

User Manual

Revision 1.000
English

IO-Link Slave / Modbus TCP Master - Converter

(Order Code: HD67963-B2-IA, HD67963-B2-IB)

Benefits

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



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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

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:

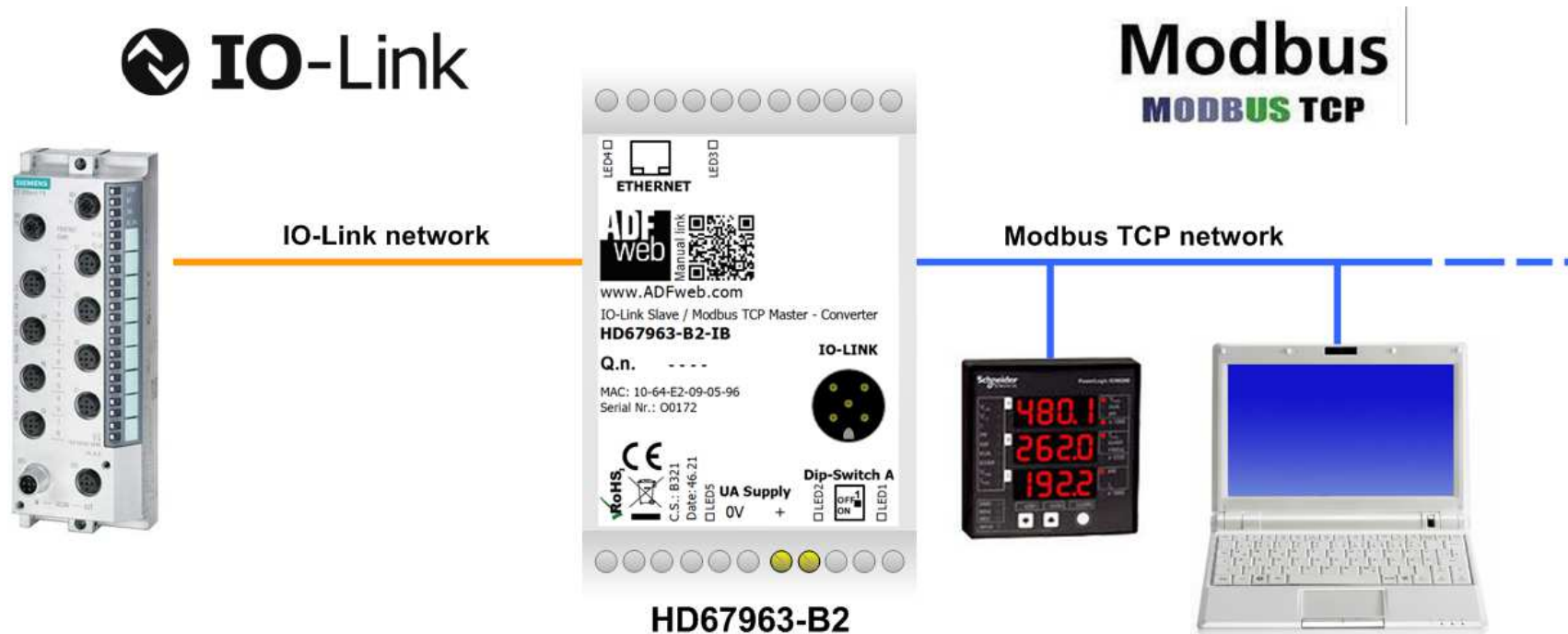


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

CE CONFORMITY

The declaration is made by our company. You can send an email to or give us a call if you need it.

EXAMPLE OF CONNECTION:



CONNECTION SCHEME:

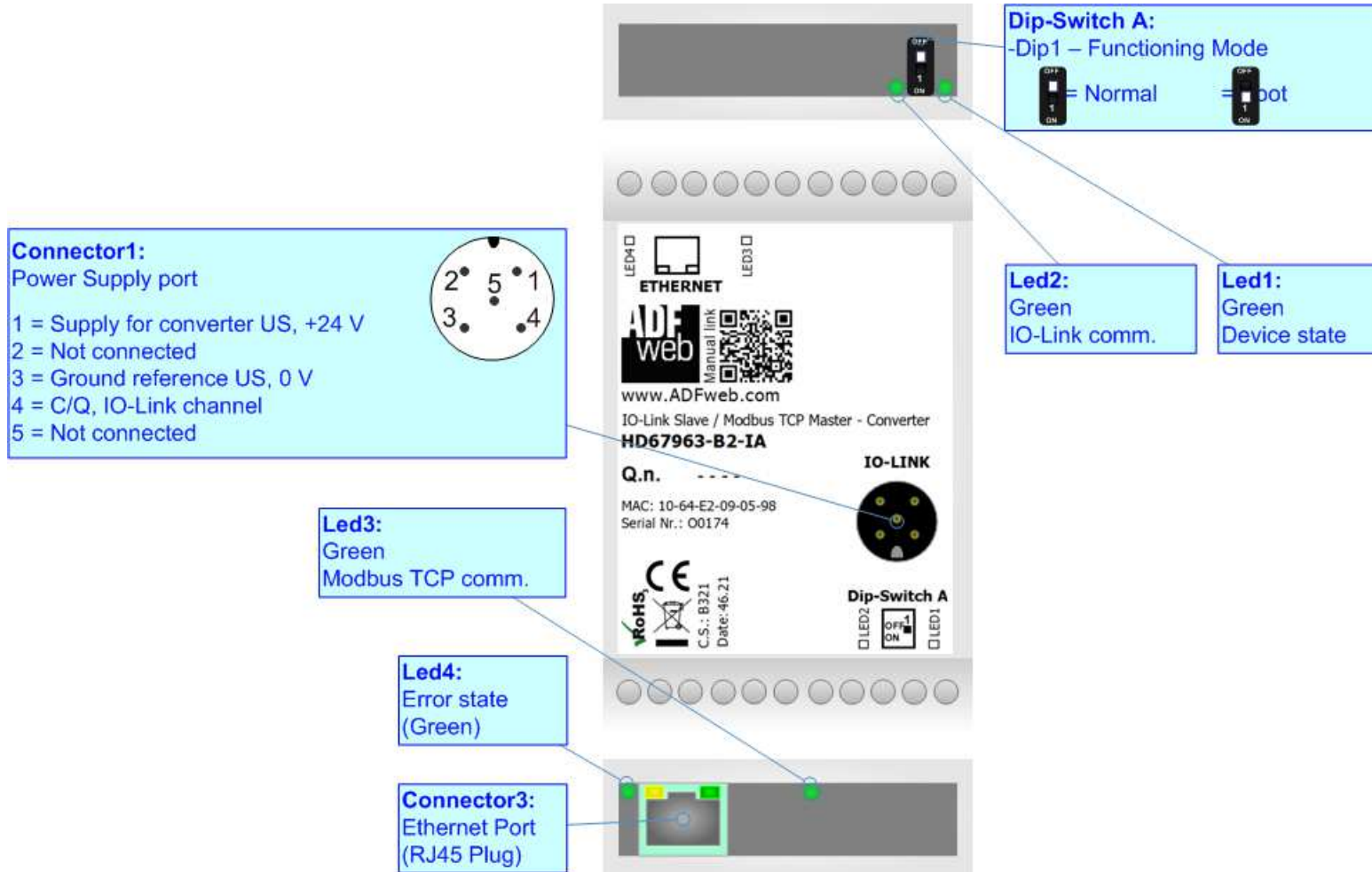


Figure 1a: Connection scheme for HD67963-B2-IA

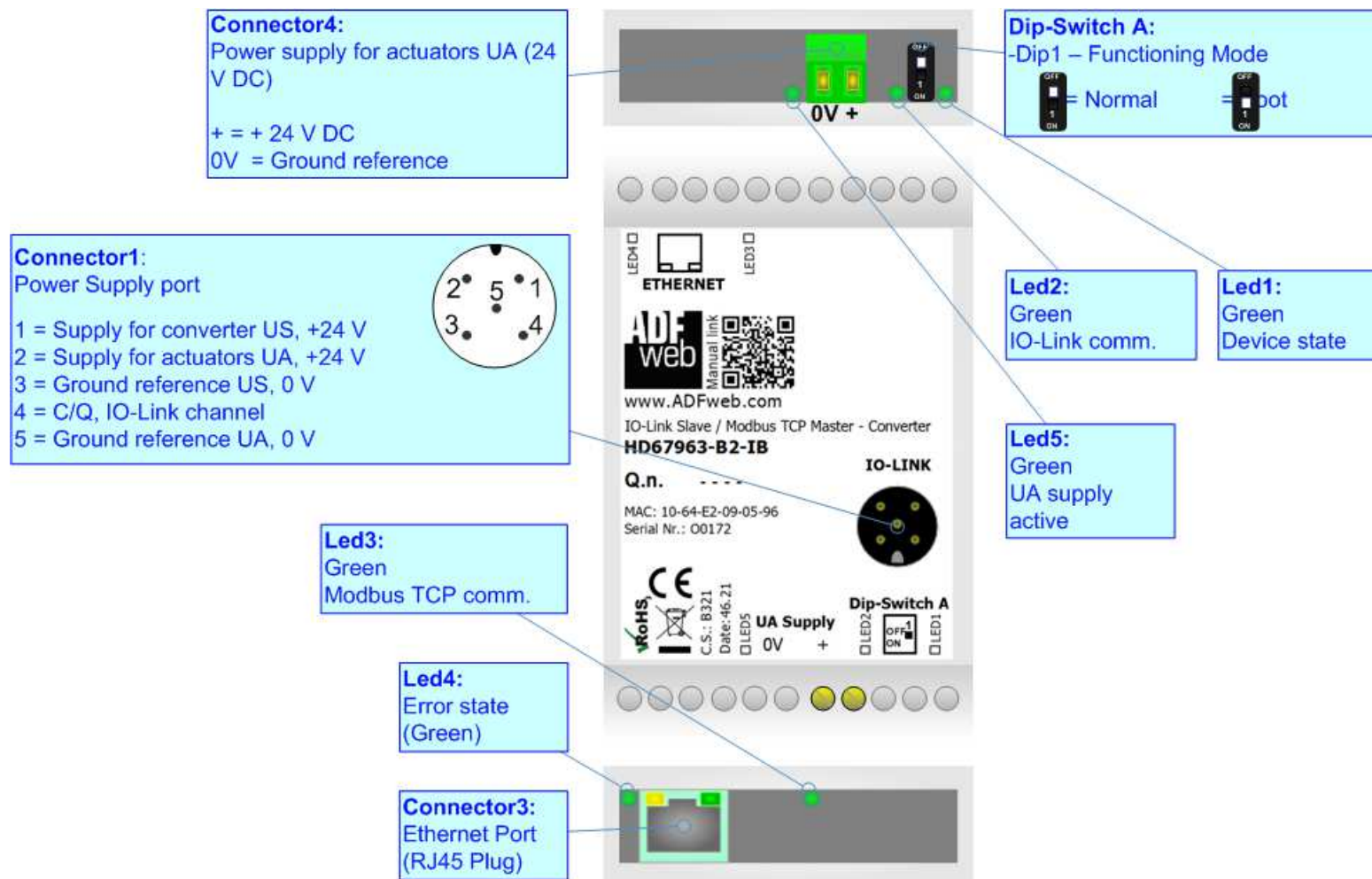


Figure 1b: Connection scheme for HD67963-B2-IB

CHARACTERISTICS:

The HD67963-B2 is a IO-Link Slave / Modbus TCP 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 Modbus TCP 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 SW67963 software on your PC in order to perform the following:

- Define the parameter of IO-Link line;
- Define the parameter of Modbus TCP line;
- Define the Process Data and parameters of IO-Link side of the converter;
- Define the list of Modbus reading and writing requests;
- Export the IODD file for the IO-Link Master;
- Update the device.

IO-LINK:

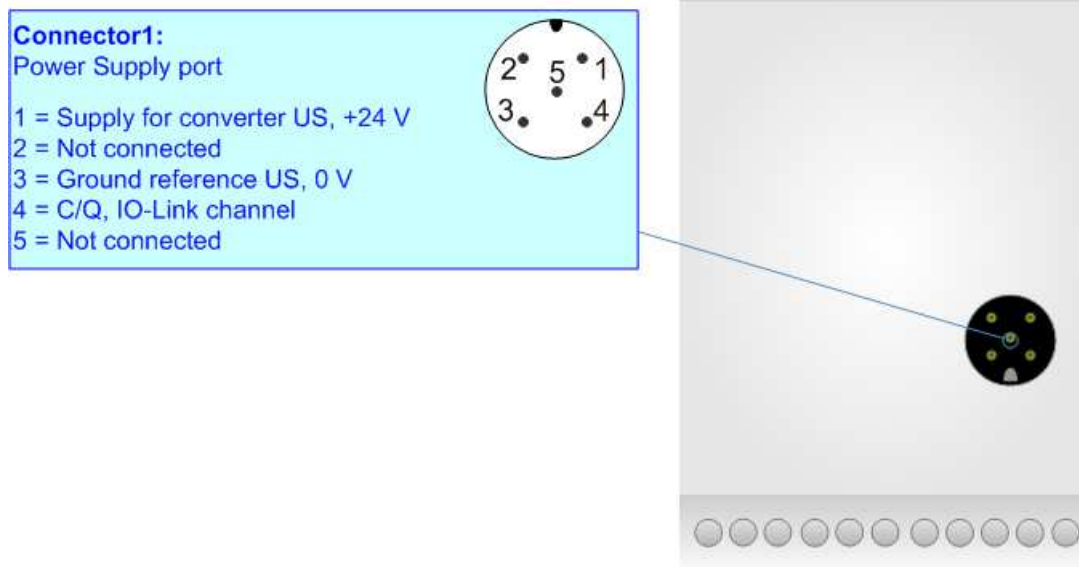
IO-Link is the first globally standardized IO technology (IEC 61131-9) that communicates from the controller down to the lowest automation level. This universally applicable interface is a fieldbus-neutral point-to-point connection which uses standard unshielded cables. IO-Link sends all the sensor and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

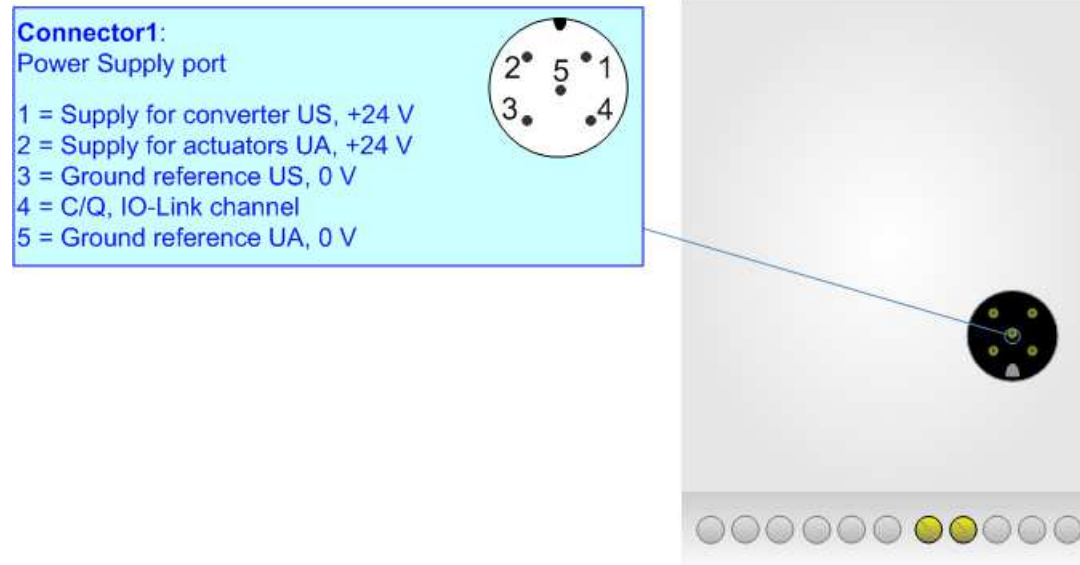
IO-LINK CLASS A:

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



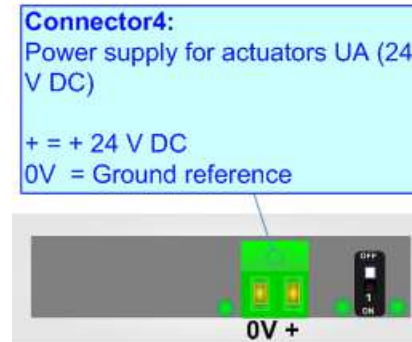
IO-LINK CLASS B:

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.



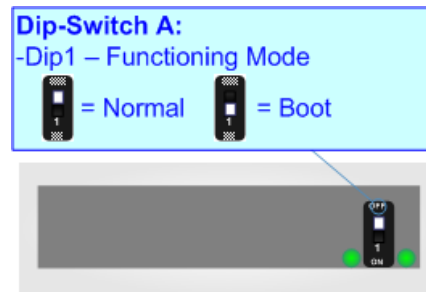
FUNCTION MODES:

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.

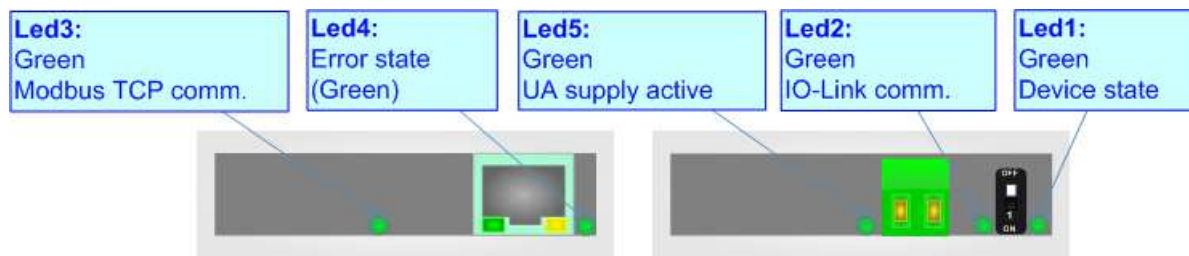
According to the functioning mode, the LEDs will have specifics functions, see 'LEDS' section.



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.

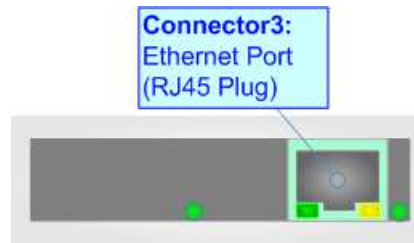
LED	Normal Mode	Boot Mode
1: Device State	Blinks slowly (~1Hz)	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
2: IO-Link communication	OFF: IO-Link power supply not present ON: IO-Link power supply OK, but no communication Blinking: IO-Link powered and communicating	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
3: Modbus TCP communication	It blinks when a Modbus response is received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
4: Error state	OFF: no errors ON: at least one Modbus TCP request has not correct response from slaves	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 Modbus TCP communication.

The Ethernet connection must be made using Connector3 of HD67963-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 SW67963:

To configure the Converter, use the available software that runs with Windows called SW67963. 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; 32/64bit).

When launching the SW67963, the window below appears (Fig. 2).



Note:

It is necessary to have installed .Net Framework 4.

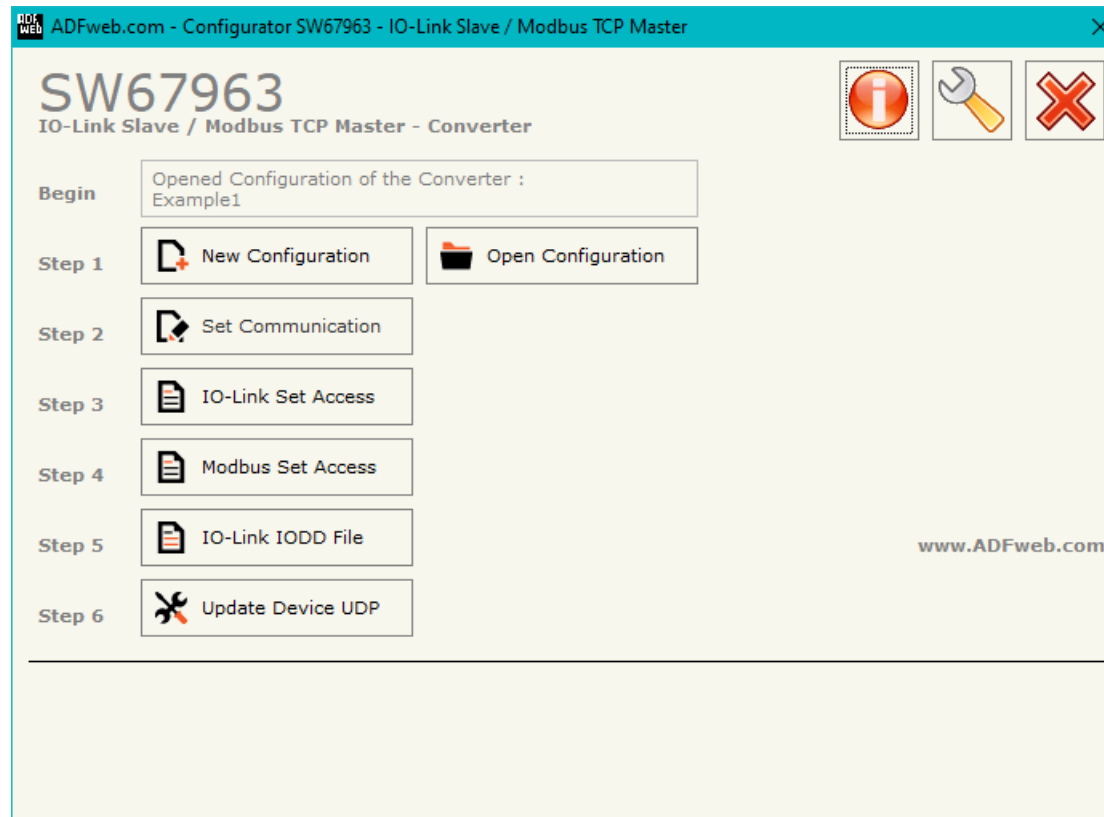
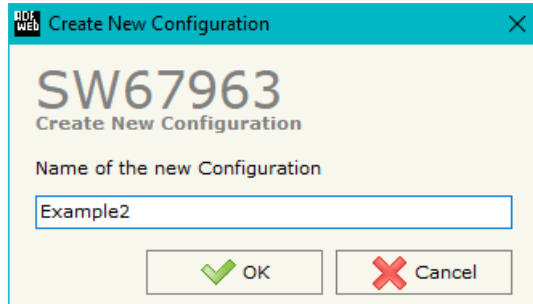


Figure 2: Main window for SW67963

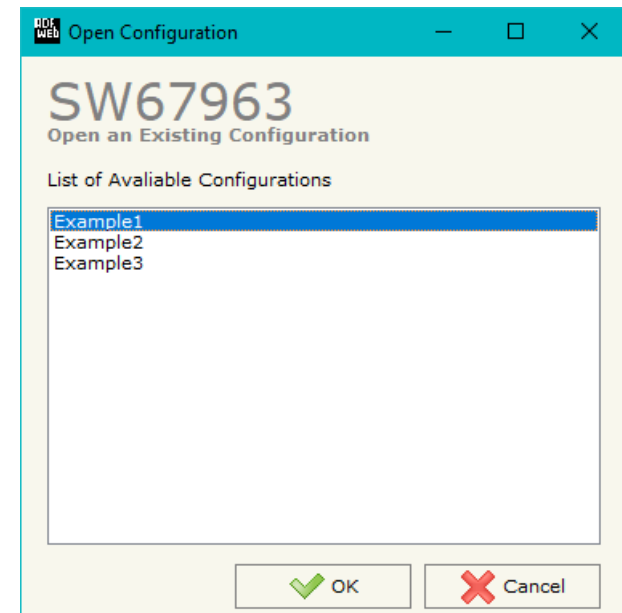
NEW CONFIGURATION / OPEN CONFIGURATION:

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




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

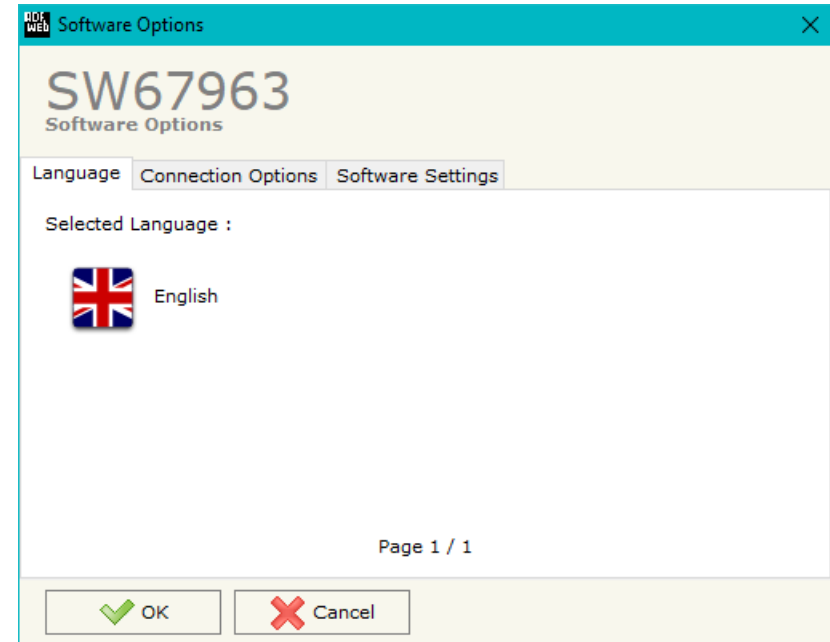
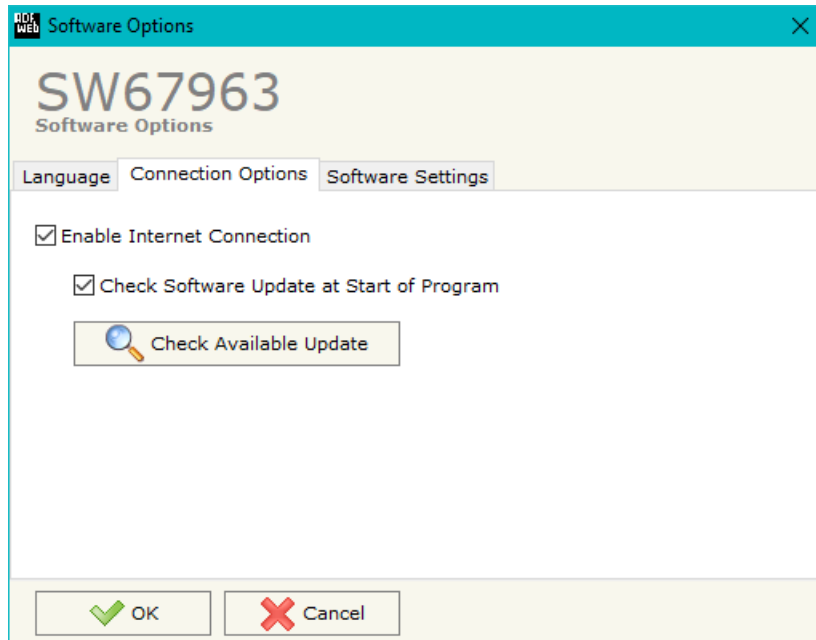
- To clone the configurations of a Programmable “IO-Link Slave / Modbus TCP Master - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient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



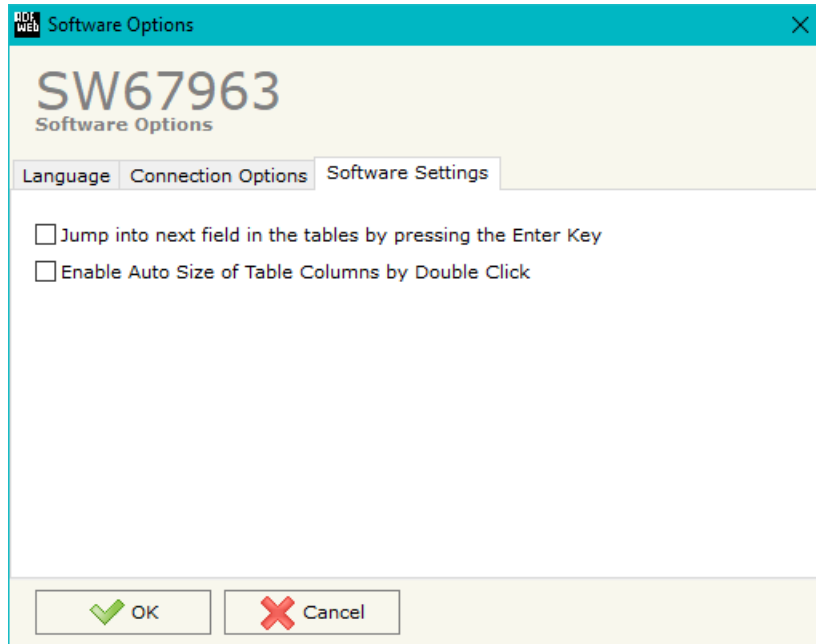
SOFTWARE OPTIONS:

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 SW67963 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 Modbus TCP.

By Pressing the **"Set Communication"** button from the main window for SW67963 (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 "Modbus TCP Master" section are:

- In the fields **"IP ADDRESS"** the IP address of Modbus TCP side of the converter is defined;
- In the fields **"SUBNET Mask"** the SubNet Mask of Modbus TCP 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 **"TimeOut (ms)"** the maximum time that the converter attends for the answer from the slave interrogated is defined;
- In the field **"Cyclic Delay (ms)"** the delay (idle time) between two Modbus requests is defined.

Figure 3: "Set Communication" window

IO-LINK SET ACCESS:

By Pressing the **IO-Link Set Access** button from the main window for SW67963 (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 Modbus TCP slaves.

PROCESS DATA

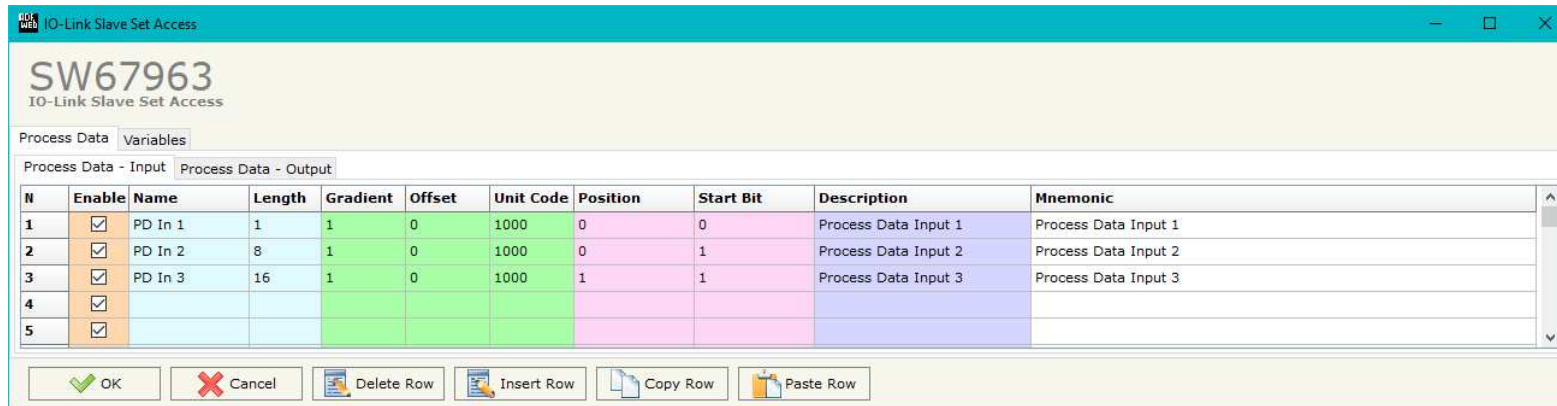
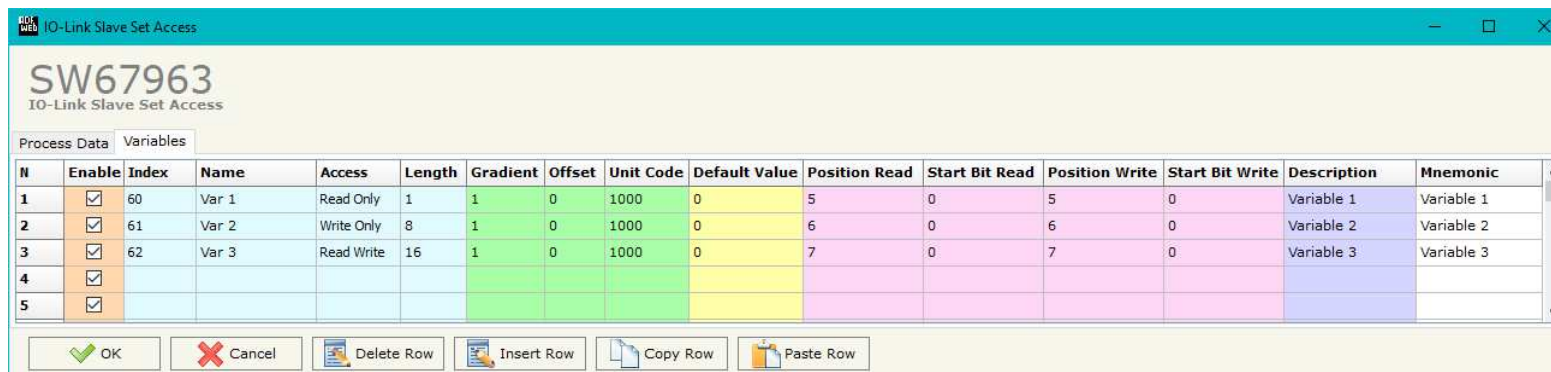


Figure 4a: "IO-Link Slave Set Access → Process Data" window

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 internal 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



#	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 internal 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 internal 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.

MODBUS SET ACCESS:

By pressing the “**Modbus Set Access**” button from the main window for SW67963 (Fig. 2) the window “Set Modbus TCP Master Access” appears.

This window is divided in two parts, the "Modbus Read" (Fig. 5a) and the "Modbus Write" (Fig. 5b).

The first part "Modbus Read" is used to read the data from the Modbus slaves and make them available on IO-Link side.

The second part "Modbus Write" is used to write the data that arrives from IO-Link side to the Modbus slaves.

MODBUS READ

The means of the fields are:

- If the field “**Enable**” is checked, the Modbus request is enabled;
- In the field “**Slave IP Address**” the IP address of the Modbus TCP device to read is defined;
- In the field “**Port**” the TCP port used for the communication is defined;
- In the field “**Slave ID**” the address of the Modbus TCP device to read is defined;
- In the field “**Type**” the data type of the register to read is defined. It is possible to choose between the following:
 - Coil Status;
 - Input Status
 - Holding Register;
 - Input Register.
- In the field “**Address**” the starting address of the register to be read is defined;
- In the field “**NPoint**” the number of consecutive registers to be read is defined;
- In the field “**Poll Time**” the delay time to make the request is defined;
- In the field “**Max Error**” the number of consecutive errors that the converter waits before suspending the request is defined;
- In the field “**Position**” the address of the internal array where placing the information is defined;

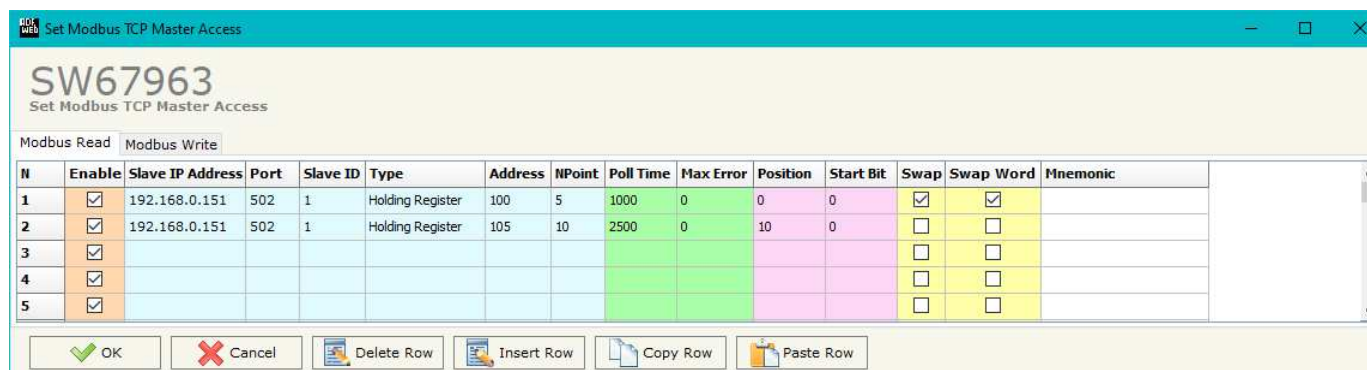


Figure 5a: "Set Access → Modbus Read" window

- ✦ In the field "**Start Bit**" the starting bit of the first byte of the field "Position" is defined;
- ✦ If the field "**Swap**" is checked, the data from the Modbus registers are swapped;
- ✦ If the field "**Swap Word**" is checked, the Modbus words are swapped;
- ✦ In the field "**Mnemonic**" the description for the request is defined.

MODBUS WRITE

The means of the fields are:

- If the field **“Enable”** is checked, the Modbus request is enabled;
- In the field **“Slave IP Address”** the IP address of the Modbus TCP device to read is defined;
- In the field **“Port”** the TCP port used for the communication is defined;
- In the field **“Slave ID”** the address of the Modbus device that you have to write is defined;
- In the field **“Type”** the data type of the register to write is defined. It is possible to choose between the following:
 - Coil Status;
 - Holding Register.
- In the field **“Address”** the start address of the register to be written is defined;
- In the field **“NPoint”** the number of consecutive registers to be written is defined;
- In the field **“Poll Time”** the delay time to make the request is defined;
- If the field **“On Change”** is checked, the converter sends the writing request when the data from IO-Link side change value;
- If the field **“On CMD”** is checked, the converter sends the writing request when the data from IO-Link is received;
- In the field **“Max Error”** the number of consecutive errors that the converter waits before suspending the request is defined;
- In the field **“Position”** the address of the internal array where taking the information is defined;
- In the field **“Start Bit”** the starting bit of the first byte of the field “Position” is defined;
- If the field **“Swap”** is checked, the data written the Modbus registers are swapped;
- If the field **“Swap Word”** is checked, the Modbus words are swapped;
- In the field **“Mnemonic”** the description for the request is defined.

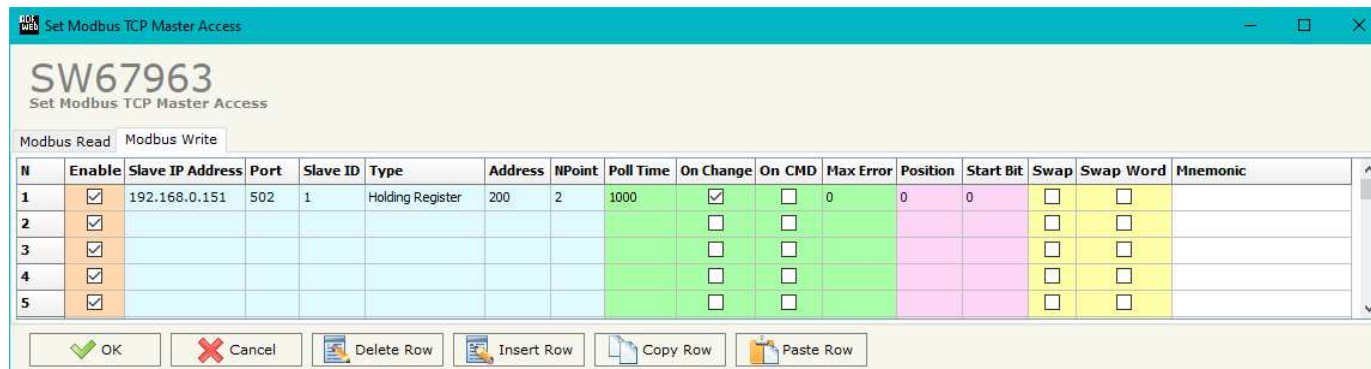


Figure 5b: "Set Access → Modbus Write" window

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.

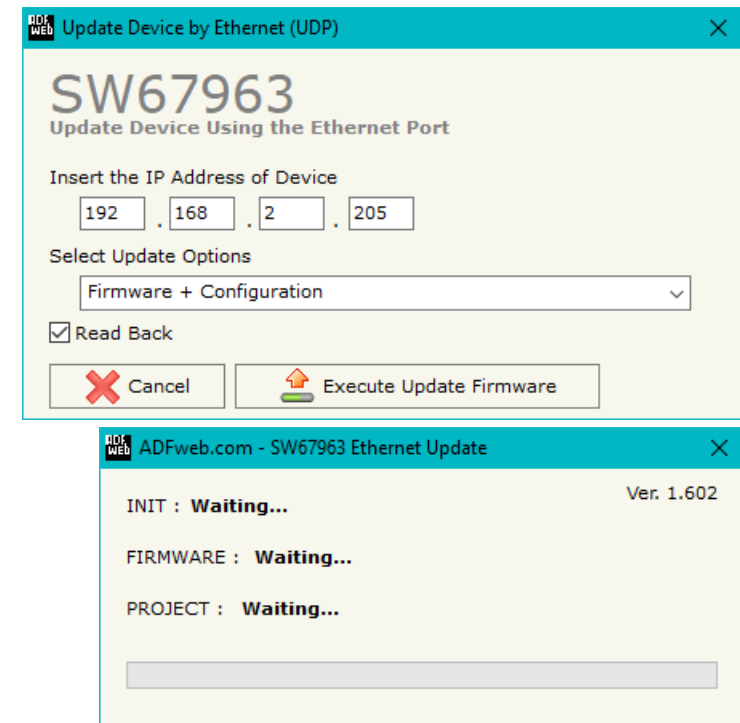


Figure 6: “Update device” windows



Note:

When you receive the device, for the first time, you also have to update the Firmware in the HD67963 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 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, 10 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

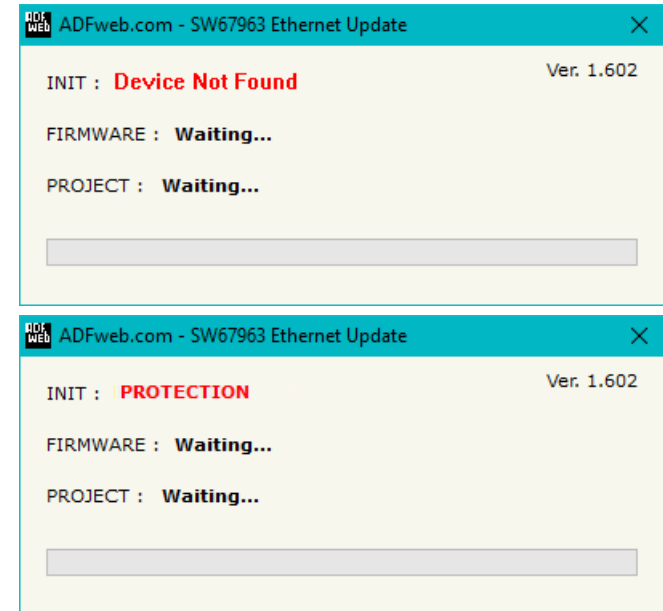


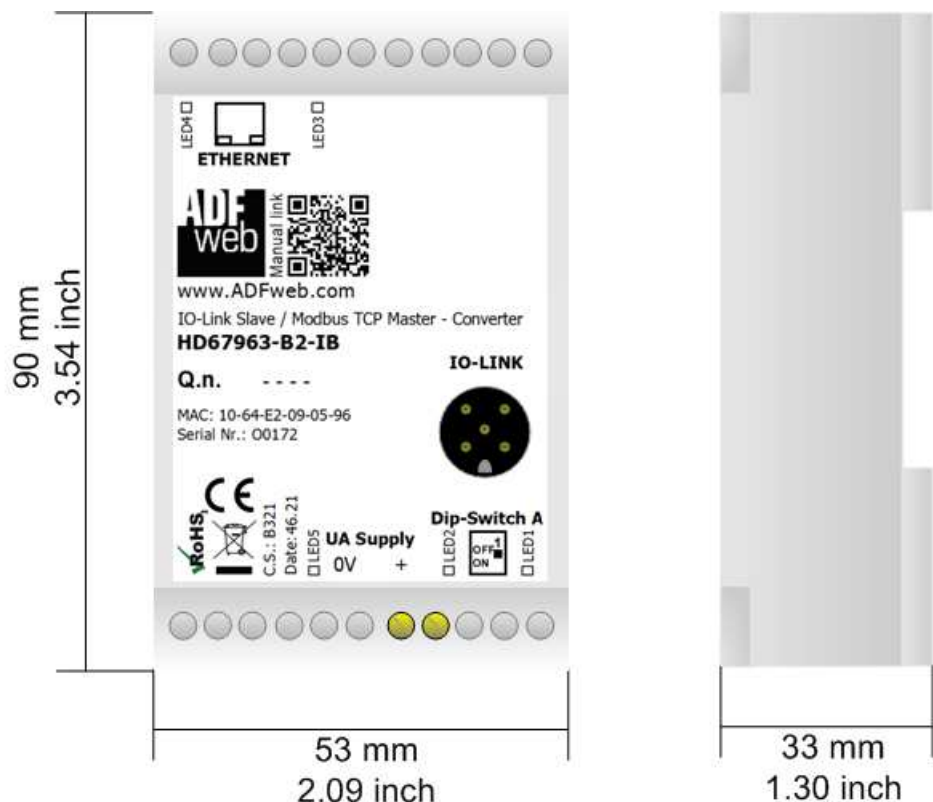
Figure 7: "Error" window



Warning:

In the case of HD67963 you have to use the software "SW67963": www.adfweb.com/download/filefold/SW67963.zip.

MECHANICAL DIMENSIONS:



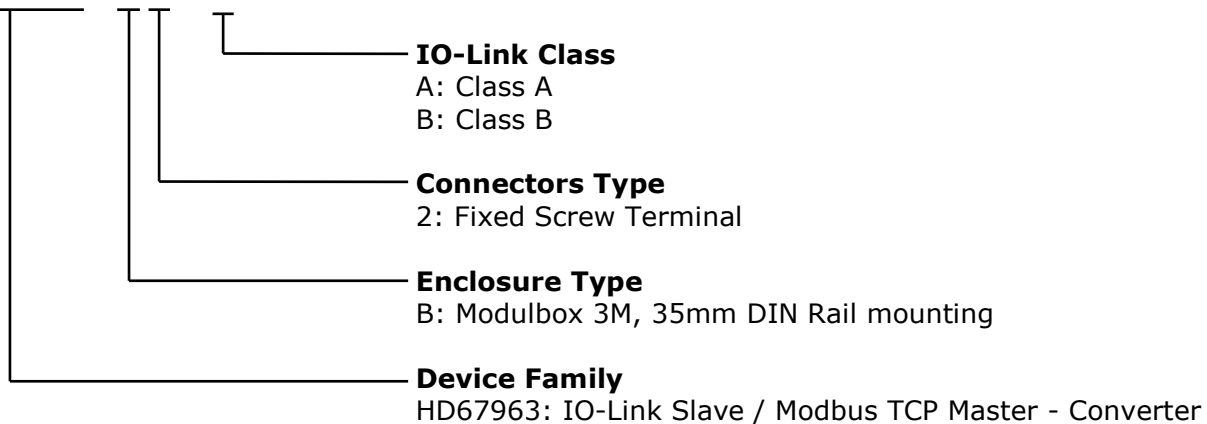
Housing: PVC
 Weight: 200g (Approx)

Figure 8: Mechanical dimensions scheme for HD67963-B2-Ix

ORDERING INFORMATIONS:

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

HD67963 – B 2 – Ix



Order Code: **HD67963-B2-IA** - IO-Link Slave / Modbus TCP Master – Converter (Class A)

Order Code: **HD67963-B2-IB** - IO-Link Slave / Modbus TCP Master – Converter (Class B)

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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