

User Manual

Revision 1.100
English

J1939 / Modbus Slave – Converter

(Order Code: HD67432)

For Website information:

www.adfweb.com?Product=HD67432

For Price information:

www.adfweb.com?Price=HD67432

Benefits and Main Features:

- ✦ Very easy to configure
- ✦ Wide supply input range
- ✦ Electrical isolation
- ✦ Industrial temperature range:
- ✦ -40°C / 105°C (-40°F / 221°F)



User Manual



For other Gateways / Bridges:

CAN from/to Modbus

See also the following links:

www.adfweb.com?product=HD67012

(Modbus RTU Slave)

www.adfweb.com?product=HD67514

(Modbus TCP Master)

www.adfweb.com?product=HD67515

(Modbus TCP Slave)

CANopen from/to Modbus

See also the following links:

www.adfweb.com?product=HD67001

(Modbus RTU Master)

www.adfweb.com?product=HD67502

(Modbus RTU Slave)

www.adfweb.com?product=HD67504

(Modbus TCP Master)

www.adfweb.com?product=HD67505

(Modbus TCP Slave)

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

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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
1.000	04/12/2012	Ff	All	First release version
1.001	25/07/2013	Fl	All	Revision
1.100	15/06/2017	Ff	All	New hardware version

WARNING:

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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:

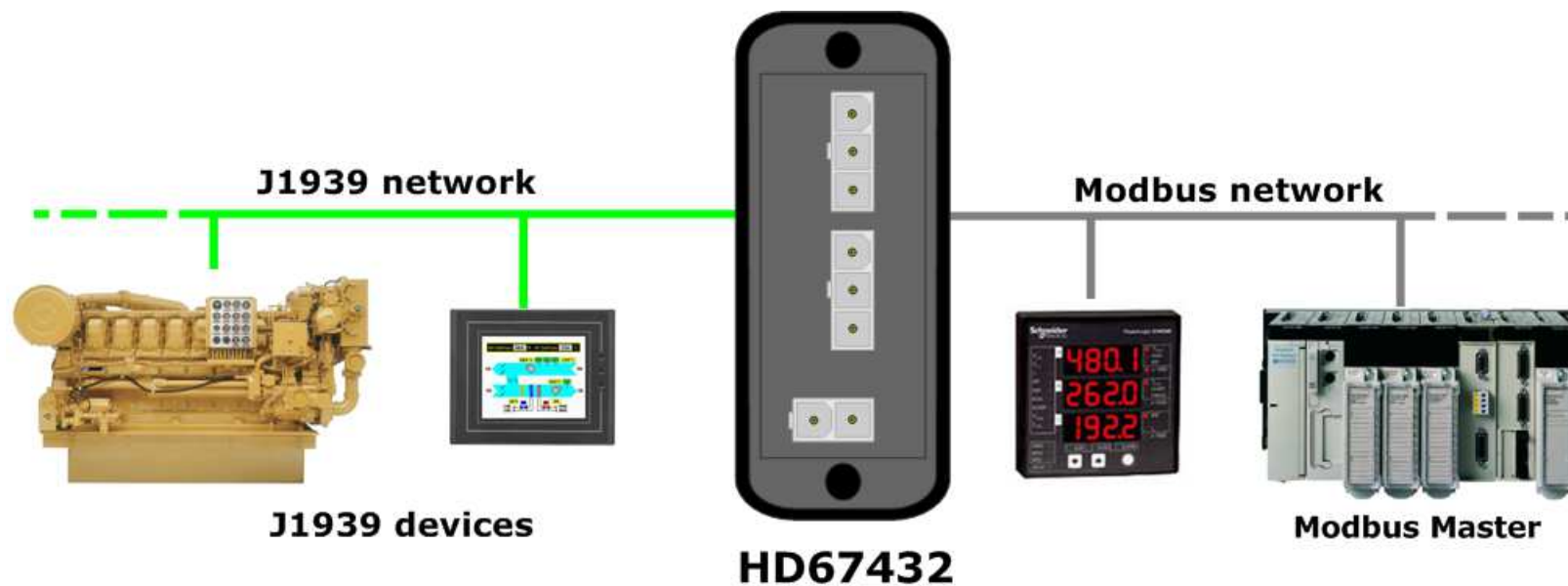


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

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 for HD67432-E4x-xxx

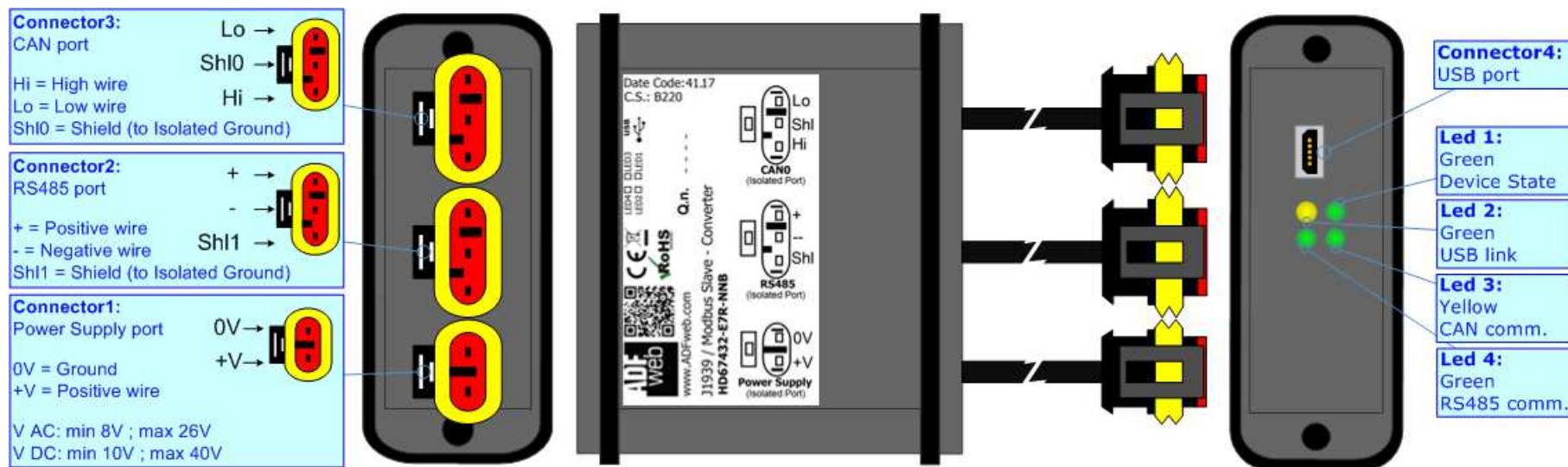


Figure 1b: Connection scheme for HD67432-E7x-xxx

CHARACTERISTICS:

The “**HD67432**” series are rugged devices used to interface J1939 devices with Modbus Master.

With his particular enclosure, equipped with four fixing lugs, makes available the mounting of the device in any plane surface (horizontal, vertical, oblique).

It is possible to have the device varnished or totally resined and also in both cases with “Mini-Fit®” connectors or “AMP SuperSeal 1.5” connectors. If is resined, the enclosure, like the “AMP SuperSeal 1.5” connectors, is waterproof.

All the four series have these characteristics:

- Triple 4kV isolation between Power Supply / RS485 / CAN;
- Varnished / Resined (optionally);
- Wide power supply input range: 8...26V AC | 10...40V DC;
- Mini-Fit® / AMP SuperSeal 1.5 connectors;
- Metal enclosure with fixing lugs;
- Possibility to use Metal hose clamps for fixing it without using lugs;
- Microprocessor for data control;
- Wide temperature range: -40°C / 105°C (-40°F / 221°F).

CONFIGURATION:

You need Compositor SW67432 software on your PC in order to perform the following:

- Define the J1939 frames received by the converter;
- Define the J1939 frames transmitted by the converter;
- Define the Modbus registers readable by the Master;
- Define the Modbus registers writeable by the Master;
- Update the device.

POWER SUPPLY:

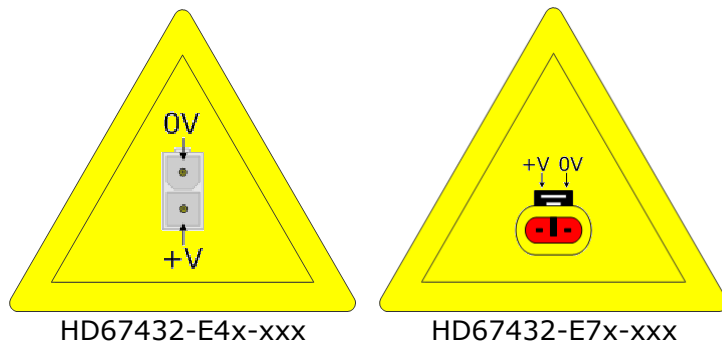
The devices can be powered between a wide range of tensions. For more details see the two tables below.

	VAC		VDC	
	Vmin	Vmax	Vmin	Vmax
HD67432-Exx-xxx	8V	26V	10V	40V

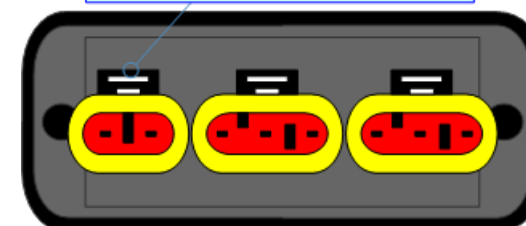
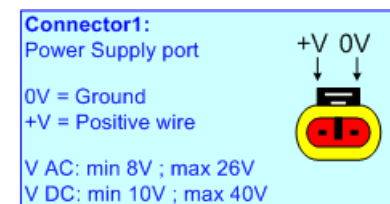
Consumption at 24V DC:

Device	W/VA
HD67432-Exx-xxx	4

Caution: Not reverse the polarity power



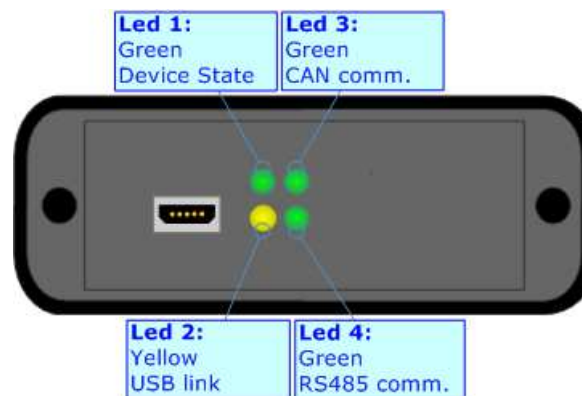
Note: It is possible to use also negative tensions. In this case the polarity must be inverted.



LEDS:

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

LED	Normal Mode	Boot Mode
1: Device state (green)	Blinks slowly (~1Hz)	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
2: USB link (yellow)	ON: USB cable inserted OFF: USB cable not inserted	ON: USB cable inserted OFF: USB cable not inserted
3: CAN Communication (green)	Blinks when J1939 frames are received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
4: RS485 communication (green)	Blinks when a Modbus request is received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress



RS485:

The connection of the RS485 in the HD67432-E4x-xxx device must be made with a 3way MiniFit Female connector. The pinout of Male MiniFit connector of the board is at right side of the page.

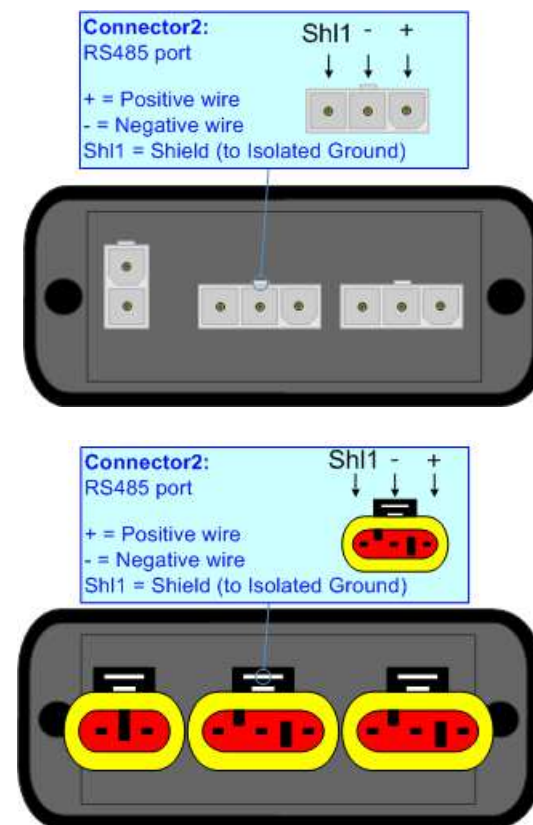
The connection of the RS485 in the HD67432-E7x-xxx device must be made with a AMP SuperSeal 1.5 Male connector. The pinout of Female connector of the board is at right side of the page.

The termination of RS485 line, with a 120Ω resistor, in the HD67432-Exx-xxx is made internally of the device; when the order is performed. If the device have the RS485 terminated the code is the follow: HD67432-Exx-xYx; otherwise is this other: HD67432-Exx-xNx.

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.



Link for Mini-Fit® connectors: http://www.molex.com/molex/products/group?key=minifit_products&channel=products

Link for SuperSeal 1.5 connectors: <http://www.te.com/catalog/cinf/en/c/10876/956>

CAN:

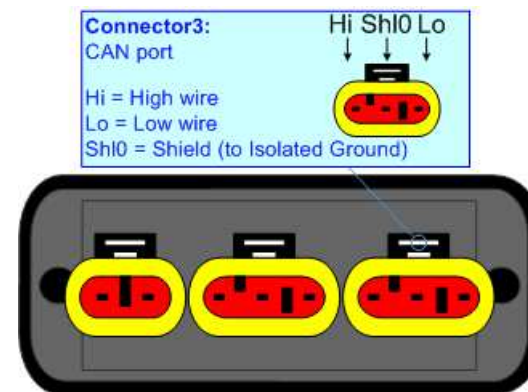
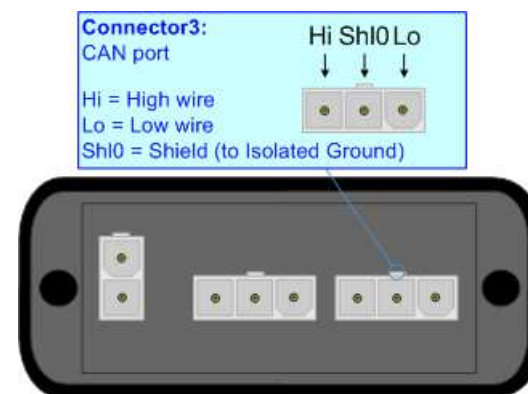
The connection of the J1939 in the HD67432-E4x-xxx device must be made with a 3way MiniFit Female connector. The pinout of Male MiniFit connector of the board is at right side of the page.

The connection of the J1939 in the HD67432-E7x-xxx device must be made with a AMP SuperSeal 1.5 Male connector. The pinout of Female connector of the board is at right side of the page.

The termination of J1939 line, with a 120Ω resistor, in the HD67432-Exx-xxx is made internally of the device; when the order is performed. If the device have the J1939 terminated the code is the follow: HD67432-Exx-Yxx; otherwise is this other: HD67432-Exx-Nxx.

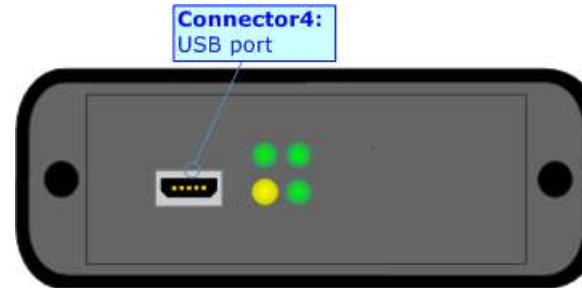
Cable characteristics:

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



USB:

The USB port is used to start the converter in Boot Mode and to program the converter. It is necessary to use a Micro USB type B cable.



USE OF COMPOSITOR SW67432:

To configure the Converter, use the available software that runs with Windows called SW67432. 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 SW67432, the window below appears (Fig. 2).

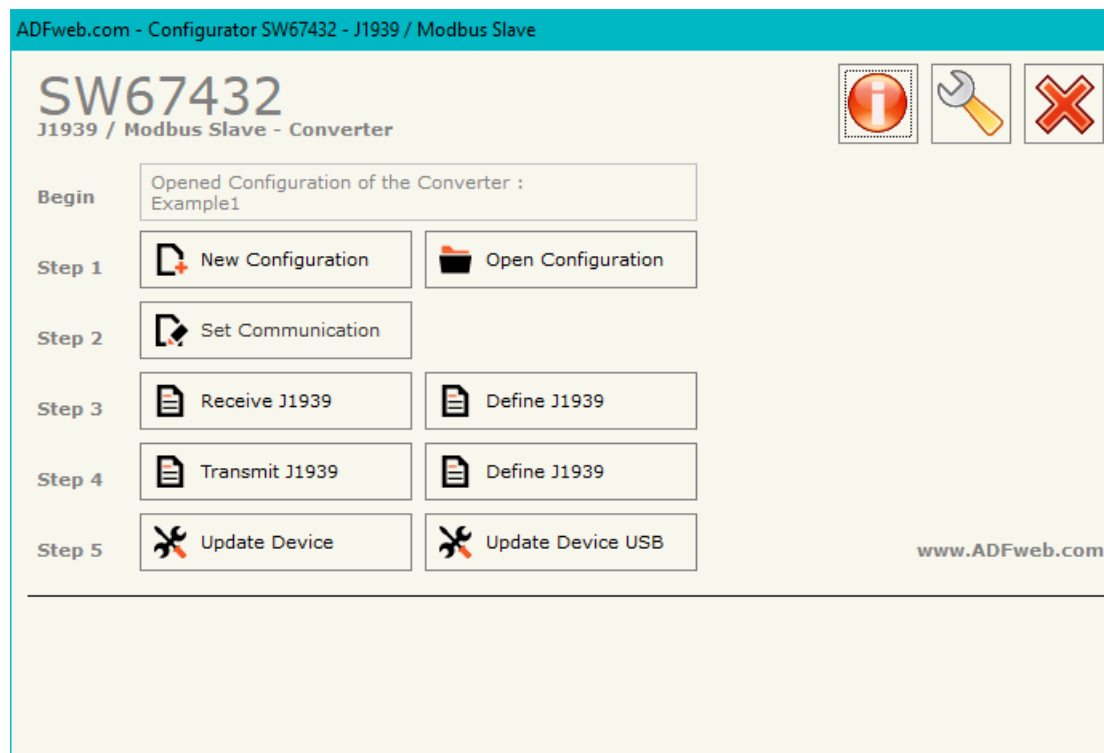
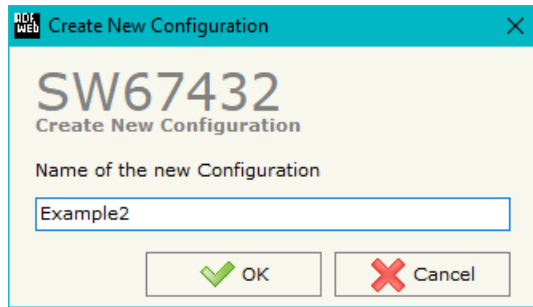


Figure 2: Main window for SW67432

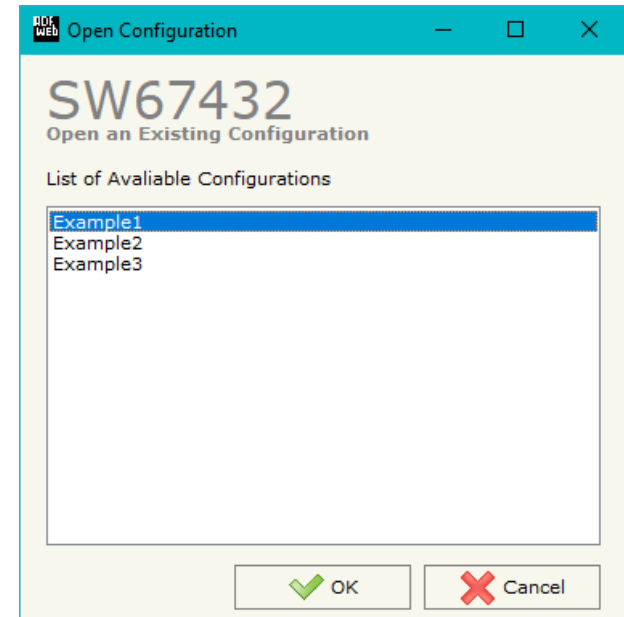
NEW CONFIGURATION / OPEN CONFIGURATION:

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




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

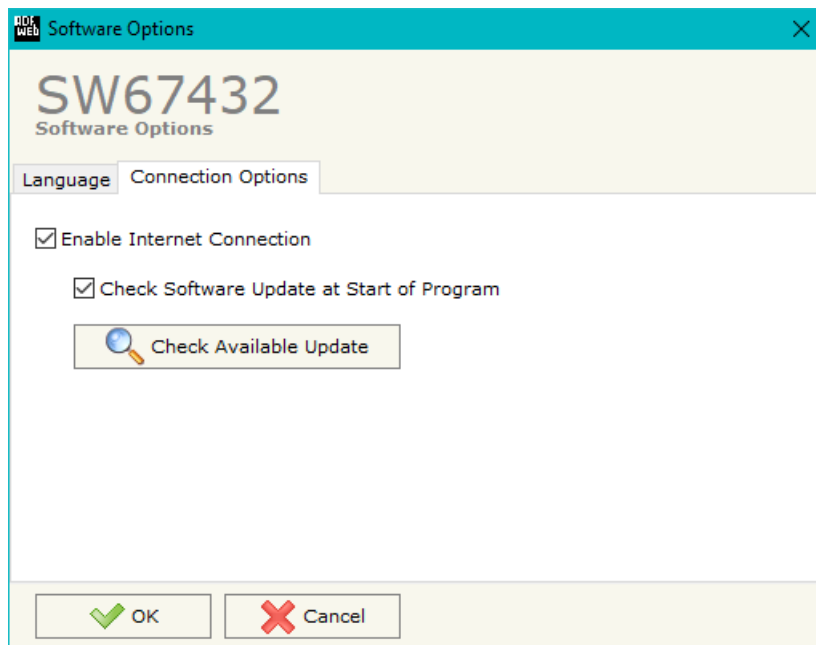
- To clone the configurations of a programmable “J1939 / Modbus Slave - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button “**Open Configuration**”.



SOFTWARE OPTIONS:

By pressing the “**Settings**” () button there is the possibility to change the language of the software and check the updatings for the compositor.

In the section “Language” it is possible to change the language of the software.



In the section “Connection Options”, it is possible to check if there are some updatings of the software compositor in ADFweb.com website. Checking the option “**Check Software Update at Start of Program**”, the SW67432 checks automatically if there are updatings when it is launched.

SET COMMUNICATION:

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

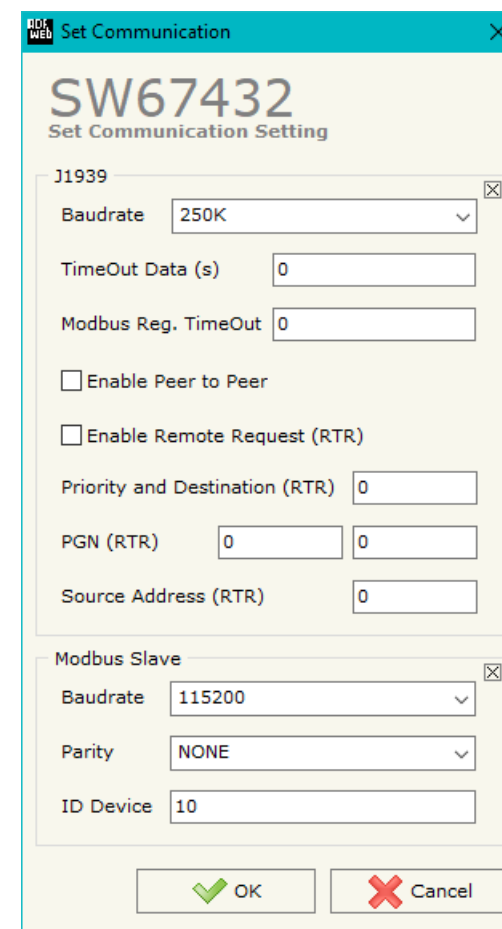
By pressing the **"Set Communication"** button from the main window for SW67432 (Fig. 2) the window "Set Communication Setting" appears (Fig. 3).

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

- In the fields **"Baud Rate"** the data rate of J1939 bus is defined;
- In the field **"Time out Data (s)"** the timeout of the data is defined. If this time is elapsed and if the "Cancel Data" field is checked in the "Receive J1939" window, the value of the data of the J1939 frame become "0xFF" on Modbus side;
- The field **"Modbus Reg. TimeOut"** a Modbus register is defined. In this register it is possible to visualize if the data is reliable, if '1' the data is ok, if '0' the data is oldest of the time inserted in the "TimeOut Data" field;
- If the field **"Enable Peer to Peer"** is checked, the Source Address of the PGNs received by the converter is masked (only if a single J1939 device is connected);
- If the field **"Enable Remote Request (RTR)"** is checked, the functions to send a remote request on J1939 side are enabled. See page 24 for more info;
- In the field **"Priority and Destination (RTR)"**, the Modbus register reserved to load the Priority and the Destination for the RTR request is defined;
- In the field **"PGN (RTR)"**, the Modbus registers reserved to load the PGN for the RTR request is defined;
- In the field **"Source Address (RTR)"**, the Modbus register reserved to the Source Address for the RTR request is defined.

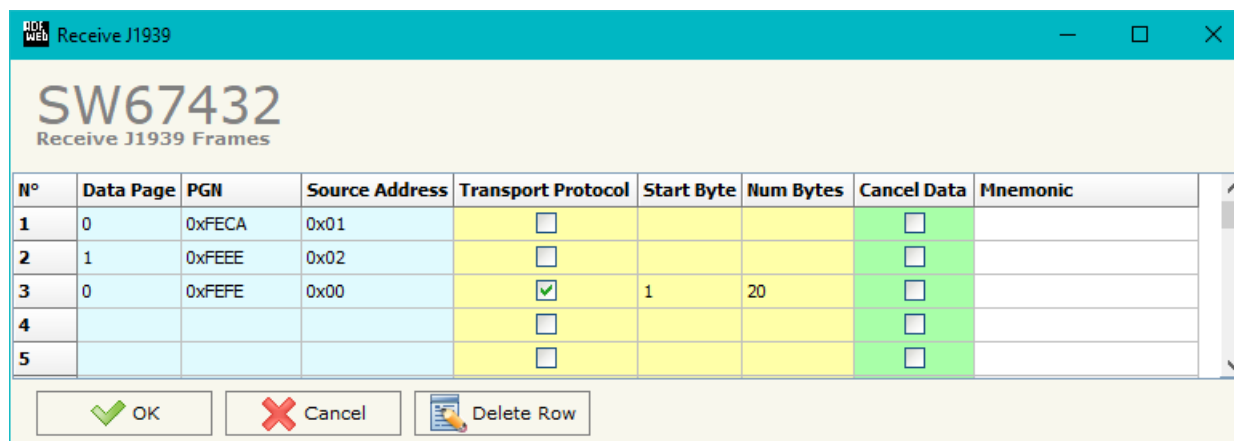
The meaning of the fields of "Modbus Slave" are:

- In the field **"Baudrate"** the data rate of the RS485 bus is defined;
- In the field **"Parity"** the serial parity is defined;
- In the field **"ID Device"** the Modbus ID is defined.



RECEIVE J1939:

By pressing the “**Receive J1939**” button from the main window for SW67432 (Fig. 2) the window “Receive J1939 Frames” appears (Fig. 4). This section is used to define the J1939 messages accepted by the converter.



N°	Data Page	PGN	Source Address	Transport Protocol	Start Byte	Num Bytes	Cancel Data	Mnemonic
1	0	0xFECA	0x01	<input type="checkbox"/>			<input type="checkbox"/>	
2	1	0xFEEE	0x02	<input type="checkbox"/>			<input type="checkbox"/>	
3	0	0xFEFE	0x00	<input checked="" type="checkbox"/>	1	20	<input type="checkbox"/>	
4				<input type="checkbox"/>			<input type="checkbox"/>	
5				<input type="checkbox"/>			<input type="checkbox"/>	

Figure 4: “Receive J1939 Frames” window

The means of the fields of the table are:

- In the field “**Data Page**” the data page of the J1939 messages is defined, the value is 0 or 1 (usually it is 0);
- In the field “**PGN**” the PGN of the J1939 message to receive is defined (in the J1939 protocol, the PGN is an identifier);
- In the field “**Source Address**” the address of the device that sends the frame is defined.
- If the field “**Transport Protocol**” is checked, the frame can use transport protocol functions;
- In the field “**Start Byte**” the starting byte to save on Modbus side is defined. This field is enabled only when the field “Transport Protocol” is checked;
- In the field “**Num Bytes**” the number of consecutive byte from the starting one is defined. For example, if the Start Byte is ‘20’ and Num Bytes is ‘10’, it is possible to read the byte from 20 to 30;
- If the field “**Cancel Data**” is checked, the converter, when the data is oldest of the time inserted in the “TimeOut Data”, sets “0xFF” in the Modbus registers reserved for the PGN;
- In the field “**Mnemonic**” the description for the frame is defined.

DEFINE J1939:

By pressing the "Define J1939" button near "Receive J1939" from the main window for SW67432 (Fig. 2) the window "Define Modbus Registers for Receive J1939 Frames" appears (Fig. 5):

- In the field "List of Receive J1939 Frames" there is the list of J1939 frames that you inserted in "Receive J1939" section
- In the field "List of Modbus Registers Relative to the PGN Selected" there are the Modbus words.
- In the field "Create/Modify a Modbus Register" you can define the index of the Modbus register and the bytes of the can frame that you map in.

For example:

Click on the frame, insert the valid address in the field "Index of Modbus Register", select the byte position (Byte 1 in High Modbus byte and Byte 3 in Low Modbus byte), click the "Create" button, in the field "List of Modbus Registers" appears the new Modbus register created with the data that it contains.

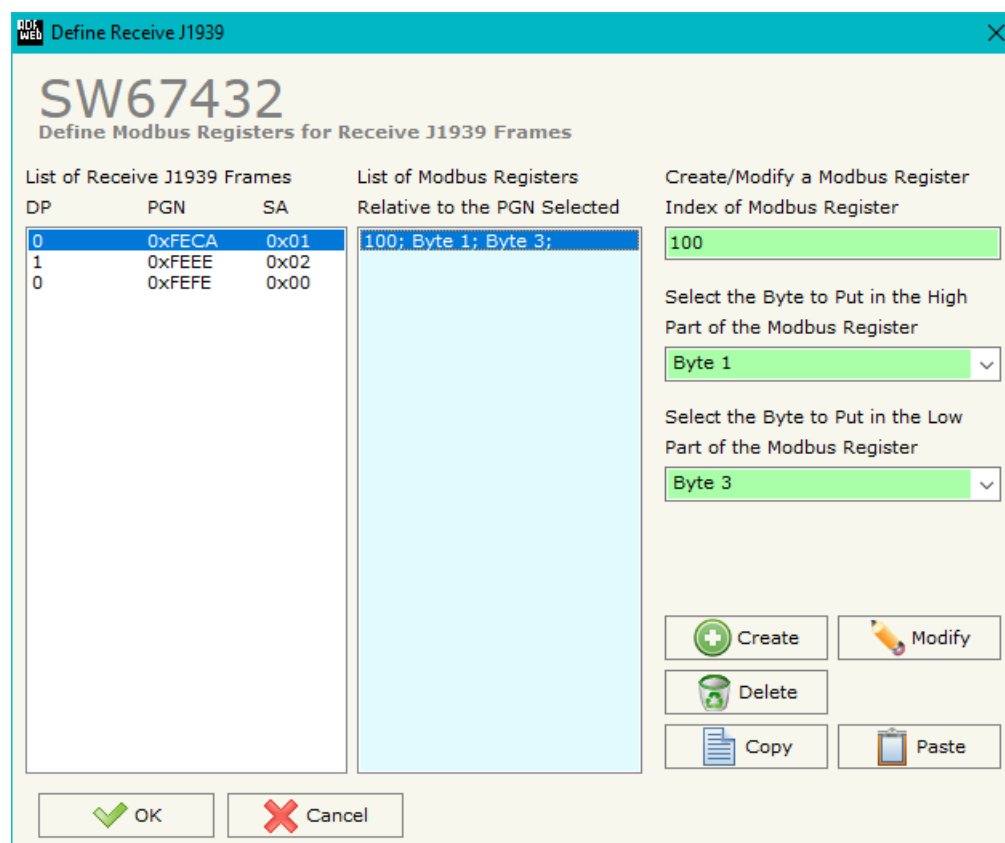
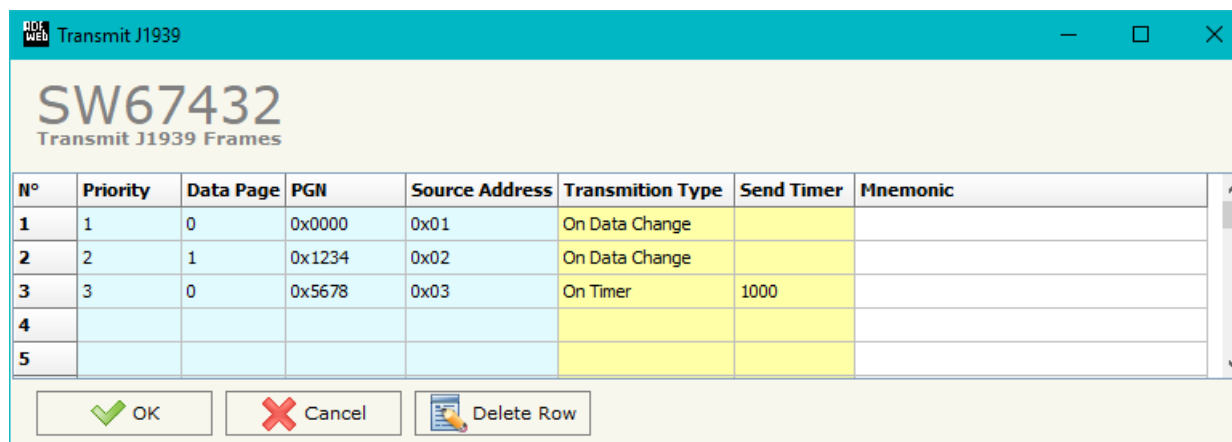


Figure 5: "Define Modbus Registers for Receive J1939 Frames" window

TRANSMIT J1939:

By pressing the “**Transmit J1939**” button from the main window of SW67432 the window “Transmit J1939 Frames” appears (Fig. 6). This section is used to define the J1939 messages sent by the converter.



N°	Priority	Data Page	PGN	Source Address	Transmission Type	Send Timer	Mnemonic
1	1	0	0x0000	0x01	On Data Change		
2	2	1	0x1234	0x02	On Data Change		
3	3	0	0x5678	0x03	On Timer	1000	
4							
5							

Figure 6: “Transmit J1939 Frames” window

The means of the fields of the table are:

- In the field “**Priority**” the priority of the J1939 message is defined. In J1939 protocol, the priority is a number between 0 and 7. 0 is the highest priority and 7 is the lowest;
- In the field “**Data Page**” the data page of the J1939 messages is defined, the value is 0 or 1 (usually it is 0);
- In the field “**PGN**” the PGN of the J1939 message to be written from Modbus is defined (in J1939 protocol the PGN is an identifier);
- In the field “**Source Address**” the address of the device that sends the frame is defined;
- In the field “**Transmission Type**” the modality of J1939 message transmission is defined:
 - On Data Change: the J1939 message is sent when the data from Modbus are changed;
 - On Timer: the J1939 message is sent cyclically.
- In the field “**Send Timer**” the delay (in milliseconds) with which sending the J1939 message is defined;
- In the field “**Mnemonic**” a description for the frame is defined.

DEFINE J1939:

By pressing the “**Define J1939**” button near “Transmit J1939” from the main window for SW67432 (Fig. 2) the window “Define Modbus Registers for Transmit J1939 Frames” appears (Fig. 7):

- In the field “**List of Transmit J1939 Frames**” there is the list of J1939 frames that you inserted in “Transmit J1939” Section.
- In the field “**List of Modbus Registers Relative to the PGN Selected**” there are the Modbus words.
- In the field “**Create/Modify a Modbus Register**” you can define the index of the Modbus register and the bytes of the J1939 frame where you write it.
- With the field “**Send J1939 frame on Modbus Write**” 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 that have this field “True” is written.

For example:

Click on the frame, insert the valid address in the field “Index of Modbus Register”, select the byte position (Byte 1 in High Modbus byte and Byte 2 in Low Modbus byte), click the “Create” button, in the field “List of Modbus Registers” appears the new Modbus register created.

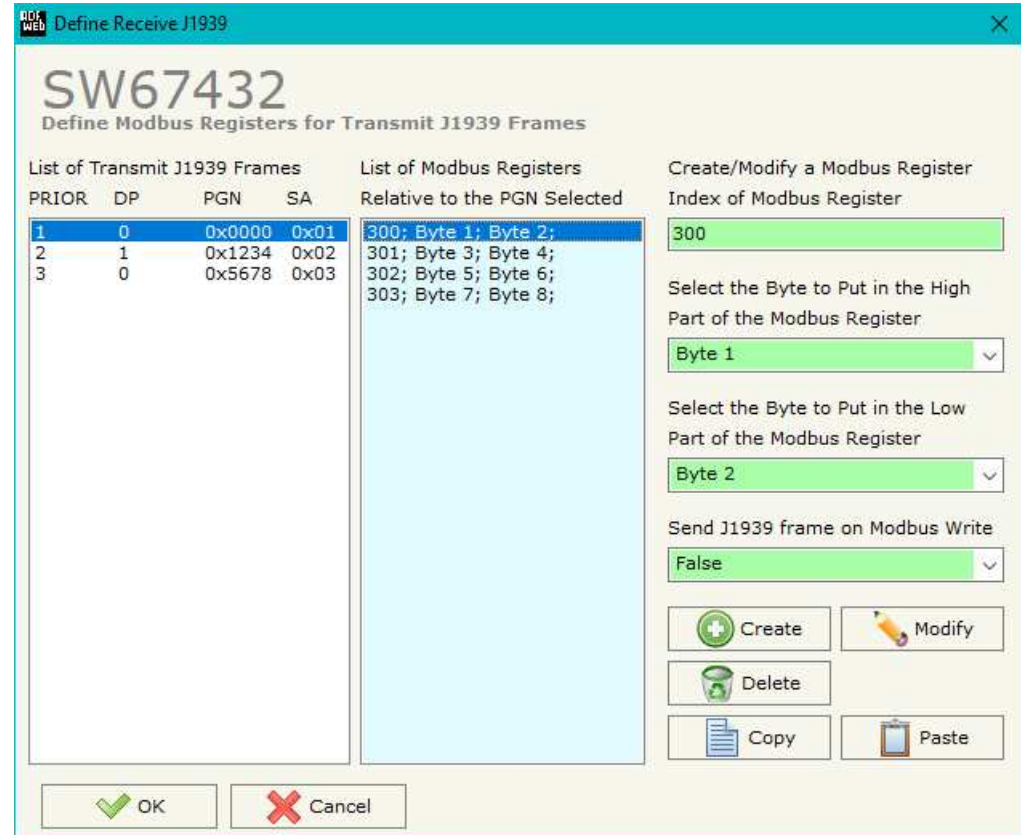


Figure 7: “Define Modbus Registers for Transmit J1939 Frames” window

UPDATE DEVICE (ONLY FOR THE HARDWARE WITHOUT USB PORT):

By pressing the **“Update by CAN”** button it is possible to load the created Configuration into the device; and also the Firmware, if is necessary.

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

- Connect the AC67400 to the PC;
- Connect the CAN port of AC67400 to CAN port of HD67432;
- Feed the HD67432;
- Turn on the device;
- Select the **“COM port”** and press the **“Connect”** button;
- 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;
- Disconnect the AC67400;
- Turn on the device.

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

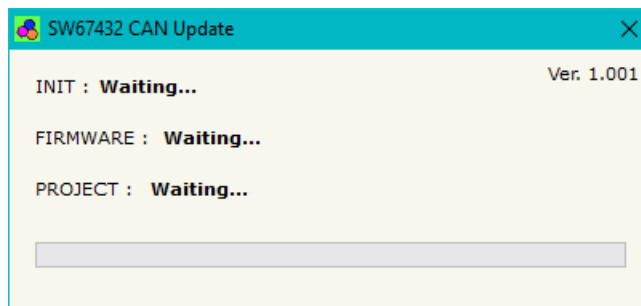
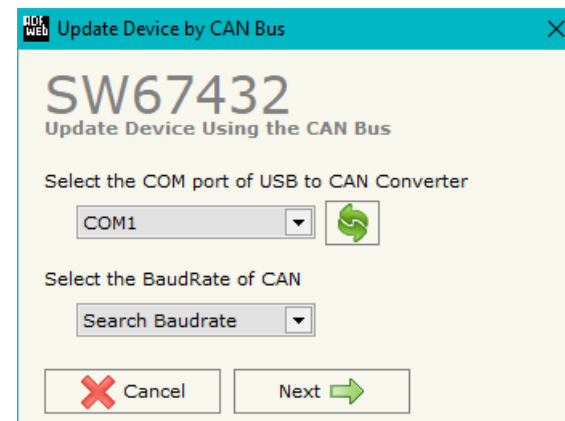


Figure 8: “Update by CAN” windows

UPDATE DEVICE USB:

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

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

- Connect the USB cable from your PC to the Converter;
- Select the “**COM port**”;
- Select which operations you want to do.
- Press the “**Execute update firmware**” button to start the upload;
- When all the operations are “OK”, disconnect the USB cable.

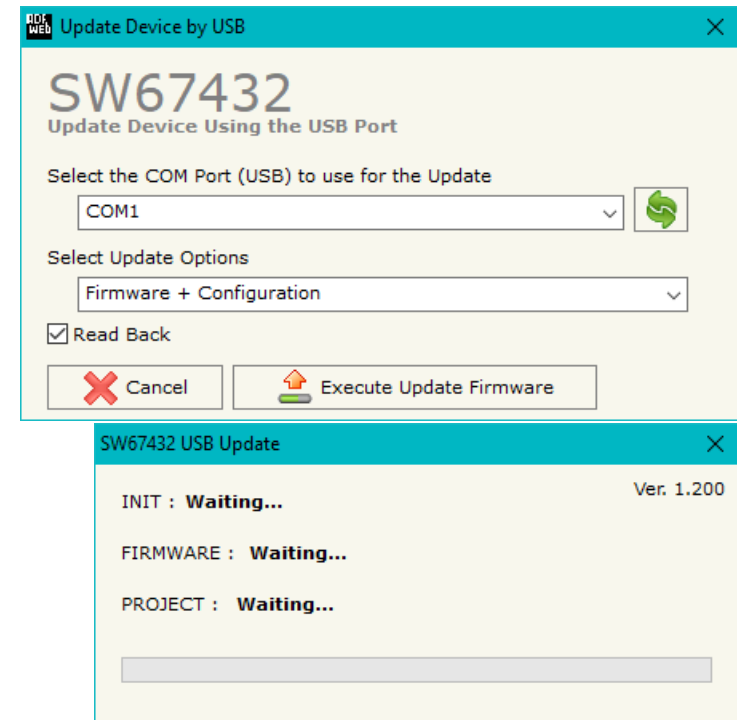





Figure 9: “Update Device” windows

 **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 HD67432 device.

 **Note:**
When you receive the device, for the first time, you have to update also the Firmware in the HD67432 device.

 **Warning:**
If the Fig. 10 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 AC67400 is connected between the PC and the device;
- Check if the USB cable is connected between the PC and the device;
- Try to repeat the operations for the updating;
- 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 or 8 or 10, make sure that you have the administrator privileges;
- Pay attention to Firewall lock.

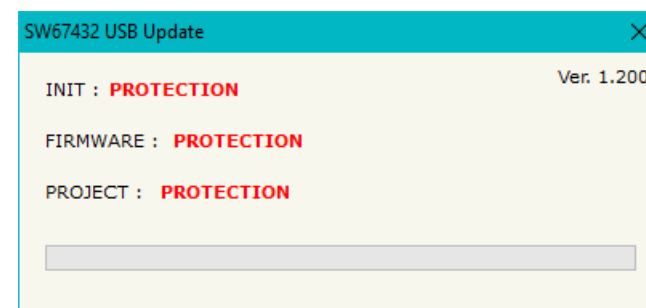


Figure 10: "Protection" window

In the case of HD67432 you have to use the software "SW67432": www.adfweb.com/download/filefold/SW67432.zip.

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 "Source 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:

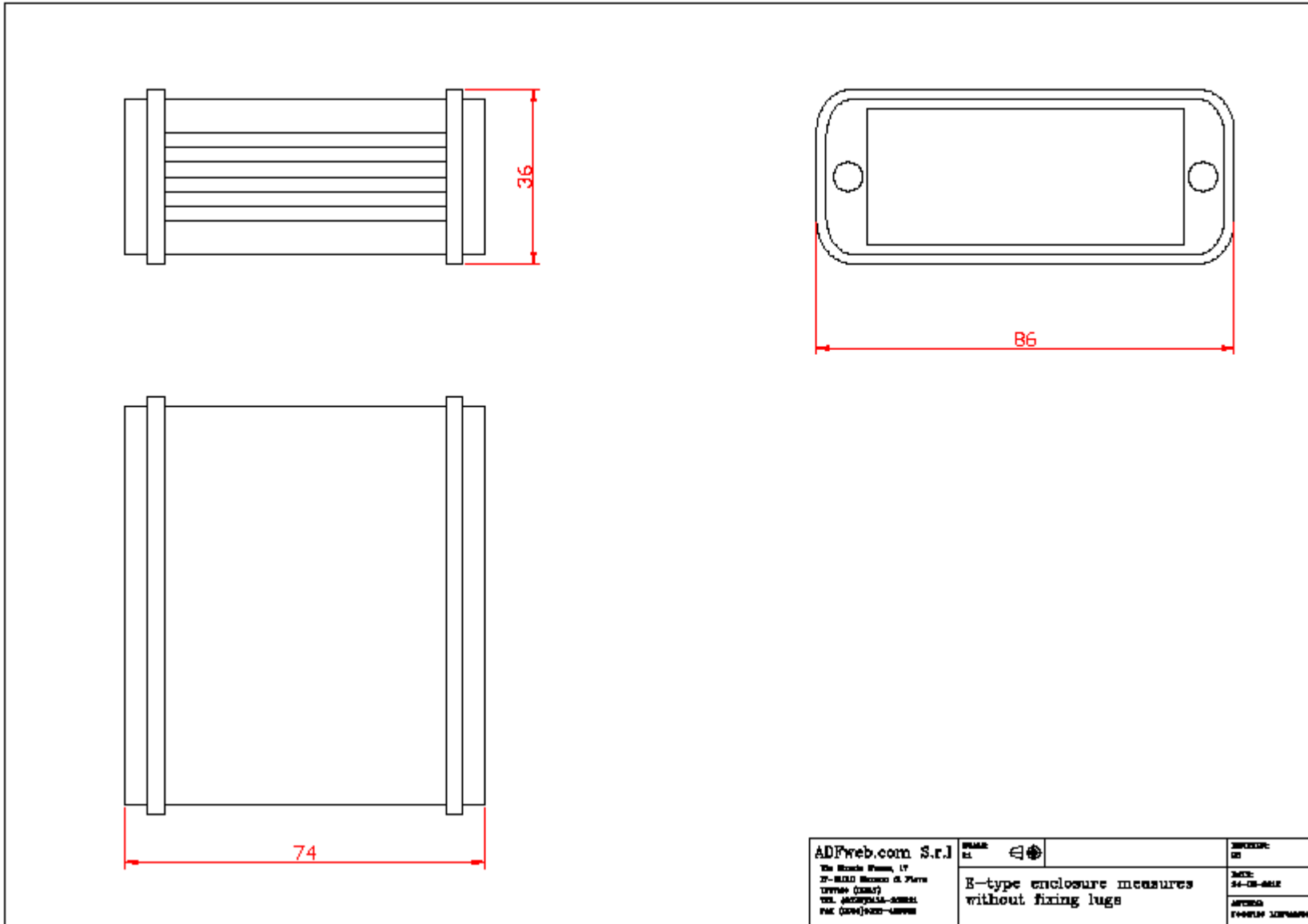
1st reg = 0x0605

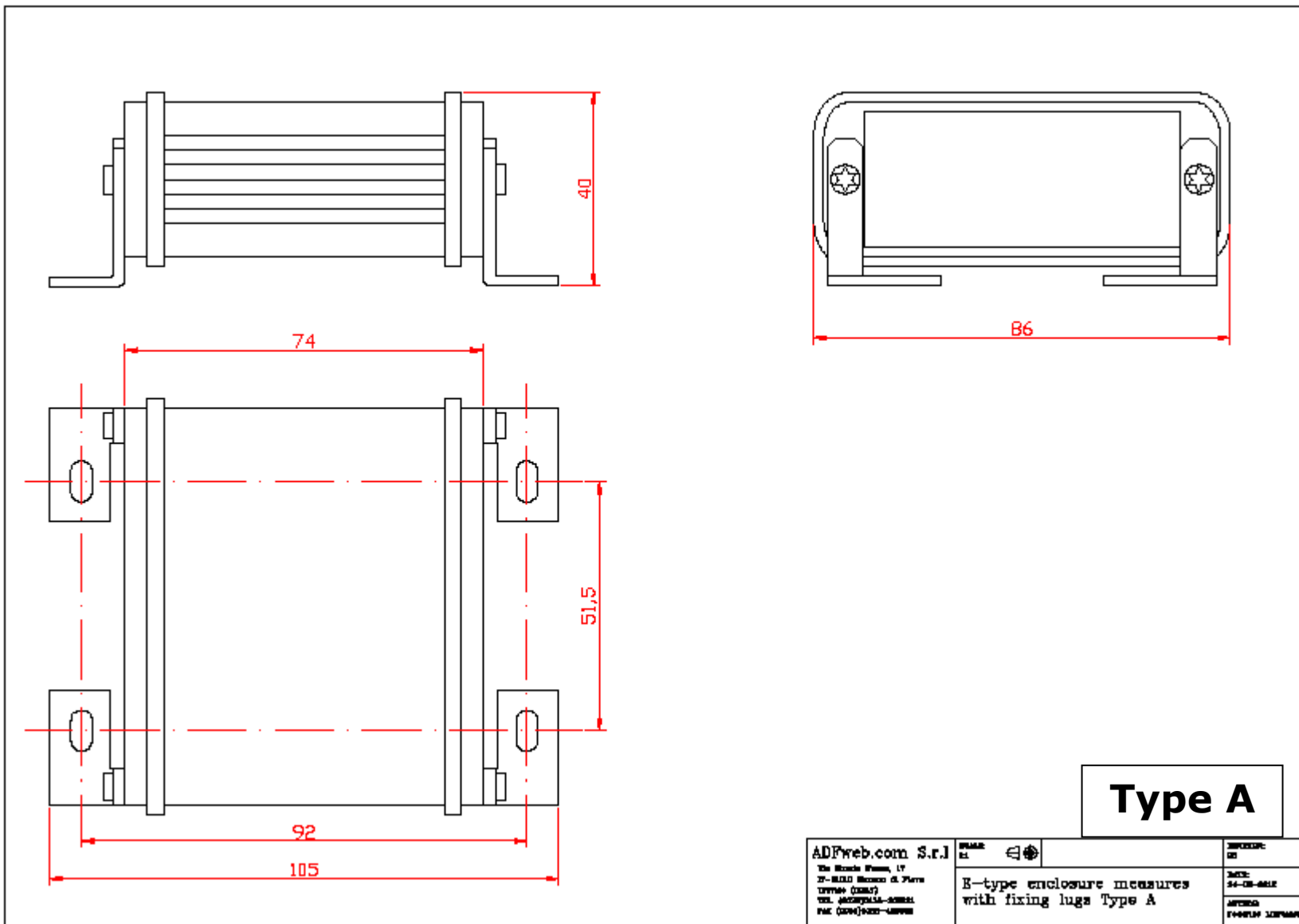
2nd reg = 0xE5FE

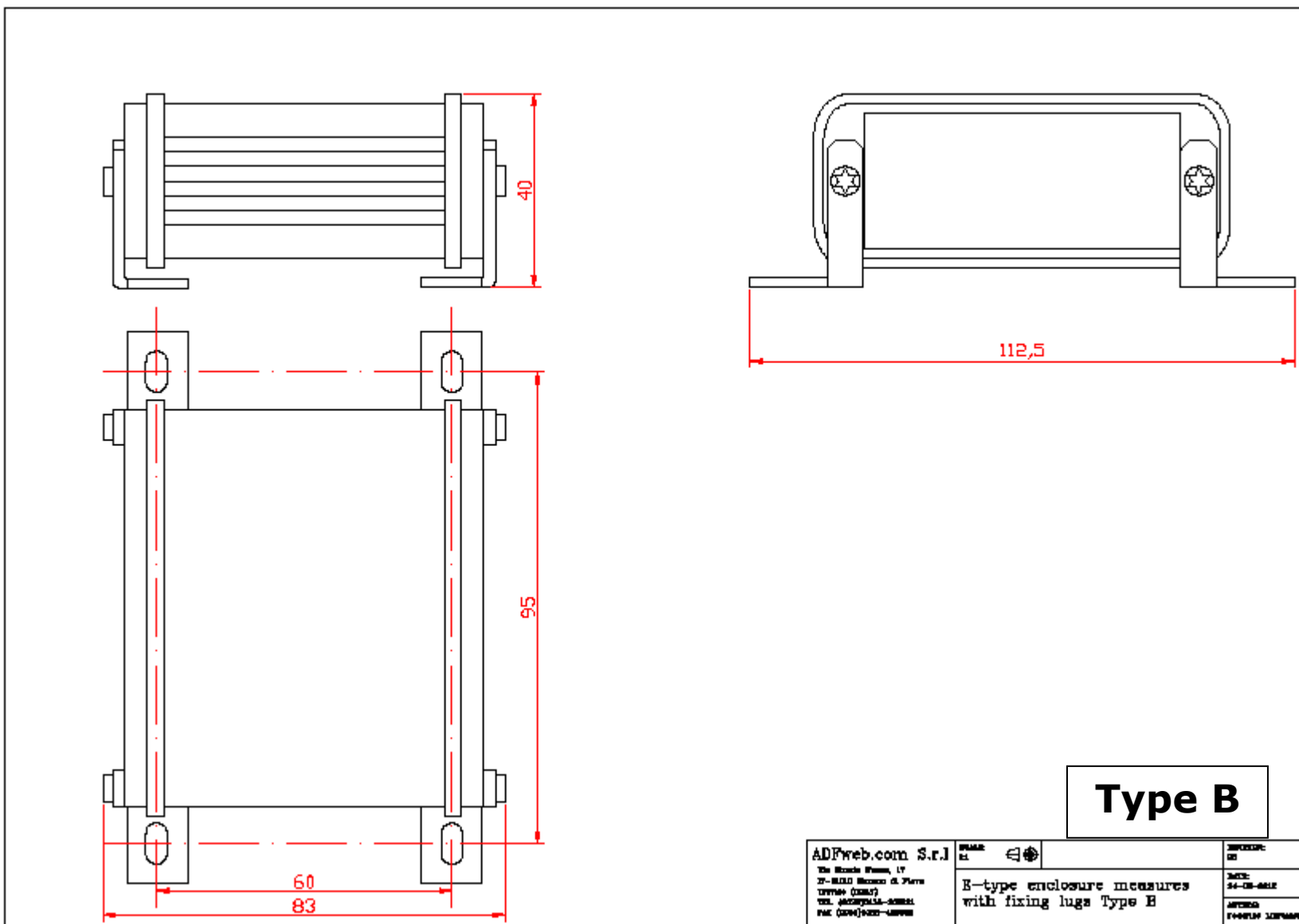
3rd reg = 0x0000

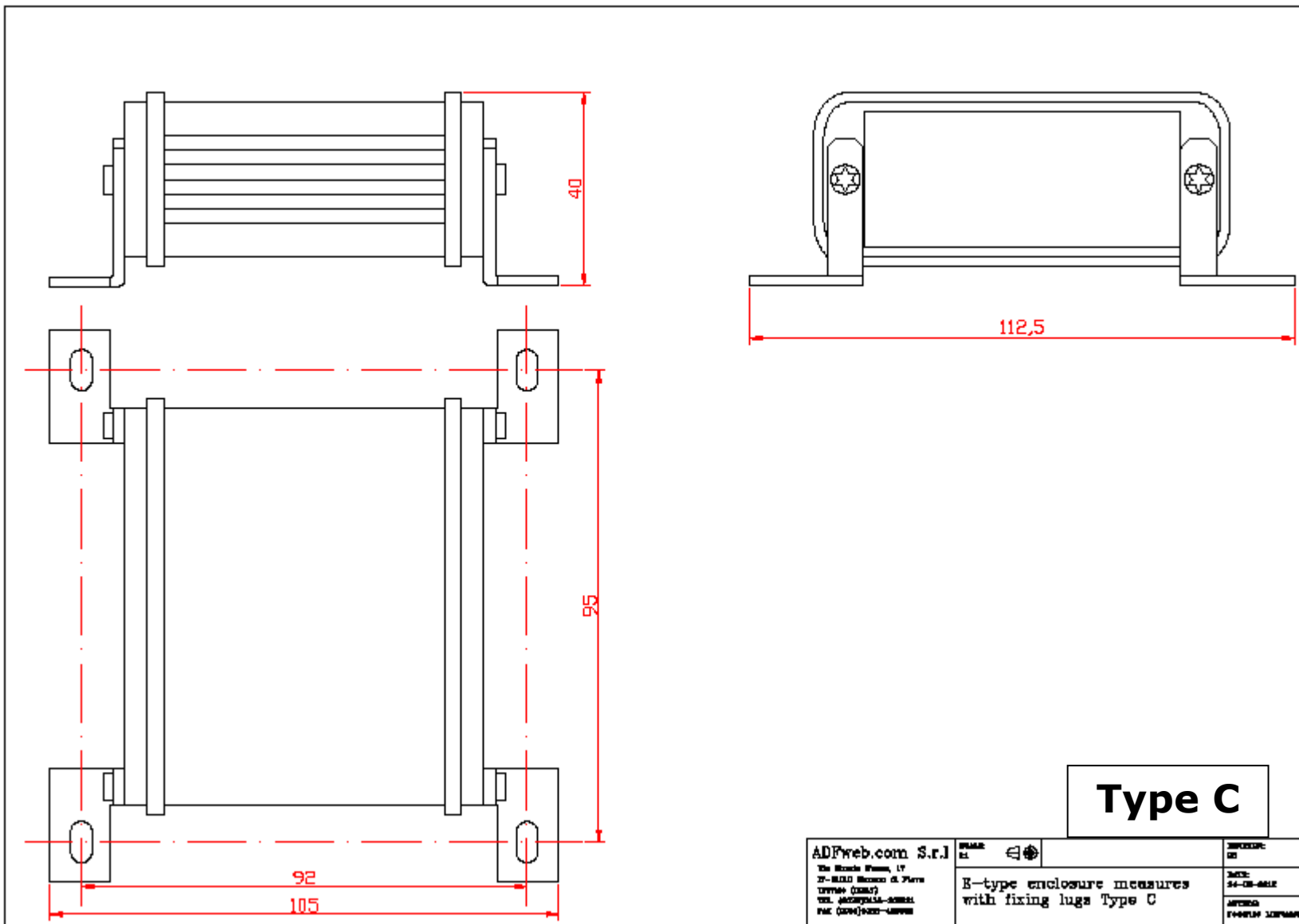
4th reg = 0x0100

MECHANICAL DIMENSIONS:





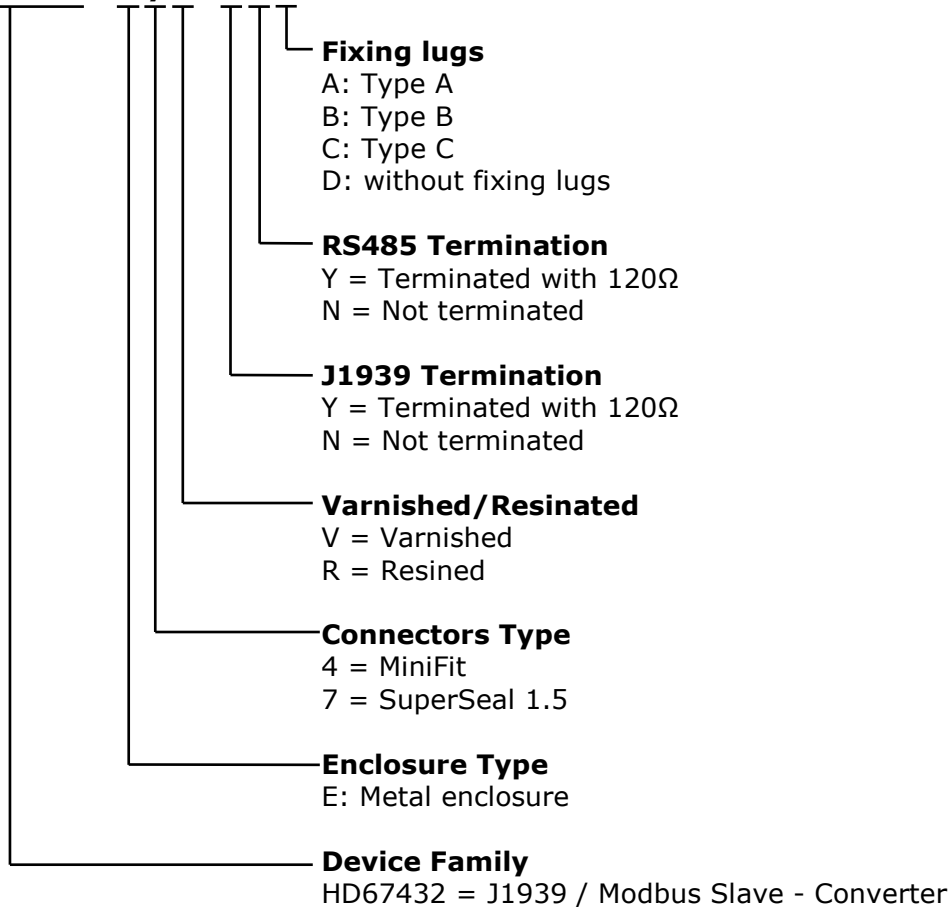




ORDERING INFORMATIONS:

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

HD67432 - E y z - s d f



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
- Order Code: **AC67402** - Cable Super Seal 1.5 MALE 2-pole - 1.0 Meter
- Order Code: **AC67402-3** - Cable Super Seal 1.5 MALE 2-pole - 3.0 Meters
- Order Code: **AC67403** - Cable Super Seal 1.5 MALE 3-pole - 1.0 Meter
- Order Code: **AC67403-3** - Cable Super Seal 1.5 MALE 3-pole - 3.0 Meters
- Order Code: **AC67410** - Accessory Automotive Devices - Support for rail DIN

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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