User Manual

Revision 1.015
English

Gateway / Bridge
J1939 to Modbus TCP

(Order Code: HD67215; HD67215-A1)

HD67215-A1

HD67215

Benefits and Main Features:

- Very easy to configure
- Low cost
- Modbus TCP on Ethertnet 10/100
- Wide supply input range
- Galvanic isolation
- Industrial temperature range: -40°C / 85°C (-40°F / 185°F)

INDEX:

UPDATED DOCUMENTATION:

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REVISION LIST:

Revision	Date	Author	Chapter	Description
1.001	11/06/2008	Av	All	Software changed
1.002	03/10/2008	Fl	All	Software changed
1.003	13/11/2008	Fl	All	Changed Update Device Section
1.010	24/02/2010	Fl	All	Software changed v2.401
1.011	18/05/2010	Dp	All	Revision
1.012	22/07/2010	FT	All	Revision
1.013	17/01/2011	Dp	All	Software changed
1.014	12/02/2013	Nt	All	Added new chapters
1.015	14/03/2013	Dp	All	Software changed

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SECURITY ALERT:

GENERAL INFORMATION

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

INTENDED USE

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

QUALIFIED PERSONNEL

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

RESIDUAL RISKS

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

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

CE CONFORMITY

The declaration is made by us. You can send an email to or give us a call if you need it.

CONNECTION SCHEME:

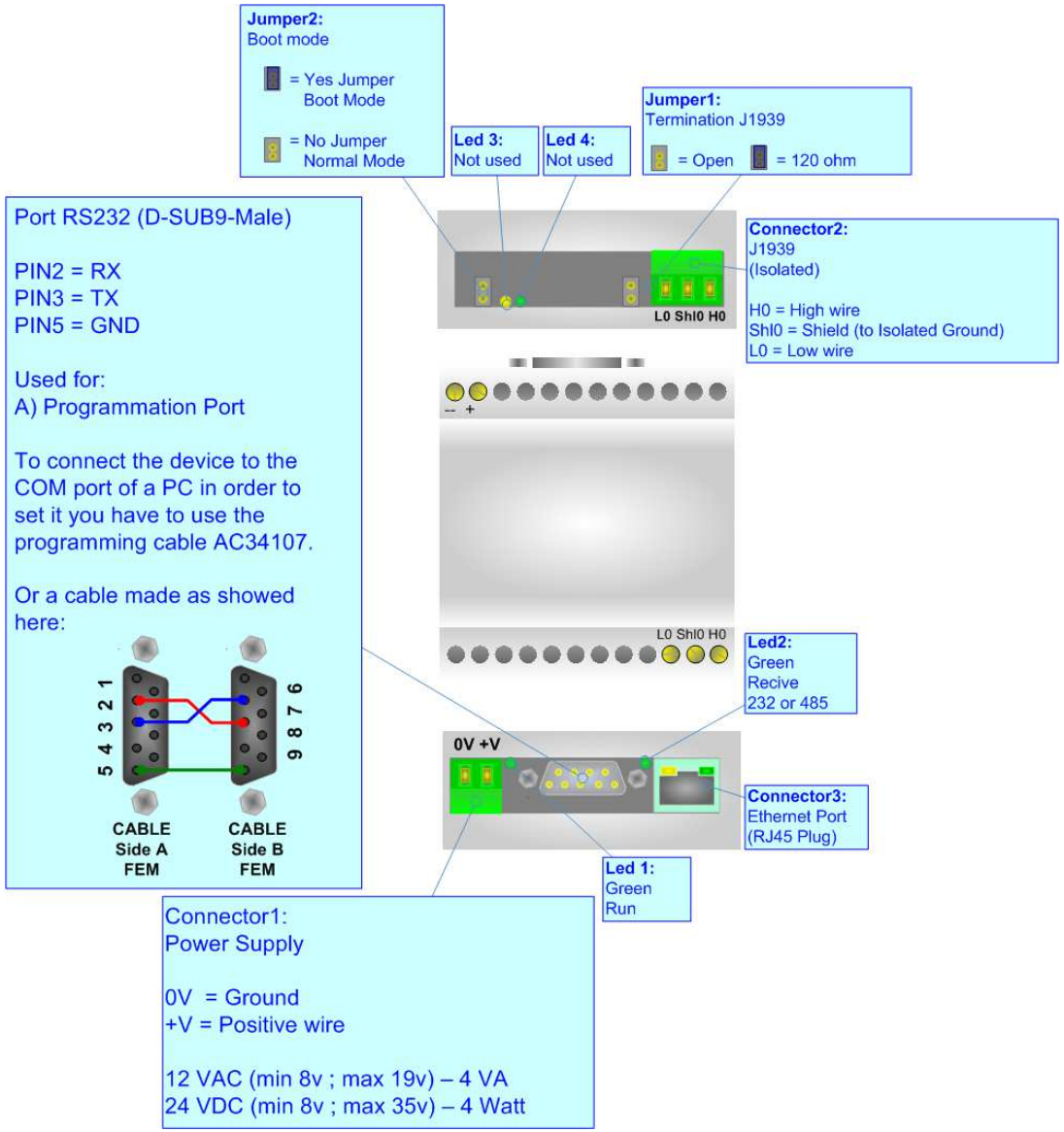


Figure 2: Connection scheme for HD67215

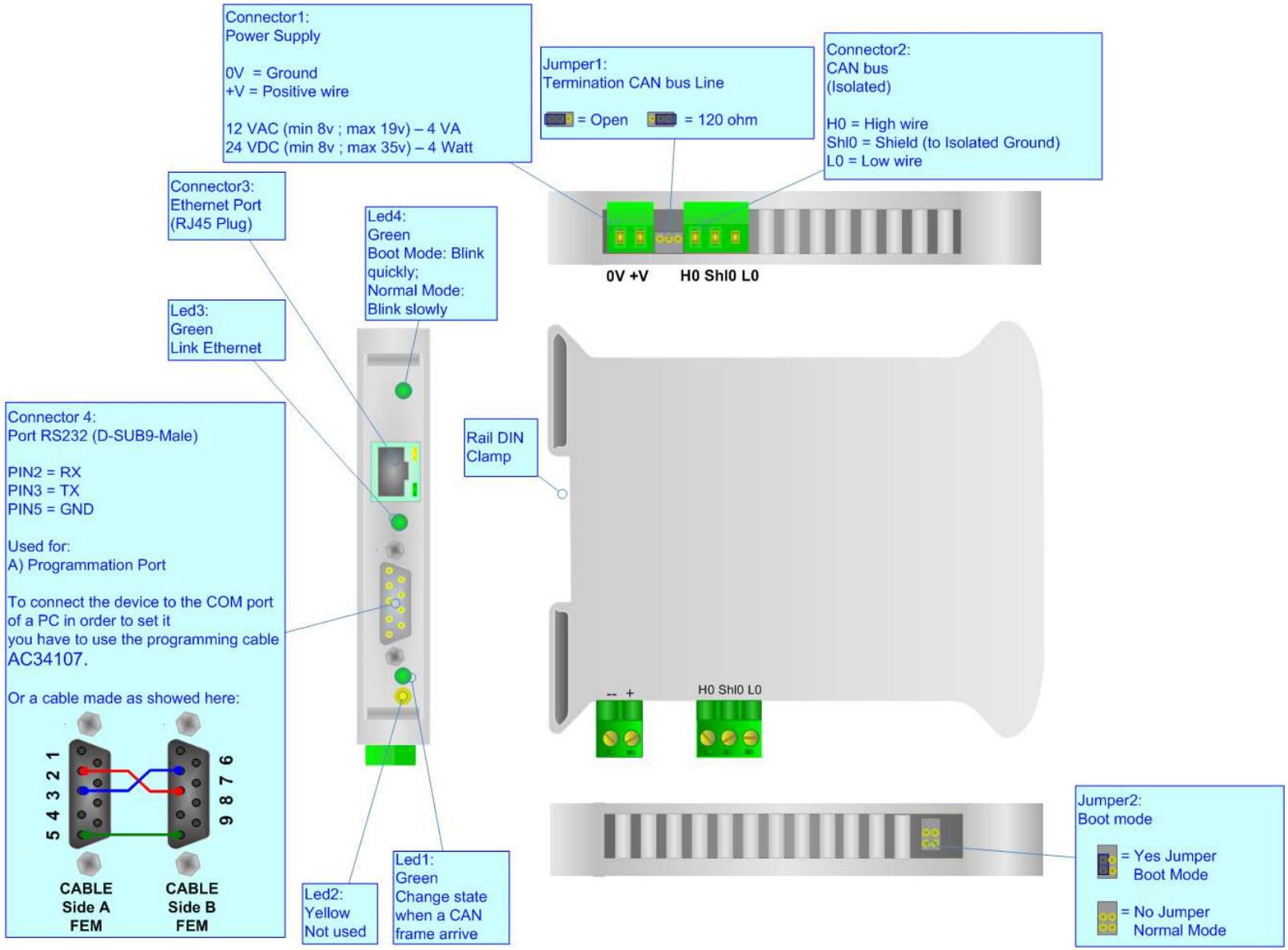


Figure 2: Connection scheme for HD67215-A1

CHARACTERISTICS:

The HD67215 is Gateway Modbus TCP from/to J1939 line.
It allows the following characteristics:

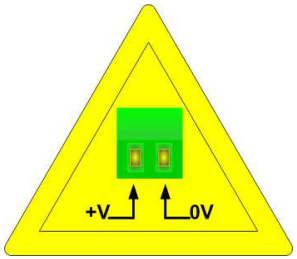
- Electrical isolation between Modbus TCP and J1939;
- Mountable on Rail DIN;
- Temperature range -40°C to 85°C.

POWER SUPPLY:

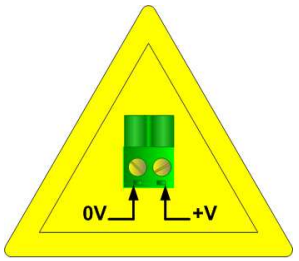
Recommended Power Supply	
VDC	**VAC**
24v	**12v**

VDC		VAC	
Vmin	**Vmax**	**Vmin**	**Vmax**
8v	**35v**	**8v**	**19v**

Caution: Not reverse the polarity power .



HD67215



HD67215-A1

CONFIGURATION:

The "Gateway J1939 to Modbus TCP Slave", allows a J1939 network to communicate with a Modbus TCP network.

You need Compositor SW67215 software on your PC in order to perform the following:

- Define that the J1939 frame of the J1939 are reading from Modbus.

USE OF COMPOSITOR SW67215:

To configure the Gateway, use the available software that runs with Windows, called SW67215. It is downloadable on the site www.adfweb.com and its operation is described in this document.

When launching the SW67215 the right window appears (Fig. 2):

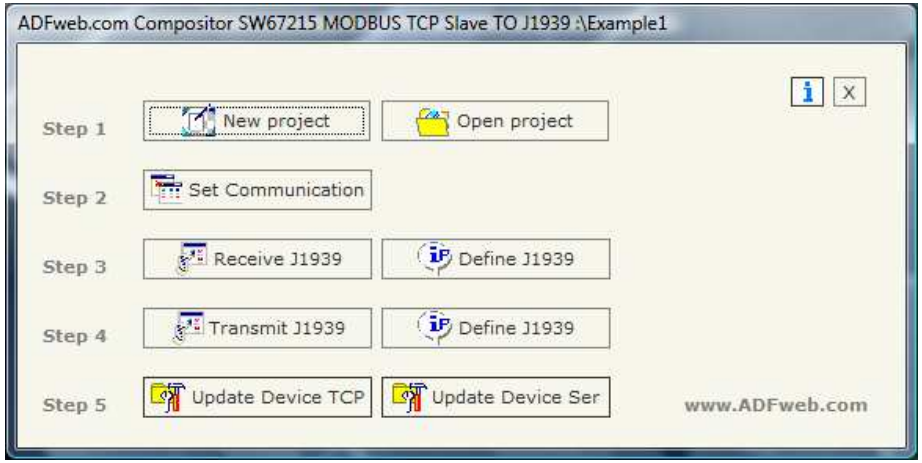


Figure 2: Main window for SW67215

NEW PROJECT / OPEN PROJECT:

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

- To clone the configurations of a Programmable "J1939 to Modbus TCP Slave" Gateway in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button "Open Project";
- When a new project is created or an existent project is open, it will be possible to access the various configuration section of the software:

    - **Set Communication**;
    - **Receive J1939;**
    - **Define J1939;**
    - **Transmit J1939;**
    - **Define J1939.**

SET COMMUNICATION:

This section defines the fundamental communication parameters of two buses, J1939 and Modbus TCP**.**

By pressing the "Set communication" button from the main window for SW67215 (Fig. 2) the window "Set Communication" appears (Fig. 3). It is divided in two sub-section, one for the J1939 (CAN Bus) and the other for the Modbus TCP (Ethernet):

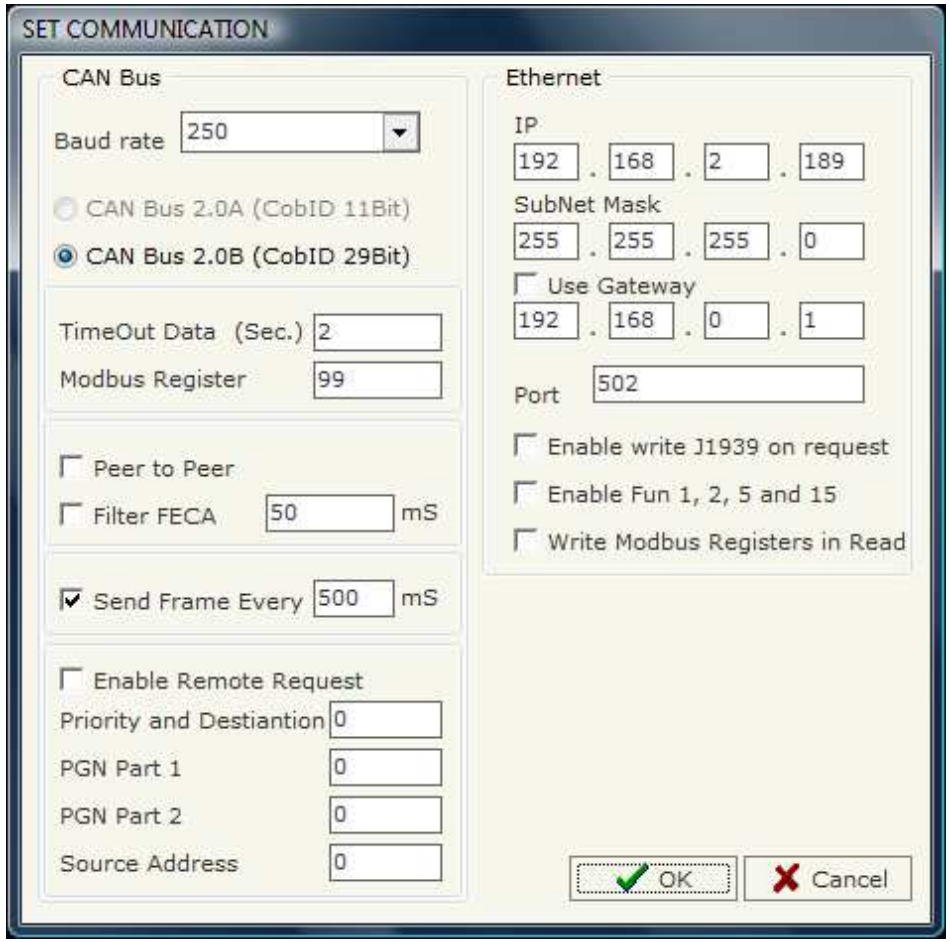
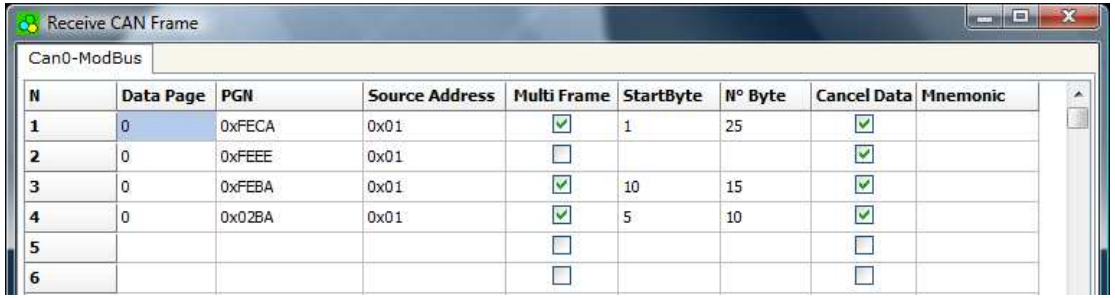


Figure 3: "Set Communication" window

- In the fields "Baud Rate", the velocity of J1939 bus id defined;
- In the field "Time out Data" insert a time, when this time is elapsed the data isn't reliable and in the Modbus register you can read "FFFF";
- The field "Modbus register" insert a number of register, in this register you can visualize if the data is reliable, if 1 the data is ok, if 0 the data is oldest of the time inserted in the time out data;
- If the field "Peer to Peer" is cheked the gateway accept any ID that have the PGN inserted in the section "Receive J1939";
- If the field "Filter FECA" is checked when the FECA PGN arrives the gateway puts the values in Standby. If the time, expressed in milliseconds and written at the right side of "Filter FECA", is elapsed and there aren't arrived the frames of Transport Protocol the gateway put the data of FECA into Modbus Registers. Otherwise if the Transport Protocol arrives before the time is elapsed the gateway put his data into Modbus Registers 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;
- If "Send frame every xx ms" is checked the gateway sends the J1939 frames defined in "Transmit J1939" section every xx ms. Otherwise a frame is sent in J1939 when a modbus register is written into the gateway;
- If the field "Enable Remote Request" is checked it is possible to use the "Remote Request". To use this, is necessary to insert in the four fields under the four Modbus Registers.
- In the field "IP" insert the IP address that you want to give at slave Modbus;

- In the field "SubNet Mask", insert the SubNet Mask of your Network;
- If the field "Use Gateway" is checked in the fields under it is possible to insert the IP address used for going out to the net;
- In the field "Port", insert the number of port that Modbus TCP use;
- If the field "Enable write J1939 on request" is checked, the field "Write J1939 frame" in "Transmit J1939 frame info" is enabled. If this field is not checked, the device send a J1939 frame for every written register. Otherwise it is possible to select when to send the J1939 frame.
- If the field "Enable Fun 1, 2, 5 and 15" is checked, the Modbus function for the status are enabled. It is possible to use the status (bit) to read or write the data of J1939. The definition of the register are fixed and start from 1 (or 2 if the Master Modbus has the offset) for the number of byte that you use per 8.

RECEIVE J1939:



N	Data Page	PGN	Source Address	Multi Frame	StartByte	N° Byte	Cancel Data	Mnemonic
1	0	0xFECA	0x01	☑	1	25	☑	
2	0	0xFEEE	0x01	☐			☑	
3	0	0xFEBA	0x01	☑	10	15	☑	
4	0	0x02BA	0x01	☑	5	10	☑	
5				☐			☐	
6				☐			☐	

Figure 4: "Receive CAN frame" window

By pressing the "Receive J1939" button from the main window for SW67215 (Fig. 2) the window "Receive CAN frame" appears (Fig. 4).

The means 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 modbus 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 "Multi Frame" is checked the frame use transposrt protocol functions;
- In the field "StartByte" insert the byte wich you would start read, this field is enable only when the field multi frame is checked;
- In the field "N° Byte" insert the number of byte you would read, for example your start byte is 20 an N°byte is 10, you can read the byte from 20 to 30.
- If the field "Cancel Data" is checked and the Modbus Register in the section "set communication" is 0 the gateway when the data is oldest of the time inserted in the "time out data" you visualize "FFFF" in the Modbus registers of this PGN.
- In the field "Mnemonic" the description for the frame is defined.

DEFINE RECEIVE J1939

By pressing the "Define J1939" button, near "Receive J1939" from the main window for SW67215 (Fig. 2) the window "Receive CAN Frame Info" appears (Fig. 5):

- In the field Correlated there are the list of frames J1939 who you inserted in Receive J1939 Section
- In the field MODBUS there are the modbus words.
- In the field Index MODBUS there is the address who contain the Modbus word.
- In the field Selecet Frame Byte you select the position of the byte.

For example:

Click on the frame, insert the valid address in the field Index MODBUS, select the byte position(Byte 1 in high MODBUS byte and Byte 2 in low MODBUS byte), click the "New" button, in the field MODBUS appears the names of modbus words (The first word is name IND MB 0, second IND MB 1, third Ind MB 2 and so on).

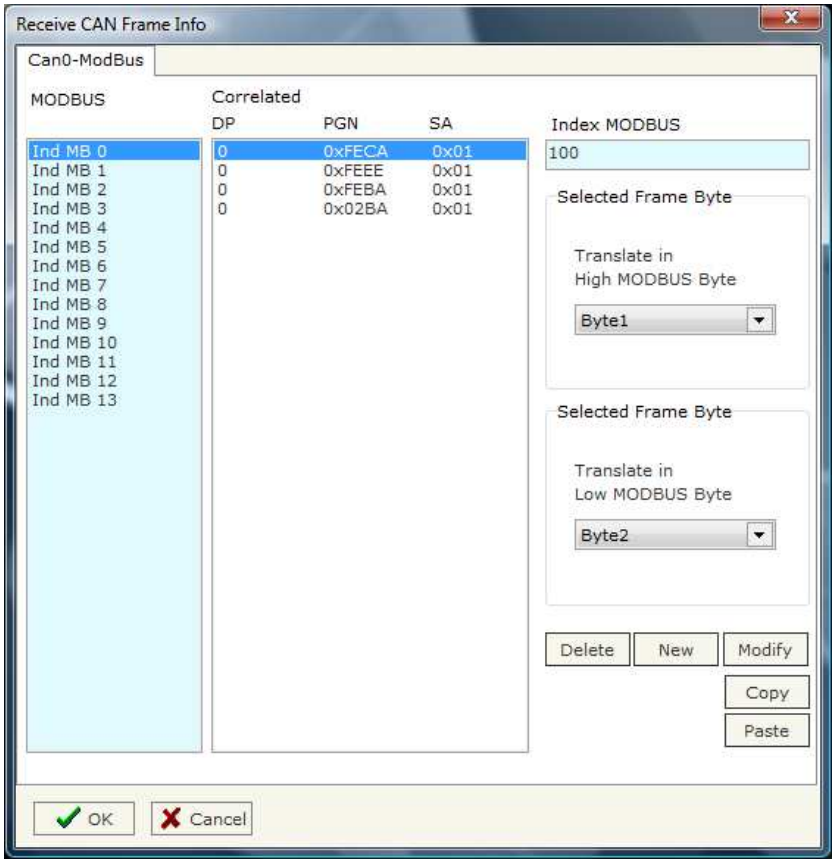


Figure 5: "Receive CAN frame info" window

TRANSMIT J1939

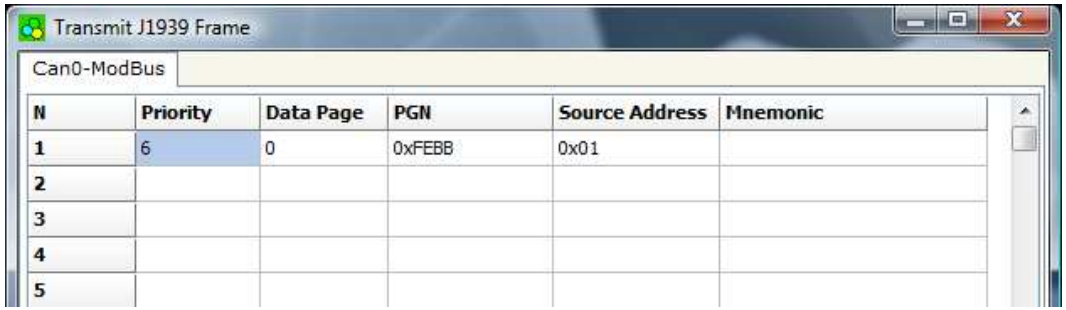


Figure 6: "Transmit J1939 frame" window

By pressing the "Receive J1939" button from the main window of SW67215 the window "Receive J1939 frame" appears (Fig. 6):

In the right scenario:

- In the field "Priority" insert the priority of the frame, in J1939 protocol 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 is 0 or 1;
- In the field "PGN" insert the PGN of the data you would to write from modbus to J1939. (in the J1939 protocol the PGN is an identifier);
- In the field "ID device" you insert the ID of device that send the frame.
- In the field "Mnemonic" the description for the frame is defined.

DEFINE TRANSMIT J1939

By pressing the "Define J1939" button from the main window for SW67215 (Fig. 2) the window "Transmit J1939 Frame Info" appears (Fig. 7):

- In the field Correlated there are the list of frames J1939 who you inserted in Transmit J1939 Section;
- In the field MODBUS there are the modbus words;
- In the field Index MODBUS there is the address who contain the Modbus word;
- In the field Selecet Frame Byte you select the position of the byte;
- With the field "Write J1939 Frame" it is possible to decide when to send the J1939 frame. If a modbus word has written "False "in this field, the J1939 frame is not sent immediately but it is sent when another word have this field "True". It is possible to have this function only if the field "Enable write J1939 on request" in the "Set Communication" window is checked.

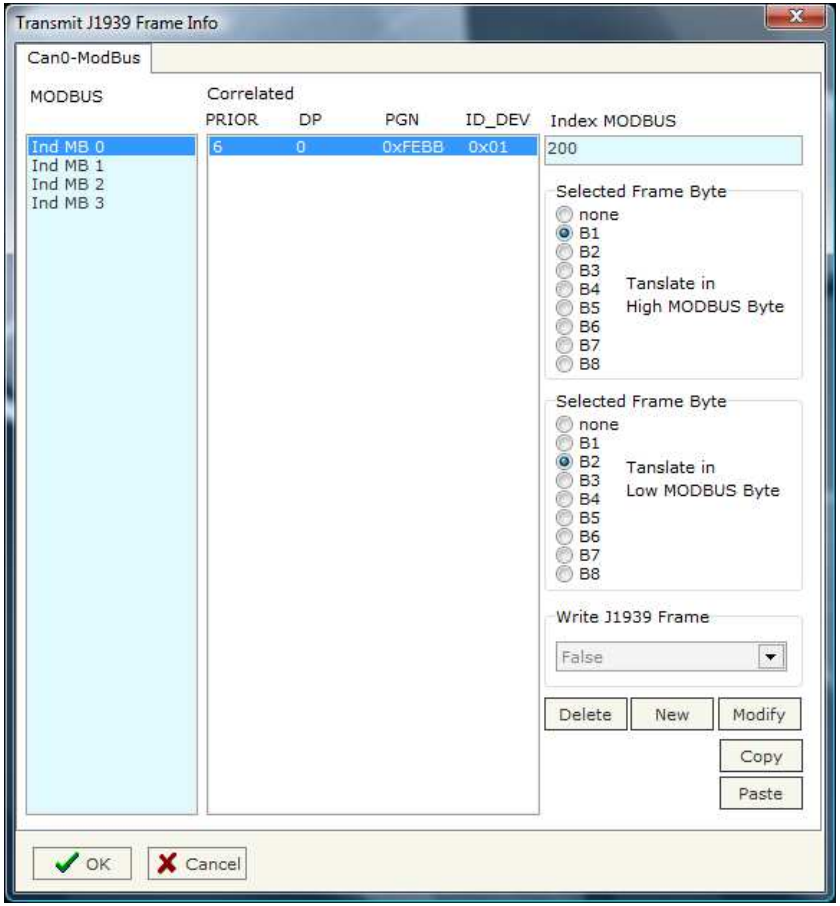


Figure 7: "Transmit J1939 frame info" window

For example:

Click on the PGN, insert the valid address in the field Index MODBUS, select the byte position (B1 in high MODBUS byte and B2 in low MODBUS byte), click the "New" button, in the field MODBUS appears the names of modbus words (The fist word is name IND MB 0, second IND MB 1, third Ind MB 2 and so on).

REMOTE REQUEST

In the "Priority and Destination" Register you have to indicate the Priority of the request in the high byte of the register (usually this value is equal to 6) and the Address of the Destination Device in the low byte of register.
In the "PGN Part 1" you have to indicate the first two byte of the PGN while in the "PGN Part 2" Register you have to indicate, in the high byte of register, the third byte of the PGN.
In the "Source Address" Register you have to indicate the Source Address of the request in the high part of the register.

Only when you write the "Souce Address" register the request will be send to the J1939 network.

For example if you want to request the PGN 0x00FEE5 at device with address 5 you have to write:
1st reg = 0x0605
2nd reg = 0xE5FE
3rd reg = 0x0000
4th reg = 0x0100

UPDATE DEVICE TCP

Section "UP Date Device TCP" (Fig. 8):
In order to load the parameters after they are set, Insert the IP of your Device, and click on "Ping button". After you click on "Next" button, in the window that appears, you select which object update.

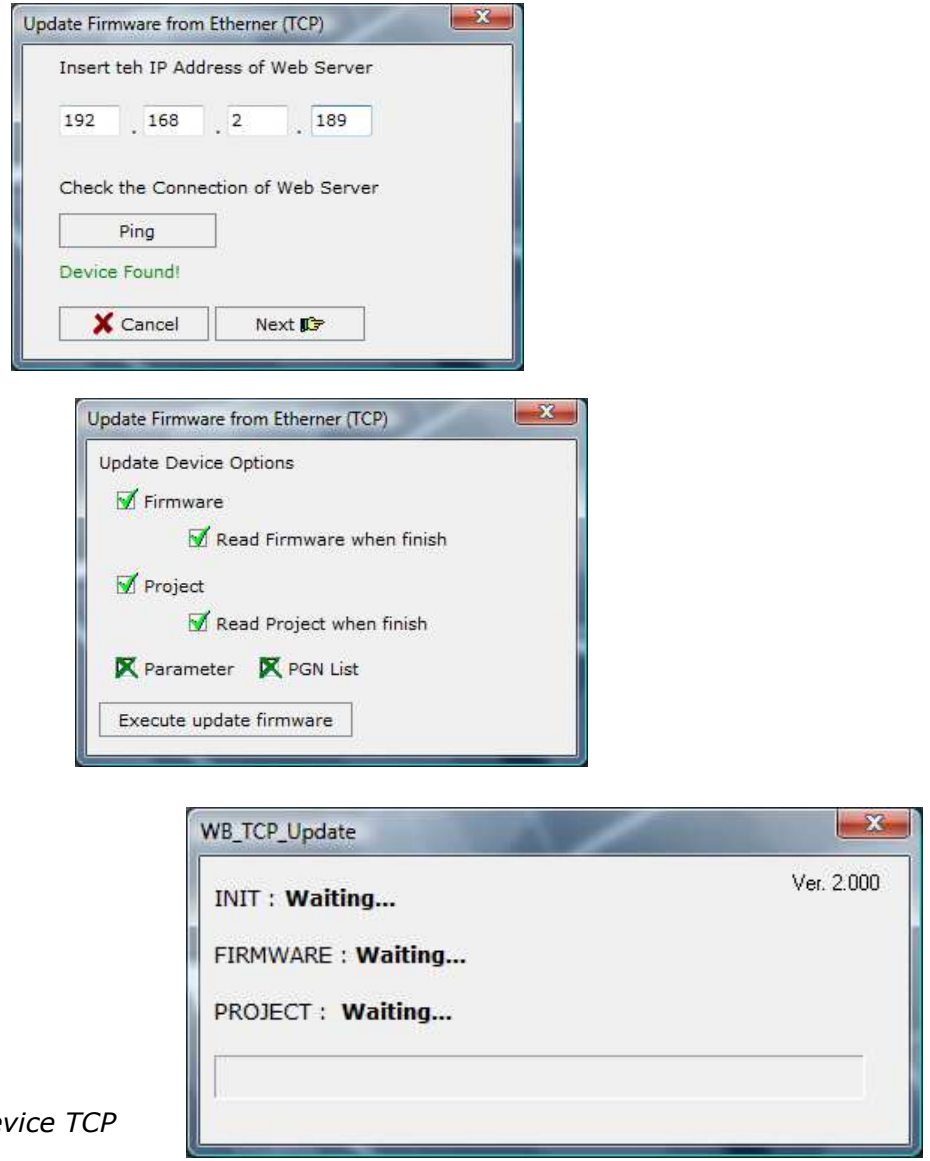


Figure 8: Update Device TCP

UPDATE DEVICE SERIAL

Section "Update device Serial" (Fig. 9):
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 Form your PC to the Gateway;
- Insert the Boot Jumper (see the Fig. 1 for more info);
- Select COM port and press the "Connect" Button;
- Turn on the device;
- Press the "Next" Button;
- Select which operations you want to do. Can select only Firmware or only Project or both;
- Press the "Execute update firmware" to start the upload;
- When all the operation are "OK" turn off the device;
- Disconnect the Boot jumper;
- Disconnect the RS232 Cable;
- Turn on the device.

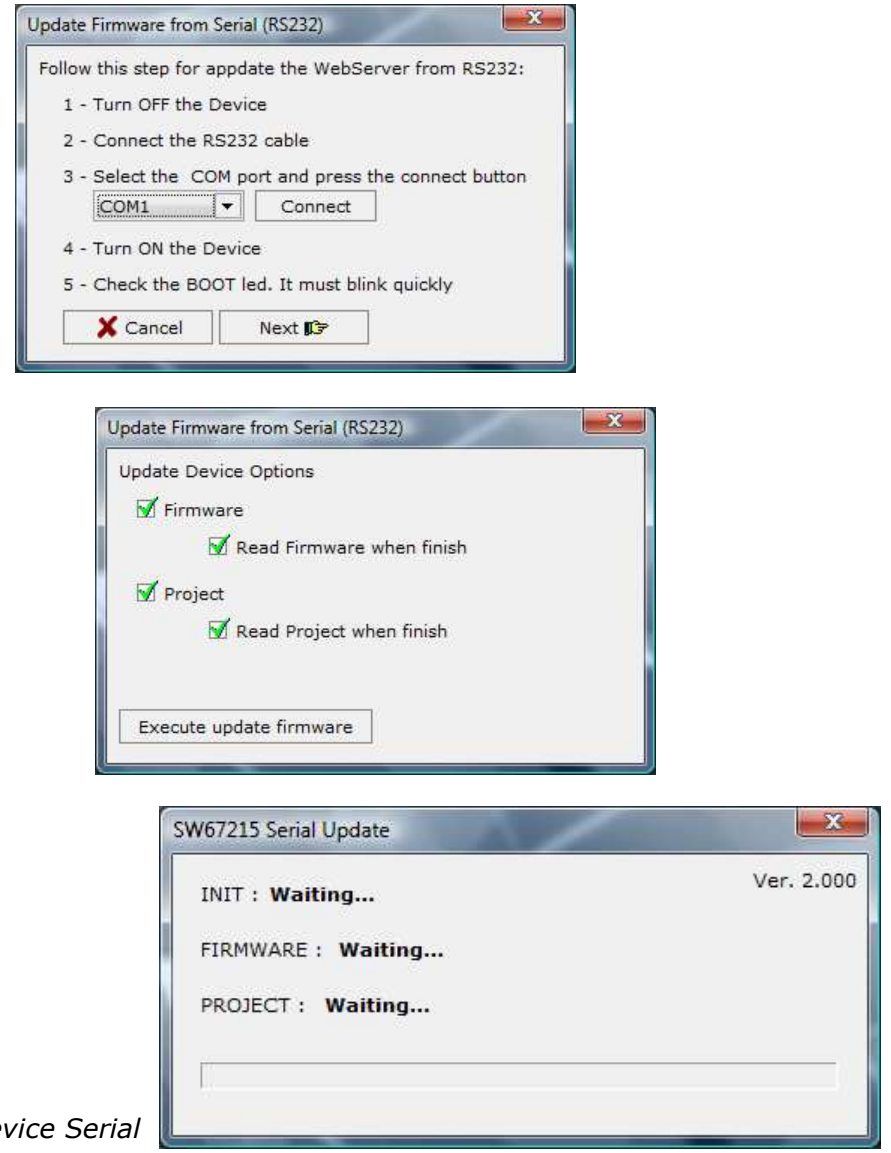
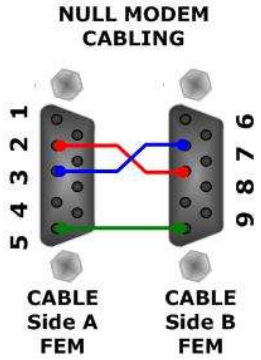


Figure 9: Update Device Serial

CHARACTERISTICS OF THE CABLES:

The connection from RS232 socket to a serial port (example one from a personal computer), must be made with a Null Modem cable (a serial cable where the pins 2 and 3 are crossed).
It is recommended that the RS232C Cable not exceed 15 meters.



MECHANICAL DIMENSIONS:

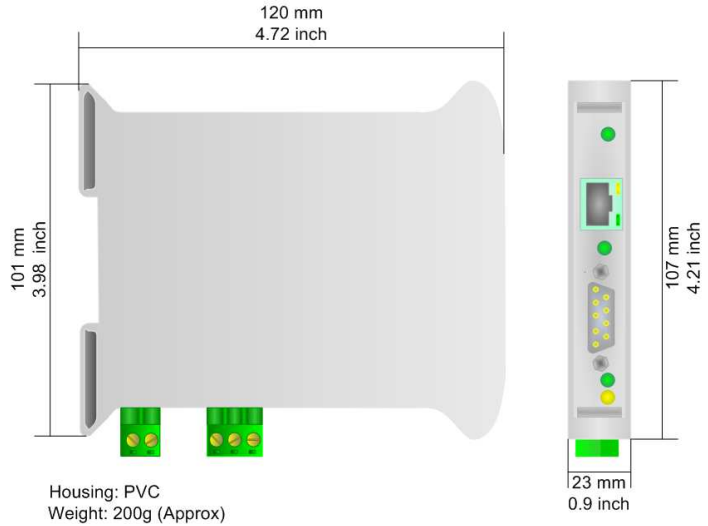


Figure 10: Mechanical dimensions scheme for HD67215-A1

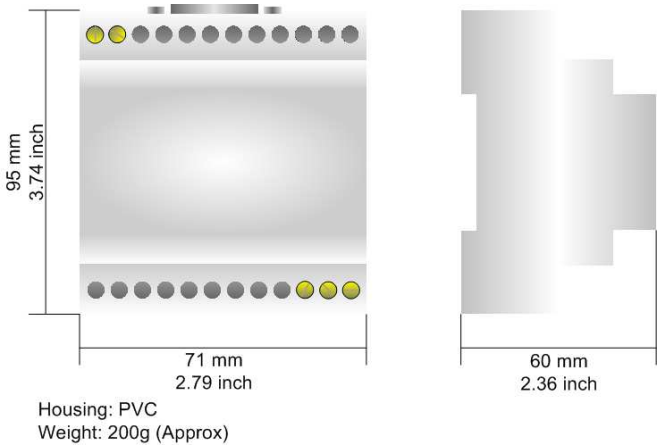


Figure 10: Mechanical dimensions scheme for HD67215

ORDER CODE:

Order Code: **HD67215** **-** Gateway – J1939 to Modbus TCP
Order Code: **HD67215-A1** **-** Gateway – J1939 to Modbus TCP (Different Enclosure)

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: **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

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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.

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
HD67121	Gateway CANopen / Canopen	www.adfweb.com?product=HD67121
HD67002	Gateway CANopen / Modbus - RTU	www.adfweb.com?product=HD67002
HD67004 HD67005	Gateway CANopen / Modbus – Ethernet TCP	www.adfweb.com?product=HD67004
HD67134	Gateway CANopen / DeviceNet	www.adfweb.com?product=HD67134
HD67117	CAN bus Repeater	www.adfweb.com?product=HD67117
HD67216	CAN bus Analyzer	www.adfweb.com?product=HD67216