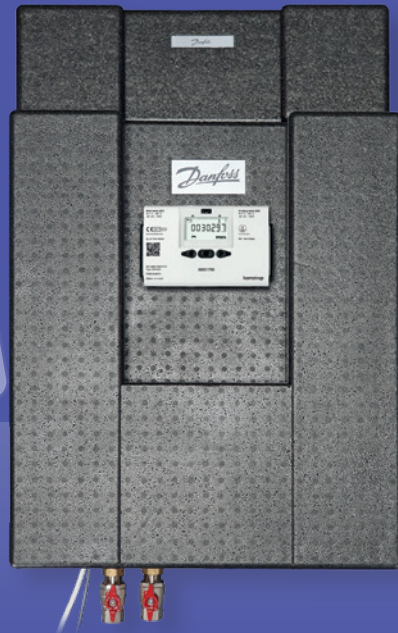


KURVE Smart M-Bus

Installation guide



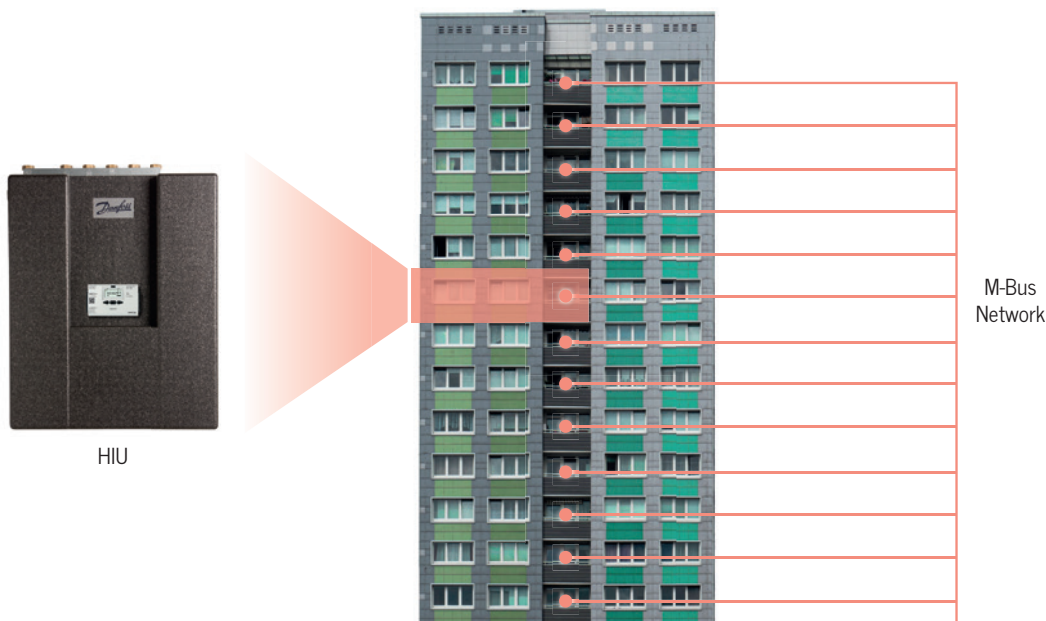
INTRODUCTION



KURVE is a joint venture between Insite Energy and SAV Systems. KURVE is a flexible billing solution built around the capabilities of Kamstrup's wired Smart M-Bus technology. Please follow this guide to ensure correct installation, with efficient and reliable operation.

It is essential that the following are fully installed and configured correctly before handover:

- Heat Interface Units (HIU)
- Wired M-Bus Network
- KURVE Communication Hub (KURVE Hub)



HIU

M-Bus Network

IMPORTANT INFORMATION

Installation must be carried out by fully trained and appropriately qualified professional installers in accordance with applicable health and safety guidance/regulations.

KURVE Technologies will not be held liable for problems resulting from incorrect system installation.



KURVE Hub

KEY POINTS TO CONSIDER

SIZE OF THE NETWORK

The KURVE Hub can communicate with up to 250 metering points, which can be further extended to 1250 metering points via use of repeaters. To i) increase the meter reading frequency, ii) reduce the time on collect meter reads, iii) improve the ease of fault finding, and iv) avoid complexity, we recommend keeping to a maximum of 250 metering points per hub.

M-BUS TOPOLOGY

Starting at the KURVE Hub or base of the building, a central spine should be installed in the riser with an M-Bus junction box on each floor. From these junction boxes a star topology (see page 5) should be used to each dwelling. On a scheme with multiple buildings, a KURVE Hub should be installed in each building rather than relying on connecting them together.

Before installation, a full topology design drawing should be made available to the installer. After installation, this drawing can be handed over to the person(s) responsible for ensuring the continuous operation of the network.

WHY STAR TOPOLOGY?

CP1 (2020) encourages the continuous improvement of heat network efficiency and customer satisfaction through improved monitoring and targeting. Star topology allows for easy fault finding and rectification in the event of a failure. Consequently, where daisy-chain topologies are installed and cable breaks occur, a lengthy and difficult reparation process will ensue. As such, daisy-chain topology should therefore be avoided.

LOCAL OR REMOTE DATA EXTRACTION, WHO WILL NEED THE DATA?

Early engagement is key between all parties, this is a minimum requirement under CP1 (2020). Key stakeholders should include but not be limited to; the client, developer, housing association or managing agent, consultant, M&B provider, facilities management, and energy manager.

Consideration will also need to be given on how the data will be extracted and used. As the data will be read remotely, an ADSL line and 4G router will be required. M-Bus creates a versatile network that will allow billing, automatic monitoring and targeting (AMT) requirements to be achieved.

PLANT / DISTRIBUTION

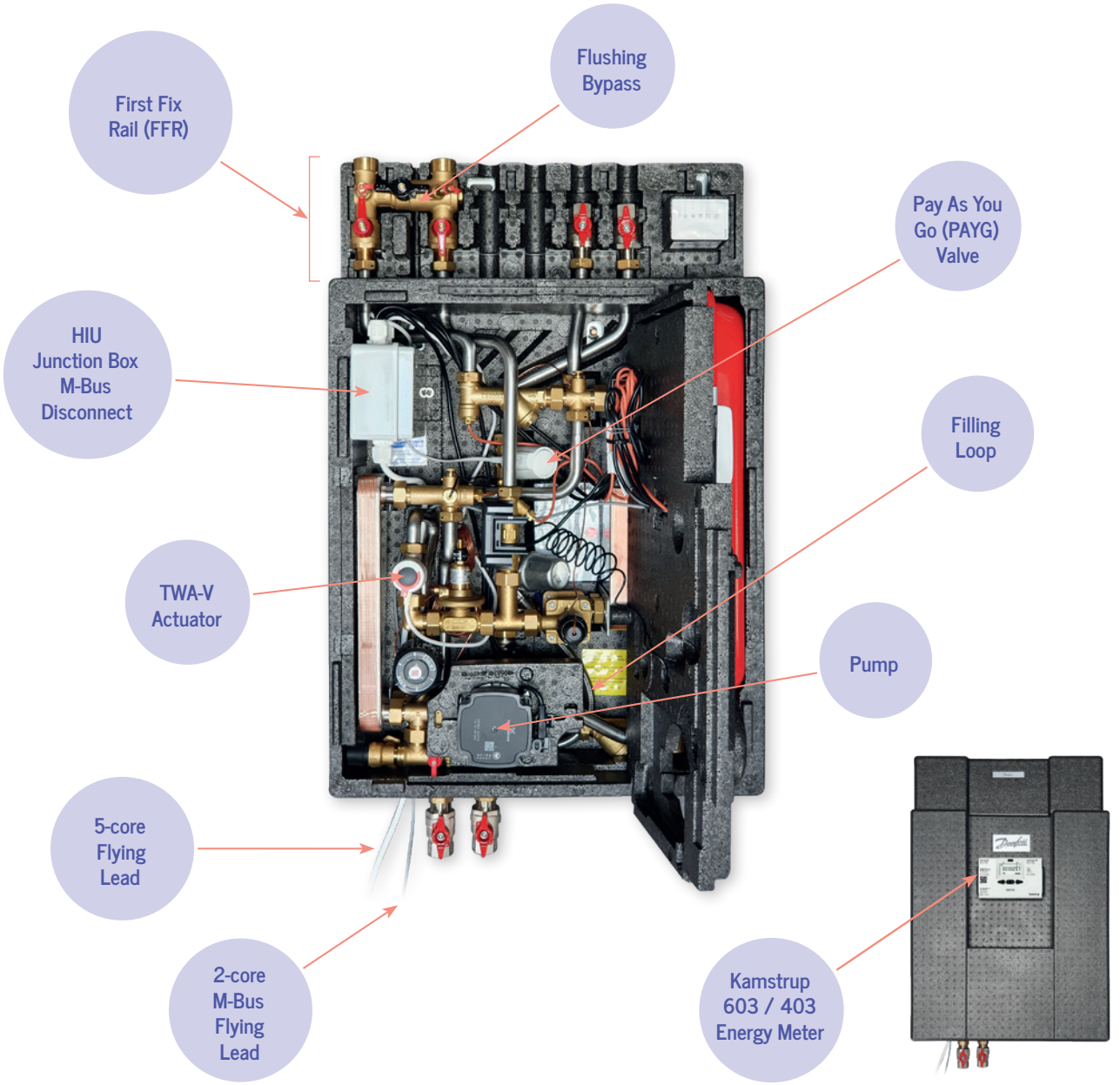
Plant room, block and check meters should be installed throughout the heat network. These need to be connected to the M-Bus network to ensure the data is extracted and used.

If the specification requires the meters to be connected to the building management system (BMS), a dual connection meter should be installed. This will allow one connection to be used for the BMS and another for the M-Bus network, meaning the meter data can be sent to both systems. Having access to this vital system data improves diagnostics and on-going monitoring and targeting.

WHICH METER & WHAT DATA?

Consideration should be made for the type and specification of the meters being installed. Ideally compact dwelling meters should be avoided, as these have limited functionality. Plant room meters may also require additional functionalities such as coefficient of performance (COP) calculation. It is a given that all meters should be correctly sized for the required min/max load.

HIU 7-SERIES (OTHER COMPATIBLE HIU TYPES ARE AVAILABLE)



PAYG VALVE

- FAR PAYG valve is installed inside the HIU on the cold water mains (CWM). The KURVE system isolates both the hot water generated and the heating circuit (TWA and pump) to fully isolate the unit.
- Please note the domestic hot water (DHW) keep-warm function will still be active and recorded on the energy meter when the unit is fully isolated. This helps maintain chemical circulation, minimum plant room pump flow rates and fast delivery of hot water to ensure customer satisfaction.

HIU COMMISSIONING

- For information on HIU commissioning, including training, procedures and checklists, please contact SAV on **01483 771910** or email hiuservice@sav-systems.com

FIRST FIX RAIL (FFR)

- Optional insulated first fix rail, isolation valves and flushing bypass can be delivered for installation prior to the HIU. This will allow for pipework connection up to the FFR and provide the ability to flush the primary system.

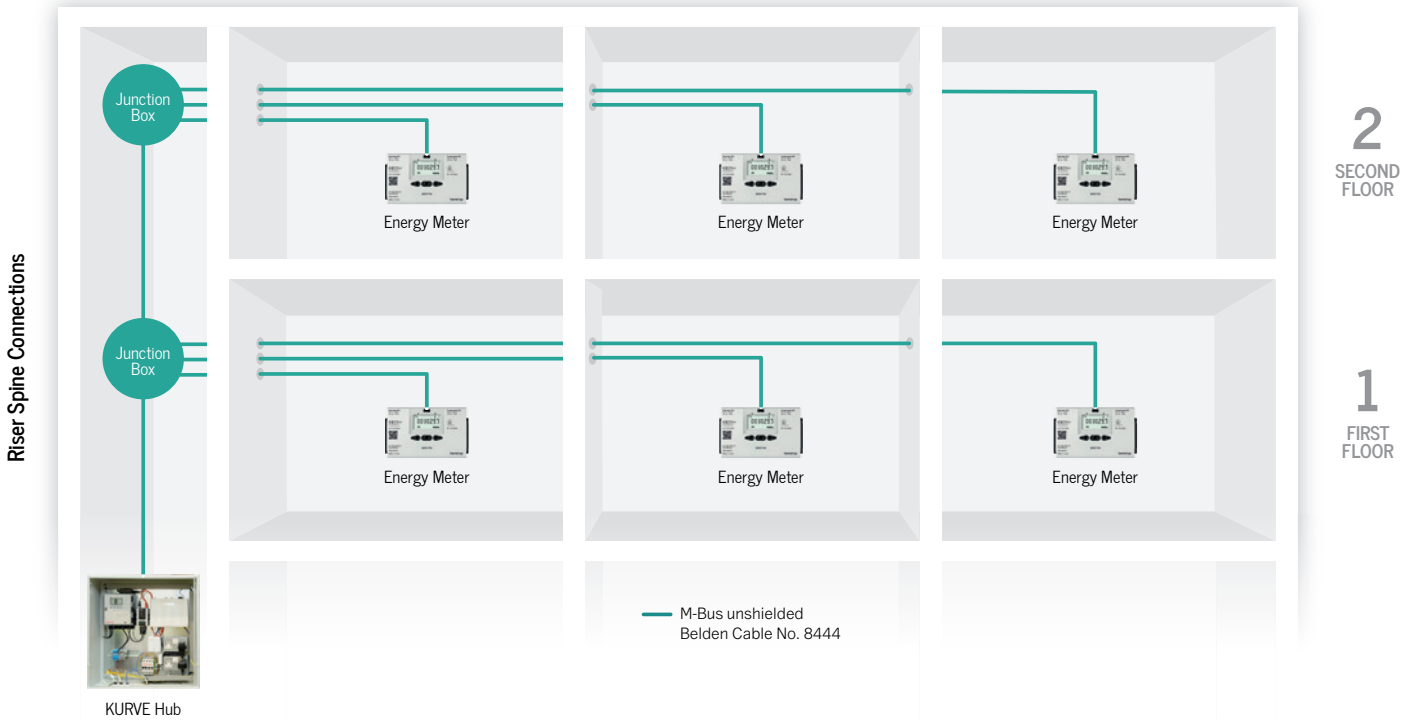
UNDERFLOOR HEATING (UFH) STAT

- If installed in conjunction with an underfloor heating system, the HIU will come with an UFH safety stat. This stat needs to be installed on the space heating flow pipework outside the unit.



TECHNICAL GUIDE

M-BUS NETWORK TOPOLOGY



CABLE SPEC

- The cable must be unshielded.
- The conductors need to be grade 4, AWG 22, stranding 7x30 and the material needs to be tinned copper.
- Preferably the wiring will be a 4-core e.g. Belden 8444 cable, but must be at least a 2-core cable.
- The wiring must be stranded and not CAT 5 or CAT 6.

M-BUS JUNCTION BOX SPEC

- At least IP54 enclosure.
- Waterproof cable entry glands to be used or bottom entry.
- Enclosure to be fixed in an accessible location.
- Enclosure to be clearly labelled with M-Bus.
- Wago 222-425 Lever Splicing Connector 4.0mm or similar to be used for M-Bus connections.
- 1 cable per terminal.
- All cables to be individually labelled with postal apartment numbers, or network direction i.e. (towards floor 2 or floor 3 etc.).

TOPOLOGY SPEC

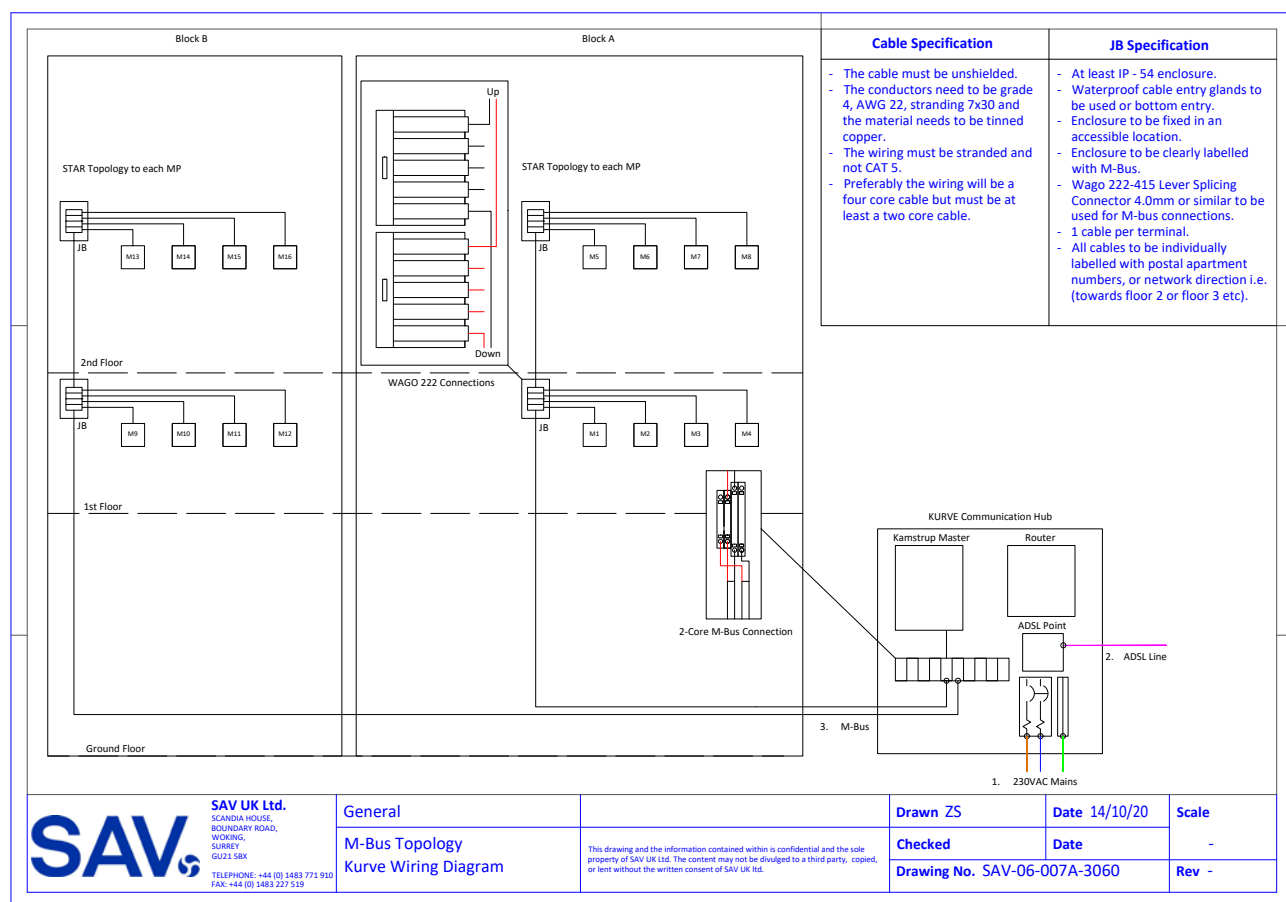
- The number of metering points on each Kamstrup Master should not exceed 250 metering points. Keeping this number down will allow for easier network maintenance and quicker M-Bus readings.
- Maximum cable length for the Kamstrup Master is 2.8 km.
- Repeaters shall be used when maximum cable length has been exceeded.
- No more than 4 repeaters can be connected to one Kamstrup Master.
- Separate M-Bus cables should link the Kamstrup Master to each individual building.
- At the entry to each building an M-Bus junction box shall be used so that individual cables are taken to each riser.
- A central spine is used with junction boxes installed on each floor with star topology being used to connect to each dwelling. Daisy-chain or Bus topology shall not be used.
- All junction boxes and cables within the network shall be labelled and easily accessible.
- On long cable runs when using 4-core cable, cores to be paired together to reduce electrical resistance.
- An as-installed topology drawing shall be created and handed over to the person(s) responsible for ensuring the network remains operational.

SITE SURVEY TOPOLOGY REVIEW

The following are objectives that will be completed by Kurve Technologies as part of the site survey topology review. Kurve Technologies offer support on site to ensure equipment supplied is installed and operating in the correct way.

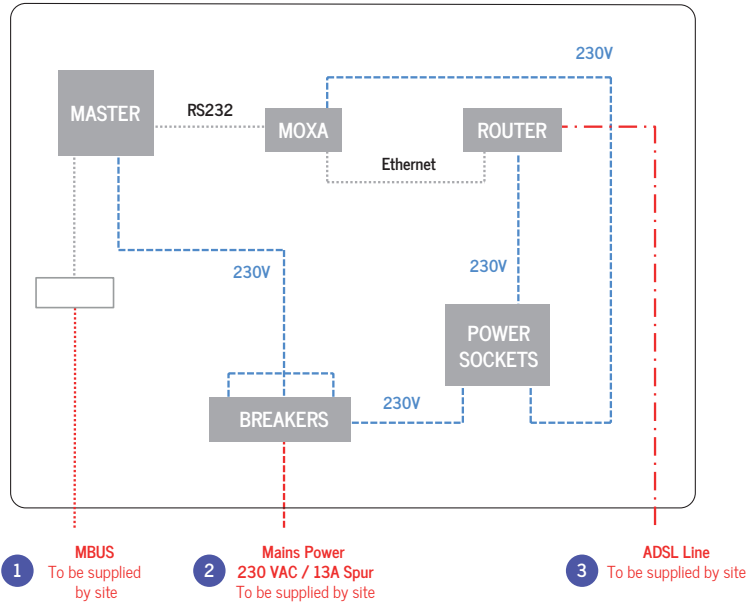
- Ensure all parties understand the specification requirements.
- Highlight suitable location for KURVE Hub(s) installation.
- Attend site for initial meeting with installers.
- Review topology design.
- Review an as-installed document with photos included for evidence of installation location.
- Review installation, and recommend any improvements if required.

EXAMPLE TOPOLOGY DOCUMENT



KURVE HUB

ELECTRICAL WIRING DIAGRAM



CONNECTIONS REQUIRED ON-SITE

- 1 M-Bus cabling from the energy meters.
- 2 Mains power 230V / 13A spur connection to breakers providing power to Master, Moxa and router.
- 3 ADSL line for the router – fixed IP address.
 - Separate line to be used by the billing system alone.
 - Username and password required for the ADSL line.

COMPONENTS

- Kamstrup Master 250D
- Draytek 2862LN Router (4G SIM for ADSL backup)
- Moxa 6150
- Breakers 1 x Double (16A)
2 x Single (10A, 2A)
- 2 x Double Wall Sockets

FEATURES

- Reduced installation time on site.
- Reduced risk of human error.
- Minimal on-site wiring required.
- Compact wall mounted enclosure.
- Full electrical testing before delivery.

TECHNICAL PARAMETERS

Enclosure dimensions	600mm x 600mm x 200mm
IP degree of protection	Sealed IP66 conforming to IEC 60529
Door opening side	Reversible (120°)
Enclosure material	Steel
Enclosure design	Back welded with double profile forming a protected sealed area. Lockable.
Weight	22.5 kg
Electrical supply	230V AC
Router connectivity	ADSL / 4G
Connection to energy meters	M-BUS

IMPORTANT INFORMATION

- Router has 4G SIM backup for continuous AMR communication.
- Please allow enough space around the enclosure for ease of access during maintenance.
- Please ensure you have 4G signal available at location of the cabinet (aerial extensions may be required to find a good signal).
- If required, SIM aerials for the router will be mounted outside the enclosure.

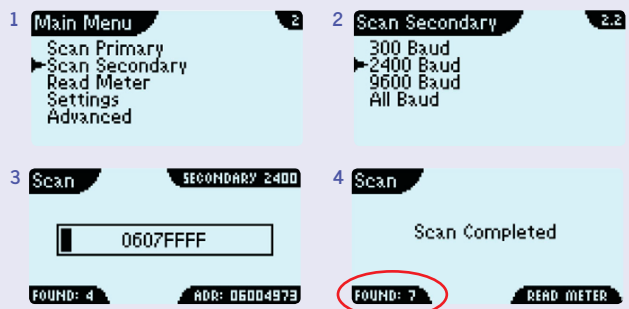
KAMSTRUP MASTER (INSIDE KURVE HUB)

When the KURVE Hub has been installed and connected into the network, the Kamstrup Master screen can be used for fault finding and to ensure the M-Bus network has been installed correctly. Prior to Kurve Technologies attending site, please ensure all meters are visible on the Master by scanning the network. Any missing metering points should be checked for connection as it is required for KURVE set-up.

LOCAL SCANNING ON KAMSTRUP MASTER

When scanning the M-Bus network from the Master, both primary and secondary scanning can be used.

Follow the four easy steps on the right to scan the M-Bus network for available meters. Tip: A quick check can be to see if the total number of metering points is correct rather than each individual serial number.



Screenshots taken from M-Bus Master

KAMSTRUP M-BUS MASTER

LED LIGHTS

4 LEDs show the status of; mains power (Power), data communication between M-Bus Master and energy meters (Request and Data) and finally overload (Overload) showing when a short circuit is occurring on the M-Bus network.

If the overload light is RED, it shows that the M-Bus network is overloading the Master. If this happens, isolate the Master to avoid damage. This can be caused by a short in the circuit or ring topology being used. The fault should be found before reconnecting the Master.



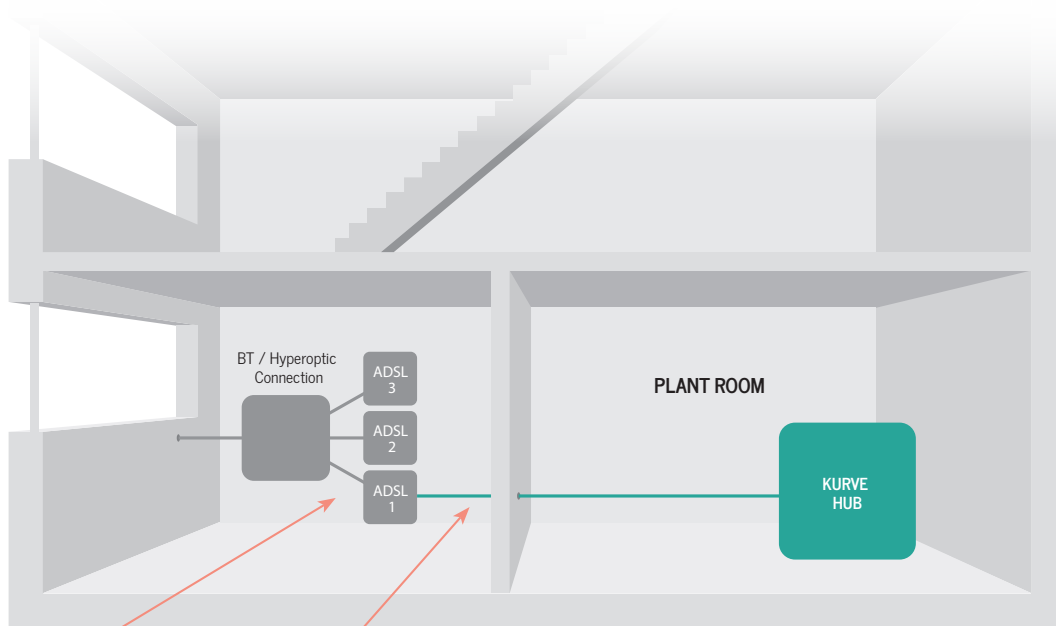
TECHNICAL GUIDE

MULTIPLE KURVE HUBS OR REPEATERS

The KURVE M-Bus survey will first design the system based on a desktop survey, with information supplied by the consultant and contractor. This should obtain most of the requirements needed for additional KURVE Hubs and repeaters. However, until the site survey has been completed the final design should not be signed off.

- Additional KURVE Hubs may be required on larger schemes with multiple blocks to keep the metering system below 250 metering points.
- Any new blocks connected to a heat network may require additional KURVE Hubs.
- If there is a drop in voltage due to cable length, a Kamstrup M-Bus repeater could be used. Where a repeater is required a 230VAC supply will be needed.
- If using multiple KURVE Hubs, please ensure all connections are available for each hub; Power, ADSL, 4G and M-Bus connections.

TYPICAL ADSL CONNECTIONS



Individual lines (Masters) installed by BT / Hyperoptic for various services:

- ADSL 1 - KURVE Metering & Billing (M&B)
- ADSL 2 - BMS
- ADSL 3 - Fire Alarms

Contractor to install cable from connector to KURVE Hub - Cat 6.



Connection box provided in KURVE Hub (slave).

RJ11 connection needed for the router, additional components needed depending on the line installed.



Phone line cover



Phone line to RJ11 filter

KURVE PRE-COMMISSIONING CHECKS

The following needs to be completed before Kurve Technologies can attend to set up the network.

- Apartment access arranged for KURVE commissioning.
- Heating and DHW will be temporarily disabled during commissioning.
- List of addresses / plot numbers / vs. meter serial numbers on Excel to be provided by contractor prior to arrival on site.
- Plant Room / primary system commissioned and working.
- Heating circuit filled and thermostats wired to allow pump control.

M-BUS NETWORK

M-Bus Cable Specification (please provide):

Topology Drawing Created/Supplied?
(Please provide)

Yes No

M-Bus Network Continuity Checked?

Yes No

KURVE COMMUNICATION HUB

Power Supply Connected?
(Answer must be 'Yes' before attendance)

Yes No

M-Bus Cable Connected?
(Answer must be 'Yes' before attendance)

Yes No

ADSL Line Connected?
(Answer must be 'Yes' and details provided below before attendance)

Yes No

Username:

Password:

IP Address:

Phone Number:

Who ordered ADSL:
(Name and contact details)

M-BUS MASTER

Power Light Illuminated Green?
(Answer must be 'Yes' before attendance)

Yes No

Overload Light Remaining Off?
(Answer must be 'Yes' before attendance)

Yes No

ENERGY METERS

HIUs all Installed with Power?
Unswitched Fuse Spurs Installed - no Switched Fuse Spurs.
(Answer must be 'Yes' before attendance)

Yes No

M-Bus Cable Connected to the Meter / Flying Lead?
When Master is powered should show 34-41 VDC at the M-Bus connection.
(Answer must be 'Yes' before attendance)

Yes No

Can all meters be scanned onto the Kamstrup Master?
(Preferable before attendance)

Photograph of Master screen emailed if possible.

Yes No



www.kurve-tech.com