

M2M Basic
2CNM203002R2001

M2M Basic Modbus
2CNM203001R2001

2CSG445010D0201

Instructions for assembly and use



Power meter M2M Basic

EN

Translation of Original Instructions



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1 GENERAL INFORMATION

1.1 Reference regulations and conformity

Electrical safety	2014/35/EU (Low Voltage Directive) IEC 61010-1 IEC 61010-2-030
Electromagnetic compatibility	2014/30/EU (EMC Directive) IEC 61326-1
Use of hazardous substances	2011/65/EU (RoHS Directive)
Measuring instruments	IEC 61557-12
Degree of protection	IEC 60529
Standardised dimensions for the panel	IEC 61554

1.2 Use and storage of the manual



Carefully read this manual and adhere to the indications described prior to using the device.

This manual contains all of the safety information, the technical aspects and the operating necessary to ensure the correct use of the device and maintain it in safe conditions.

ABB cannot be held liable for any damage or personal injury arising from incorrect or improper use of its equipment.

This document is subject to changes without prior notice.

This manual refers to the instrument firmware version V.1.07 or later.

1.2.1 Storing

The manual must be stored close to the device; safe from liquids and anything else which may compromise its legibility.

The manual and the declaration of conformity are both an integral part of the device until it is dismantled.

If the manual is lost or illegible please request a copy from the manufacturer.

1.2.2 Copyright

The copyright of this manual is the property of ABB S.p.A.

This manual contains texts, designs and illustrations of a technical nature which must not be disclosed or transmitted to third parties, even partially, without the written authorization of ABB S.p.A.

1.3 General safety warnings



Non-adherence to the following points can lead to serious injury or death.

- Use the suitable personal protection devices and adhere to the current regulations governing electrical safety.
- **This device must be installed exclusively by qualified personnel who have read all of the information relative to the installation.**
- Check that the voltage supply and measurement are compatible with the range permitted by the device.
- Ensure that all current and voltage supplies are disconnected prior to carrying out any controls, visual inspections and tests on the device.
- Always assume that all circuits are under voltage until they are completely disconnected, subjected to tests and labelled.
- Disconnect all of the power supply prior to working on the device.
- Always use a suitable voltage detection device to check that the supply is interrupted.
- Pay attention to any dangers and carefully check the work area ensuring that no instruments or foreign objects have been left inside the compartment in which the device is housed.
- The correct use of this device depends on a correct manipulation, installation and use.
- Failure to adhere to the basic installation information can lead to injuries as well as damage to the electric instruments or to any other product.
- NEVER connect an external fuse in by-pass.
- Disconnect all of the input and output wires before carrying out a dielectric rigidity test or an insulation test on an instrument in which the device is installed.
- The tests carried out at a high voltage can damage the device's electronic components.

2 PACKAGING CONTENTS

2.1 *Description of the contents*

The packaging includes:

- 1) power meter
- 2) installation manual
- 3) calibration certificate
- 4) assembly accessories



Prior to using the product read the documentation attached and strictly adhere to the indications provided.

3 TECHNICAL CHARACTERISTICS

3.1 *Description of the device*

M2M Basic is a digital power meter that allows the effective measurement of more than 40 electrical parameters on 3-phase and monophase networks.

The power meter is suitable for panel door mounting.

It is equipped with a red LED HMI easy to view and four buttons keyboard for the navigation and configuration of the meter.

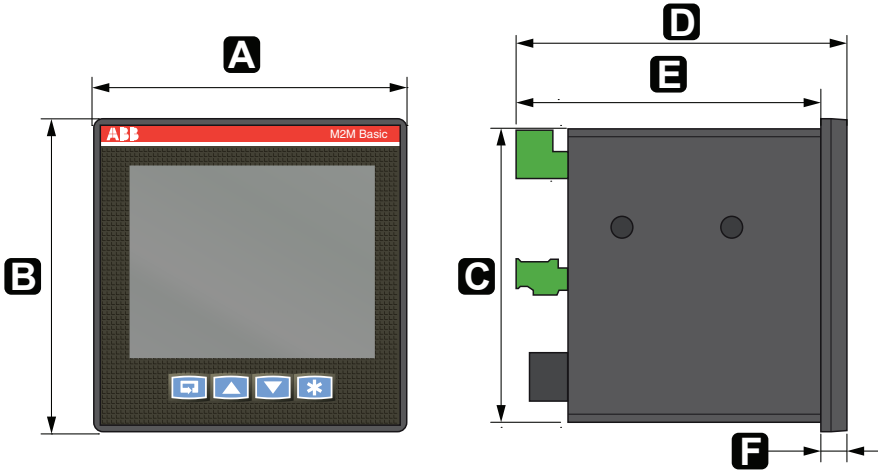
M2M Basic supports serial communications through the RS-485 Modbus RTU communication interface which allows to remotely configure and monitor the device through the software M2M SW.

3.2 *Measuring functions*

M2M Basic is able to measure and process the quantities shown below.

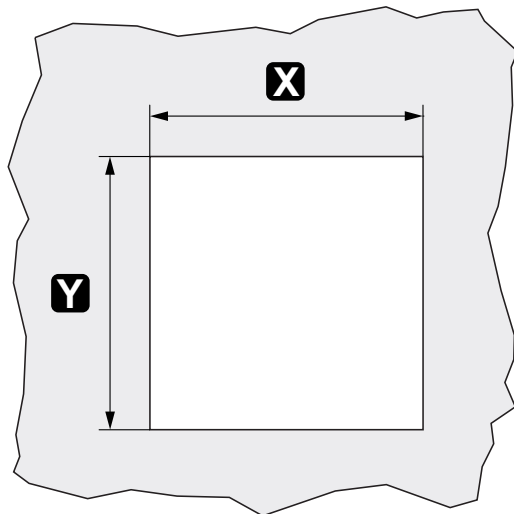
- 1) Voltages(phase neutral and concatenated)
- 2) Currents (phase and neutral)
- 3) Average current values on 15 minutes
- 4) Cosphi phases and the 3-phase system
- 5) Active and reactive for the 3-phase system on 4 quadrants (monitoring of energy absorbed and generated by the system)
- 6) Apparent energy for the 3-phase system
- 7) Active, reactive and apparent power phases and the 3-phase system
- 8) Average active, reactive and apparent power values on 15 minutes for the 3-phase systems
- 9) Voltage and current THD expressed in percent values
- 10) Current and voltages unbalances expressed in percent values

3.3 Overall dimensions



A 96 mm	D 102,3 mm
B 96 mm	E 94,3 mm
C 90 mm	F 8 mm

IEC 61554	
X	92 ^{-0+0,8} mm
Y	92 ^{-0+0,8} mm



3.4 Technical data

Auxiliary power supply		
Voltage range	[V]	85 ... 265V ac / 90...300V dc
Protection fuse		T 0,5 A
Frequency range	[Hz]	45-65

Power consumption	[VA]	3 max
-------------------	------	-------

Measurement type		Sampling TRMS
------------------	--	---------------

Accuracy class		
Voltage		±0,5% reading value According IEC 61557-12
Current		±0,5% reading value According IEC 61557-12
Frequency		±0,2% reading value According IEC 61557-12
Power factor		±1% reading value According IEC 61557-12
Active power		±1% reading value According IEC 61557-12
Reactive power		±1% reading value According IEC 61557-12
Active energy		±1% reading value According IEC 61557-12

Measurement range		
Voltage	[V]	40...300VL-N, 69...515VL-L Auto range
Current	[A]	from 20 mA to 6 A TRMS Auto range
Frequency	[Hz]	from 45 to 65 Hz Visualisation with 2 decimals
Power factor		Visualisation with 3 decimals
Cosphi		Visualisation with 3 decimals

Installation		
Distribution networks		Low voltage Singlephase insertion 3-phase with neutral 3-phase without neutral
Ammetric inputs	[A]	Always use external CT Primary from 1 to 10.000 A a.c. approx. Secondary 5 A and 1 A a.c. approx.
Voltmetric inputs	[V]	Direct insertion up to 300 a.c. approx. Indirect insertion with VT: Primary from 40 to 800k V a.c. approx. Secondary from 40 to 300 V a.c.
Protection fuse	[A]	0,1

Data refresh rate	1 time/second
--------------------------	---------------

Harmonic distortion	[Hz]	Measurement bandwidth up to 2000 Hz
----------------------------	------	-------------------------------------

Energy measurement	
3-phase maximum value counted	10 GWh / Varh / VAh

Terminal characteristics	
Ammetric inputs	Section 3.3 mm ² - Step 9.5 mm
Volumetric inputs	Section 2.5 mm ² - Step 7.62 mm
RS485 Serial port	Section 1.5 mm ² - Step 3.81 mm

Overall dimensions	
96 mm x 96 mm x 102.3 mm (Depth inside switchboard: 94.3 mm)	

Weight	[Kg] 0.350 max
--------	----------------

Standard normatives	
Degree of protection	IEC 60529
Accuracy class	IEC 61557-12
Electrical safety	IEC 61010-1 IEC 61010-2-030

User interface	
Display	Navigation through the measurement data
Display type	LED
Display dimensions	[mm] 75x60

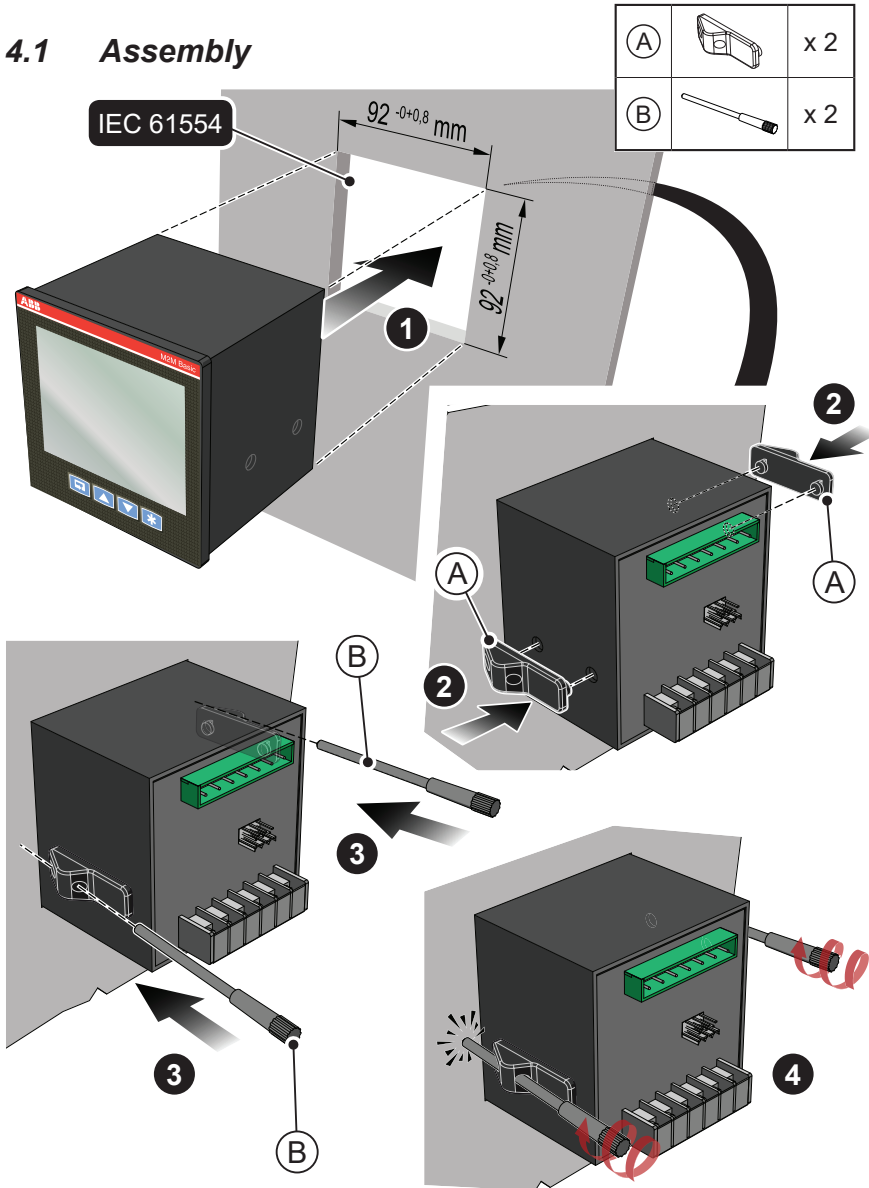
Communication interface	
RS485	
Protocol	Modbus RTU
Electric standard	RS485 with optical isolation
Baud rate	4.8, 9.6, 19.2, 38.4 kbps
Parity number	Odd, Even, None
Stop bit	1, 2
Address	1-247
Connector	3 pole terminal

Climatic conditions	
Storing	[°C] from -40 to +85
Operation	[°C] from -25 to +70
Relative humidity	Max 75% (without condensation) at 40°C

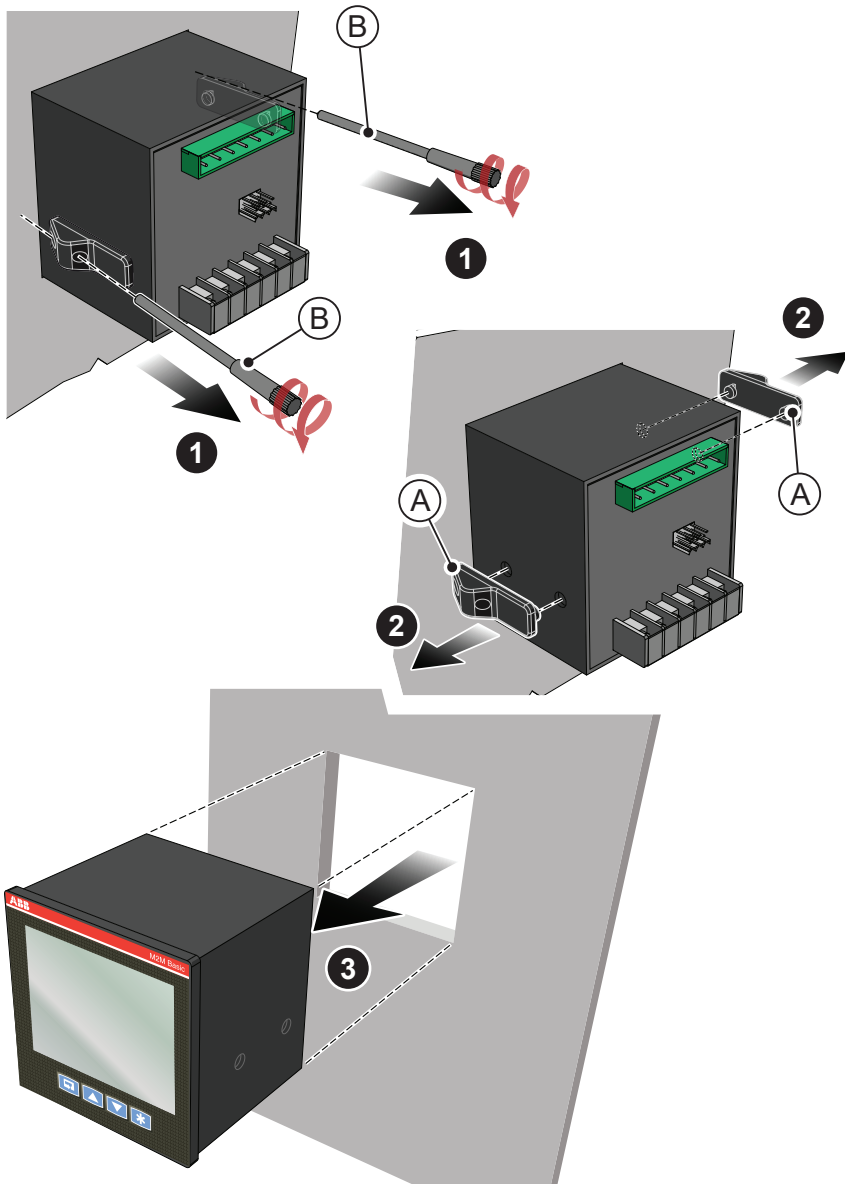
Degree of protection	
Frontal	IP50
At terminals	IP20

4 INSTALLATION

4.1 Assembly



4.2 Disassembly



4.3 *Wiring diagrams*

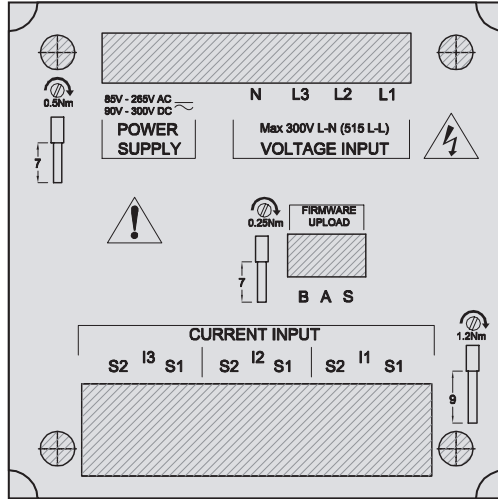
The operations to carry out for the correct connection of the device, based on the type of electric line available, are described in this section.



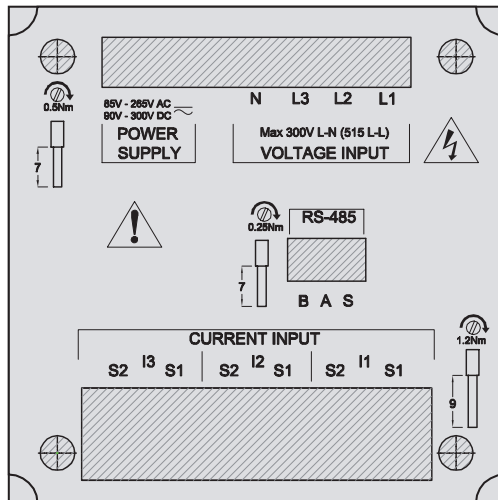
The installation and the cabling of the device must be carried out by qualified personnel.



**Danger of electrocution, burning and electric arc.
Use the personal protection devices suitable to adhere to the current regulations governing electrical safety.
Prior to carrying out any connections check the sectioning of the electric supply with the voltage detection device.**



M2M Basic



M2M Basic MODBUS

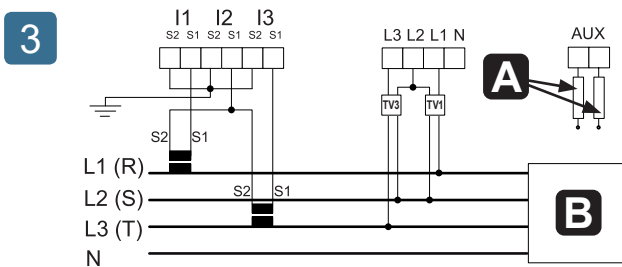
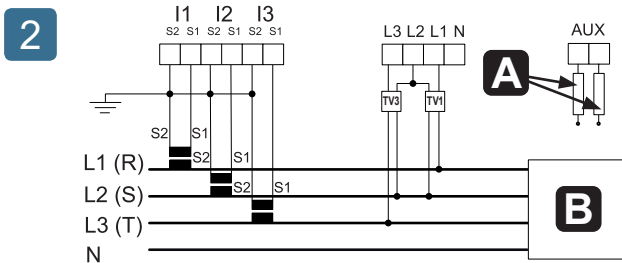
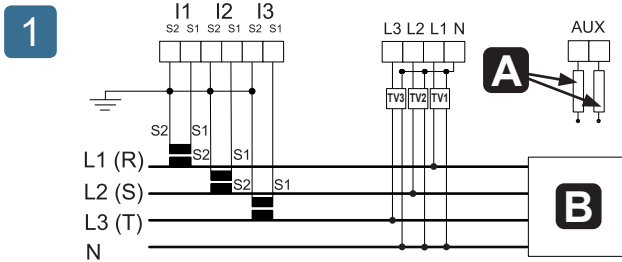
1 3-phase + neutral with 3 CT

2 3-phase without neutral and 3 CT

3 3-phase without neutral and 2 CT

A Fuse

B Load

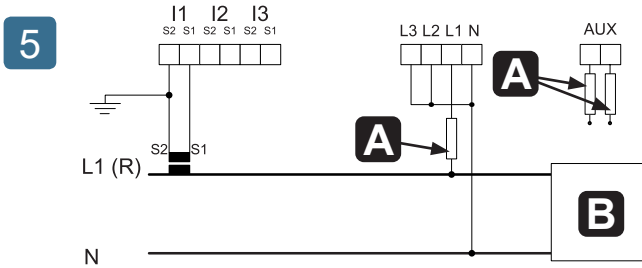
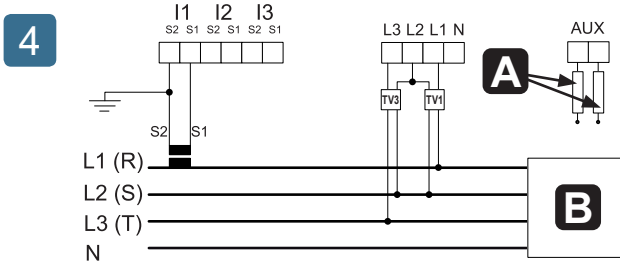


4 3-phase without neutral and 1 CT

5 Single phase connection

A Fuse

B Load



4.4 Configurations for first use

After having cabled the instrument according to the pre-selected layout, the following operations must be carried out to start to use the analyser:

- 1) enter the password (see paragraph [“5.2.3 Enabling the configuration”](#));
- 2) set the language (see paragraph [“5.2.13 Language”](#));
- 3) set the CT transformation ratio (see paragraphs [“5.2.4 Primary of the CT”](#) and [“5.2.5 Secondary of the CT”](#));
- 4) set the VT transformation ratio (see paragraphs [“5.2.6 Primary of the VT”](#) and [“5.2.7 Secondary of the VT”](#)).

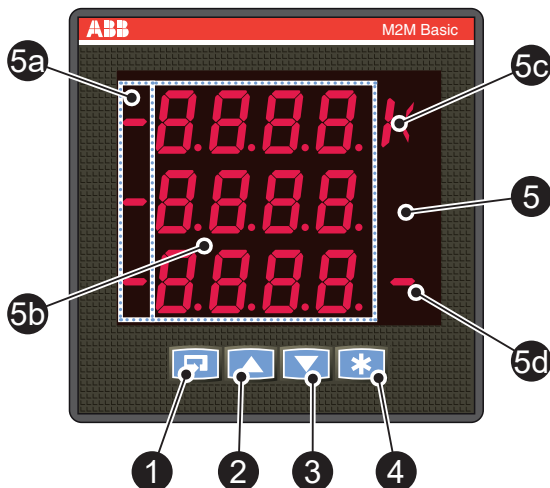


It is recommended to modify the password after first use as specified in the paragraph [“5.2.17 Password modification”](#)

5 OPERATING

5.1 Front panel

	Description
①	“Loop” button
②	“Up” button
③	“Down” button
④	“Enter” button
⑤	Display



It is possible to divide the display (5) in four main elements:

- minus signal (5a);
- measured values and configuration text (5b);
- magnitude indication (5c);
- LED energy pulses (5d).

The minus signal (5a) is enabled only for variables that can present negative values (active power, reactive power, power factor, demand of active power and demand of reactive power).

The measurements and texts area (5b) has four 7-segment digits with decimal points, showing numeric values or texts for configuration and data reading.





The magnitude area (5c) can present the “K” (kilo), “M” (Mega) or “%” (percent) according to the current measured value.

The LED energy pulses (5d) according to the active energy consumption.


5.2 Configuration mode

5.2.1 Accessing the configuration menu

The configuration screen is accessed by following the next steps:

- 1) Use “Loop”  to access the first level of the menu
- 2) Use “Up”  and “Down”  to navigate the first level of the menu
- 3) Use “Enter”  to select the SET page

The configuration menu allows checking and configuring all parameters of the meter.

Use “Up”  and “Down”  to navigate the configuration menu.


The following table presents all the parameters that can be configured.

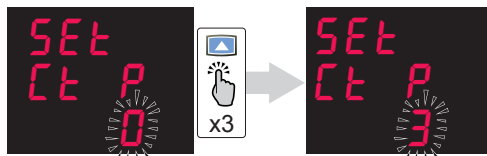
Parameter	Function
Ct P	Primary of the CT
Ct S	Secondary of the CT
Ut P	Primary of the VT
Ut S	Secondary of the VT
Wir	Type of connection
rES	Energy resolution
br	Communication baud rate
bYtE	Communication byte format
Addr	Communication address
LAnG	Language
LED	LED energy pulse
dCnt	Display control
d Tr	Timer display
PASS	Password
CnFC	Critical configuration counter
Fir	Firmware revision

5.2.2 Data entry

Some of the pages require the entry of numerical characters (0-9) in the Configuration mode.

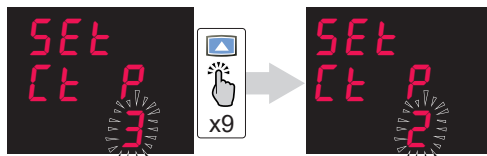
In these cases the display will show an active field identified by a flashing number. The data entry procedure is as follows:


- 1) Press “Up”  to increase the numerical characters from 0 to 9, until the required character is obtained;

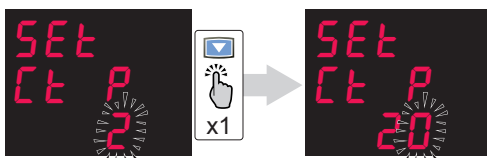


How to: Go back to a previous number


If during the data entry the desired number is exceeded by mistake, it is needed to increase the displayed number until data entry starts again from 0.

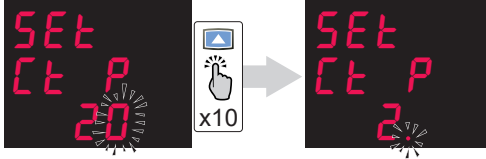



- 2) Press “Down”  to move the cursor in order to add a second digit to the number;

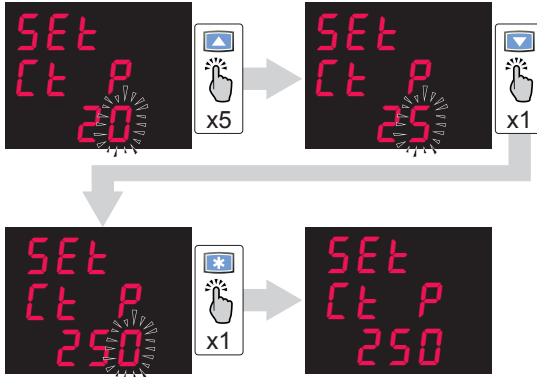


How to: Enable the comma

Some device configurations allow entering the comma. Comma can be displayed by increasing the number with “Up” , after character 9 and before data entry starts again from character 0.






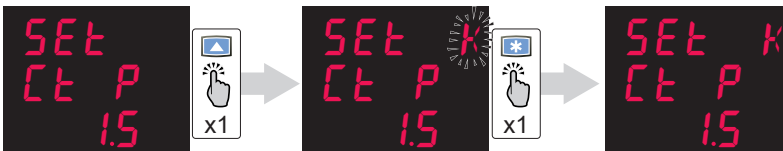
- 3) Repeat the operations described in steps 1 and 2 until the desired number is obtained
- 4) Press “Enter”  to confirm the number.



How to: Enter the magnitude

Some device configurations allow entering the magnitude.

Once the number has been entered as after step 4, keys “Up”  and “Down”  allow enabling the magnitude “K” (kilo) or not. Press “Enter”  to confirm the magnitude.



5.2.3 Enabling the configuration

In order to configure the device and to change its settings, it is first necessary to enable the configuration by entering the 4-digit password.

The default password is 0000; it is recommended to modify the password at the first use of the device, as explained in paragraph [“5.2.17 Password modification”](#)

In order to enter the device protection password:

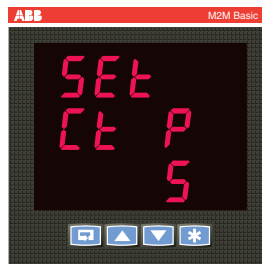
- 1) press “Loop” to access the first level of the menu;
- 2) press “Up” and “Down” to navigate the first level of the menu ;
- 3) press “Enter” to select the PASS page;
- 4) enter the 4-digit password as explained in [“5.2.2 Data entry”](#).

5.2.4 Primary of the CT

In order to modify the primary of the current transformer:

- 1) Access the **Ct P** page in the SET menu;
- 2) enter the value as explained in [“5.2.2 Data entry”](#).

**The comma can be enabled.
The magnitude can be enabled.**



5.2.5 Secondary of the CT

In order to modify the secondary of the current transformer:

- 1) access the **Ct S** page in the SET menu;
- 2) press “Up” and “Down” to set the secondary of the CT, according to the table.
- 3) press “Enter” to confirm.



Parameter	Description
5	5A
1	1A

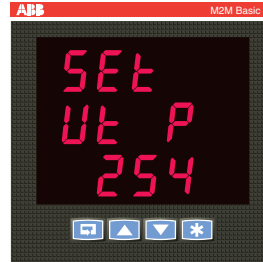
5.2.6 Primary of the VT

In order to modify the primary of the current transformer:

- 1) Access the **Ut P** page in the SET menu;
- 2) enter the value as explained in [“5.2.2 Data entry”](#).



The comma can be enabled.
The magnitude can be enabled.



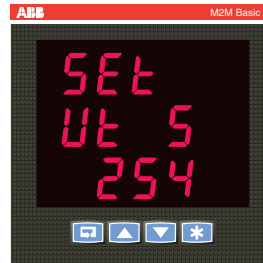
5.2.7 Secondary of the VT

In order to modify the primary of the current transformer:

- 1) Access the **Ut S** page in the SET menu;
- 2) enter the value as explained in [“5.2.2 Data entry”](#).






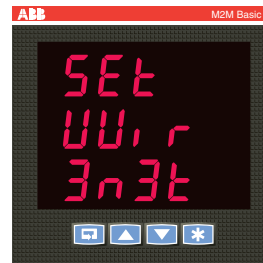
The comma can be enabled.
The magnitude can be enabled.



5.2.8 Type of connection

In order to modify the type of connection:




- 1) access the **Wir** page in the SET menu;
- 2) press “Up”  and “Down”  to set the type of connection, according to the table.
- 3) press “Enter”  to confirm.



Parameter	Description
3n3t	Three phase system with neutral and three CTs
3 3t	Three phase system without neutral and three CTs
3 2t	Three phase system without neutral and two CTs
3 1t	Three phase system without neutral and one CT
1n1t	Single phase system

5.2.9 Energy resolution

In order to modify the resolution of energy:




- 1) access the **rES** page in the SET menu;
- 2) press “Up”  and “Down”  to set the energy resolution, according to the table.
- 3) press “Enter”  to confirm.

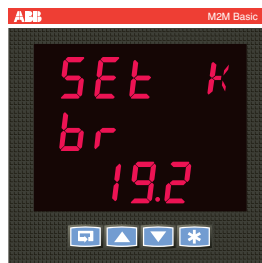


Energy range	Range
1	0...9999999.9 kWh
2	0...999999.99 kWh

5.2.10 Communication baud rate

In order to modify the communication baud rate:




- 1) access the **br** page in the SET menu;
- 2) press “Up”  and “Down”  to set the communication baud rate, according to the table.
- 3) press “Enter”  to confirm.

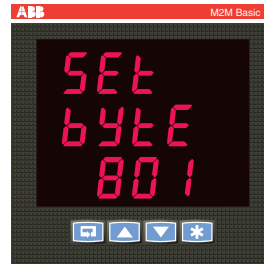


Parameter	Description
4.8	4800 bps
9.6	9600 bps
19.2	19200 bps
38.4	38400 bps

5.2.11 Communication byte format

In order to modify the communication byte format:

- 1) access the **bYtE** page in the SET menu;
- 2) press “Up”  and “Down”  to set the communication byte format, according to the table.
- 3) press “Enter”  to confirm.



Parameter	Description
8n2	8 bits, without parity, two stop bits
8E1	8 bits, even parity, one stop bit
8O1	8 bits, odd parity, one stop bit
8n1	8 bits, without parity, one stop bit

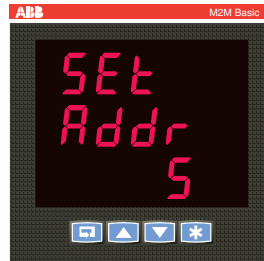
5.2.12 Communication Address

In order to modify the communication address:

- 1) access the **Addr** page in the SET menu;
- 2) enter the value as explained in “5.2.2 Data entry”.






The valid range of addresses for Modbus RTU slave is from 1 to 247



5.2.13 Language

In order to modify the language of the HMI:




- 1) access the **LANg** page in the SET menu;
- 2) press “Up”  and “Down”  to set the language, according to the table.
- 3) press “Enter”  to confirm.



Parameter	Description
En	English
Pt	Portuguese

5.2.14 LED energy pulse

In order to modify the LED energy pulse :



- 1) access the **LEd** page in the SET menu;
- 2) press “Up”  and “Down”  to set the LED option, according to the table.
- 3) press “Enter”  to confirm.



Parameter	Description
OFF	Disabled
EP	Active power (blink frequency)
EQ	Reactive power (blink frequency)

5.2.15 Display control




The display can operate in two modes: manual and automatic.

In manual mode, navigation between data reading pages is done by the user pressing “Up”  and “Down” , as explained in [“5.3.2 Visualization of measured parameters”](#).

When the display mode is set to automatic, navigation among data reading pages on the meter is achieved according to the display timer.

The display timer can be set as explained in [“5.2.16 Display timer”](#).

In order to modify the control of the display:

- 1) access the **dCnt** page in the SET menu;
- 2) press “Up”  and “Down”  to set the display control option;
- 3) press “Enter”  to confirm.

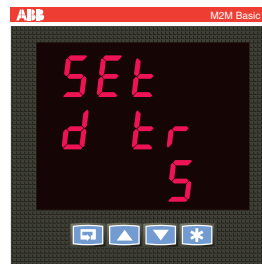


Parameter	Description
ON	Automatic control
OFF	Manual control

5.2.16 Display timer

In order to set the timer of the display for the automatic control mode:

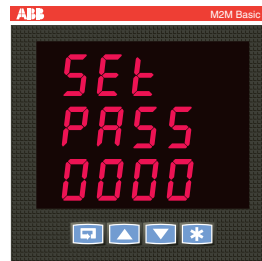
- 1) access the **d tr** page in the SET menu;
- 2) enter the value as explained in [“5.2.2 Data entry”](#).



5.2.17 Password modification

In order to modify the device protection password:

- 1) access the **PASS** page in the SET menu;
- 2) enter the new 4-digit password as explained in [“5.2.2 Data entry”](#).



5.2.18 Critical configuration counter

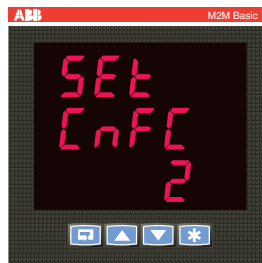
The critical configuration counter counts how many times the critical parameters have been configured. Critical parameters are the ones which causes impact in the energy calculation, which are:

- primary of the CT;
- secondary of the CT;
- primary of the VT;
- secondary of the VT;
- type of connection;
- energy resolution.

This is a tool useful to control possible undesired changes done by the user, which may impact the energy calculation.

In order to access the critical configuration counter:

- 1) access the **CnFC** page in the SET menu;



It is a read only parameter.

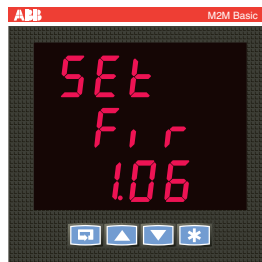
5.2.19 Firmware revision

In order to check the firmware version currently installed on the device:

- 1) access the **Fir** page in the SET menu;



It is a read only parameter.







5.2.20 Configuration menu exit

To exit from the configuration menu, press "Loop" .

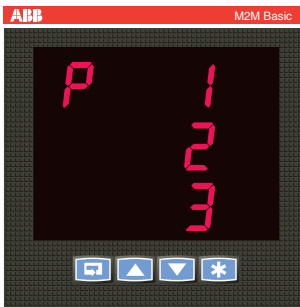
5.3 Data reading mode

5.3.1 Accessing the data reading menu

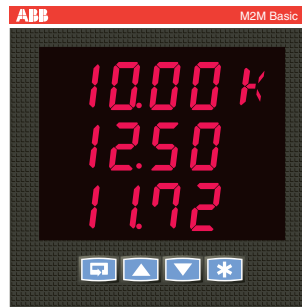
The data reading menu is accessed by following the next steps:

- 1) access the first level of the menu by pressing “Loop” ;
- 2) through “Up”  and “Down” , find the rEAd page and press “Enter” .

The data reading of the measured parameters, except for neutral current and energy, is composed by 2 different pages. The first one shows the current variable (**A**) for some seconds, then it changes to the second one that shows the measured values (**B**), as shown by the following figures.



A



B

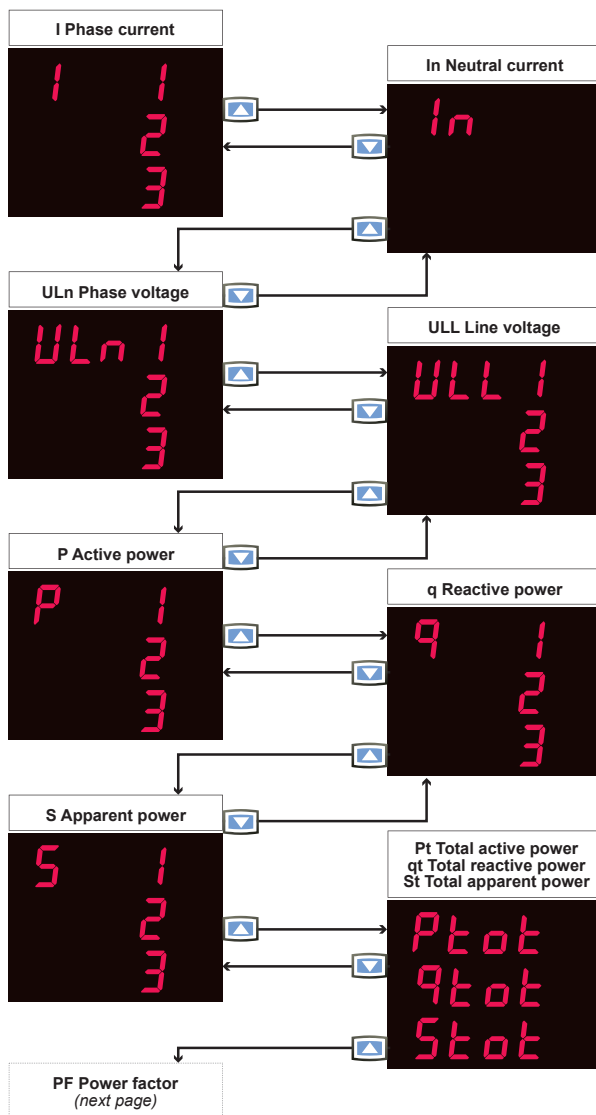
For neutral current and energy, there is a single page that includes both the current variable and the measured value (**C**), as shown by the following figure.

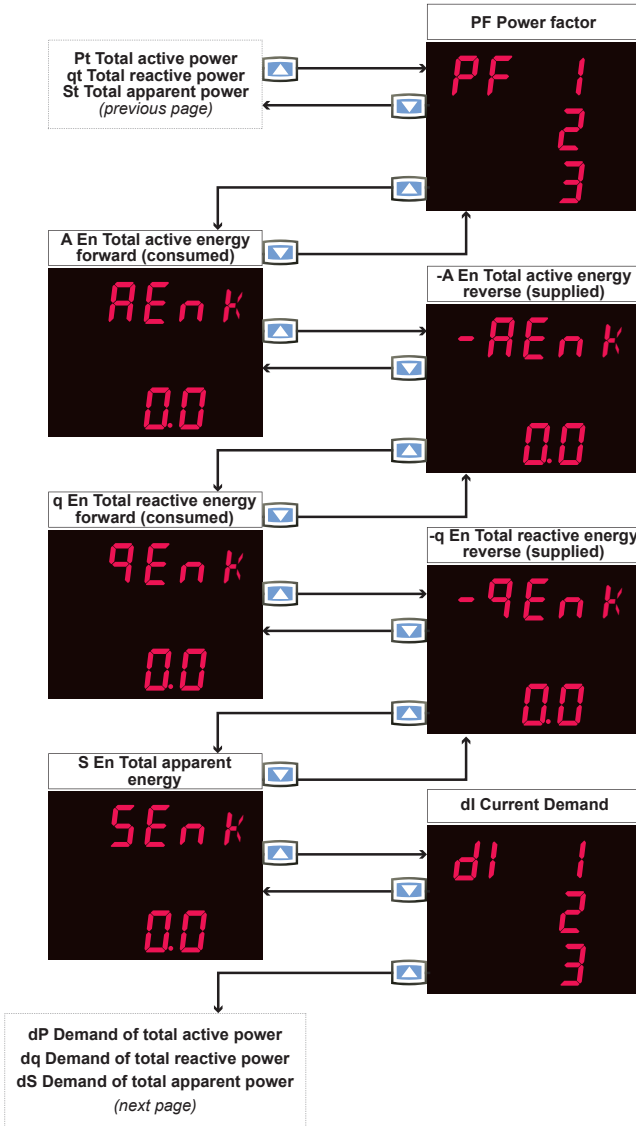


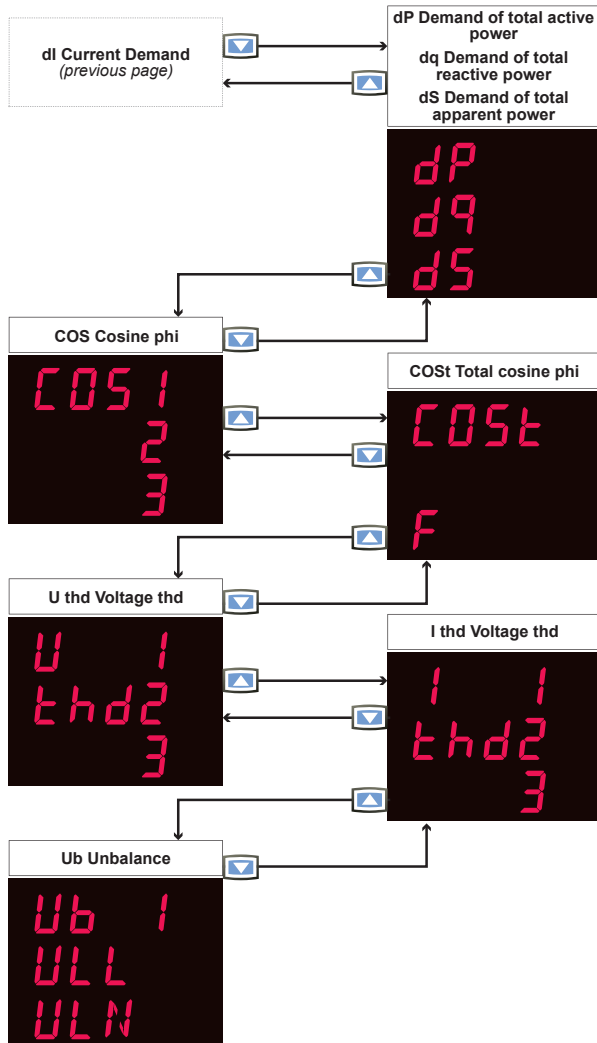
C

5.3.2 Visualization of measured parameters

The navigation in the data reading menu through the different visualization pages of the measured parameters is performed by pressing “Up” and “Down” . Please notice that if the Loop functionality has been used on the software M2M SW, then the following parameters order might not be guaranteed.







5.4 M2M SW software

M2M SW is a software that allows enhancing communication capabilities of power meters, like M2M Basic. Through the software it is possible to read measurements, generate and export historical data and configure M2M Basic.

5.4.1 Installing M2M SW software

Download the *Setup M2M SW.zip* file from ABB Library and extract the files included in the archive.

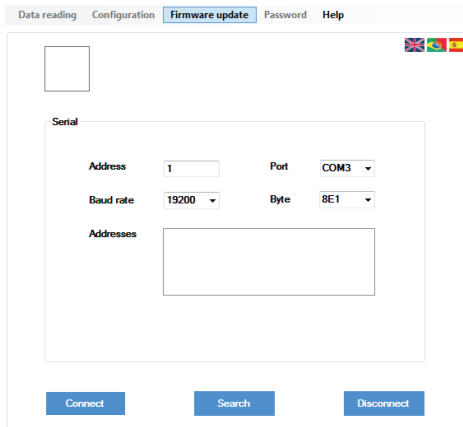
Start the installation process by double-clicking on *setup.exe*.

- 1) Click Next once the M2M SW Setup Wizard has started
- 2) Select the installation folder through the Browse key, select which user is going to use M2M SW (*Everyone* or *Just me*), then click Next.
- 3) Confirm the installation by clicking Next.
- 4) Once the installation is complete, click Close to exit.

5.4.2 How to update M2M Basic firmware

Remote firmware update through M2M SW is guaranteed for both M2M Basic and M2M Basic Modbus. Firmware versions for M2M Basic are available on ABB Library. After downloading the latest version of the firmware from ABB Library, you can proceed with the firmware update through M2M SW.

First of all, connect the device to the computer through RS232 port or USB port. Then open the software by double-clicking on M2M SW, thus the homepage will be shown. From the homepage of the software, click on *Firmware update*:



The Firmware update window will appear on the screen:

Here, it is needed to enter the main communication parameters of the device:

- **Address:** enter the value that can be found as explained in [“5.2.12 Communication Address”](#).
- **Port:** Select the port that is being used to connect the device to the computer (COM3 for RS-232 port, COM4 for USB port)
- **Baud rate:** enter the value that can be found on the device as explained in [“5.2.10 Communication baud rate”](#)
- **Byte:** enter the communication byte format that can be found on the device as explained in [“5.2.11 Communication byte format”](#)

Once all the parameters have been entered, click on Open file, go to the directory where the new firmware has been downloaded and select the .frw file.

It is now possible to start the process by clicking on Upload.

M2M SW will start searching for the device on the serial line, recognizing the instrument, the current version and the new version of the firmware. This information will be shown on the screen.

Finally, M2M SW will upload the firmware of M2M Basic.



If there is any issue in the connection during the process, switch off the auxiliary supply of the device, then provide again power supply to the device and restart the firmware update process from the beginning.

5.4.3 Connecting M2M Basic Modbus to M2M SW

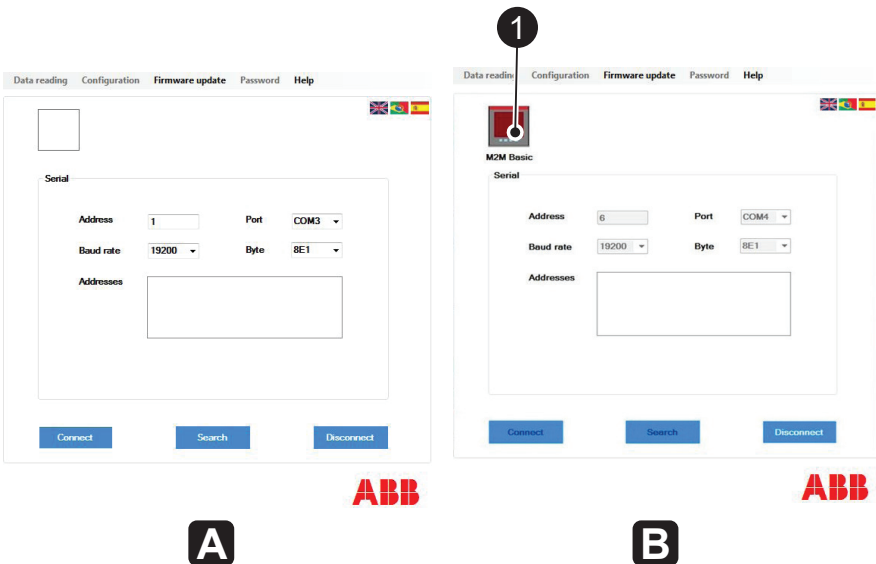
It is possible to connect M2M Basic Modbus to a computer through M2M SW in order to read and export measurement data, along with configuration of the device. First of all, connect M2M Basic Modbus to your computer, then open M2M SW homepage (A).

Here, the main communication parameters that are needed to connect M2M Basic or M2M Basic Modbus with M2M SW are shown.

The following fields must be filled according to the device parameters:

- **Address:** enter the value that can be found as explained in [“5.2.12 Communication Address”](#).
- **Port:** Select the port that is being used to connect the device to the computer (COM3 for RS-232 port, COM4 for USB port)
- **Baud rate:** enter the value that can be found on the device as explained in [“5.2.10 Communication baud rate”](#)
- **Byte:** enter the communication byte format that can be found on the device as explained in [“5.2.11 Communication byte format”](#)

After entering the four device communication parameters, click on Connect to connect the device to the software. The image (1) and product name of M2M Basic will be shown on M2M SW homepage (B) when the product is connected to the software.



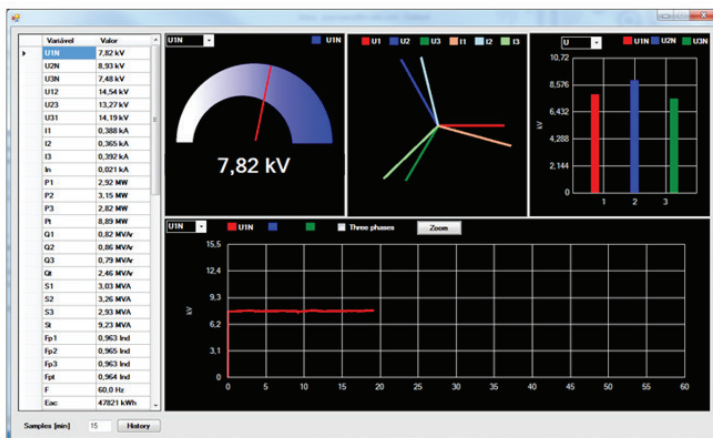
5.4.4 Remote data reading and device configuration

After connecting M2M Basic Modbus to M2M SW as explained in [“5.4.3 Connecting M2M Basic Modbus to M2M SW”](#), it is possible to access to measured data and to configure the device directly from the software.

- **Data reading and data export:**

From the homepage of the software, click on Data reading and choose between *Data reading overview*, *Data reading via Modbus map 1*, *Data reading via Modbus map 2*, *Data reading via Modbus map 3*.

Clicking on *Data reading overview*, the following window will appear on the screen:



Here it is possible to visualize the measurements, through a speedometer graph, phasor chart, bar graph and trend line chart.

Moreover, in the lower part of the screen, sample time for data export is shown and can be modified. After entering the sampling time value, click on *Historical* and select the folder where you want to save the .csv file with measured data.

M2M SW will start saving in the .csv file the measurements according to the sampling time. To stop the data export, click again on *Historical*.

Clicking on *Data reading via Modbus map 1*, *Data reading via Modbus map 2*, *Data reading via Modbus map 3* allows to visualize and export measurement data under Modbus map form.

The three Modbus tables differentiate each other according to the data format:

- Data reading via Modbus map 1: float 32 bits
- Data reading via Modbus map 2: integer 32 bits
- Data reading via Modbus map 3: integer 16 bits.

It is possible to export measured data in the same way as per the *Data reading* section.

- **Password:**

In order to start the device configuration, it is needed to enter the M2M Basic password. From the homepage of the software, click on Password and enter the 4-digit password

that has been set on the device. Press OK and wait for confirmation message from the software.

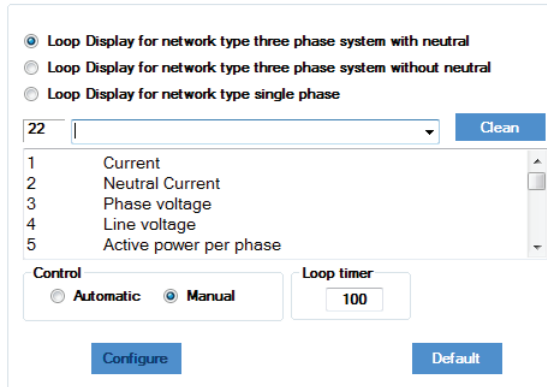
- **Device configuration:**

From the homepage of the software, click on *Configuration* and choose between *Configure meter*, *Communication*, *Loop display*.

Clicking on *Configure meter*, the following window will appear on the screen: Here the software allows setting all the configuration parameters that can be also modified through the device.

Clicking on *Communication*, it is possible to modify communication parameters (Address, baud rate, byte format)

Clicking on *Loop display*, the following window will appear on the screen:



The screenshot shows a configuration window for the Loop Display. It features three radio buttons for network types: 'Loop Display for network type three phase system with neutral' (selected), 'Loop Display for network type three phase system without neutral', and 'Loop Display for network type single phase'. Below these is a dropdown menu showing '22' and a 'Clean' button. A list of parameters is shown with a scroll bar: 1 Current, 2 Neutral Current, 3 Phase voltage, 4 Line voltage, and 5 Active power per phase. At the bottom, there are 'Control' options for 'Automatic' and 'Manual' (selected), a 'Loop timer' set to '100', and 'Configure' and 'Default' buttons.

Here it is possible change the order of data reading parameters on M2M Basic Modbus. The default order is the one shown in [“5.3.2 Visualization of measured parameters”](#)

6 TROUBLESHOOTING

6.1 Frequently asked questions

What can I do if the instrument does not switch on?

- 1) Verify that the auxiliary power supply is within the limits. If the power supply is A.C., the voltage range must fall in the range between 85 V and 265 V and the frequency must fall in the range between 45 Hz and 65 Hz. If the power supply is D.C., the voltage range must fall in the range between 90 V and 300 V.
- 2) Verify the status of fuses or that the circuit breaker has not tripped.
- 3) Verify that the power supply is connected to the correct terminals.

What can I do if the instrument does not register any values?

- 1) Verify that the device is switched on.
- 2) Verify the status of fuses or that the circuit breaker has not tripped.
- 3) If a VT is installed: verify that the secondary phase voltage falls in the range between 40 V and 300 V A.C. and that the secondary line voltage falls in the range between 69 V and 515 V A.C.; verify that the real phase voltage (primary phase voltage) falls in the range between 40 V and 800,000 V A.C.
- 4) If no VT is installed: verify that the phase voltage falls in the range between 40 V and 300 V A.C. and that the line voltage falls in the range between 69 V and 515 V A.C.
- 5) Verify that the current coming from secondary terminal of the CT falls in the range between 0.02 A and 6 A and that the real current flowing through the primary of the CT falls in the range between 1 A and 10,000 A (ensuring that the CT selected have a full scale of the primary compatible with real current in the primary).
- 6) Verify that the measuring terminal block is in the correct position.
- 7) Verify through a voltmeter that there is any voltages between the voltage input terminals:
 - a. Between L1 and N for phase 1
 - b. Between L2 and N for phase 2
 - c. Between L3 and N for phase 3
- 8) Verify through an ammeter that there is any currents in the terminals of the meter:
 - a. I1 (S1, S2)
 - b. I2 (S1, S2)
 - c. I3 (S1, S2)

What can I do if the instrument shows incoherent values?

- 1) Verify that the device is correctly switched on and working.
- 2) Please refer to the paragraph [“5.2 Configuration mode”](#) of User Manual and verify that all parameters (CT, VT and connection type) are correctly set up.
- 3) Verify that the sign of the active power, reactive power and power factor are coherent with the application.
- 4) Please refer to the [“4.3 Wiring diagrams”](#) paragraph of User Manual and verify that the connection between current and voltage input terminals are coherent with the phase:
 - a. Connect phase 1 or the VT connected to phase 1 to L1 voltage terminal and connect the CT installed in phase 1 to I1 current terminal (S1 and S2)
 - b. Connect phase 2 or the VT connected to phase 2 to L2 voltage terminal and connect the CT installed in phase 2 to I2 current terminal (S1 and S2)
 - c. Connect phase 3 or the VT connected to phase 3 to L3 voltage terminal and connect the CT installed in phase 3 to I3 current terminal (S1 and S2)
- 5) Verify that there is not a phase inversion on CT between S1 and S2.

What can I do if the instrument does not communicate?

- 1) Verify that the device is correctly switched on.
- 2) Verify that the following parameters are correctly setup in the meter and in the master device, which was used to do the request to the meter:
 - a. Address in the network communication
 - b. Baud rate
 - c. Byte format
- 3) Verify that the RS485 terminals B, A and S are correctly connected.
- 4) Verify that the installed infrastructure complies with the requirements of the network.
- 5) Verify that Modbus RTU protocol is correctly set up in the master device and with the same parameter used in the M2M Basic communication configuration.

What can I do if the instrument shows wrong energy values?

- 1) Verify that the device is correctly switched on and working.
- 2) Please refer to the [“5.2.9 Energy resolution”](#) paragraph of User Manual and verify the energy resolution.

What can I do if the instrument does not allow to configure?

Please refer to the [“5.2.3 Enabling the configuration”](#) paragraph of User Manual and verify that the password was correctly entered.

What to do if I forgot the password?

Contact your ABB referent person or technical support.

What is the serial port for Modbus communication and how can I recognize it?

The serial port is the Modbus communication interface, through which it is made possible to transfer data remotely to the master device. In M2M Basic Modbus it is installed a RS-485 Serial port. It is composed of 3 terminals (B-A-S terminals), located on the back side of the device, in the central section.

What is the difference between B-A-S terminals of the RS485 Serial port?

The B-A-S terminals compose the RS485 Serial port, through which it is made possible to transfer, with Modbus communication protocol, data remotely to a master device.

1. A represents the positive terminal connection
2. B represents the negative terminal connection
3. S represents the ground connection

What can I do if the A-B terminals are inverted?

- 1) If the A-B terminals are inverted the device does not communicate through Modbus interface.
- 2) Ensure to connect all positive cables in A terminal and all negatives cables in B terminal.

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