

METHODS OF WATER METER AUTOMATIC READING

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ABSTRACT

In this paper will be discuss about water meter and methods of automatic reading. It will be given definition of water meter, theirs characteristics, way of devide. It also be explained two methods of automatic metering reading: M - bus system and Radio system. Software for automatic reading will be given in short explanation. At the end of this paper will be given economic analyses which including installation of water meter for automatic reading and connecting with software.

Keywords: water meter; automatic metering reading; calibration

1. INTRODUCTION

It is public opinion that natural resources of potable water in B&H are inexhaustible and the lack of water is not possible. The truth is somewhat different, since the springs are, unfortunately, unevenly located and there are certain areas with sufficient amount of water, but there are some areas with insufficient amount of water. The major influencing factors, for the day-to-day worsening situation in water supplying are man and his negative attitude, along with the problem of uneven distribution. It is more that common saying that water is "public good" and individual valve must not be closed although the consumer does not pay his bills. This statement is true when we talk about water from public faucets, drinking fountains, springs, lakes or rivers, whose water has neither treatment, nor any control or maintenance. This kind of water is, of course, out of any kind of payment. However, when we talk about water which has been exposed to constant conditioning, controlling and in most cases transporting by pumps from the water tanks to consumers, then we are talking about merchandise or goods which have to be paid. When we speak about water bills, we have to think how to calculate the amount of water which was used. We must have the measurement upon which we calculate water spent in certain period of time and release the bill. But, if we need water flow parameters [1/s, 1/h, or m³/h], or some other parameters as pressure, temperature, etc. we use water flow gauge which give us required information, opposite to water meter which gives only information about used amount of water in m³. To be able to operate upon the economics principles, water distributing companies, as distributive units must set efficient way of distribution, as well as the charging of distributed water. Also, they need, at the same time, decrease loss in order of future distribution of clean potable water to consumers. It is necessary to establish fair and correct relationship with consumers as well as work under the EU norms. We can do that if we establish certain system solutions for water meters installations, setting monthly readings, daily of consumers data base, distribution and billing. It has been said that water distributing companies have only one way to be paid for their services and that way is water meter readings.

2. WATERMETER

Watermeter is instrument intended to measure continuously, memorize and display the volume of water passing through the measurement transducer at metering conditions. A watermeter include at least a measurement transducer, a calculator (including adjustment or correction devices, if present) and an indicating device. These three devices may be in diferent housing. Water meters can be divide on: home or residential, industrial, combined. It can also be divide by way of installation on horizontal and vertical. Period between two calibration for home water meter is 5 years, and for industrial and combined is 3 yeras.

3. METHODS OF WATER METER AUTOMATIC READING

Automatic metering readings are based by the principle of several water meters to be read in one place. Automatic Meter Reading advantages:

- faster readings,
- faster processing of information received,
- reading without disturbance,
- exclusion of human mistake,
- faster detection and repairing of leaking spots.

Nowadays we have two basic principles of AMR:

- M – bus system,
- Radio system.

3.1. M – bus system

Readings with this system are conducted by impulse water meters, counting impulses electronics and M – bus processing unit, with overall readings available in one place. There are several configurations of this system in use today, but each of these systems are based on cable connection between water meter and Central Processing Unit. This stands as a huge disadvantage in applying just because it is practically impossible to separate individual unit from existing installations and set a separate water meter, but the system has to be installed for the entire facility. This system is also unpractical when we have older buildings for the cables and their installation.

This paper will describe the Family of M – bus Masters with digital interface, ideal for large M-bus installations up to 250 water meters. We have available models of module design with physical interfaces – RS232, RS485 or Current Loop.

According to this, the series is equipped with solutions for different control systems. It is possible to install a network with one of the members of the family – DR007, with unlimited length and unlimited numbers of water meters. It offers a repeatable function, allowing adding of devices within the chain without loosing a signal. Optional internal or external modem allows reading all information from one location.

M – bus system characteristics:

- cheap Bus System,
- two wired cable power supplying,
- length up to several kilometers,
- EU standard (EN 1434),
- system components easy to get
- adjustable for home or industrial installations,
- possible readings from the distance,
- supervision and control of energy,
- readings by mouse – clicks.



Figure 1. Schematic show of water meter connection to M – bus Digitam master in network up to 250 slaves

3.2. Radio system

This system consists of water meters equipped by signal counting electronics which transfers signal by radio waves. Electronic part is installed directly onto water meter and makes a unit with it. Readings are done by radio receiver which an employee carries on his hand-held –Pision. Reading possible from the distance up to several hundred of meters, depending on obstacles in the field, but always without entering into facilities (flats, houses, etc). The System has remarkable applying advantages due to simple installation in new and old buildings. This system allows individual installation of water meter on a certain locations, without additional adjusting on already existing installation, or installation of other components beside water meter. Basic component of the system is water meter prepared for the remote reading. The family of these water meters is consisted of water meter from DN 15 to DN 1000, all standardized and reading is possible with the same electronic equipment for all water meters. This includes all water meter (home, industrial, etc), all metrological accuracy. All these water meters have one scale – sensor which transfers electrical oscillations connected to electrical capacity. Basic functions of these electronics:

- Possible readings from the distance
- Gathering and transferin information from water meter to radio receiver
- Individual installation of water meter
- Memorizing 13 previous readings per individual water meters
- Detection of water meter leaking
- Date and time adjustment
- Detection of possible manipulation
- Two sided communication
- 100 % accuracy of reading
- no power supply required
- simple installation

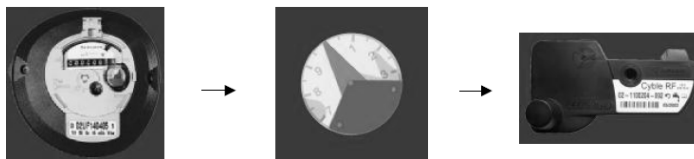


Figure 2. Schematic show of equipment for Radio system



Figure 3. Show of hand – held computer and radio receiver



Figure 4. Schematic show of Radio meter reading

4. SOFTWARE

It is consisted of software for planning route and hand – held reading software. Both software allow M – bus and radio readings. Gathering information can be presented by diagram or tabs. This kind of diagrams shows annual consumption of individual consumer, possible flow in opposite direction and amount, water meter leaking, possible manipulation of water meter or electronics, battery life etc.

5. ECONOMICAL ANALYSIS

At the end of this paper we need to look back at the AMR installation costs. Water meter installation price has certain limitations which have to be taken under consideration. Installation problems are mainly as follows:

- 80% of old buildings have two vertical pipelines entering the flats, causing installation of two water meters.

- it has to be set that all entering water goes through water meter before it reaches the consumer

Equipment estimation can be divided in to two parts:

- equipment (price of one water meter with electronic for Radio or M – bus data transfer) is approximately 200 €
- construction depending on installations from 100 € to 150 € per one installed water meter.

6. CONCLUSION

Installation of equipment for consumption reading – directly and loss control – indirectly are needed in each water distribution company, and it is process that each company should star with as early as possible. Results achieved are decreased loss and increased charge, and they are much bigger then the costs of preparation of the company for system appliance and water meter installation. Effects will be shown at the same time on both sides – at the company with loss control, increased charge, and decreased necessity for new springs and at the consumer with decreased monthly bills. Both sides will benefit because only fair distributed – measured – consumed – paid relationship can be a foundation for complete water distributing system efficiency.

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