Industrial Electronic Devices

User Manual

Revision 1.000
English

NMEA 2000 / PROFIBUS - Converter

(Order Code: HD67457)

For Website information:
www.adfweb.com?Product=HD67457

For Price information:
www.adfweb.com?Price=HD67457

Benefits and Main Features:

 ✦ Very easy to configure

 ✦ Triple Electrical isolation

 ✦ Temperature range: -40°C/105°C (-40°F/221°F)

User Manual

For others Gateways / Bridges:

CANopen 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)

For others Gateways / Bridges:
For **CAN bus 2.0A** and/or **CAN bus 2.0B** to **Modbus**

See also the following links:
www.adfweb.com?Product=HD67011 (Modbus RTU Slave)
www.adfweb.com?Product=HD67012 (Modbus RTU Master)
www.adfweb.com?Product=HD67514 (Modbus TCP Slave)
www.adfweb.com?Product=HD67515 (Modbus TCP Master)

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

Industrial Electronic Devices

INDEX:

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	18/04/2016	Ff	All	First release version

WARNING:

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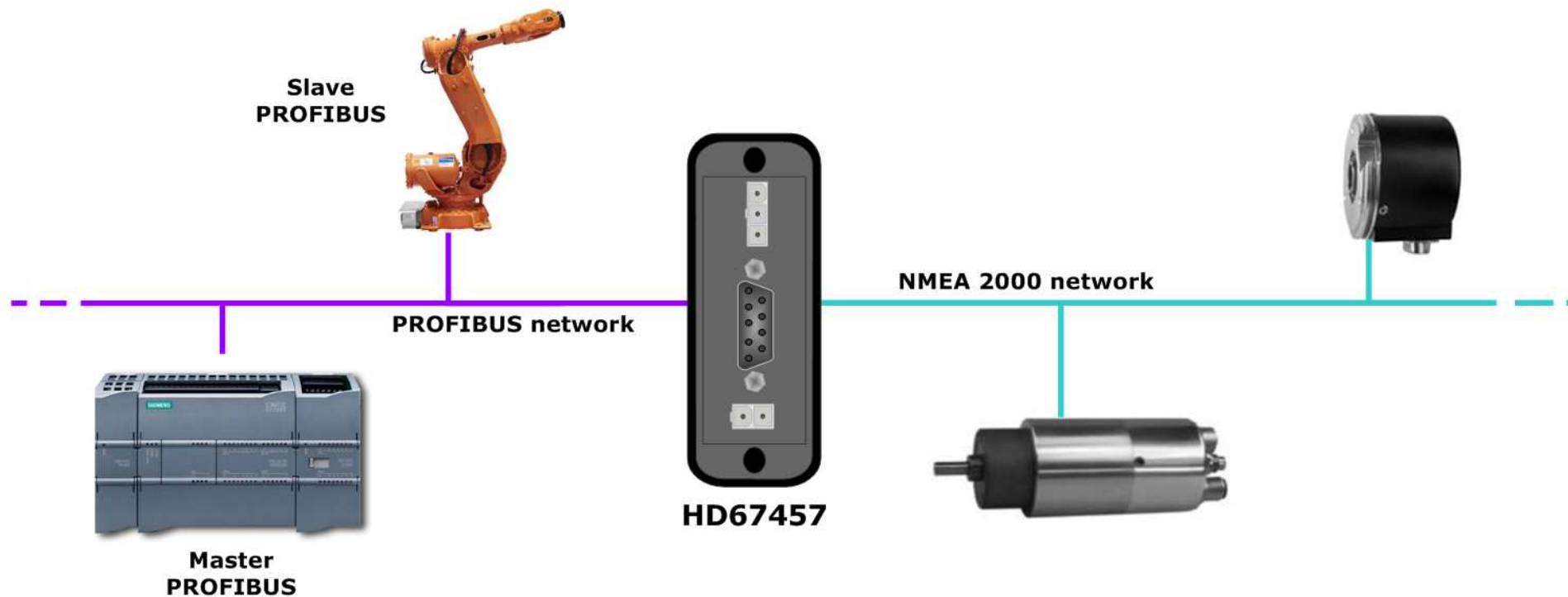
This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

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.
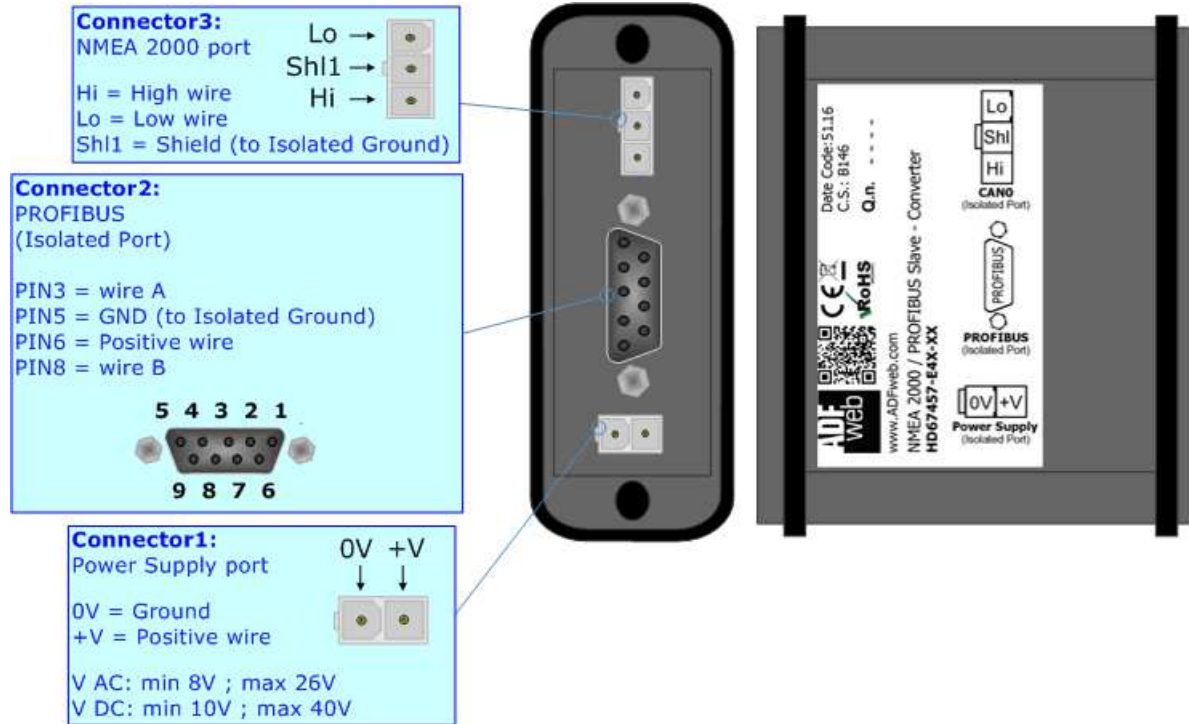
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EXAMPLE OF CONNECTION:

Slave PROFIBUS

PROFIBUS network

NMEA 2000 network

HD67457

Master PROFIBUS

CONNECTION SCHEME:

Figure 1a: Connection scheme for HD67457-E4x-xx

Connector3:
NMEA 2000 port

Lo →
Shl →
Hi →

Hi = High wire
Lo = Low wire
Shl1 = Shield (to Isolated Ground)

Connector2:
PROFIBUS
(Isolated Port)

PIN3 = wire A
PIN5 = GND (to Isolated Ground)
PIN6 = Positive wire
PIN8 = wire B

5 4 3 2 1

9 8 7 6

Connector1:
Power Supply port

0V →
+V →

0V = Ground
+V = Positive wire

V AC: min 8V ; max 26V
V DC: min 10V ; max 40V
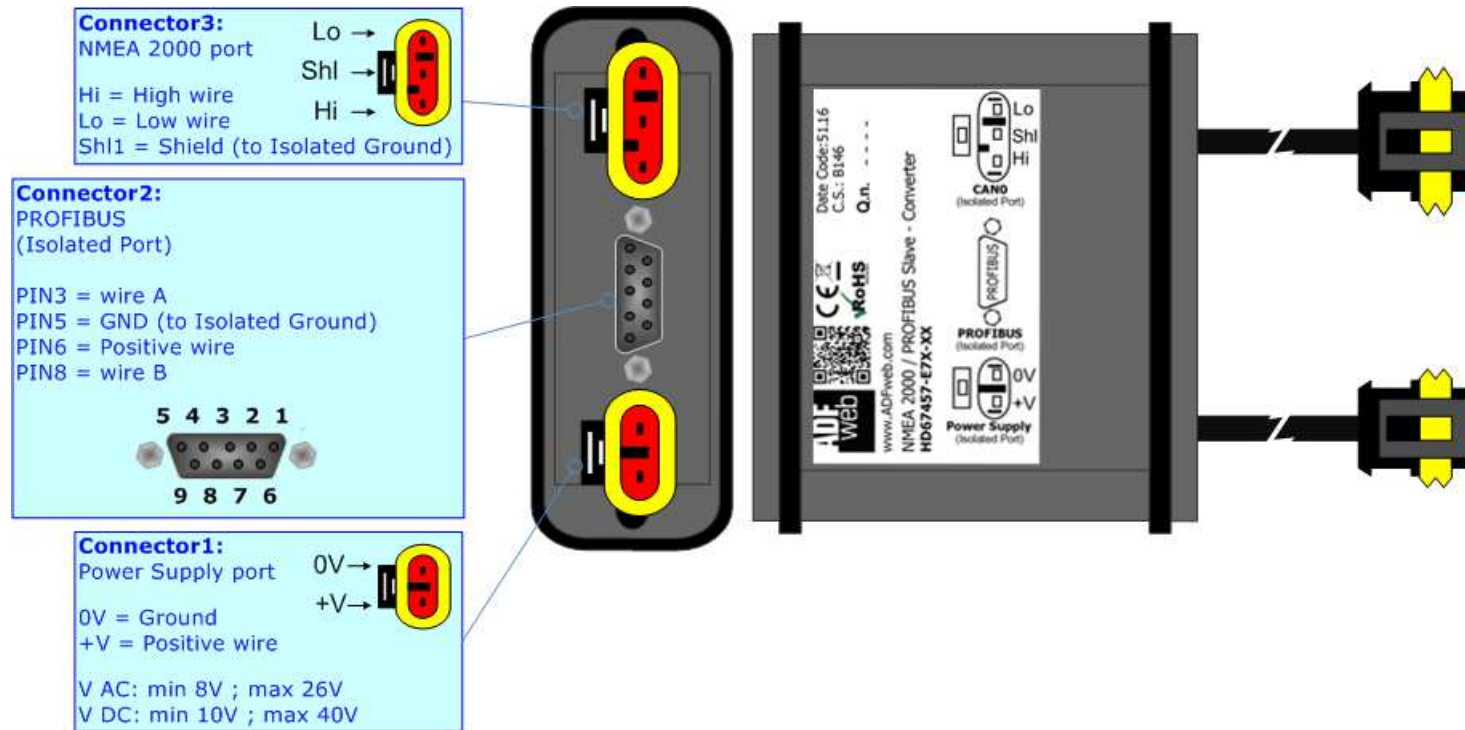
Figure 1b: Connection scheme for HD67457-E7x-xx

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CHARACTERISTICS:

The "HD67457" series are rugged devices used to interface NMEA 2000 devices with PROFIBUS 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.

The Configurable NMEA 2000 / PROFIBUS - Converter allows the following characteristics:

- Triple 4kV isolation between Power Supply / PROFIBUS / NMEA 2000;
- 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 SW67457 software on your PC in order to perform the following:

- Define the parameter of the NMEA 2000;
- Define the parameter of the PROFIBUS;
- Receive NMEA 2000 frames;
- Transmit NMEA 2000 frames;
- Create a GSD File;
- Update the device.

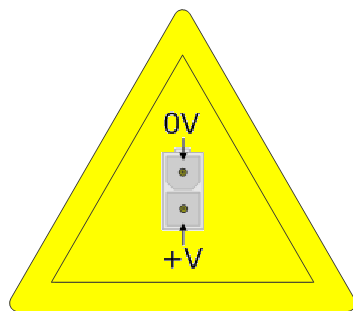Industrial Electronic Devices

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**
HD67457-Exx-xx	**8V**	**26V**	**10V**	**40V**

Consumption at 24V DC:

Device	W/VA
HD67457-Exx-xx	4

⚠️ **Caution: Not reverse the polarity power**
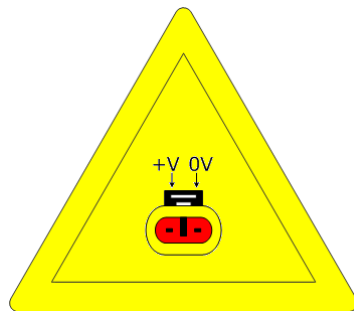
HD67457-E4x-xx   HD67457-E7x-xx

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

Connector1:
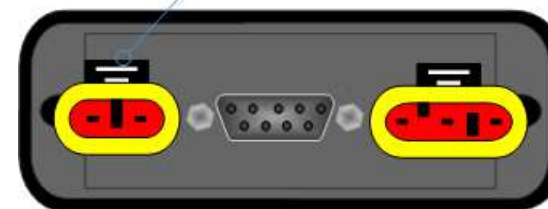Power Supply port

0V = Ground
+V = Positive wire

V AC: min 8V ; max 26V
V DC: min 10V ; max 40V

←0V
←+V

Connector1:
Power Supply port

0V = Ground
+V = Positive wire

V AC: min 8V ; max 26V
V DC: min 10V ; max 40V
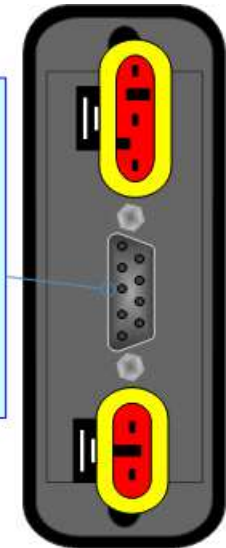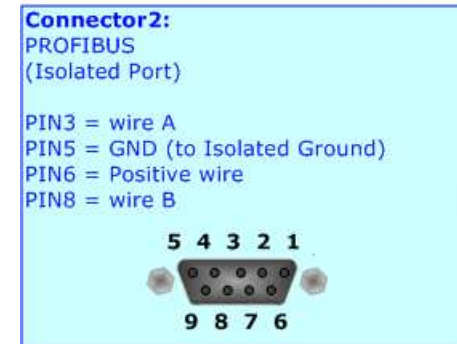
+V 0V

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PROFIBUS:

The PROFIBUS uses a 9-pin D-SUB connector. The pin assignment is defined like in the right figure.

Here some codes of cables:

- Belden: p/n 183079A - Continuous Armor DataBus® ISA/SP-50 PROFIBUS Cable;

Connector2:
PROFIBUS
(Isolated Port)

PIN3 = wire A
PIN5 = GND (to Isolated Ground)
PIN6 = Positive wire
PIN8 = wire B

5 4 3 2 1
9 8 7 6

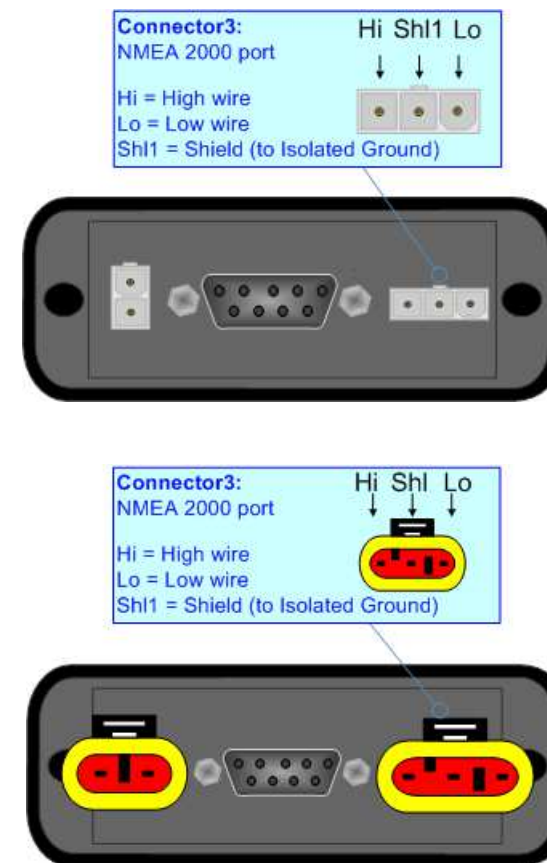Industrial Electronic Devices

NMEA 2000:

The connection of NMEA 2000 in the HD67457-E4x-xx device must be made with a 3way MiniFit Female connector. The pinout of Male Mini-Fit connector of the board is at right side of the page.

The connection of NMEA 2000 in the HD67457-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 HD67457-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: HD67457-Exx-Yx; otherwise is this other: HD67457-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

Connector3:
NMEA 2000 port   Hi Shl1 Lo

Hi = High wire
Lo = Low wire
Shl1 = Shield (to Isolated Ground)

Connector3:
NMEA 2000 port   Hi Shl Lo

Hi = High wire
Lo = Low wire
Shl1 = Shield (to Isolated Ground)

Industrial Electronic Devices

USE OF COMPOSITOR SW67457:

To configure the Converter, use the available software that runs with Windows called SW67457. 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).
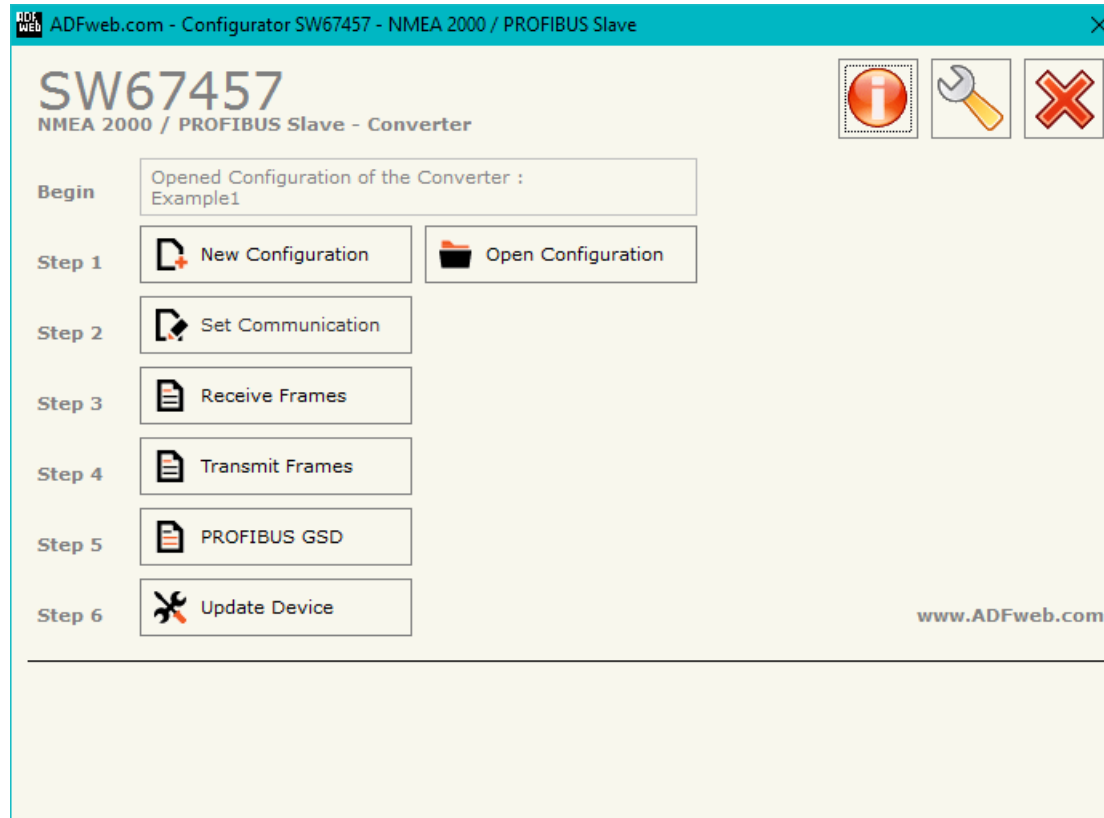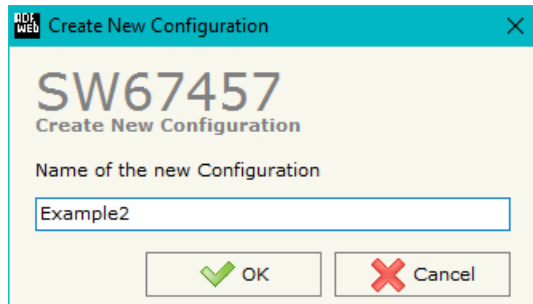
When launching the SW67457, the window below appears (Fig. 2).


Figure 2: Main window for SW67457

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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 "NMEA 2000 / PROFIBUS - 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**".
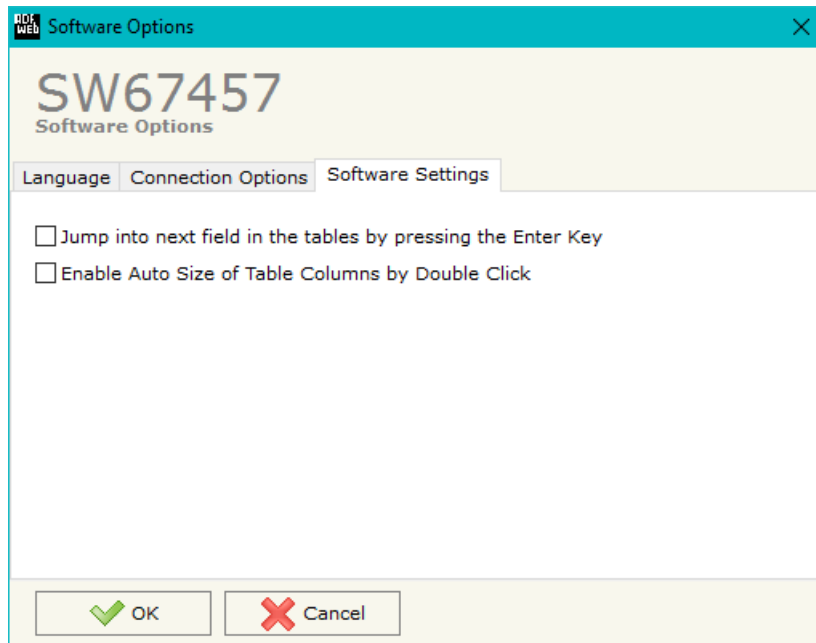
Industrial Electronic Devices
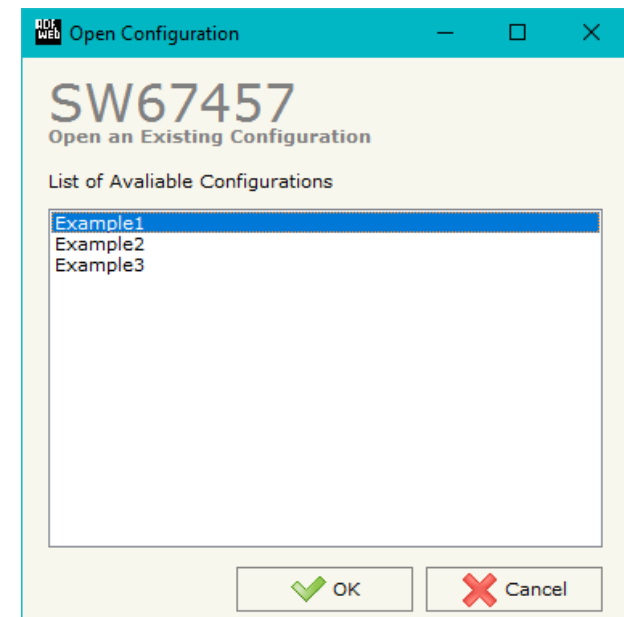
SOFTWARE OPTIONS:

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.
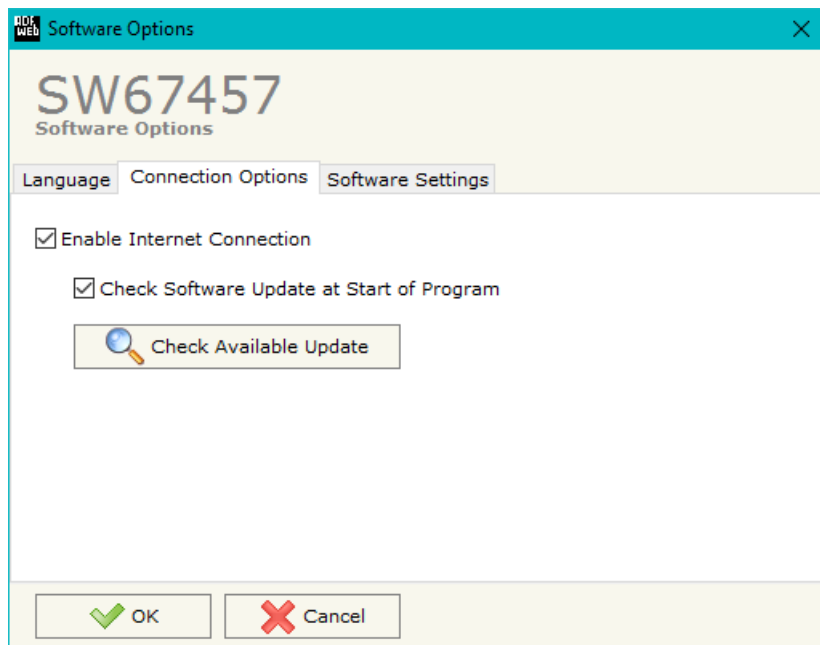
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67457 checks automatically if there are updatings when it is launched.

Software Options

SW67457

Software Options

Language | Connection Options | **Software Settings**

☐ Jump into next field in the tables by pressing the Enter Key

☐ Enable Auto Size of Table Columns by Double Click

✔ OK   ✘ Cancel

In the section "Software Settings", it is possible to enable/disable some keyboard's commands for an easier navigation inside the tables contained in the different sections of the software.

SET COMMUNICATION:

This section defines the fundamental communication parameter of two Buses, NMEA 2000 and PROFIBUS.

By Pressing the "**Set Communication**" button from the main window for SW67457 (Fig. 2) the window "Set Communication" appears (Fig. 3).

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

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

- In the field "**Baud Rate**" the data rate of the NMEA 2000 bus is defined;
- In the field "**TimeOut Data (s)**" a time is defined; when this time is elapsed and the data isn't reliable, on PROFIBUS side the data will be set to 0xFF;
- 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;
- In the field "**ID Device**" the ID of the NMEA 2000 side is defined.

The means of the fields for "PROFIBUS Slave" are:

- In the field "**ID Device**" the address for the PROFIBUS side is defined;
- In the field "Baudrate" the data rate of the PROFIBUS side is defined (fixed to 'Auto Baudrate');
- If the field "**Module for each NMEA 2000 Frame**" is checked, when the "GSD File" is created, every NMEA 2000 frame will be inserted in a different Module, otherwise, if this field is not checked, a Module will contain up to 64 byte.
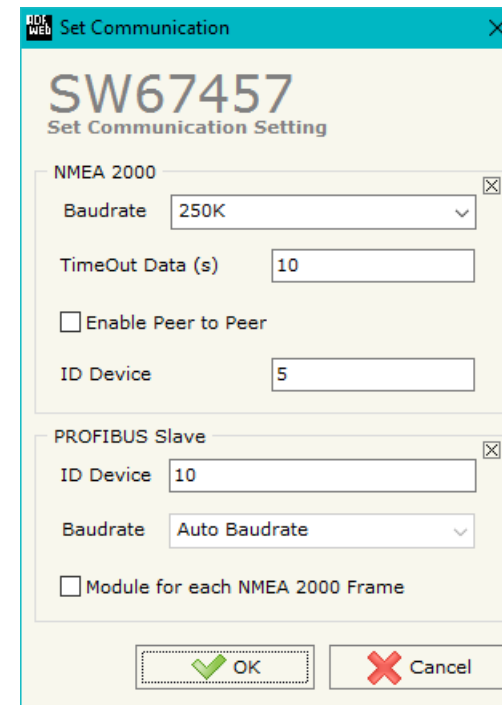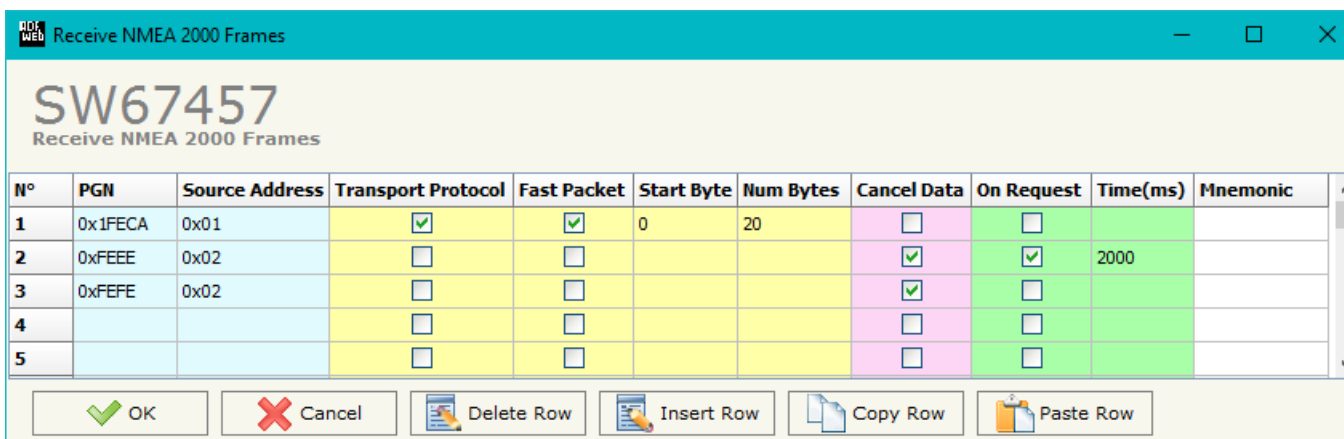
Figure 3: "Set Communication" window

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RECEIVE FRAMES:

By pressing the "**Receive Frames**" button from the main window for SW67457 (Fig. 2) the "Receive NMEA 2000 Frames" window appears (Fig. 4). The NMEA 2000 frames inserted in this table contains the Output data of PROFIBUS. These frames are accepted by the gateway.

N°	PGN	Source Address	Transport Protocol	Fast Packet	Start Byte	Num Bytes	Cancel Data	On Request	Time(ms)	Mnemonic
1	0x1FECA	0x01	☑	☑	0	20	☐	☐		
2	0xFEEE	0x02	☐	☐			☑	☑	2000	
3	0xFEFE	0x02	☐	☐			☑	☐		
4			☐	☐			☐	☐		
5			☐	☐			☐	☐		

Figure 4: "Receive NMEA 2000 Frames" window

The data of the columns have the following meanings:

- In the field "**PGN**" the PGN of the data to be read from PROFIBUS is defined (it is a message 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 uses Transport Protocol functions;
- If the field "**Fast Packet**" is checked, the frame uses Fast Packet functions;
- In the field "**Start Byte**" the starting byte to start to save is defined. This field is valid only when the field "Transport Protocol" is checked;
- In the field "**Num Byte**" the number of consecutive bytes starting from "Start Byte" is defined;
- If the field "**Cancel Data**" is checked, the data in the frame will be erased after the expiration of the "**TimeOut Data (s)**" defined in "Set Communication" section;
- If the field "**On Request**" is checked, the converter sends the request for the PGN. This feature is used for PGNs transmitted on request;
- In the field "**Time(ms)**" the delay between two requests is defined;
- In the field "**Mnemonic**" a brief description is defined.

Industrial Electronic Devices

TRANSMIT FRAMES:

By pressing the "**Transmit Frames**" button from the main window for SW67457 (Fig. 2) the "Transmit NMEA 2000 frames" window appears (Fig. 5).

The NMEA 2000 frames inserted in this table contains the Input data of PROFIBUS. These frames are sent by the gateway.

Figure 5: "Send NMEA 2000 Frames" window

The data of the columns have the following meanings:

- In the field "**Priority**" the priority of the frame is defined. Number "0" is the highest priority and "7" is the lowest;
- In the field "**PGN**" the PGN of the data to be written from PROFIBUS is defined (it is a message identifier);
- In the field "**Source Address**" the address of the device that sends the frame is defined;
- If the field "**On Request**" is checked, the PGN is transmitted when a NMEA 2000 request for this PGN is received;
- If the field "**Data Change**" is checked, the PGN is transmitted when the data from PROFIBUS changes;
- If the field "**On Timer**" is checked, the PGN is transmitted cyclically;
- In the field "**Time(ms)**" the delay used for the "On Timer" mode is defined;
- In the field "**Mnemonic**" a brief description is defined.

Industrial Electronic Devices

GSD FILE:

By pressing the "**GSD File**" button from the main window for SW67457 (Fig. 2), it is possible to save the GSD file for the PROFIBUS side.

Note:
    When you import the .gsd file on your Master PROFIBUS, you will have to add all the modules that are present inside it.

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.

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 NMEA 2000 port of HD67457;
- Turn ON the HD67457;
- Select the "**COM port**" and the "**Baudrate**";
- 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.

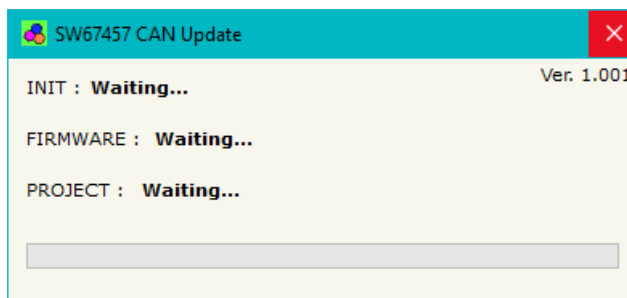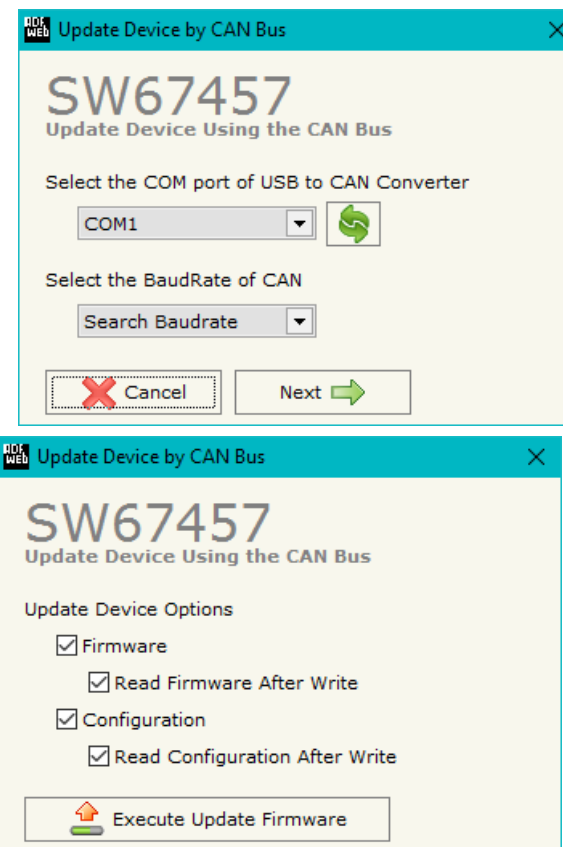At this point the configuration/firmware on the device is correctly update.

Figure 6: "Update Device" windows

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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 HD67457 device.

Note:

When you receive the device, for the first time, you have to update also the Firmware in the HD67457 device.

Warning:

If the Fig. 7 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 CAN connection is correct between the AC67400 and the converter;
- 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 rights;
- Pay attention to Firewall lock.
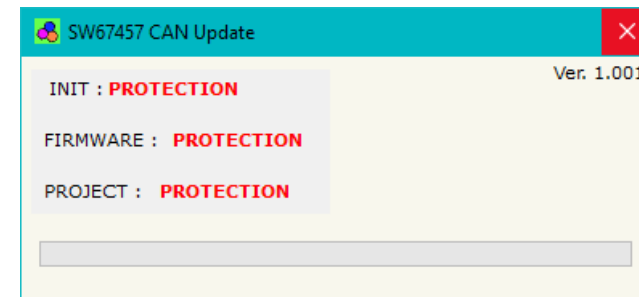
Figure 7: "Protection" window

In the case of HD67457 you have to use the software "SW67457": www.adfweb.com\download\filefold\SW67457.zip.

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MECHANICAL DIMENSIONS:

ADF web

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Type A

ADFweb.com S.r.l

E-type enclosure measures
with fixing lugs Type A

![ADFweb logo] Industrial Electronic Devices

Type B

ADFweb.com S.r.l

E-type enclosure measures
with fixing lugs Type B

![ADFweb logo]
Industrial Electronic Devices

40

112,5

95

92

105

Type C

ADFweb.com S.r.l

E-type enclosure measures
with fixing lugs Type C

ADFweb

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ORDERING INFORMATIONS:

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

HD67457 – E y z – s f

Fixing lugs
A: Type A
B: Type B
C: Type C
D: Without fixing lugs

NMEA 2000 Termination
Y: Terminated with 120Ω
N: Not terminated

Varnished/Resinated
V: Varnished
R: Resined

Connectors Type
4: MiniFit
7: SuperSeal 1.5

Enclosure Type
E: Metal enclosure

Device Family
HD67457: NMEA 2000 / PROFIBUS - Converter
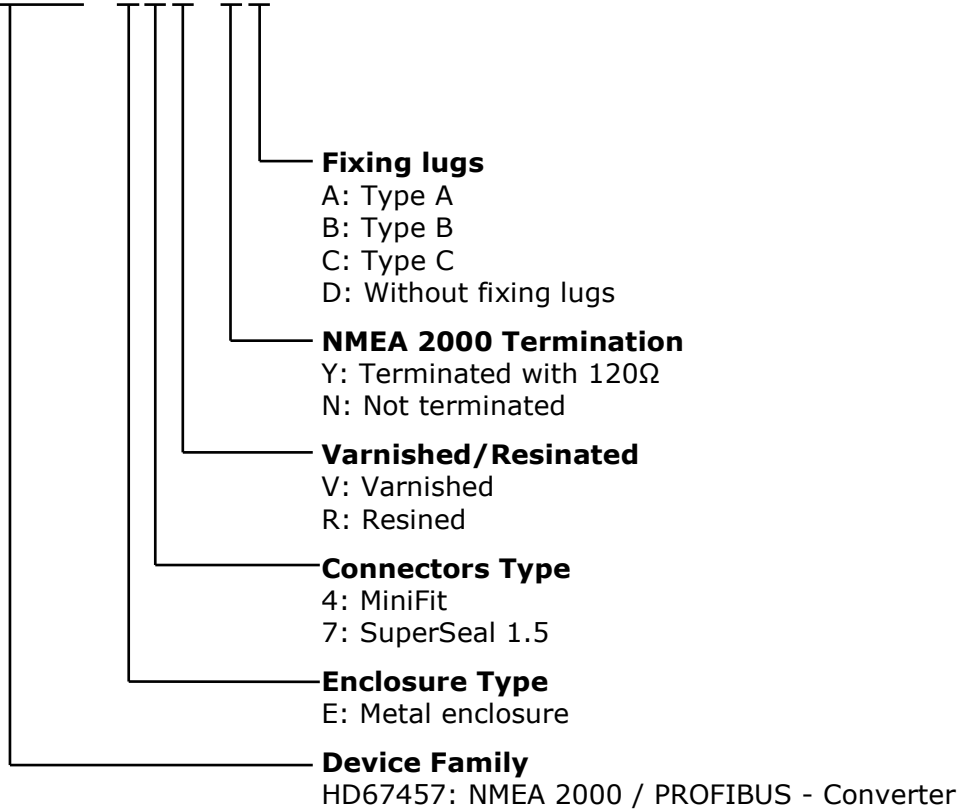
ACCESSORIES:

Order Code: **AC67400**   -   CAN interface to configure devices

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

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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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