

User Manual

Revision 1.001

English

IO-Link Slave / EtherNet/IP Master - Converter

(Order Code: HD67973-B2-IA, HD67973-B2-IB)

For Website information:

www.adfweb.com?Product=HD67973-B2

For Price information:

www.adfweb.com?Price=HD67973-B2-IA

www.adfweb.com?Price=HD67973-B2-IB

Benefits and Main Features:

- ⊕ Very easy to configure
- ⊕ Power Supply 18...35V DC and 8...24 V AC
- ⊕ Temperature range: -40°C/+85°C (-40°F/+185°F)



User Manual

For others IO-Link Slave products, see also the following links:

Converter IO-Link Slave to

www.adfweb.com?Product=HD67961
www.adfweb.com?Product=HD67962
www.adfweb.com?Product=HD67963
www.adfweb.com?Product=HD67964
www.adfweb.com?Product=HD67965
www.adfweb.com?Product=HD67966
www.adfweb.com?Product=HD67967
www.adfweb.com?Product=HD67968
www.adfweb.com?Product=HD67969
www.adfweb.com?Product=HD67970
www.adfweb.com?Product=HD67971
www.adfweb.com?Product=HD67974
www.adfweb.com?Product=HD67977
www.adfweb.com?Product=HD67978
www.adfweb.com?Product=HD67979
www.adfweb.com?Product=HD67980
www.adfweb.com?Product=HD67983
www.adfweb.com?Product=HD67984
www.adfweb.com?Product=HD67985
www.adfweb.com?Product=HD67986
www.adfweb.com?Product=HD67987

(Modbus Master)
(Modbus Slave)
(Modbus TCP Master)
(Modbus TCP Slave)
(BACnet Master)
(BACnet Slave)
(CAN)
(CANopen)
(DeviceNet Master)
(DeviceNet Slave)
(EtherCAT Slave)
(EtherNet/IP Slave)
(J1939)
(MQTT)
(NMEA0183)
(NMEA2000)
(PROFINET Master)
(PROFINET Slave)
(S7comm)
(SNMP Manager)
(SNMP Agent)

Do you have an your customer protocol?

www.adfweb.com?Product=HD67003

Do you need to choose a device? do you want help?

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	08/11/2021	Ff	All	First release version
1.001	13/03/2024	Ln	All	Revision

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:

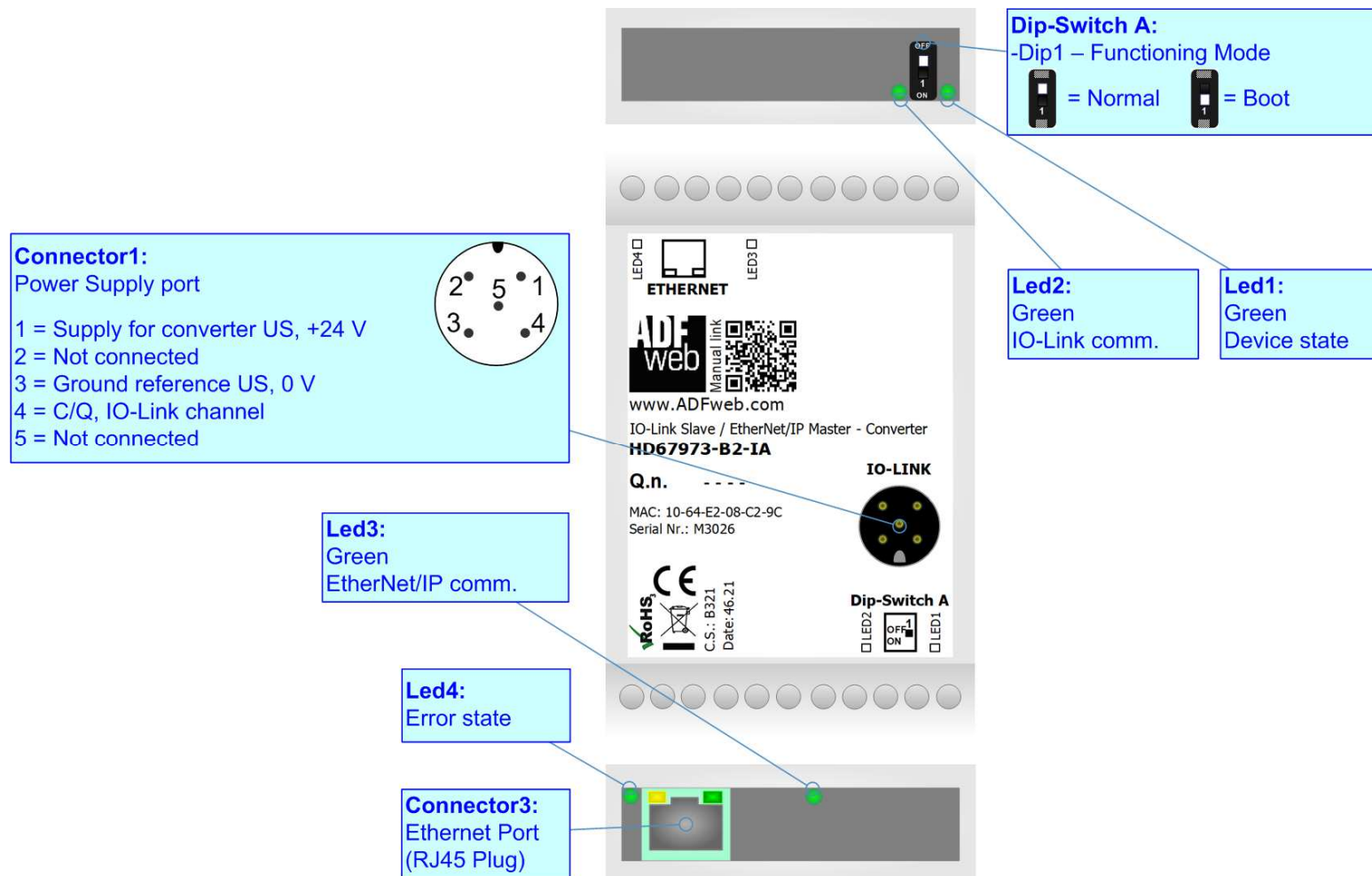


Figure 1a: Connection scheme for HD67973-B2-IA

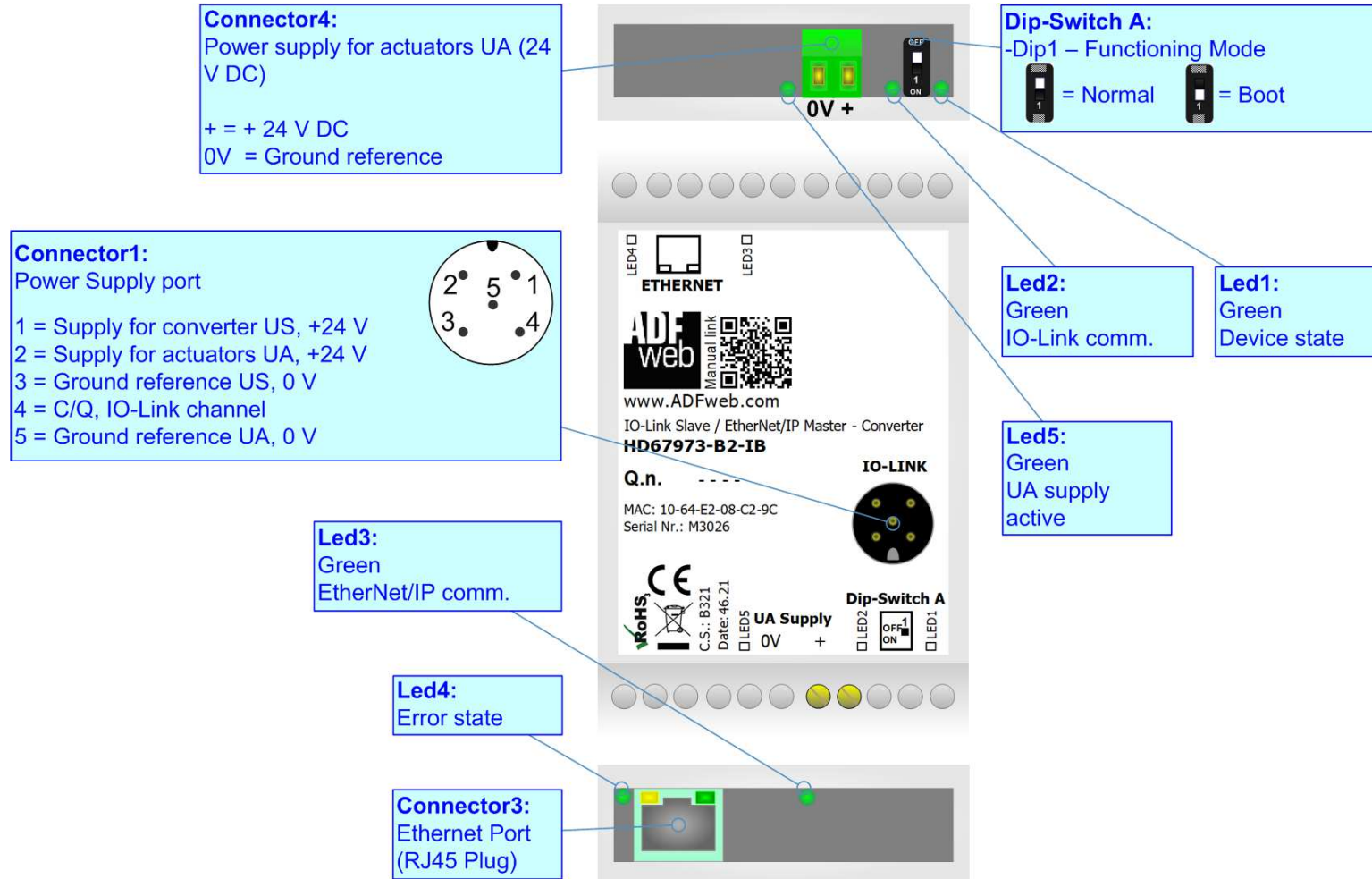


Figure 1b: Connection scheme for HD67973-B2-IB

CHARACTERISTICS:

The HD67973-B2 is a IO-Link Slave / EtherNet/IP Master Converter.

It allows the following characteristics:

- Up to 1500 bytes in reading and 1500 bytes in writing;
- Mountable on 35mm Rail DIN;
- Two-directional information between EtherNet/IP and IO-Link;
- Possibility to have Class A or Class B version in relation to the order code;
- Wide temperature range: -40°C / 85°C [-40°F / +185°F].

CONFIGURATION:

You need Compositor SW67973 software on your PC in order to perform the following:

- Define the parameter of IO-Link line;
- Define the parameter of EtherNet/IP line;
- Define the Process Data and parameters of IO-Link side of the converter;
- Define the list of EtherNet/IP slaves to read/write;
- Export the IODD file for the IO-Link Master;
- Update the device.

IO-LINK:

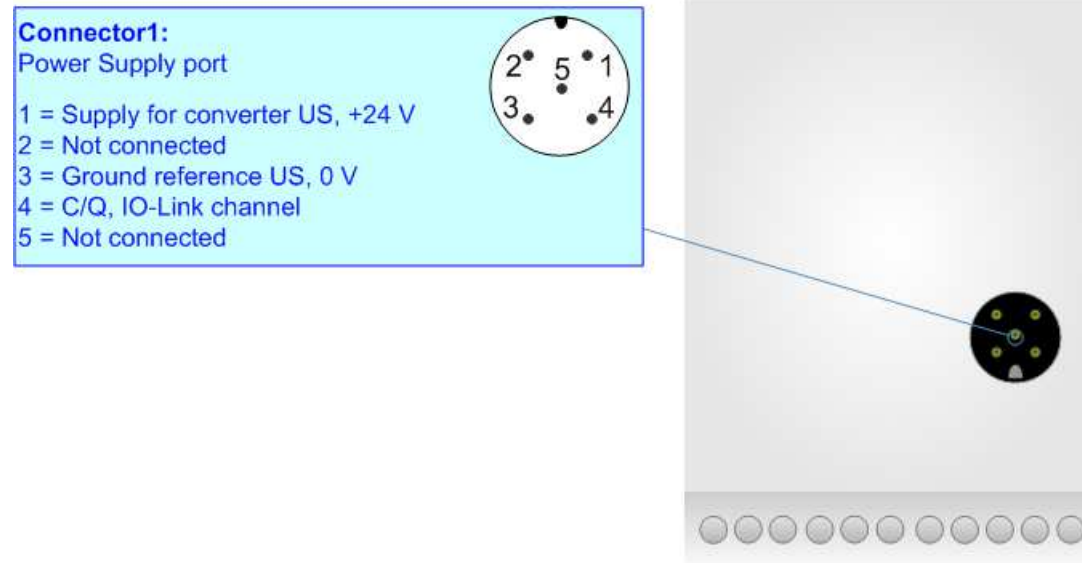
IO-Link is the first globally standardized IO technology (IEC 61131-9) that communicates from the controller down to the lowest automation level. This universally applicable interface is a fieldbus-neutral point-to-point connection which uses standard unshielded cables. IO-Link sends all the sensor and actuator signals to the controller and in turn carries controller data to the sensor/actuator level with revolutionary consequences.

It is possible to have IO-Link device of two different type: IO-Link Class A and IO-Link Class B. ADFweb.com’s converters can manage both of them in relation to the product code selected.

In both cases, the power supply is taken directly from IO-Link interface and it has a maximum consumption of 2 W (80 mA).

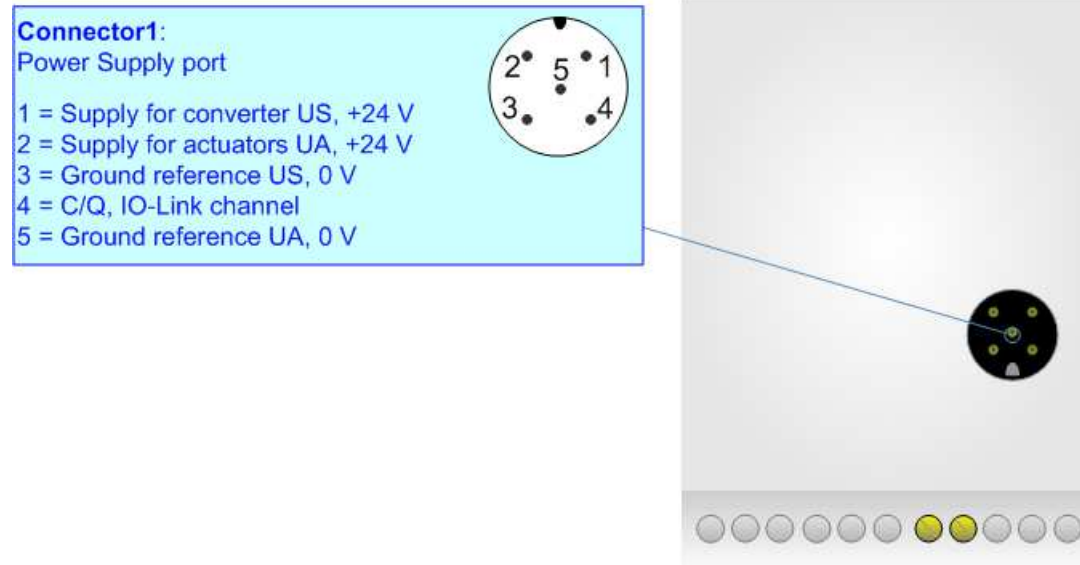
IO-LINK CLASS A:

IO-Link Class A devices uses 3 pins on connectors.



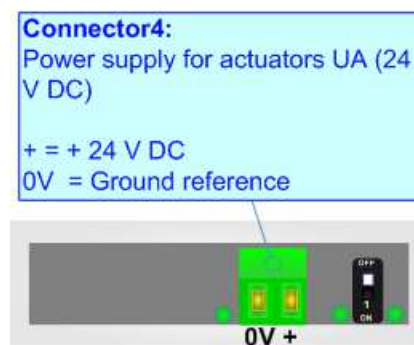
IO-LINK CLASS B:

IO-Link Class B devices uses 5 pins on connectors and they allow to provide an external auxiliary power UA to feed external actuators.



POWER SUPPLY FOR ACTUATORS UA (for IO-Link Class B):

The Power Supply for actuators UA is used to provide an additional power supply and it is available just for Class B version. The output voltage is typically to 24 V DC, but it can arrive up to 35 V DC. The maximum current that can pass is 1 A.



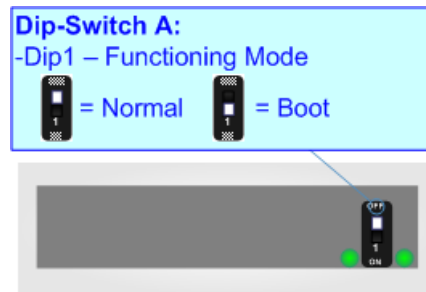
FUNCTION MODES:

The device has got two functions mode depending of the position of the 'Dip1 of Dip-Switch A':

- The first, with 'Dip1 of Dip-Switch A' at "OFF" position, is used for the normal working of the device.
- The second, with 'Dip1 of Dip-Switch A' at "ON" position, is used for upload the Project and/or Firmware.

For the operations to follow for the updating, see 'UPDATE DEVICE' section.

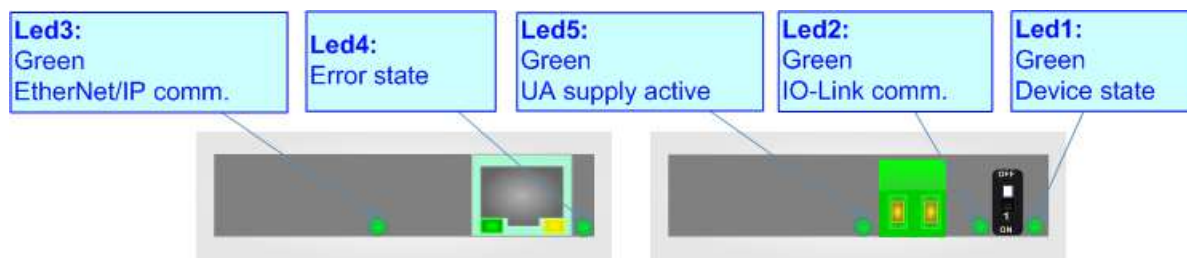
According to the functioning mode, the LEDs will have specifics functions, see 'LEDS' section.



LEDS:

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

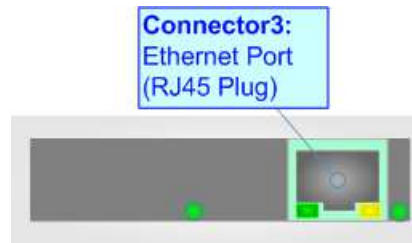
LED	Normal Mode	Boot Mode
1: Device State	Blinks slowly (~1Hz)	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
2: IO-Link communication	OFF: IO-Link power supply not present ON: IO-Link power supply OK, but no communication Blinking: IO-Link powered and communicating	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
3: EtherNet/IP communication	It blinks when an EtherNet/IP message is received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
4: Error state	OFF: no errors ON: at least one EtherNet/IP slave is not answering	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
5: UA supply active (only for Class B version)	OFF: UA power supply not present ON: UA power supply present	OFF: UA power supply not present ON: UA power supply present



ETHERNET:

The Ethernet port is used for programming the device and for EtherNet/IP communication.

The Ethernet connection must be made using Connector3 of HD67973-B2 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 is recommended the use of a cross cable.



USE OF COMPOSITOR SW67973:

To configure the Converter, use the available software that runs with Windows called SW67973. It is downloadable on the site www.adfweb.com and its operation is described in this document. The software works with MS Windows (XP, Vista, Seven, 8, 10 or 11; 32/64bit).

When launching the SW67973, the window below appears (Fig. 2).



Note:

It is necessary to have installed .Net Framework 4.

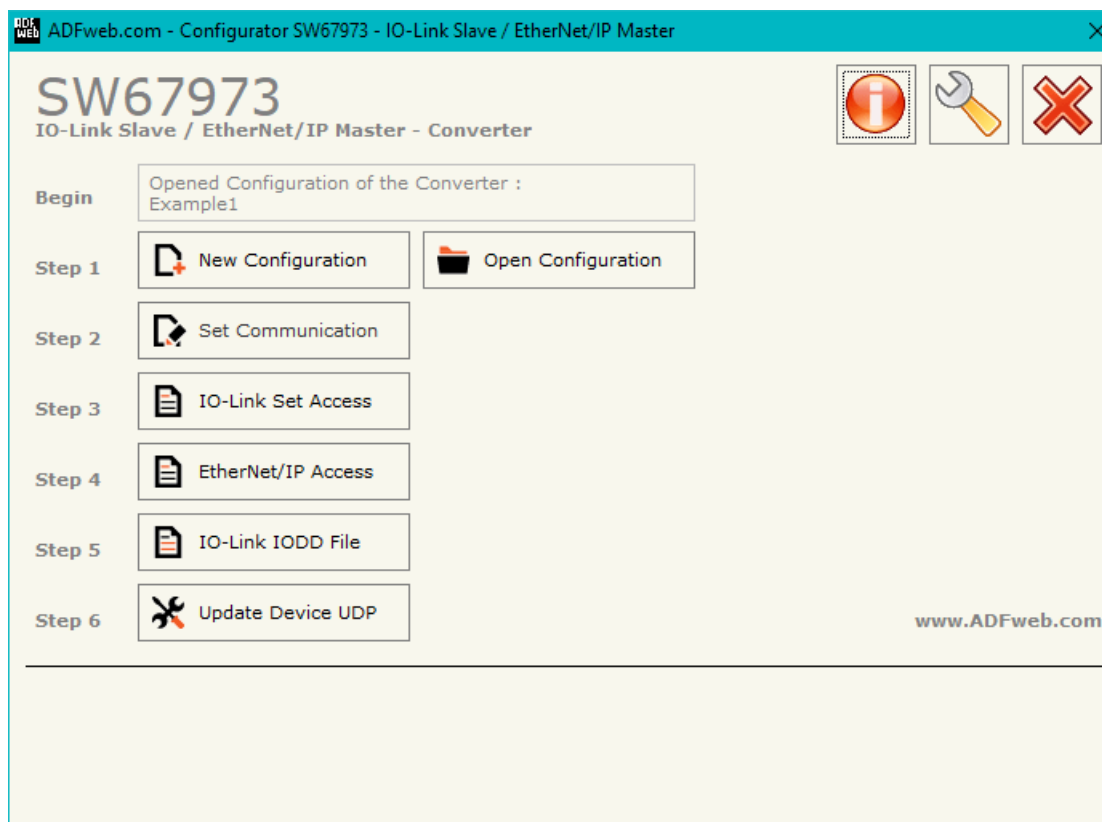
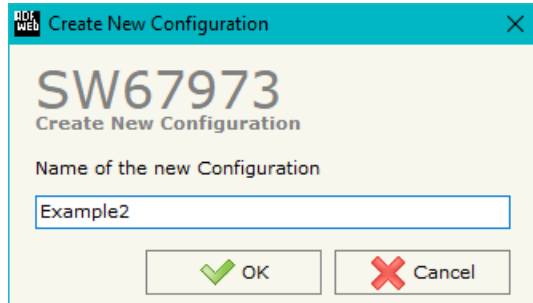


Figure 2: Main window for SW67973

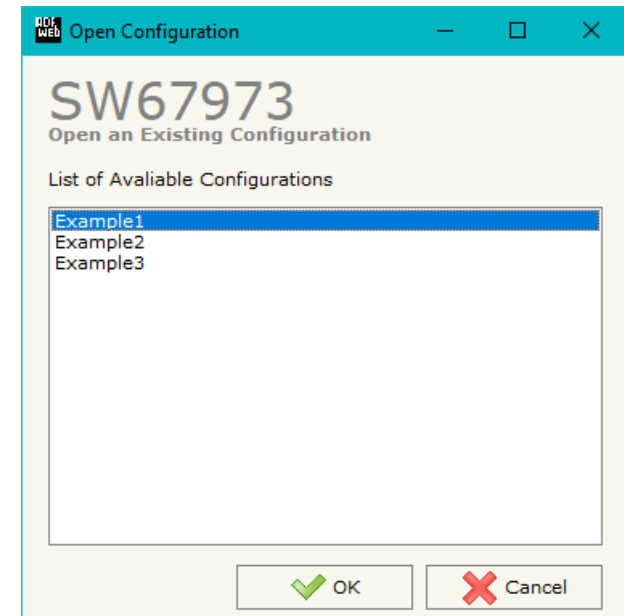
NEW CONFIGURATION / OPEN CONFIGURATION:

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




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

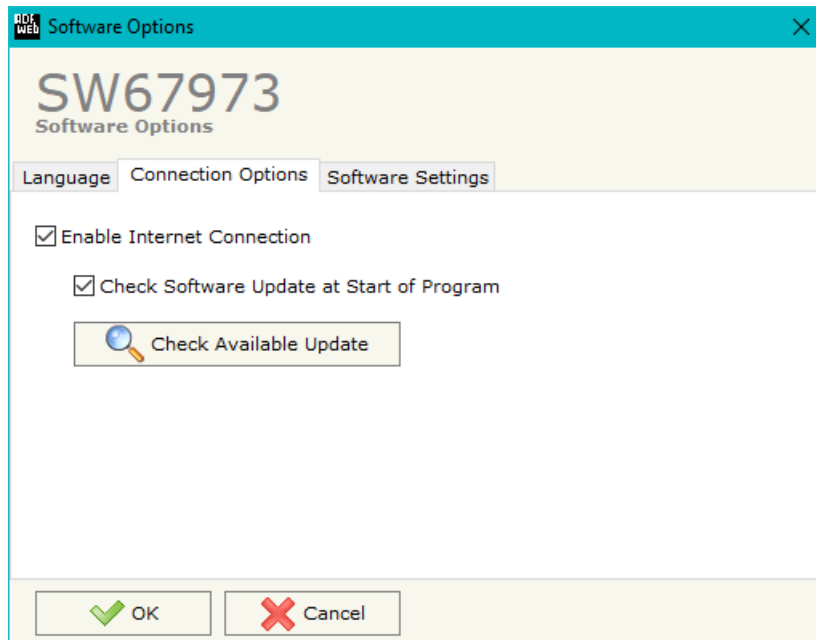
- To clone the configurations of a Programmable “IO-Link Slave / EtherNet/IP Master - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient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



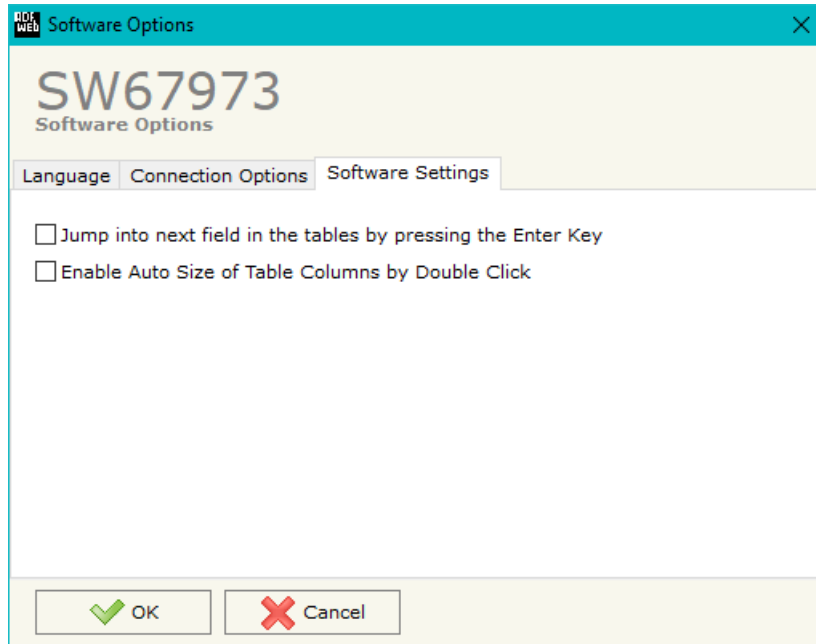
SOFTWARE OPTIONS:

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 SW67973 check automatically if there are updatings when it is launched.



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 define the fundamental communication parameters of two buses, IO-Link and EtherNet/IP.

By Pressing the **"Set Communication"** button from the main window for SW67973 (Fig. 2) the window "Set Communication" appears (Fig. 3).

The means of the fields for "Ethernet Connection" are:

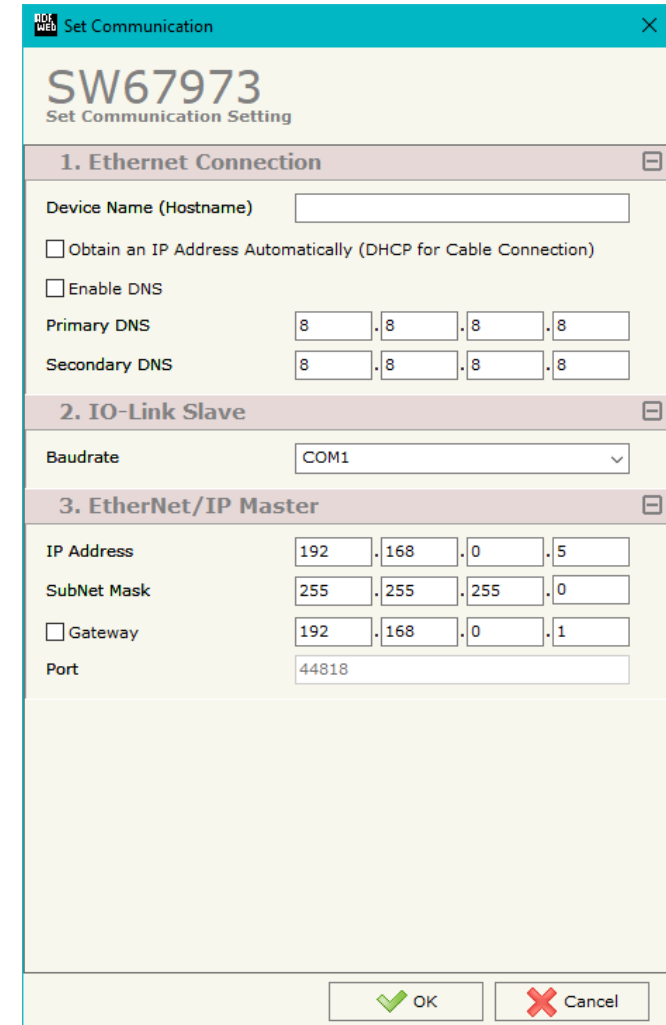
- In the field **"Device Name (Hostname)"** the Hostname to assign to the converter is defined;
- If the field **"Obtain an IP Address Automatically (DHCP for Cable Connection)"** is checked, DHCP for LAN connection is enabled;
- If the field **"Enable DNS"** is checked, DNS protocol is enabled;
- In the field **"Primary DNS"** the IP Address of the primary DNS server is defined;
- In the field **"Secondary DNS"** the IP Address of the secondary DNS server is defined.

The means of the fields for "IO-Link Slave" are:

- In the field **"Baudrate"** the standard baudrate used by the IO-Link interface is defined.

The means of the fields for the "EtherNet/IP Master" section are:

- In the fields **"IP ADDRESS"** the IP address of EtherNet/IP side of the converter is defined;
- In the fields **"SUBNET Mask"** the SubNet Mask of EtherNet/IP side of the converter is defined;
- In the fields **"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 EtherNet/IP communication is defined.



The screenshot shows the 'Set Communication' window for device SW67973. The window is titled 'Set Communication' and 'Set Communication Setting'. It is divided into three sections: 1. Ethernet Connection, 2. IO-Link Slave, and 3. EtherNet/IP Master. Section 1 includes fields for Device Name (Hostname), checkboxes for DHCP and DNS, and IP address fields for Primary and Secondary DNS. Section 2 includes a dropdown for Baudrate (set to COM1). Section 3 includes IP address, SubNet Mask, Gateway, and Port fields. At the bottom are OK and Cancel buttons.

Figure 3: "Set Communication" window

IO-LINK SET ACCESS:

By Pressing the “**IO-Link Set Access**” button from the main window for SW67973 (Fig. 2) the window “IO-Link Slave Set Access” appears (Fig. 4).

This section is used to define the Process Data and the variables where mapping the data read/written from/to the EtherNet/IP slaves.

PROCESS DATA

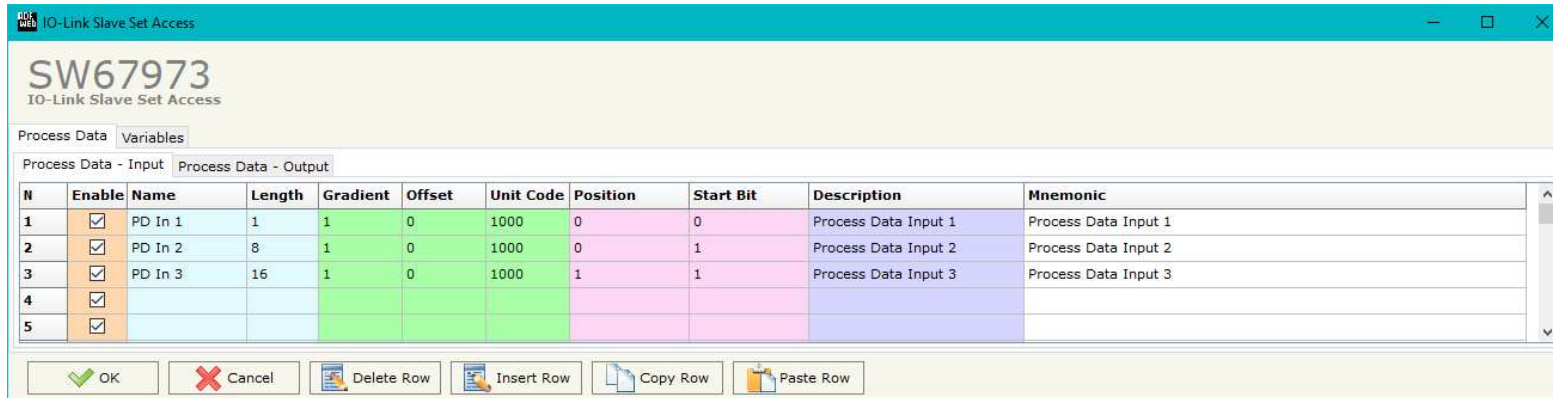


Figure 4a: “IO-Link Slave Set Access → Process Data” window

The means of the fields are:

- If the field “**Enable**” is checked, the IO-Link variable is enabled;
- In the field “**Name**” the name of the IO-Link variable is defined;
- In the field “**Length**” the dimension in bit of the variable is defined;
- In the field “**Gradient**” the gradient of the variable is defined;
- In the field “**Offset**” the offset of the variable is defined;
- In the field “**Unit Code**” the unit for the variable is defined;
- In the field “**Position**” the starting byte of the EtherNet/IP memory array where placing the data is defined;
- In the field “**Start Bit**” the starting bit of the selected Position where mapping the data is defined;
- In the field “**Description**” the description of the variable is defined;
- In the field “**Mnemonic**” a note is defined.

VARIABLES

N	Enable	Index	Name	Access	Length	Gradient	Offset	Unit Code	Default Value	Position Read	Start Bit Read	Position Write	Start Bit Write	Description	Mnemonic
1	<input checked="" type="checkbox"/>	60	Var 1	Read Only	1	1	0	1000	0	5	0	5	0	Variable 1	Variable 1
2	<input checked="" type="checkbox"/>	61	Var 2	Write Only	8	1	0	1000	0	6	0	6	0	Variable 2	Variable 2
3	<input checked="" type="checkbox"/>	62	Var 3	Read Write	16	1	0	1000	0	7	0	7	0	Variable 3	Variable 3
4	<input checked="" type="checkbox"/>														
5	<input checked="" type="checkbox"/>														

Figure 4b: "IO-Link Slave Set Access → Variables" window

The means of the fields are:

- If the field "Enable" is checked, the IO-Link variable is enabled;
- In the field "Index" the index of the variable is defined (typically it starts from 64);
- In the field "Name" the name of the IO-Link variable is defined;
- In the field "Access" the access type is defined;
- In the field "Length" the dimension in bit of the variable is defined;
- In the field "Gradient" the gradient of the variable is defined;
- In the field "Offset" the offset of the variable is defined;
- In the field "Unit Code" the unit for the variable is defined;
- In the field "Default Value" the default value at the start-up is defined;
- In the field "Position Read" the starting byte of the EtherNet/IP memory array where placing the data read is defined;
- In the field "Start Bit Read" the starting bit of the selected Position where mapping the data is defined;
- In the field "Position Write" the starting byte of the EtherNet/IP memory array where placing the data written is defined;
- In the field "Start Bit Write" the starting bit of the selected Position where mapping the data is defined;
- In the field "Description" the description of the variable is defined;
- In the field "Mnemonic" a note is defined.

ETHERNET/IP ACCESS:

By Pressing the “**EtherNet/IP Access**” button from the main window for SW67973 (Fig. 2) the window “Set EtherNet/IP Slaves Access” appears (Fig. 5).

This section is used to define the list of the EtherNet/IP slaves to read/write with the IO-Link Master.

N	Enable	IP Address	Start Input	Num Input	Start Output	Num Output	Time Poll	Instance T > O	Conn. Point T > O	Instance O > T	Conn. Point O > T	Dim Header T > O	Dim Header O > T	Enable	Electronic Key	Enable	Data Segment	Reset Data	Mnemonic
1	<input checked="" type="checkbox"/>	192.168.0.12	0	10	5	15	1000	1	100	1	101	Default	Default	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
2	<input checked="" type="checkbox"/>	192.168.0.13	1	5	0	0	2500	1	100	1	101	Default	Default	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
3	<input checked="" type="checkbox"/>													<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
4	<input checked="" type="checkbox"/>													<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
5	<input checked="" type="checkbox"/>													<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
6	<input checked="" type="checkbox"/>													<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
7	<input checked="" type="checkbox"/>													<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
8	<input checked="" type="checkbox"/>													<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
9	<input checked="" type="checkbox"/>													<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	

Figure 5: “Set EtherNet/IP Slaves Access” window

The means of the fields are:

- If the field “**Enable**” is checked, the polling to the EtherNet/IP slave is enabled;
- In the field “**IP Address**” the IP Address of the EtherNet/IP slave is defined;
- In the field “**Start Input**” the starting Input byte of the EtherNet/IP slave to map on IO-Link side is defined;
- In the field “**Num Input**” the number of consecutive Input byte to map on IO-Link side is defined;
- In the field “**Start Output**” the starting Output byte of the EtherNet/IP slave to write from IO-Link side is defined;
- In the field “**Num Output**” the number of consecutive Output byte to write from IO-Link side is defined;
- In the field “**Time Poll**” the polling time in ms is defined;
- In the field “**Instance T > O**” the instance of the assembly for the Target to Originator data direction is defined;
- In the field “**Conn. Point T > O**” the connection point of the assembly for the Target to Originator data direction is defined;
- In the field “**Instance O > T**” the instance of the assembly for the Originator to Target data direction is defined;
- In the field “**Conn. Point O > T**” the connection point of the assembly for the Originator to Target data direction is defined;
- In the field “**Dim Header T > O**” the dimension of the data header for the Target to Originator data direction is defined;
- In the field “**Dim Header O > T**” the dimension of the data header for the Originator to Target data direction is defined;

- If the field "**Enable**" is checked, the converter will check the electronic key to verify the authenticity of the slave. The key is defined in the field "**Electronic Key**";
- If the field "**Enable**" is checked, the converter will send the parameterization of the slave at the start-up using the "**Data Segment**";
- If the field "**Reset Data**" is checked, the converter resets the data on IO-Link side in case of EtherNet/IP fault;
- In the field "**Mnemonic**" a brief description is defined.

IO-LINK IODD FILE:

By pressing the "**IO-LINK IODD FILE**" button it is possible to save the IODD file for the IO-Link Master.

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. This by using the Ethernet port.

If you don't know the actual IP address of the device you have to use this procedure:

- Turn OFF the Device;
- Put Dip1 of 'Dip-Switch A' in ON position;
- Turn ON the device
- Connect the Ethernet cable;
- Insert the IP **“192.168.2.205”**;
- 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;
- Put Dip1 of 'Dip-Switch A' in OFF position;
- Turn ON the device.

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;
- 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.

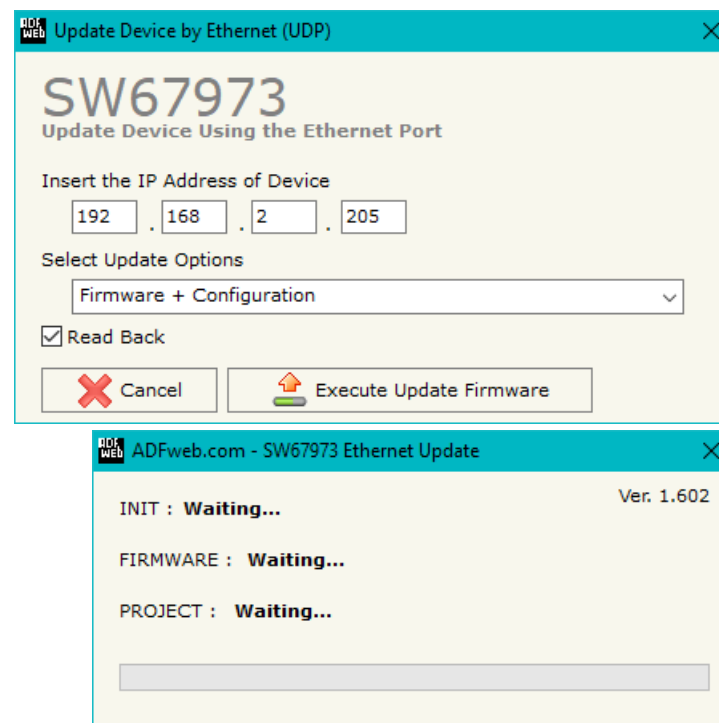


Figure 6: “Update device” windows



Note:

When you receive the device, for the first time, you also have to update the Firmware in the HD67973 device.



Warning:

If Fig. 7 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.

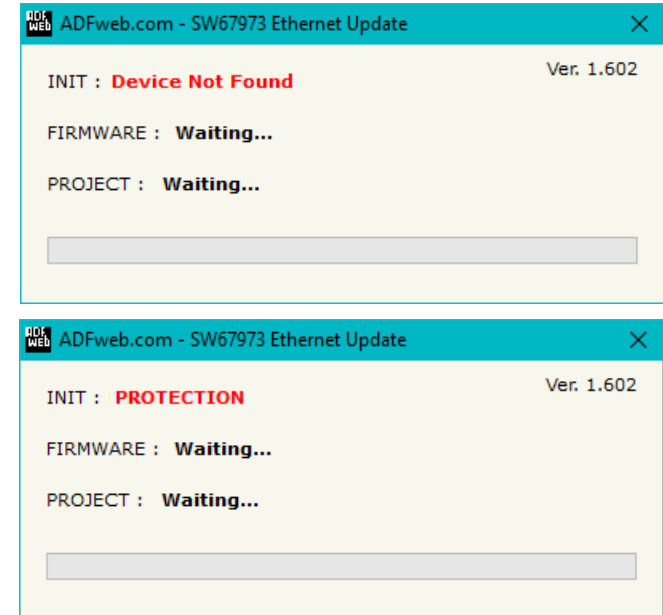


Figure 7: "Error" window



Warning:

In the case of HD67973 you have to use the software "SW67973": www.adfweb.com/download/filefold/SW67973.zip.

MECHANICAL DIMENSIONS:

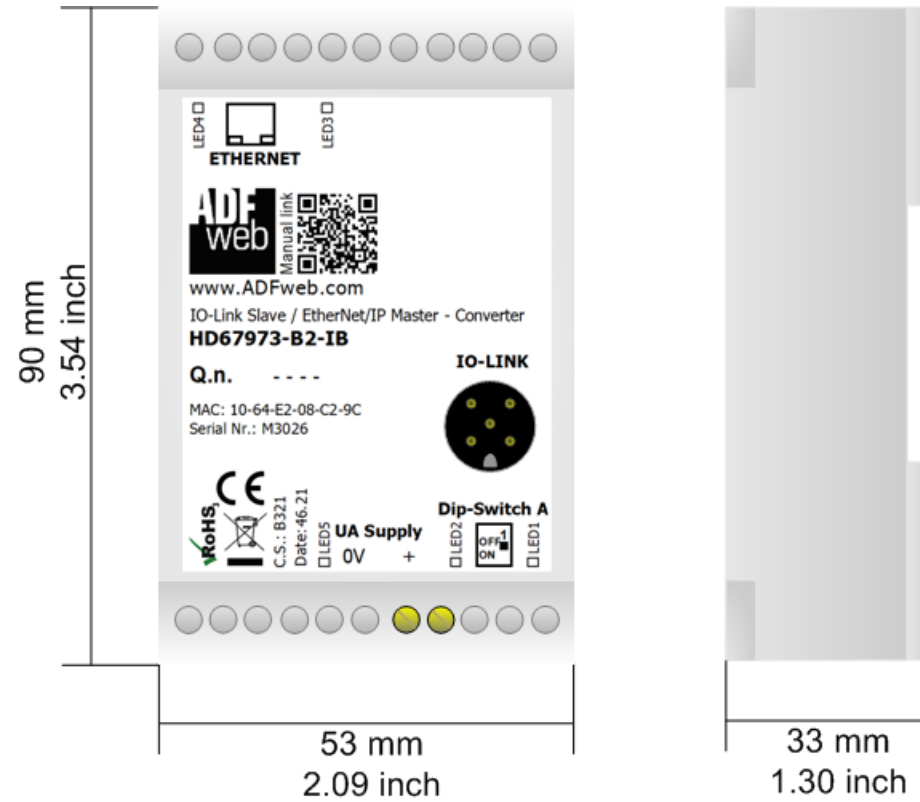
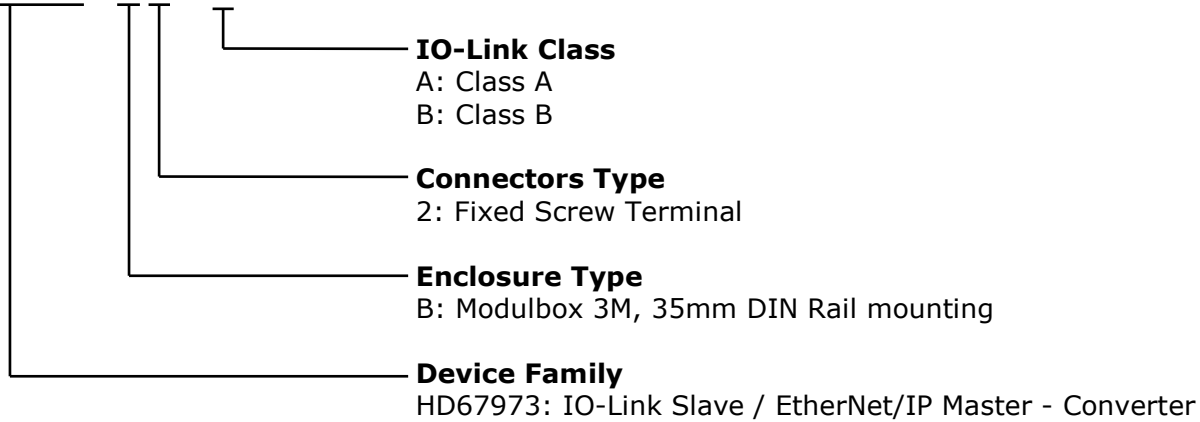


Figure 8: Mechanical dimensions scheme for HD67973-B2-Ix

ORDERING INFORMATIONS:

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

HD67973 – B 2 – Ix



Order Code: **HD67973-B2-IA** - IO-Link Slave / EtherNet/IP Master – Converter (Class A)

Order Code: **HD67973-B2-IB** - IO-Link Slave / EtherNet/IP Master – Converter (Class B)

DISCLAIMER:

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OTHER REGULATIONS AND STANDARDS:**WEEE INFORMATION**

Disposal of old electrical and electronic equipment (as in the European Union and other European countries with separate collection systems).

■ This symbol on the product or on its packaging indicates that this product may not be treated as household rubbish. Instead, it should be taken to an applicable collection point for the recycling of electrical and electronic equipment. If the product is disposed correctly, you will help prevent potential negative environmental factors and 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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