

# Commissioning

Strictly follow [Safety instructions](#)!

## Mounting

Mount the main controller MC-230, IOT-L2-2 linker, PM1-E-D, PM3-E-D and PM3-I-D power sensors, fuses, power relays, and push-buttons to a suitable location.

## Wiring

Wire all elements **except** communication with **PM1-E-D** and **PM3-E-D** sensors.

Connect the MC-230 and IOT-L2-2 to the home LAN or use LTE 4G modem.

## Configuration

Install and run [HEMS Configurator](#) on your PC.

Go to the “**settings**” page.

With the “**autodetect**” button, the application will locate the controller in the local network.

Enter **names**, select **icons** for all sources and consumers.

## Power-sensor adding

Note: adding is supported one by one.

### One-phase sensor PM1-E-D

- **Connect** communication bus (to only one power-sensor)
- In HEMS Configurator power-sensor should appear as a “new device”
- Press and hold the push-button on the power-sensor until it appears **-Set-** on display
- In HEMS Configurator click on the “**add**” button next to the source or consumer that the sensor is measuring
- Connect communication bus to the next power-sensor and repeat procedure

### Three-phase sensor PM3-E-D

- **Connect** communication bus (to only one power-sensor)

- In HEMS Configurator power-sensor should appear as a “new device”
- Click on the “ **add** ” button next to the source or consumer that the sensor is measuring
- Connect communication bus to the next power-sensor and repeat procedure

### Three-phase sensor PM3-I-D

- Communication bus with the power-sensor should already be connected
- Press and hold the push-button on the sensor until it appears “ **CO nF Add** ” on display
- In HEMS Configurator counter should appear as a “new device”
- Click on the “ **add** ” button next to the device that the sensor is measuring

### Without grid power sensor

- **Virtual grid PS** is an option if no grid meter is used. Power, current and energy will be calculated from other power sensors.

### Power-sensor removing

#### One-phase sensors PM1-E-D

- Make sure the “new device” is empty
- Press the button on power-sensor until **-Set-** appears on the display
- In HEMS Configurator press “ **del** ” button next to the sensor
- After a few seconds, the sensor should appear as the “new device”
- If desired, the sensor can be removed or it can be assigned to another device

#### Three-phase power-sensor

- Make sure the “new device” is empty
- In HEMS Configurator press “ **del** ” button next to the sensor
- After a few seconds, the sensor should appear as the “new device”
- If desired, the sensor can be removed or it can be assigned to another device

### Power plant connection

The power plants can be connected to the grid in two ways:

serial with grid power sensor	parallel with grid power sensor
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When configuring the power plant, select

- **in**: serial (**internal**) with grid power sensor
- **ex**: parallel (**external**) with grid power sensor

The power plants are configured as internal by default.

## Wireless setting

Enable the wireless setting to add, delete, or set repeater level of wireless modules.

### Wireless module adding

#### Temperature and humidity sensor

- Launch the pairing by the press on the learning button on the back of the device.
- The wireless sensor is added in the HEMS Configurator.

#### Micro smart plug and Smart plug

- Launch the pairing by the press on the button for 2 seconds until the LED becomes red. Release the button, the LED will then glow in red
- To confirm that the pairing is OK, the LED will blink in green
- In the HEMS Configurator module should appear as a "new device"
- Click on the "**add**" button next to the consumer that is connected to the module

#### Relay switch-1 channel

- Launch the pairing by doing 3 consecutive presses on the relay switch button. The LED blinks red
- To confirm that the pairing is OK, the LED will blink green twice
- The HEMS Configurator module should appear as a "new device"
- Click on the "**add**" button next to the consumer that is connected to the module

## Relay switch-2 channel

- Launch the pairing by doing 3 consecutive presses on the relay switch button. The LED blinks red
- To confirm that the pairing is OK, the LED will blink green twice
- In the HEMS Configurator the module first channel should appear as a “new device”
- Click on the “ **add** ” button next to the consumer that is connected to the modules first channel
- In the HEMS Configurator the module second channel should appear as a “new device”
- Click on the “ **add** ” button next to the consumer that is connected to the modules second channel
- Before you pair a new device both channels must be added to the consumers

## Wireless module removing

### Micro smart plug, smart plug and relay switch-1 channel

- In the HEMS Configurator press “ **del** ” button next to the consumer connected to the module you want to remove
- After a few seconds the module is removed

### Relay switch-2 channel

- In the HEMS Configurator press “ **del** ” button next to the consumer connected to the channel module you want to remove
- After a few seconds, deleted channel of a module should appear as a “new device”
- We can remove the module by deleting the second channel or the deleted channel can be assigned to another consumer

## Setting repeater level

When enabling repeater mode, the wireless module can repeat a message not addressed to him, and increase range by creating network between all wireless devices.

The repeater can be configured to level 0 (off), level 1 (one hop), or level 2 (two hops):

- **Level 0:** gateway — module.
- **Level 1:** gateway — repeater — module.
- **Level 2:** gateway — repeater — repeater — module<sup>1</sup>.

By default, the repeater mode is disabled (level 0). If you want to change the repeater mode press icon «» in the **output** in **Consumers settings table**.

<sup>1</sup> Both repeaters must be set to level 2.

## Setting device management features

For each consumer we can set:

- **sub**: mark device as a submeter if device is not part of internal network and/or is not connected as intended by default. Energy division for this device will be ignored.
- **man. time**: the time is in minutes for the manual override. It serves to ensure that the user can ensure a minimum validity of the manual switchover.
- **timetable checkbox**: enable or disable the timetable for each device.

## Enable power-sensor from compatible systems

HEMS will automatically detect compatible

- battery systems **eStore** and
- home automation systems **HIQ Home**

which are in the same local network.

Only the first system is detected, if there is more than one it is necessary to enter the NAD number of the desired system manually.

if **eStore** is **enabled**, HEMS will read:

- **grid** power-sensor
- power-sensor for the **first PV Plant** and
- power-sensor of the **first storage** system

From the **enabled HIQ Home** system, HEMS will automatically read the **grid** power-sensor.

## Internet access

HEMS is connected to the internet via IOT-L2-2 linker.

## Digital output

HEMS is supporting up to 8 digital outputs on MC controller (QX0,QX1,QX2,QX3,IO12,IO13,IO14 and IO15). How to set?

- using [HEMS configurator](#) on settings page, define digital output for desired consumer (e.g. Digital-2),
- on IO MUX page assign digital to output port (e.g. IO15 → Digital 2): in this case consumer 2 (Digital-2) is assigned to IO15 port and enables ON/OFF functionality on it.

**Note**: if it is set **digital** for consumer without assigned power sensor, it is possible to define **P nominal** power instead. It represents fixed power of consumer and while in operating mode HEMS calculates consumed energy.

## Analog output

On port IO14 is supported analog output 0-10V, while on IO15 is PWM signal with frequency of 1kHz. Using analog load is possible for consumer 1 only! How to set ([HEMS wiring](#))?

- using [HEMS configurator](#) on settings page, define analog output for consumer 1,
- on IO MUX page define IO14 and/or IO15 port for Analog/PWM output,
- on home screen define analog value 0-100% (long-press) for consumer1 and turn it ON/OFF with short-press.

**Note:** if it is set **analog** for consumer without assigned power sensor, it is possible to define **P nominal** power instead. It represents fixed power of consumer and while in operating mode HEMS calculates consumed energy.

## IO mux

IO mux page within [HEMS configurator](#) allows setting of input/output types for ports on controller:

- e.g. if it is set QX2 → Router reset, it means that when conditions are met (for reset), QX2 port will change state to turn OFF router,
- or if it is set QX2 → Digital-2, it means that digital2 (consumer 2) is assigned to QX2 and enables switching ON/OFF on it,
- for input ports IX0,IX1 and IX2 it is possible to set toggle and enable functionality ([HEMS wiring](#)). it means that dedicated consumer will be directly managed (ON/OFF) by input signal on IX0,IX1 or IX2.

## Permanent memory

Saving parameters to the permanent memory, after changing the settings, is necessary since at startup HEMS always reads parameters from the permanent memory.

## Backup / restore to PC

HEMS Configurator allows you to backup and restores all parameters to PC.

## Phase alignment and limiter settings

Under limiter page set correct phase order to align phases of each device. Set correct main fuse limit [A] to protect the main grid fuse from over current. Check devices that can be managed by limiter and set correct limiter priority. Choose from no limiter, limit last, limit second, limit first. Max expected device current consumption is dynamically calculated and does not need to be set. In case device is an EV charging station, manually set max current for this device.

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