

User Manual

Revision 1.000
English

PROFINET / NMEA 2000 – Converter

(Order Code: HD67459)

for Website information:

www.adfweb.com?Product=HD67459

for Price information:

www.adfweb.com?Price=HD67459

Benefits and Main Features:

- ✦ Very easy to configure
- ✦ Isolation between two buses
- ✦ 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	04/09/2017	Ff	All	First release 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:

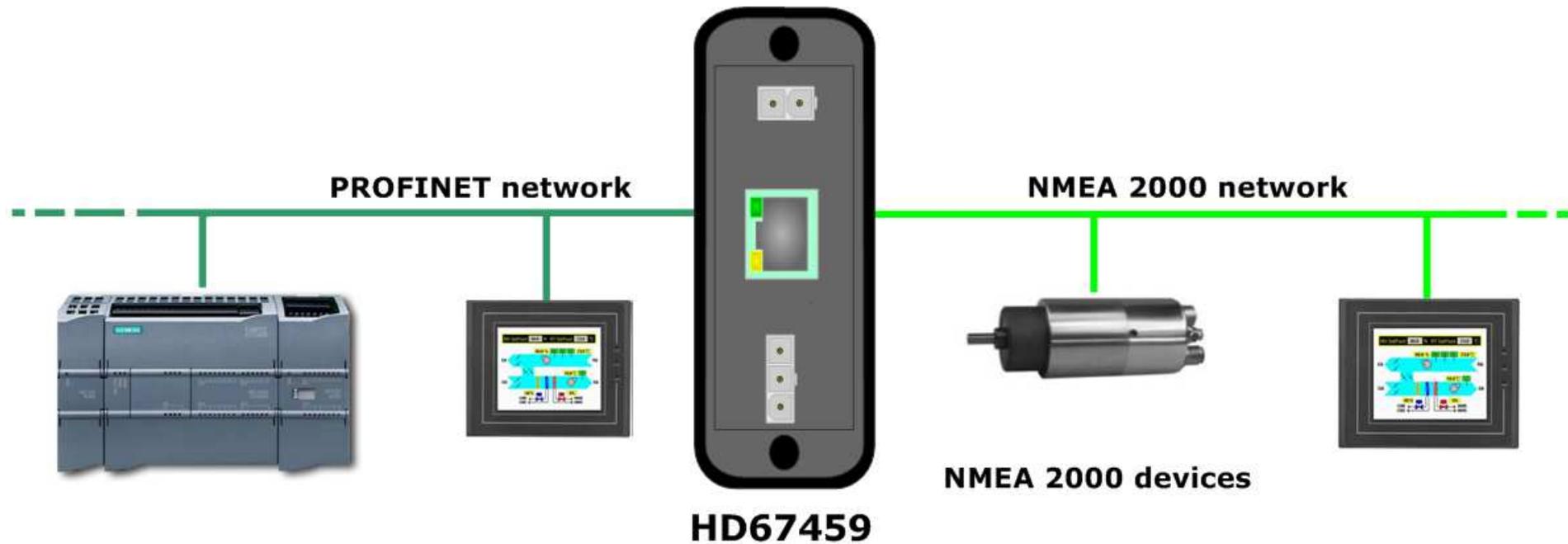


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

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:



ADfweb.com
 tel. +39 - 0438.30.91.31
www.adfweb.com
info@adfweb.com

CONNECTION SCHEME:



Figure 1a: Connection scheme for HD67459-E4x-xx

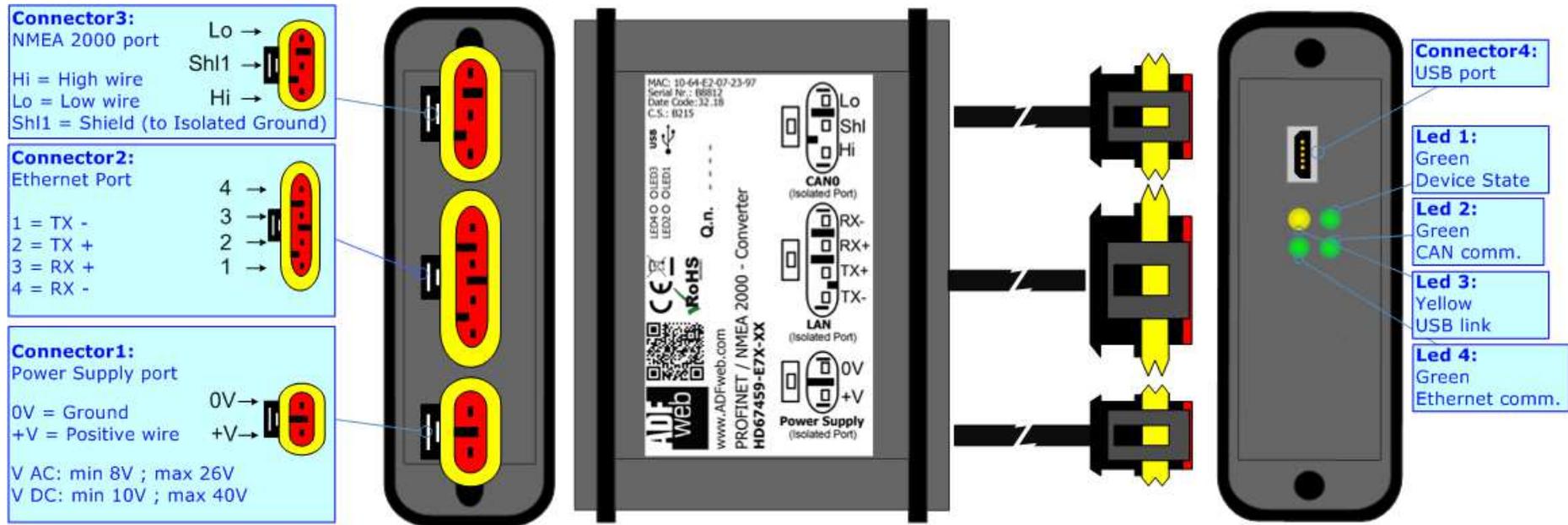


Figure 1b: Connection scheme for HD67459-E7x-xx

CHARACTERISTICS:

The “**HD67459**” series are rugged devices used to interface NMEA 2000 devices with a PROFINET 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 (IP63).

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 SW67459 software on your PC in order to perform the following:

- Define the parameter of the NMEA 2000 bus;
- Define the parameter of the PROFINET bus;
- Define a list of PGNs in reception and transmission;
- Update the Firmware and/or the Project.

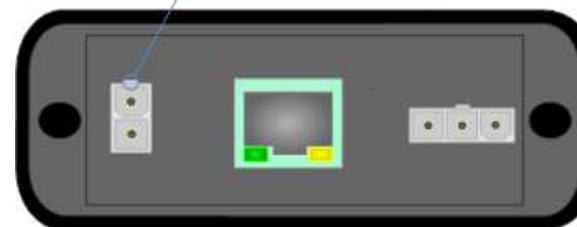
POWER SUPPLY:

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

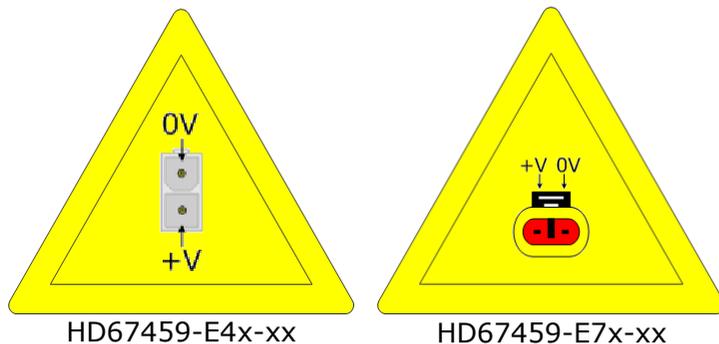
	VAC		VDC	
	Vmin	Vmax	Vmin	Vmax
HD67459-Exx-xx	8V	26V	10V	40V

Consumption at 24V DC:

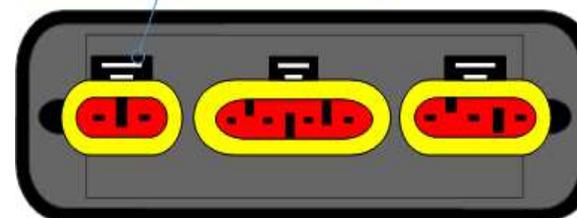
Device	W/VA
HD67459-Exx-xx	4



Caution: Not reverse the polarity power



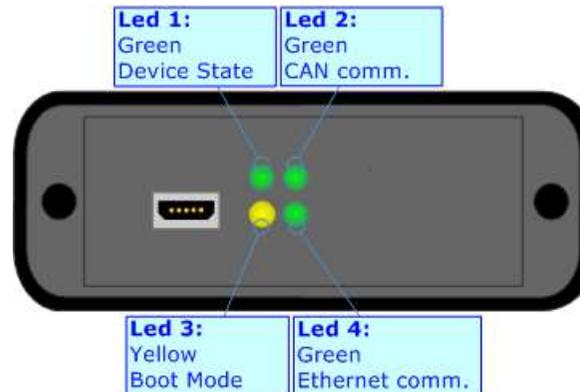
Note: It is possible to use also negative tensions. In this case the polarity must be inverted.



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: CAN Communication (green)	Blinks when NMEA 2000 frames are received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
3: Boot Mode (yellow)	OFF	ON
4: Ethernet communication (green)	Blinks when the PROFINET communication is working	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress



NMEA 2000:

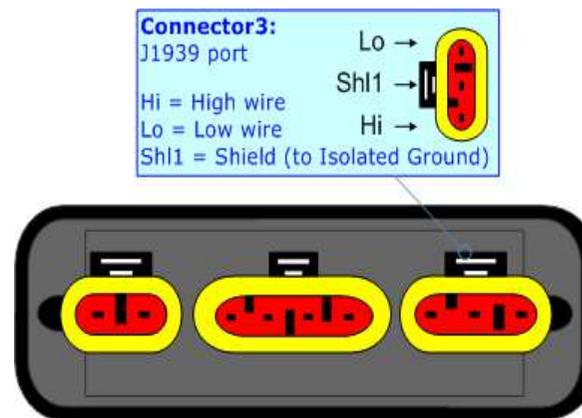
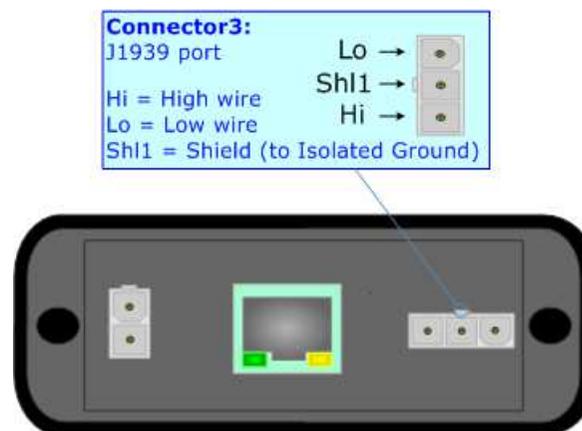
The connection of the NMEA 2000 in the HD67459-E4x-xx device must be made with a 3way MiniFit Female connector. The pinout of Male MiniFit connector of the board is at right side of the page.

The connection of the NMEA 2000 in the HD67459-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 NMEA 2000 line, with a 120Ω resistor, in the HD67459-Exx-xx is made internally of the device; when the order is performed. If the device have the NMEA 2000 terminated the code is the follow: HD67459-Exx-Yx; otherwise is this other: HD67459-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

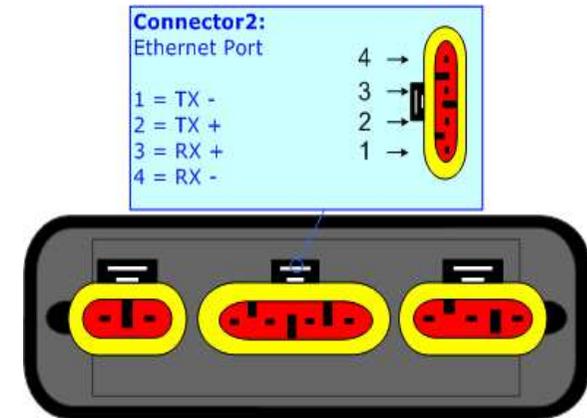


PROFINET:

The connection of PROFINET in the HD67459 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.

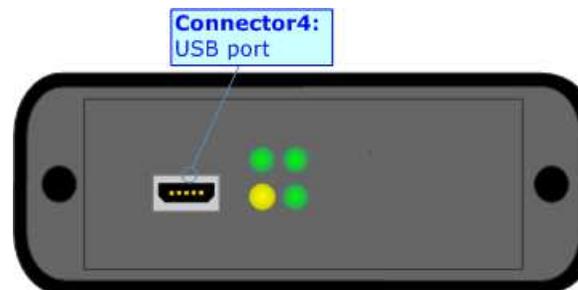
The connection of PROFINET in the HD67459-E4x-xx device must be made with RJ45 connector.

The connection of the PROFINET in the HD67459-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 SW67459:

To configure the Converter, use the available software that runs with Windows called SW67459. 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 SW67459, the window below appears (Fig. 2).



Note:

It is necessary to have installed .Net Framework 4.

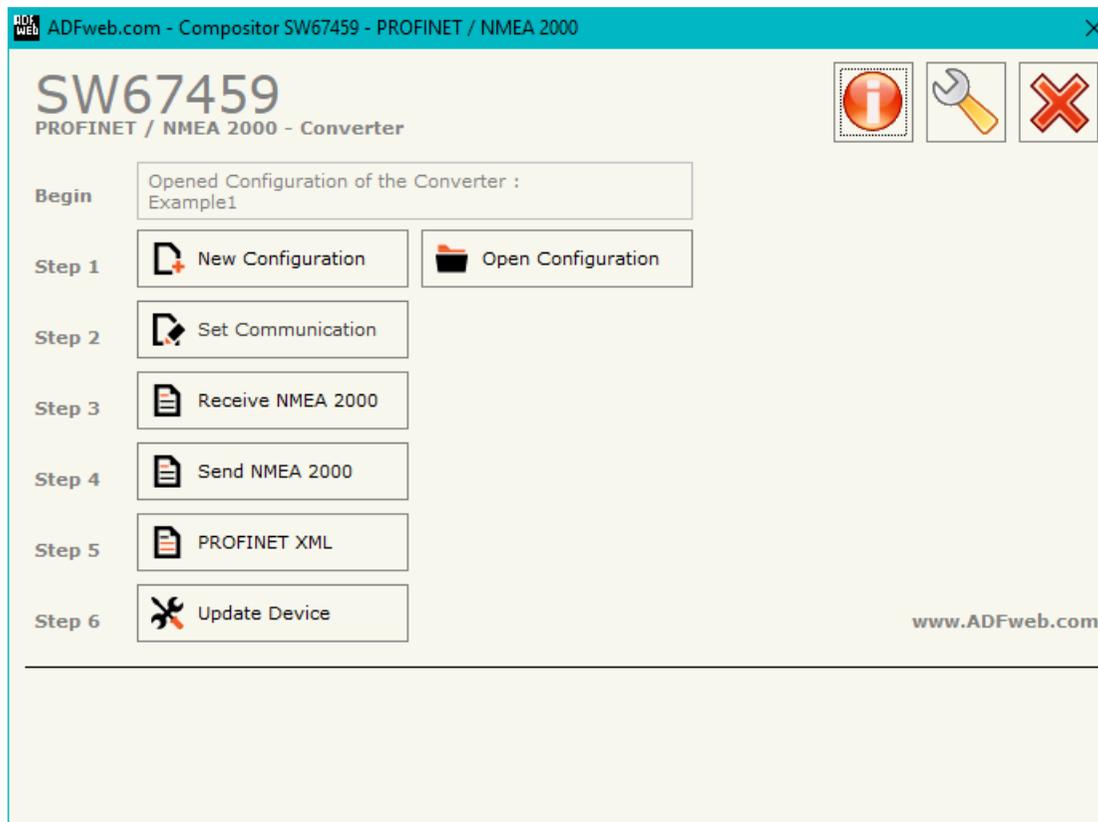
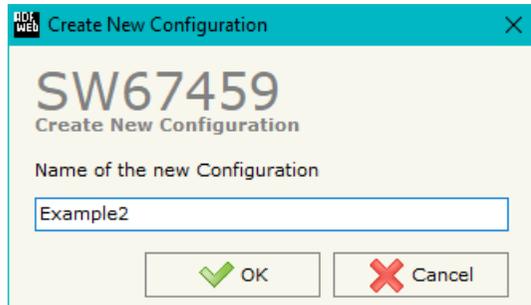


Figure 2: Main window for SW67459

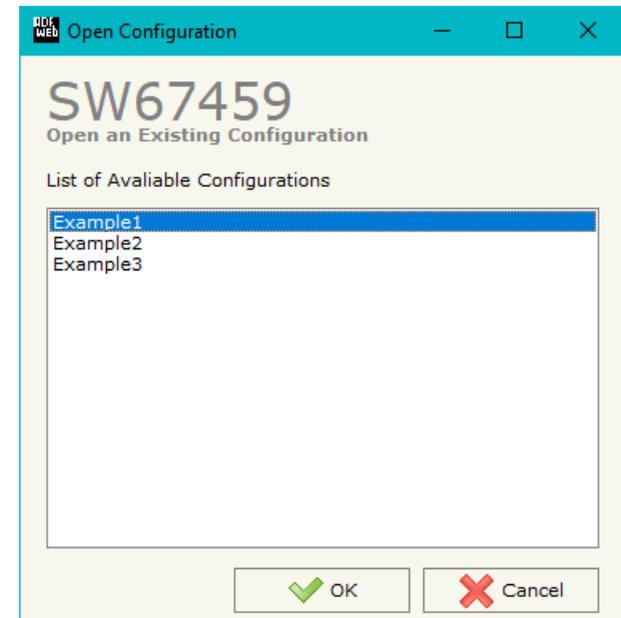
NEW CONFIGURATION / OPEN CONFIGURATION:

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



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

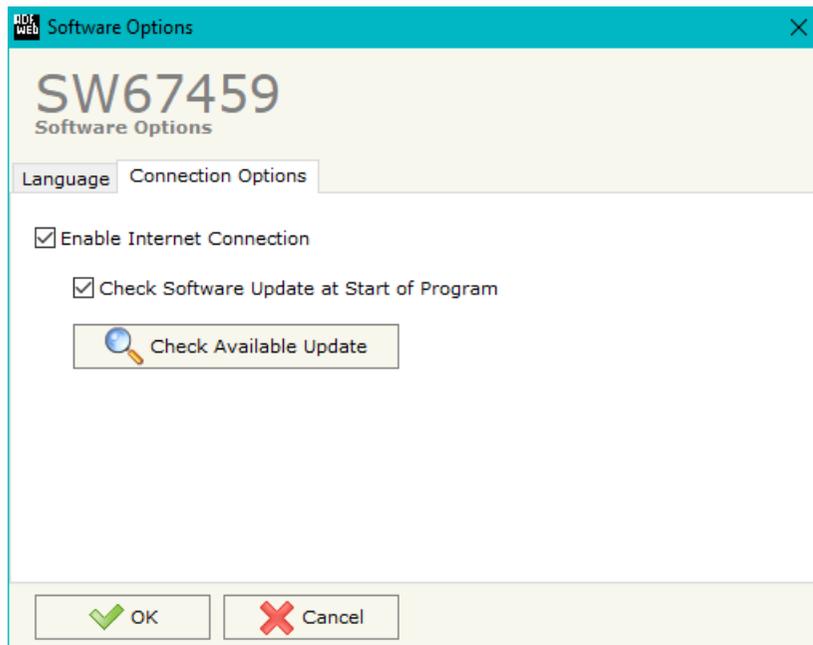
- To clone the configurations of a programmable “PROFINET / NMEA 2000 - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate 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 SW67459 checks automatically if there are updatings when it is launched.

SET COMMUNICATION:

This section define the fundamental communication parameters of two buses, PROFINET and NMEA 2000.

By Pressing the **"Set Communication"** button from the main window for SW67459 (Fig. 2) the window "Set Communication" appears (Fig. 3).

The window is divided in two sections, one for the PROFINET and the other for the NMEA 2000.

The means of the fields for "PROFINET" are:

- In the field **"IP ADDRESS"** the IP address of the PROFINET side of the converter is defined;
- In the field **"SUBNET Mask"** the SubNet Mask of the PROFINET 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 PROFINET communication is defined. The port has a fixed value of 34964;
- In the field **"PROFINET Name of Station"** the name to the PROFINET side of the converter is defined;

The means of the fields for the "NMEA 2000" section are:

- In the field **"Baud Rate"** the baud rate of the NMEA 2000 is defined;
- In the field **"Time Out Data (s)"** the timeout of the data is defined. If this time is elapsed, the value of the data of the NMEA 2000 frame become "0xFF" (if the "Cancel Data" field is checked in the "Receive NMEA 2000" section);
- If the field **"Enable Peer to Peer"** is checked, the gateway accepts all the ID that have the PGN inserted in the "Receive Frames" section.

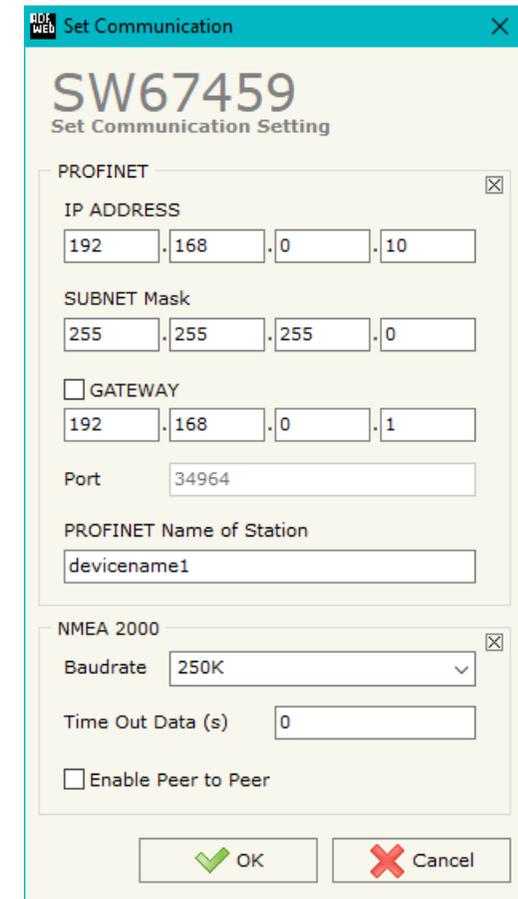


Figure 3: "Set Communication" window

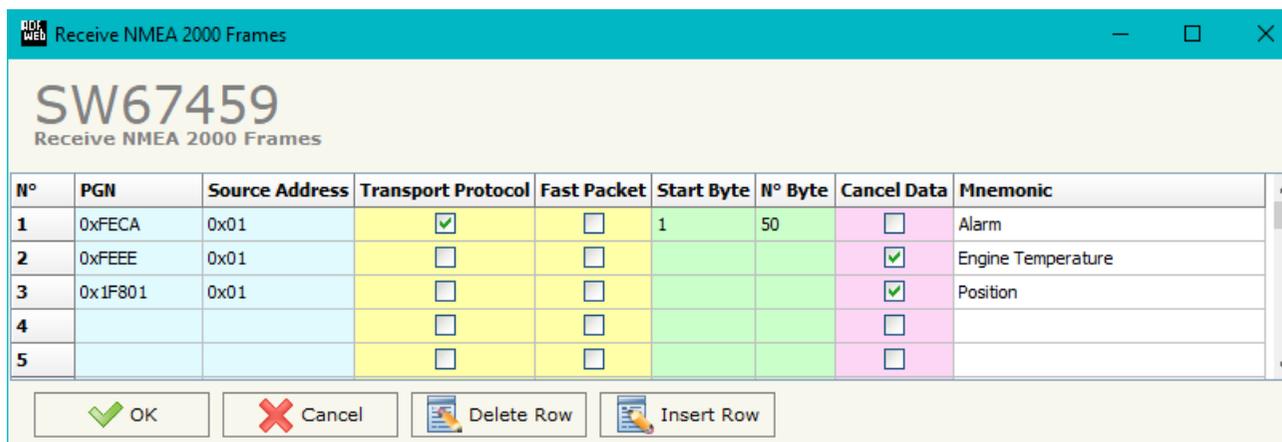


Note:

The number of Input byte and Output byte of PROFINET is calculated automatically by the Compositor in relation of the NMEA 2000 frames defined.

RECEIVE NMEA 2000:

By pressing the **Receive NMEA 2000** button from the main window for SW67459 (Fig. 2) the window "Receive NMEA 2000 Frames" appears (Fig. 4). The NMEA 2000 frames inserted in this table will be mapped in the Output data of PROFINET. These frames are received by the gateway.



N°	PGN	Source Address	Transport Protocol	Fast Packet	Start Byte	N° Byte	Cancel Data	Mnemonic
1	0xFECA	0x01	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	50	<input type="checkbox"/>	Alarm
2	0xFEFE	0x01	<input type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	Engine Temperature
3	0x1F801	0x01	<input type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	Position
4			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	
5			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	

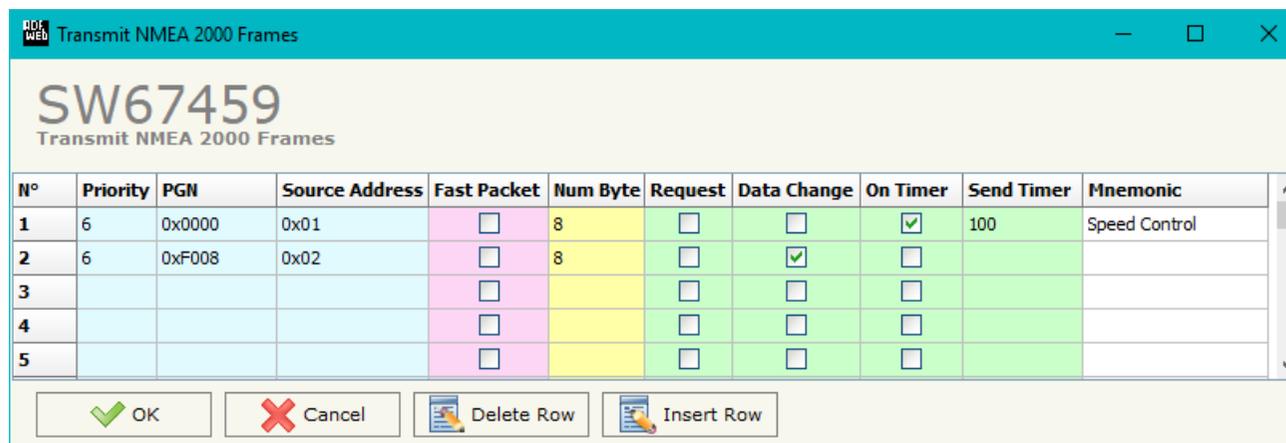
Figure 4: "Receive NMEA 2000 Frames" window

The means of the fields of the table are:

- In the field **PGN** the PGN of the NMEA 2000 message to receive is defined (in the NMEA 2000 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;
- If the field **Fast Packet** is checked, the frame will use the Fast Packet functions;
- In the field **Start Byte** the starting byte to save on Modbus side is defined;
- 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 and the "Modbus Register" in the section "Set Communication" is different from '0', 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.

SEND NMEA 2000:

By pressing the “**Send Frames**” button from the main window for SW67459 (Fig. 2) the “Send NMEA 2000 frames” window appears (Fig. 5). The NMEA 2000 frames inserted in this table contains the Input data of PROFINET. These frames are sent by the gateway.



N°	Priority	PGN	Source Address	Fast Packet	Num Byte	Request	Data Change	On Timer	Send Timer	Mnemonic
1	6	0x0000	0x01	<input type="checkbox"/>	8	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	100	Speed Control
2	6	0xF008	0x02	<input type="checkbox"/>	8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3				<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4				<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5				<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Figure 5: “Send NMEA 2000 Frames” window

The data of the columns have the following meanings:

- In the field “**Priority**” the priority of the NMEA 2000 message is defined. It is a number among 0,1,2,3,4,5,6,7. The number “0” is the highest priority and “7” is the lowest;
- In the field “**PGN**” the PGN of NMEA 2000 message is defined (it is an identifier);
- In the field “**Source Address**” the source address to use to send the frame is defined;
- If the field “**Fast Packet**” is checked, the frame will use the Fast Packet functions;
- In the field “**Num Bytes**” the number of byte of the frame is defined;
- If the field “**Request**” is checked, the NMEA 2000 message is sent when a NMEA 2000 request is received;
- If the field “**Data Change**” is checked, the NMEA 2000 frame is sent when the data from MQTT change;
- If the field “**On Timer**” is checked, the NMEA 2000 message is sent cyclically with the delay defined in the field “**Send Timer**”;
- In the field “**Mnemonic**” a brief description is defined.

UPDATE DEVICE:

By pressing the **Update Device** button it is possible to load the created Configuration into the device; and also the Firmware, if is 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;
- Insert the IP **"192.168.2.205"**;
- Turn ON the device;
- 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 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.

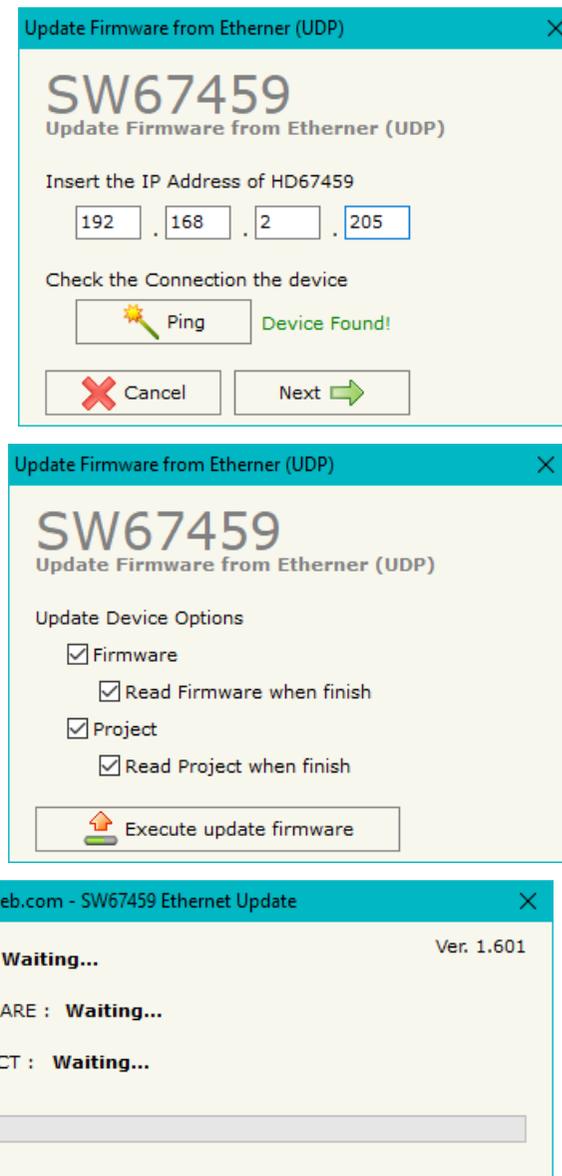


Figure 6: "Update device" windows



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 HD67459.



Note:

When you receive the device, for the first time, you have to update also the Firmware in the HD67459 device.



Warning:

If the Fig. 7 appears when you try to do the Update before require assistance try these points:

- 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 or 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 or 10 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

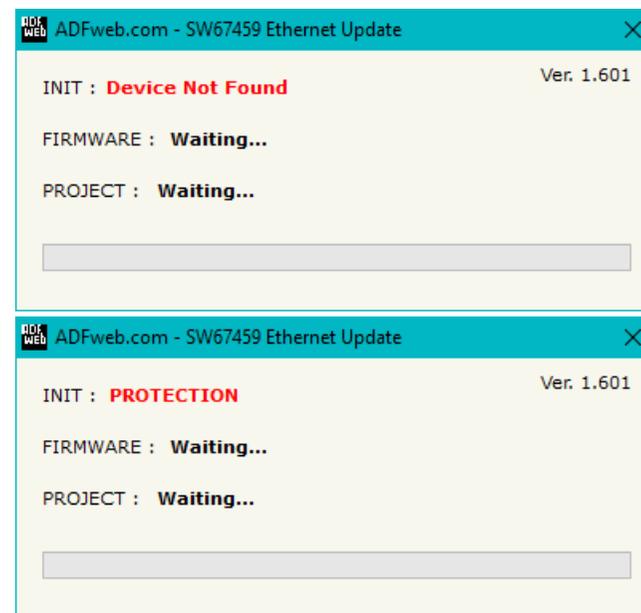


Figure 7: "Protection" error



In the case of HD67459 you have to use the software "SW67459": www.adfweb.com/download/filefold/SW67459.zip.

PLC CONFIGURATION:

The configuration and commissioning of the PROFINET Converter as described on the following pages was accomplished with the help of the TIA Portal V12-software by Siemens. In the case of using a control system from another supplier, refer to attend to the associated documentation.

These are the steps to follow:

the

1) Install the description file of module.

File	Version	Language	Status	Info
GSDML-V2.25-ADFweb-HD67604-20121221.xml	V2.25	English	Not yet installed	ADFweb Gateways

2) Import the module in the network; connect the device to the PLC network and edit the parameters of IP, station name etc.

The screenshot shows the Siemens TIA Portal interface. The main workspace displays a network diagram with the following components:

- PLC_1 CPU 1212C
- SERIAL CAN PLC_1
- DP-NORM
- IO system: PLC_1.PROFINET IO-System (100)

The 'Network overview' table below the diagram is as follows:

Device	Type	Address in subnet	Subnet	Master system	Comment
SIMATIC 1200 station_1	SIMATIC 1200 station				
PLC_1	CPU 1212C AC/DC/Rly				
GSD device_1	GSD device				
SERIAL	CAN				

The 'Properties' dialog for 'IE1' is open, showing the 'General' tab. The 'Use IP protocol' checkbox is checked. The 'Set IP address in the project' radio button is selected. The IP address is set to 192.168.2.189 and the subnet mask is 255.255.255.0. The 'Use IP router' checkbox is unchecked, and the router address is 0.0.0.0. The 'Set IP address using a different method' radio button is unselected.

3) Load the configuration into the PLC.

Extended download to device

Configured access nodes of "PLC_1"

Device	Device type	Type	Address	Subnet
PLC_1	CPU 1212C ACID...	PN/IE	192.168.2.50	PN/IE_1
CM 1243-5	CM 1243-5	PROFIBUS	2	

Type of the PG/PC interface:

PG/PC interface:

Connection to subnet:

1st gateway:

Accessible devices in target subnet: Show all accessible devices

Device	Device type	Type	Address	Target device
PLC_1	CPU 1212C ACID...	PN/IE	192.168.2.50	PLC_1
--	--	PN/IE	Access address	--

Flash LED

Refresh

Online status information:

- Connected to address 192.168.2.50
- Scanning ended.

Load Cancel

Load preview

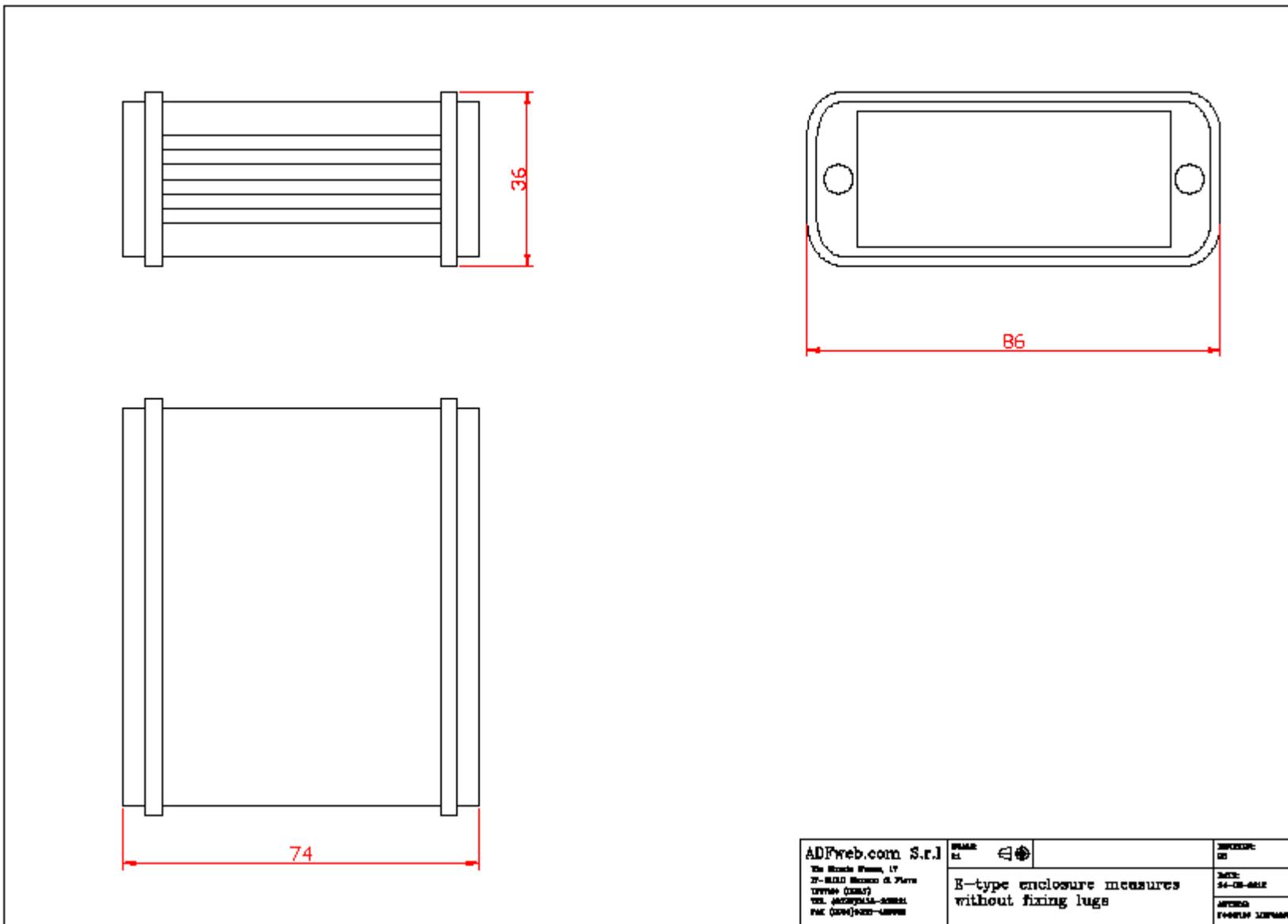
Check before loading

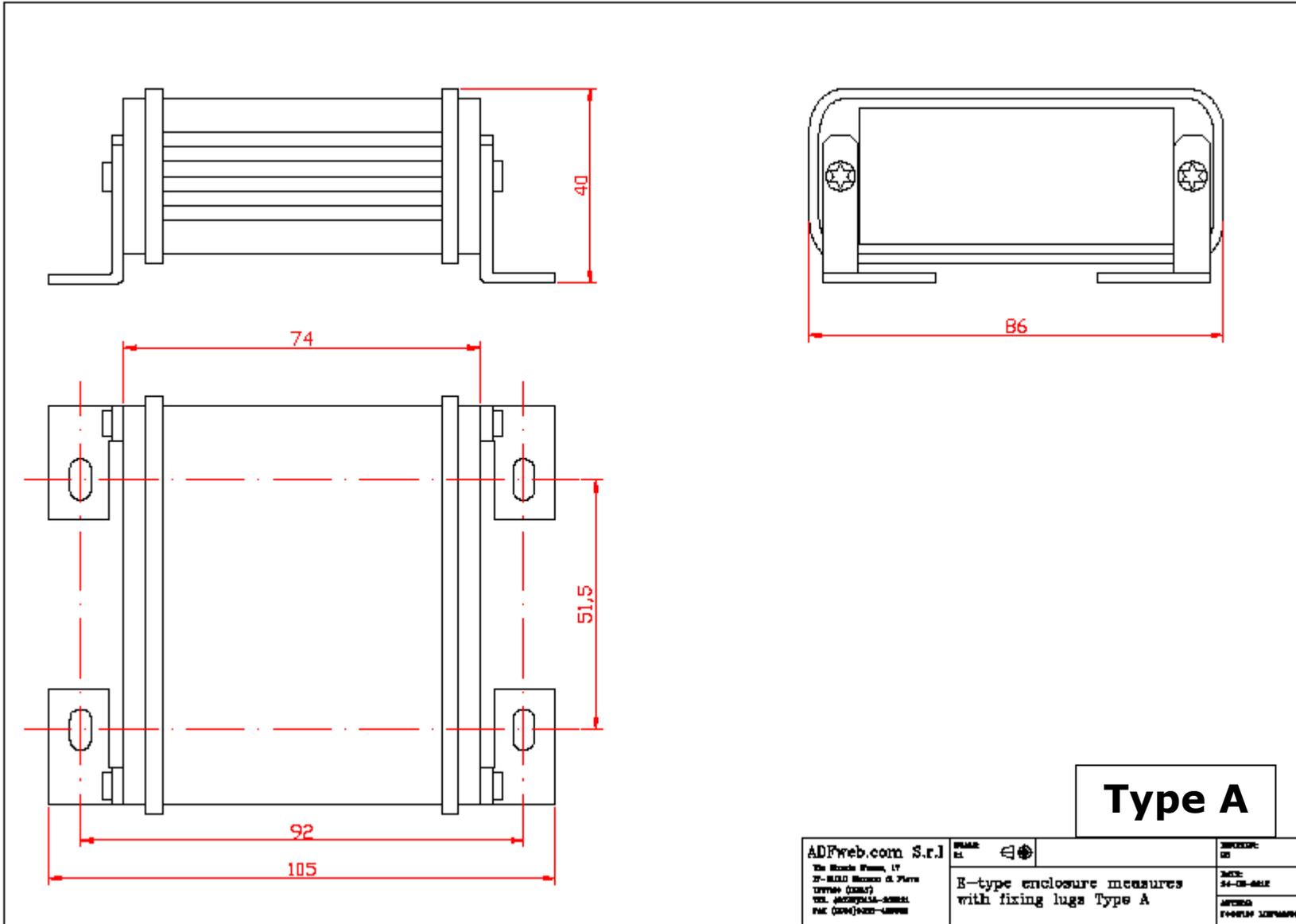
Status	!	Target	Message	Action
↓	✓	PLC_1	Ready for loading.	
	✓	▶ Stop modules	All modules will be stopped for downloading to device.	Stop all
	✓	▶ Device configurati...	Delete and replace system data in target	Download to device
	✓	▶ Software	Download software to device	Consistent download
	✓	▶ Additional inform...	There are differences between the settings for the project and the se	<input checked="" type="checkbox"/> Overwrite all

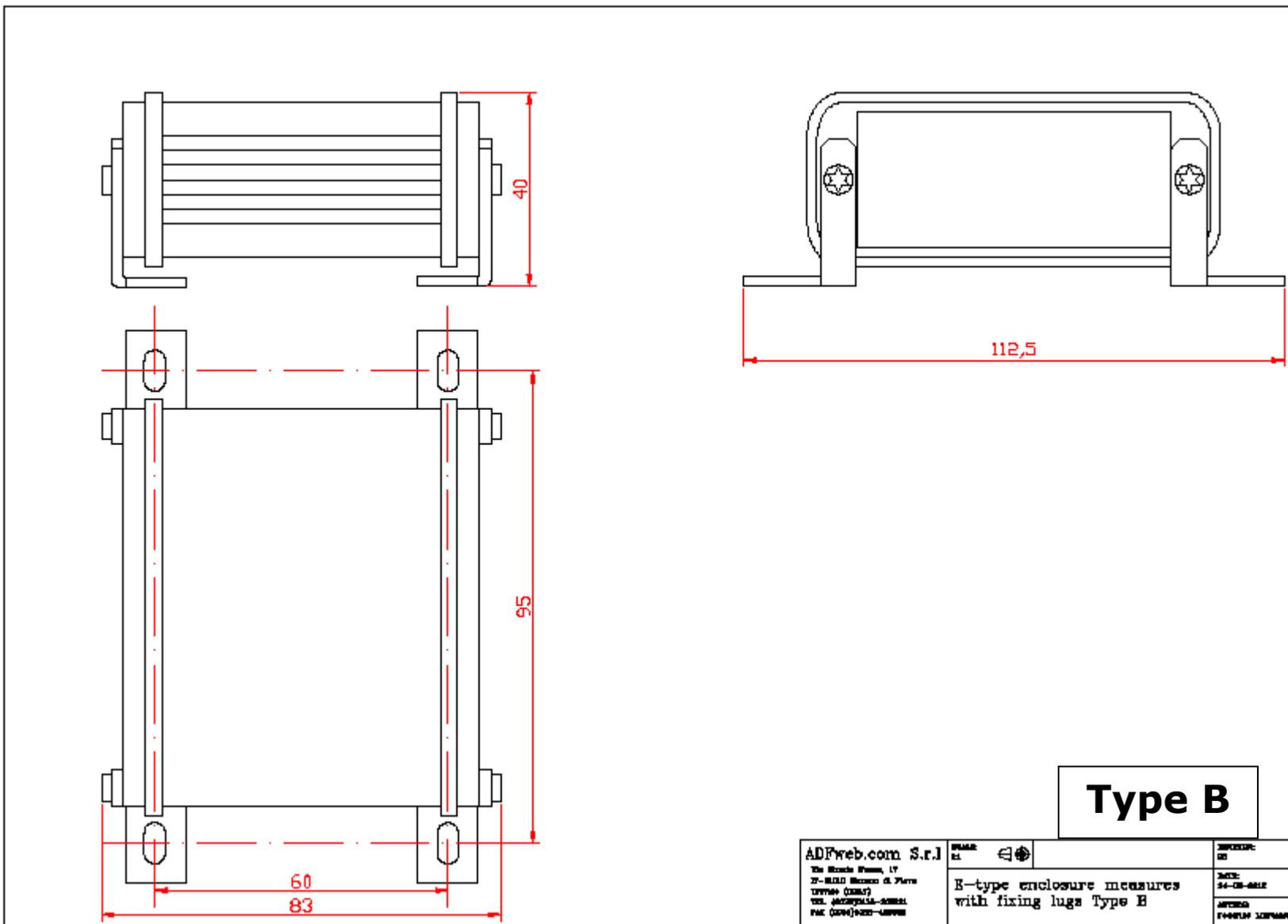
Refresh

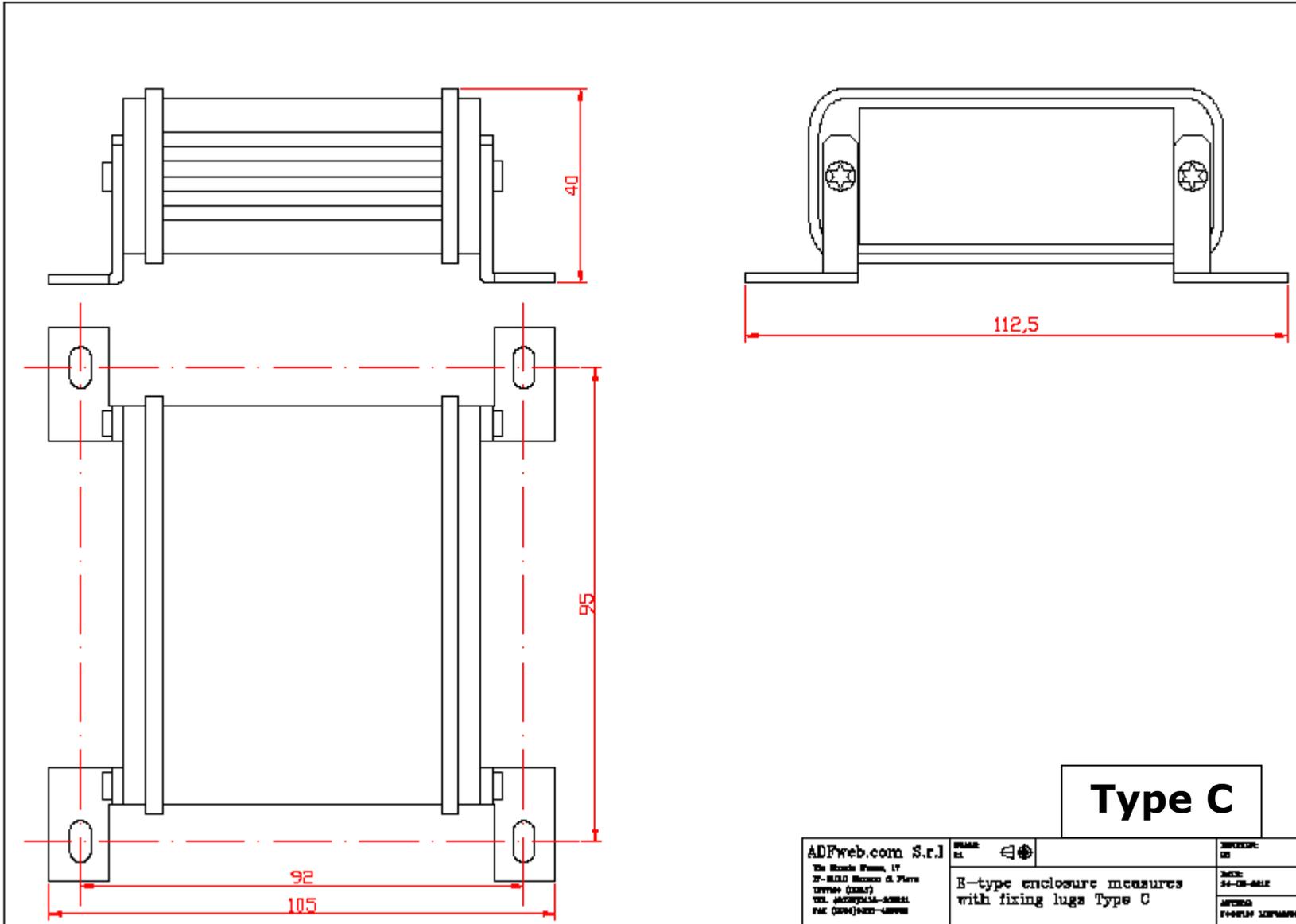
Finish Load Cancel

MECHANICAL DIMENSIONS:





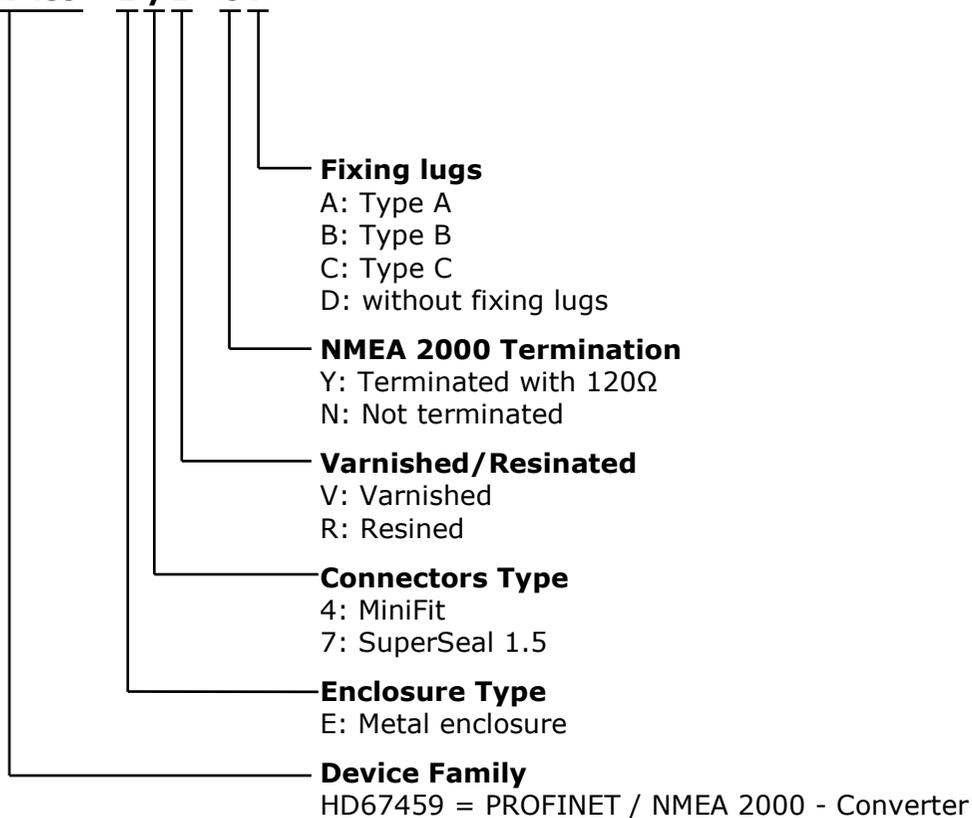




ORDERING INFORMATIONS:

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

HD67459 - E y z - s 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: **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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