- 96x96mm Panel Mounted
- Three different variant options at different price points.
- Operates as a Data Concentrator with 1G memory
- High resolution colour FTF LCD display
- Configuration tool with auto address of modules on the bus network
- Detects Modbus address conflicts and can automatically correct
- Modbus RS485 RTU output or Ethernet Modbus TCP
- Operates as a gateway (MCS-D50/60 only equipped with ethernet port)
- SOE Management (Sequence of Events)

| MCS-D Display	Display Functions
MCS-D40	Multi-points display with RS485 Modbus RTU
MCS-D50	Multi-points display with RS485 Modbus RTU and Ethernet Modbus TCP
MCS-D60	Multi-points display with RS485 Modbus RTU, Ethernet Modbus TCP and embedded web server power and energy monitoring

Conformity references:

Electromagnetic Compatibility: IEC/EN61326-1, IEC/EN55011 Class A, IEC/EN61000-4-2,-3-4-5-6-8-11 IEC/EN50470-1/3
Accuracy: IEC60253-22 Class 0.5s, IEC61557-12 Class 0.5
Safety: EC/EN61010, IEC/EN50470-1

Dimension drawing
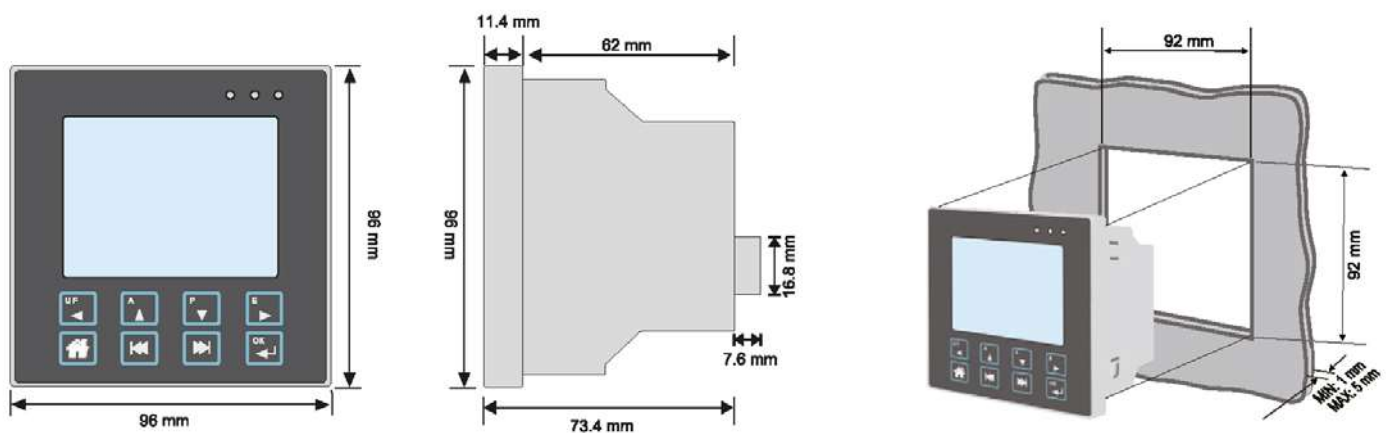
Installation

For more information on these products, please contact our sales team on 0203 758 3494 or email sales@eastroneurope.com

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www.eastroneurope.com

MCS-D Module User Manual
2024.02.20

CONTENTS

1. **DOCUMENTATION**

   All documentation on MCS-D is available on the EASTRON Website:

   www.eastrongroup.com

2. **HAZARDS AND WARNINGS**

   The term "device" used in this document covers MSC- D60.

   The assembly, use, servicing and maintenance of this equipment must only be carried out by trained, qualified professionals.

   Eastron shall not be held responsible for failure to comply with the instructions in this manual.

   2.1 Risk of electrocution, burns or explosion
   - This Device must only be installed and serviced by qualified personnel who have good knowledge of installing, commissioning and operating the device. He/she must have read and understood the various safety measures and warnings in this manual.
   - Before carrying out any work on the device, the power supply must be switched off.
   - Make sure the devices is working with correct voltage.
   - Install the devices in a suitable electrical cabinet.

   2.2 Risk of damaging the device

   Please make sure the wiring of the devices are correct.

   All devices are installed correctly.

   The power supply voltage must be in the range of that indicated on the devices

   1A fast fuse is recommended at the auxiliary power supply

3. **PRELIMINARY OPERATIONS**

   To ensure the safety of personnel and the device, please carefully read the contents of these instructions before installation.

   Check the following points as soon as you receive the package containing the device:

   The packaging is in good condition.

   The device has not been damaged during transportation.

   The packaging includes the device fitted with removable terminal blocks.

4.   INTRODUCTION

4.1 Range

| MCS-D60 multi-points display |
| :---: |
| RS485 Modbus RTU |
| Ethernet Modbus TCP |
| Embedded web server power and energy monitoring |

4.2 Introduction

MCS-D60 are a range of 96mm Panel Mounted displays that work in conjunction with our new "MultiClick" solution. It allows you to monitor 32x three phase / 96x single phase channels from one centralized point, replacing the need for 32 individual panel meters. All the MCS devices that are connected on the MCS bus can be configured via the Display.

4.2.1 Introduction to MCS-D60

MCS-D60 display works as a master device on the RS485 Bus and also a master on the MCS-Bus. It is used like a Gateway between RS485 to Ethernet.
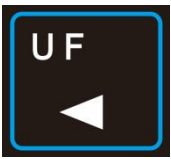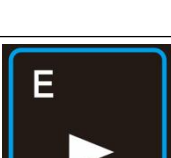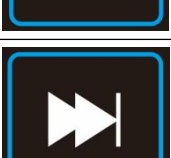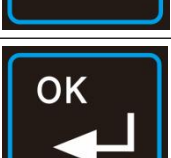MCS-D60 has an embedded webserver for data monitoring.
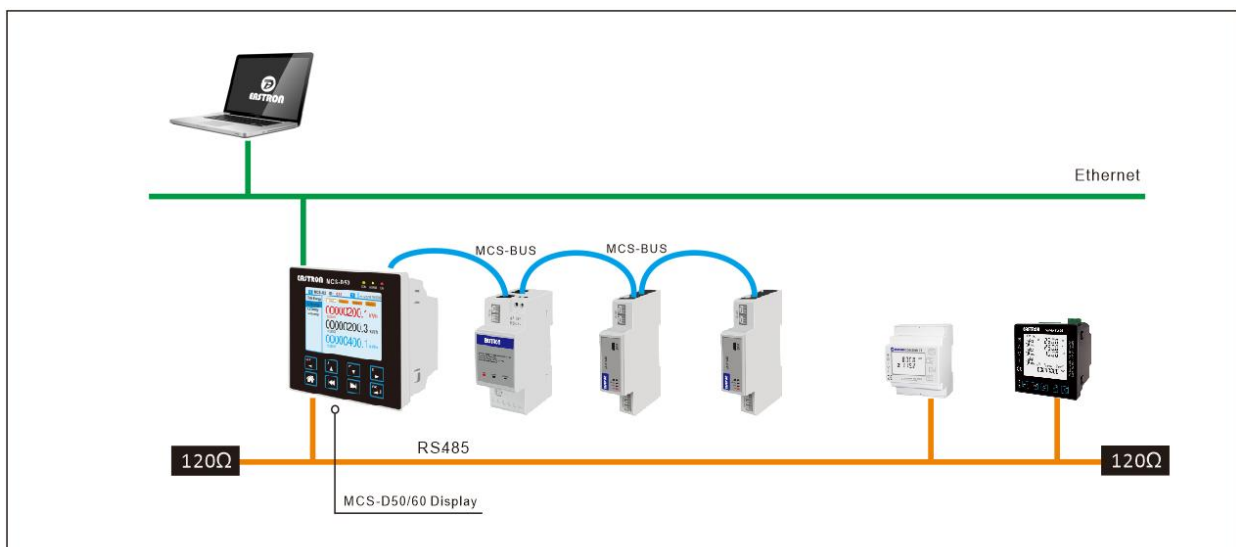
4.3 Touchscreen Buttons

The display module has 8 touchscreen buttons on the front for easy navigation and shortcut keys:

Button	Click	Long press (3seconds)
U F ◄	❖ Go left	❖ Shortcut for Voltage and frequency measurements: (Phase to Phase and Phase to Neutral) and Frequency
A ▲	❖ Go up	❖ Shortcut for current measurements: I1, I2, I3, In, I1-2, I2-3, I3-1
P ▼	❖ Go down	❖ Shortcut for power measurements: active power (P1, P2, P3, P∑); reactive power (Q1, Q2, Q3, Q∑); apparent power (S1, S2, S3, S∑); Power factor;
E ►	❖ Go right	❖ Shortcut for active energy, reactive energy, apparent energy (total, import and export readings)
🏠	❖ Use this to go up a level in the menu	❖ Return to the main menu
⏮	❖ Use this to go to the previous product	
⏭	❖ Use this to go to the next product	
OK ↵	❖ Use this to confirm your navigation or entry selection	❖ Use this to get into setup mode

4.4 LED indicators

COM:

- Off: no communication

- Flashing: communication in progress on the RS485 and MCS Bus.

ALARM

- off: no alarm

- Solid: SD card is not found in the display, or logical/analogue mistake happens

- Flashing: system alarm is active on one device connected to the display

ON

- off: device is off power

- on: device is on power

4.5 Menu Structure

			D-60
Measurements	Voltage/ Frequency	L-N Voltage (instantaneous, Max. and Min.) and frequency	●
		L-L Voltage (instantaneous, Max. and Min.) and frequency	●
		L-N voltage THD%	●
		L-L voltage THD%	●
	Current	I 1, I2, I3, In (instantaneous, Max. and Min.)	●
		I (L-N) THD	●
		I-demand (instantaneous, Max. and Min. current)	●
		P-demand (instantaneous, Max. and Min. power)	●
	Power, PF, Angle	Active Power: P1,P2,P3,PΣ (instantaneous, Max. and Min.)	●
		Reactive Power: Q1,Q2,Q3,Q Σ (instantaneous, Max. and Min.)	●
		Apparent Power: S1, S2, S3, S Σ (instantaneous, Max. and Min.)	●
		Power Factor: PF1, PF2, PF3, PFΣ	●
		Angle	●
	Energy	Total Energy (total/net/import/export of kwh/kvarh/kVAh)	●
		L1 Energy (total/net/import/export of kwh/kvarh/kVAh)	●
		L2 Energy (total/net/import/export of	●

|		kwh/kvarh/kVAh)	
		L3 Energy (total/net/import/export of kwh/kvarh/kVAh)	●
Statics	Montly kwh/kVarh		●
	Daily data kWh/kVarh		●
SOE		640 historical event records (for important setting change and alarms)	●
Settings	Display	Language	●
		Date and Time	●
		RS485 Communication	●
		Ethernet Communication	●
		Screen Settings	●
		Change Password	●
		Battery Voltage	●
	Configure a Device	Network type; CT ratio, Current direction etc.	●
	Auto-address Serial Devices	Found devices; found conflicts; auto-address the conflicts; auto-address all devices	●
	List Products		●
	Data Saving	Interval setting	●
HELP	System Information		●
	Operation Guide		●

5. DIMENSION:
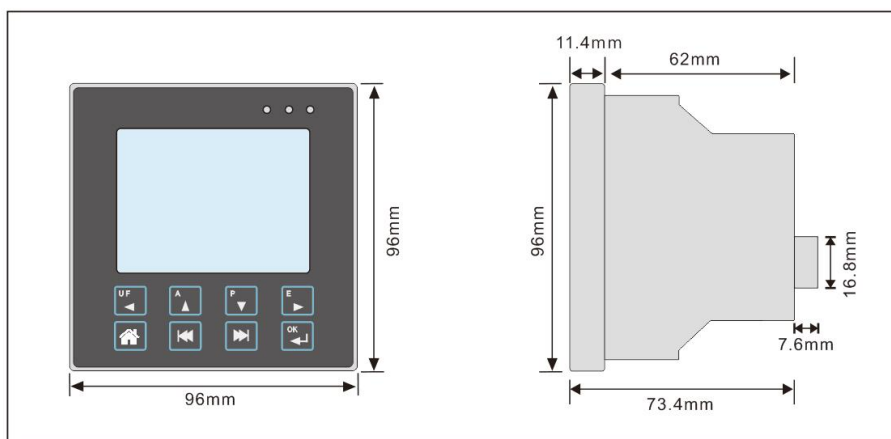
6. MOUNTING

MSC-D modules are panel board mounted with slot size: 92x92mm.
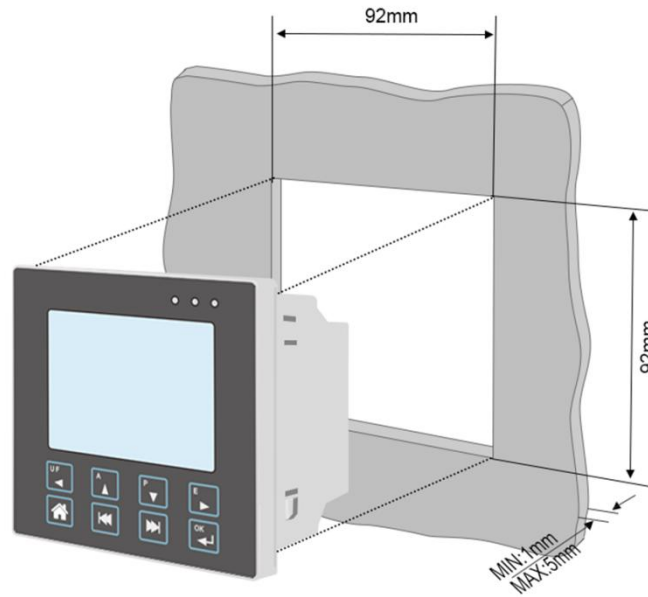
7. CONNECTION

The Display module connects with MCS-U and MCS-I module via RJ45.

For 3P4W, 1P2W, up to 32x MCS-I modules and 1x MCS-U module can be connected to MCS-D display.

For 3P3W network, up to 24x MCS-I modules and 1x MCS-U module can be connected to MCS-D display.
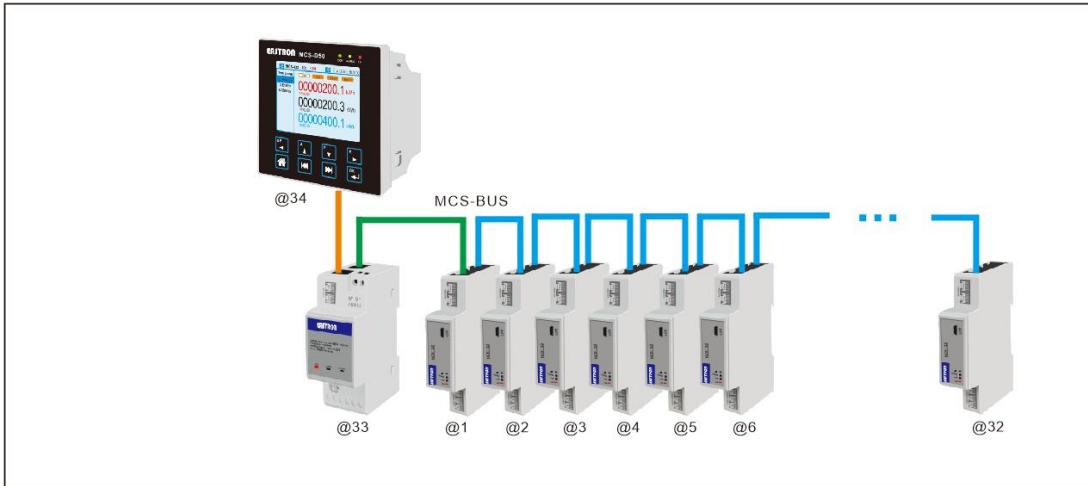
7.1 MCS-D60 connection

MCS-D60 works as a master for MCS-BUS and RS485, also it can be used as a gateway.
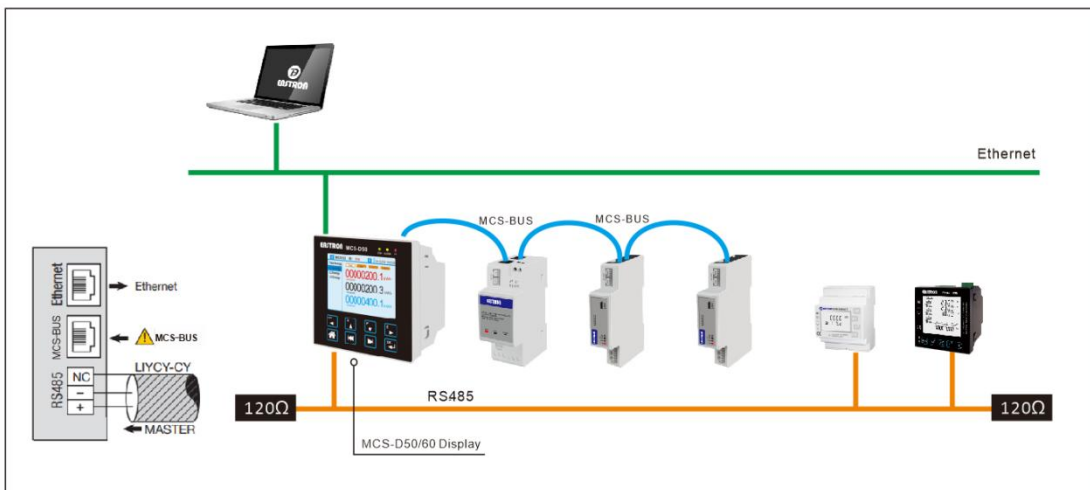
7.3 Length of cables for MCS-BUS

RJ45 cable is used to connect the MCS-D, MCS-U, and MCS-I modules. The RJ45 cable provides data transmission between them, and also power supply from MCS-U to MCS-I.

The cable between them shall be as short as possible to make the reliability. The max. Length of them are:

━━━━━ The cable length between MCS-D and MCS-U module can be up to 100M.

━━━━━ The cable length between MCS-U and the first MCS-I module can be up to 100M.

━━ + ━━ The total cable length between MCS-U and MCS-I modules can be up to 500M with repeater.

Note: the total cable length between MCS-D to the last MCS-I module can be up to 100M if without repeater.

 Caution: Over-length cable might cause errors in measurement.

8. CONFIGURATION

When the display module is powered on, it will take a few seconds for initial checking.

Once it is done, the program shows the main menus:

To use the navigation buttons to choose:

Measurements: all measured data from each measuring device on the MCS-BUS can be found.

Statistics: active energy reading and reactive energy reading on monthly and daily base for each measuring device on the MCS-BUS.

SOE: Sequence of events. All alarms, important setting changes, system power failure/recover will be recorded in SOE.

Settings: Parameter settings for the measuring devices on the MCS-BUS and the display module.

Helps: System general information is provided, and a quick start can be found.

After the installation of the devices, the first step is to set the parameter settings, allowing you to build your own system.

Select the "Settings" menu by using the arrow keys and confirm with "OK":
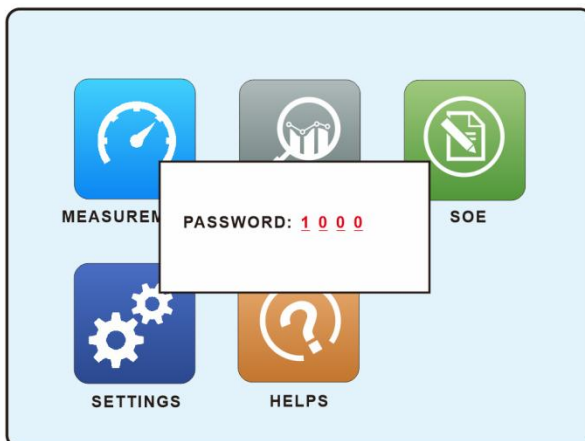
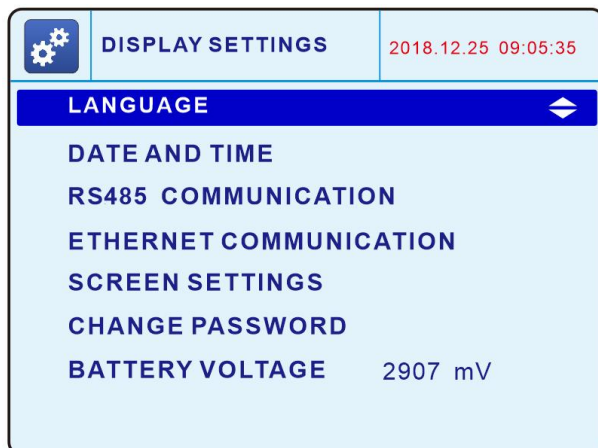Enter the password and confirm with "OK". (default password: 1000).

You can get access to the following settings:

PARANETER SETTINGS   2018.12.25 16:37:55

DISPLAY

CONFIGURE A DEVICE

AUTOCONFIGURE SERIAL DEVICES

LIST PRODUCTS

U/I ALARM SETTING

DATA SAVING

SN:00000000   VERSION:1.6

- **Display:** specific setting for display module
- **Configure a device:** parameter setting for one slave device on the MCS-BUS.
- **Auto-address serial devices:** auto-detect all slave devices on the MCS-BUS; list conflict devices; auto-address the conflicts or all devices
- **List products:** list all devices on the MCS-BUS.
- **U/I alarm setting:** the alarm level setting for MCS-U and MCS-I
- **Data saving:** setting on automatic data saving to the SD card.

8.1 Display settings

Go to the "DISPLAY" menu, press "OK" to confirm.

DISPLAY SETTINGS   2018.12.25 09:05:35

LANGUAGE

DATE AND TIME

RS485 COMMUNICATION

ETHERNET COMMUNICATION

SCREEN SETTINGS

CHANGE PASSWORD

BATTERY VOLTAGE   2907 mV

8.1.1 MSC-D50/60

- **LANGUAGE:** to set the display's navigation language
- **DATE AND TIME:** to set the date and time and their format
- **RS485 COMMUNICATION:** to set RS485 bus communication
- **ETHERNET COMMUNICATION:** to set the Ethernet port communication
- **SCREEN SETTINGS:** to set the brightness, and wake-up duration
- **CHANGE PASSWORD:** to change the password to access the setting menu (default: 1000)
- **BATTERY VOLTAGE:** the voltage of battery in display module

8.1.3 Language

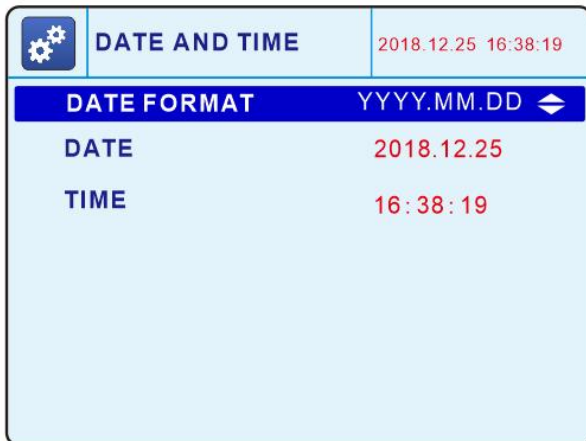The language of display can be changed here.

Choose from: English and Chinese.

Select your language with arrow keys and confirm with "OK".

(More languages can be added.)

8.1.4 Date and time

The display module has Real Time Clock inside. The user can set the date and time and their format.

- **Date Format:** YYYY.MM.DD   /   DD.MM.YYYY   /   MM.DD.YYYY
- **Date:** The date information of the system
- **Time:** The time information of the system

8.1.5 RS485 communication

The display module has a RS485 bus communication port. The baud rate, stop bits, parity of RS485 can be configured here.

Caution: These settings are just for RS485 bus, not for MCS-BUS.

There is no need to do any settings on the MCS-BUS, which is automatically configured when the devices are connected.

The address will be used for both RS485 Bus and MCS-BUS

- **Address:** The address for both RS485 Bus and MCS-Bus
- **Baudrate:** The baud rate for RS485 communication (2400~115200bps)
- **Parity:** EVEN / ODD / NONE
- **Stop Bit:** 1 / 2
- **Mode:** Slave or Master

8.1.6 Ethernet Communication

You can configure the Ethernet settings of the MCS-D60 display:

- DHCP (automatic address location via the Ethernet network) ON/OFF
- IP address
- Subnet mask
- Gateway:
- Port:
- Work Mode:

8.1.7 Screen Setting

This menu allows the user to set the brightness of the display and the wake-up duration time after last key press.
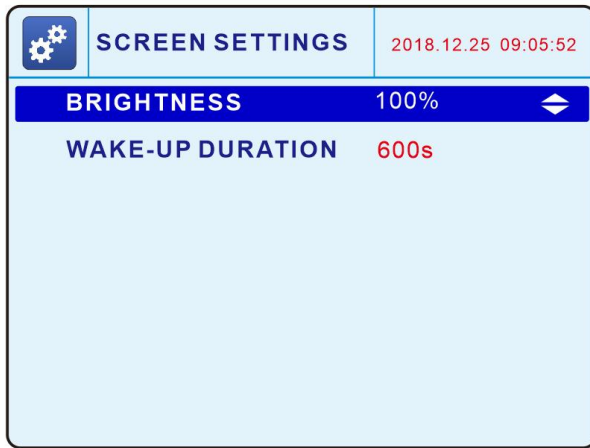
- **Brightness:** adjust the brightness of the LCD according to the installation environment.
- **Wake-up Duration:** the wake-up duration time of LCD after last operation on the button (0~9999s). 0 second means LCD keep on showing.

8.1.8 Change Password

To secure the system parameters, the user can change the password for parameter setting.
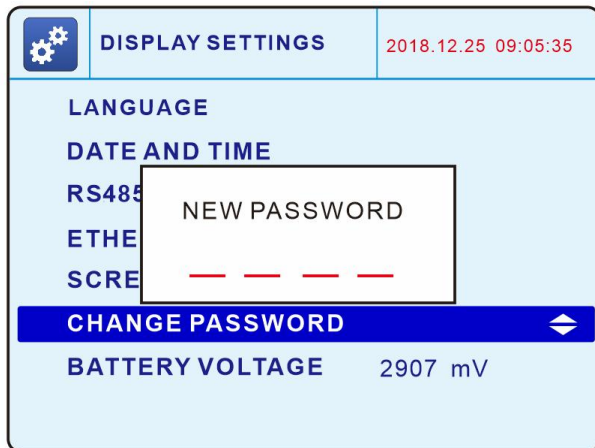
8.2 Locating and Addressing

Choose the menu "auto-address serial devices", the display automatically detects and locates the addresses of the slave devices (MCS-U and MCS-I) that are connected to the MCS-D display via MCS-Bus. It will show the quantity of devices found and the quantity of devices with a conflicted address.

Start address: enter the starting address and at this point the MCD-D will automatically assign an address in sequence down the MCS-Bus network

Found devices： The total quantity of devices connected to the display module on the MCS-BUS.

Conflict devices: The total quantity of devices with conflict address connected to the display module on the MCS-BUS.

Auto-address conflict devices: Automatically assign new addresses to the conflicted devices on the MCS-BUS.
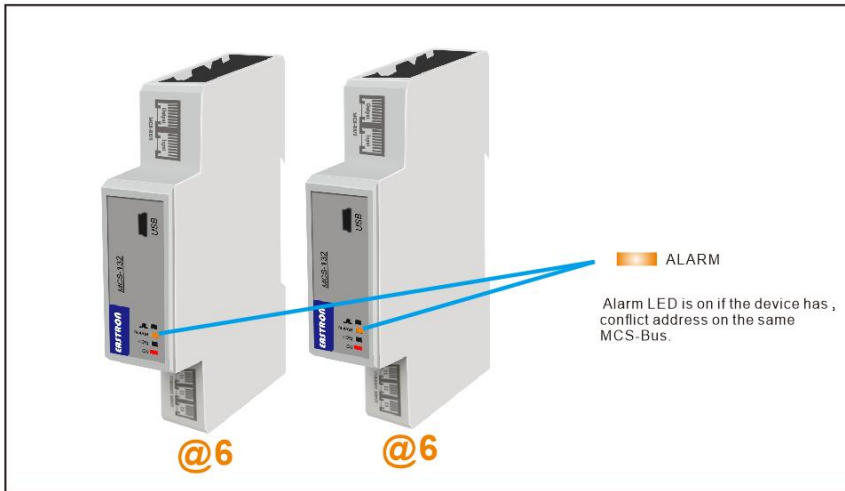
Auto-address all devices: Automatically assign new addresses to all devices on the MCS-BUS
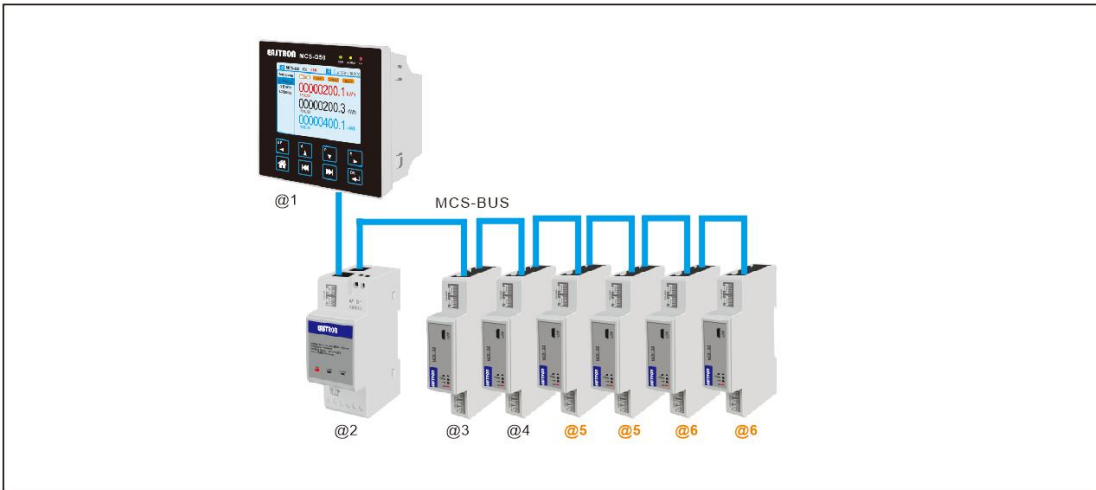
Found devices: 7
Conflict devices: 4

If the devices are with conflict address, the LED "ALARM" of the device is on.
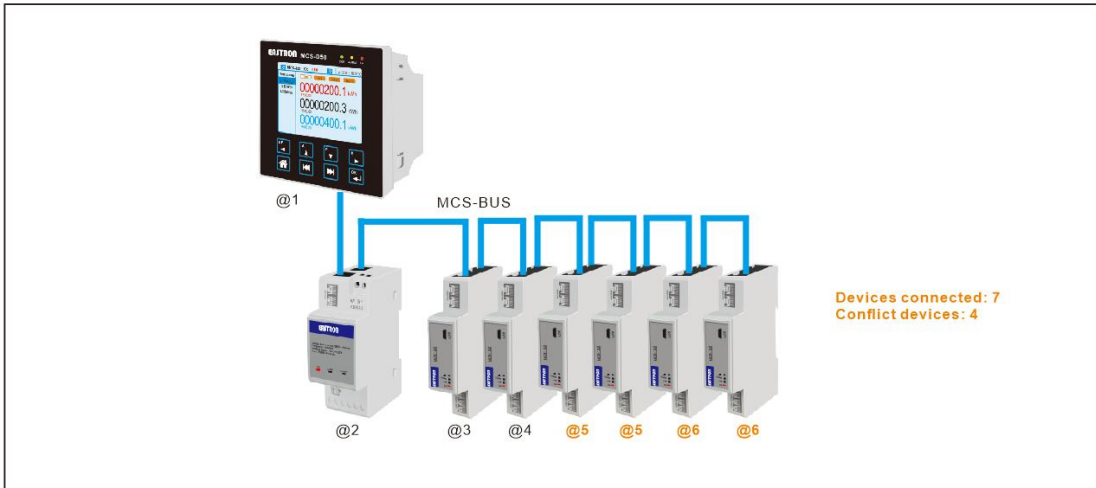

With auto-address mode, you can have the system automatically assign addresses to the conflict devices only or re-address all devices.
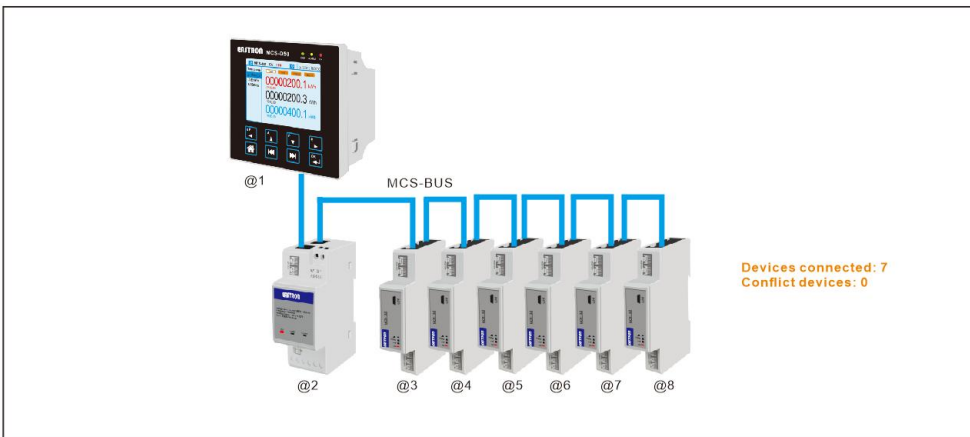
8.2.1 Auto-address conflict devices

Example of auto-address the conflict devices only. There are 7 devices founded and 4 devices with conflict address.
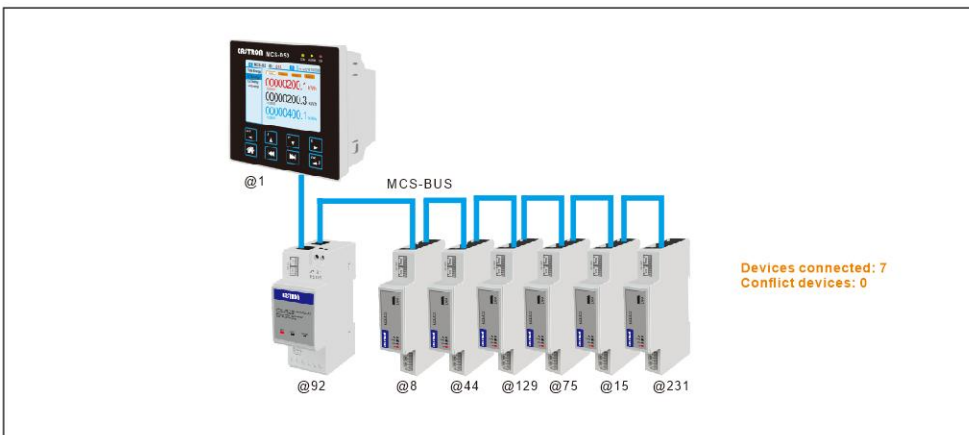
To resolve address conflicts, go to "PARAMETER/ AUTO-ADDRESS SERIAL DEVICES/ AUTO-ADDRESS CONFLICT DEVICES", and confirm "OK". The system will automatically assign new addresses to those conflict devices. The new addresses are chosen from the unoccupied addresses in order within the address range.   It won't change the address of the devices with non-conflict address.


8.2.2 Auto-address all devices

Example of auto-address all devices. There are 7 devices founded and 0 devices with conflict address, but the addresses are not in order, so the user want to re-address all devices.

To re-address all devices, go to "PARAMETER/ AUTO-ADDRESS SERIAL DEVICES/ AUTO-ADDRESS ALL DEVICES", and confirm "OK". The system will automatically assign new addresses to all devices. The new addresses are chosen from the unoccupied add addresses in order within the address range.

If the starting address is 10, end address is 47, so the range is 10~47. The devices will be addressed:
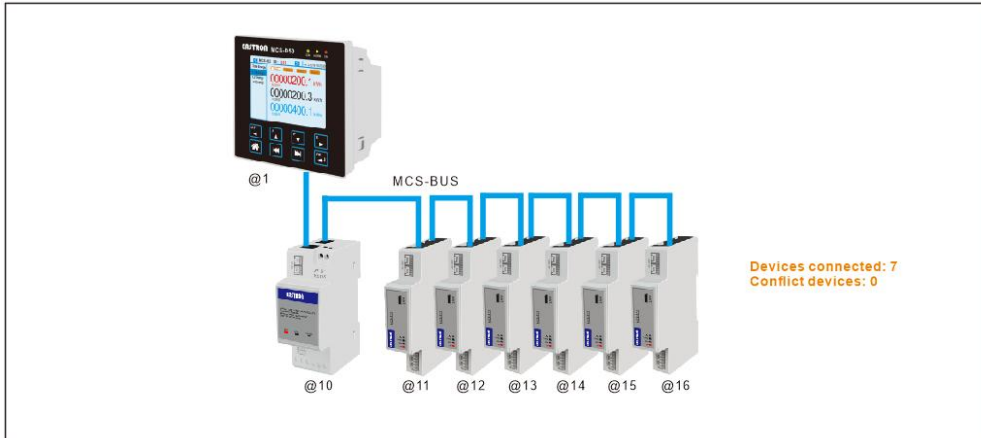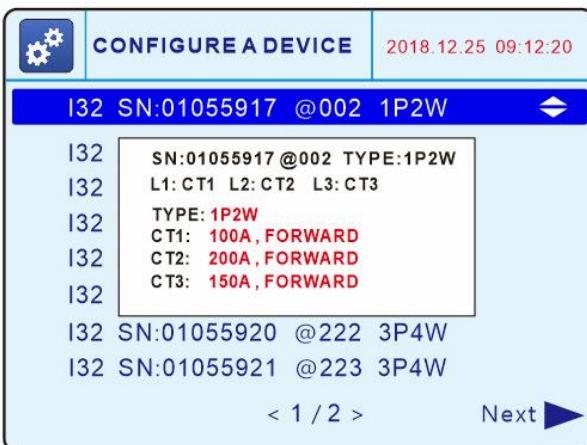

8.3 Configuring a device

If you want to configure a specific device, go to the menu: CONFIGURE A DEVICE
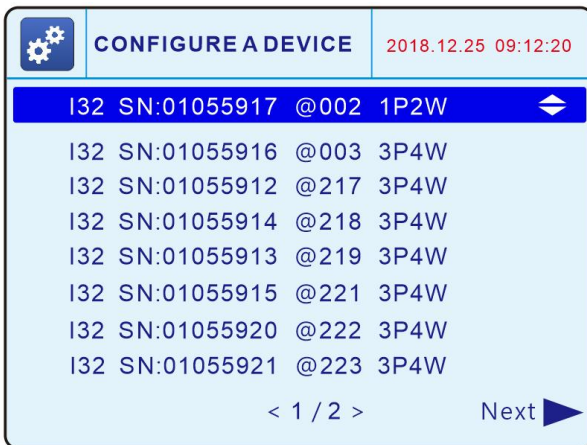
The Display list all MCS-I modules on the MCS-BUS. The user can set the network type, Modbus ID, Primary current of 3 CTs, direction of current flow.


8.3.1 Network Type

The setting of network shall be same to the physical connection of MCS-I.   The MCS-I module can be used in 1P2W, 2P3W, 3P3W, 3P4W network.

8.3.2 CT setting

Current transformers with different ratio are connected to the MCS-I modules. Users can configure the CTs primary current according to the CT connected.

In 1P2W network, 3 Current transformers can be set, CT1, CT2, CT3 can be configured with different primary current.

For example: 1P2W CT1: 100A, CT2: 200A, CT3: 150A
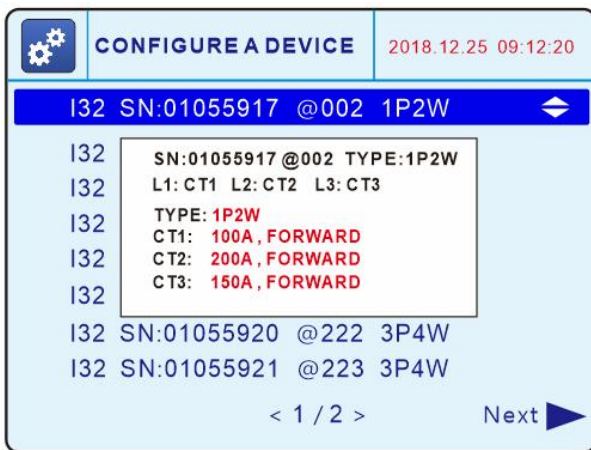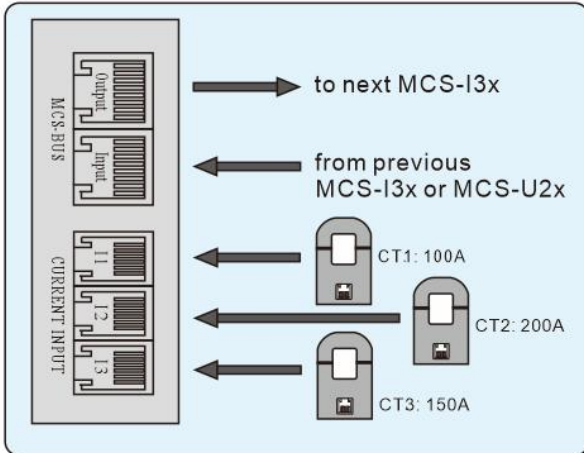
In 3 Phase network, the CTs' primary current is set to the same value.
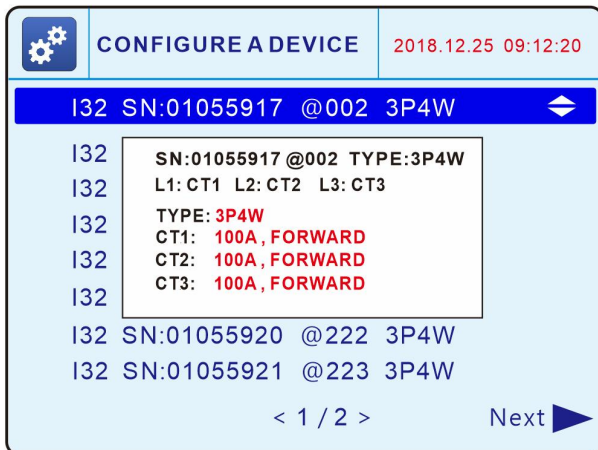
8.3.3 Direction of Current Flow

It often happens that the CT is installed reversely on the load. The reading of power shows negative value instead of positive value. Sometime it is very inconvenient to re install the CT.

To solve this problem, the user can just change the direction of the load according to the real physical installation direction.

For example: CT3 is installed reversely.
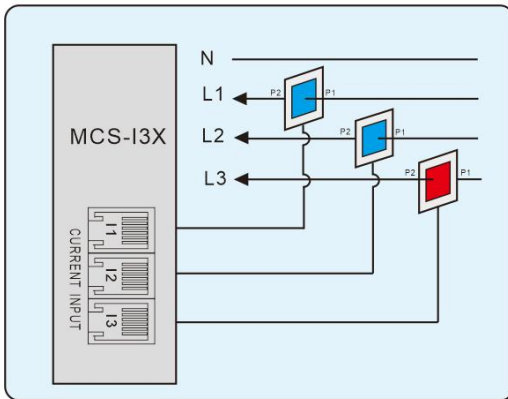
The user can configure the CT3 direction to be REVERSE
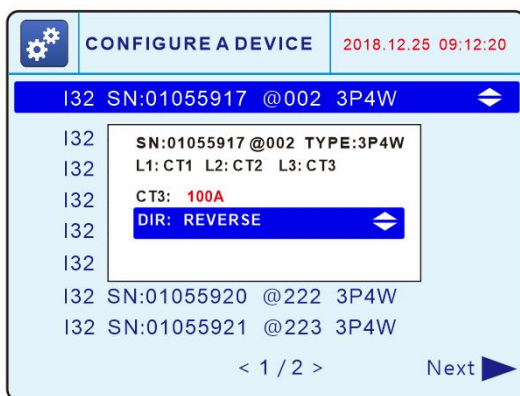
**8.3.4 Auto-correction on wrong phase connection**

If current transformers are installed on wrong phase, it is not necessary to adjust or reconnect the CT installation. The system will automatically auto-correct the phase connection by program, and the measurement and accuracy won't be influenced.

The display detects and shows the information of CT and the phase where it installed.

For Example: CT1 is installed on L3,   CT2 is installed on L2,   CT3 is installed on L1.
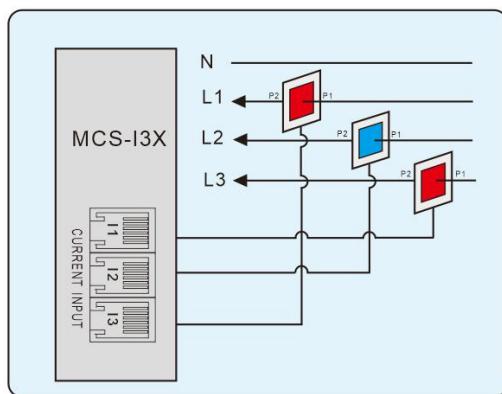
The display shows: L1: CT3   L2: CT2   L3: CT1
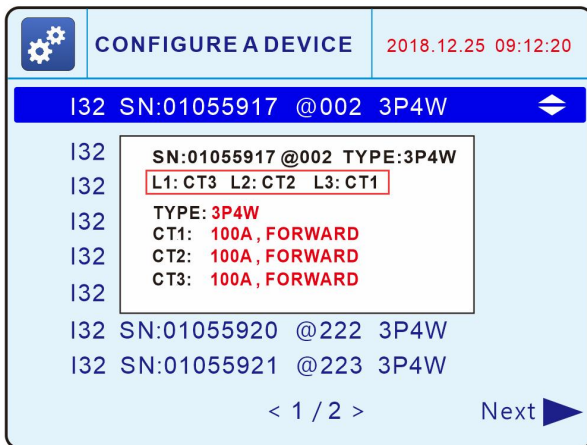
8.4 List products

This menu gives a general information of all devices on the MCS-BUS.

It shows the model, serial number, address, network type, primary current of each CT

8.5 U/I alarm settings

The MCS-U21/U22 has the functionality of voltage alarms. Once the voltage measured is over or below the limits of the alarm levels, the MCS-U's alarm LED flashes and it will send the alarm information to the display module.

The MCS-I31/I32 has the functionality of current alarms. Once the current measured is over the limit of the alarm level, the MCS-I's alarm LED flashes and it will send alarm information to the display module.

The display can set the alarm levels for both MCS-U and MCS-I modules via this menu. The voltage alarm settings will only be implemented to MCS-U, and current alarm settings will be only implemented to MCS-I.

- H-Voltage alarm (MCS-U) : High value of voltage alarm
- L-Voltage alarm (MCS-U): Low value of voltage alarm
- Overcurrent alarm (MCS-I): the percentage of Imax. , which is used as overcurrent alarm threshold
  For example:
    if the meter Imax. is 100A, and the setting is 80%, then the alarm level is 80A
- Temperature (MCS-D): The over temperature limit of the environment where MCS-D is installed.
- Battery Voltage (MCS-D): the low battery alarm level.   In MCS-D, there is a battery works as a power supply to the real time clock

8.6 Data saving

The MCS-D provides an SD Memory card, which allows you to save the reading data from the slave devices on the MCS-Bus automatically. The user can set the time interval for automatic data saving. The fastest interval is 60 minutes.

The default capacity of the memory card is **1GB.**   If a bigger memory is needed, Eastron can provide up to 32GB.

Interval: The data saving time interval. The default setting is saving the data every 60minutes.
Memory: 1GB SD card is provided in SDM-D module.It can be upgraded up to 32GB.
        The SD card can be removed and read on a computer. The data is saved in an Excel format

9.   STATISTICS

Based on the readings from all slave modules, the MCS-D module can summarize the active energy and reactive energy consumption on monthly and daily base for each module.

Monthly reading:

Daily reading：

10. SOE

This menu provides a sequence of events. Such as historical alarms and active alarms and a log of any parameter changes with a record showing the time of such an event.

The following information will be recorded:
- Change device address

- Change CT primary current
- Change system type
- Change direction of CT
- Auto-address all devices
- Auto-address conflict devices
- SD card remove/insert

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