USER MANUAL
RS232/RS485/CANopen/Ethernet FO Converters

Sample pic

SENECA S.r.l.
Via Austria 26 – 35127 – Z.I. - PADOVA (PD) - ITALY
Tel. +39.049.8705359 – 8705355 Fax +39 049.8706287
www.seneca.it

ORIGINAL INSTRUCTIONS

Preface

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This documentation is expressly addressed to qualified technicians: as such, certain information that is easily inferable from a reading of the texts and from a review of the drawings may not be further explained.

The editor is no way responsible for the information and data reported in this manual: all the information herein contained have been provided, checked, and approved under scrutiny by the manufacturer/agent.

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General remarks

All operating instructions, maintenance and recommendations described in this manual must be respected.

It is very important the training of the personnel responsible for the device, both as regards to its installation, programming and set-up as monitoring of the compliance with the operating procedures and all safety rules outlined in this manual.

In no event will SENECA S.r.l. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes.

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Document revisions

DATE	REVISION	NOTES
18/01/2015	0	First revision
04/02/2016	1	Added new converters and relative configurations
26/07/2016	2	Added DIP-switch configuration table

Throughout this manual we use notes to make you aware of safety considerations:

WARNING!	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment or which may lead to personal injury or death, property damage or economic loss

NOTE	Identifies information that is critical for successful application and understanding the product.

ATTENTION!	Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss. Attention help you to: • identify a hazard • avoid a hazard • recognize the consequence

SHOCK HAZARD	Labels may be located on or inside the drive to alert people that dangerous voltage may be present.

SHOCK HAZARD	Labels may be located on or inside the drive to alert people that high temperatures may be present on the surfaces.

More information

ITA - http://www.seneca.it/linee-di-prodotto/comunicazione-industriale-e-telecontrollo/convertitori-fibra-ottica/
ENG - http://www.seneca.it/en/linee-di-prodotto/comunicazione-industriale-e-telecontrollo/convertitori-fibra-ottica/

CONTACT US	
Technical support	supporto@seneca.it
Product information	commerciale@seneca.it – sales@seneca.it

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DEVICE DESCRIPTION AND CONFIGURATION

The following products are Copper / Optical Fiber Converters:

Product Codes	Description	Connectors	Configuration method
S232-FO-MONO-SL	RS232 - single mode fiber, single loop converter	LC-LC	SENECA Compositor
S232-FO-MONO-DL	RS232 - single mode fiber, double loop converter	LC-LC	SENECA Compositor
S232-FO-MULTI-SL	RS232 - multimode fiber, single loop converter	LC-LC	SENECA Compositor
S232-FO-MULTI-DL	RS232 - multimode fiber, double loop converter	LC-LC	SENECA Compositor
S485-FO-MONO-SL	RS485 - single mode fiber, single loop converter	LC-LC	SENECA Compositor
S485-FO-MONO-DL	RS485 - single mode fiber, double loop converter	LC-LC	SENECA Compositor
S485-FO-MULTI-SL *	**RS485 - multimode fiber, single loop converter**	**ST-ST**	**DIP-Switch**
S485-FO-MULTI-DL *	**RS485 - multimode fiber, double loop converter**	**ST-ST**	**DIP-Switch**
SCAN-FO-MONO-SL	CAN - single mode fiber, single loop converter	LC-LC	SENECA Compositor
SCAN-FO-MONO-DL	CAN - single mode fiber, double loop converter	LC-LC	SENECA Compositor
SCAN-FO-MULTI-SL	CAN - multimode fiber, single loop converter	LC-LC	SENECA Compositor
SCAN-FO-MULTI-DL	CAN - multimode fiber, double loop converter	LC-LC	SENECA Compositor
SETH-FO-MONO-SL	Ethernet - single mode fiber, single loop converter	LC-LC	SENECA Compositor
SETH-FO-MONO-DL	Ethernet - single mode fiber, double loop converter	LC-LC	SENECA Compositor
SETH-FO-MULTI-SL	Ethernet - multimode fiber, single loop converter	LC-LC	SENECA Compositor
SETH-FO-MULTI-DL	Ethernet - multimode fiber, double loop converter	LC-LC	SENECA Compositor
Accessories	**Description**		
CU-A-MINIB-1	USB type A - miniUSB cable with 1 m lenght		
CU-A-MINIB-2	USB type A - miniUSB cable with 2 m lenght		
CE-RJ45-RJ45-C	Ethernet cable RJ45 (cross) with 1 m length		
CE-RJ45-RJ45-R	Ethernet cable RJ45 (right) with 1 m lenght		

They have the following characteristics:
- Triple isolation between Bus (copper) - Power Supply, Bus (copper) – Optical Fiber, Power Supply – Optical Fiber;
- Mountable on 35mm DIN rail;
- Two-directional information between Bus (copper) and Optical Fiber;
- Wide power supply input range: 8…24V AC or 12…35V DC;
- Wide temperature range: -40°C / 85°C [-40°F / +185°F].

For the configuration you need **SENECA Compositor** software * on your PC. With this tool you can:
- Define the parameters of RS232/RS485/CAN/Ethernet line;
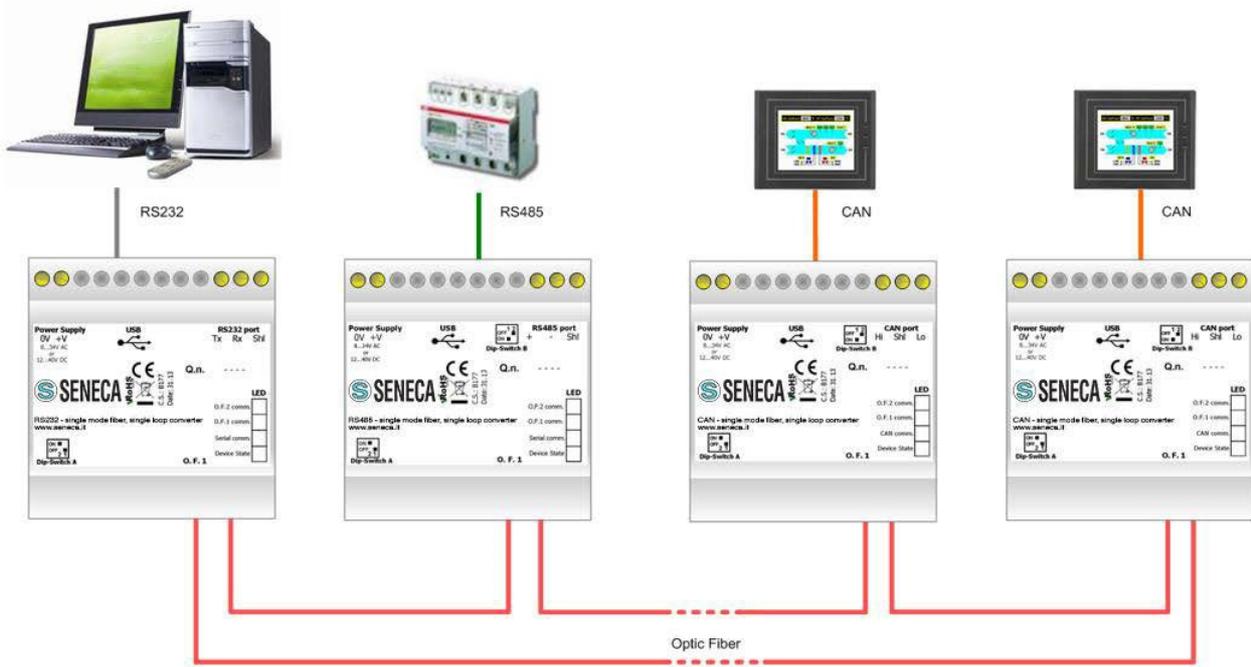- Define the I/O map (if I/O module is present);
- Update the device.

Benefits and Main Features
- Resistant to harsh environmental specifications
- Electrical isolation
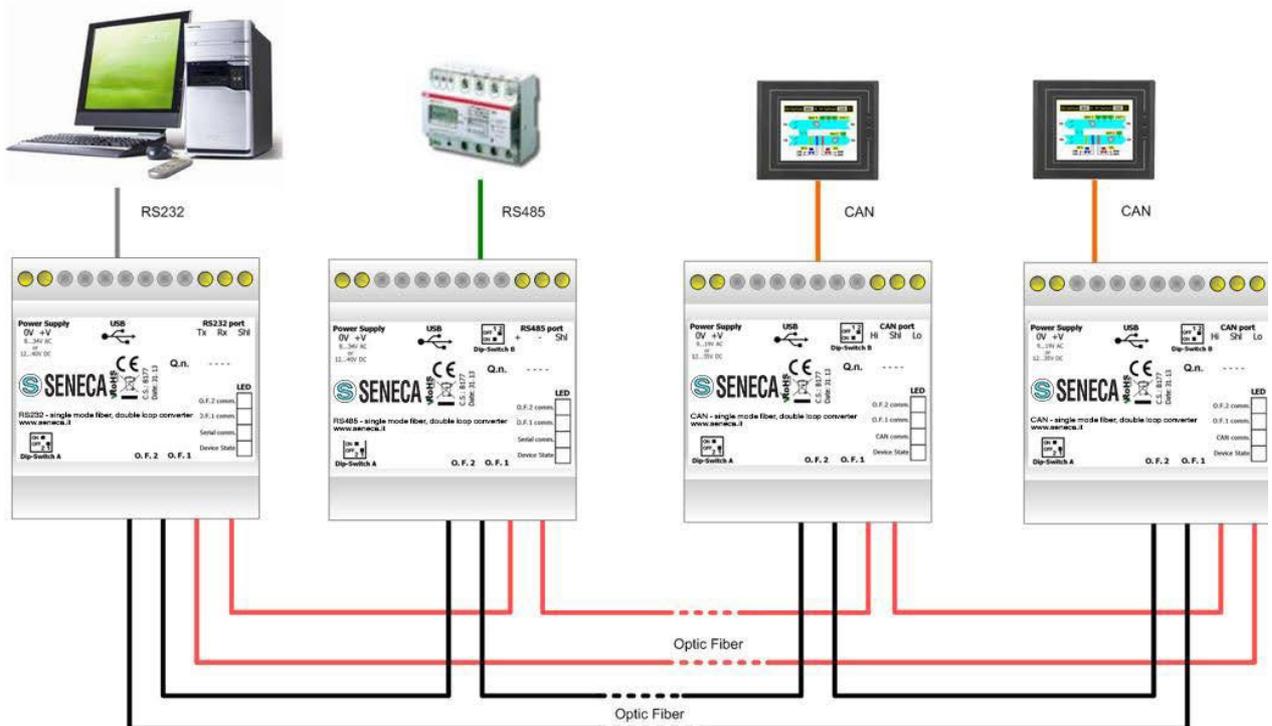- Temperature range: -40°C / 85°C (-40°F / 185°F)

(*) S485-FO-MULTI-SL and S485-FO-MULTI-DL are only programmable via DIP-switch.

EXAMPLE OF CONNECTION:

SINGLE LOOP
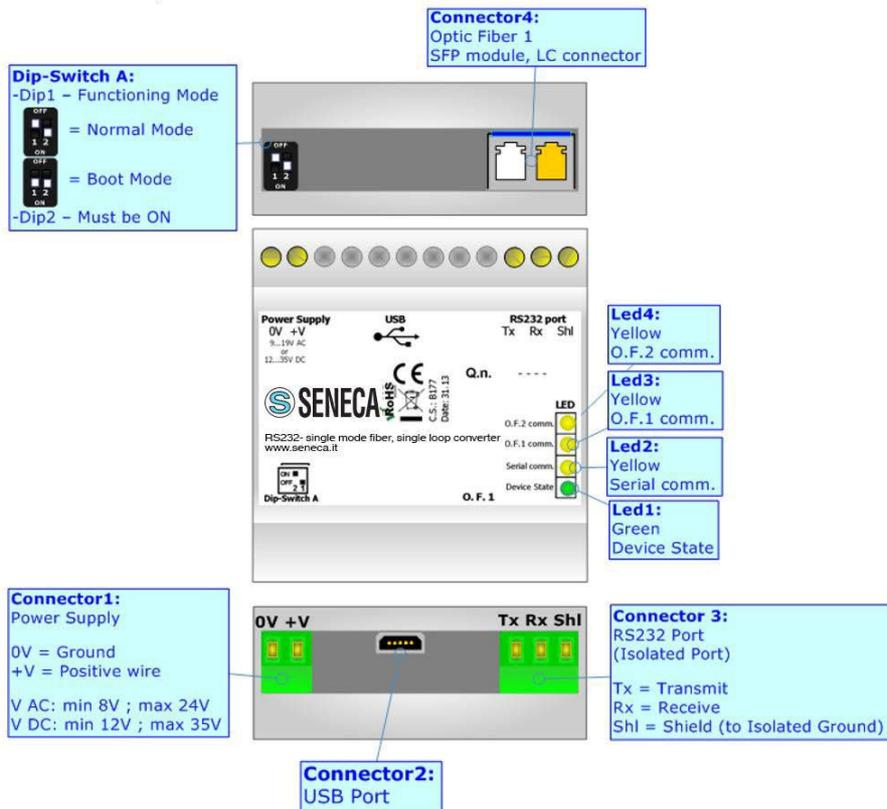

DOUBLE LOOP

CONNECTION SCHEME:

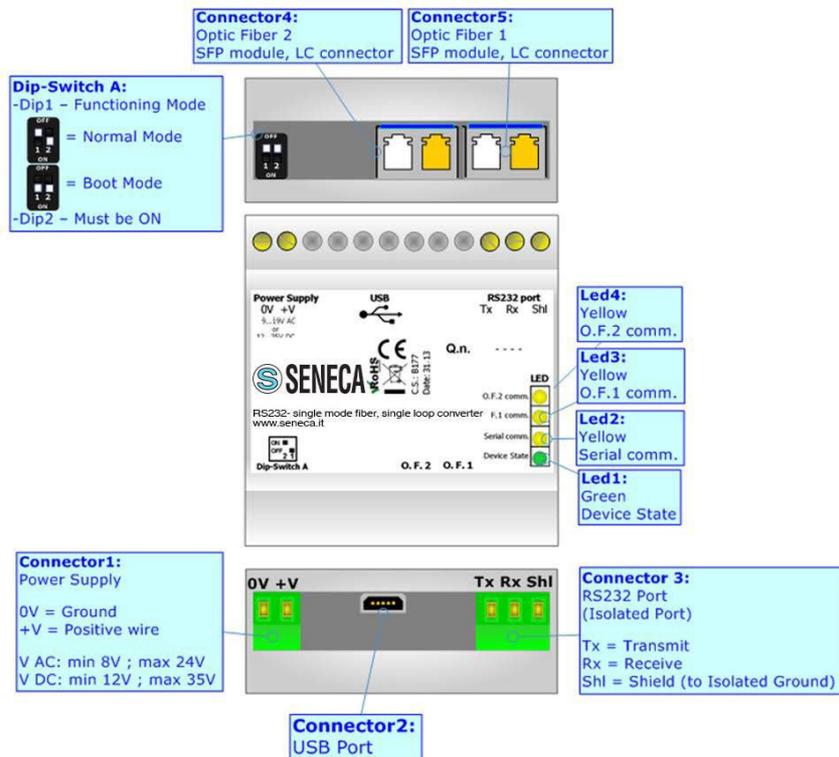*Figure 1a: Connection Scheme for S232-FO-MONO-SL*

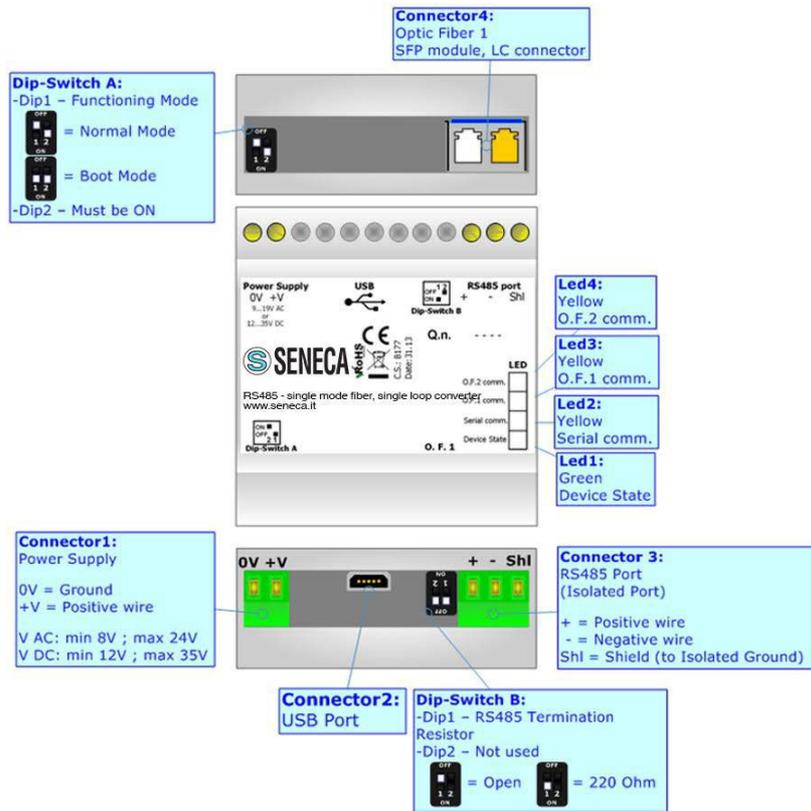*Figure 1b: Connection Scheme for S232-FO-MONO-DL*

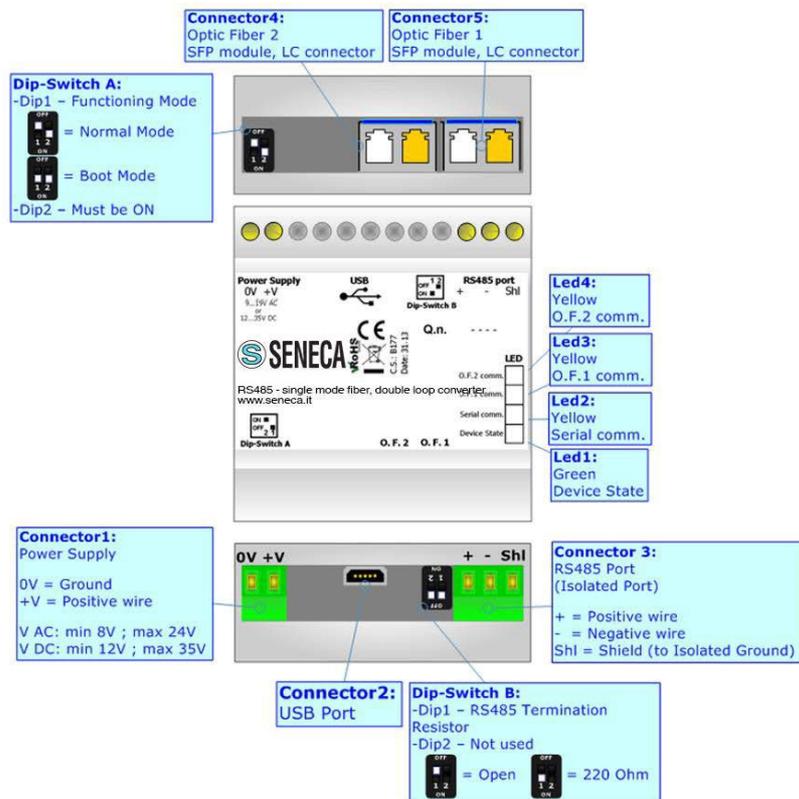*Figure 1c: Connection Scheme for S485-FO-MONO-SL*
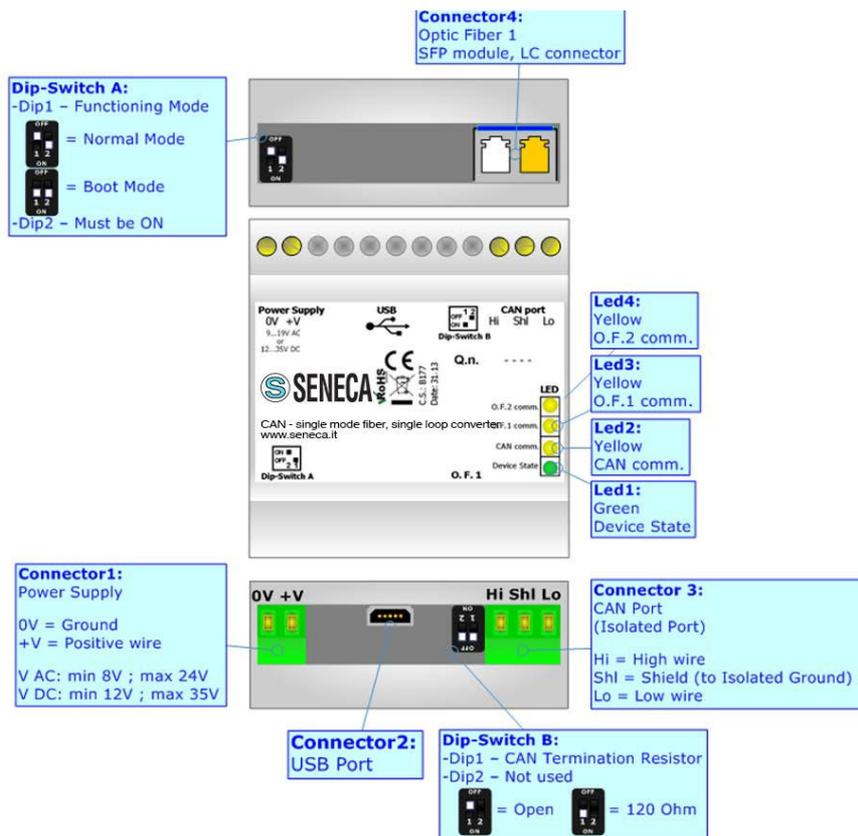

Figure 1d: Connection Scheme S485-FO-MONO-DL
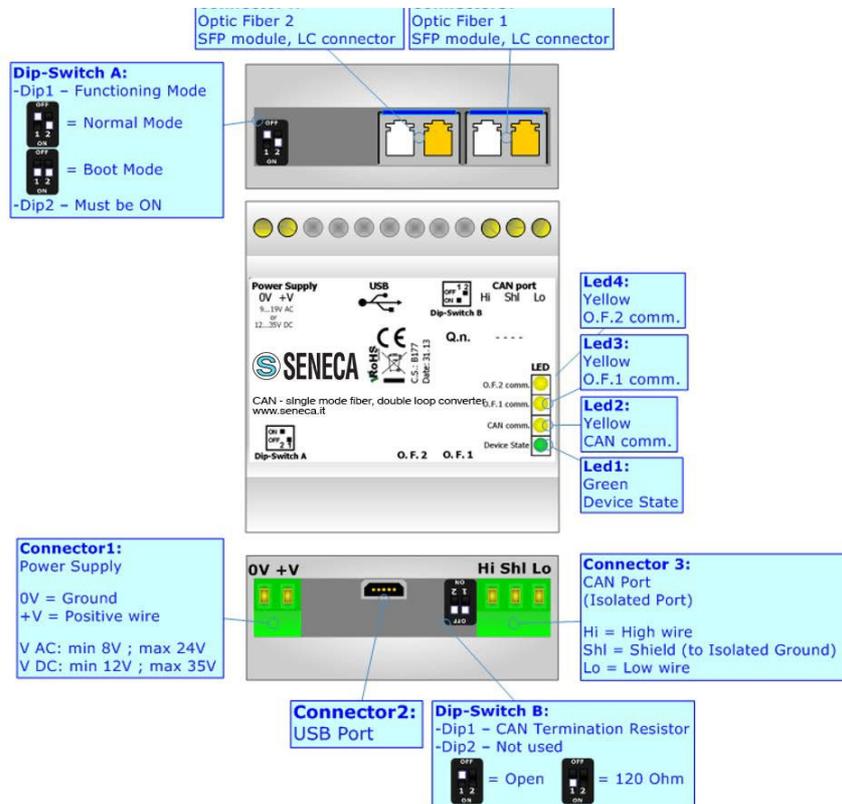
Figure 1e: Connection Scheme for SCAN-FO-MONO-SL

Figure 1f: Connection Scheme for SCAN-FO-MONO-DL

Normal Mode
IP: 192.168.90.101
SM: 255.255.255.0

Boot Mode
IP: 192.168.2.205
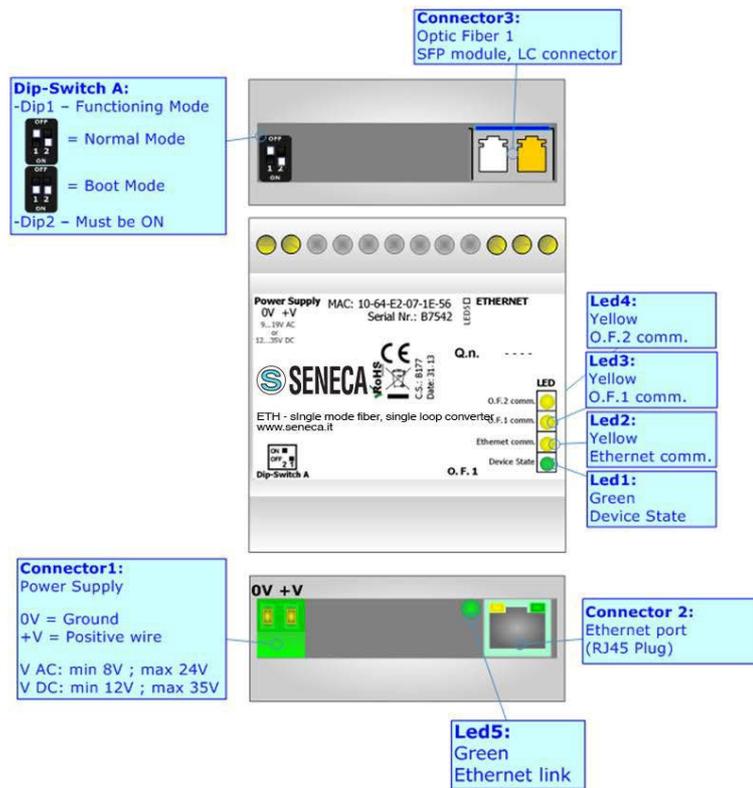*SM: 255.255.255.0*

Figure 1g: Connection Scheme for SETH-FO-MONO-SL

Normal Mode
IP: 192.168.90.101
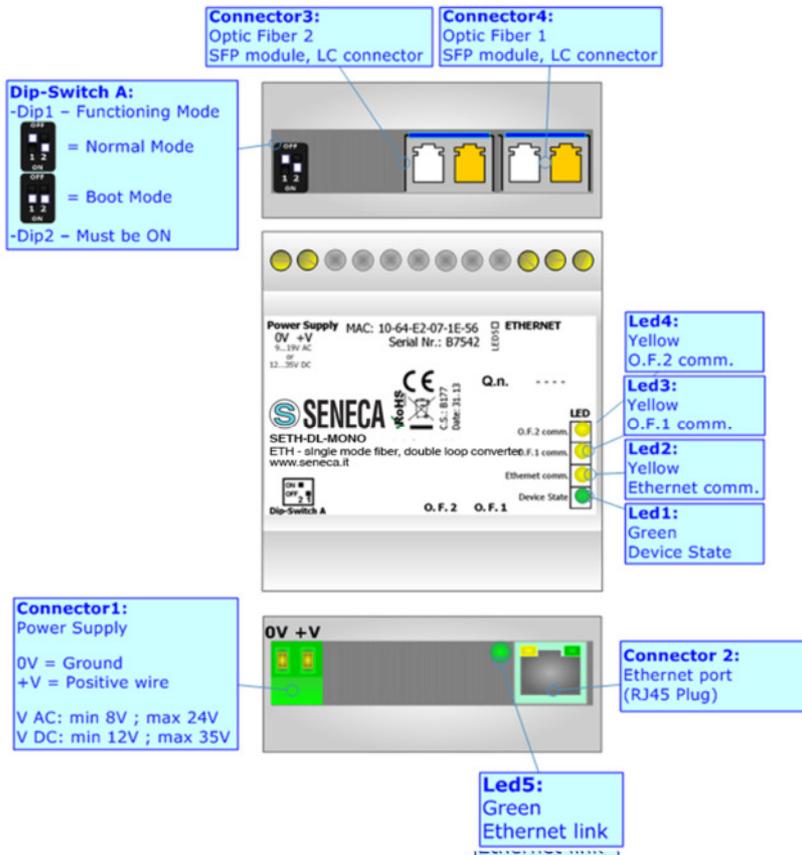*SM: 255.255.255.0*

Boot Mode
IP: 192.168.2.205
SM: 255.255.255.0

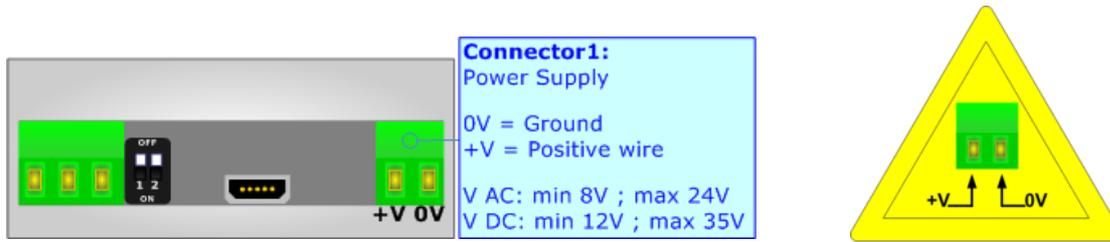*Figure 1h: Connection Scheme for SETH-FO-MONO-DL*

Normal Mode
IP: 192.168.90.101
SM: 255.255.255.0

Boot Mode

POWER SUPPLY:

The devices can be powered at 8...19V 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]
Optical fiber converters	3.5

Caution: Not reverse the polarity power

Connector1:
Power Supply

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

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.

Dip-Switch A:
-Dip1 – Functioning Mode

= Normal Mode

= Boot Mode

-Dip2 – Must be ON
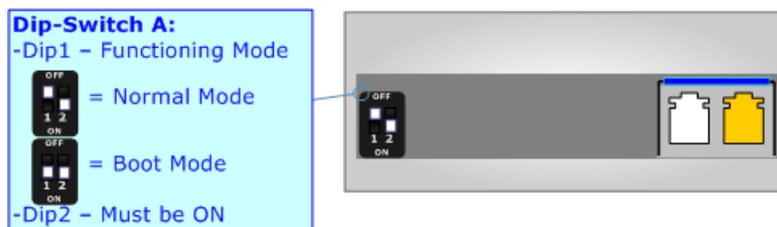
Warning:
Dip2 of 'Dip-Switch A' must be at ON position for working even if the Ethernet cable isn't inserted.

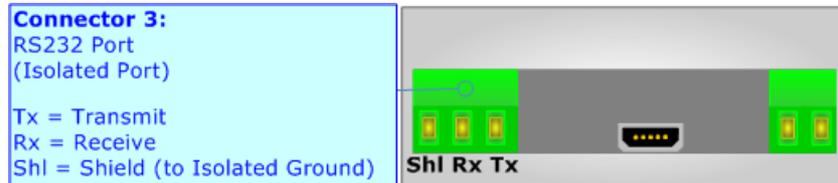**www.seneca.it** | Doc. MI00425 | Rev. 2 | Page 11 |

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.

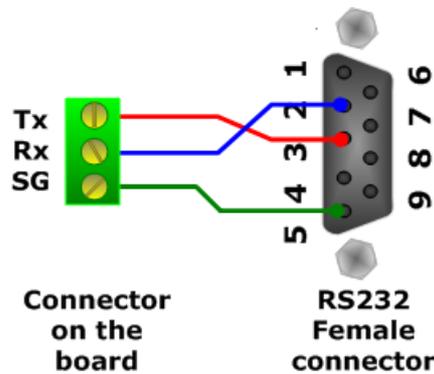| LED	Normal Mode	Boot Mode
1: Device State (green)	Blinks slowly (~1Hz)	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
2: Bus comm. (yellow)	Blinks quickly for a short time when a frame is received (Serial, CAN or Ethernet)	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
3: O.F.1 comm. (yellow)	Blinks quickly for a short time when data on Optical Fiber 1 is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: O.F.2 comm. (yellow)	Blinks quickly for a short time when data on Optical Fiber 2 is received	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
5: Ethernet Link (green) (only for SETH-FO-MONO-SL, SETH-FO-MONO-DL, SETH-FO-MULTI-SL, SETH-FO-MULTI-DL)	**ON:** Ethernet cable inserted **OFF:** Ethernet cable not inserted	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
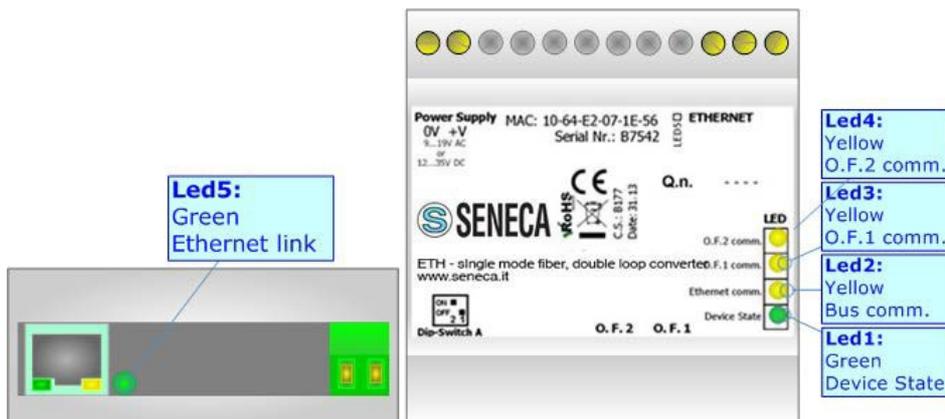
RS232 (S232-FO-MONO-SL, S232-FO-MONO-DL, S232-FO-MULTI-SL, S232-FO-MULTI-DL):

The connection from RS232 socket to a serial port must be made with a cable with these characteristics:

Connector 3:
RS232 Port
(Isolated Port)

Tx = Transmit
Rx = Receive
Shl = Shield (to Isolated Ground)

Shl Rx Tx

It is recommended that the cable not exceed 15 meters.

Tx
Rx
SG

Connector on the board

RS232 Female connector

RS485 (S485-FO-MONO-SL, S485-FO-MONO-DL, S485-FO-MULTI-SL, S485-FO-MULTI-DL):

Connector 3:
RS485 Port
(Isolated Port)

+ = Positive wire
 - = Negative wire
Shl = Shield (to Isolated Ground)

Dip-Switch B:
-Dip1 – RS485 Termination Resistor
-Dip2 – Not used

= Open   = 220 Ohm

Shl - +   +V 0V

For terminate the RS485 line with a 220Ω resistor it is necessary that the 'Dip1' of the Dip-Switch B is at ON position.

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.

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DIP SWITCH CONFIGURATION FOR S485-FO-MULTI-SL AND S485-FO-MULTI-DL

S485-FO-MULTI-SL
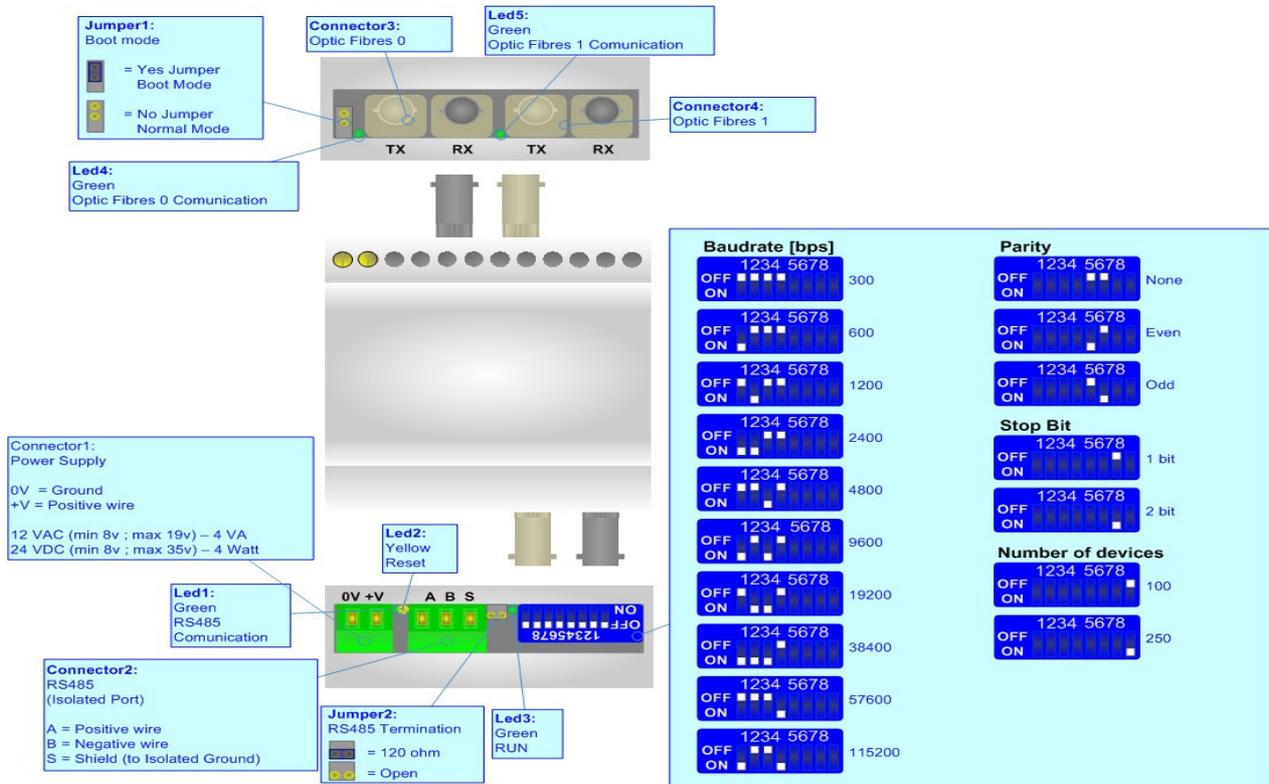
S485-FO-MULTI-DL
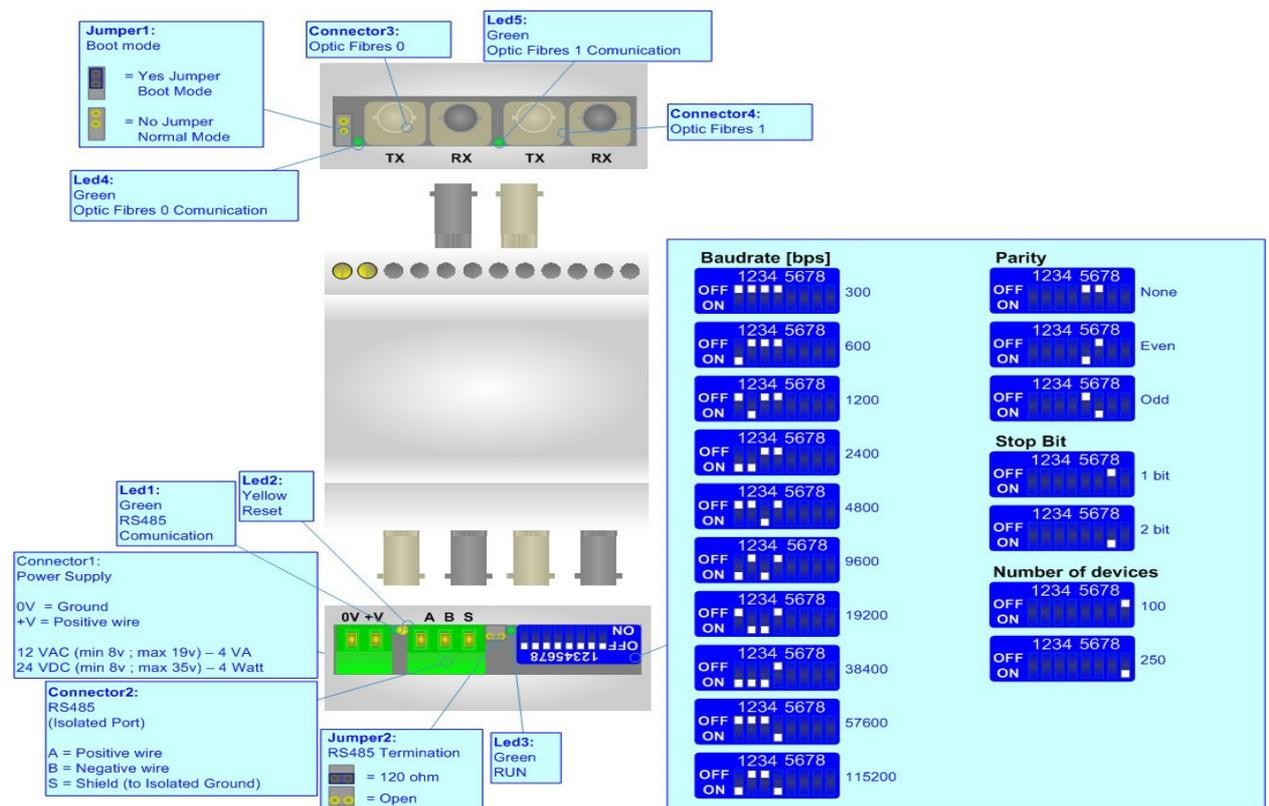
IMPOSTAZIONI DIP SWITCH

Baud rate

Speed [bps]	Dip 1	Dip 2	Dip 3	Dip 4
300	OFF	OFF	OFF	OFF
600	ON	OFF	OFF	OFF
1200	OFF	ON	OFF	OFF
2400	ON	ON	OFF	OFF
4800	OFF	OFF	ON	OFF
9600	ON	OFF	ON	OFF
19200	OFF	ON	ON	OFF
38400	ON	ON	ON	OFF
57600	OFF	OFF	OFF	ON
115200	ON	OFF	OFF	ON

Parity

Parity	Dip 5	Dip 6
None	OFF	OFF
Even	ON	OFF
Odd	OFF	ON

Stop bit

Stop Bit	Dip 7
One	OFF
Two	ON

Maximum number of devices connectable via optical fiber

Max Dev. #	Dip 8
Up to 100	OFF
Up to 250	ON

Configuration and updates via ModBUS using a PC can be established via RS485 ↔ USB or RS485 ↔RS232 converter (i.e. SENECA serial converter **S117P1**)

For proper operation in compliance with EMC regulations, it is recommended to use shielded cable for the RS485 connection, and grounding of the negative power of the device.

CAN (SCAN-FO-MONO-SL, SCAN-FO-MONO-DL, SCAN-FO-MULTI-SL, SCAN-FO-MULTI-DL):

To terminate the CAN line with a 120Ω resistor it is necessary that the 'Dip1' of the Dip-Switch B is at ON position.
CAN interface is compliant with ISO 11898 standard
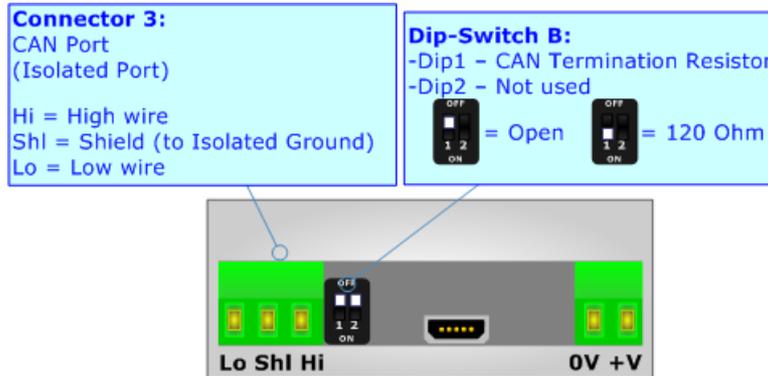
Cable characteristics:

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

ETHERNET (SETH-FO-MONO-SL, SETH-FO-MONO-DL, SETH-FO-MULTI-SL, SETH-FO-MULTI-DL)

The **IP for Normal Mode is 192.168.90.101** with subnet mask 255.255.255.0 while the **IP for Boot Mode is 192.168.2.205** with subnet mask 255.255.255.0.
The Ethernet connection must be made using Connector2 of SETH-FO-MONO-SL, SETH-FO-MONO-DL, SETH-FO-MULTI-SL and SETH-FO-MULTI-DL with at least a Category 7E 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.7 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.
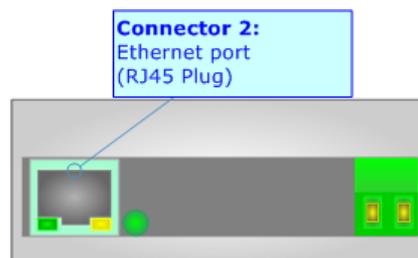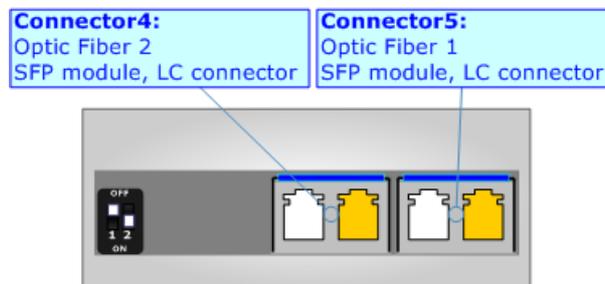
USB (UPDATING PORT)

The USB connector (Connector2) is a Type-MINI AB Female. So the cable must be a Type-MINI AB Male.
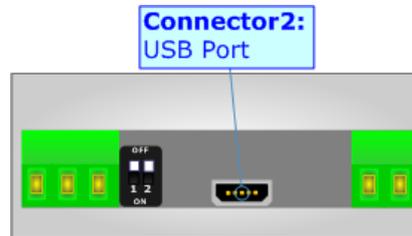
OPTICAL FIBER:

On optical fiber side, the SFPs (Small Factor Pluggable) are mounted: They are interchangeable modules through which you can choose the type of optical fiber and the maximum distance that can be covered.

In relation to the order code, it is possible to have different SFPs module mounted:

- Single-Mode Optical Fiber, LC connectors, Maximum distance of 10 km
- Multi-Mode Optical Fiber, LC connectors, Maximum distance 275 m (with 62.5/125 µm fiber) or 550 m (with 50/125 µm fiber)
- None

USE OF SENECA COMPOSITOR:

To configure the Converter, use the available software that runs with Windows called SENECA Compositor. It is downloadable on the site www.seneca.it 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 MS Windows (XP, Vista, Seven, 8, 32/64bit).

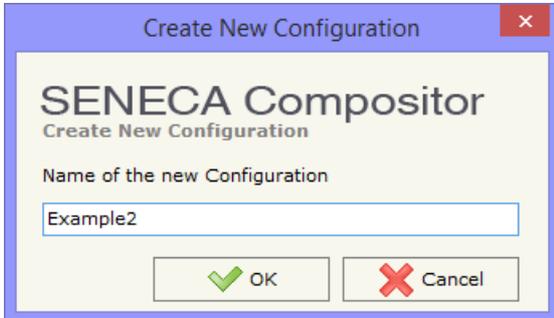When launching the SENECA Compositor, the window below appears (Fig. 2).

Note:
  It is necessary to have installed .Net Framework 4.

*Figure 2: Main window for SENECA Compositor*

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 "Copper / Optical Fiber - 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**".
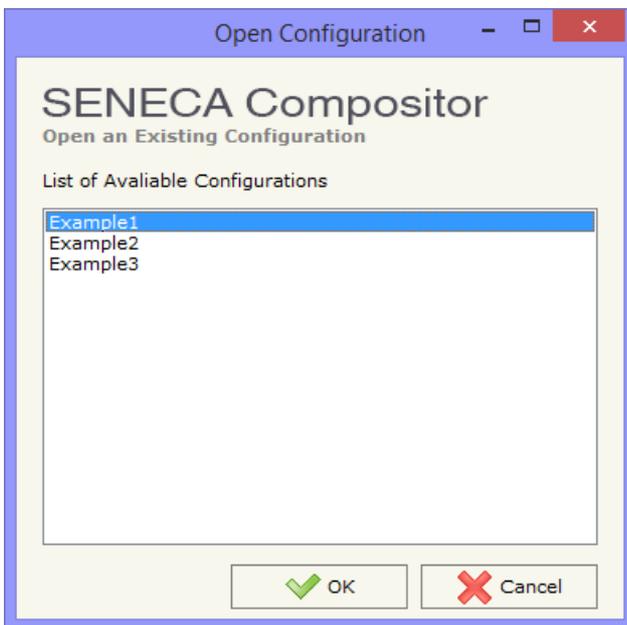
SOFTWARE OPTIONS:

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.
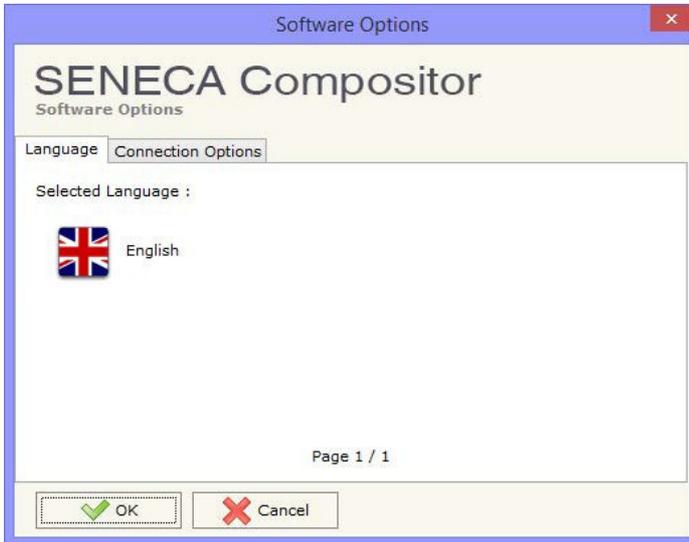
In the section "Connection Options", it is possible to check if there are some updatings of the software Compositor in SENECA website www.seneca.it .
Checking the option "**Check Software Update at Start of Program**", the SENECA COMPOSITOR check automatically if there are updatings when it is launched.

CONFIGURE DEVICES:

By pressing the "**Configure Devices**" button from the main window for SENECA COMPOSITOR (Fig. 2), the window "Configure Devices" appears (Fig. 3).
It is possible to add a new device by pressing the "**Add**" button and remove an existing device by pressing the "**Remove**" button.
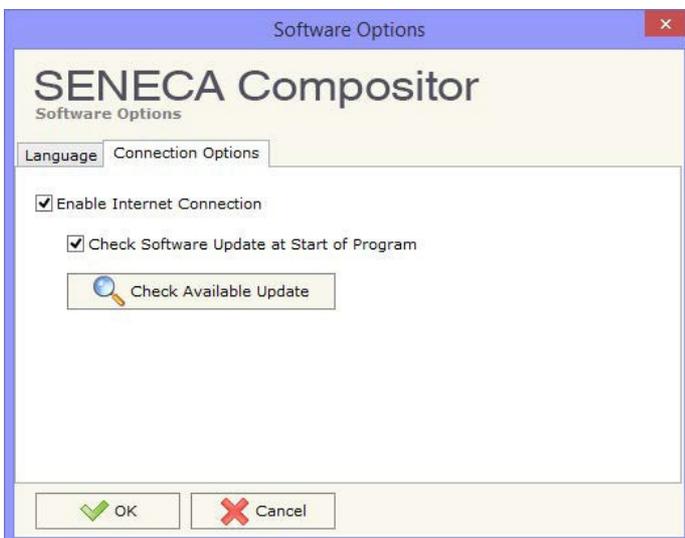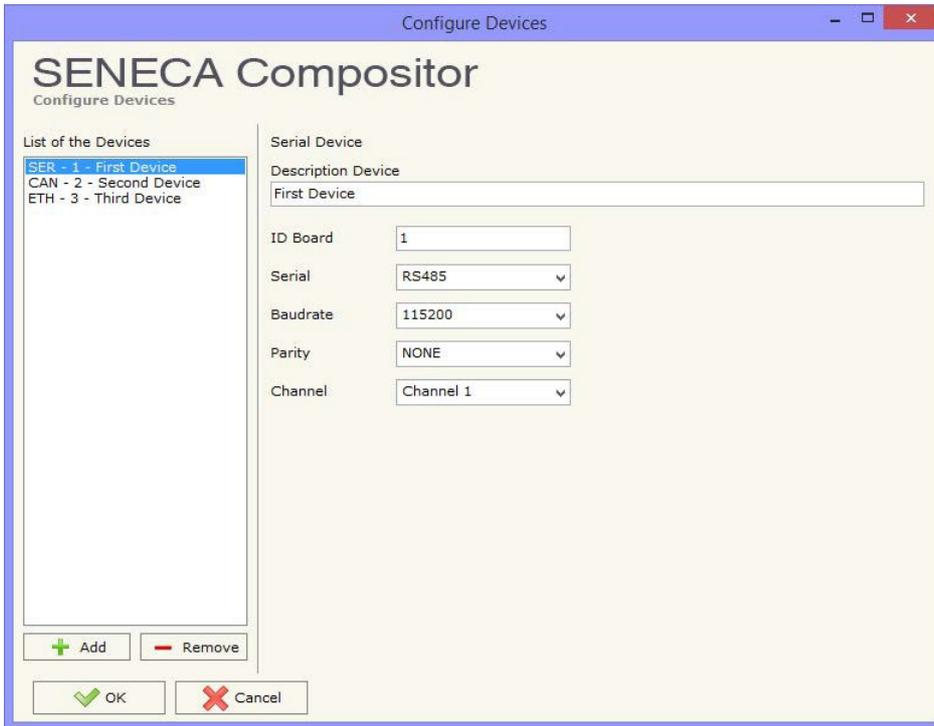
Figure 3: "Configure devices" window

When the "Add" button is pressed, the "**Select Type of Board**" window appears (Fig. 4).
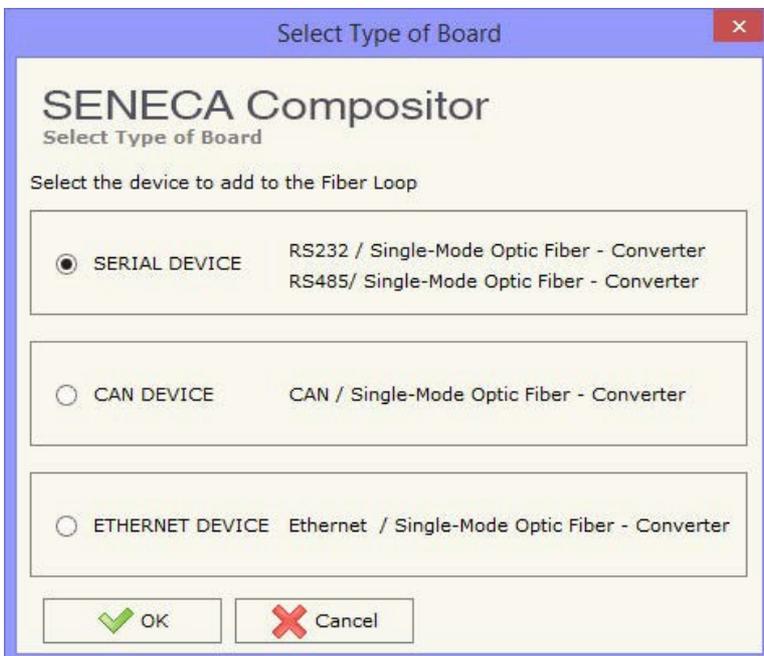In this window, the type of board (Serial Device, CAN Device or Ethernet Device) must be defined.

Figure 4: "Select Type of Board" window

For the Serial Devices, the fields to compile are the following (Fig. 5):

- In the field "**ID Board**", the ID of the board is defined;
- In the field "**Serial**", the type of serial port (RS232 or RS485) is defined;
- In the field "**Baudrate**", the baudrate of the serial line is defined;
- In the field "**Parity**", the parity of the serial line is defined;
- In the field "**Channel**", the communication channel is defined; you can define up to 4 channels (4 different serial networks in the same optical fiber's network).

CAN DEVICE:

For the CAN Devices, the fields to compile are the following (Fig. 6):

- In the field "**ID Board**", the ID of the board is defined;
- In the field "**Baudrate**", the baudrate of the CAN line is defined;
- In the field "**Channel**", the communication channel is defined; you can define up to 4 channels (4 different CAN networks in the same optical fiber's network).

ETHERNET DEVICE:

For the Serial Devices, the fields to compile are the following (Fig. 7):

- In the field "**ID Board**", the ID of the board is defined;
- In the field "**IP Address**", the IP Address of the board is defined (Normal Mode 192.168.90.101, Boot Mode 192.168.2.205 with the same subnet mask 255.255.255.0)
- In the field "**SubNet Mask**", the SubNet Mask is defined;
- If the field "**Gateway**" is checked, in the field below it is possible to insert the IP Address of the default gateway for going out to the net.

Ethernet Device

Description Device

Third Device

ID Board	3			
IP Address	192	. 168	. 90	. 101
SubNet Mask	255	. 255	. 255	. 0
☐ Gateway		.	.	.

Note:
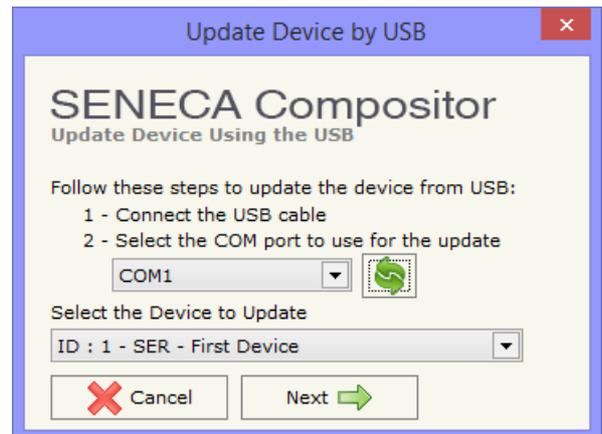The IDs of the boards in the same network must be different between them.

UPDATE BY USB (FOR SERIAL AND CAN VERSIONS):

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 device, follow these instructions:

- Turn off the Device;
- Connect the USB cable form your PC to the converter;
- Put Dip1 of Dip-Switch A at "ON" position;
- Select the "**COM port**" and press the "**Connect**" button;
- Select the Configuration/Device that you want to update;
- Turn on the device;
- 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;
- Put Dip1 of Dip-Switch A at "OFF" position;
- Disconnect the USB Cable;
- Turn on the device.

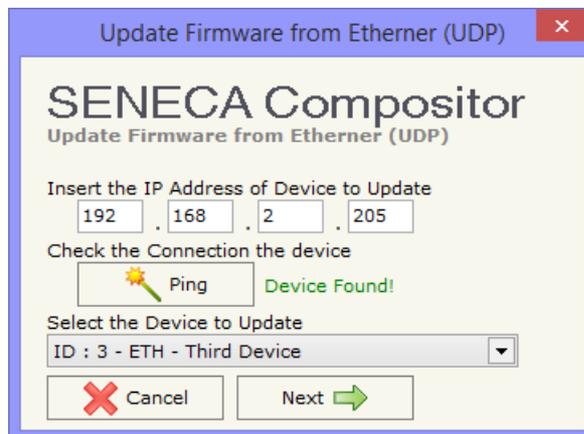At this point the configuration/firmware on the device is correctly update.

Update Device by USB
SENECA Compositor
Update Device Using the USB

Follow these steps to update the device from USB:
1 - Connect the USB cable
2 - Select the COM port to use for the update
COM1
Select the Device to Update
ID : 1 - SER - First Device
Cancel   Next

Update Device by USB
SENECA Compositor
Update Device Using the USB

Update Device Options
☑ Firmware
☑ Read Firmware After Write
☑ Configuration
☑ Read Configuration After Write

Execute Update Firmware

SENECA Compositor USB update
Ver. 1.202
INIT : **Waiting...**
FIRMWARE : **Waiting...**
PROJECT : **Waiting...**

Figure 9: "Update by USB" window **www.seneca.it**

UPDATE BY ETHERNET (ONLY FOR ETHERNET VERSION):

By pressing the "**Update Device**" button, it is possible to load the created Configuration into the device; and also the Firmware, if necessary.

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**";
- Press the "**Ping**" button, "Device Found!" must appear;
- 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;
- Put Dip1 of 'Dip-Switch A' at OFF position;
- Turn on the device.

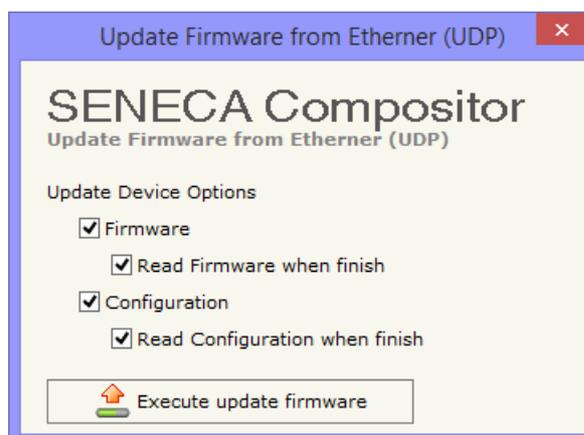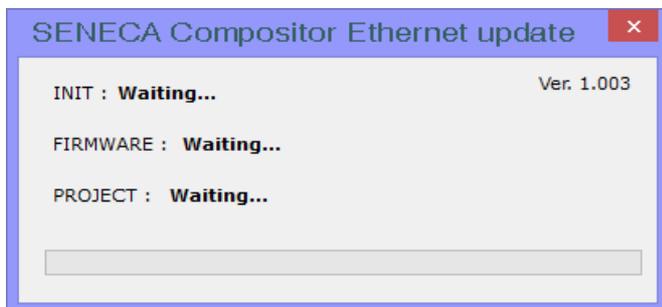At this point the configuration/firmware on the device is correctly updated.

Figure 10: "Update by Ethernet" windows

Note:
When you install a new version of the software, if it is the first time it is better you do the update of the Firmware in the fiber optical converters.

Note:
When you receive the device, for the first time, you also have to update the Firmware in the fiber optical converters.

Warning:
If Fig. 11 appears when you try to do the Update try these points before seeking assistance:

- Check if the serial COM port selected is the correct one;
- Check if the serial cable is connected between the PC and the device;
- Try to repeat the operations for the updating;
- 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 and 8 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 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

You have to use the software "SENECA COMPOSITOR" except for MULTIMODE fiber optical serial converter. You can download it from www.seneca.it

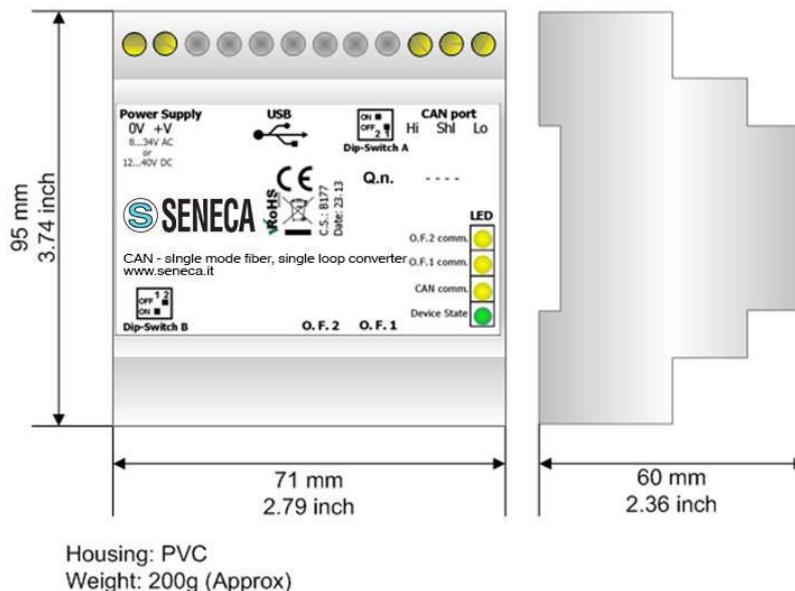*Figure 11: "Protection" windows*

MECHANICAL DIMENSIONS:

Figure 12a: Mechanical dimensions scheme for fiber optic converters