CIRCUTOR

Protocol transducer

CMBUS-8 CMBUS-24

INSTRUCTION MANUAL

(M98252701-03-14A)

CE

SAFETY PRECAUTIONS

Follow the warnings described in this manual with the symbols shown below.

	DANGER Warns of a risk, which could result in personal injury or material damage.

	ATTENTION Indicates that special attention should be paid to a specific point.

If you must handle the unit for its installation, start-up or maintenance, the following should be taken into consideration:

	Incorrect handling or installation of the unit may result in injury to personnel as well as damage to the unit. In particular, handling with voltages applied may result in electric shock, which may cause death or serious injury to personnel. Defective installation or maintenance may also lead to the risk of fire. Read the manual carefully prior to connecting the unit. Follow all installation and maintenance instructions throughout the unit's working life. Pay special attention to the installation standards of the National Electrical Code.

	Refer to the instruction manual before using the unit In this manual, if the instructions marked with this symbol are not respected or carried out correctly, it can result in injury or damage to the unit and /or installations.

CIRCUTOR, SA reserves the right to modify features or the product manual without prior notification.

DISCLAIMER

CIRCUTOR, SA reserves the right to make modifications to the device or the unit specifications set out in this instruction manual without prior notice.

CIRCUTOR, SA on its web site, supplies its customers with the latest versions of the device specifications and the most updated manuals.

www.circutor.com

CONTENTS

REVISION LOG

Table 1: Revision log.

Date	Revision	Description
09/14	M98252701-03-14A	Initial Version

Note: *The images of the units are for illustrative purposes only and may differ from the original unit.*

1.- VERIFICATION UPON RECEPTION

Check the following points when you receive the unit:

     a) The unit meets the specifications described in your order.
     b) The unit has not suffered any damage during transport.
     c) Perform an external visual inspection of the unit prior to switching it on.
     d) Check that it has been delivered with the following:
           - An installation guide.

> ⚠ If any problem is noticed upon reception, immediately contact the transport company and/or **CIRCUTOR's** after-sales service.

2.- PRODUCT DESCRIPTION

CMBUS protocol transducers enable devices with RS-485 Modbus Master communications to communicate with different M-BUS slave units.

There are two unit models:

    ✓ The **CMBUS-8** model can communicate with 8 slave units (100 parameters).
    ✓ The **CMBUS-24** model can communicate with 24 slave units (500 parameters).

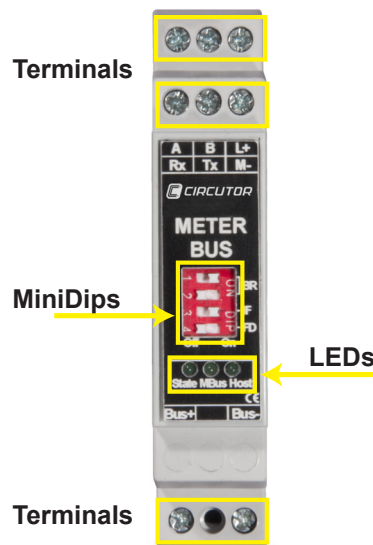**Figure 1: Description of the CMBUS**

The unit features:
    ✓ **4 MiniDips** for configuration,
    ✓ **3 LEDs** that indicate the converter status and the M-BUS and Modbus traffic,
    ✓ An **RS-232** connection for the initial configuration of the unit.

M-BUS slave units are integrated into the transducer using programming software.

3.- UNIT INSTALLATION

3.1.- PRELIMINARY RECOMMENDATIONS

⚠️	In order to use the unit safely, it is critical that individuals who handle it follow the safety measures set out in the standards of the country where it is being used, use the personal protective equipment necessary, and pay attention to the various warnings indicated in this instruction manual.

The **CMBUS** unit must be installed by authorised and qualified staff.

The power supply plug must be disconnected and measuring systems switched off before handling, altering the connections or replacing the unit. It is dangerous to handle the unit while it is powered.

Also, it is critical to keep the cables in perfect condition to avoid accidents, personal injury and damage to installations.

The manufacturer of the unit is not responsible for any damages resulting from failure by the user or installer to heed the warnings and/or recommendations set out in this manual, nor for damages resulting from the use of products or accessories that did not come with the unit or that were made by other manufacturers.

⚠️	Disconnect the unit from the power supply (unit and measuring system power supply) before maintaining, repairing or handling the unit's connections. Please contact the after-sales service if you suspect that there is an operational fault in the unit.

3.2.- INSTALLATION

⚠️	Do not use the unit until it is fully installed.

The unit is installed on a 35 mm DIN rail (EN 50022).

To install the unit on a DIN rail (**Figure 2**) :

1.- Hook the rear clip of the unit to the top of the DIN rail.
2.- Pull the clip downwards.
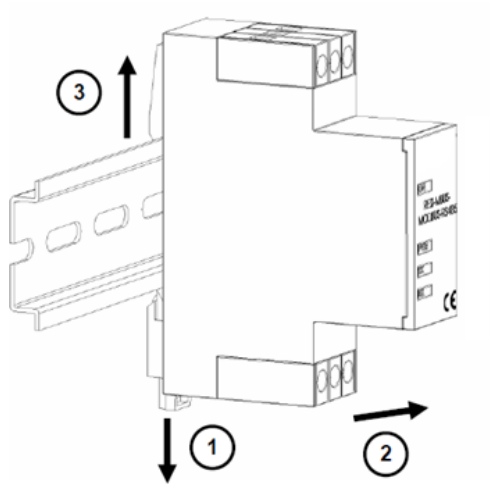**3.-** Push the unit into place on the DIN rail and release the clip.

Figure 2: Installing the CMBUS on a DIN rail

To uninstall from the DIN rail (**Figure 3**):

> **1.-** Pull the clip downwards.
> **2.-** Pull the unit to release the bottom edge of the DIN rail.
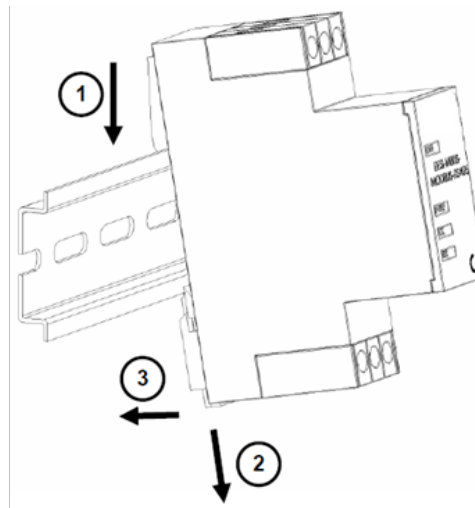> **3.-** Pull the unit up to release the upper clip from the DIN rail.

Figure 3: Uninstalling the CMBUS from a DIN rail

3.3.- UNIT TERMINALS

Table 2: List of unit terminals.

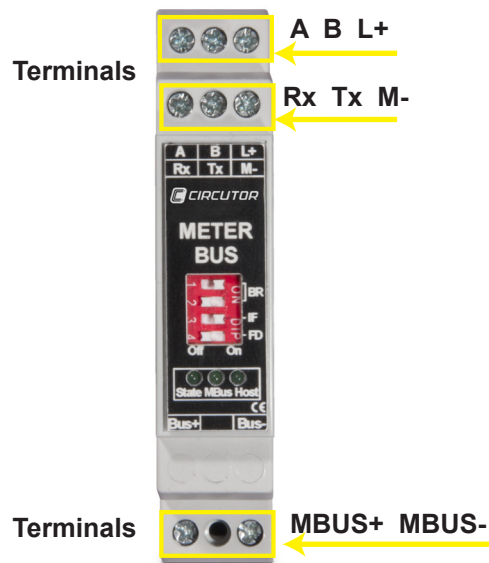| Terminal	Description
A	A (+) Modbus
B	B (-) Modbus
L+	+ 24 Vdc
M-	GND
Rx	RS-232, data reception
Tx	RS-232, data transmission
MBUS+	+ connection to M-BUS slaves
MBUS-	- connection to M-BUS slaves

Figure 4: Unit terminals
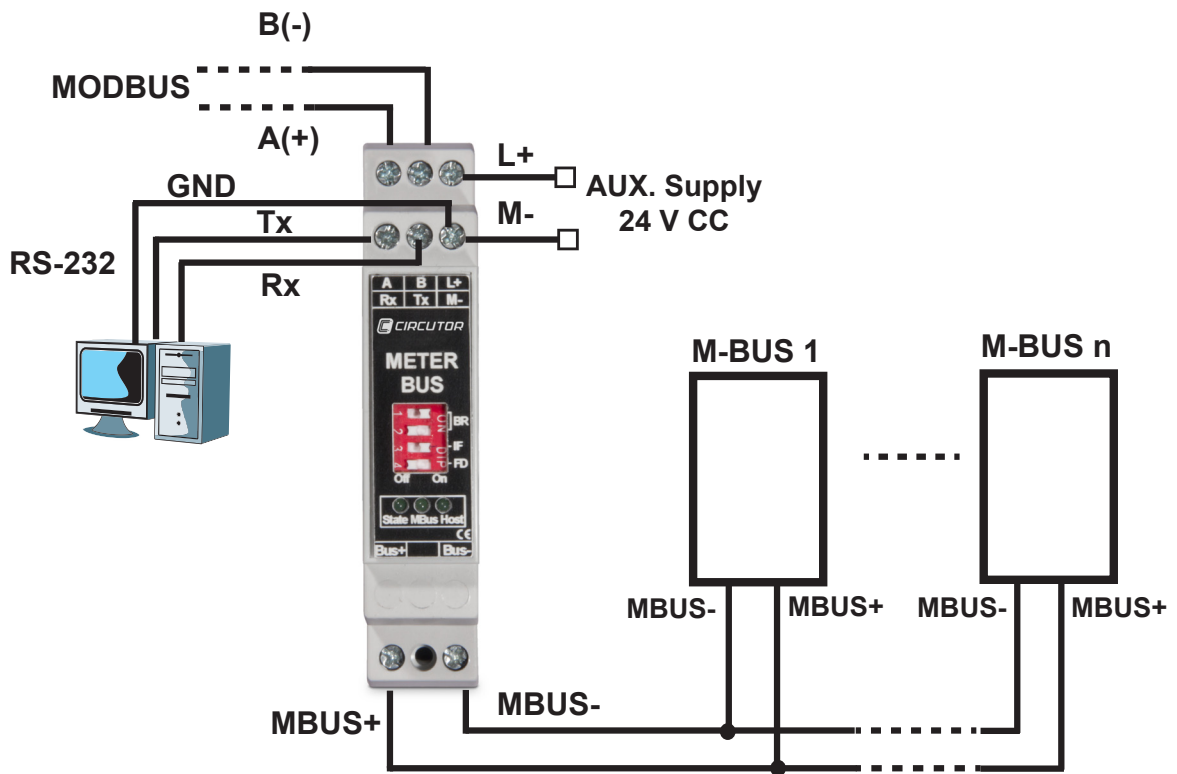
3.4.- CONNECTION DIAGRAM

Figure 5:Connection diagram

Note: RS-232 communications are used to configure the unit for the first time via a PC.

4.- START-UP

The initial configuration of the unit is complete using the 4 MiniDips found on the front panel of the unit.
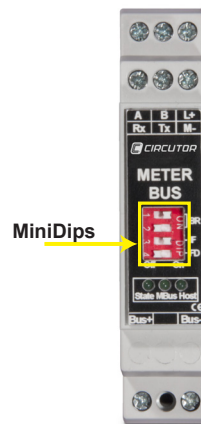
MiniDips ←

Figure 6: Location of the MiniDips in the CMBUS

Table 3: Initial configuration of the CMBUS.

Initial configuration		
Speed	**MiniDip 1**	**MiniDip 2**
9600	OFF	OFF
19200	ON	OFF
38400	OFF	ON
57600	ON	ON
Interface	**MiniDip 3**	
RS-232 (Programming)	OFF	
RS-485 (Modbus Master)	ON	
Peripheral no.	**MiniDip 4**	
As programmed	OFF	
By default (255)	ON	

Note: Restart the CMBUS by removing the power supply for a few seconds after making any changes to the configuration using the MiniDips.

5.- OPERATION

The M-BUS protocol (Meter-Bus) is a communications bus used to read information from gas, water and energy meters.
M-BUS is a hierarchical protocol whose communication is controlled by a Master device with a certain number of slave elements that respond to its queries.
The protocol is standardised according to the EN 13757-3 and EN 13757-2 standards.

The **CMBUS** transducer connects the M-BUS slave devices with a RS-485 master.

5.1.- LED INDICATORS

CMBUS has 3 LED indicators:

- ✓ **State**: LED indicating the state of the converter, blinking light every 1 second.
- ✓ **MBUS**: LED which blinks when there is data transmission in the M-BUS bus.
- ✓ **Host**: LED which blinks when there is data transmission in the MODBUS bus.

5.2.- PROGRAMMING

The **CMBUS** has built-in Windows-compatible software with which you can:

- ✓ Configure the communication parameters of the converter.
- ✓ Configure the M-BUS slave units.

5.2.1. INSTALLATION OF THE CMBUS SOFTWARE

The **CMBUS** software must be run in a Windows environment (Windows XP or Windows 7) with administrator rights.
Steps for **CMBUS** software installation:

1.- Download the programming software, *CMBUS-SETUP.zip* from the Circutor website (www.circutor.es).

2.- Extract the content of the compressed file onto the computer.

3.- Run the *CMBUS-SETUP.exe* program in a Windows environment with administrator rights. The program is compatible with 32-bit and 64-bit operating systems.

4.- Connect the **CMBUS** to the computer's RS-232 port, as shown in **Figure 7.**
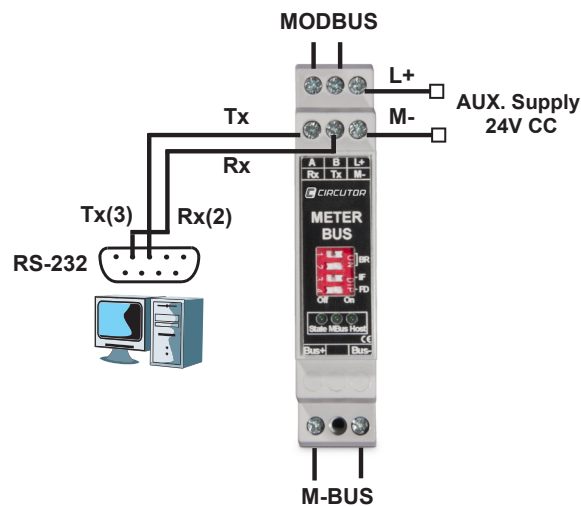
Figure 7: CMBUS connection to the RS-232 port

5.- Connect the **CMBUS** to the power supply.

6.- Put the MiniDip 3 on the front panel of the unit in the OFF position to enable the RS-232 configuration.

7.- Put the MiniDip 4 on the front panel of the unit in the ON position to configure the peripheral number to 255.

8.- Select the serial port to which the **CMBUS** is connected on the main screen of the software (**Figure 8**).
If in doubt, you can select more than one COM port so that the program auto-detects the correct port.
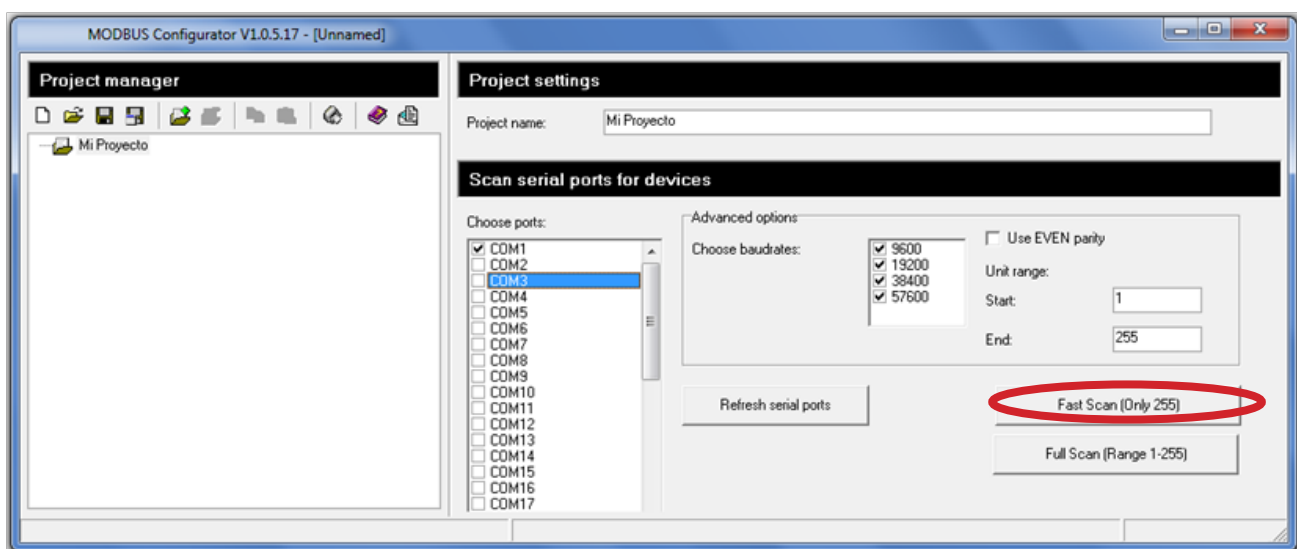Click on the button "**FAST SCAN (only 255)**".

Figure 8: Selecting the COM port to which the CMBUS is connected

9.- Click on the button "**Scan serial ports for devices**". The window status bar indicates the progress of the detection process of the transducer. (**Figure 9**)

If nothing is detected, check the connections of the unit and the serial port configuration of the computer making the connection.
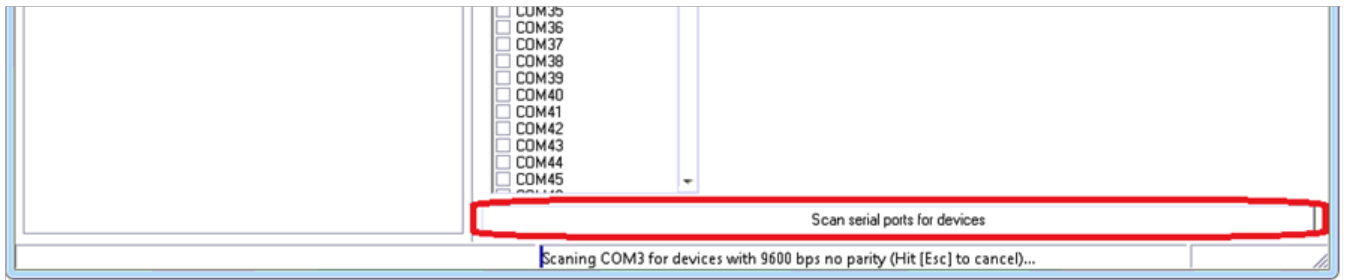
Figure 9:Selecting "Scan serial ports for device".

10.- Once the COM port has been detected, you can add a **CMBUS** unit to the project by clicking on the button to add units to the project as shown in **Figure 10**.

Figure 10: Button to add units to the project.

From the suggested units, select option:

- RESI-MBUS-MODBUS for the **CMBUS-8** model and
- RESI-MBUS2-MODBUS for the **CMBUS-24** model.

11.- Once the unit has been added, select it from the list of project units and configure the communication parameters (**Figure 11**).
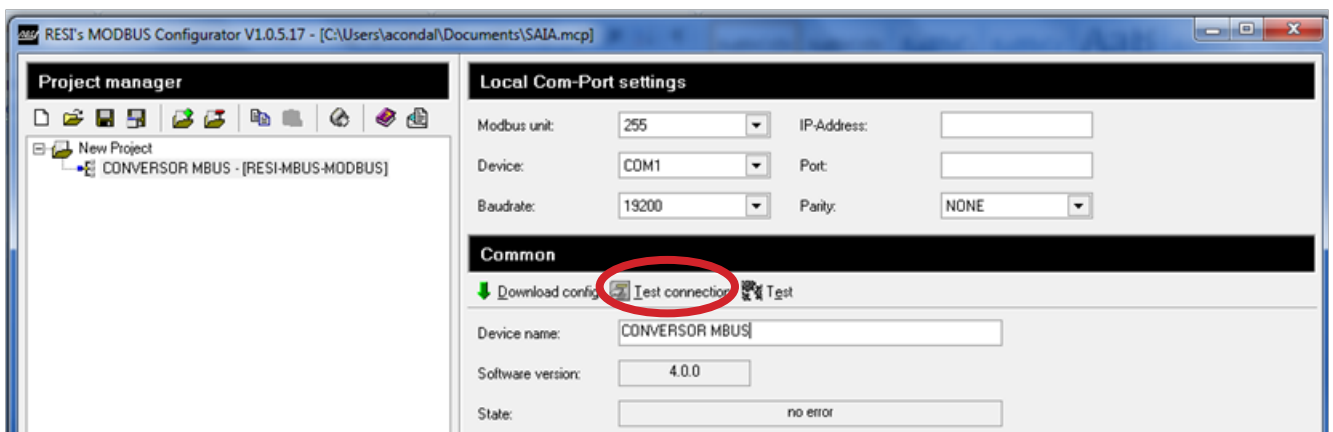

Figure 11: CMBUS configuration screen.

12.- Check the connection with the **CMBUS** by clicking on **"TEST CONNECTION"** (**Figure 11**).
If the connection is successful, the **CMBUS** firmware version will appear on the screen in the **"Software version"** field along with the **"State"** of the unit at the time.

5.2.2.- ADDING M-BUS UNITS FROM THE DATABASE

You can add the M-BUS units connected to the **CMBUS** from the database by following these steps:

1.- Click on the button to add units to the project (**Figure 10**).
A list of units from different manufacturers appears together with their pre-configured M-BUS memory maps (**Figure 12**).

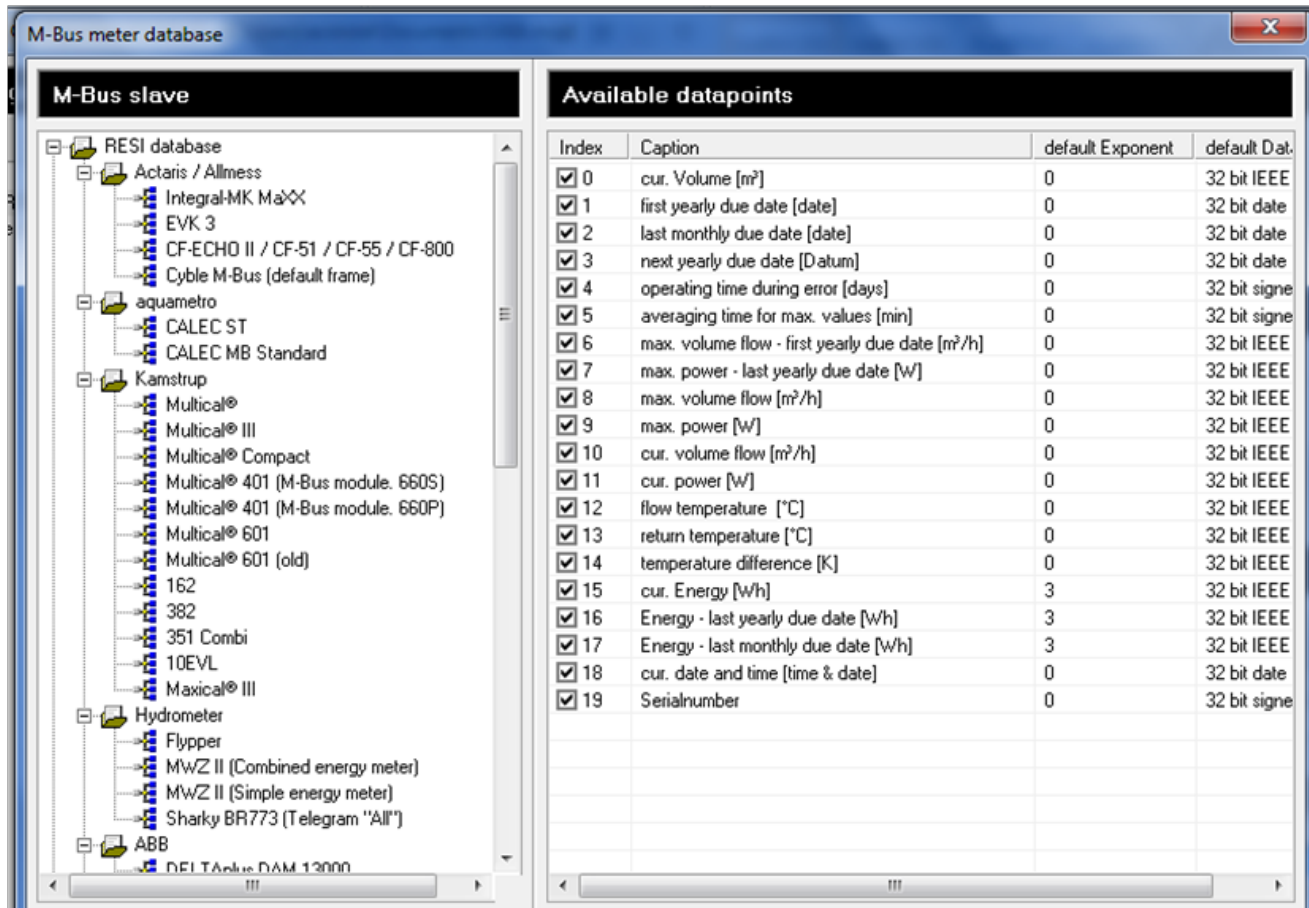

Figure 12: Database of the different M-BUS units

2.- Select the unit from the list and click **OK** to add it to the project as a M-BUS slave unit. (**Figure 13**)
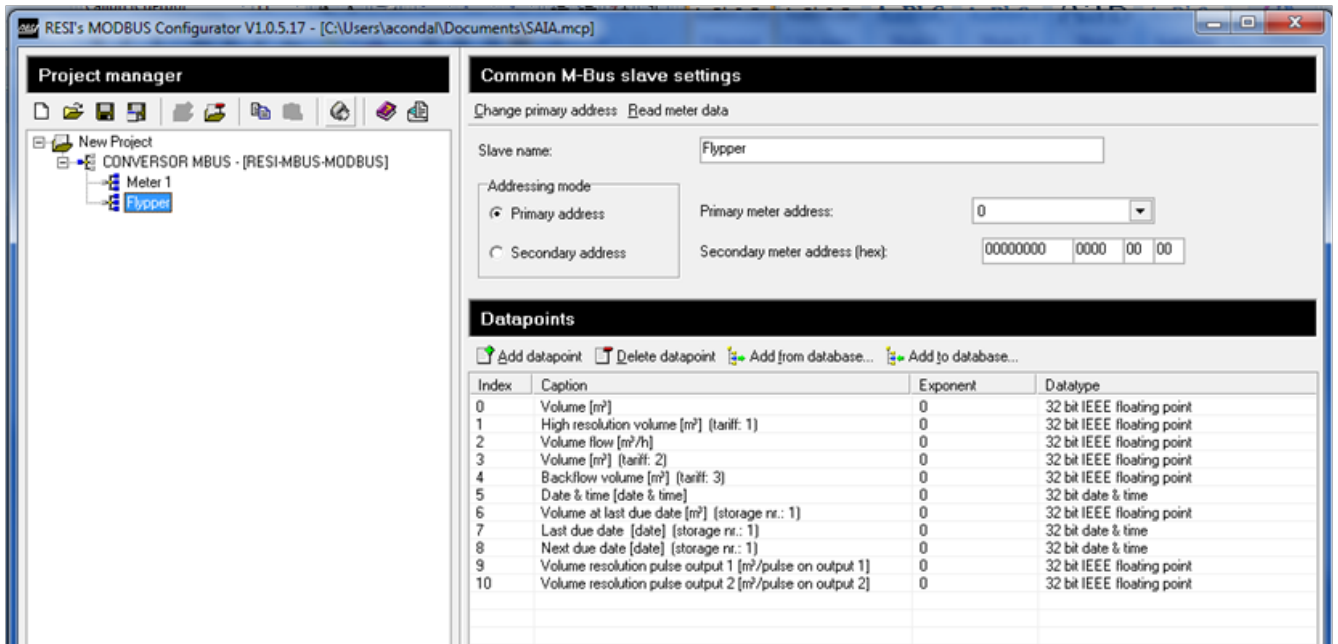You can modify the pre-configured memory map to adapt it to your needs.

Figure 13: M-BUS slave unit added to the project

5.2.3. ADDING M-BUS UNITS THROUGH AUTO-DETECTION

You can also add M-BUS units through auto-detection by configuring the following parameters (**Figure 14**):
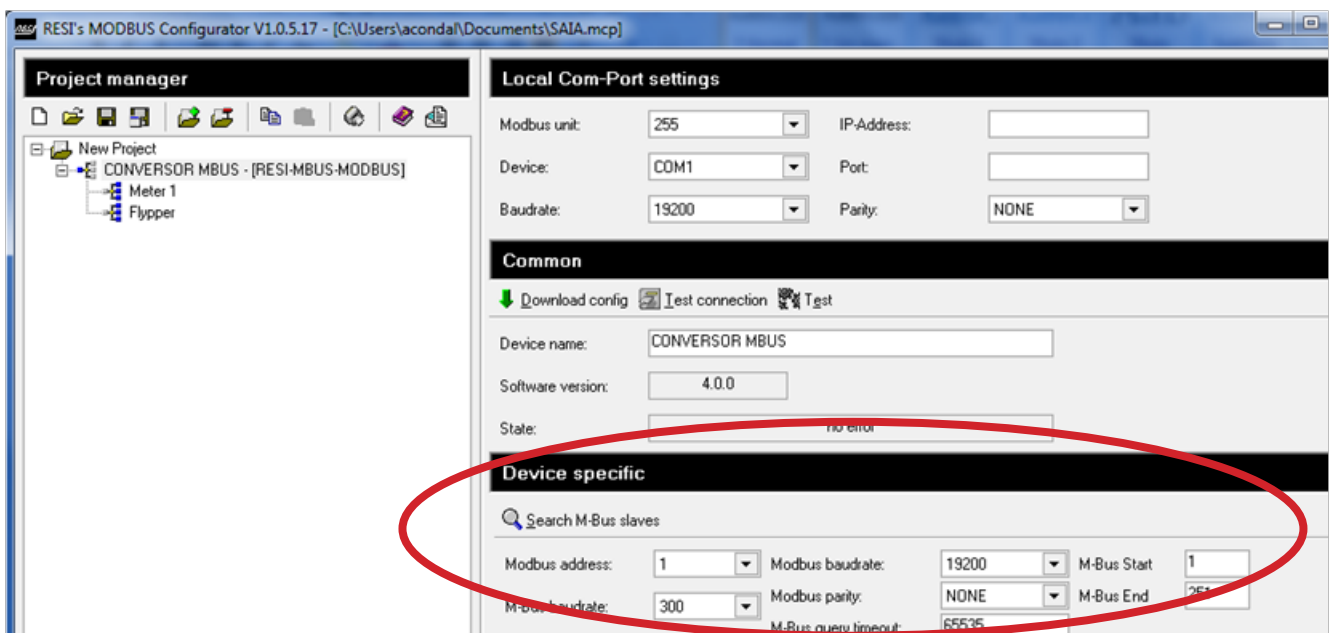
Figure 14: M-BUS units auto-detection screen

- ✓ **Modbus Address**: Modbus peripheral number.
- ✓ **Modbus baudrate**: Modbus transmission/reception speed.
- ✓ **Modbus parity**: Modbus transmission/reception parity.
- ✓ **M-Bus Start**: First peripheral number to start auto-detection.
- ✓ **M-Bus End**: Last peripheral number to end auto-detection.
- ✓ **M-Bus query timeout**: Wait time in ms before going to the next peripheral number during the search for slave units.

The auto-detection process can take between 1 and 15 minutes.
You can see the progress of the search process on the bar at the bottom of the program screen (**Figure 15**).
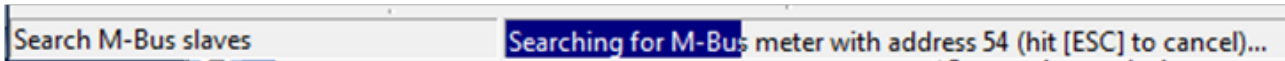
Figure 15: Bar at the bottom of the screen showing the auto-detection process.

You can cancel the search by clicking the ESC button on the keyboard.
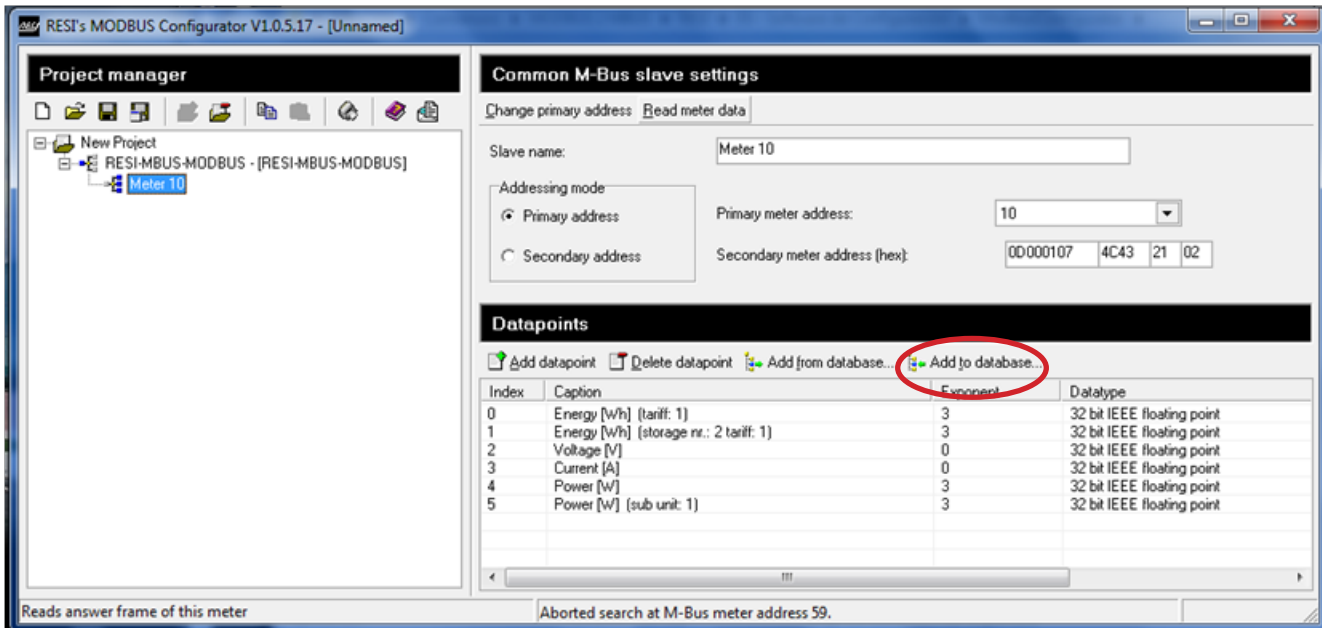If a unit is detected it will appear in the project list (**Figure 16**).

Figure 16: Memory map of a auto-detected M-BUS unit

Once the unit has been auto-detected you can save it in the database for future start-ups in future projects. To do so, click the button **"Add to database"** (**Figure 16**).

5.2.4. CMBUS START-UP

Once the slave units and their corresponding M-BUS memory maps have been determined, and the Modbus parameters to which the converter must respond have been configured, click the button "**Download config**" to send the configuration to the transducer (**Figure 17**).
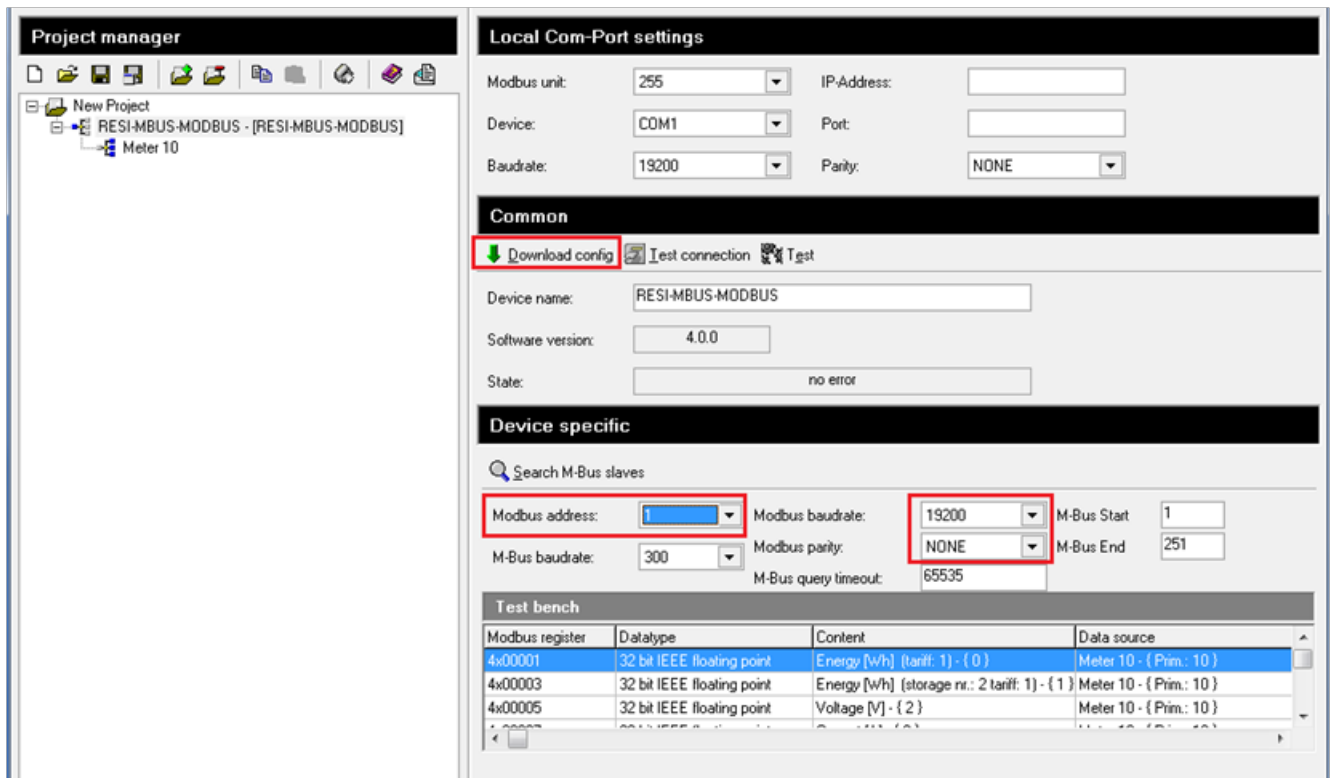
Figure 17:Sending the configuration to the CMBUS

Once the configuration has been sent to the unit, the program will display the corresponding information in the status bar (**Figure 18)**.

Figure 18: Sending of the configuration to CMBUS completed.

To verify the correct reception of the data obtained from the M-BUS slave units, click the TEST button (**Figure 19**). The values reported by the slave units will be shown in the table of Modbus variables.
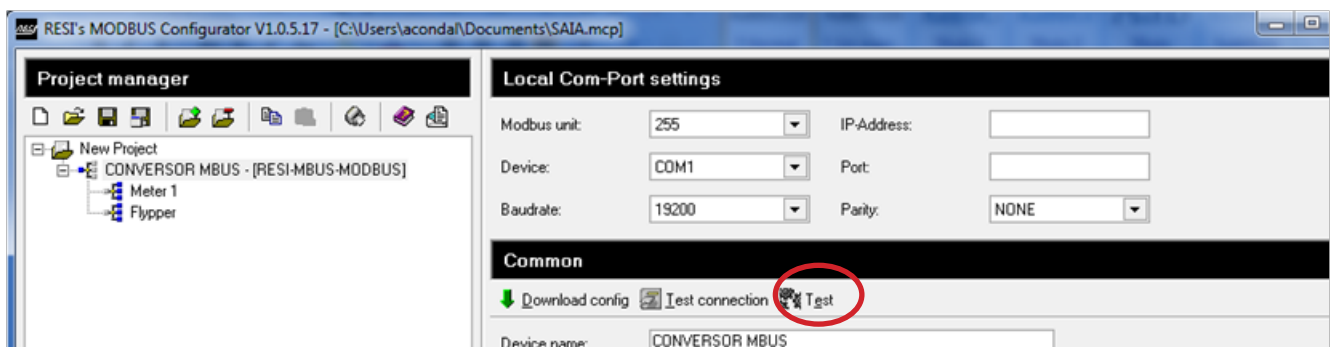
Figure 19: Verifying correct data reception with the TEST button

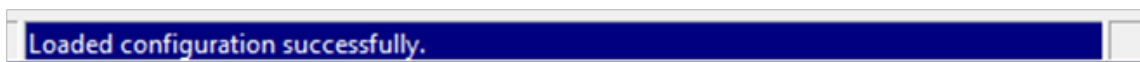If you need to restart the project again, it is important to send the unit an empty configuration without configured M-BUS slave units. This process will format the internal memory of the **CMBUS** and return the unit to its factory configuration.

To finish, put the MiniDip 3 in ON position to activate RS-485 communications.

If the **CMBUS** must reply to a specific peripheral number other than 255, based on the determined configuration, put the MiniDip 4 in OFF position.

6.- TECHNICAL FEATURES

Power supply	
Rated voltage	18 V ... 30 V $=$
Typical consumption	36 mA
Maximum consumption (operating)	55 mA
Maximum consumption (start-up)	100 mA (20 ms)

Modbus connection	
Interface	RS-232 or RS-485
Transmission speed	9600, 19200, 38400, 57600
Bits, Parity, Stop bits	8, N, 1
Protocol	Modbus RTU / Slave
LED indicator	HOST LED
Supported Modbus master units	1
Maximum cabling distance	350 m.

M-BUS connection	
Interface	M-BUS (Meter-Bus)
Transmission speed	300 ... 38400
Bits, Parity, Stop bits	8, N, 1
Protocol	M-BUS (Meter-Bus)
LED indicator	M-BUS LED
Maximum cabling distance	350 m.
Maximum bus capacitance	180 nF

Terminals	
Permitted section	1.5 mm^2
Torque	0.8 ... 1 Nm
Screws	Pozidrive 1

Environmental features	
Operating temperature	0ºC ... +60ºC
Storage temperature	- 20ºC... +85ºC
Relative humidity	10 ... 90%
Maximum altitude	2,000 m
Resistance to pollution	IP 20
Protection degree	IP20 in accordance with DIN 40050/EN 60529

Mechanical features	
Dimensions (Figure 20)	15.5 x 90 x 58 mm
Weight	90 g
Colour	Grey (RAL 7035)
Material	Self-extinguishing PPO
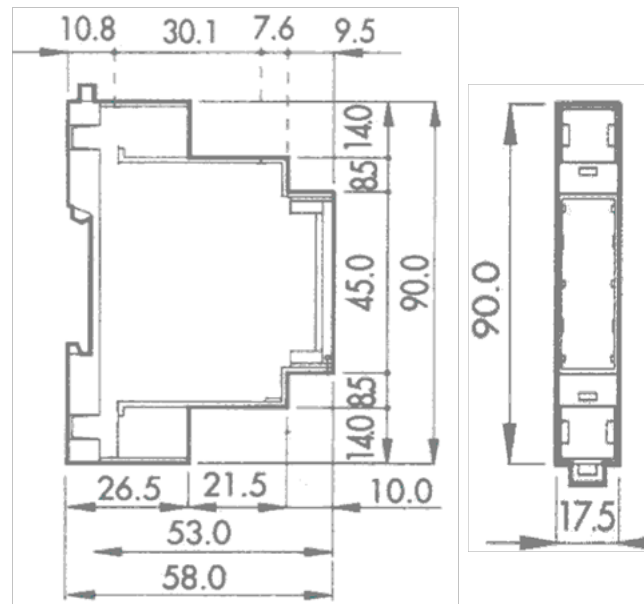
Figure 20: Dimensions of the CMBUS

Standards	
Low voltage directive	LVD 73/23/EEC
Electromagnetic compatibility	EMC 89/336/EEC
CE Marking	CE 93/68/EEC
Emission limits	EN 61000-6-3:2007+A1:2011
Immunity requirements	EN 61000-6-2:2005
Electromagnetic fields	IEC 61000-4-3
ESD	IEC 61000-4-2
Burst	IEC 61000-4-4
Surge	IEC 61000-4-5
Conducted RF	IEC 61000-4-6
Safety requirements for electrical equipment for measurement, control and laboratory use	EN 61010-1

7.- MAINTENANCE AND TECHNICAL SERVICE

In the case of any query in relation to unit operation or malfunction, please contact the **CIRCUTOR, SA** Technical Support Service.

Technical Assistance Service
Vial Sant Jordi, s/n, 08232 - Viladecavalls (Barcelona)
Tel: 902 449 459 (España) / +34 937 452 919 (outside of Spain)
email: sat@circutor.es

8.- WARRANTY

CIRCUTOR guarantees its products against any manufacturing defect for two years after the delivery of the units.

CIRCUTOR will repair or replace any defective factory product returned during the guarantee period.

• No returns will be accepted and no unit will be repaired or replaced if it is not accompanied by a report indicating the defect detected or the reason for the return.
•The guarantee will be void if the units has been improperly used or the storage, installation and maintenance instructions listed in this manual have not been followed. "Improper usage" is defined as any operating or storage condition contrary to the national electrical code or that surpasses the limits indicated in the technical and environmental features of this manual.
• **CIRCUTOR** accepts no liability due to the possible damage to the unit or other parts of the installation, nor will it cover any possible sanctions derived from a possible failure, improper installation or "improper usage" of the unit. Consequently, this guarantee does not apply to failures occurring in the following cases:
- Overvoltages and/or electrical disturbances in the supply;
- Water, if the product does not have the appropriate IP classification;
- Poor ventilation and/or excessive temperatures;
- Improper installation and/or lack of maintenance;
- Buyer repairs or modifications without the manufacturer's authorisation.

9.- CE CERTIFICATE