emonHP – Level 3 OpenEnergyMonitor Heatpump Monitoring

Pre-provisioned fully inclusive bundle for Level 3 Heat Pump Monitoring

The emonHP kit includes everything required for high accuracy (1-2% MID approved) monitoring of air-to-water air source heat pump (ASHP) or water-to-water ground source heat pumps (GSHP).

The monitoring system is web-connected with remote data access available via **emoncms.org.**

Kit of parts

- emonPi web-connected data-logger
- Heat meter with USB M-Bus adaptor
- Electricity Meter(s) with USB Modbus adaptor (RS485)
- *Clip on CT sensor for DHW 3-port valve (optional)*
- Power supply: USB-C
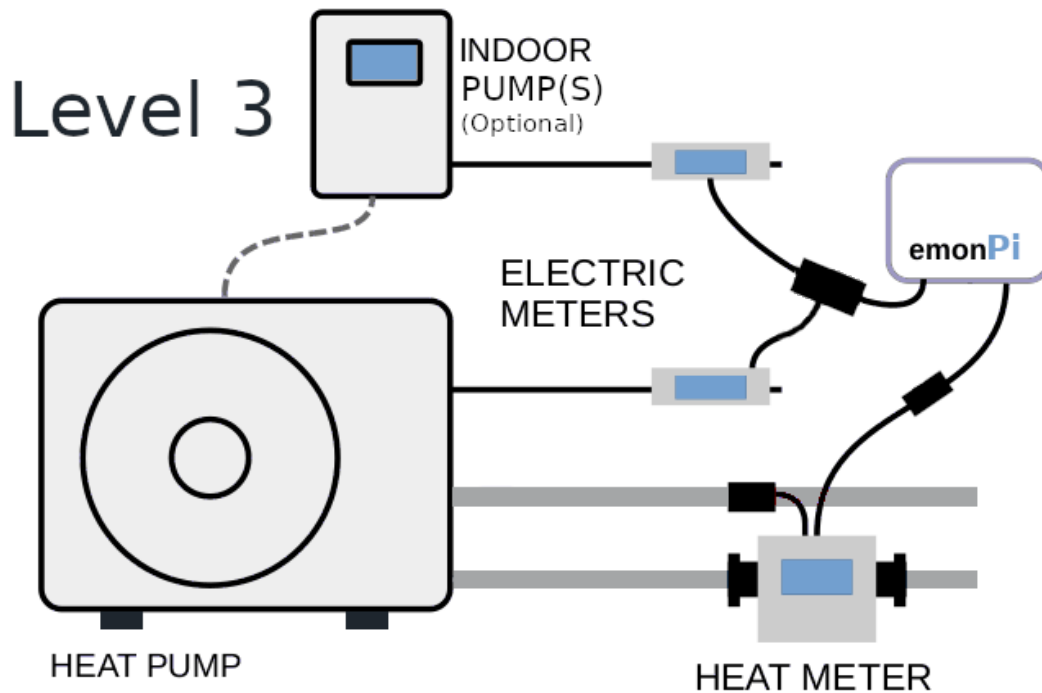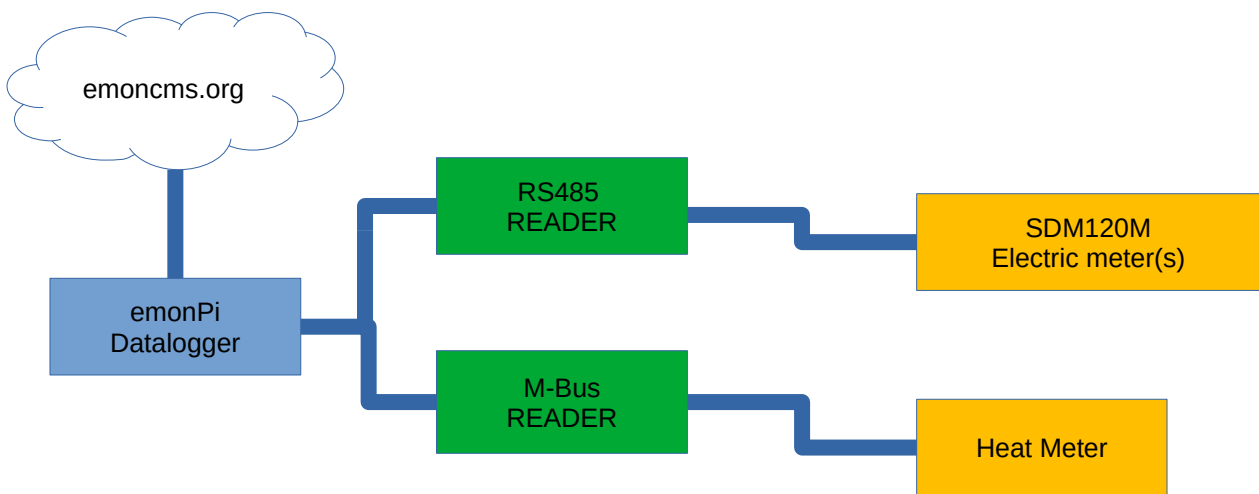
Heat Meter Installation

- **Heat meter body:**

  - Install on **primary pipework** before any diverter valve, volumiser or buffer

  - See **sticker on meter** to determine which pipe to install meter body

  - Observe **direction of flow arrow** on meter body

  - Avoid close proximity with other heat sources

- **Temperature sensor pocket:** install on the **opposite pipe** to the meter body away from other heat sources

- *Note: Larger Axioma meters (DN25+) don't have a temperature sensor in the body of the meter, these meters require two temperature sensor pockets, the sensor marked in RED should be fitted on the primary Flow and the sensor marked in Blue should be fitted on the primary Return. These can be fitted close-by the meter body, either before or after*

- See below manufacturers guidance on heat meter body installation location, take care to **install the heat meter in position 'A' or 'B'** and avoid sources of turbulence directly before or after the meter.

- If meter is installed horizontally I.e **position 'A'** ensure the **meter body is at 45°**

3.2   Flow sensor position

A Recommended flow sensor position.
B Recommended flow sensor position.
C Unacceptable position due to risk of air build-up.
D Acceptable position in closed systems.
E A flow sensor ought not to be placed immediately after a valve, with the exception of block valves (ball valve type) which must be fully open when not used for blocking.
F A flow sensor must never be placed on the inlet side of a pump.
G A flow sensor ought not to be placed after a double bend in two planes.
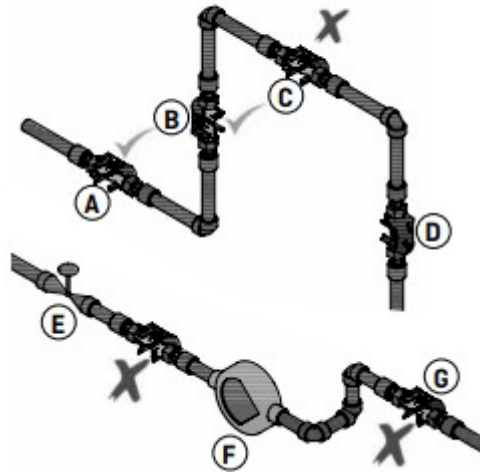
- Heat meters require minimum 1.2 bar, **recommend 1.8 bar** of system pressure.

- IMPORTANT: Take care to **purge all the air out of the system**, air in the system will lead in incorrect readings

- Heat meters are susceptible to dirt, ensure system if properly flushed before connecting heat meter

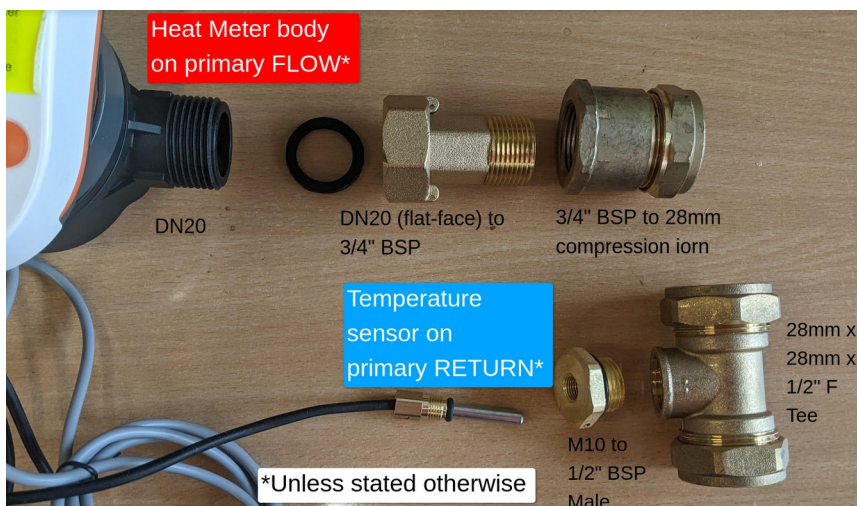- **Axioma and Supercal5 meters require a 240V power supply**

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Figure 1: Fitting sizes & meter location may vary

Heat Meter(s) Connections

The heat meter should be connected to the emonPi using the M-BUS to USB adaptor.

- M-BUS is a two wire bus which is **polarity irrelevant**

- The heat meter M-BUS connections should be wired to **M+ and M-**

- Multiple MBUS meters can be connected, the M-BUS connections should be connected together in star or bus topology. Each meter requires an unique M-BUS ID, this will be pre-set if purchased as a bundle

- M-BUS cable can be extended, standard 2-core flex can be used for short runs, for long runs we recommend twisted pair non-shielded (min 0.5 mm2). MBUS cable should be separated from mains 240V cables by minimum 5cm.
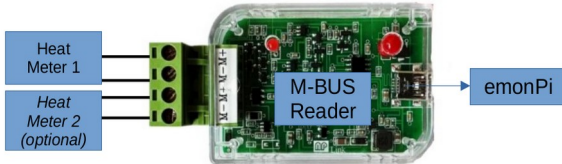
Electricity Meter(s) Connections

- 1st electricity meter should be installed on the circuit feeding the **outdoor unit**

- *Optional: 2nd electricity meter should be installed on the circuit feeing the **indoor control unit including pump(s)** e.g NIBE and Samsung heatpumps or if secondary pumps are fitted*

- *Optional: A 3rd electric meter can be added to monitor a booster heater*

- Additional electrical meters MODBUS (RS485) connections should be wired in star or bus topology, if multiple MODBUS meters are used each should have unique MODBUS ID, this will be be pre-set if purchased as a bundle

- The power terminals should be torqued to **1.5NM** and MODBUS connections should be torqued to **0.4NM**
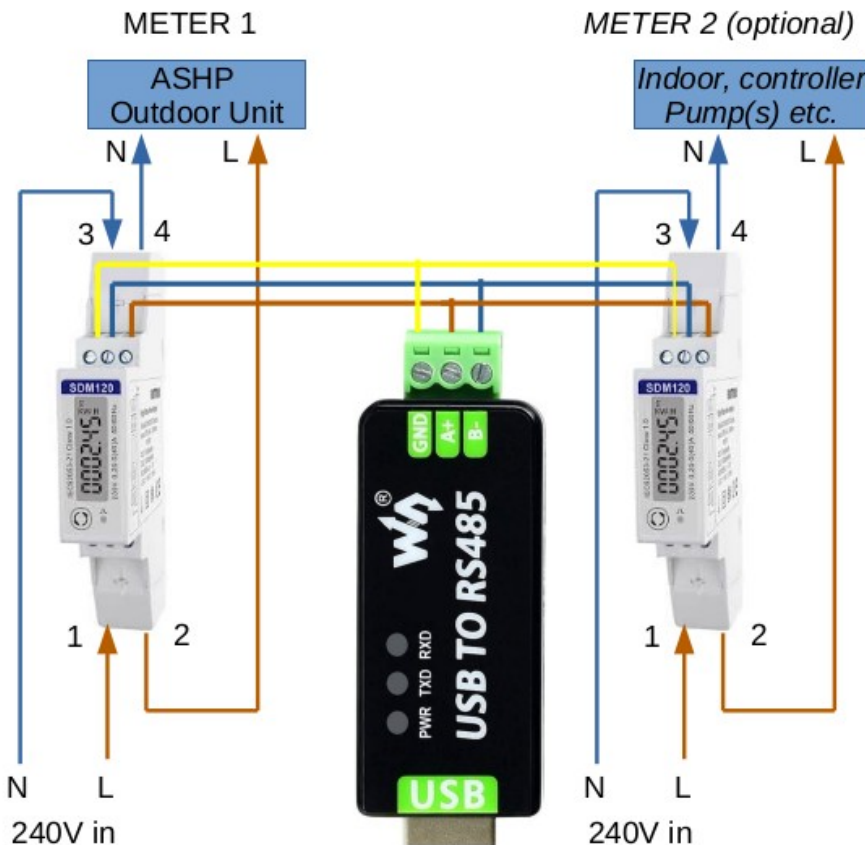

- The USB > RS485 MODBUS adaptor should be plugged into the emonPi using the supplied USB extension cable

- RS485 MODBUS cable can be extended if required, standard 3-core flex can be used for short runs, for long runs we recommend shielded cable e.g cat5 shielded (minimum 0.2 mm2). MODBUS cable run should be separated from 240V mains by minimum 5cm.

DHW 3-port Diverter Valve Connections (optional)

The emonHP bundle can monitor the position of the diverter valve to determine when the heat pump is heating DHW:

- Plug the clip on CT sensor jack plug into **CT1 connection on the emonPi**

- Clip the CT current sensor around the **Live wire which controls the diverter valve**. If there are multiple live wires e.g Switched Live & Permanent Live, clip the CT around **both live** cables.

- It's usually convenient to locate the CT sensor inside the heat pump controller

- Orientation of the CT sensor is irrelevant

- DHW sensing can only be used on AC powered diverter valves, it cannot be used to detect the position of DC diverter valves e.g Viessmann 150A/151A

Important: The CT sensor must be clipped around only the live conductor(s), **do not clip the CT sensor around the flex cable which contains both Live and Neutral conductors**.
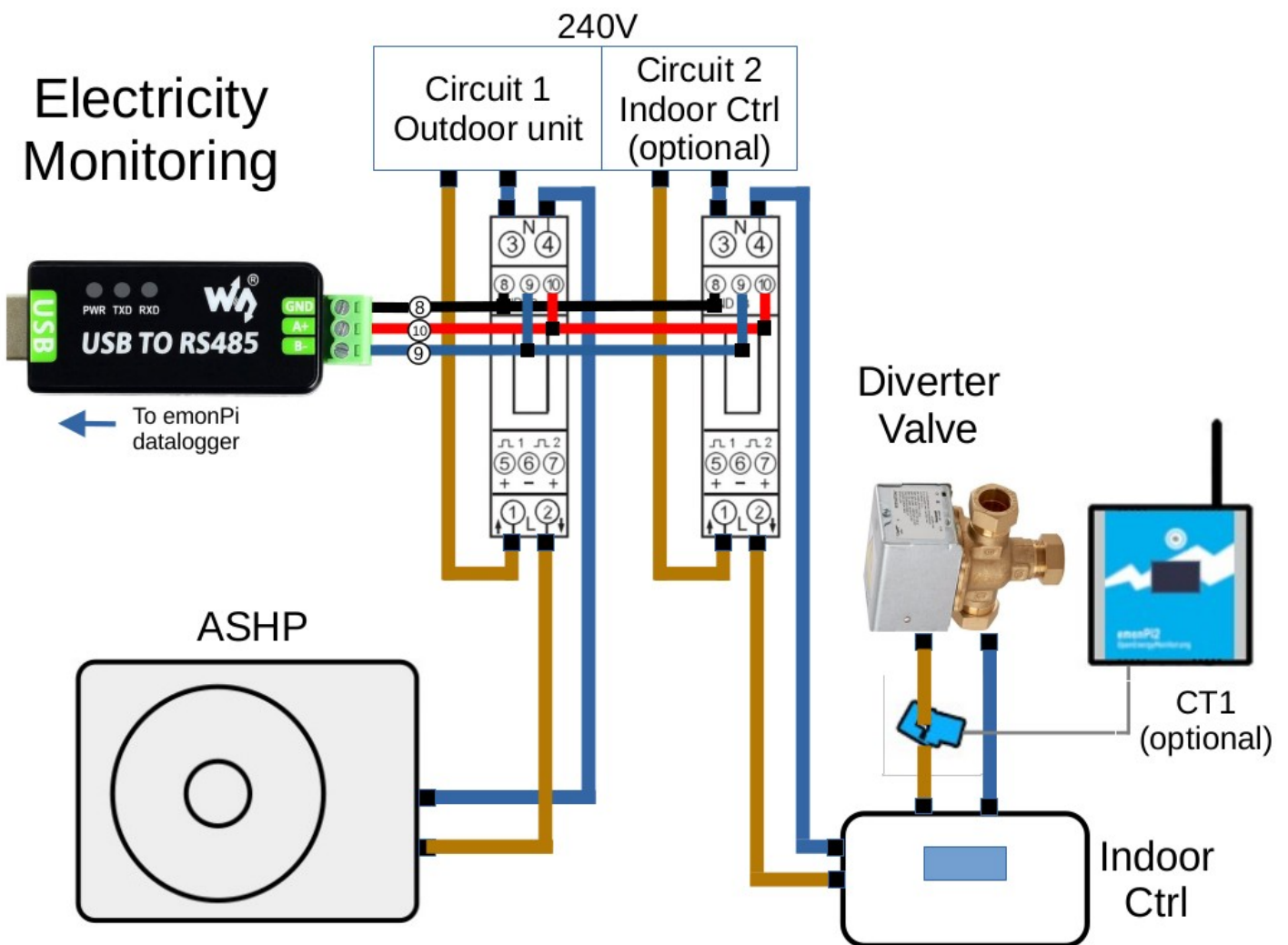
emonPi Data logger Installation

The emonPi data logger reads and decodes data from both the electricity and heat meters and logs data to emoncms.org. It's essential that the emonPi has a reliable connection to the internet, **we recommend using wired Ethernet**. Install emonPi as follows:

1) Connect Heat Meter and Electricity Meter reader USB connection(s) to any of the 4x USB ports

2) Connect Ethernet cable (recommended)

3) Plug in and switch on 5V USB-C power supply

Wi-Fi Operation (not recommended)

If WiFi credentials were provided when the kit was purchased the Wi-Fi will be **pre-provisioned and will automatically connect**. *If not follow the instructions below:*

1. Using a smartphone connect to Wi-Fi Access Point '**emonPi**' with password '**emonpi2016**'

2. The captive portal should bring up the Wi-Fi configuration interface

3. Select "Connect to WiFi network", select your WiFi network name then enter password, then 'Connect'

4. After a few moments it should display 'Connected', the WiFi connection status is also shown on the emonPi LCD display, use button to scroll through options
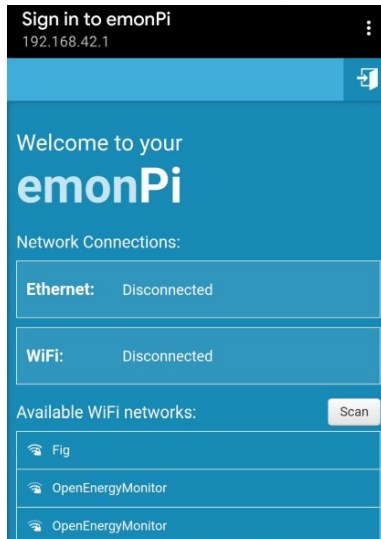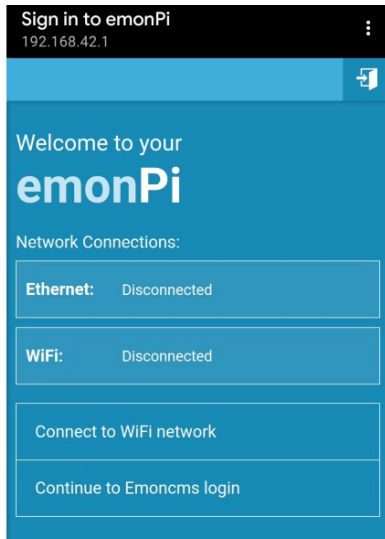
To change the WiFi network the LCD display can be used to re-enable the emonPi WiFi Access Point. See:

https://docs.openenergymonitor.org/emonpi2/ install.html

If required the local login details are as follows:

Local hostname: http://emonhp.local

Local username: emonhp

Local password: emonhp

Cloud Portal: emoncms.org

The emonPi datalogger is pre-provisioned to log data to the emoncms.org provided when kit was purchased.

To view the Heat Pump Monitor App Dashboard **scan the QR code on the emonPi** Or login to the account on emoncms.org and select Apps > MyHeatPump.

Heat Pump Monitor Website

You can choose to submit the system to **heatpumpmonitor.org** website. To do this login to the site with the same username/password as for emoncms.org and follow the instructions to add a new system. The MyHeatPump URL is the URL from the QR code.

Support

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