MODBUS/PROFIBUS DP CONVERTER

TYPE

CPB

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1. GENERAL

The CPB converter enables the connection of Microelettrica Scientifica protective relays, which have a MODBUS-RTU protocol serial communication output, into an industrial network with PROFIBUS-DP protocol serial communication.
The basic CPB converter function is to make available to the Profibus-DP network the Modbus Data Base of the connected device.
The CPB converter works as a MASTER on the Modbus side and as a SLAVE on the Profibus-DP side.
The scheme below shows the structure of the Profibus/Modbus Network using the CPB converter together with a protective relay.

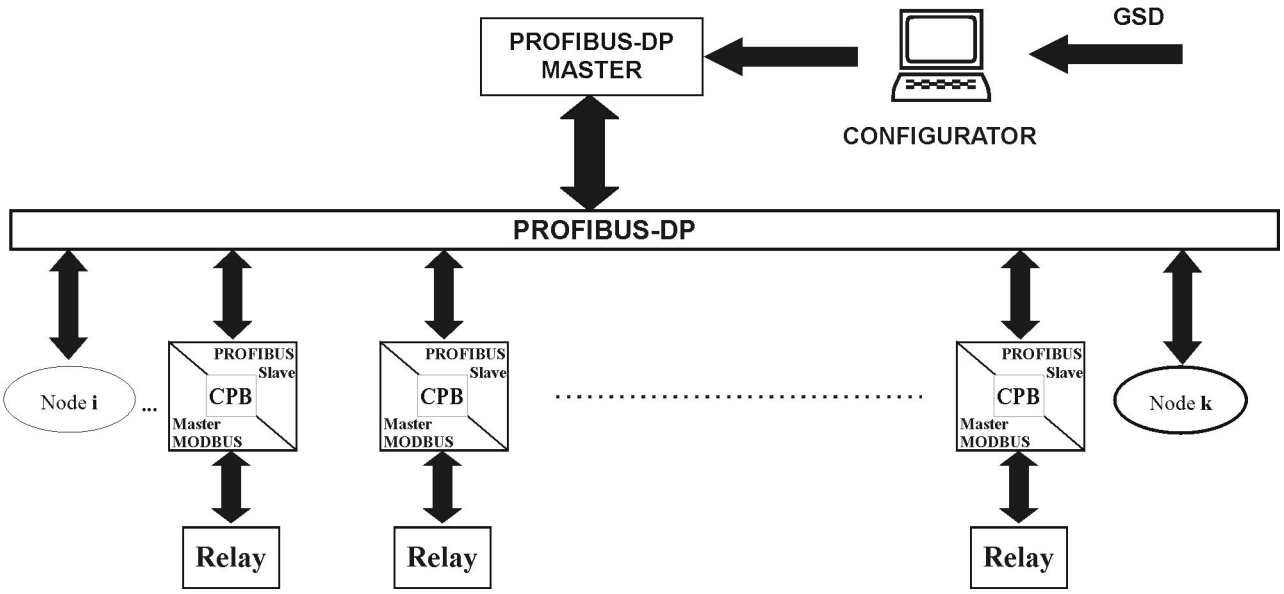


Fig .1: ***Block scheme of the measuring system with the CPB converter.***

The converter is equipped with two optoisolated RS-485 interfaces; one using three terminals dedicated to the Modbus connection, the other using a 9 pin sub-d connector for the Profibus connection.

2. CPB set

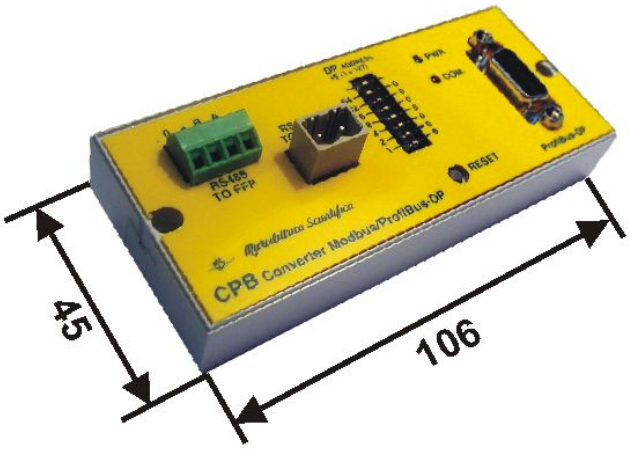
The CPB set includes:

- CPB converter
- User's manual
- CD with : Configuration file "RELAY.gsd" - Modbus/Profibus Mapping file "RELAY.txt"

3 . Installation

3.1 - CPB converter assembling

The CPB converter is to be plug-in on the N-DIN "RMB" base.



Height = 37 with connector

3.2 - ProfiBus Terminal description.

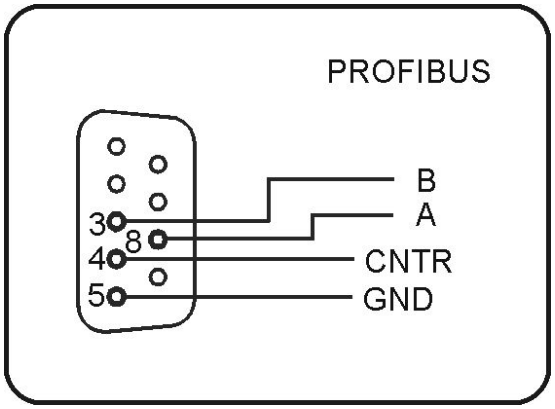


Table 1. Description of terminals of the connector DB9.

Terminal	Terminal description
3	**B** – Line **P** (RxD/TxD) of the PROFIBUS DP interface
4	**STER** – Control line (**CNTR**) of the PROFIBUS DP interface
5	**GND** – Line **GND** of the PROFIBUS DP interface
8	**A** – Line **N** (RxD/TxD) of the PROFIBUS DP interface

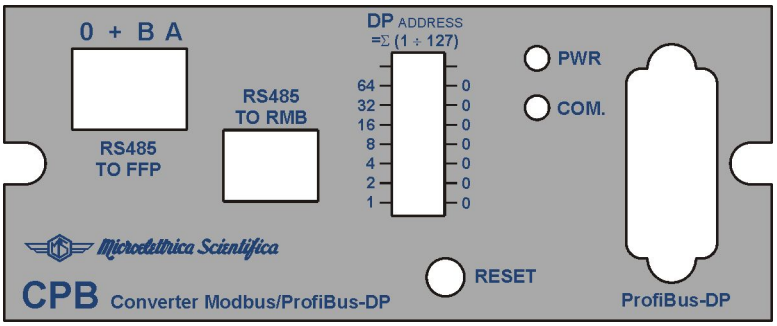
3.3 - CPB Connection to N-DIN

3.3.1 - Wiring diagram cable RMB (N-DIN) to CPB

3.4 - Signalization

There are two Leds on the front plate:

- **Yellow (COM)** On = Communicating
  Off = Out of Communication
  Flashing = Wrong master configuration
- **Green (PWR)** On = Power supply on
  Off = Power supply off



- **Reset** CPB unit Reset
- **DP ADDRESS** CPB unit Address Setting, “power-on” or after “reset”.
- **RS485 to RMB** Connection to N-DIN base (RMB)
- **RS485 to FFP** Connection to N-DIN FFP module
- **ProfiBus-DP** ProfiBus Port

3.5 - Requirements for terminal connection

In order to obtain proper Electromagnetic compatibility:

- Use twisted shielded cables for connecting the communication interface.
- Don't lay the communication cable near power cables.

3.6 - Setting of transmission parameters in MODBUS and PROFIBUS DP networks

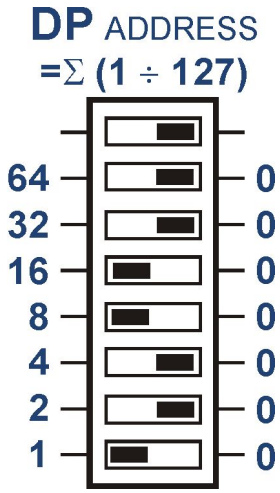
Setting of the device address in the PROFIBUS DP network

In the Profibus-DP network the CPB converter works as a "slave" device.
The range of addresses for the slave device is 1...127.
Before connecting the converter to the network, the device address in the PROFIBUS DP network must be set.

Set the dip-switch as to obtain the required numbers:

Node = Σ (1 ÷ 127)

Example: Set Address "25" = 16 + 8 + 1.



3.7 - Setting of the transmission parametric data in PROFIBUS DP

The CPB converter works as a MASTER on the Modbus side and as a SLAVE on the Profibus-DP side. The communication parameter between

N-DIN (RMB) 9600bps, N,8,1 See “N-DIN” Operation Manual (Main Comm Par)

At power-on or during further reconfiguration, the parametric data concerning the operation in the Modbus network are transmitted to the converter through the Master Profibus-DP.
The converter configuration is included in the RELAY.gsd file.

3.7.1- Configuration of the CPB converter to co-operate with the co-operating device

The read-out operation parameters (addresses of registers and number of variables), whose values will be transmitted to the Profibus-DP network, are given as parametric data defined in the RELAY.gsd file.
The maximum number of variables to read are 64 (Input Word).
One Output word is available for write operation.

3.7.2 - Render result registers available to the Profibus-DP network

The Data values (content of 16-bit registers) are available to the Profibus-DP in a sequence according to the registers recording sequence defined in the parametric data.

3.8 - Format of diagnostic data

Diagnostic data give to the user the signalization of the CPB converter data exchange failure.
This CPB communication failure can be due to:

- lack of connection with the Modbus bus,
- lack of power supply to the co-operating device (RELAY),
- damage of the co-operating device (RELAY).

- When one of the above situation takes place, the CPB converter signals error into first Profibus Input Word by setting the high order bit to “1”**.** Usually this input word is reserved to get the node address of slave device(low byte).

- When the input buffer length in the RELAY.gsd file (`User_Prm_Data_Len=57`) differences from 57, the error **PRM FAULT** is signaled.
- I When the input buffer length in the RELAY.gsd file is not declared or its length exceeds the value 244, the diagnostic configuration error **CFG FAULT** is signaled.

Other parameters are set according to the PROFIBUS DP device description standard *“EN 50 170 Vol 2 Working with PROFIBUS-DP, Device Description Data Files GSD”*.

The RELAY.gsd configuration file allowing the CPB converter to co-operate with the relay, with described configuration fields, is described in Addendum file.

4. Description of the CPB operation

4.1 - CPB working functions

The CPB acts as gateway from a Slave device Modbus and a Profibus Master system.
During its operation executes the cyclic configured Modbus requests and stores data received from the slave in an internal memory buffer and makes data available as inputs to Profibus-DP master.
In the other way receives the output changes from Profibus master and performs the Modbus write operation.

4.2 - Features

- automatic control of the data transmission direction.
- reach of the transmission, up to 1200 m.
- indicators of the incorrect working states.
- network supply.
- easy assembling and exploitation.

5. Technical data

CE EMC Compatibility (EN50081-2 - EN50082-2)

Electromagnetic emission	EN55022 industrial environment			
Radiated electromagnetic field immunity test	IEC61000-4-3	level 3	80-1000MHz	10V/m
	ENV50204		900MHz/200Hz	10V/m

Transmission data MODBUS	baud rate	9600
	parity	N
	data format [bit]	8
	stop bits	1

Transmission data PROFIBUS	baud rate[bit/s]	9.6	k	[bit/s]	1200m
		19.2	k	[bit/s]	1200m
		45.45	k	[bit/s]	1000m
		93.75	k	[bit/s]	1000m
		187.5	k	[bit/s]	1000m
		500	k	[bit/s]	400m
		1.5	M	[bit/s]	100m

Power consumption	Self powered to N-DIN	
Storage and transport	ambient temperature	-10°C / +55°C

6. MAINTENANCE

No maintenance is required. In case of malfunctioning please contact Microelettrica Scientifica Service or the local Authorised Dealer mentioning the Serial N° reported in the label on relay enclosure.

Microelettrica Scientifica S.p.A. policy is one of continuous improvement and we reserve the right to make changes in design and specification of any products as engineering advances or necessity requires and revise the above specification without notice.

6.1 - Waste Disposal of Electrical & Electronic Equipment

(Applicable throughout the European Union and other European countries with separate collection program).
This product should not be treated as household waste when you wish dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment.
By ensuring this product is disposed of correctly, you will help prevent potential negative consequence to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resource.

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