CPE103 CONVERTER
(FC400 vs PROFIBUS)
USE AND MAINTENANCE MANUAL

General Index

1 GENERAL NOTES

Thanks for buying a HYTERM product.
Read carefully this instruction manual before the installation, the start-up, the use and maintenance of the protocol converter . An improper use can compromise the correct functioning and cause damages to people and property.
The non-compliance with the regulations given in this instruction manual brings to the expiry of the warranty of the protocol converter .

This instruction manual

- refers to and is integral part solely of the here described Hyterm product;
- is intended for the technical personnel appointed for the installation, the start up and maintenance of the protocol converter .
- must be kept near the product, available for any possible intervention required.
- can be downloaded from the site www.hyterm.com, in case of discrepancies between this document and the on-line version, always refer to the latter.

Hyterm follows an ongoing improvement corporate policy, thus reserves the right to introduce technical or design modifications at any time.
Possible mistakes, omissions or discrepancies in the manual should be promptly communicated to Hyterm.

WARNING
This use and maintenance manual is the translation of the original instruction of the product.

WARNING
This manual includes text and pictures that, for a better understanding of the content, need to be colour printed.

1.1 APPLICATION FIELD

The product must be used exclusively for the here described purposes.
CPE103 is a protocol converter designed to work in combination with the Hyterm 's FC400 speed controller.
It can be applied in the civil, industrial and commercial sector air conditioning, in the industrial or commercial refrigeration, in refrigerating systems for process industry, in the generation of energy from conventional or renewable sources, in data centers and many others.
Those, who intend to use Hyterm protocol converters on critical or unattended applications, where extremely high levels of reliability are required (as for instance in aerospacial systems, chemical or petrochemical industry, in control systems for nuclear power, or in electromedical systems..) are required to contact HYTERM.
HYETRM is not responsible for damages to property and people deriving from such use, if not previously authorized in written form by HYTERM.

1.2 CONTACT ADDRESS OF THE MANUFACTURER AND TECHNICAL SUPPORT

In case of information requests or technical issues the buyer can contact HYTERM at the following address:

HYTERM S.r.l.
Viale del lavoro, 18 - 25045 Castegnato (BS)
Site: www.hyterm.com
E-mail: info@hyterm.com

Technical support:
E-mail: support@hyterm.com
Teams: support@hyterm.com

1.3 MODELS

This manual was drawn up for the following models:

CODE	DESCRIPTION
12.001.00.0003	CPE103 - Contenitore A1 - PROFIBUS for FC400

1.4 MANUAL UPDATES

Here follow the updates of the manual:

DATE	UPDATES
28/10/25	Release

2 SAFETY NORMS

This chapter contains all regulations for the safety of people and properties. Given regulations are not to be considered extensive, thus HYTERM won't assume the responsibility of its completeness.

2.1 SECURITY SYMBOLS

Here are the meaning of the symbols used for the security warnings for properties and people:

INFORMATION

CAUTION/DANGER

2.2 PERSONNEL REQUIREMENTS

The technical personnel in charge of the projecting, installation, start-up and maintenance of the protocol converter must be properly qualified, trained and have a suitable working experience.
The technical personnel must be aware of the local relevant norms for safety and accident prevention and of further company provisions regarding the activities to be performed.
The technical personnel must be adequately informed about possible danger zones and about the possible risks, connected with the required operations at the protocol converters according to current regulations.
Technical personnel in phase of training or learning is allowed to operate only if under the direct surveillance of expert and qualified operators.

2.3 INSTALLATION

Carefully follow the protocol converter assembly instructions, described in the present manual.
The protocol converter must be installed and used in environments, that respect the limits indicated in the present manual.

It's not allowed to make any modification of the device

It's not allowed to disassemble and/or tamper with the protocol converter or any of the related acessories: this may cause damages to property and/or persons.
Don't alter or damage the identification labels of the protocol converter.

2.4 START UP AND USE

The protocol converter can be started up only if the incorporating system has already been certified according to current regulations.
Before powering the protocol converter, double check the correct installation and wiring of the system.

Provide to the protocol converter a constant power supply, in order to keep the internal temperature stable and avoid any condensation problems.

Warning – During the start up of the protocol converter unexpected situations, due to improper wiring, settings or to defect components, may occur .

Warning- Electro Shock Risk – Never operate on live parts when power is on.

Warning – The protocol converter can be started up only in completely dry environment.

2.5 MAINTENANCE

Before starting any maintenance operation make sure that the power is off.

Warning- Never operate on live parts.

Warning- Device modifications are not allowed

Do not disassemble or tamper with the protocol converter and its accessories: this may cause damages to persons and/or property. In case of any malfunctioning please refer to Hyterm Support Service.
Do not alter or damage the identification labels of the protocol converter.

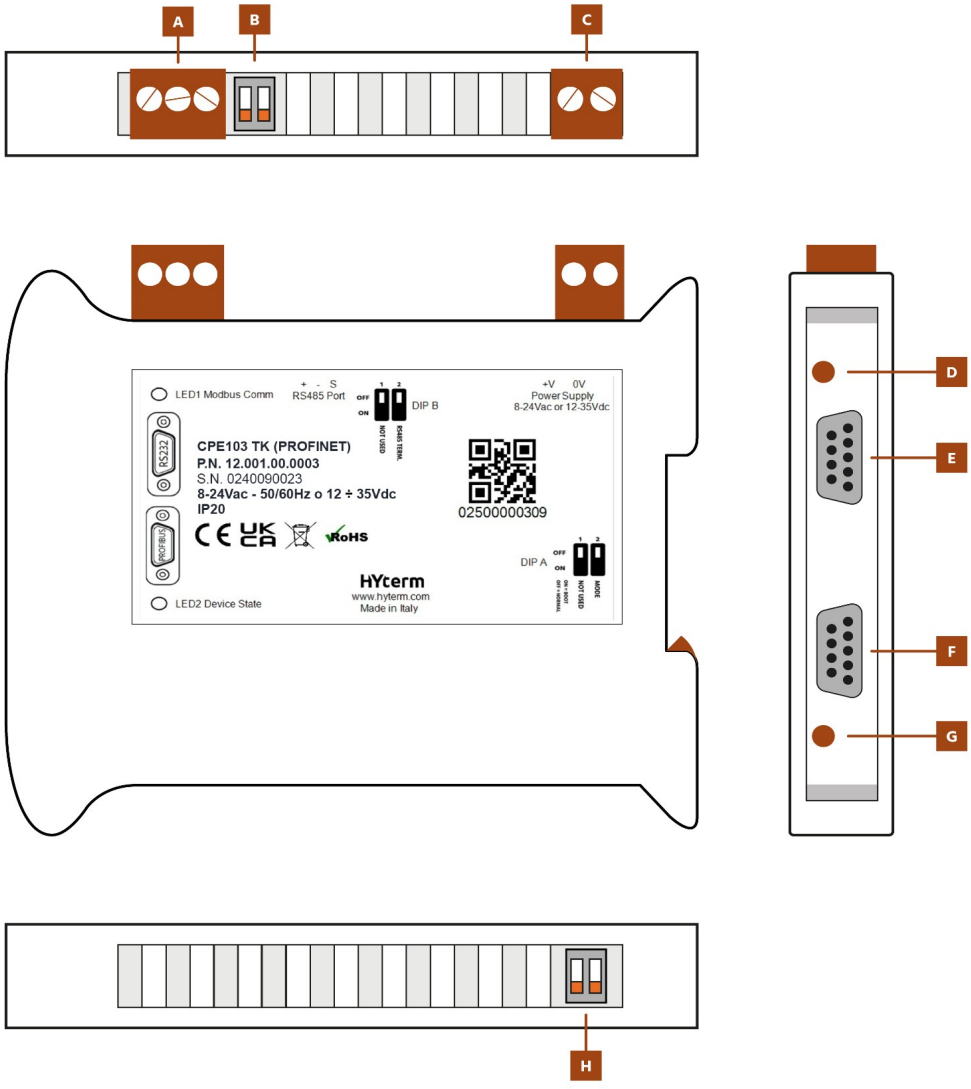
3 PROTOCOL CONVERTER OVERVIEW

CPE103 is equipped with the following Hardware features:

- No. 1 Insulated serial Port RS485;
- No. 1 RS232 port (DB9 Male Plug).
- No. 1 PROFIBUS Insulated port (DB9 Female Plug).

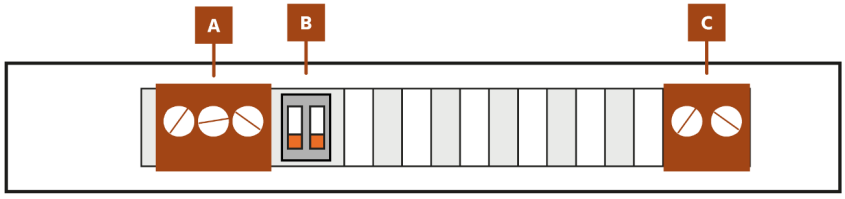
3.1 OVERVIEW

In this paragraph is an overview of the product.



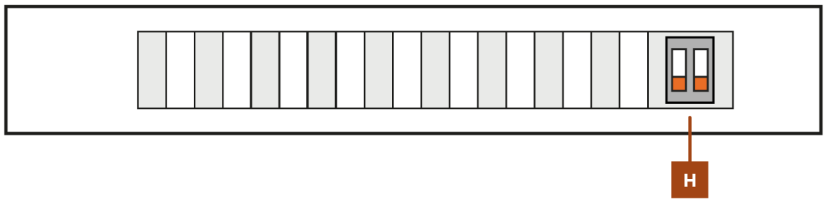
PART	DESCRIPTION
A	Insulated serial Port RS485
B	Dip-Switch B: Termination Resistor
C	Power Supply Port
D	Led 1: Modbus Comm
E	RS232 Port
F	PROFIBUS Isolated Port
G	Led 2: Device State
H	Dip-Switch A: Operating Mode

3.2 DIP-SWITCH “B” TERMINATION RESISTOR



DIP	DESCRIPTION
1	**OFF**: Open **ON**: 120 Ohm
2	Not Used

3.2 DIP-SWITCH “A” OPERATION MODE



DIP	DESCRIPTION
1	**OFF**: Normal operation **ON**: Boot
2	Not Used

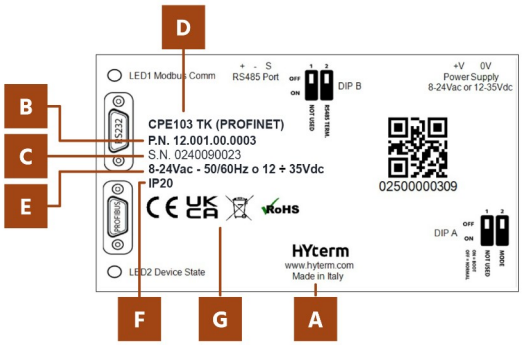
4 TRANSPORT, RECEIPT AND STORAGE

All Hyterm products are accurately checked before the delivery in order to ensure the highest quality standards.

4.1 IDENTIFICATION LABEL

Each protocol converter can be identified through following PRODUCT label:

PART	DESCRIPTION
A	Logo and site of the manufacturer
B	Product code
C	Serial number
D	Product name
E	Supply voltage
F	Protection rate
G	Certifications



The protocol converter can be identified also though the following packaging label:

PART	DESCRIPTION
A	Product name
B	Barcode
C	Product code
D	Logo and site of manufacturer
E	Certifications

4.2 PACKAGING CONTENT

The components supplied with the packaging are:

- CPE103;
- Quickstart Guide.

4.3 TRANSPORT

The protocol converter must be transported exclusively inside its original packaging or retail box.

The factory packaging of the protocol converter is suitable for the transport conditions agreed with the buyer.

During the transportation it's recommended to avoid shocks, vibrations or exposure to high temperature and humidity.

4.4 RECEIPT AND INSPECTION

It's customer's responsibility to check that the received protocol converter complies with the order and is free of defects.

The following checks are suggested:

- Check that the protocol converter complies in code, description and type with the order
- Check that no parts or components are damaged or missing
- Check that there are no loose parts, apart from those that are specifically designed to be movable.

In case of doubts refer to the technical documentation or contact the technical support at Hyterm.

4.5 STORAGE

Keep the protocol converter inside the original packaging or retail box in dry place, avoid the exposure to the elements, to very high or low temperature, humidity, vibrations or shocks.

Caution, we suggest to avoid long storage periods, max 1 year from purchase date.

5 ASSEMBLY AND INSTALLATION

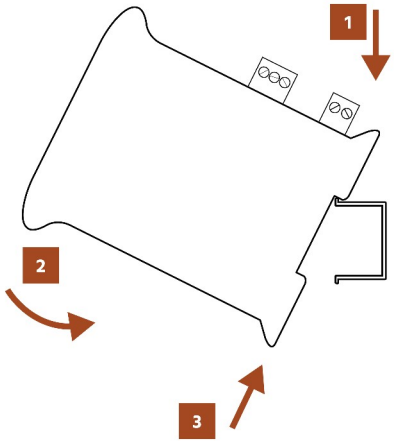
Warning, to avoid damages to the protocol converter, due to an improper assembly, it's necessary to consider the following points:

- If the protocol converter has been picked up from a very cold storage, let it rest at least two hours at room temperature before the assembly.
- Before the assembly unbox the protocol converter and check its integrity; in case of transport or storage damages the installation is not allowed.
- Install the protocol converter inside containers having an adequate IP protection rate.
- It's not allowed to install the protocol converter on surfaces subjected to stresses or vibrations, that range over the limits stated in present manual.
- It's not allowed to install the protocol converter in the presence of flammable or explosive gases.
- Avoid the protocol converter to get wet; rain and moisture may irreversibly damage the electronic circuits.
- It's not allowed to install the protocol converter in presence of conductive dust or dry dust, made conductive by condensation problems.
- The protocol converter must be installed in order to permit all use and maintenance operations, as for instance the access to the user interface, communication ports and so on.
- Scraps, screws and /or other foreign parts must not get inside the protocol converter.

5.1 INSTALLATION AND REMOVAL PROCEDURE

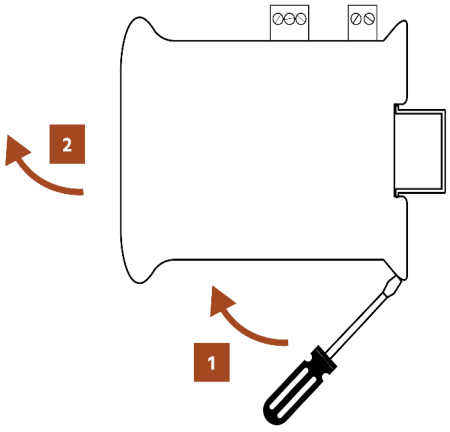
Here is described the protocol converter assembly procedure:

1. Place the upper groove of the protocol converter on the upper edge of the DIN rail.
2. Press the protocol converter against the DIN rail
3. Lock the bracket.



Here follows the protocol converter disassembly procedure:

1. Through a screwdriver open the bracket;
2. Unlock the protocol converter from the DIN rail.



5.2 OUTDOOR INSTALLATION

Warning, To avoid damages to the protocol converter on outdoor installations it's necessary to consider the following points:

- Install the protocol converter inside containers having an adequate IP protection rate.
- The protocol converter must be protected by atmospheric elements
- Avoid direct exposure to solar radiation
- Outdoor installation is allowed at min. -20°C if the protocol converter is constantly powered.

5.3 INSTALLATION IN CONTAMINATED ENVIRONMENT

Warning, the protocol converter is not suitable to be installed in environments with presence of oxidant and /or corrosive agents in the air. (as for example ammonium or hydrogen sulfide exhalations, salt fogs and smokes etc.)

Typical examples of these environments are coasts, marine platforms or ships, chemical or Oil&Gas plants, etc..
In any case the protocol converter cannot be installed directly in such environments, but must be deployed in separate rooms, where the presence of such contaminated agents is not possible, in order to avoid any damages.

6 ELECTRICAL CONNECTIONS

Before proceeding, read carefully the safety norms at chapter 2 SAFETY NORMS.

Warning- Electro Shock Risk – Never operate on live parts.

Caution, in order to avoid danger to property or persons observe the following points:

- Interventions on the protocol converter must be executed exclusively by adequately qualified and trained technical personnel (See chapter 2.2 PERSONNEL REQUIREMENTS).
- The control panel, where the protocol converter is installed, must be always locked. Exclusively authorized technical personnel, equipped with the necessary key or device, are allowed to open it.
- It's in no case allowed to let the protocol converter operate with open enclosure (plastic box or electrical cabinet).
- The max torque to close the screws of the terminal blocks is 0.2Nm for pitch 3,81mm (analogue and digital inputs, analogue outputs and communication ports) and 0,5Nmfor pitch 5,01mm (digital outputs).
- At the end of the wiring operations carefully check the tightening of the blocks connections.
- In case of installation of the protocol converter in environments subjected to electromagnetic interference, it's recommended to use protected cables or interlaced conductors.
- Avoid direct contact between the fingers of the operator and the components of the electronic boards; electrostatic discharge may damage the protocol converter.
- Do not apply excessive pressure with the screwdriver on the connectors, in order to avoid damages of the protocol converter.

6.1 EMC NORMS

Warning, in order to install the protocol converter according to the EMC norms, it's necessary to observe the following points:

- Do not lay on the same channels (electrical panels included) power and signal cables
- Provide an adequate distance between the signal and power cables (at least 3cm), in case of crossing provide a 90° angle.
- The cable protection must be connected to the protective conductor on one side only (protocol converter side), the connection must be the shortest and with the lowest impedance possible.

6.2 POWER SUPPLY

The protocol converter can be suppied with the following tensions:

- 8 ÷ 24Vac 50/60Hz;
- 12 ÷ 35Vdc.

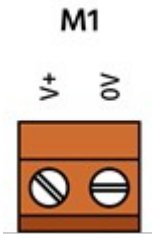
Warning: Live parts. It's not allowed to operate on live parts.

Please note: for a proper powering of the protocol converter it's necessary to consider the following points:

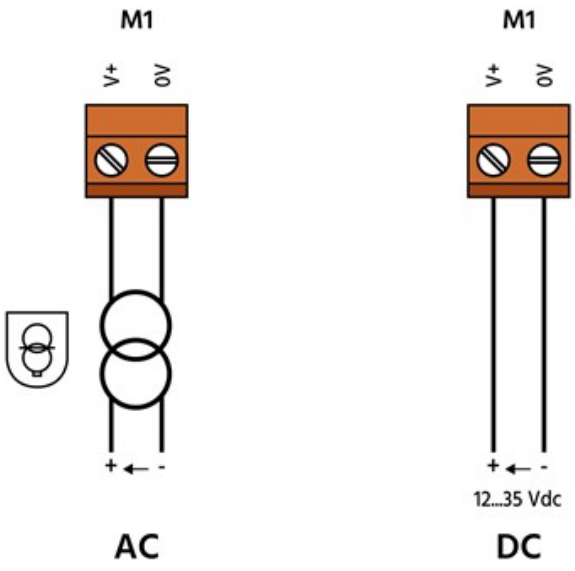
- Provide each single protocol converter with a cut-off device
- Provide with a power supply omnipolar protection device each single protocol converter a 2A - fast acting F fuse it's recommended.
- The grid voltage must comply with the requirements of the EN 50160 and IEC 60038 norms.
- The supply voltage of the protocol converter must keep within the tolerance limits specified in this manual.

6.2.1 TERMINAL BLOCK

TERMINAL		DESCRIPTION
1	V+	Input + ac/dc
2	0V	Input - ac/dc



6.2.2 ELECTRICAL CONNECTION



6.3 SERIAL LINE RS-485

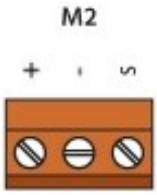
The protocol converter is equipped with an insulated serial line RS-485 for the communication with FC400 over protocol Modbus RTU.

Warning, for the correct use of the serial line it's necessary to observe the following points:

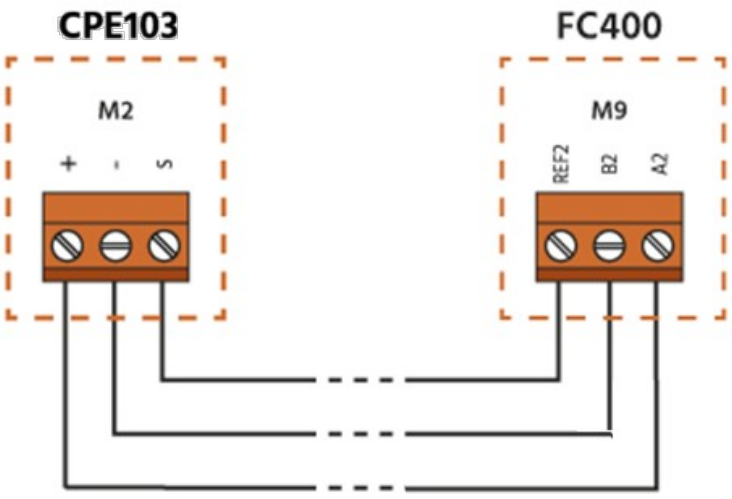
- Pay attention to the polarity of the connections.
- t's necessary to connect REF2 terminal of the FC400 to the S terminal of the CPE.
- Use a suitable cable, specific for data transmission on outdoor applications, as for instance the serial cable used for MODBUS ITC BELDEN 2457DPN applications.
- Do not connect the shielding to the terminal REF2 or S, at any position.
- The parasitic capacity of the transmission line increases proportionally with the length of the same, thus limiting the max available speed.
- Never apply voltage on terminals "+" and "-" of the serial line of the protocol converter: this could compromise the communication or damage the physical interface.

6.3.1 TERMINAL BLOCK

TERMINAL		DESCRIPTION
1	S	Insulated ground
2	-	Negative (B)
3	+	Positive (A)

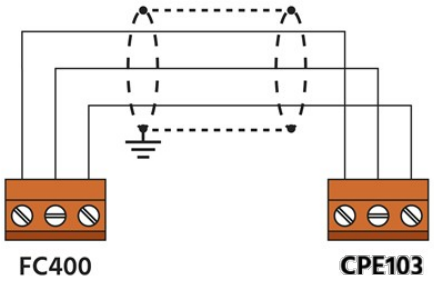


6.3.2 ELECTRICAL CONNECTION



6.3.3 SHIELD CONNECTIONS

The shield of the data transmission cable must be grounded at an end and be connected with a bridge between the shields.



6.4 RS232 PORT

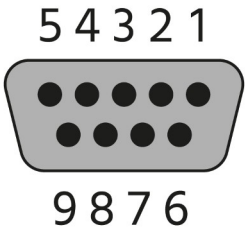
The protocol converter is equipped with RS232 Port used for programming the device.

Warning, for the correct use of the RS232 Port it's necessary to observe the following points:

- Max. length of the connection: 15mt
- To connect the device to PC use Null Modem cable (a serial cable where the pins 2 and 3 are crossed).

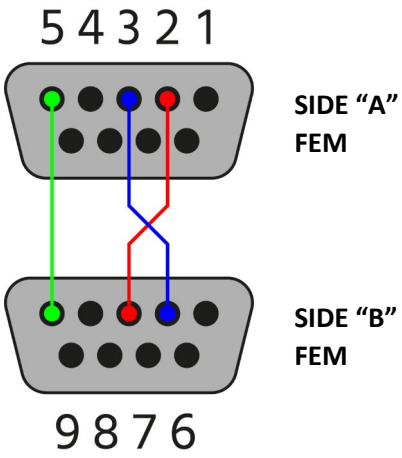
6.4.1 TERMINAL BLOCK

PIN	DESCRIPTION
2	RX
3	TX
5	GND



6.4.2 ELECTRICAL CONNECTION

To connect the device to the COM port of a PC in order to set it oyu have to use the programming cable 12.000.00.0017 or a cable made as showed here.

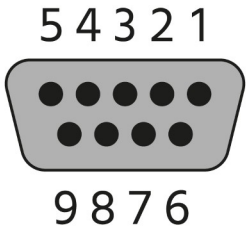


6.5 PROFIBUS PORT

The protocol converter is equipped with **PROFIBUS Isolated Port** used for for communication with the BMS/PLC. The PROFIBUS uses a 9-pin D-SUB female connector.

6.5.1 TERMINAL BLOCK

PIN	DESCRIPTION
3	Wire A
5	GND (to Isolated Ground)
6	Positive Wire
8	Wire B



Warning, for the correct use of the PROFIBUS Port it's necessary to observe the following points:

- Max. length of the connection: 100mt

7 LEDS

The protocol converter has got two LEDs that are used to give information about the functioning status.
The various meanings of the LEDs are described in the table below.

LED	NORMAL MODE Dip-Switch A = OFF position (See 3.2 DIP-SWITCH "A" OPERATION MODE)	BOOT MODE Dip-Switch A = ON position (See 3.2 DIP-SWITCH "A" OPERATION MODE)
D: MODBUS Comm. (green)	Blinks quickly when there is MODBUS communication	**OFF**
G: Device state (green)	Blinks slowly (~1Hz)	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress

8 USE OF SWCPE103 SOFTWARE

To configure the Protocol converter, use the available software that runs with Windows called SWCPE103. It is downloadable from the site www.hyterm.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)*.

8.1 SYSTEM REQUIREMENTS

Minimum System Requirements:

- Windows XP SP2 or higher;
- 1GHz processor;
- 512MB RAM;
- 50MB disk space;
- Net Framework 4.

8.2 MAIN WINDOW

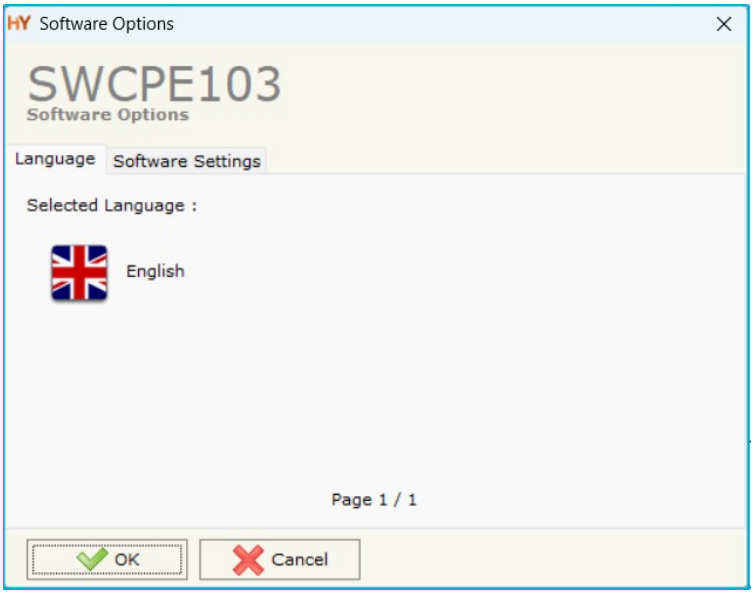
When launching the SWCPE103, the window below appears (Fig. 1).

Figura 1: Main window for SWCPE103

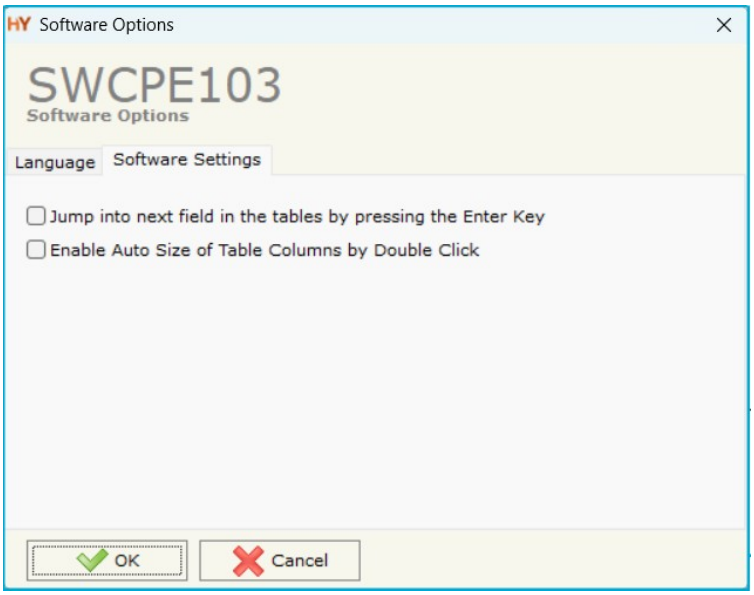
8.3 SOFTWARE OPTIONS

By pressing the "**Settings**" () button from the main window (Fig. 1) there is the possibility to change the language of the software and check the updatings for the software.

In the section "Language" it is possible to change the language of the software.



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.



8.4 OPEN CONFIGURATION

The "**Open Configuration**" button from the main window (Fig. 1) open the window with the list of available configurations.
Select the desired configuration and press OK.

8.5 SET COMMUNICATION

This section define the fundamental communication parameters of PROFIBUS.

By Pressing the "**Set Communication**" button from the main window (Fig. 1) the window "Set Communication" appears.

The means of the fields are:

- In the fields "**ID Device**" the address of the ProfiBus side is defined;

8.6 GSD FILE

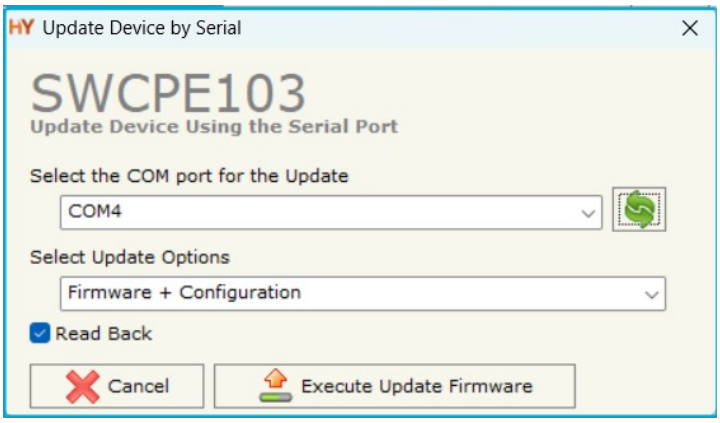
By Pressing the "**GDS FILE**" button from the main window (Fig. 1) is possible to create a ".gsd" document that describes the features and functionality of a PROFIBUS device.

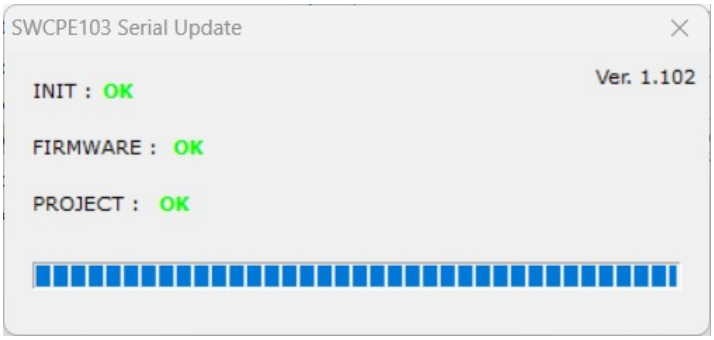
8.7 UPDATE DEVICE UDP

By pressing the "**Update Device UDP**" button from the main window (Fig. 1), it is possible to load the configuration into the device and also the Firmware, if necessary.

To configure the device, use the following procedure:

1. Choose your FC400 configuration (See paragraph 8.4 OPEN CONFIGURATION)
2. Set the PROFIBUS communication parameters (See paragraph 8.5 SET COMMUNICATION)
3. Turn OFF the Device;
4. Put 'Dip-Switch A' at ON position (BOOT MODE See 3.2 DIP-SWITCH "A" OPERATION MODE);
5. Turn ON the device → Now the "Device state" led of CPE start blinking (See 7 LEDS);
6. Connect the USB/RS232 converter between PC and CPE Converter;
7. Press the "**Update Device**" button from the main window (Fig. 1)
8. Select COM Port for the Update;
9. Press the "**Execute update firmware**" button to start the upload (**Don't change the flags**);
10. When all the operations are "**OK**" close the window and turn OFF the Device;
11. Put 'Dip-Switch A' at OFF position (NORMAL OPERATION MODE See 3.2 DIP-SWITCH "A" OPERATION MODE);
12. Turn ON the device, now the device is ready to work.





After restarting, communication with the speed controller starts automatically, the following icon appear on the display of FC400 **(restart FC400 together with the CPE converter)**:

Active communication between FC400 and CPE protocol converter.

After restarting the device, the PROFIBUS Communication parameters set in the SET COMMUNICATION window (See paragraph 8.5 SET COMMUNICATION) will be effective.

8.8 TROUBLESHOOTING

The following instructions will help the technical personnel to solve general problems or malfunctions, described in this section.

If the malfunction is not resolved, contact HYETRM SRL support service

PROBLEM	SOLUTION
	• Try to repeat the operations for the updating; • Try with another PC; • Try to restart the PC; • Check the USB/RS232 Converter; • 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; Pay attention at Firewall lock.

9 ACCESSORIES AND SPARE PARTS

It's recommended to use exclusively HYTERM original parts.
The original HYTERM parts and accessories are designed specifically for the protocol converter; the use of other components do not guarantee the proper and safe functioning of the system.

This manual refers to the following models:

CODE	DESCRIPTION
12.000.00.0017	Null Modem Cable Serial RS232 DB9 Female/Female 1.8 m

10 MAINTENANCE

Before any maintenance service disconnect the network power supply.

Warning, do not operate on live parts

The protocol converter must be checked on annual basis; the following operations should be executed:

- Visual inspection:
  - Thermal or mechanical damages;
  - Electrical damages, including oxidation;
  - Integrity of power and signals cables;
  - Integrity and readability of identification or warning labels
- Check the tightening torque of the electrical connections;
- Cleaning of the protocol converter

The protocol converter must be cleaned with a dry cloth. It's strictly forbidden to use any type of aggressive cleaning agents, aggressive chemical products or solvents.

All non functioning and/or damaged parts detected during maintenance operations must be substituted; if this is not possible, it's necessary to replace the whole protocol converter.

Warning, the maintainer must report the results of all annual checks on the machine maintenance register.

11 WARRANTY

Hyterm warrants to the buyer that the product will be defect-free within one year (12 months) from the date of purchase.
During warranty period, any repair o support service must be exclusively executed by HYTERM personnel.
During warranty time, and against presentation of purchase invoice, the product will be repaired or replaced, at HYETRM's discretion, without any additional costs as regards spare parts and repair, if the damages are proven to be manufacturing defects.
Warranty will be voided if the product has not been used properly (wrong installation, tampering, unsuitable environmental conditions, reparations by non authorized personnel)

12 TECHNICAL SUPPORT

In case of malfunctions the buyer can require a technical assistance from HYTERM, at the contacts mentioned at the beginning of present manual.

In case of request for technical support, the following information shall be communicated:

- protocol converter type and model (P/N and S/N available on the identification label of the protocol converter or on the original packaging).
- Detailed description of the malfunction or detected defect

13 RETURN AND REPAIR

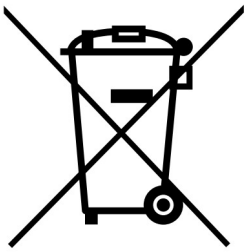
Product return to HYTERM must be previously authorized, requesting a RMA number.

Please send an Email at HYTERM containing following information:

- Complete customer's name and address
- Contact Person
- Place of purchase
- Product P/N and S/N as displayed on the product or the package
- Detailed description of fault and/or reason for return

HYTERM will communicate the RMA number, in order to start the return procedure of the product. The delivery of the goods shall be arranged DDP at HYTERM premises. Products returned without factory seals will be automatically treated as out-of-warranty repair services.

14 DISPOSAL



The disposal of the protocol converter must comply with the local regulation in force.

The product shall not be treated as household waste. It shall be instead handed over to an appropriate collection point for the recycling of electrical and electronic products. For further information about recycling of this product, contact the local city office and/or the local waste disposal service.

This protocol converter may contain hazardous substances: an inappropriate disposal may have negative consequences for the health of people and environment.

In case of improper disposal of the protocol converter and its accessories, penalties according to the local regulations in maters of waste disposal are provided.

15 ANNEX

In this chapter are listed all technical data of the protocol converter.

15.1 TECHNICAL DATA

TECHNICAL DATA:

	DESCRIPTION
Nominal Voltage	8÷24Vac or 12÷35Vdc
Frequence	50/60Hz
Absorbed power	3,5VA

USE CONDITIONS:

	DESCRIPTION
Working temperature	–40 ÷ 85°C
Storage temperature	–40 ÷ 85°C
Vibrations	Vibrazioni < 1g (9,8ms2)

CASE:

	DESCRIPTION
Mount	On Panel
Material	PC / ABS
Colour	Gray RAL 7035
Dimensions	120 x 101 x 23 mm
Protection rate	IP20 (according to EN 60529)
Pollution degree	2
Weight	200g

TERMINAL BLOCKS:

	DESCRIPTION	
Nominal Section	Pitch 5,08mm	24-12 AWG 0,20-2,5mm^2
Torque	Pitch 5,08mm	0,5 Nm
Termination	Screw	
Material	Polyamide	

RS232 PORT:

	DESCRIPTION
Plug	DB9 Male
Maximum length	15 m

PROFIBUS PORT:

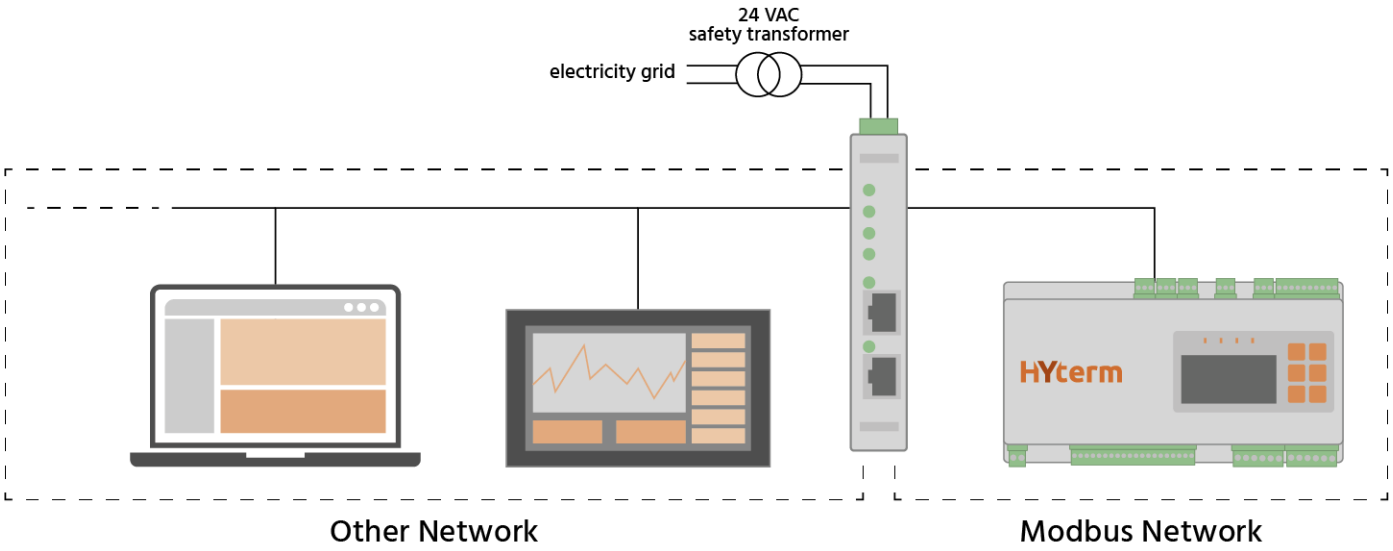
	DESCRIPTION
Plug	DB9 Female
Supported protocols	PROFIBUS
Maximum length	100 m
Recommended cable	Belden: p/n 183079A - Continuous Armor DataBus® ISA/SP-50 PROFIBUS Cable

CERTIFICATION:

CERTIFICATION		REGULATION	
CE	EMC	EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments.
		EN 61000-4-3	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
		EN 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
		EN 61000-4-5	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
		EN 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
		EN 61000-4-11	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase
	RoHs II	EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

15.2 WIRING DIAGRAM

Below is the protocol converter wiring diagram.



15.3 MECHANICAL DRAWINGS

Below are the mechanical drawings of the protocol converter.