# BrunataNet

BrunataNet is the name for Brunata's remote reading systems. BrunataNet consists of several standard systems developed in order to solve metering tasks in buildings of all sizes.

## System description

The BrunataNet system ensures an accurate and reliable transmission of data from consumption meters to places where the information is needed. Consumption meters comprise for instance Brunata heat cost allocators, water and energy meters as well as electricity and gas meters. Data are transmitted from meters to strategically placed receivers through radio signals. From here the data are transmitted to a central controller box through the RS485 network. The controller box is either directly or indirectly connected to a PC placed in the building, at the housing association or in administration headquarters.

The BrunataNet system is part of the latest technology within wireless communication. We have now developed systems for the GPRS network which give access to meters and metering data through the Internet.

## Standard systems

BrunataNet is available in four standard configurations:

1. Systems based on meter readings by means of hand-held computers
2. Remote reading systems based on radio communication in the building and RS485 network
3.

## System 1
## Reading by handheld computer

System 1 is applicable if frequent meter readings are not necessary and manual reading is acceptable.

The system consists of the following components:

- Brunata electronic heat cost allocators, RME 95, installed on all radiators (HA)
- Cold and hot water (CW/HW) meters with pulse output
- Pulse counter (PuC) including connection box (CB)
- Energy meters (EM) Brunata HG, Rayheat, Sharky-Heat or Multical with pulse output
- WorkAbout handheld computer (HC)

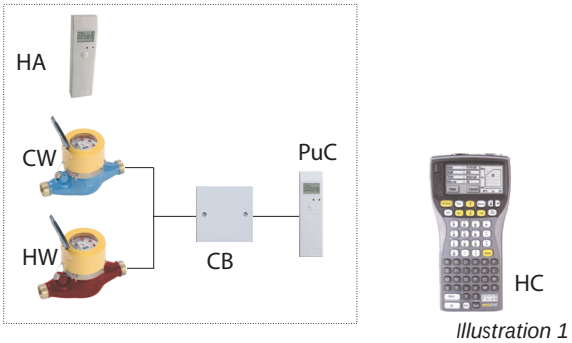


*Illustration 1*

Configuration of the system may vary. Illustration 1 shows a traditional system in which heat cost allocators are installed on all radiators + a cold and hot water meter.

Meter readings are done in the apartment by means of a handheld computer.

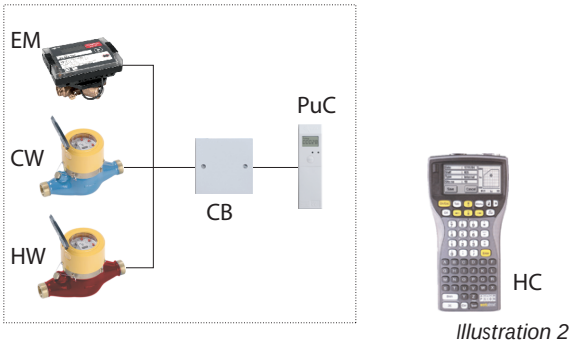


*Illustration 2*

If the apartment is equipped with an energy meter several solutions are available. Illustration 2 shows an energy meter (all Brunata energy meters are applicable) and two water meters that send pulses onwards to a pulse counter in the apartment; the pulse counter also functions as a central reading unit to the resident. Meters are read in the apartment by means of a handheld computer.

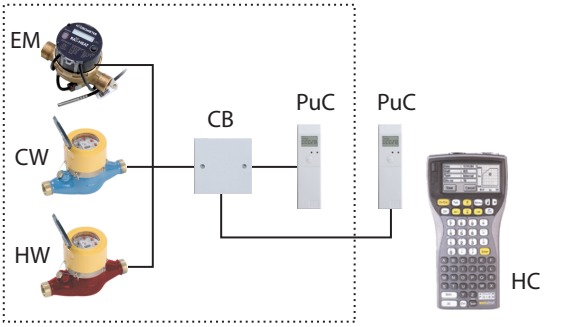


*Illustration 3*

Illustration 3 shows a similar solution for Sharky or RayHeat using two pulse counters. One pulse counter functions as a central reading unit in the apartment and the other, which is placed outside the apartment, is used in connection with meter readings by a handheld computer.

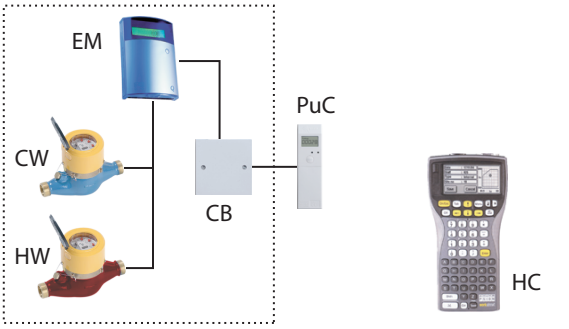


*Illustration 4*

By using the Brunata HG energy meter as pulse counter, as shown in illustration 4, the energy meter can be used as a central reading unit. The pulse counter is placed outside the apartment, which means that the person reading the meter does not need to enter the apartment.

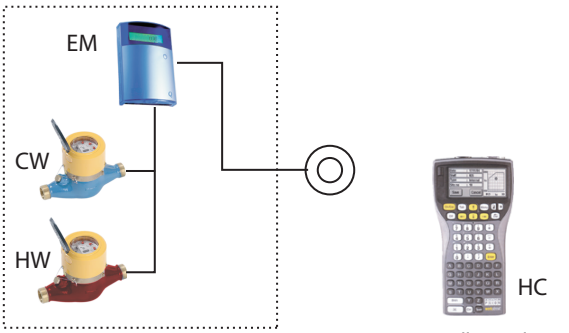


*Illustration 5*

In illustration 5 the energy meter delivers its data in serial form (M-Bus telegram) and at the same time it functions as a central reading unit. The energy meter used is Multical (Multical is read by a handheld Kamstrup computer through a connector).



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## System 2
## Remote reading based on radio communication in the building and RS485 Network

System 2 is used when frequent meter readings and/or monitoring of the system are required. Besides delivering information about the consumption for billing purposes, the metering system also provides information about the current consumption and in case of irregularities it raises an alert.

The system consists of the following components:

- Brunata electronic heat cost allocators with integral radios (RME95-R) on all radiators.
- Cold and hot water meters (CW/HW) with pulse output.
- Pulse counter (PuC-R) with integral radio including connection box (CB).
- Radio receiver (RR). Dependent on the arrangement of the building radio receivers are placed either in staircases, in the attic or in the cellar up to 20-50 meters from the allocators. The number of radio receivers depend on the size of the building; one radio receiver normally covers 2-3 storeys.
- Controller box (CoB) that gathers and stores signals from the radio receivers.
- Telephone modem, ordinary telephone or GSM networks, which may be installed in a controller box.
- Windows-based reading software 'Brunata Monitor' installed on a PC.

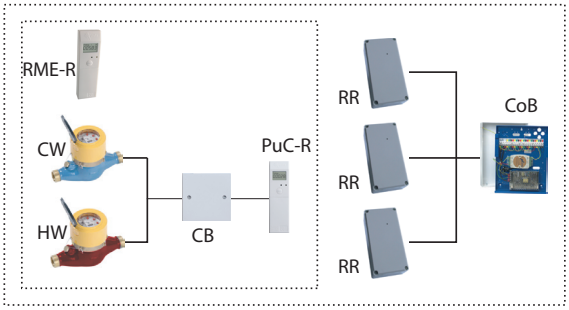


*Illustration 6*

Illustration 6 shows the configuration in a three-storey building block with three staircases. All apartments have heat cost allocators and water meters with pulse counters installed. At each reading, data are transmitted to allocators and pulse counters via radio receivers to a controller box. The integral modem ensures that customers or/and Brunata personal can access the data. Readings by handheld computers are of course also possible.

In large buildings with several meters and radio receivers it may be necessary to extend the system by one or more repeater boxes between the radio receivers and the controller boxes.

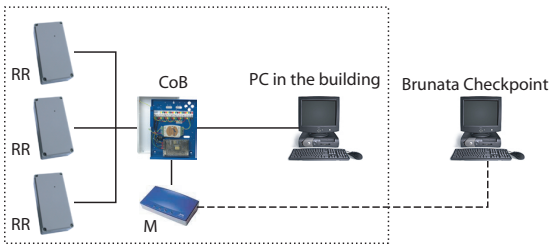


*Illustration 7*

As shown in illustration 7 information from the controller box is transmitted to a locally placed PC; for instance at the janitor's office. If it is preferred that the PC is placed in another building a modem is required.

If a support agreement is set up the PC is supplied with 'PC-anywhere'. PC-anywhere is a software program ensuring that Brunata can monitor the PC as well as receive selected information for the allocation accounts. If actual meter data are required, they must be taken directly from the controller box (due to transmission speed).

## System 3
## Remote reading based on serial M-Bus communication and RS232

System 3 is Brunata's system for buildings in which the piping arrangement allows for the use of energy meters and where serial reading is requested. It is advantageous to do readings serially. All meter information is basically picked up the way it is, as opposed to pulse gathering which provides no guarantee for synchronicity between what the meter shows and the value of the pulses gathered. Besides delivering consumption information for accounting purposes; the system submits information about the current consumption status as well as raises an alert in cases of abnormal consumption.

The system consists of the following components

- Brunata HG electronic energy meters type HGQ or HGS with integral communication module or RayHeat with M-Bus output.
- Cold and hot water meters (CW/HW) with pulse output
- M-Bus Master type HGPW3, 20, 60, 120 or 240 - dependent on the number of allocators connected.
- Telephone modem, special modem for ordinary telephone networks or GSM networks.
- PC with Windows 95-98® and reading software Brunata MCom.

Similar to system 1 the Brunata HG energy meter functions as the pulse counter of two external meters. It does not matter whether they are water, electricity or gas meters as long as they have pulse outputs. If more than two meters per energy meter the pulse counter 'HGQ-Dat' should be used.



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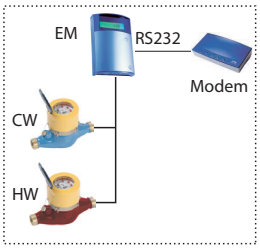


*Illustration 8*

Illustration 8 shows the reading of one single meter. A RS232 module must be integrated in the HG meter and afterwards connected to a modem. Subsequently, it is possible to do readings using the PC with the Brunata MCom program installed. The PC must be supplied with a modem.

If the meters are interconnected in a databus it is necessary to use a concentrator, the so-called M-Bus Master, to which a PC can be connected. Please see illustration 9. If the PC is placed in another building, it is supplied with a modem and the M-Bus Master is connected to a local modem as shown below. Subsequently, meter reading is possible.

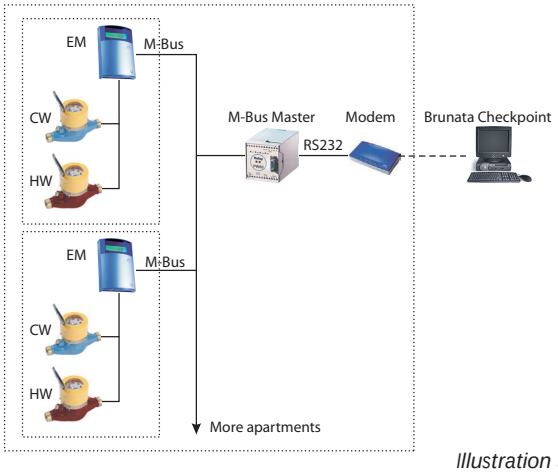


*Illustration 9*

If a support agreement is set up, the PC is supplied with the special reading program PC-anywhere. This program ensures that Brunata can monitor both the PC and the metering system as well as receive information for the allocation accounts.

## System 4
## Remote reading through the Internet

System 4 is Brunata's latest system. The system uses the Internet to communicate with the meters and supplies data continuously – allowing for consumption to be monitored closely.

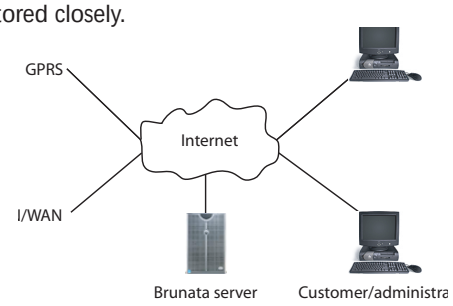


*Illustration 10*

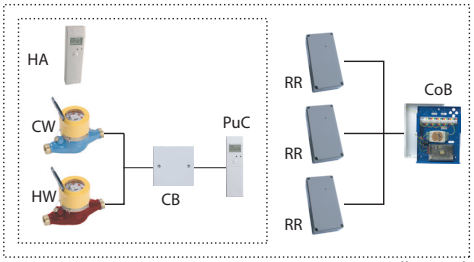


*Illustration 11*

Communication takes place in one of the following two ways:

1. Through wireless data technology GSM/GPRS (General Package Radio Service) which is supported by most telephone companies
2. Through local net or broadband directly to the Internet

Meter data are transferred to and stored in Brunata's Oracle server from where selected data can be collected and used for for instance allocation purposes or for WebMon presentations on Brunata's website. An access code allows for customers and consumers to watch their own metering data.

The systems are arranged according to requirements using the same meters as the systems 2 and 3. Added, however:

- A Brunata GSM/GPRS module with integrated SIM card for controller box, meter or M-Bus Master Connection
- A PC with reading software and an Internet browser

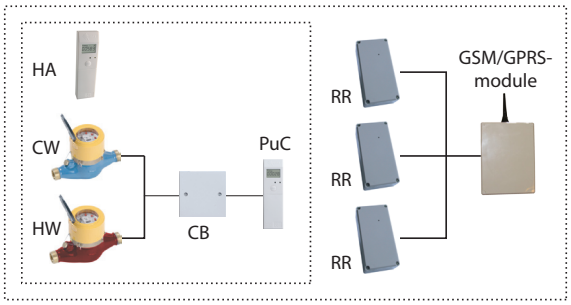


*Illustration 12*

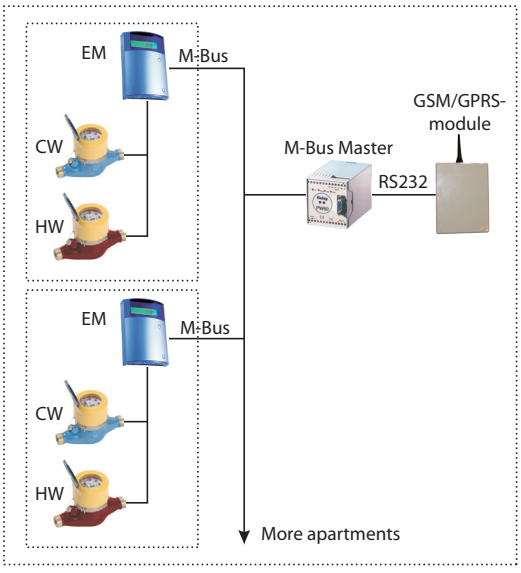


*Illustration 13*



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