supply, J1939 - Ethernet, Ethernet - Power Supply;
- Two-directional information between Ethernet bus and J1939 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 SW67213 software on your PC in order to perform the following:

- Define the parameters of J1939 line;
- Define the parameters of Ethernet line;
- Define the J1939 frames that contains the data that are readable by a Ethernet Client;
- Update the device.

POWER SUPPLY:

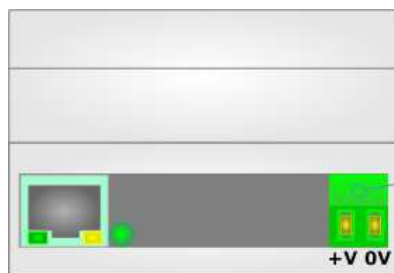
The devices can be powered at 8...24V AC and 12...35V DC. For more details see the two tables below.

VAC		VDC	
Vmin	Vmax	Vmin	Vmax
8V	24V	12V	35V

Consumption at 24V DC:

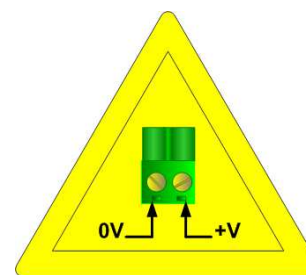
Device	Consumption [W/VA]
HD67213-A1	3.5
HD67213-B2	3.5

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

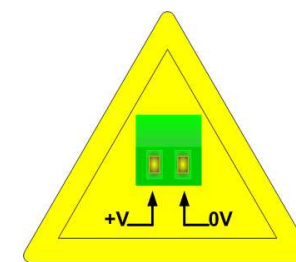


Connector1:
Power Supply port
0V = Ground
+V = Positive wire
V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

Caution: Do not reverse the polarity power



HD67213-A1



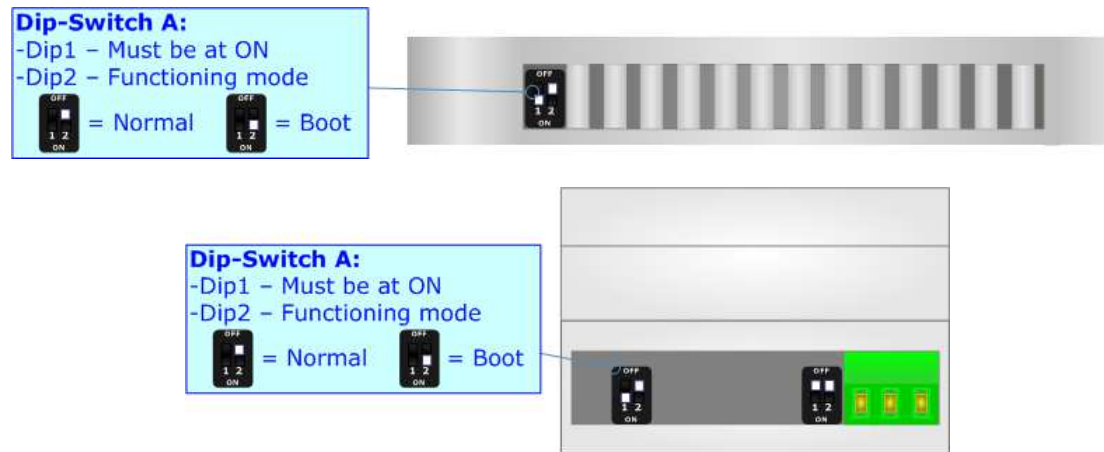
HD67213-B2

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.



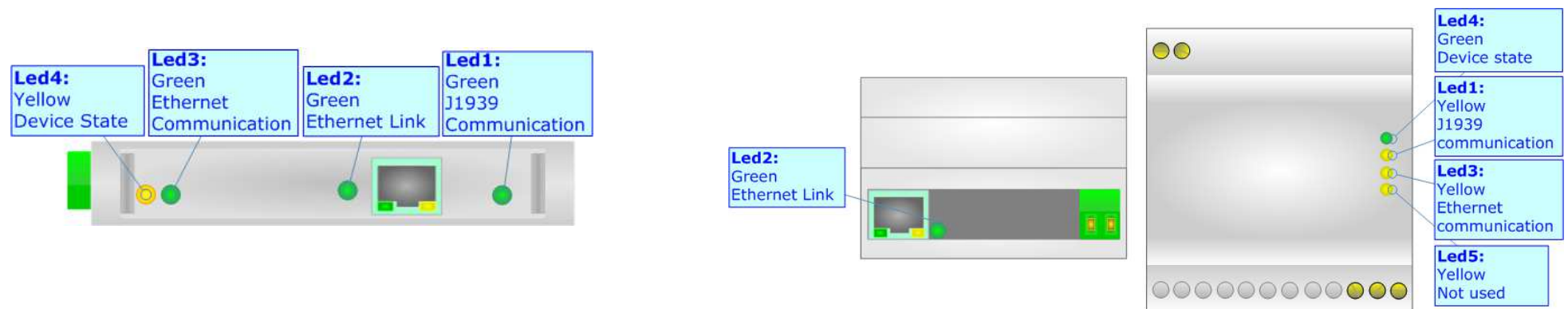
Warning:

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

LEDS:

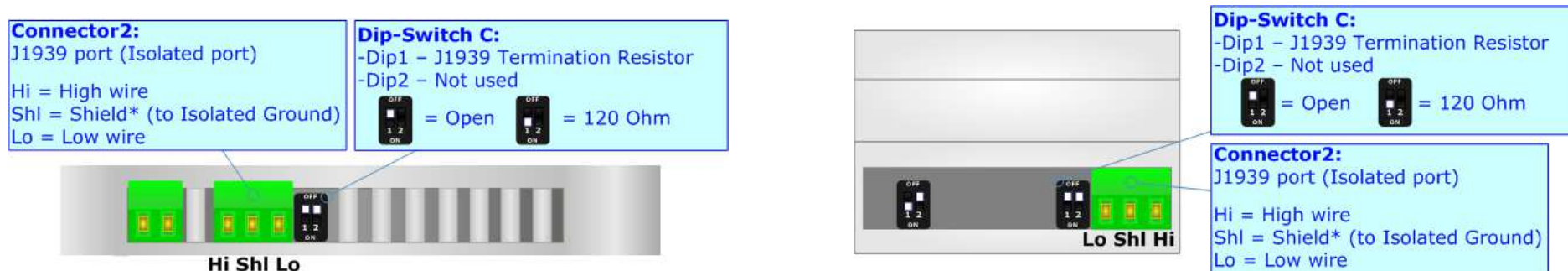
The device has got four/five LEDs that are used to give information about the functioning status. The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: J1939 communication	Blinks when a J1939 frame arrives	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
2: Ethernet Link	ON: Ethernet cable connected OFF: Ethernet cable disconnected	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
3: Ethernet communication	Blinks when an Ethernet command is received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
4: Device state	Blinks slowly (~1Hz)	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
5: Not used (present only on HD67213-B2)	Not used	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 C' is at ON position.



Cable characteristics:

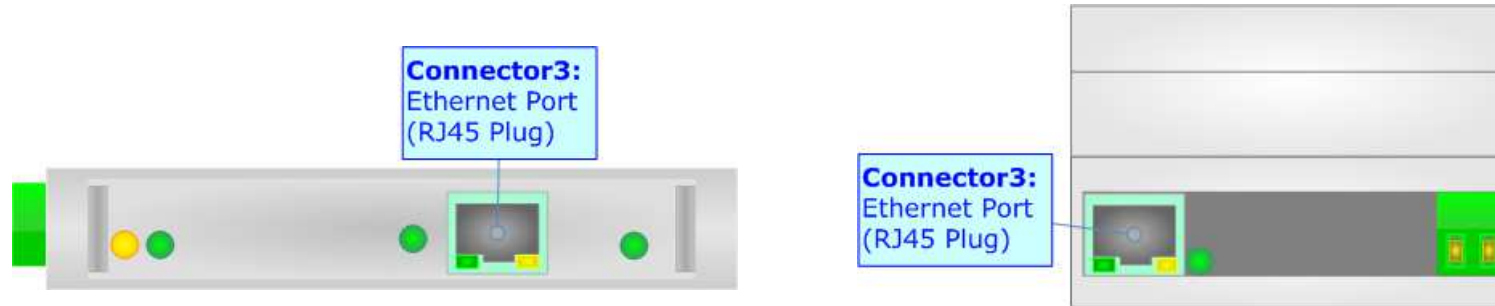
DC parameter:	Impedance	70 Ohm/m
AC parameters:	Impedance	120 Ohm/m
	Delay	5 ns/m
Length	Baud Rate [bps]	Length MAX [m]
	10 K	5000
	20 K	2500
	50 K	1000
	100 K	650
	125 K	500
	250 K	250
	500 K	100
	800 K	50
	1000 K	25

Here some codes of cable:

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

ETHERNET:

The Ethernet connection must be made using Connector3 HD67213-A1/B2 with at least a Category 5E cable. The maximum length of the cable should not exceed 100m. The cable has to conform to the T568 norms relative to connections in cat.5 up to 100 Mbps. To connect the device to an Hub/Switch is recommended the use of a straight cable, to connect the device to a PC/PLC/other is recommended the use of a cross cable.



USE OF COMPOSITOR SW67213:

To configure the Converter, use the available software that runs with Windows called SW67213. 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; 32/64bit).

When launching the SW67213, the window below appears (Fig. 2).



Note:

It is necessary to have installed .Net Framework 4.

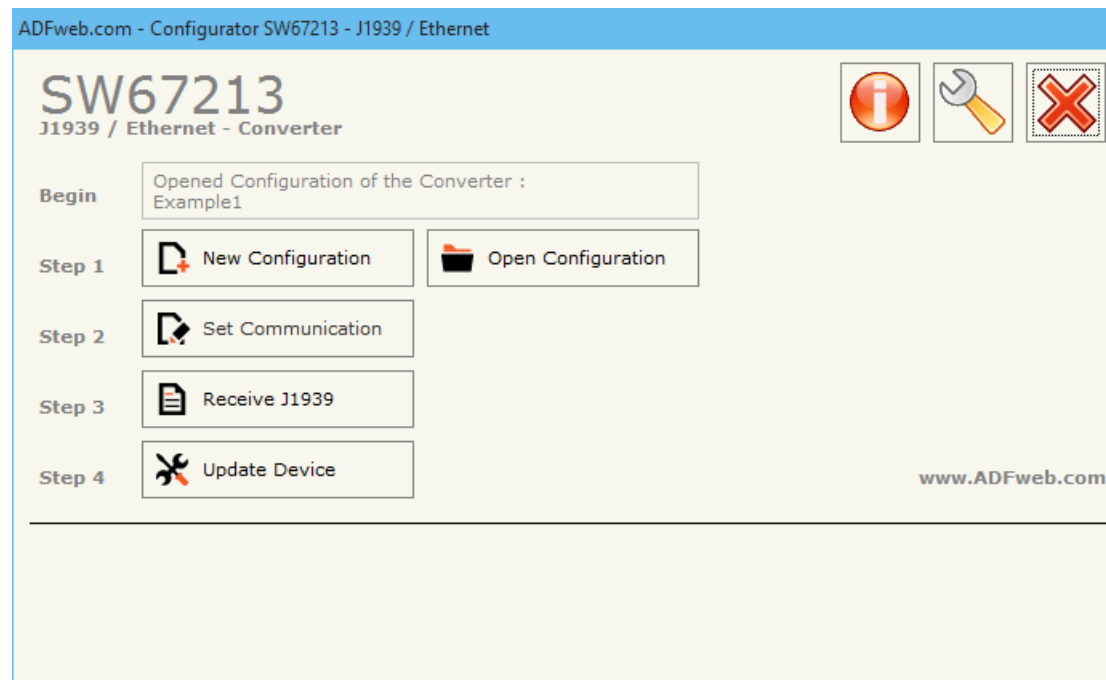
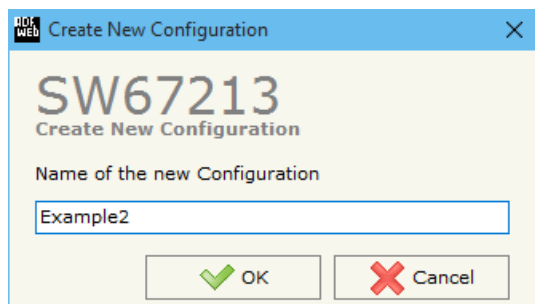


Figure 2: Main window for SW67213

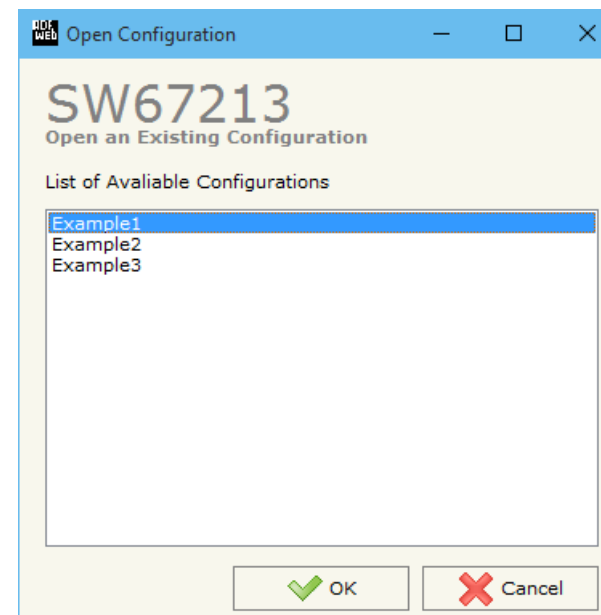
NEW CONFIGURATION / OPEN CONFIGURATION:

The “**New Configuration**” button creates the folder which contains the entire device’s configuration.




A device’s configuration can also be imported or exported:

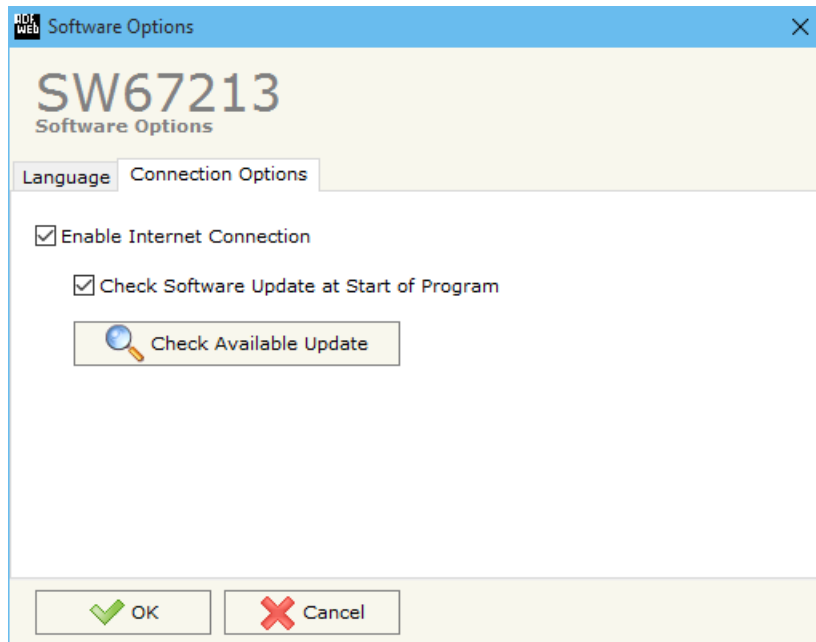
- To clone the configurations of a programmable “J1939 / Ethernet - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button “**Open 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 SW67213 check automatically if there are updatings when it is launched.

SET COMMUNICATION:

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

By Pressing the **"Set Communication"** button from the main window of SW67213 (Fig. 2) the window "Set Communication" appears (Fig. 3).

In the section "Select Device" is possible to select the type of device in possess:

- Device from May 2014 (with Dip-Switch);
- Device till April 2014 (with Jumper).

The meaning of the fields of "J1939" are:

- In the field **"Baudrate"**, the velocity of J1939 is defined;
- In the field **"TimeOut Data (s)"** insert a time, when this time is elapsed the data isn't reliable;
- If the field **"Enable Peer to Peer"** is cheked, the converter accept any ID that have the PGN inserted in the section "Receive J1939";
- In the field **"Device ID J1939"** the J1939 address of the converter is defined (only if "Device from May 2014 (with Dip-Switch)" is used);
- If the field **"Filter FECA (ms)"** is checked, when the FECA PGN arrives the converter puts the values in Standby. If the time, expressed in milliseconds and written at the right side of "Filter FECA (ms)", is elapsed and there aren't arrived the frames of Transport Protocol the converter put the data of FECA into Ethernet array. Otherwise if the Transport Protocol arrives before the time is elapsed the gateway put his data into Ethernet array discarding the data of FECA. When this field is checked the values aren't updated when the FECA frame arrive but there is an offset of xx ms. You can use this function if there is only one J1939 device in the network (only if "Device till April 2014 (with Jumper)" is used).

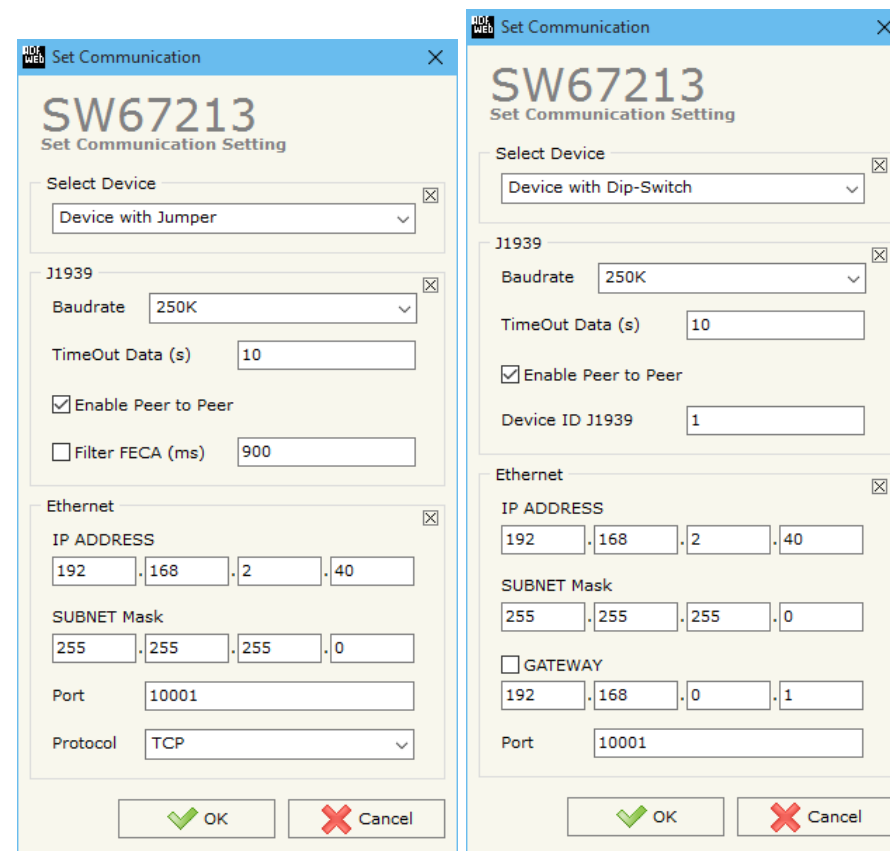


Figure 3: "Set Communication" windows

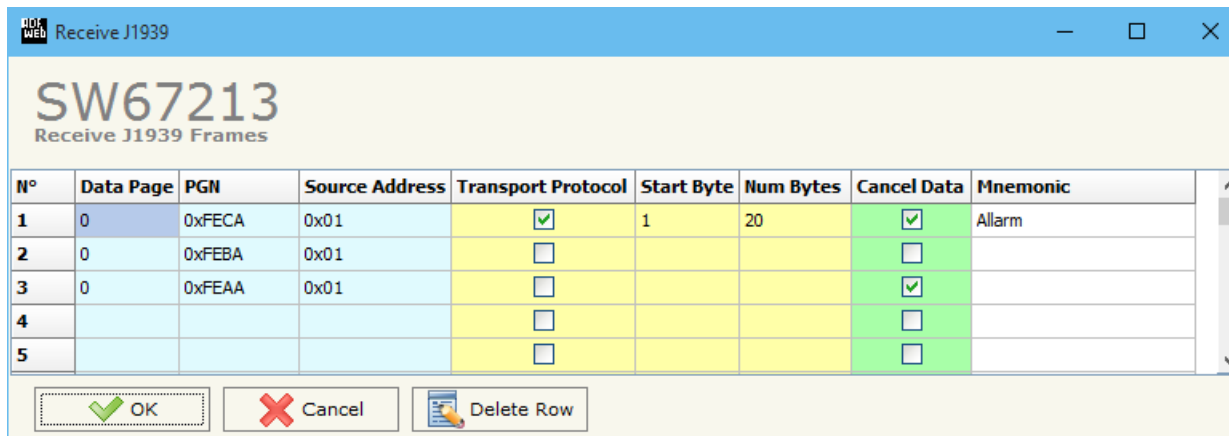
The meaning of the fields of "Ethernet" are:

- In the field "**IP ADDRESS**" insert the IP address that you want to give to the Converter;
- In the field "**SUBNET Mask**" insert the SubNet Mask;
- In the field "**GATEWAY**" insert the default gateway that you want to use. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net (only if "Device from May 2014 (with Dip-Switch)" is used);
- In the field "**Port**" the port number used for Ethernet communication is defined;
- In the field "**Protocol**" the Ethernet protocol is defined (only if "Device till April 2014 (with Jumper)" is used).

RECEIVE J1939:

By pressing the "Receive J1939" button from the main window of SW67213 (Fig. 2) the window "Receive J1939 Frames" appears (Fig. 4).

If "Device till April 2014 (with Jumper)" is set in the section "Set Communication", the window appears like below:



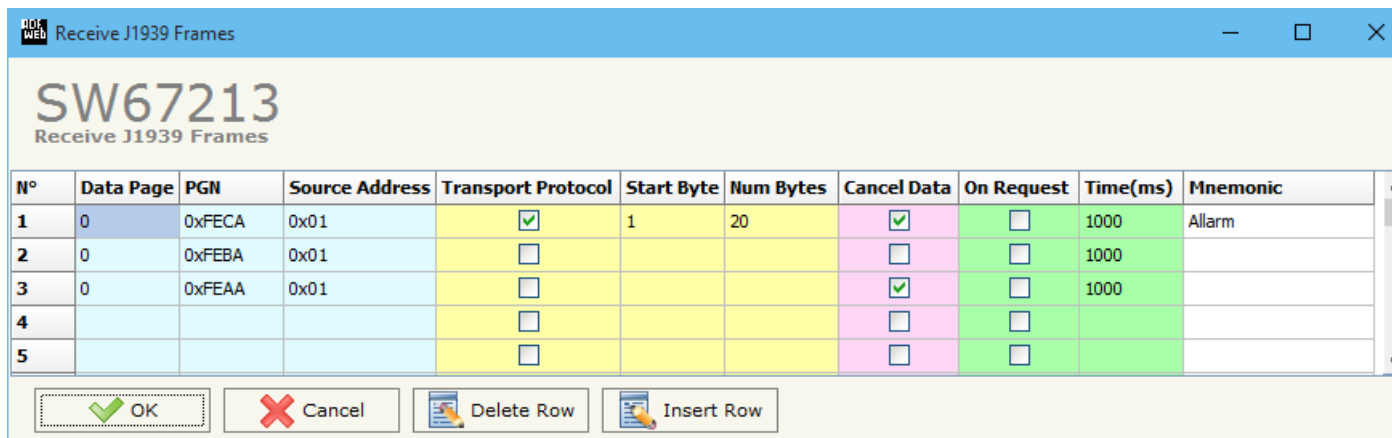
N°	Data Page	PGN	Source Address	Transport Protocol	Start Byte	Num Bytes	Cancel Data	Mnemonic
1	0	0xFECA	0x01	<input checked="" type="checkbox"/>	1	20	<input checked="" type="checkbox"/>	Allarm
2	0	0xFEBA	0x01	<input type="checkbox"/>			<input type="checkbox"/>	
3	0	0xFEAA	0x01	<input type="checkbox"/>			<input checked="" type="checkbox"/>	
4				<input type="checkbox"/>			<input type="checkbox"/>	
5				<input type="checkbox"/>			<input type="checkbox"/>	

Figure 4a: "Receive J1939 Frames" window

The meaning of the fields of the table are:

- In the field "Data Page" insert the data page, the value is 0 or 1 (usually is 0);
- In the field "PGN" insert the PGN of the data you would to read from Ethernet 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 use 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 older of the time inserted in the "time out data", you visualize "FFFF" as data for this PGN in the Ethernet array;
- In the field "Mnemonic" the description for the frame is defined.

If "Device from May 2014 (with Dip-Switches)" is set in the section "Set Communication", the window appears like below:



N°	Data Page	PGN	Source Address	Transport Protocol	Start Byte	Num Bytes	Cancel Data	On Request	Time(ms)	Mnemonic
1	0	0xFECA	0x01	<input checked="" type="checkbox"/>	1	20	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1000	Allarm
2	0	0xFEBA	0x01	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	1000	
3	0	0xFEAA	0x01	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>	1000	
4				<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
5				<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		

Figure 4b: "Receive J1939 Frames" window

The meaning of the fields of the table are:

- In the field "**Data Page**" insert the data page, the value is 0 or 1 (usually is 0);
- In the field "**PGN**" insert the PGN of the data you would to read from Ethernet 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 use 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 older of the time inserted in the "time out data", you visualize "FFFF" as data for this PGN in the Ethernet array;
- If the field "**On Request**" is checked, the converter send 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 frame "On Request";
- In the field "**Mnemonic**" the description for the frame is defined.

UPDATE VIA SERIAL (only if "Device till April 2014 (with Jumper)" is set):

By pressing the "Update Device" button it is possible to load the created Configuration into the device, and also the Firmware if is necessary, using the RS232 port.

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

- Turn off the Device;
- Connect the RS232 Null Modem cable form your PC to the Converter;
- Insert the Boot Jumper;
- Select the "COM port" and press the "Connect" button;
- Turn on the device;
- Check the "Device state" Led. It must blink quickly;
- 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;
- Remove Boot Jumper;
- Disconnect the RS232 cable;
- Turn on the device.

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

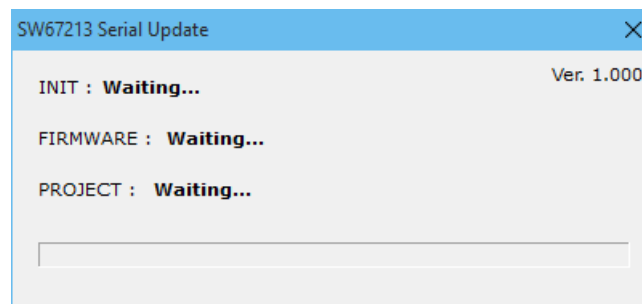
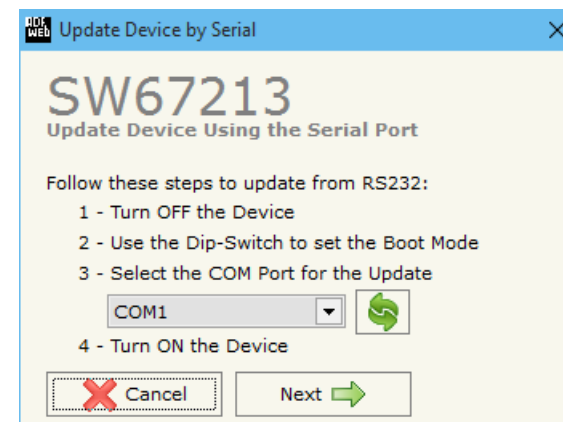


Figure 5a: "Update Device" windows

UPDATE VIA ETHERNET (only if “Device from May 2014 (with Dip-Switches)” is set):

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 Dip2 of ‘Dip-Switch A’ in ON position;
- Turn on the device
- Connect the Ethernet cable;
- Insert the IP “**192.168.2.205**”;
- Press the “**Ping**” button, “Device Found! must appear”;
- Press the “**Next**” button;
- Select which operations you want to do;
- Press the “**Execute update firmware**” button to start the upload;
- When all the operations are “OK” turn off the Device;
- Put Dip2 of ‘Dip-Switch A’ in OFF position;
- Turn on the device.

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

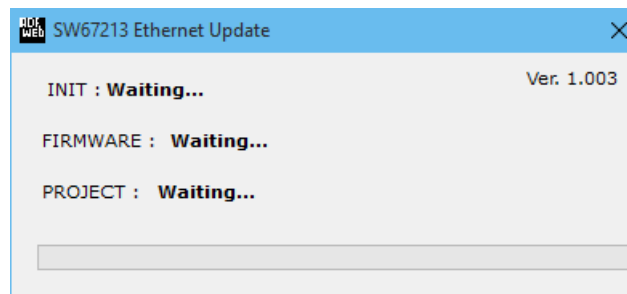
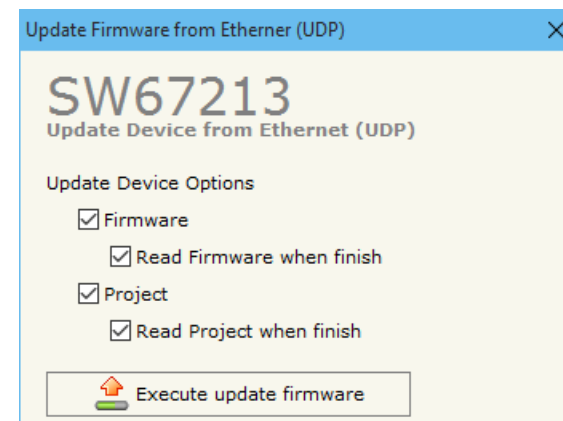
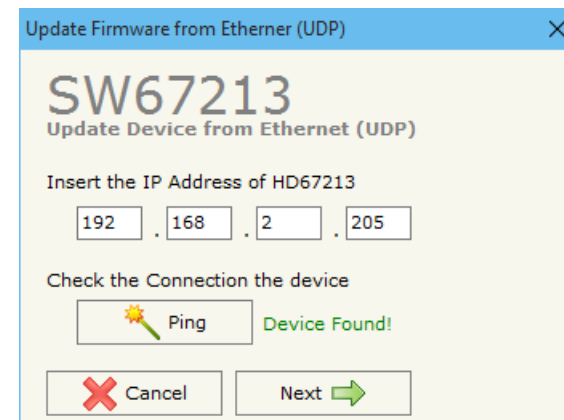


Figure 5b: “Update device” windows

If you know the actual IP address of the device, you have to use this procedure:

- Turn on the Device with the Ethernet cable inserted;
- Insert the actual IP of the Converter;
- Press the "**Ping**" button, must appear "Device Found!";
- Press the "**Next**" button;
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" the device automatically goes at Normal Mode.

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



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 HD67213-A1 or HD67213-B2 device.



Note:

When you receive the device, for the first time, you also have to update the Firmware in the HD67213-A1 or HD67213-B2 device.



Warning:

If Fig. 6 appears when you try to do the Update try these points before seeking assistance:

- Check if the serial COM port selected is the correct one;
- Check if the 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;
- 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, 10 you have to launch the "Command Prompt" with Administrator Rights;
- Take attention at Firewall lock.



Warning:

In the case of HD67213-A1 or HD67213-B2 you have to use the software "SW67213":

www.adfweb.com/download/filefold/SW67213.zip.



Note:

The minimum version of the configuration software must be the 2.000.

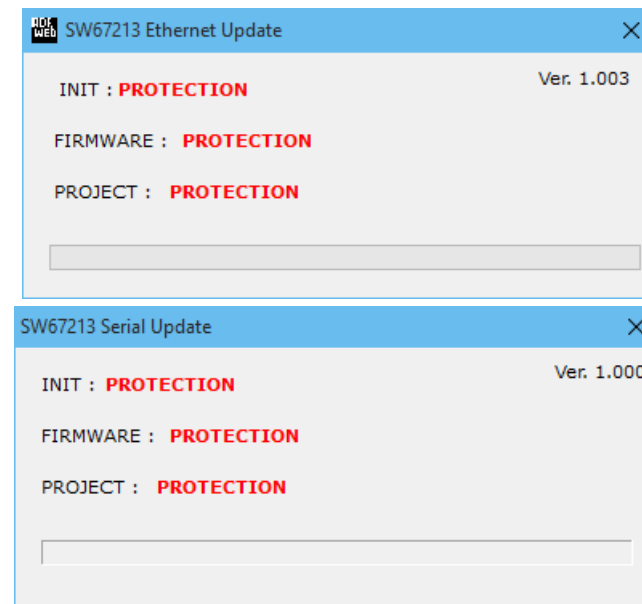


Figure 6: "Protection" window

ETHERNET PROTOCOL

This protocol is able to read and write frames in the J1939 net.

Write Frames

The transmission is very simple, it require only what are the packets to send. In a single request it is possible to write at maximum 19 frames in the J1939 net. The Bytes that composed the request are these:

Byte Number	Description
1	Read / Write Identifier (Read=0x01 / Write=0x02)
2	Number of frames to send
3	Priority
4	Data Page
5	PGN Hi
6	PGN Lo
7	Source Address
8÷15	Data (Byte 8 is the higher, byte 15 is the lower)

A single frame is composed by 13 bytes (byte 3 to byte 15). Now if the "Number of frame to send" (Byte Number 2) has got a value greater than one the next frame is composed from byte 3 to byte 15 and so for all the frames.

The response is composed by only one byte. It can have two values:

- 0x00: No Errors;
- 0x01: Parameter Error.

Example:

We want to write two frames with the following characteristics:

Frame 1: Priority=6; Data Page=0; PGN=FECA; Source Address=1; Data=0x0102030405060708;

Frame 2: Priority=6; Data Page=0; PGN=FFCA; Source Address=2; Data=0x1122334455667788.

So the string of hexadecimal numbers is:

REQ:[02][01][06][00][FE][CA][01][01][02][03][04][05][06][07][08][06][00][FF][CA][02][11][22][33][44][55][66][77][88]

RES:[01]

Read Frames

For reading Data it is necessary to have a map in the RAM memory that contains the Data that passing in the bus. This map is implemented in the "Compositor SW67213" but it has some standard address given by the software. It is possible to see this map in Fig. 4.

The Bytes that composed the request are these:

Byte Number	Description
1	Read / Write Identifier (Read=0x01 / Write=0x02)
2	Starting Address Hi
3	Starting Address Lo
4	Number of Byte to read Hi
5	Number of Byte to read Lo

The Bytes that composed the respons are these:

Byte Number	Description
1	Error
2	TimeOut
3÷n+2	Data

n=Number of Byte

The Error Byte (Byte 1) can have three values:

- 0x00: No error;
- 0x01: Starting Address doesn't exist;
- 0x02: Too many Data to read.

The TimeOut Byte (Byte 2) can have three values:

- 0x00: TimeOut not used;
- 0x01: Data consistent;
- 0x02: Data not consistent.

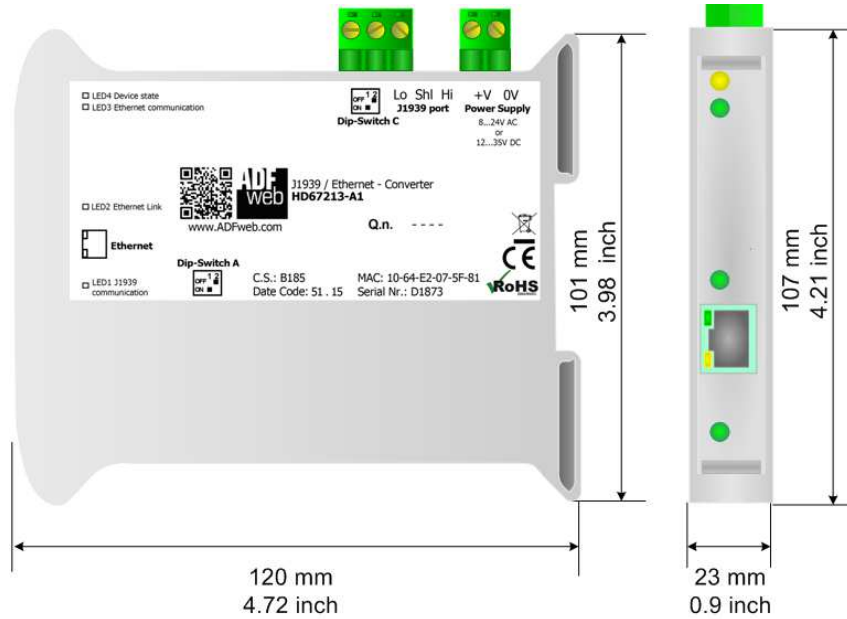
Example:

We want to read ten frames from Starting Address 1. So the string of hexadecimal numbers is:

REQ:[01][00][00][00][10]

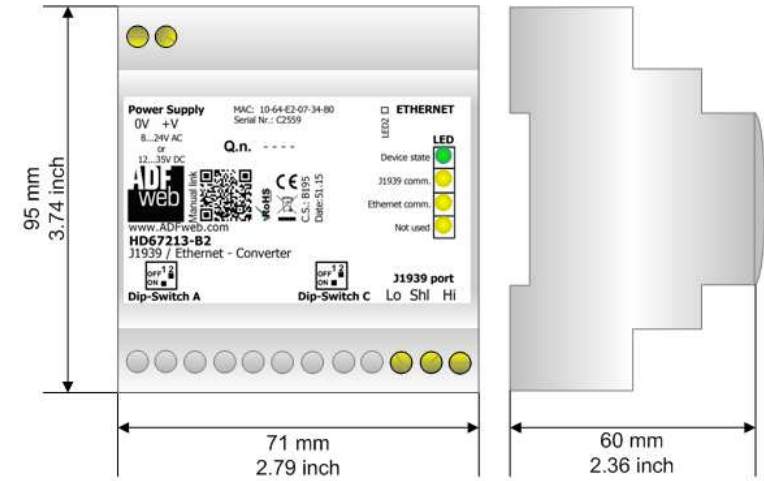
RES:[00][01][01][02][03][04][05][06][07][08][09][0A][0B][0C][0D][0E][0F][10]

MECHANICAL DIMENSIONS:



Housing: PVC
Weight: 200g (Approx)

Figure 7a: Mechanical dimensions scheme for HD67213-A1



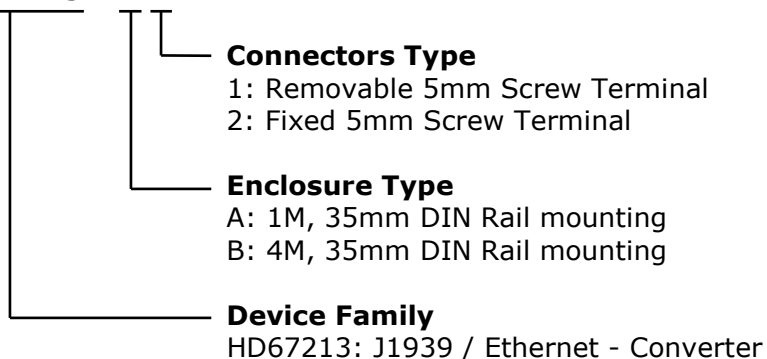
Housing: PVC
Weight: 200g (Approx)

Figure 7b: Mechanical dimensions scheme for HD67213-B2

ORDERING INFORMATIONS:

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

HD67213 - x x



Order Code: **HD67213-A1** - J1939 / Ethernet - Converter (Housing type: A, Terminal Blocks Connectors)

Order Code: **HD67213-B2** - J1939 / Ethernet - Converter (Housing type: B, Terminal Blocks Connectors)

ACCESSORIES:

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

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

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 is a under continual renewal. For losses due to fire, earthquake, third party access or other accidents, or intentional or accidental abuse, misuse, or use under abnormal conditions repairs are charged to the user. ADFweb.com S.r.l. will not be liable for accidental loss of use or inability to use this product, such as loss of business income. ADFweb.com S.r.l. shall not be liable for consequences of improper use.

OTHER REGULATIONS AND STANDARDS:**WEEE INFORMATION**

Disposal of old electrical and electronic equipment (as in the European Union and other European countries with separate collection systems).

— This symbol on the product or on its packaging indicates that this product may not be treated as household rubbish. Instead, it should be taken to an applicable collection point for the recycling of electrical and electronic equipment. If the product is disposed correctly, you will help prevent potential negative environmental factors and impact of human health, which could otherwise be caused by inappropriate disposal. The recycling of materials will help to conserve natural resources. For more information about recycling this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE

The device respects the 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:

- 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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