



## **PowerServe Automated Meter Reading AMR Metering Systems**

The rapid growth of electronic systems and communication capabilities combined with the information age presents the opportunity to fully integrate and automate utility metering.

The *PowerServe* metering system combines the best in class electronic metering devices and software billing approaches to provide a remote metering solution that is maintenance free, accurate and easy to use with extensive report types offering extensive management information to ensure that people can conduct their business with flexibility and value-added functionality.

### **AMR**

 Instantaneous Billing

 Various Report Formats

 Extensive SQL Database

 Checks & Comparisons

The power of the software solution is contained in its embedded ability to also accommodate manual-billing inputs thereby providing a unified billing platform for automated and manually read metering sites. The system fully automates readings, at any user-defined interval, directly from non-volatile registers inside the electronic billing devices. This approach eliminates all problems arising out of manually read meters. It further reduces processing time, reduces the cash cycle, guarantees data integrity and eliminates operator errors.

- **Communications Media**, The meters communicate via a single screened twisted pair wire, fiber optic, PSTN or GSM network using ModBus RTU, TCP/IP or FTP protocols.
- **Operation**, The system is fully automated. Takes normal readings once every user-specified period (hourly, daily or weekly), performs the month-end reads at the specified billing interval, process the billing data and prints the invoices and reports.
- **System Integrity**, A reconciliation report where both cost and energy balancing are quantified provides information concerning the metering system identifying possible meter failures, tampering etc, saving on maintenance costs and ensuring revenue.
- **Instantaneous Billing**, Invoices are processed immediately reducing the cash cycle whilst, further increasing utility profitability.
- **Data Availability**, Read billing and status information data is stored in a SQL database where all historical data can be viewed immediately providing instantaneous solutions to any queries.

- **Data Integrity,** The system is designed to read all status and billing registers directly. Consequently, data and (therefore) revenues are guaranteed. This because; even if the communication medium has been compromised, once reinstated the system will have access to the billing or status data which is stored in non-volatile memory inside the energy billing devices.

## PowerServe Software

The strength of the system lies in the powerful software with its useful statistical and other measurement tools. Here the metering data is stored and presented in various formats so that effective benchmarking and management information can be presented.

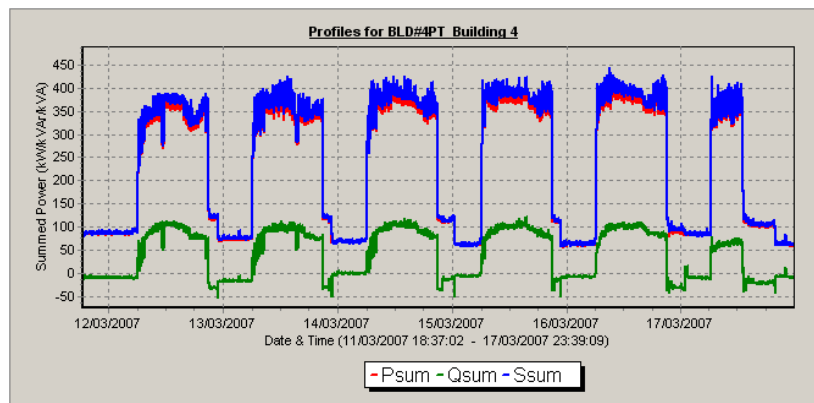
Nevertheless, the main purpose of the software is to automate meter-reading, billing procedures and to provide true remote Meter configuration and customer contractual parameters.

Customer Name	kWh Total	kWh Cost	kVA Total	kVA Cost	Basic Charge	Network Charge
Woolworths	126772	R11460.16	417.4	R15791.76	R341.70	R176.10

Once the system is commissioned the various metering points will be read automatically at the end of a defined billing period. These readings are then used to calculate each customer's energy, water, gas or heat meter consumption and then to process invoices accordingly.

Meter Name	Description	Date From	Date To	Reading From	Reading To	Total kWh
BLD#1	Building 1	1/2/2007 8:39:47 AM	2/1/2007 9:02:43 AM	12952791	13110328	157537
BLD#3	Building 3	1/2/2007 8:39:50 AM	2/1/2007 9:02:45 AM	7278132	7392490	114358

The metering data can be displayed in graphical or statistical formats with various reporting and export functions available. The reconciliation section ensures that the integrity of the system stays within acceptable limits and detects problem areas promptly (meter damage, fraud, water leakage's etc.) metering.

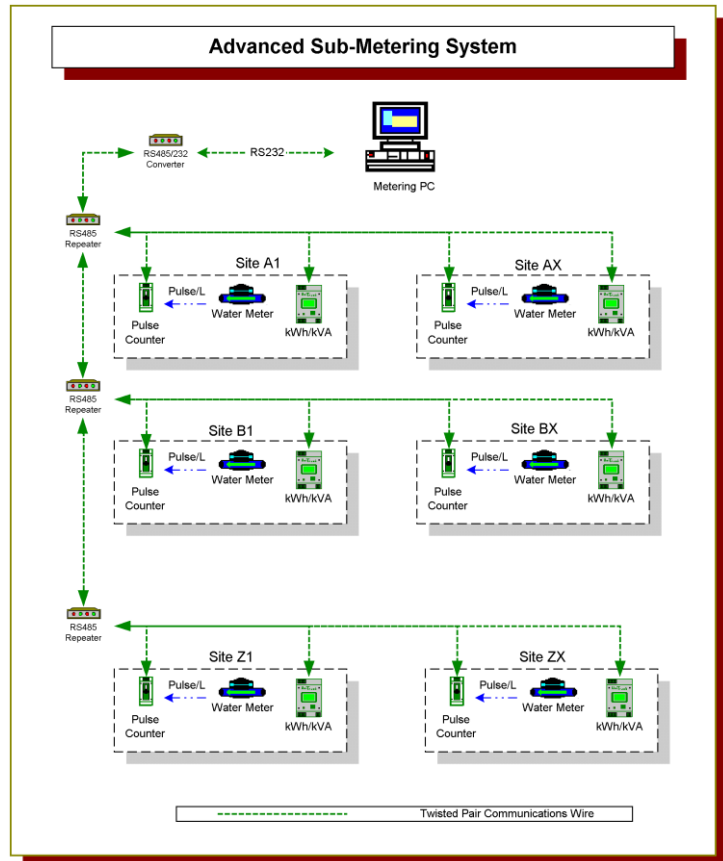


## Technical Information

Sub-metering systems need accurate, reliable and intelligent devices for distributed metering purposes. Various types of energy meters can be used as front ends to measure and report consumption. Intelligent data concentrators enable the system to accommodate volumetric determinations such as water and gas meters and, for energy meters with pulse outputs.

Volumetric measurement is done using pulse counters (data concentrators) to keep track of the amount of water/gas displaced through a meter. The pulse counters count pulses emitted from a meter and stores the count in memory for retrieval by the management system as required.

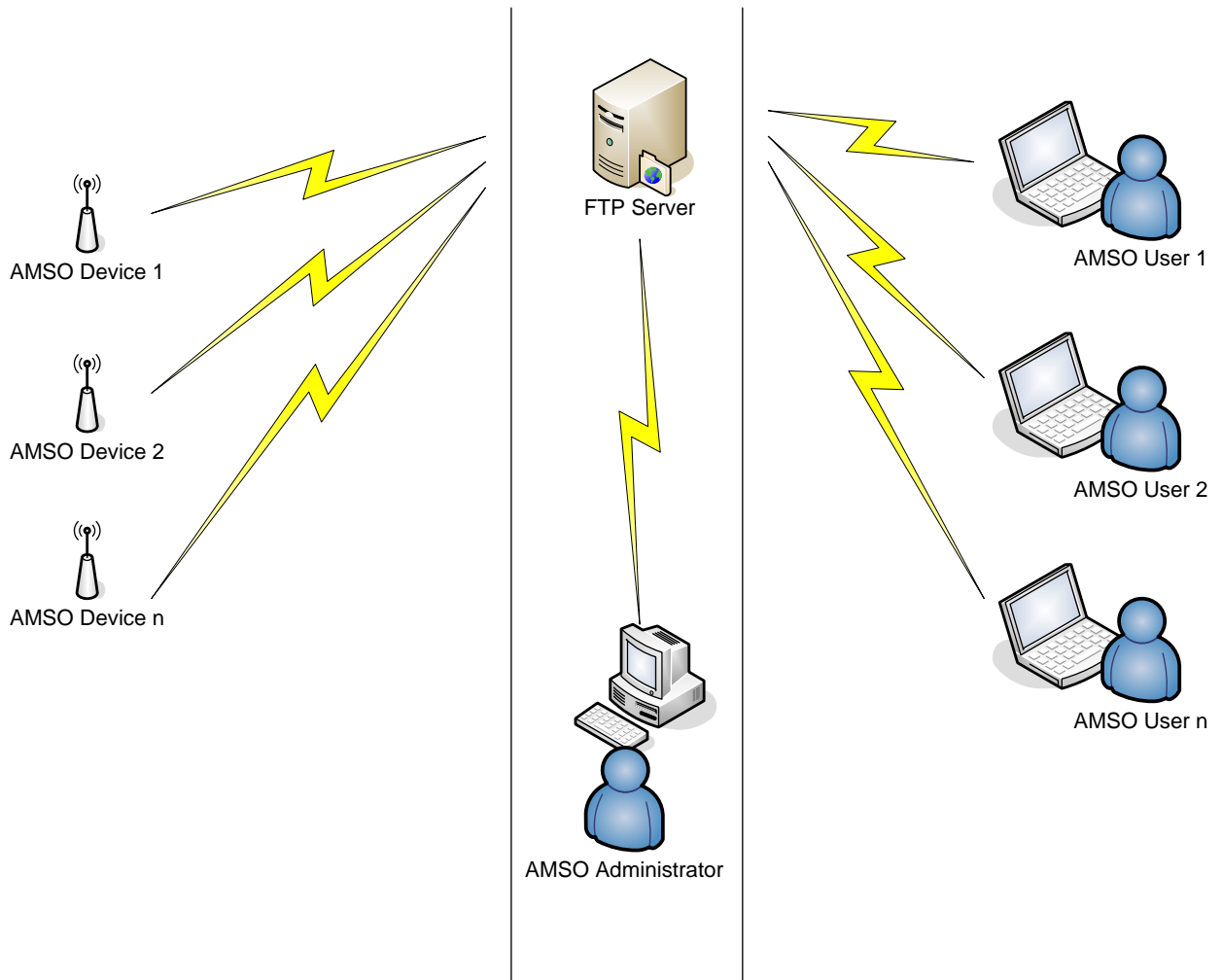
The *PowerServe* metering system uses the *Modicon ModBus RTU* or *TCP/IP* communication protocols. The system is very reliable and flexible and integrates computers, monitoring and control devices.



There are various communications media that can be used with the system.

- **Direct wire** – all devices are linked with a screened twisted pair wire or optic-fiber and connect to the computer via an RS485/RS232 converter.
- **Via radio** – Radio modems are used to connect the computer and remote metering sites.
- **Via telephone lines (PSTN) / GSM network** – normal telephone lines or GSM networks connects remote metering sites with the computer.
- **Via EtherNet (TCP/IP)** – The metering network can be linked with the LAN (Local Area Network) by simply installing a converter which converts the ModBus protocol to TCP/IP. The TCP/IP converter is programmed with a static IP address which then acts as another device on the EtherNet. The information on the meters can then be accessed using a combination of the IP address and the ModBus address. The combination of the 2 addresses uniquely identifies each metering device on the network.

- **FTP Data transfer** – The “File Transfer Protocol” makes use of the GSM network to send consumption values from the metering devices to an internet server. The server can then be interrogated from any computer with an internet connection using the appropriate software and passwords. This functionality takes AMR metering to a complete new level of information interchange.



**Note**

For remote metering applications using the RS485 port, up to 32 *ModBus* devices can be connected using a screened twisted pair wire in a daisy-chain configuration. Communication can be established over distances of up to 1000m on the RS485 port. Networks with longer distances or more than 32 *ModBus* devices require a RS485 repeater.