

User Manual

Revision 1.000
English

CANopen / Modbus TCP Master – Converter

(Order Code: HD67424)

For Website information:

www.adfweb.com?Product=HD67424

For Price information:

www.adfweb.com?Price=HD67424

Benefits and Main Features:

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



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



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
1.000	13/08/2025	Ln	All	First released 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:

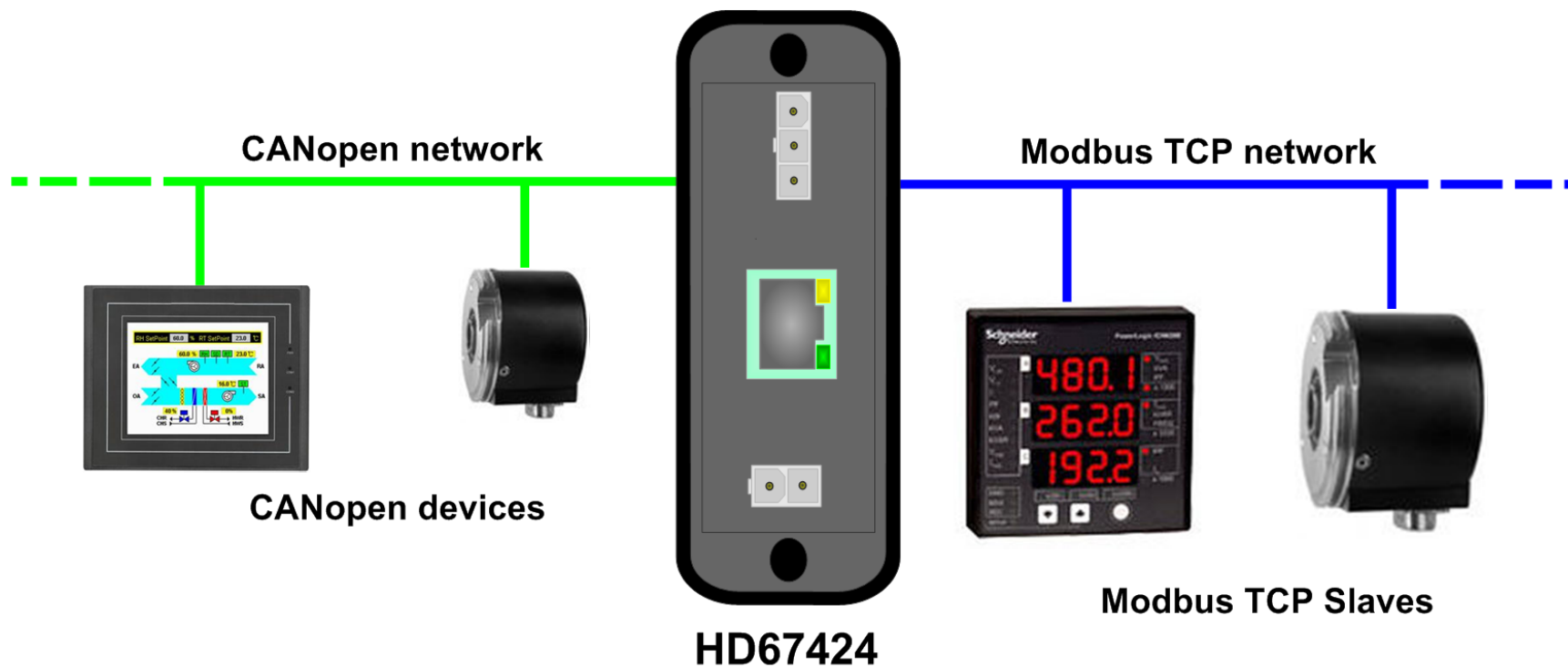


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

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:

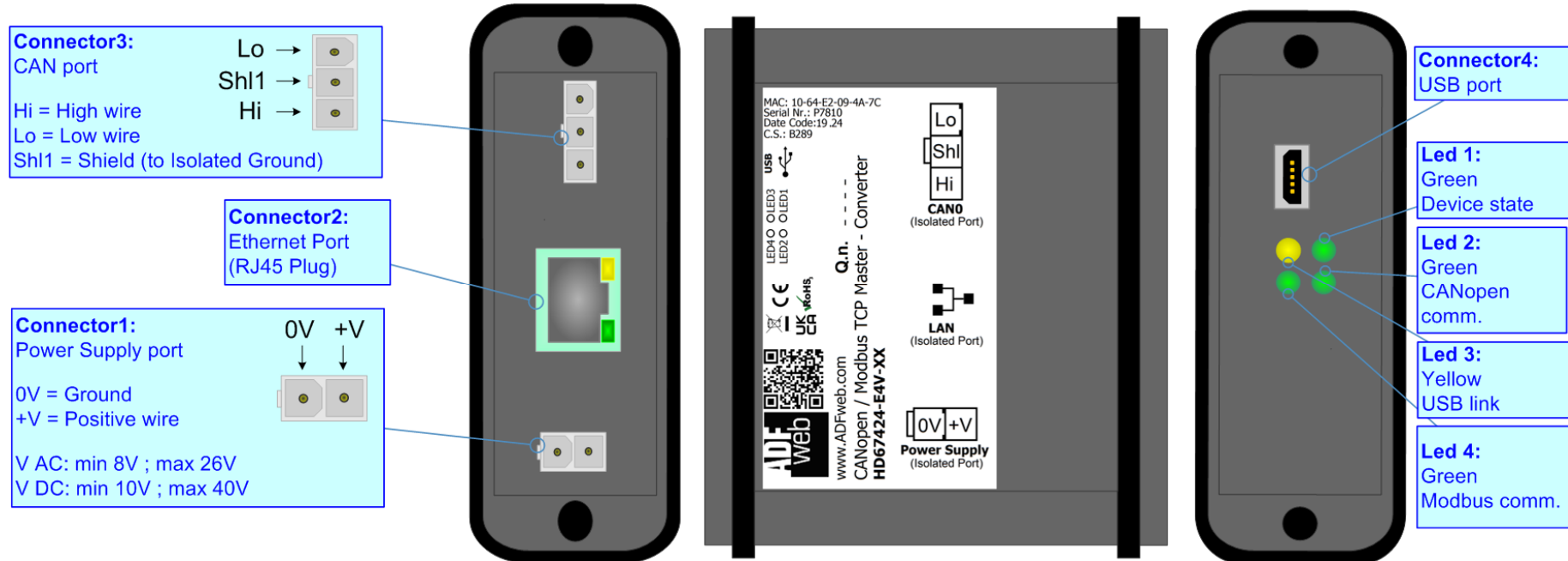


Figure 1a: Connection scheme for HD67424-E4x-xx

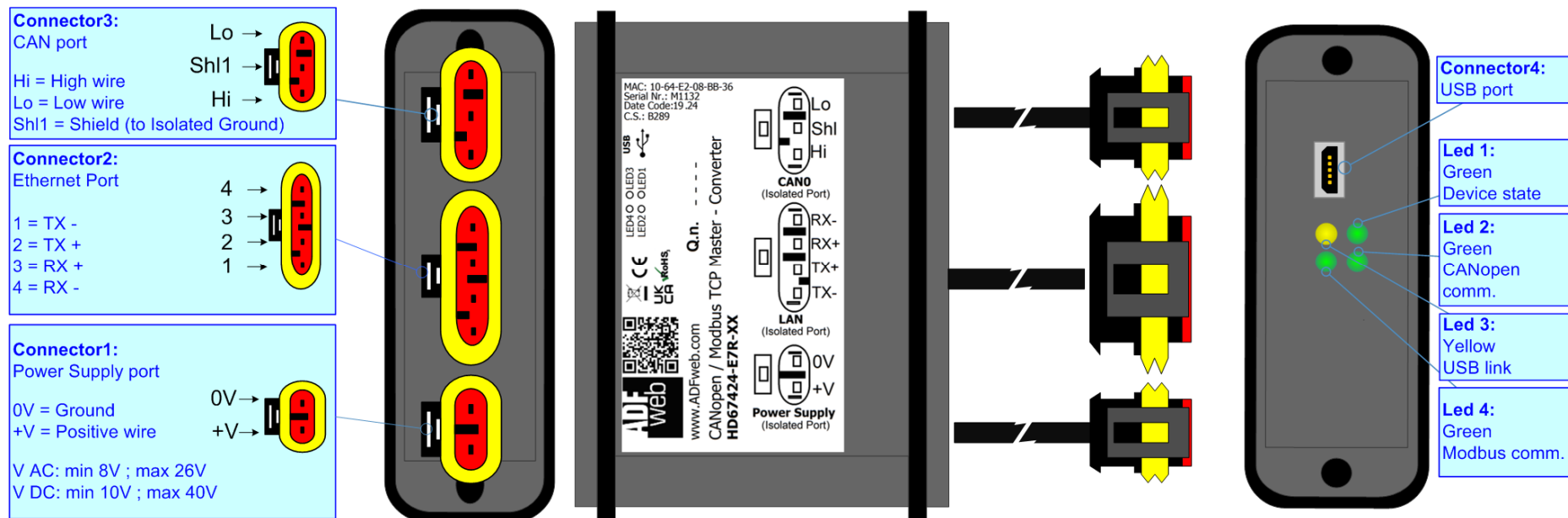


Figure 1b: Connection scheme for HD67424-E7x-xx

CHARACTERISTICS:

The “**HD67424**” series are rugged devices used to interface CANopen devices with a Modbus TCP devices.

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.

The device have these characteristics:

- Triple 4kV isolation between Power Supply / Ethernet / 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 SW67424 software on your PC in order to perform the following:

- Define the parameter of CANopen;
- Define the parameter of Modbus TCP;
- Define which and how the PDO of CANopen are accessible from Modbus TCP;
- Update the device.

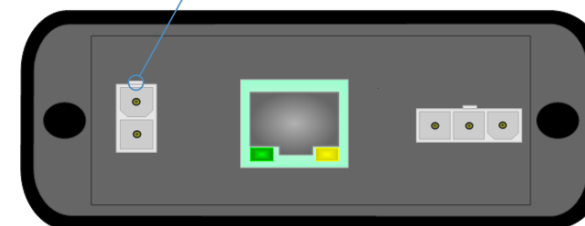
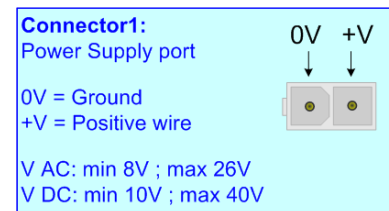
POWER SUPPLY:

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

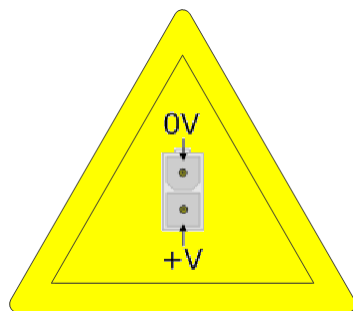
	VAC		VDC	
	Vmin	Vmax	Vmin	Vmax
HD67424-Exx-xx	8V	26V	10V	40V

Consumption at 24V DC:

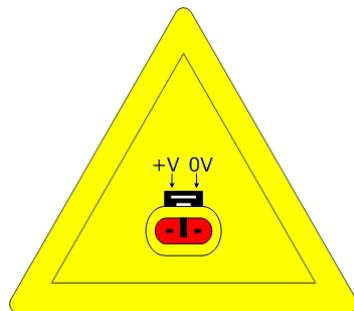
Device	W/VA
HD67424-Exx-xx	4



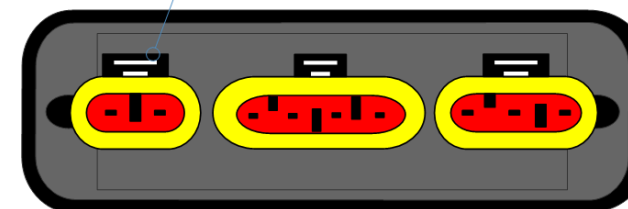
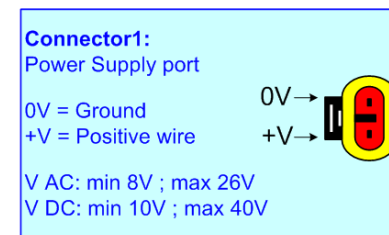
Caution: Not reverse the polarity power



HD67424-E4x-xx



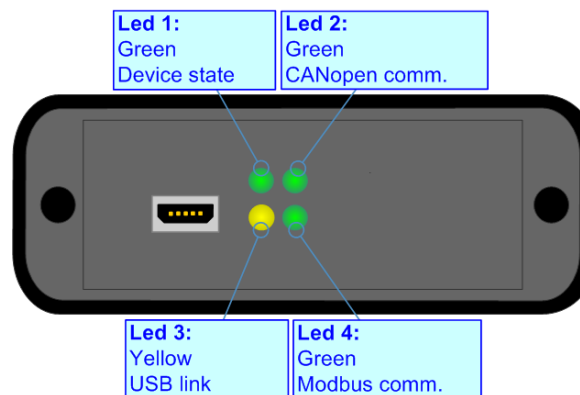
HD67424-E7x-xx



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: CANopen comm. (green)	Blinks when CANopen frames are received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
3: USB link (yellow)	ON: USB cable inserted OFF: USB cable not inserted	ON: USB cable inserted OFF: USB cable not inserted
4: Modbus TCP comm. (green)	Blinks when a Modbus TCP request is received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress



CAN:

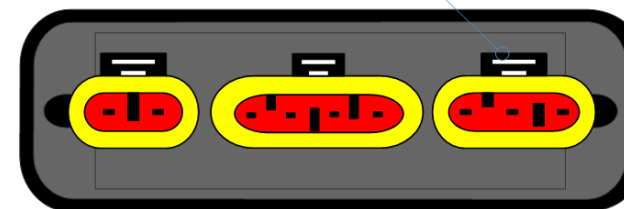
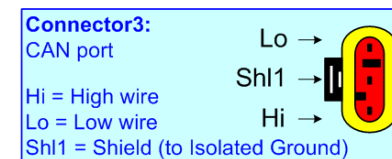
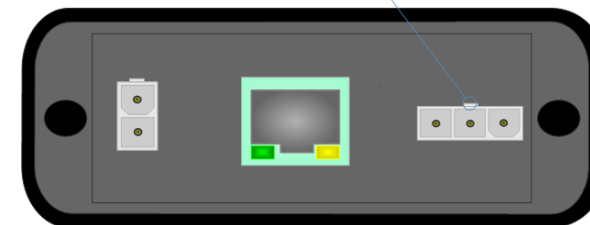
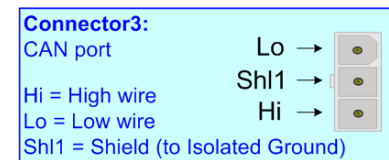
The connection of the CANopen in the HD67424-E4x-xx device must be made with a 3way MiniFit Female connector. The pinout of Male MiniFit connector of the board is at right side of the page.

The connection of the CANopen in the HD67424-E7x-xx 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 CANopen line, with a 120Ω resistor, in the HD67424-Exx-xx is made internally of the device; when the order is performed. If the device have the CANopen terminated the code is the follow: HD67424-Exx-Yx; otherwise is this other: HD67424-Exx-Nx.

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

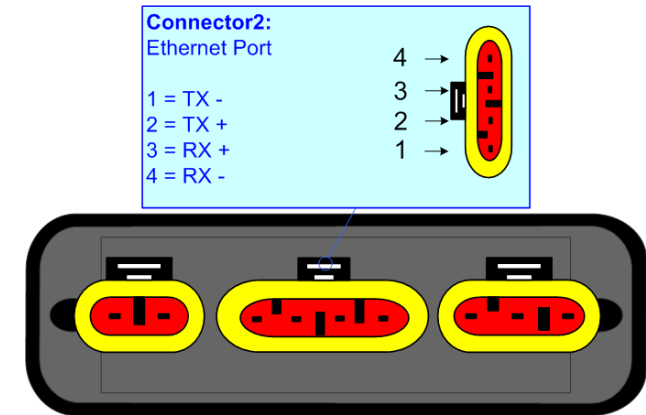


ETHERNET:

The connection of Ethernet in the HD67424 device must be made 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.

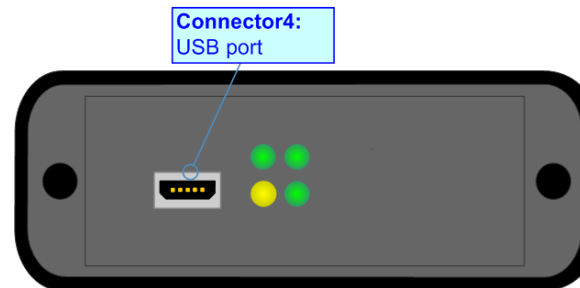
The connection of Ethernet in the HD67424-E4x-xx device must be made with RJ45 connector.

The connection of the Ethernet in the HD67424-E7x-xx 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.



USB:

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



USE OF COMPOSITOR SW67424:

To configure the Converter, use the available software that runs with Windows called SW67424. 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 or 11; 32/64bit).

When launching the SW67424, the window below appears (Fig. 2).



Note:

It is necessary to have installed .Net Framework 4.

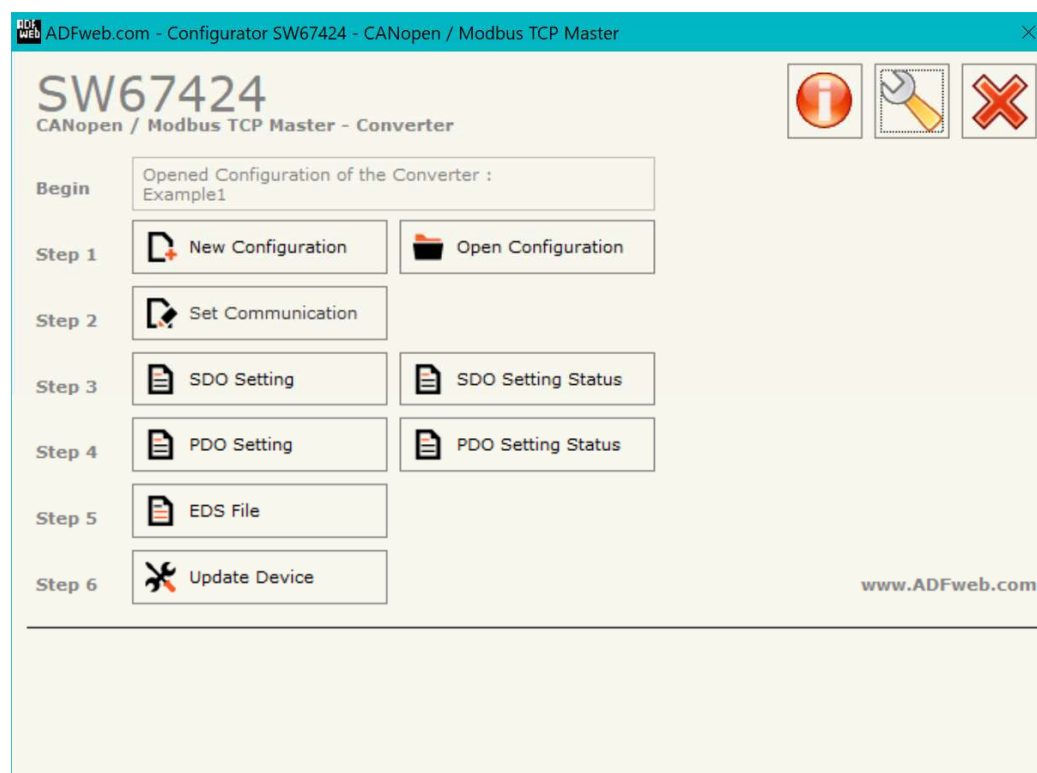


Figure 2: Main window for SW67424

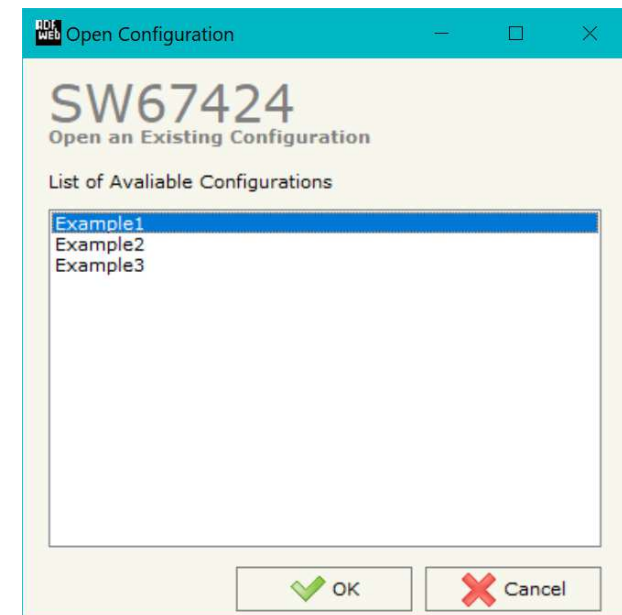
NEW CONFIGURATION / OPEN CONFIGURATION:

The **"New Configuration"** button creates the folder which contains the entire device's configuration.




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

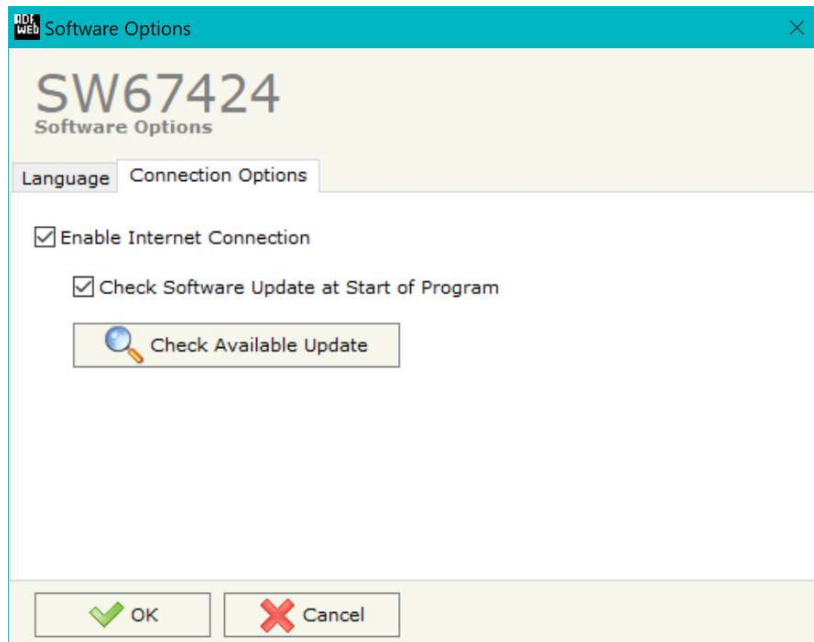
- To clone the configurations of a programmable "CANopen / Modbus TCP Master - Converter" in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient 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 SW67424 check automatically if there are updatings when it is launched.

SET COMMUNICATION:

This section defines the fundamental communication parameters of two Buses, CANopen and Modbus TCP.

By pressing the **Set Communication** button from the main window for SW67424 (Fig. 2) the window "Set communication" appears (Fig. 3).

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

- In the field **Device ID** the ID of the CANopen side is defined;
- In the field **Baudrate** the data rate of the CANopen line is defined;
- In the field **Set Operational State at Start-Up** the state of the CANopen is defined. I.e. If it is checked the board starts in Operational State, else it starts in Pre-Operational;
- In the field **Network Start at Start-Up** the state of the CANopen network is defined. I.e. If it is checked the board sends a command to set the Operational State of all the devices present in the network, after the time defined in the "Delay" field;
- In the field **Delay (s)** the delay before sending the "Start" command for the CANopen is defined;
- If the field **Send Transmit PDO on SYNC** is checked, the TPDO messages are sent on SYNC message. In the field **Transmission Type** the number of SYNC messages before the transmission of the PDO is defined;
- If the field **Send Transmit PDO on Change** is checked, the TPDO is transmitted when the data from Modbus TCP side change.

The means for the fields for "Modbus TCP Master" are:

- In the field **IP ADDRESS**, the IP address of the Modbus TCP side of the converter is defined;
- In the field **SUBNET Mask** the SubNet Mask of the Modbus TCP side of the converter is defined;
- In the field **GATEWAY**, the default gateway of the network is defined. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net;
- In the field **Port** the port used for Modbus TCP communication is defined;
- In the field **TimeOut (ms)** the maximum time that the converter attends for the answer from the Slave interrogated is defined;

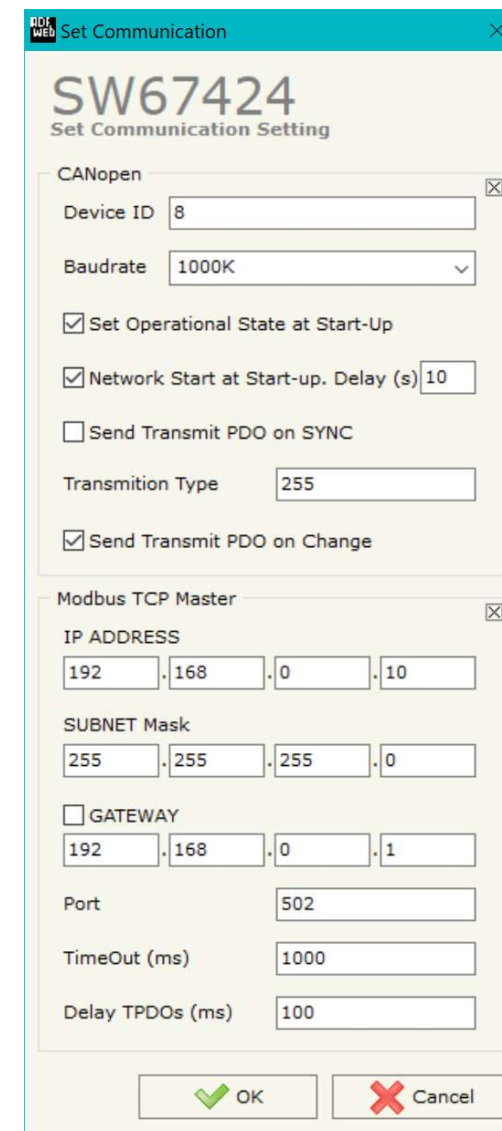
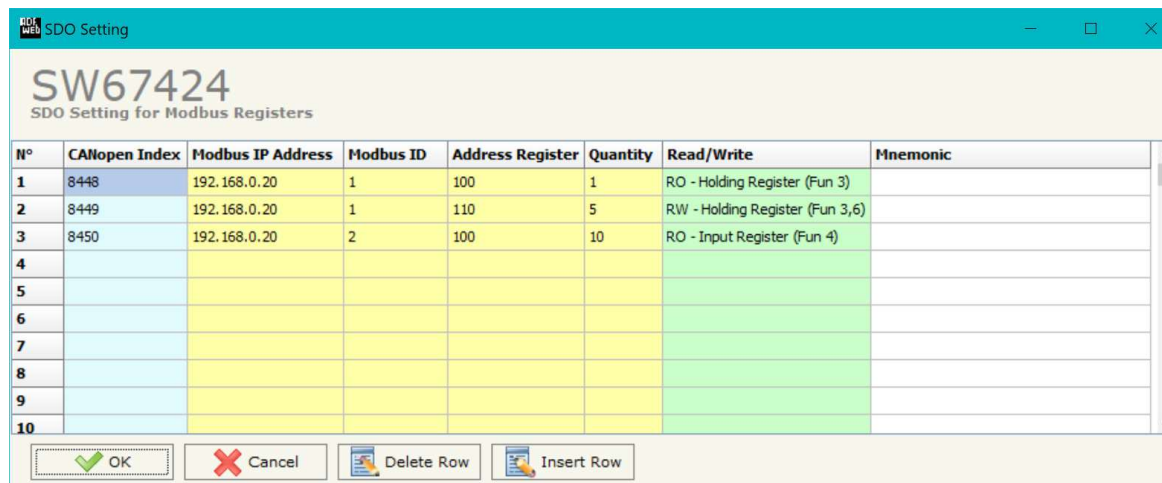


Figure 3: "Set Communication" window

- In the field "**Delay TPDOs (ms)**" the delay with which the data into the TPDOs is refreshed is defined.

SDO SETTING:



N°	CANopen Index	Modbus IP Address	Modbus ID	Address Register	Quantity	Read/Write	Mnemonic
1	8448	192.168.0.20	1	100	1	RO - Holding Register (Fun 3)	
2	8449	192.168.0.20	1	110	5	RW - Holding Register (Fun 3,6)	
3	8450	192.168.0.20	2	100	10	RO - Input Register (Fun 4)	
4							
5							
6							
7							
8							
9							
10							

Figure 4: "SDO Setting for Modbus Registers" window

By pressing the "**SDO Setting**" button from the main window for SW67424 (Fig. 4) the window "SDO Setting for Modbus Registers" appears (Fig. 4):

- In the field "**CANopen Index**" the Index of the SDO Object is defined;
- In the field "**Modbus IP Address**" the IP Address of the Modbus device to poll is defined;
- In the field "**Modbus ID**" the ID of the Modbus device to poll is defined;
- In the field "**Address Register**" the address of the Modbus register to read/write is defined;
- In the field "**Quantity**" the number of consecutive Modbus register to read/write is defined;
- In the field "**Read/Write**" the type of SDO Object is defined (RO: ReadOnly or RW:ReadWrite);
- In the field "**Mnemonic**" a brief description is defined.

The Modbus TCP requests will be sent when a SDO request is received on CANopen. The CANopen Client needs to have a timeout higher than 500 ms. The reply time is the time for a Modbus query plus the Modbus response.

SDO SETTING STATUS:

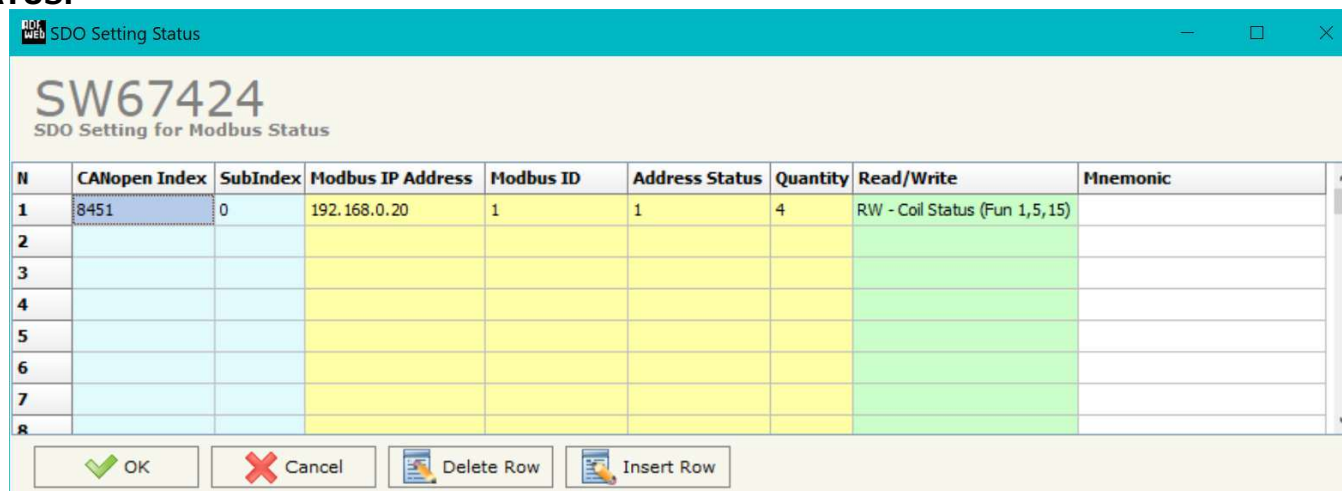


Figure 5: "SDO Setting for Modbus Status" window

By pressing the "SDO Setting Status" button from the main window for SW67424 (Fig. 4) the window "SDO Setting for Modbus Status" appears (Fig. 5):

- In the field "CANopen Index" the Index of the SDO Object is defined;
- In the field "SubIndex" the SubIndex of the SDO Object is defined;
- In the field "Modbus IP Address" the IP Address of the Modbus device to poll is defined;
- In the field "Modbus ID" the ID of the Modbus device to poll is defined;
- In the field "Address Status" the address of the Modbus status to read/write is defined;
- In the field "Quantity" the number of consecutive Modbus status to read/write is defined;
- In the field "Read/Write" the type of SDO Object is defined (RO: ReadOnly or RW:ReadWrite);
- In the field "Mnemonic" a brief description is defined.

The Modbus TCP requests will be sent when a SDO request is received on CANopen. The CANopen Client needs to have a timeout higher than 500 ms. The reply time is the time for a Modbus query plus the Modbus response.

PDO SETTING:

The converter allows to use 4 Receive PDOs and 4 Transmit PDOs.

Sending a defined RPDO to the converter, the Modbus writing request will be sent to the defined Modbus TCP device.

The TPDO sent by the converter will contain the data read from the Modbus TCP devices.

By pressing the “**PDO Setting**” button from the main window for SW67424 (Fig. 4) the window “PDO Setting for Modbus Registers” appears (Fig. 6):

- In the field “**Index**” the SDO Objects where the PDO is linked is defined (not editable);
- In the field “**Description**” the description of the SDO Object is defined (not editable);
- In the field “**Modbus IP Address**” the IP address of the Modbus device to poll is defined;
- In the field “**Modbus ID**” the ID of the Modbus device to poll is defined;
- In the field “**Address Register**” the address of the Modbus register to read/write is defined;
- In the field “**Type**” the type of Modbus registers is defined (only for TPDOs);
- In the field “**Num Points**” the number of consecutive Modbus registers to read/write is defined;
- In the field “**Delta Send**” the difference between the last data read and the new data for which the TPDOs is sent is defined (only for Transmit PDO);
- If the field “**Swap**” is checked, the bytes of each word are swapped;

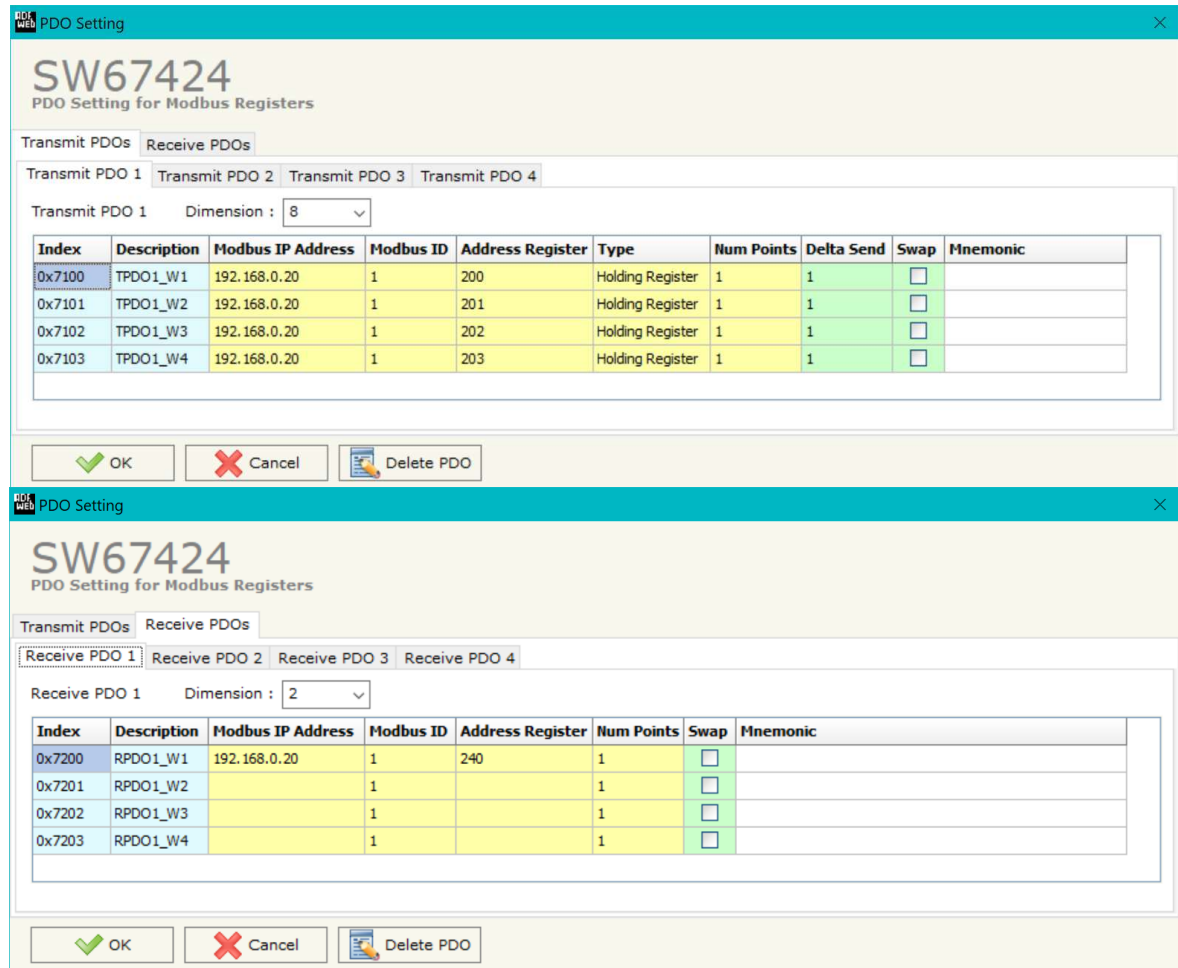


Figure 6: Modbus registers to read/write is defined window



- ✦ In the field "**Mnemonic**" a brief description is defined.

PDO SETTING STATUS:

The converter has 2 additional PDOs (one in reception and one is transmission) used to send/receive the status of the Modbus devices.

By pressing the "PDO Setting Status" button from the main window for SW67424 (Fig. 4) the window "PDO Setting for Modbus Status" appears (Fig. 7):

- In the field "Cob-ID for the Transmit/Receive PDO 5" the CON-Ids of the PDOs is defined;
- In the field "Modbus IP Address" the IP address of the Modbus device to poll is defined;
- In the field "Modbus ID Device" the ID of the Modbus device to poll is defined;
- In the field "Address Status" the address of the Modbus status to read/write is defined;
- In the field "Quantity" the number of consecutive Modbus status to read/write is defined;
- In the field "Status Type" the type of Modbus status is defined (only for TPDO);
- In the field "Mnemonic" a brief description is defined;
- In the field "MASK for Automatic Send of PDO" the mask for the status is defined. It allows to define for the changing of which status the PDO is sent is defined.

Example of mask:

Data read from Modbus	0001	0001	0011	1111	0001
Mask set	0011	0110	1111	1111	0011
Result	xx01	x00x	0011	1111	xx01

With this settings, the TPDO will be sent only when the not-masked bits will change.

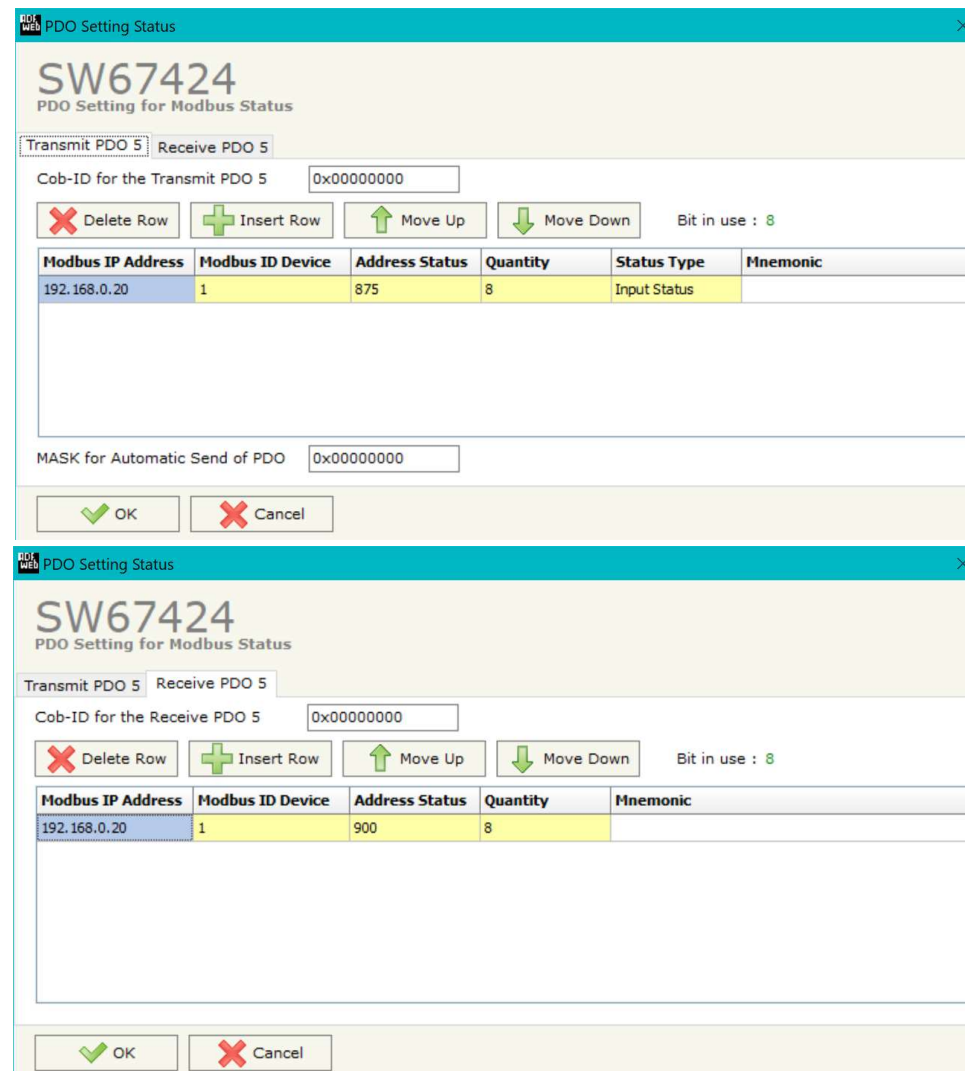


Figure 7: "PDO Setting for Modbus Status" window

EDS FILE:

By Pressing the “**EDS File**” button from the main window for SW67424 (Fig. 2) it is possible to generate the EDS file to be imported into the CANopen Client.

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:

- Connect the USB cable;
- Connect the Ethernet cable;
- Turn ON the converter;
- 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", the updating is done;
- Remove the USB cable;

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.

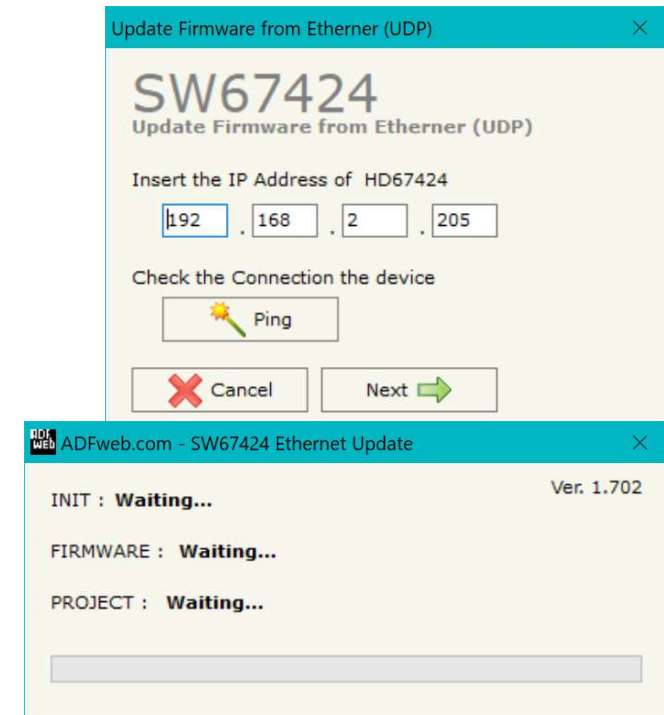


Figure 8: "Update Device" windows

**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 HD67424 device.

**Note:**

When you receive the device, for the first time, you also have to update the Firmware in the HD67424 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, 10 or 11 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 or 11 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

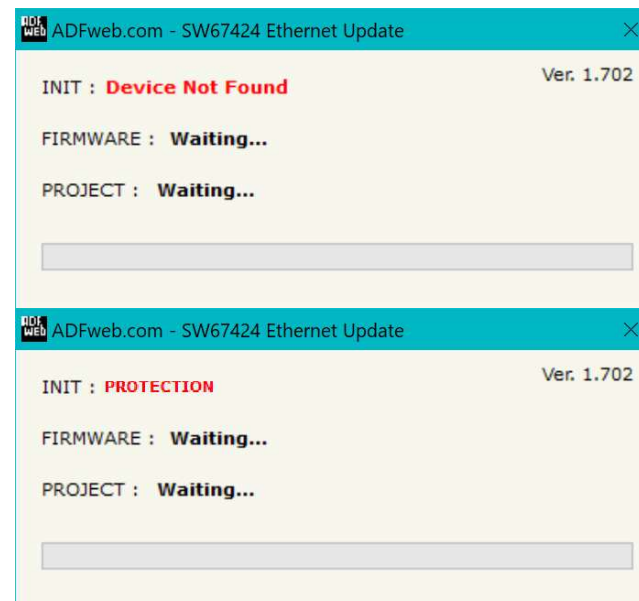
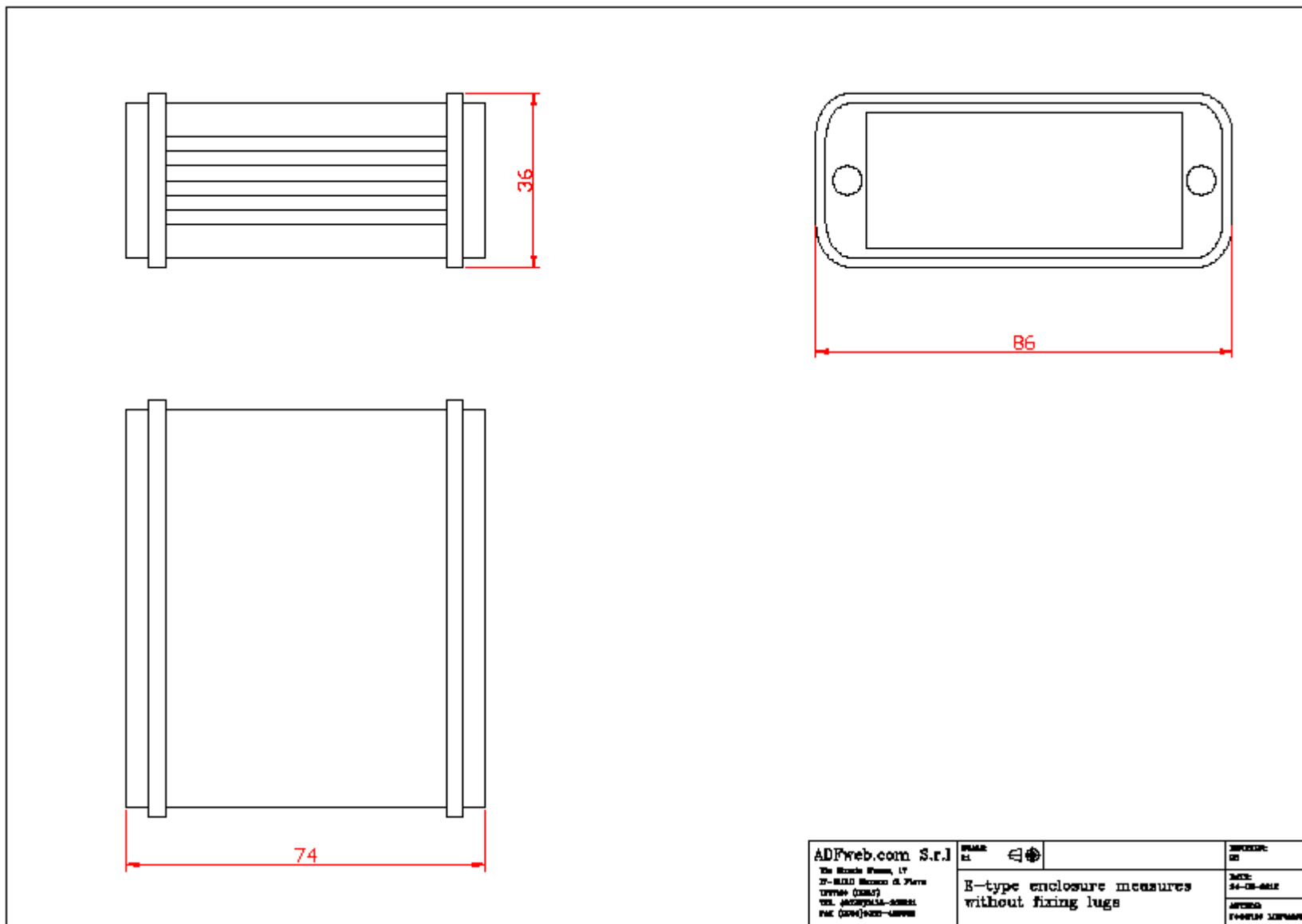
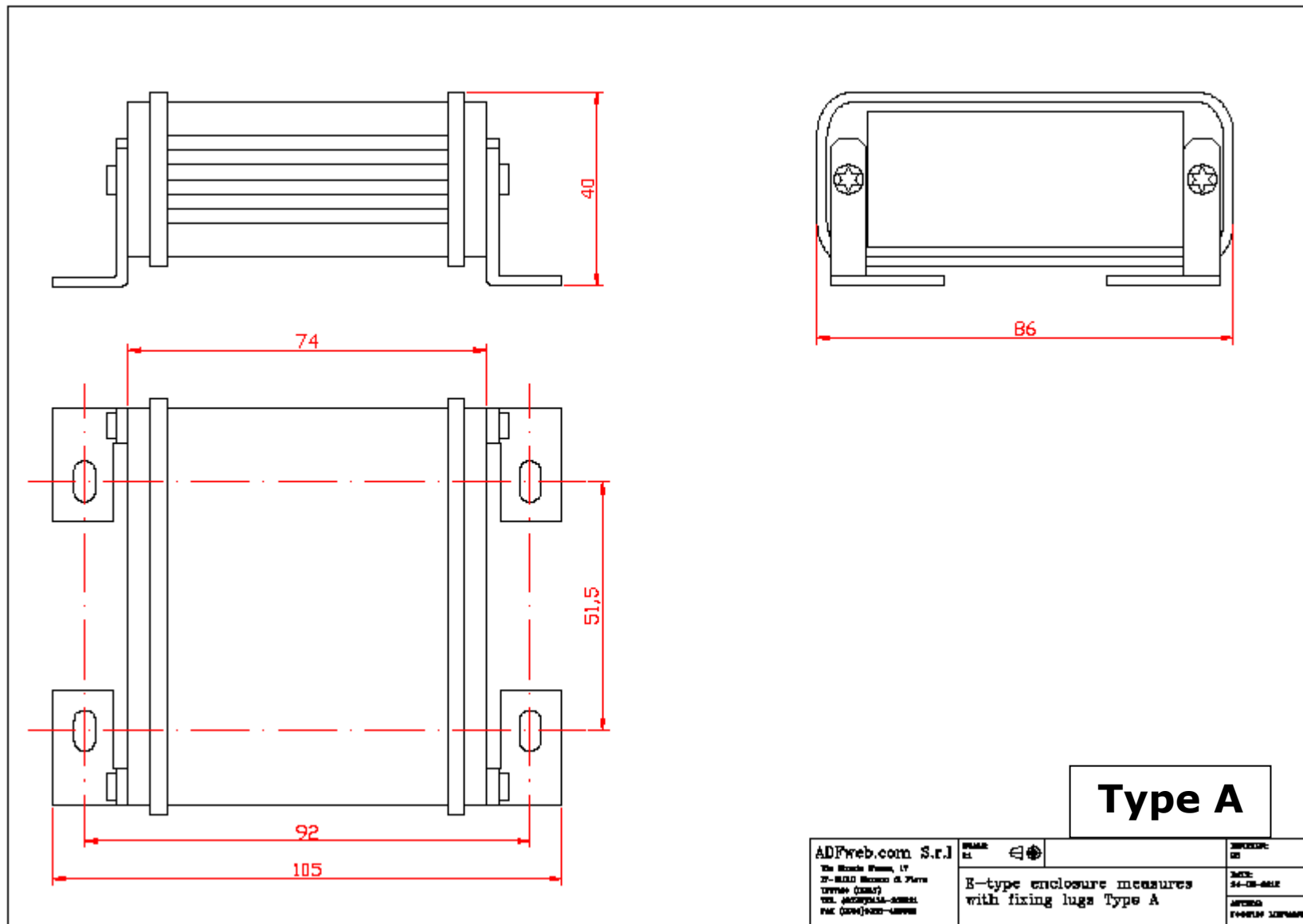


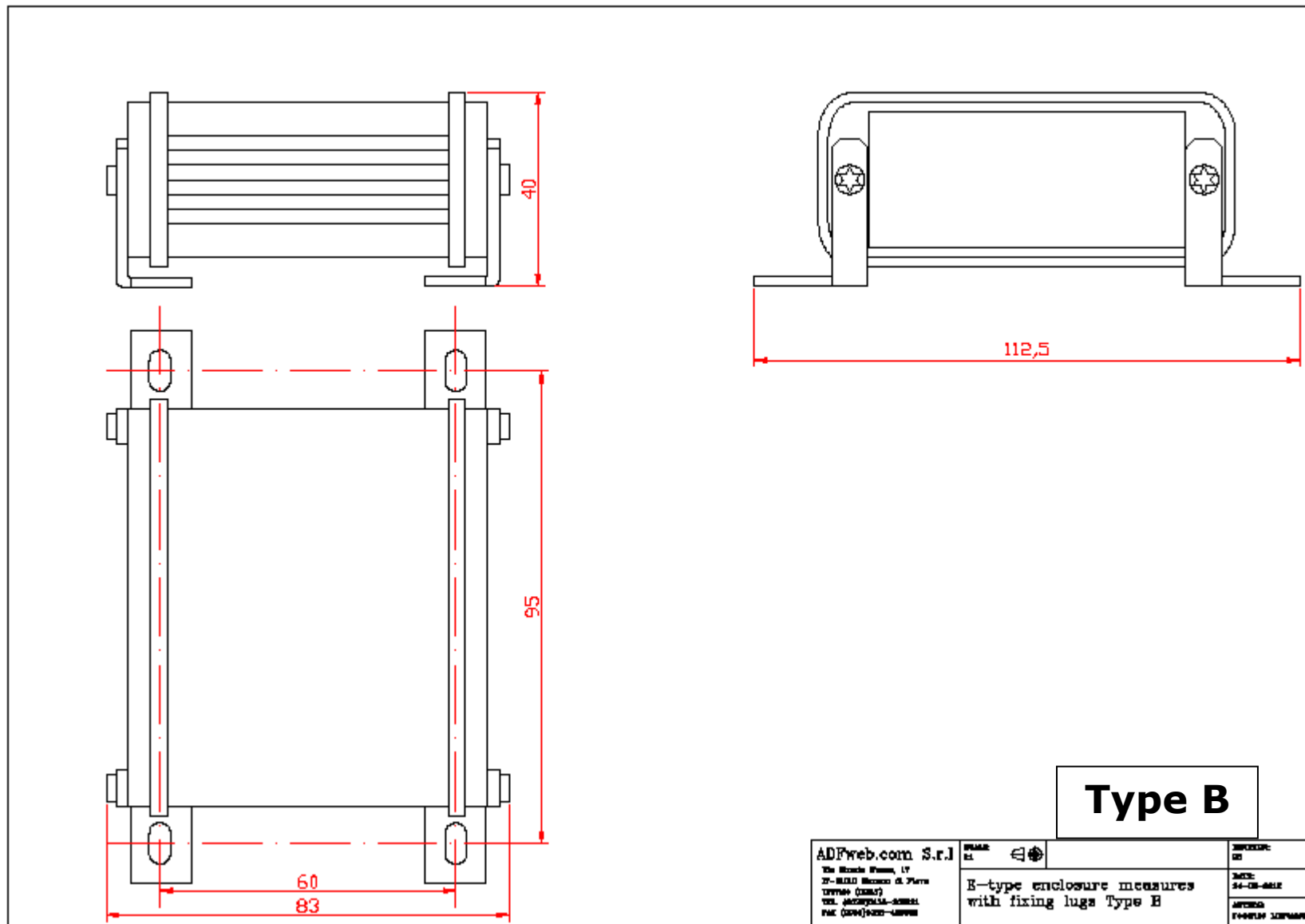
Figure 9: "Error" windows

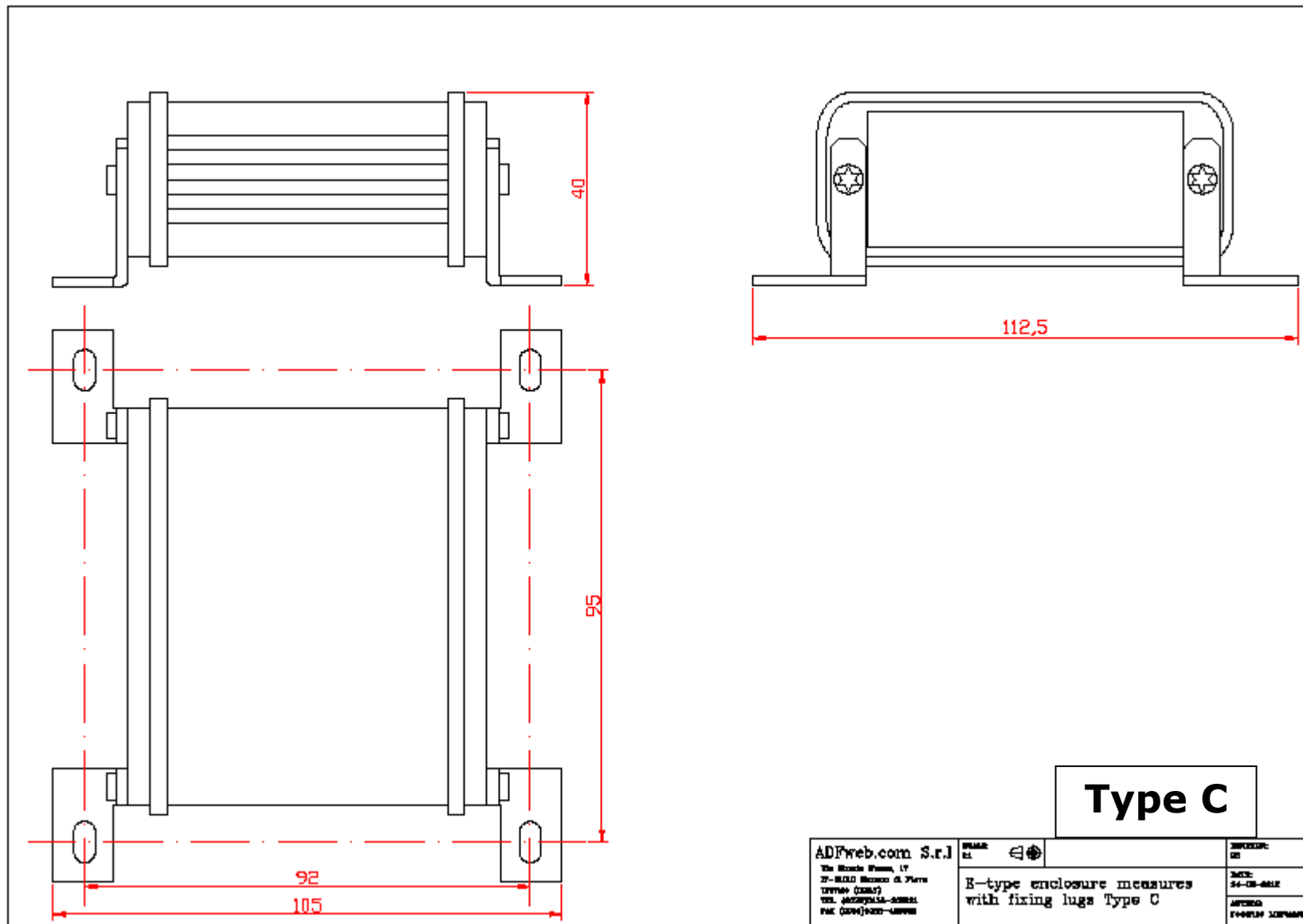
In the case of HD67424 you have to use the software "SW67424": www.adfweb.com/download/filefold/SW67424.zip.

MECHANICAL DIMENSIONS:





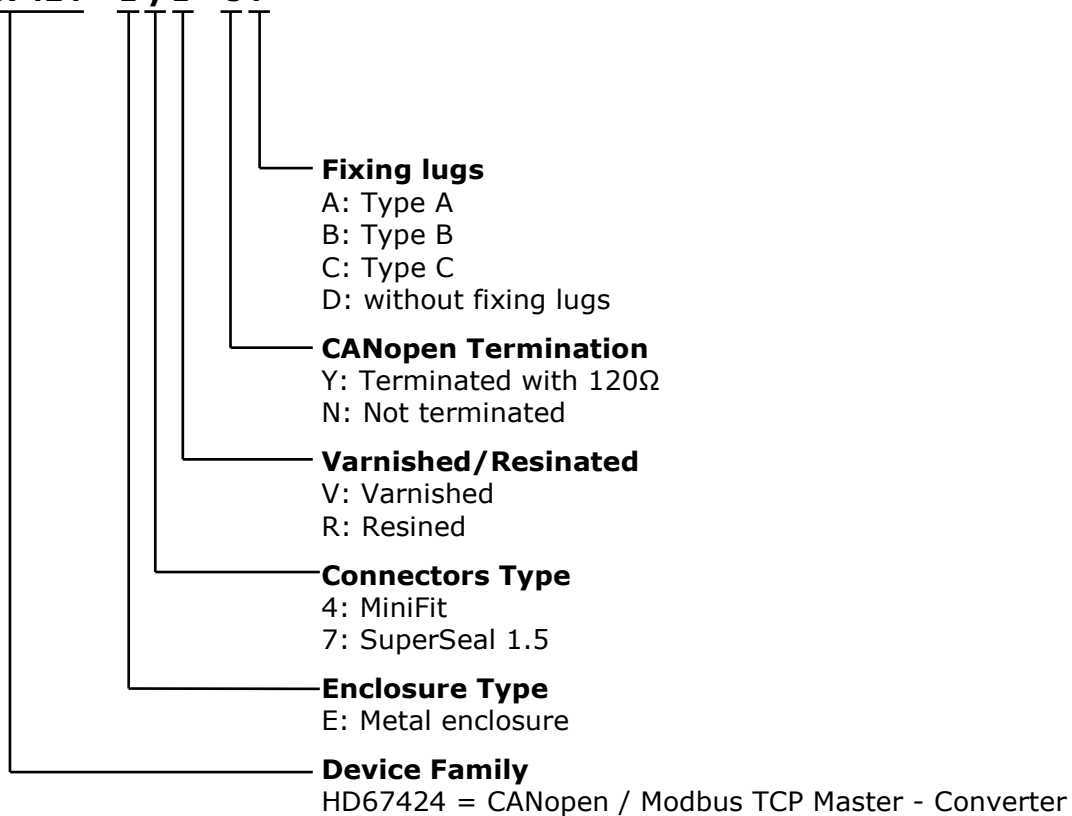




ORDERING INFORMATION:

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

HD67424 - E y z - s f



ACCESSORIES:

- Order Code: **AC34011** - Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V DC
- Order Code: **AC34012** - Rail DIN - Power Supply 220/240V AC 50/60Hz – 24 V DC
- 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: **AC67404** - Cable Super Seal 1.5 MALE 4-pole - 1.0 Meter
- Order Code: **AC67404-3** - Cable Super Seal 1.5 MALE 4-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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