

User Manual

Revision 1.003
English

EtherNet/IP / Serial - Converter

(Order Code: HD67590-232-A1, HD67590-485-A1, HD67590-422-A1)

For Website information:

www.adfweb.com?Product=HD67590

For Price information:

www.adfweb.com?Price=HD67590-232-A1

www.adfweb.com?Price=HD67590-485-A1

www.adfweb.com?Price=HD67590-422-A1

Benefits and Main Features:

- ✦ Triple electrical isolation
- ✦ Two EtherNet/IP ports
- ✦ Temperature range: -40°C/+85°C (-40°F/+185°F)



User Manual

For other EtherNet/IP products see also the following link:

Converter EtherNet/IP to

www.adfweb.com?Product=HD67077
www.adfweb.com?Product=HD67091
www.adfweb.com?Product=HD67159
www.adfweb.com?Product=HD67174
www.adfweb.com?Product=HD67588
www.adfweb.com?Product=HD67589
www.adfweb.com?Product=HD67591
www.adfweb.com?Product=HD67592
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www.adfweb.com?Product=HD67871
www.adfweb.com?Product=HD67906
www.adfweb.com?Product=HD67945
www.adfweb.com?Product=HD67974
www.adfweb.com?Product=HD67B16
www.adfweb.com?Product=HD67B39
www.adfweb.com?Product=HD67B78
www.adfweb.com?Product=HD67C63
www.adfweb.com?Product=HD67D25
www.adfweb.com?Product=HD67E27
www.adfweb.com?Product=HD67E77
www.adfweb.com?Product=HD67F25

(M-Bus)
(M-Bus Wireless)
(SNMP Agent)
(SNMP Manager)
(DMX)
(NMEA 2000)
(Modbus Master)
(Modbus Slave)
(PROFIBUS Master)
(PROFIBUS Slave)
(CAN)
(CANopen)
(DeviceNet Master)
(DeviceNet Slave)
(J1939)
(S7comm)
(PROFINET Slave)
(Modbus TCP Slave)
(Modbus TCP Master)
(BACnet IP Slave)
(BACnet IP Master)
(IEC 61850 Server)
(IEC 61850 Client)
(KNX)
(DALI)
(IO-Link Master)
(HART)
(MQTT)
(IO-Link Slave)
(OPC UA Client)
(OPC UA Server)
(PROFINET Master)
(EnOcean)
(LoRaWAN)
(EtherCAT Slave)
(EtherCAT Master)
(LoRaWAN Gateway)

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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
1.001	04/04/2013	Nt	All	Added new chapters
1.002	05/08/2014	Ff	All	Revision
1.003	23/07/2024	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:

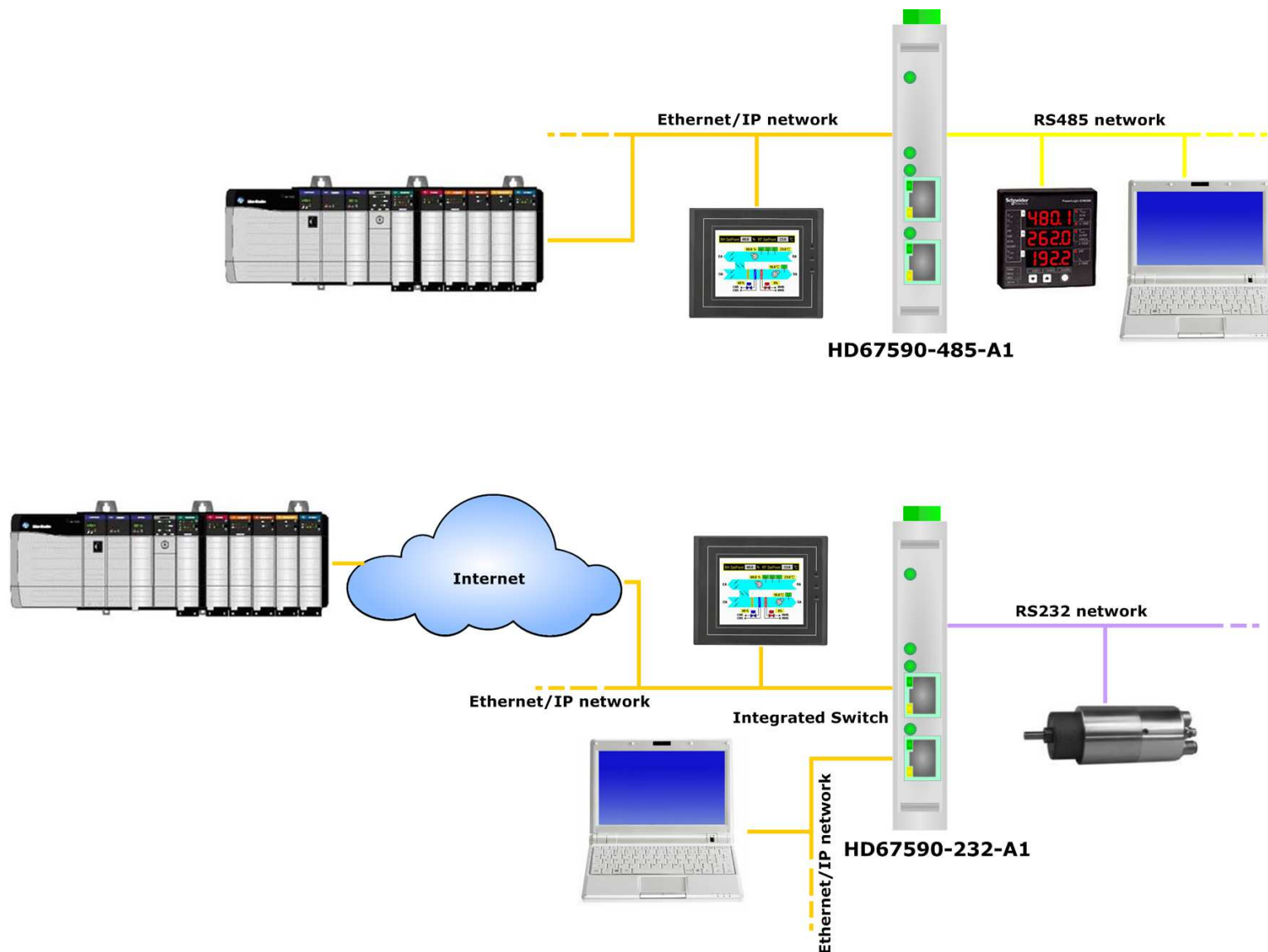


This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

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:

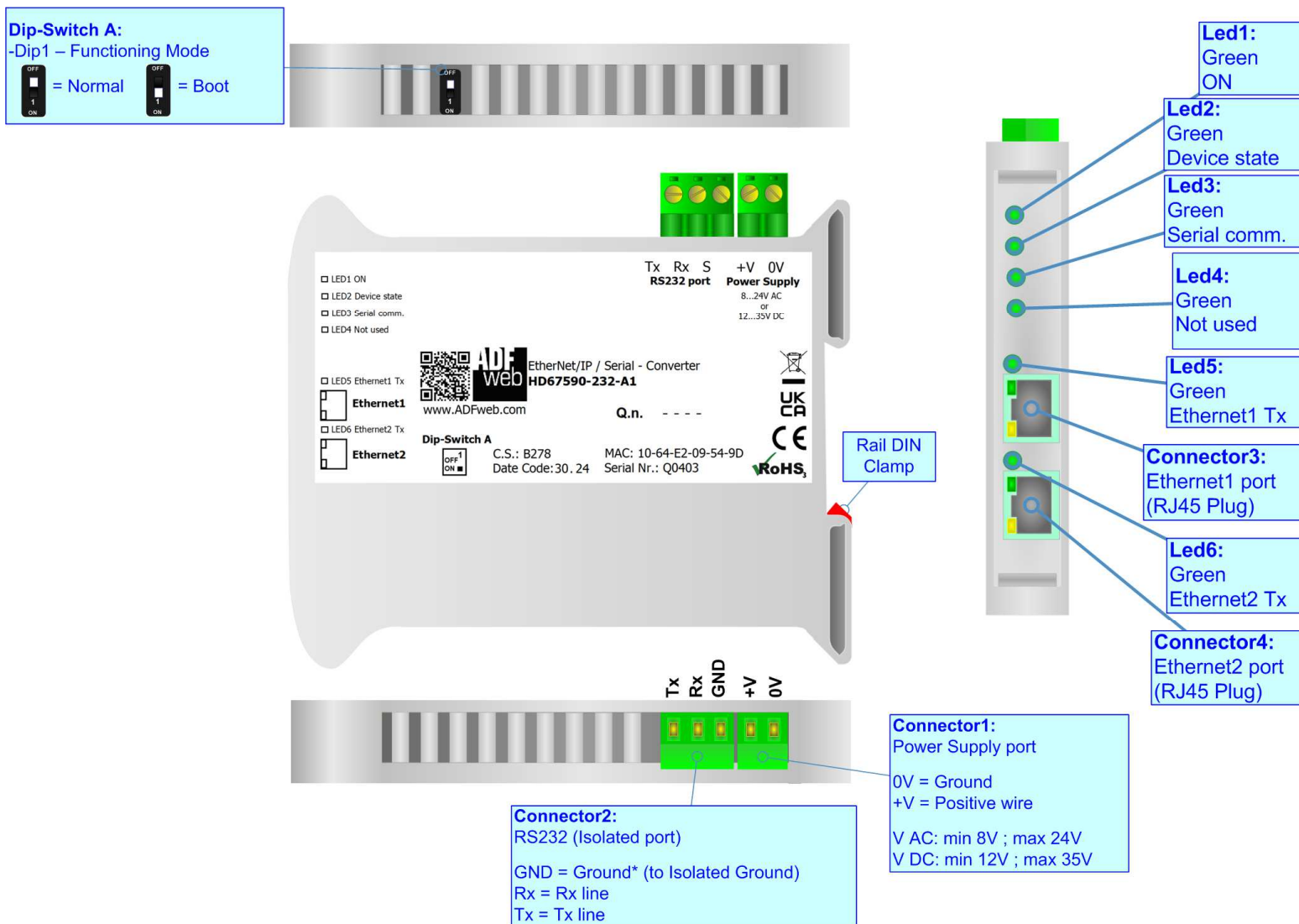


Figure 1a: Connection scheme for HD67590-232-A1

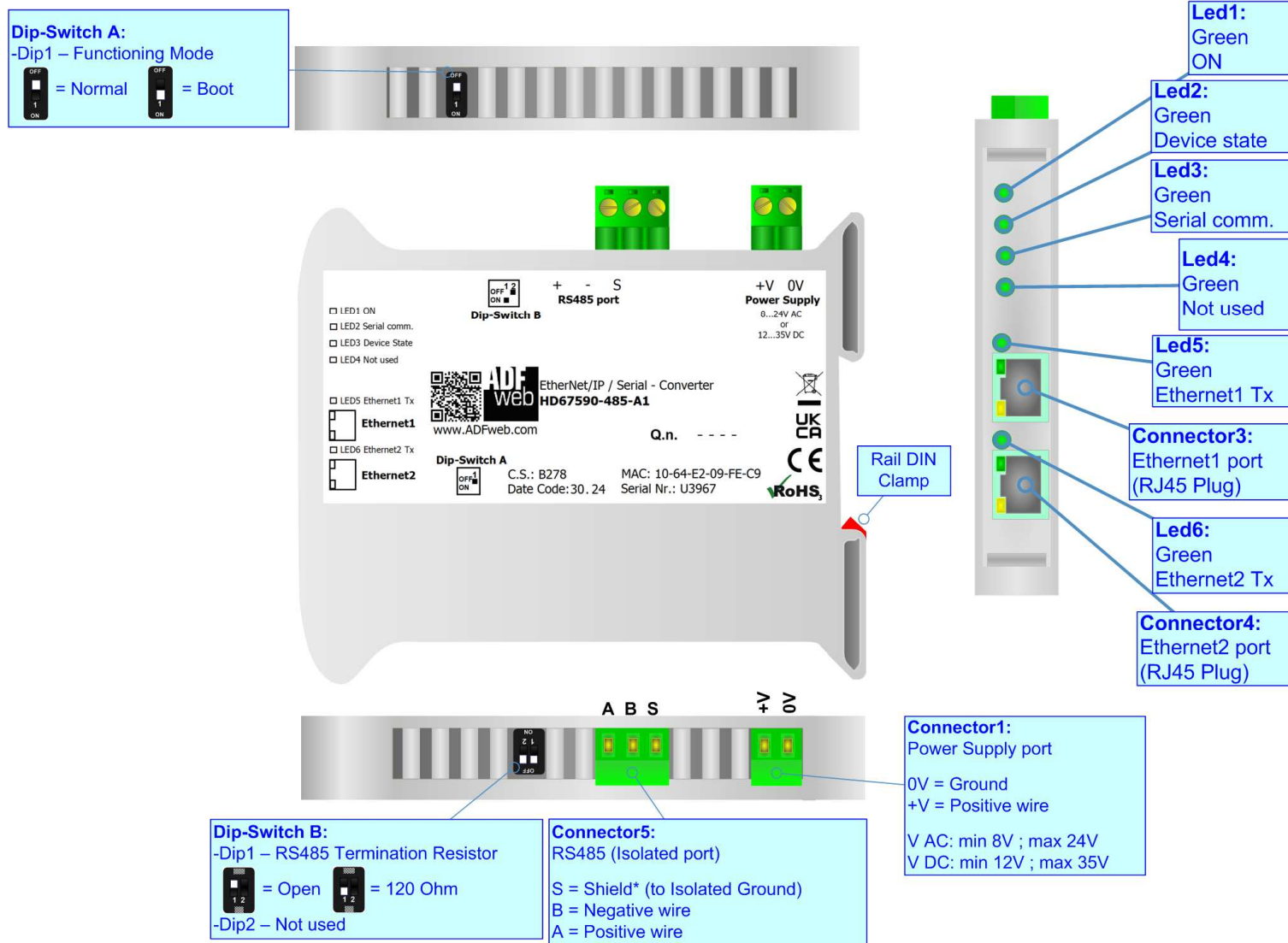
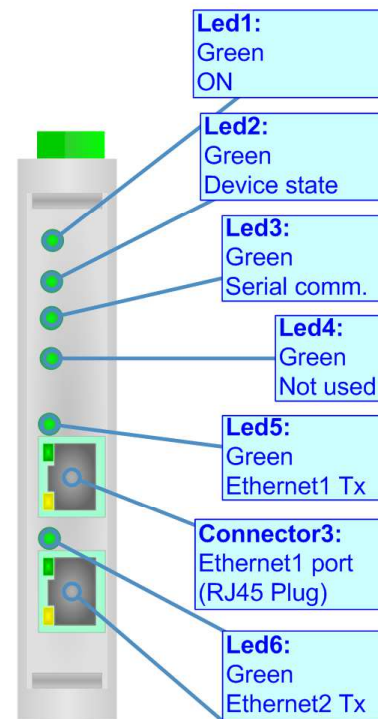
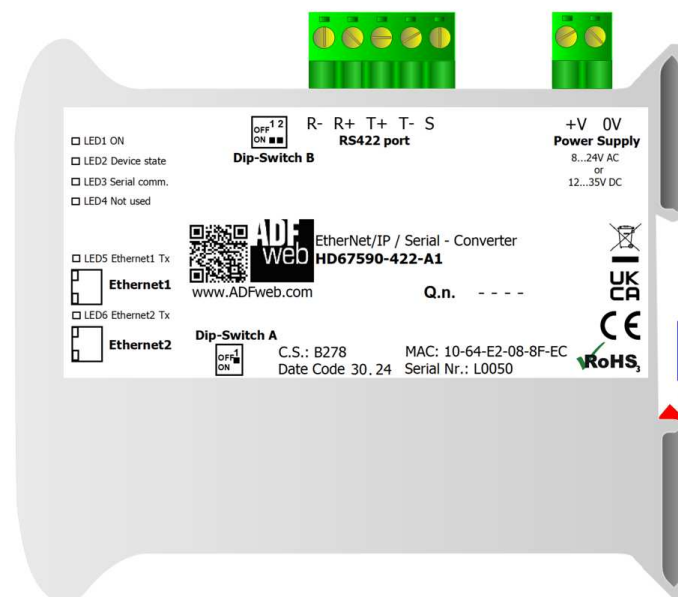
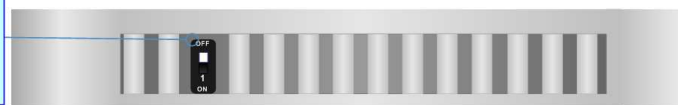


Figure 1b: Connection scheme for HD67590-485-A1

Dip-Switch A:
-Dip1 – Functioning Mode

 = Normal  = Boot



Led1:
Green
ON

Led2:
Green
Device state

Led3:
Green
Serial comm.

Led4:
Green
Not used

Led5:
Green
Ethernet1 Tx

Connector3:
Ethernet1 port
(RJ45 Plug)

Led6:
Green
Ethernet2 Tx

Connector4:
Ethernet2 port
(RJ45 Plug)

Rail DIN
Clamp

Dip-Switch B:
-Dip1 – RS422 Termination Resistor (T)
 = Open  = 120 Ohm
-Dip2 – RS422 Termination Resistor (R)
 = Open  = 120 Ohm

Connector2:
RS422 (Isolated port)
S = Shield* (to Isolated Ground)
T- = Inverting transmitter
T+ = Noninverting transmitter
R+ = Noninverting receiver
R- = Inverting receiver

Connector1:
Power Supply port
0V = Ground
+V = Positive wire
V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

Figure 1c: Connection scheme for HD67590-422-A1

CHARACTERISTICS:

The HD67590-232-A1, HD67590-485-A1 and HD67590-422-A1 are a Ethernet/IP / Serial Converter.

It allows the following characteristics:

- Up to 496 bytes in reading and 496 bytes in writing;
- Two-directional information between Serial bus and Ethernet/IP bus;
- Mountable on 35mm Rail DIN;
- Power Supply 8...24V AC or 12...35V DC;
- Temperature range -40°C to 85°C.

CONFIGURATION:

You need Compositor SW67590 software on your PC in order to perform the following:

- Define the parameter of Ethernet/IP line;
- Define the parameter of Serial line;
- Update the device.

POWER SUPPLY:

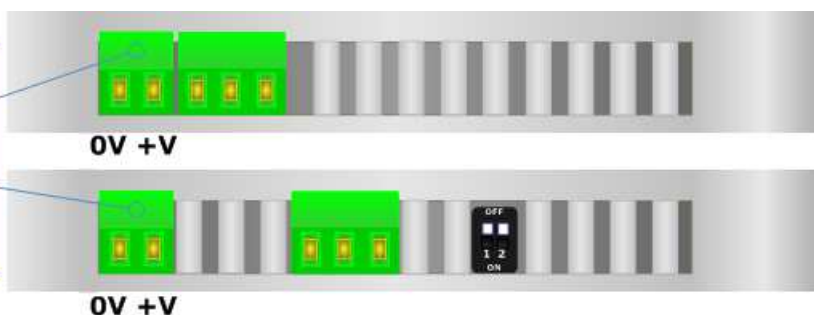
The devices can be powered at 8...24V AC and 12...35V DC. For more details see the two tables below.

VAC 		VDC 	
Vmin	Vmax	Vmin	Vmax
8V	24V	12V	35V

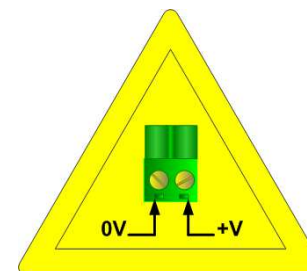
Consumption at 24V DC:

Device	Consumption [W/VA]
HD67590-232-A1	3.5
HD67590-485-A1	3.5
HD67590-422-A1	3.5

Connector1:
Power Supply port
0V = Ground
+V = Positive wire
V AC: min 8V ; max 24V
V DC: min 12V ; max 35V



Caution: Not reverse the polarity power



HD67590-xxx-A1

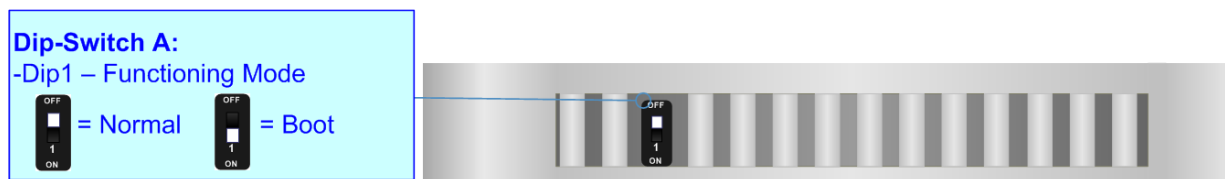
FUNCTION MODES:

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

- The first, with Dip1 in Off position (factory setting), is used for the normal working of the device.
- The second, with Dip1 in On position, is used for upload the Project/Firmware.

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

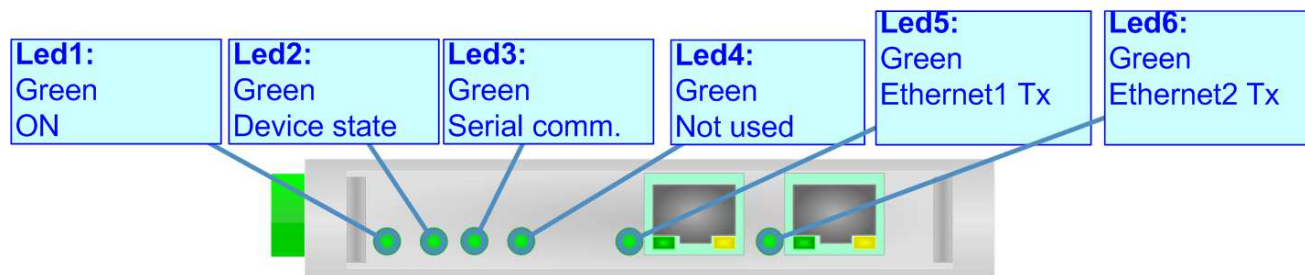
According to the functioning mode, the LEDs will have specifics functions (see 'LEDS' section).



LEDS:

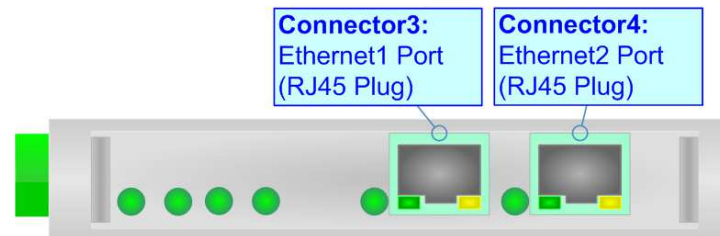
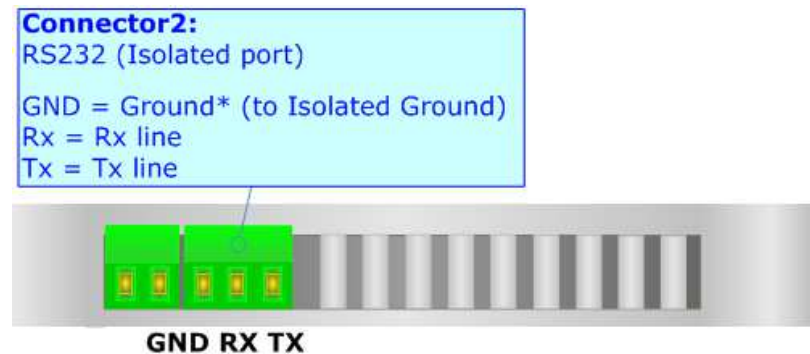
The device has got six LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: ON (green)	ON: Device powered OFF: Device not powered	ON: Device powered OFF: Device not powered
2: Device state (green)	Blinks slowly (~1Hz)	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
3: Serial comm. (green)	Blinks when Serial data are received	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
4: Not used (green)	OFF	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
5: Ethernet1 Tx (green)	Blinks when is transmitting Ethernet frames	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress
6: Ethernet2 Tx (green)	Blinks when is transmitting Ethernet frames	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress



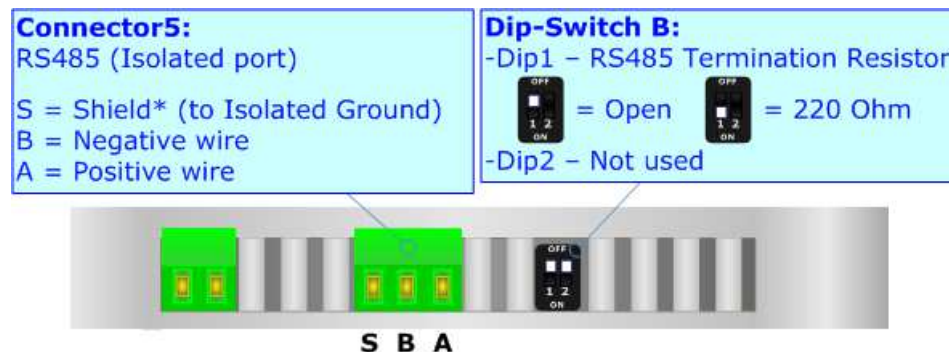
ETHERNET/IP:

The Ethernet/IP connection must be made using Connector3 and/or Connector4 of HD67590-xxx-A1 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.

**RS232:**

RS485:

For terminate the RS485 line with a 220Ω resistor it is necessary to put ON dip 1, like in figure.



The maximum length of the cable should be 1200m (4000 feet).

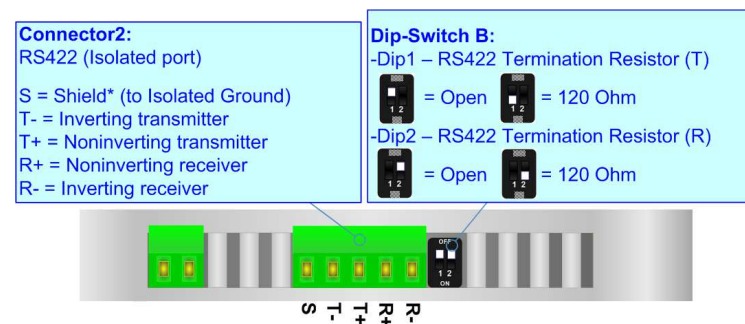
Here some codes of cables:

- Belden: p/n 8132 - 2x 28AWG stranded twisted pairs conductor + foil shield + braid shield;
- Belden p/n 82842 - 2x 24AWG stranded twisted pairs conductor + foil shield + braid shield;
- Tasker: p/n C521 - 1x 24AWG twisted pair conductor + foil shield + braid shield;
- Tasker: p/n C522 - 2x 24AWG twisted pairs conductor + foil shield + braid shield.

RS422:

For terminate the RS422 line with a 120Ω resistor it is necessary to put ON dip 1 for T line and/or put ON dip 2 for R line, like in figure.

The maximum length of the cable should be 1200m (4000 feet).



USE OF COMPOSITOR SW67590:

To configure the Converter, use the available software that runs with Windows called SW67590. It is downloadable on the site www.adfweb.com and its operation is described in this document. *(This manual is referenced to the last version of the software present on our web site)*. The software works with MSWindows (XP, Vista, Seven, 8, 10 or 11; 32/64bit).

When launching the SW67590, the window below appears (Fig. 2).

**Note:**

It is necessary to have installed .Net Framework 4.

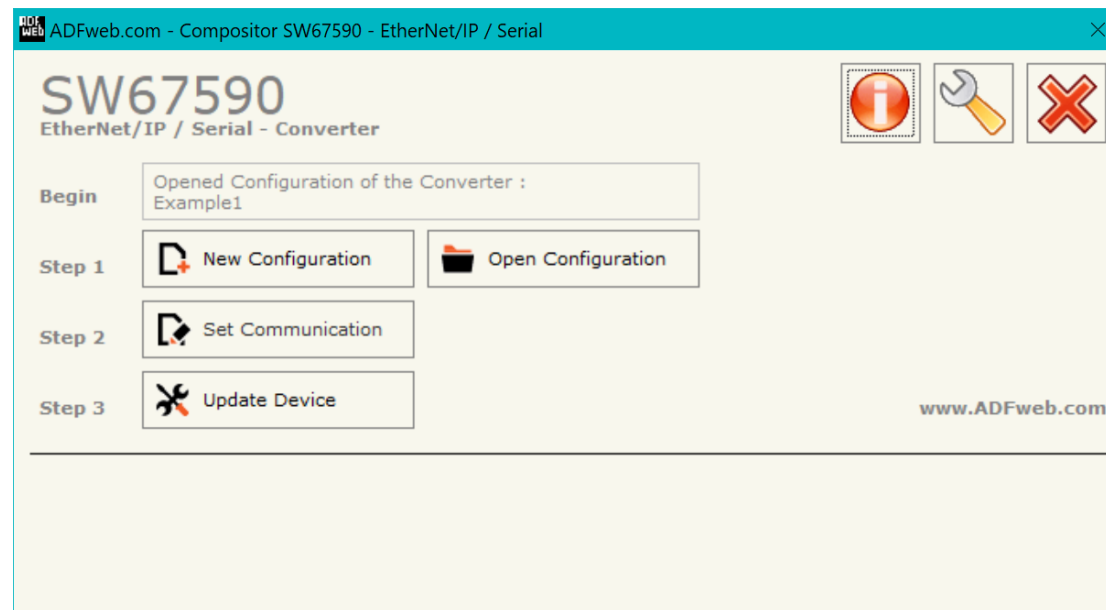
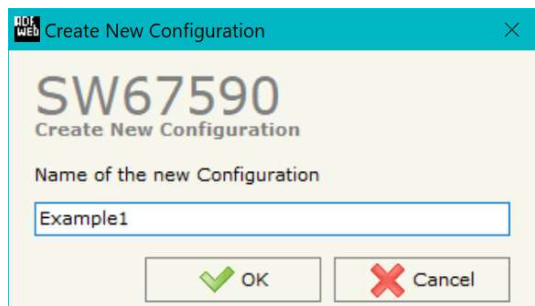


Figure 2: Main window for SW67590

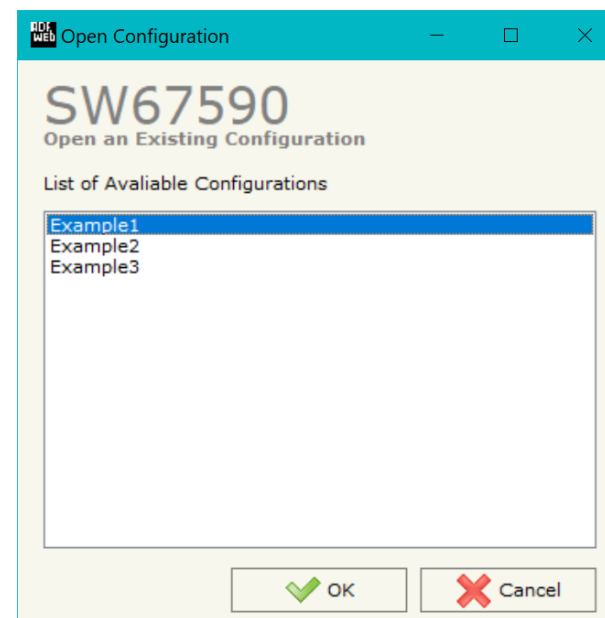
NEW CONFIGURATION / OPEN CONFIGURATION:

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




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

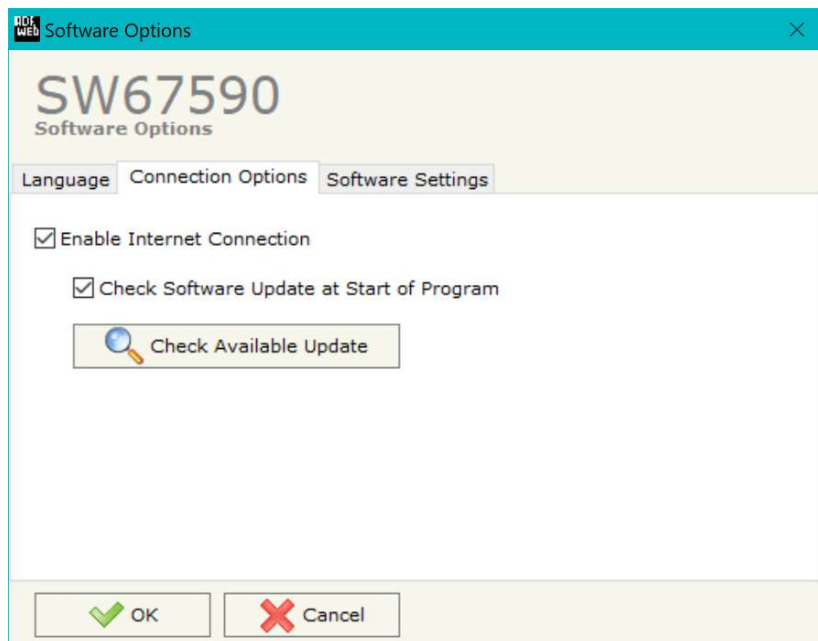
- To clone the configurations of a Programmable “Ethernet/IP / Serial - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate 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 SW67590 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, EtherNet/IP and Serial.

By Pressing the "**Set Communication**" button from the main window for SW67590 (Fig. 2) the window "Set Communication" appears (Fig. 3).

The window is divided in two sections, one for the EtherNet/IP and the other for the Serial.

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

- In the fields "**IP ADDRESS**" insert the IP address that you want to give to the Converter;
- In the fields "**SUBNET Mask**" insert the SubNet Mask;
- In the fields "**GATEWAY**" insert the default gateway that you want to use. 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 for the EtherNet/IP communication is defined (fixed to '44818').

The means of the fields for the "Serial" section are:

- In the field "**Serial**" the serial to use is defined (RS232 or RS485);
- In the field "**Baudrate**" the baudrate for the serial line is defined;
- In the field "**Parity**" the parity of the serial line is defined.
- In the field "**DataBits**" the number of data bits used for the serial line communication is defined.

The screenshot shows the 'Set Communication' window for device SW67590. The window has a title bar with the ADFweb logo and a close button. The main content area is titled 'SW67590 Set Communication Setting'. It is divided into two sections: 'EtherNet/IP' and 'Serial'. The 'EtherNet/IP' section includes fields for IP ADDRESS (192.168.0.10), SUBNET Mask (255.255.255.0), a checkbox for GATEWAY (unchecked), and a Port field (44818). The 'Serial' section includes a dropdown for Serial (RS485), a dropdown for Baudrate (115200), a dropdown for Parity (NONE), and a dropdown for Data Bits (8 Bits). At the bottom are 'OK' and 'Cancel' buttons.

Figure 3: "Set Communication" window

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 4: “Update device” windows

**Note:**

When you receive the device, for the first time, you also have to update the Firmware in the HD67590 device.

**Warning:**

If Fig. 5 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, 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, 11 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

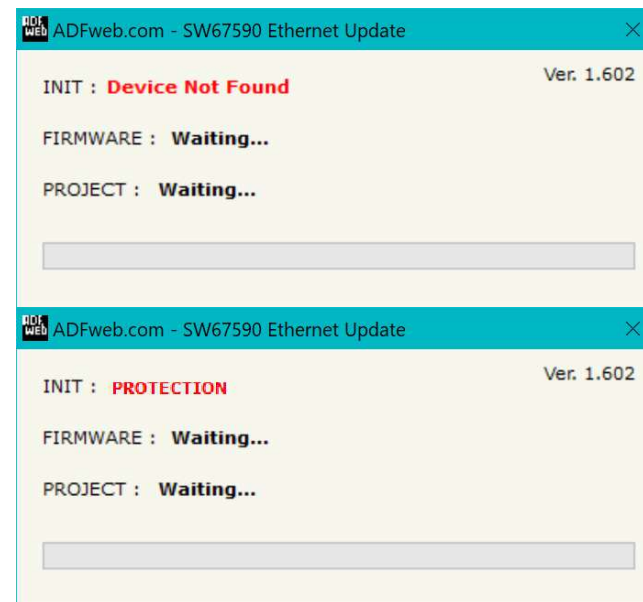


Figure 5: "Error" window

**Warning:**

In the case of HD67590 you have to use the software "HD67590": www.adfweb.com/download/filefold/SW67590.zip.

SERIAL PROTOCOL:

To send/receive EtherNet/IP data from a master device, it is necessary to follow these instructions:

Master EtherNet/IP → HD67590-xxx-A1

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
YY	ZZ	Data...data

In the byte ZZ and the less significant bit of YY the length of data that follow must be written; the most significant bit of YY must be toggled every time a new message must be sent on serial.

Byte 0 (YY)								Byte 1 (ZZ)							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	0	0	0	0	0	0									

	Toggle between 0 and 1
	0...498 (number of bytes to send on serial)
0	"0" must be written

Examples:

- Send on serial 4 bytes: 00 04 01 02 03 04
- Send again the same 4 bytes: 80 04 01 02 03 04
- Send 8 bytes: 00 08 05 06 07 08 09 0A 0B 0C

HD67590-xxx-A1 → Master EtherNet/IP

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 7	Byte 6
YY	ZZ	Data...data

In the byte ZZ and the less significant bit of YY the length of data that follow is written; the other bits are used for send a progressive number .

Byte 0 (YY)								Byte 1 (ZZ)							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

	0...127 (counter incremented after every frame received)
	0...498 (number of bytes received from serial)

Examples:

- Received on serial 4 bytes: 02 04 01 02 03 04
- Received the same 4 bytes again: 04 04 01 02 03 04
- Received 8 bytes: 06 08 05 06 07 08 09 0A 0B 0C



Note:

The time for considering the receiving frame finished is when there is a idle time between bytes of 4tbit.



Note:

If the Converter receives more than 496 bytes in a single frame, the remaining bytes are deleted and only the firsts 496 are sent to the Master EtherNet/IP.

MECHANICAL DIMENSIONS:

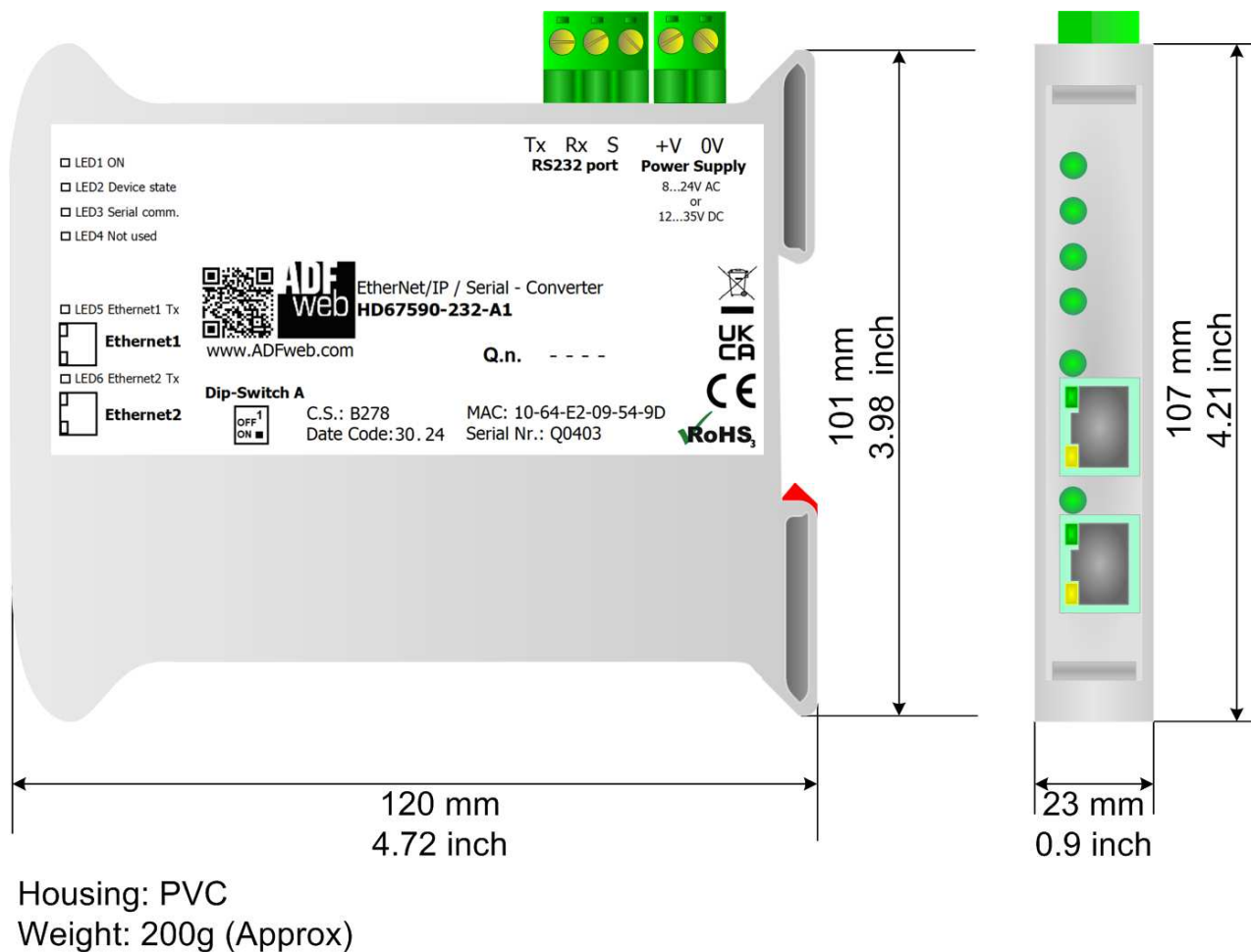
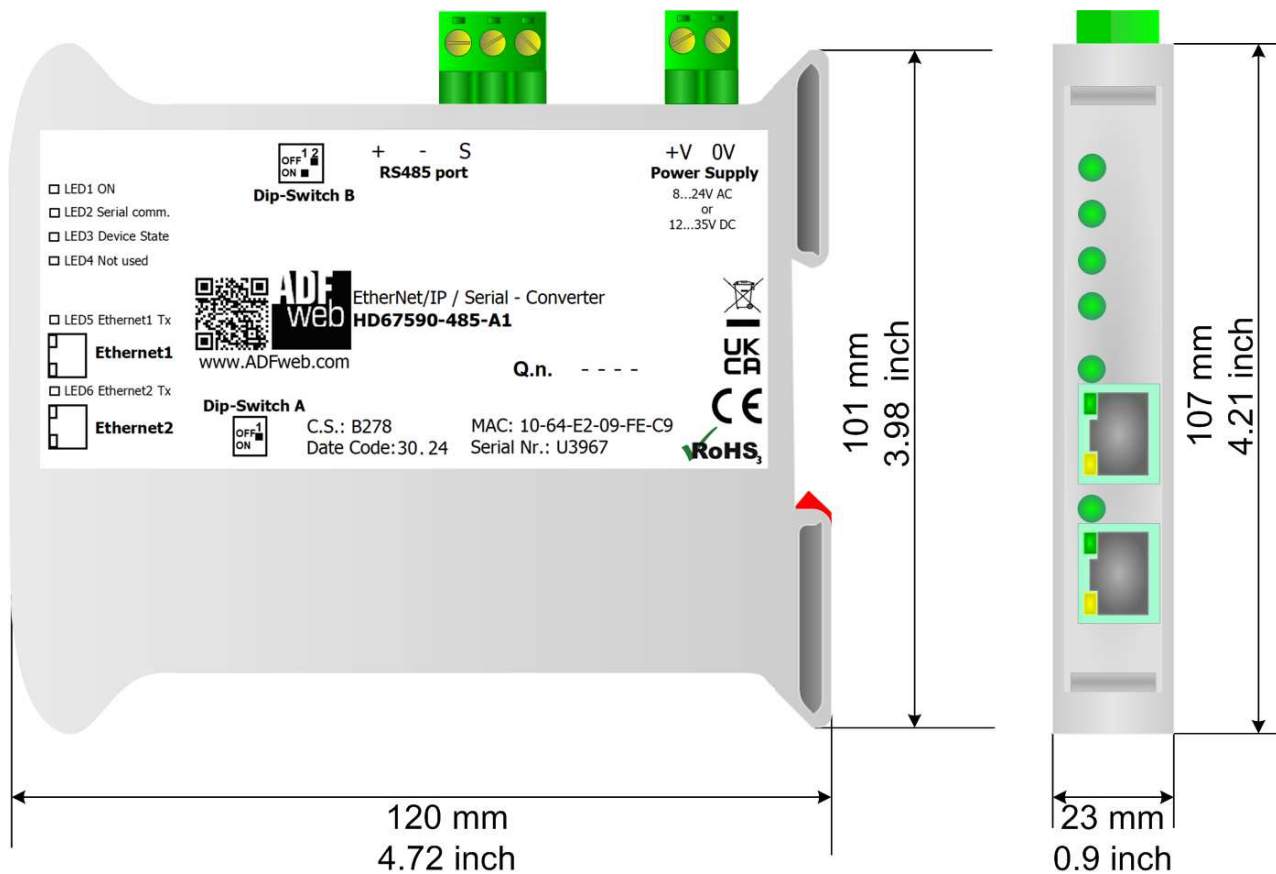
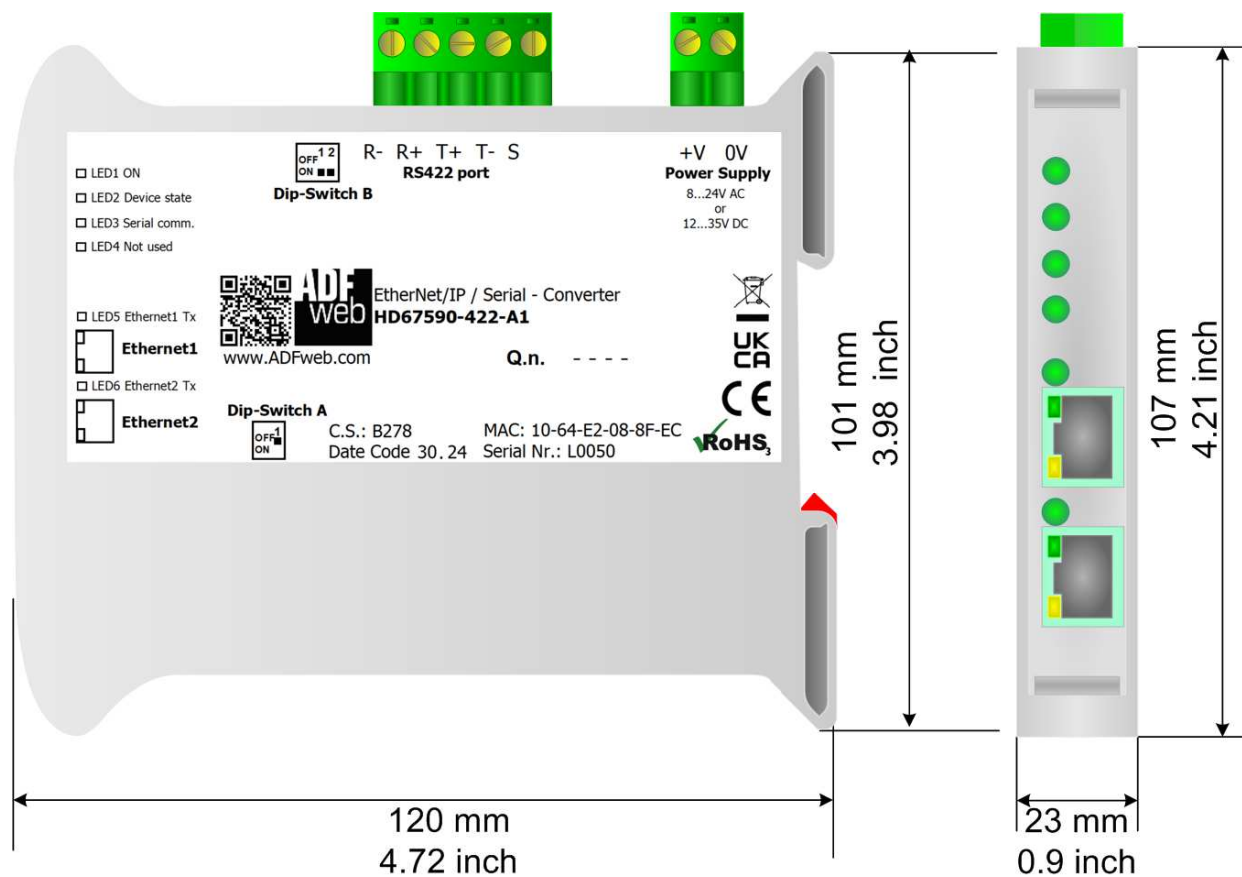


Figure 6a: Mechanical dimensions scheme for HD67590-232-A1



Housing: PVC
Weight: 200g (Approx)

Figure 6b: Mechanical dimensions scheme for HD67590-485-A1



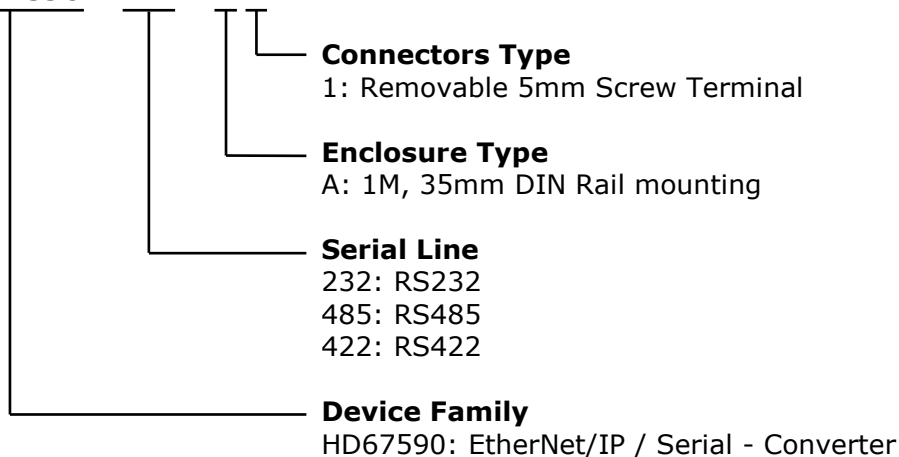
Housing: PVC
Weight: 200g (Approx)

Figure 6c: Mechanical dimensions scheme for HD67590-422-A1

ORDERING INFORMATION:

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

HD67590 - xxx - A 1



Order Code: **HD67590-232-A1** - EtherNet/IP / Serial - Converter (RS232 serial)

Order Code: **HD67590-485-A1** - EtherNet/IP / Serial - Converter (RS485 serial)

Order Code: **HD67590-422-A1** - EtherNet/IP / Serial - Converter (RS422 serial)

ACCESSORIES:

Order Code: **AC34011** - 35mm Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V DC

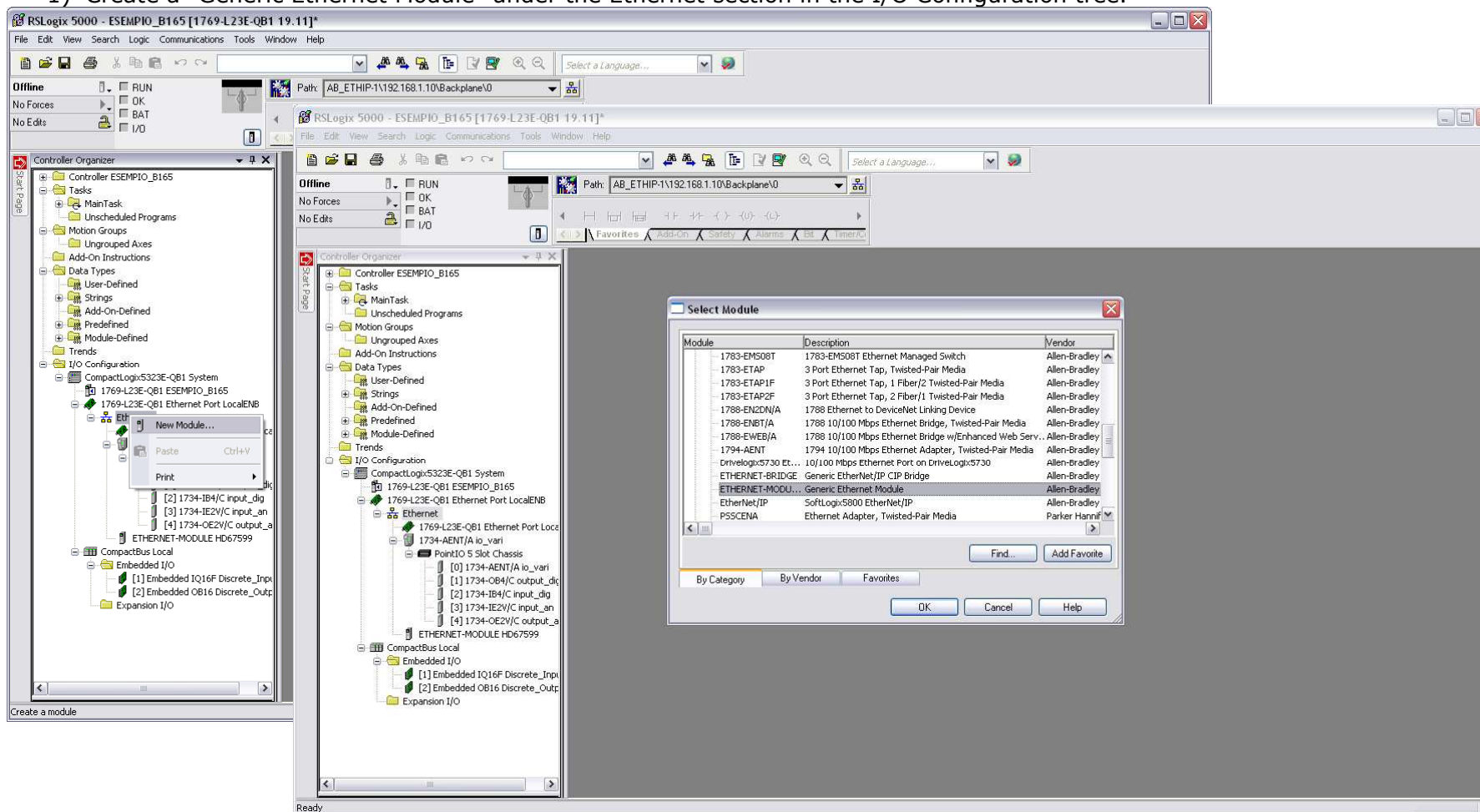
Order Code: **AC34012** - 35mm Rail DIN - Power Supply 220/240V AC 50/60Hz – 24 V DC

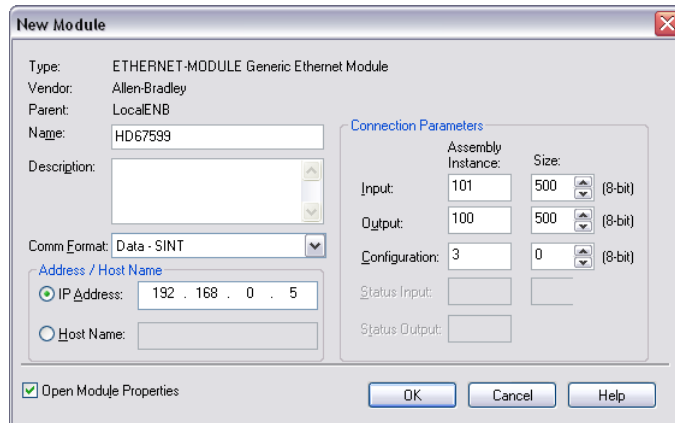
PLC CONFIGURATION:

The configuration and commissioning of the EtherNet/IP Converter as described on the following pages was accomplished with the help of the "RSLogix 5000" software of Rockwell Automation. In case of using a control system from another supplier please attend to the associated documentation.

These are the steps to follow:

- 1) Create a "Generic Ethernet Module" under the Ethernet section in the I/O Configuration tree.





2) Edit the settings of the new Generic Ethernet Module. As shown in the screen shot below, the module was named "HD67590" and the IP-address assigned is 192.168.0.5.

For the Comm Format "Data - SINT" shall be selected as the data type.

The HD67590-xxx-A1 can use up to 496 bytes for input assembly instance 101 and 496 bytes for output assembly instance 100.

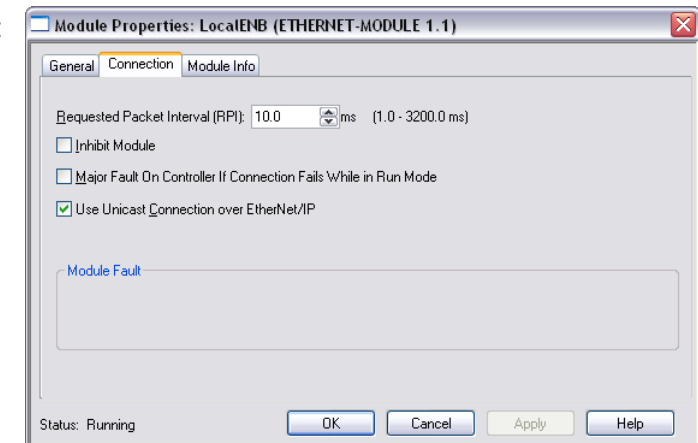
RSLogix 5000 requires a configuration assembly instance. Both modules do not provide a configuration assembly instance. Therefore it is allowed to select an instance of 3 and to set the value to zero.

3) The setting of 10msec for the "Requested Packet Interval (RPI)" is adequate but it is possible to change this value as required. A lower value of 2ms shall not be selected.



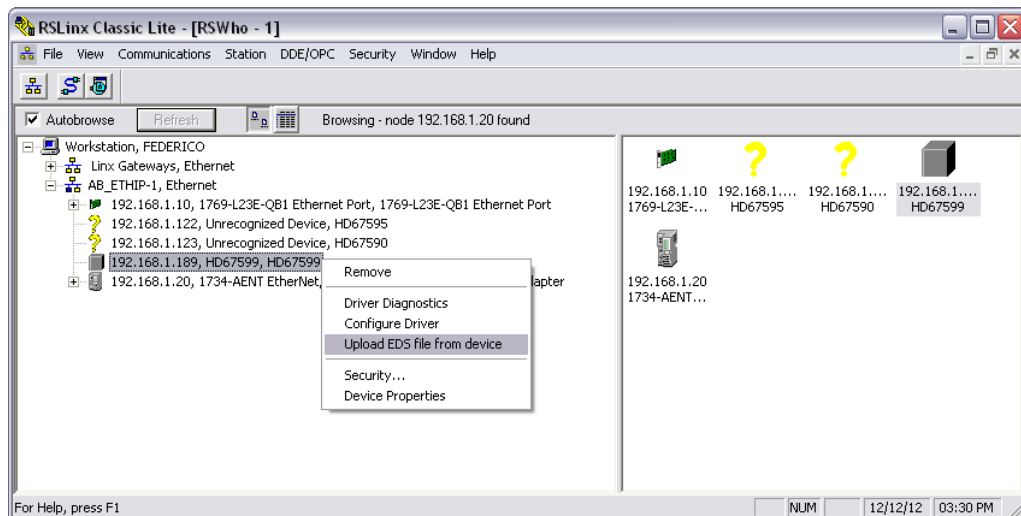
Warning:

The field "Use Unicast Connection over EtherNet/IP" must be checked.

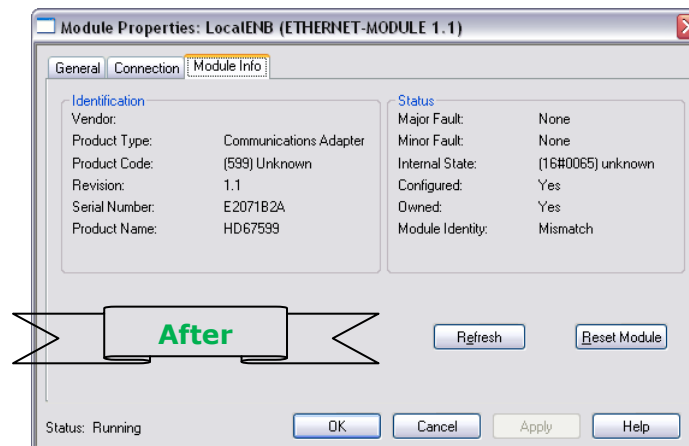
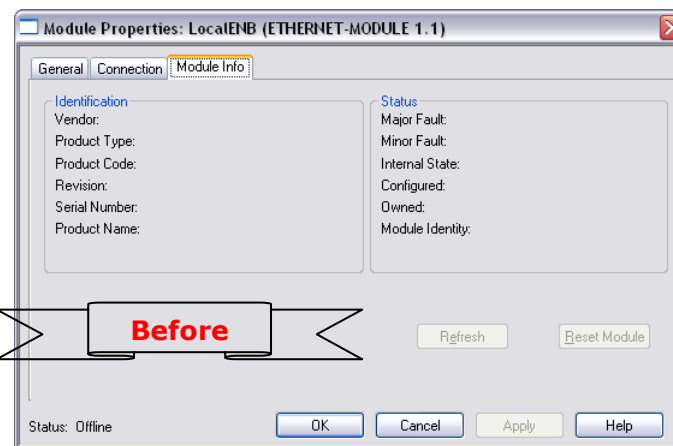


4) After the configuration is completed, the controller tags are created.

[illegible]



5) With "RSLinx Classic Lite", after have done a network scan (RSWho), and finding the EtherNet/IP device, it is possible to load the EDS file for the device in order to have the "Module Info" compiled.



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- 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.
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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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