Introduction of the Automatic Meter Reading (AMR) System in Water Supplies Department (WSD)
The Automatic Meter Reading (AMR) System provides the metering data, status outputs and alert signals where applicable for operation and monitoring of the smart metering system.

The smart water meter equipped with a meter interfacing unit (MIU) is capable of storing the meter reading and status in its internal memory for retrieval by the data concentration unit (DCU) at a preset interval via the M-Bus wires. The metering data collected by the DCU is transmitted to the master station in the WSD through broadband/3G network as deemed appropriate by the WSD for application of the smart metering system.
The infrastructure of the system consists of AMR Master Station and AMR Outstations.

- **AMR Master Station** – AMR application server, database server, time sync. server, communication equipment (router/modem), workstations, etc.

- **AMR Outstation** – Smart water meters equipped with meter interfacing units (MIU) of mechanical water meters and/or signal converter of electromagnetic (EM) water meters, Data Concentration Unit (DCU), Programmable Logic Controller (PLC), communication equipment (router/modem), backup battery panel, etc.
Automatic Meter Reading (AMR) System

AMR Master Station

- AMR Servers at WSD
- WSD Intranet
- Communication Networks (broadband/3G, etc.)
- Billing System
- Water Intelligent Network Management System

AMR Outstation 1

- AMR Panel
- Data Concentration Unit (DCU)
- M-Bus
- Top Meter
- G/F Meter
- Housing Block

AMR Outstation 2

- AMR Panel
- Data Concentration Unit (DCU)
- M-Bus
- Top Meter
- G/F Meter
- Residential Building

AMR Outstation 3

- AMR Panel
- Data Concentration Unit (DCU)
- M-Bus
- Top Meter
- G/F Meter
- Commercial Developments

Web Portal

Internet

AMR Servers at WSD

Data Concentration Unit (DCU)

Automatic Meter Reading (AMR) System

Communication Networks (broadband/3G, etc.)

Water Intelligent Network Management System

Data Concentration Unit (DCU)
Typical equipment at AMR Master Station

- Monitor and control system & equipment
- Displays of alarms
- Reporting
- Information display

- Data log
- Alarm log
- Monitor and troubleshoot networks reliably
- Information distribution
- Time sync. Outstation DCU
- Interface to WSD intranet

- Acquire GPS time
- Provide time sync. Function for central equipment

- IP based communication
- Public wireless communication to Outstation DCU
Typical equipment at AMR Outstation

**Communication Equipment (router/modem)**
- IP based communication
- Public wireless communication to central equipment
- Provide communication self healing function

**PLC**
- IP based communication
- Send alarm status of outstation
- Provide communication self healing function

**DCU**
- IP based communication
- Open M-Bus communication
- Send MIU alarms
- Send MIU data log

**MIU**
- Open M-Bus communication
- Acquire pulse and flow from water meter
- Generate leakage, battery low alarm

**Water Meter**
- Register tenant water counter

**Backup Battery Panel**
- Provide power backup function in case of main supply failure
Typical arrangement of smart water meters

Smart water meter
MIU
Typical arrangement of Electromagnetic (EM) water meter for AMR application

- EM water meter
- EM water meter converter generating pulse output
- Pulse to M-Bus Converter
Typical AMR Outstation Panel

Battery Charger Panel

AMR Panel

Battery Panel
Typical Overview of AMR Panel

- **Communication equipment (router/modem)**
- **Ethernet Switch**
- **PLC**
- **Power Supply Unit**
- **24VDC To 220VAC Converter**
- **MCB**
- **Selector**
- **DCU**
Benefits

- Improve meter reading efficiency (i.e. automatic reading of water meters and reduce human error)
- Detection of abnormal water consumption (e.g. leakage of customers’ piping)
- Better planning and management of water supplies
- Enhancing customer services through provision of timely water consumption information via Internet and mobile phone
- Ideal platform for promotion of water conservation