UNIVERSAL METERING


# SmartComms™

## AMR Solutions - the next generation

# SmartComms™

**SmartFlow™** ensures accuracy and performance, allowing further assured investment into AMR. Only with electronic water metering can and should AMR be incorporated. If the information from the source, i.e. the meter cannot be guaranteed to be accurate or precise, the information at the receiver's end cannot either, regardless of the sophistication of the AMR equipment. **SmartFlow™** guarantees performance and therefore, the following AMR solutions will allow Water Metering to be taken to the next level.

## AMR Solutions
## The next generation

**SmartFlow™** uses open protocol communication, which means any AMR system is compatible. However, with the amount of systems available, selecting the correct one, can often become a complicated process. For this reason, **SmartFlow™** has six established solutions, covering the complete spectrum of AMR options:

- Inductive **SmartTouch™**
- Walk-by Radio Frequency
- Drive-by Radio Frequency
- Fixed Radio Frequency Network
- **SmartConnect™** – RF Mesh Network
- Prepayment

## SmartTouch™ Pad

For a low cost, guaranteed accurate remote reading option, the inductive **SmartTouch™** system utilises an inductive touch pad and inductive probe reader. This system ensures that human error or corruption is eradicated on an economical viable basis. The inductive reader connects to any PC, laptop or hand held PC through a standard serial port. As such, the software to read is available for Microsoft Windows, Pocket PC or CE but can also be customised to a utility's requirements for data formatting, storage, downloading and processing.

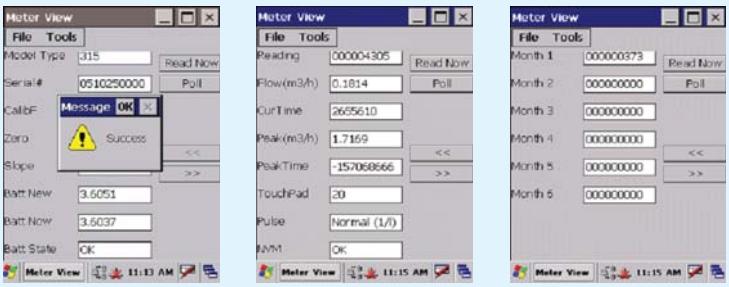
The **SmartTouch™** Pad is passive but driven by the **SmartFlow™** meter directly, which can provide data from the meter such as:

- Meter reading
- Meter serial number
- Peak flow since last read
- Current flow rate
- Readings for the last 12 months
- Meter self test status and diagnostics
- Battery condition
- Time stamping

# Application Software

Suitable for Windows CE and Pocket PC devices, the reader software controls the touchpad reader and stores the data for each meter read. This data can then be downloaded to a billing system or other database using a docking station or internet connection.

### Database Information




# Walk-by Radio Frequency

Utilising radio technology, meter readings can be retrieved significantly faster, and all with the need for very few components. Each meter is connected to a RF transmitter using either 168, 434, 896 or 915Mhz frequencies, which sends metering information wirelessly to a hand held receiver. The Hand Held Unit suggested is the Windows CE version of the Psion Walkabout, but it is compatible with a number of the industry's leading hand held data capture terminals and AMR software packages.

The transmitter is of a 'sealed for life' construction and can be used in above or below ground applications with minimal change to the operating range.

### Typical Hand Held Units


### Technical Specifications

| FEATURE | SPECIFICATION |
|---|---|
| Frequency | 168, 434, 896 or 915Mhz |
| Approvals | CE, R&TTE Directive |
| Data Format | Secure Encrypted Protocol |
| Operating mode | Chirp Transmission (5 seconds) |
| Modulation | Wide Band FM |
| Operating Distance | 250m |
| Operating Temperature | -20°C to +55°C normal<br>-30°C to +70°C extended |
| Battery Life | Up to 10 years |
| Antenna | Integrated and 100% sealed |
| Size | 40 x 36 x 110 mm |
| Weight | 100g |
| Sealing | IP68 |
| Mounting | Integrated Brackets |

### Typical RF Transmitters

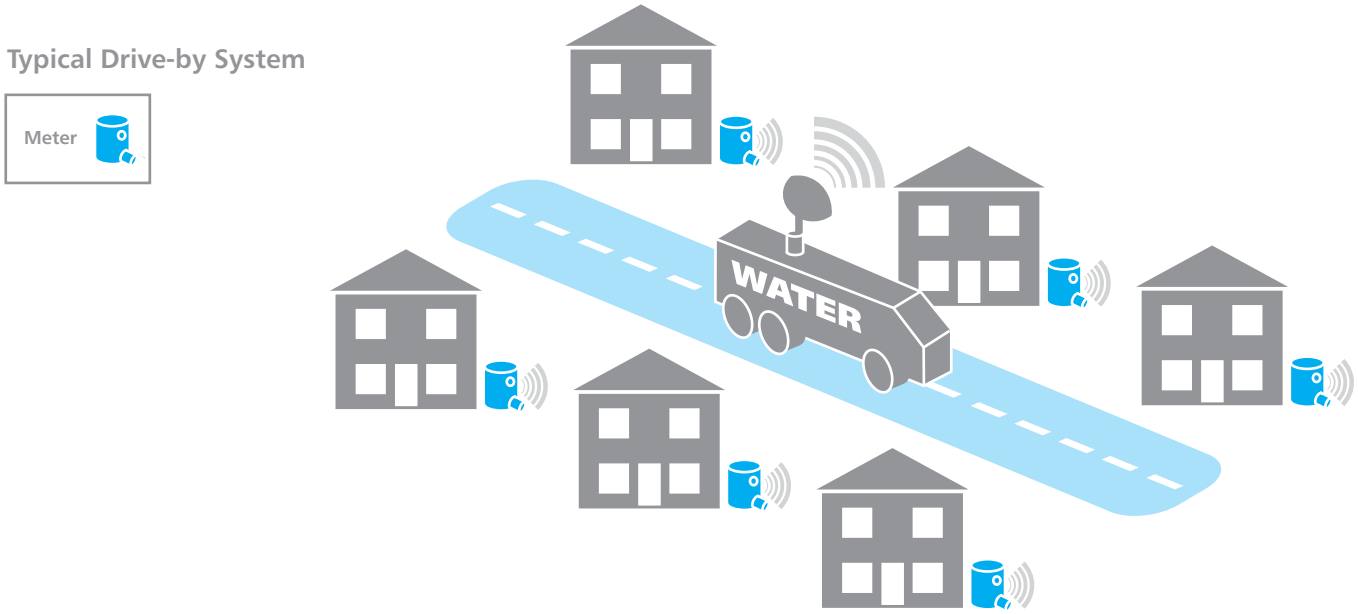
# Drive-by Radio Frequency

'Drive-by' RF ensures twice, if not more reads per day than walk-by RF, resulting in a more economical solution for reading and billing.

Transmission of meter data is possible at driving speeds of approximately 30 miles per hour (50 kph).

Utilising a similar meter and transmitter installation set-up as with walk-by, the drive-by solution incorporates a more powerful vehicle-based data collection receiver.

## Typical Drive-by System




## Technical Specifications

| FEATURE | SPECIFICATION |
|---|---|
| Frequency | 896Mhz |
| Transmission power | <10dBm (10mW erp) |
| Data Rate | 576K baud |
| Approvals | CE, R&TTE Directive |
| Data Format | Two Way Secure RTL specific |
| Operating Temperature | -10°C to +40°C |
| Humidity | <95% RH |
| Power Supply | USB connection to reading device |
| Size | 20 x 65 x 105 mm |
| Sealing | IP53 |

The compact and lightweight USB receiver attaches to most existing hand held computers, or can be installed on dedicated laptops. The USB connection powers the USB device from the computer, thus ensuring that no additional power supply is required.

The sophisticated software includes route management programs, which allows pre-determined meters to be read that day, by creating a route for the RF receiver vehicle to follow.

# Fixed Radio Frequency Network

Removing the need for meter readers, a fixed network solution can offer substantial economic benefits, as meter readings are sent to the utility in 'live' feeds. With the ability to cover vast areas, meter reading with zero running costs, has never been so simple.

Powered by 2 Watts, the meter transmitters provide a nominal range of 5 miles (line of sight can reach 20 to 25 miles), and with the use of repeaters, this can be expanded to ranges of tens to hundreds of miles. The rugged, water proof and tamper proof reinforced polyester housing for outdoor/indoor and pit installations ensures the longevity of the product, which is powered by 8 long-lasting lithium batteries providing a 20-year battery warranty.

Operates in the VHF (136-174 Mhz) or UHF (400-500 Mhz) frequency bands, assuring a clear channel and no lost readings.

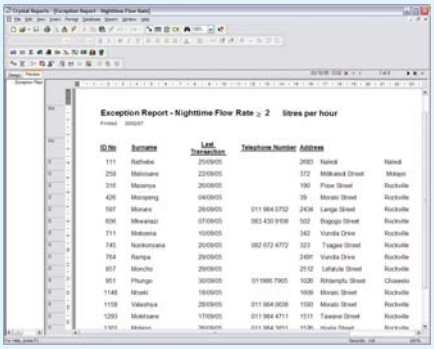
### Typical FIxed Radio Transmitter

The sophisticated software at the base station (Water Utility Headquarters) alerts the user of issues at the meter sites such as leak detection, tamper detection, high flow, low flow, negative flow, unauthorised high consumption during water banned hours and consumption on vacant or seasonal homes. The system can also store unlimited data from readings for reporting requirements.

### Reports

Management, customer, consumption and exception reporting available both at the customer and management level. Reports are available in both number or graph format and export data files are easily generated.

The base station radio transceiver, receives signals from the individual meter transmitters directly and/or from repeaters. It then records data into its database displaying the consumptions of the meters. Compact and easy-to-install it connects to computer/server through computer's serial port or USB port.




If data repeaters are required, they relay data from the meter's transmitters to the base station or to other repeaters and then the base station. After the repeater receives data from the meter, it checks the content and forwards it to the water utility. The data is security enabled by encryption using sophisticated coding.

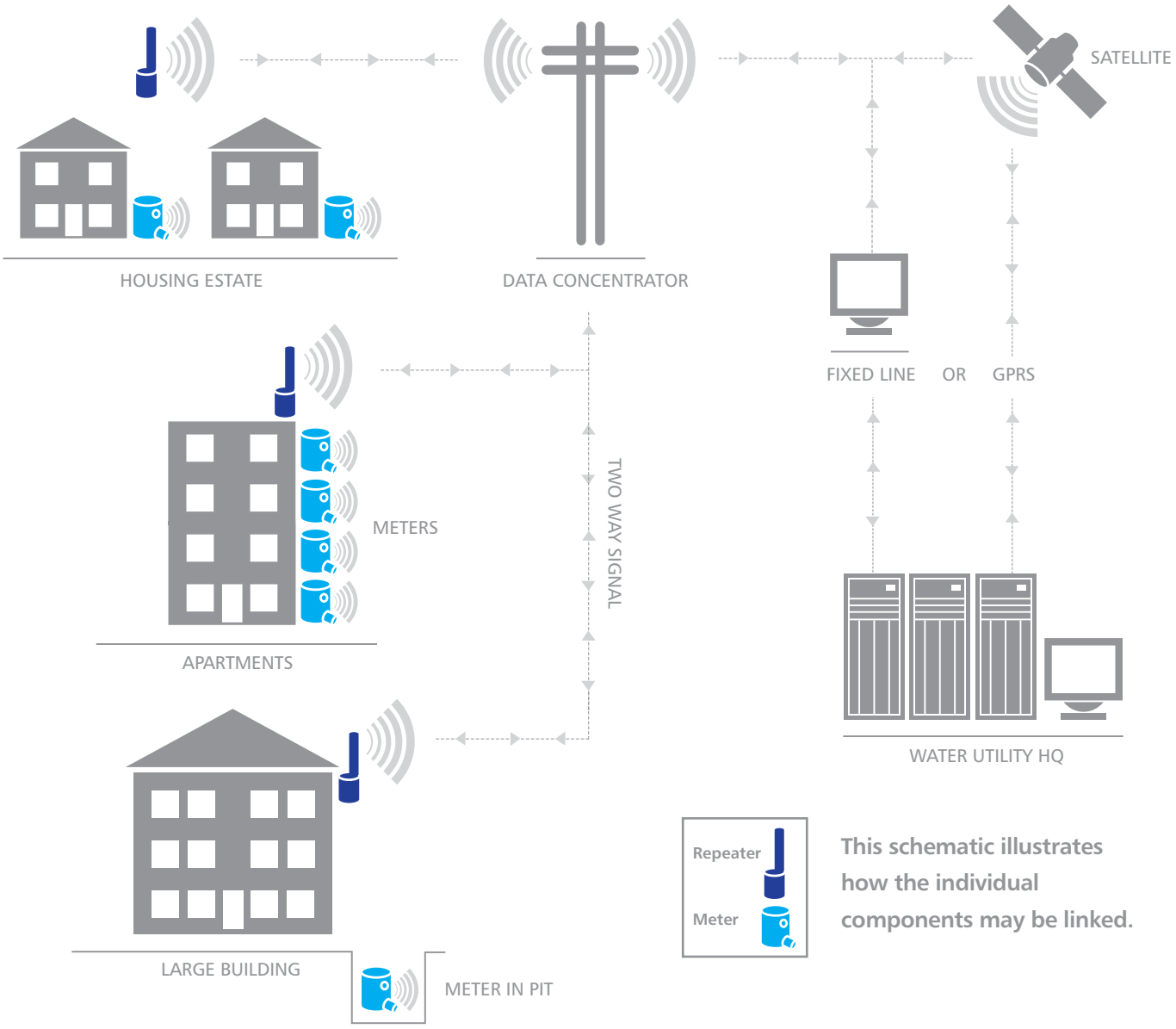
No impact on the currently billing system is seen, as a simple field mapping will enable the required fields to be entered into the existing billing system software.

# SmartConnect™
## Integrated RF Mesh Network

**SmartFlow™** is the first water meter to incorporate an RF transmitter. The RF transmitters within the meters operate as part of a wireless mesh network. Like a fixed network system, this wireless mesh system transmits the much more detailed metering information to the Water Utility's head quarters without the need for meter readers.

Each meter installation transmits information to the main base station, either directly or via repeaters and/or concentrators using the 2.4 Ghz frequency. The exact set-up is dependent upon geographic layout, but any network can be structured.

### Typical SmartConnect™ AMR Solution

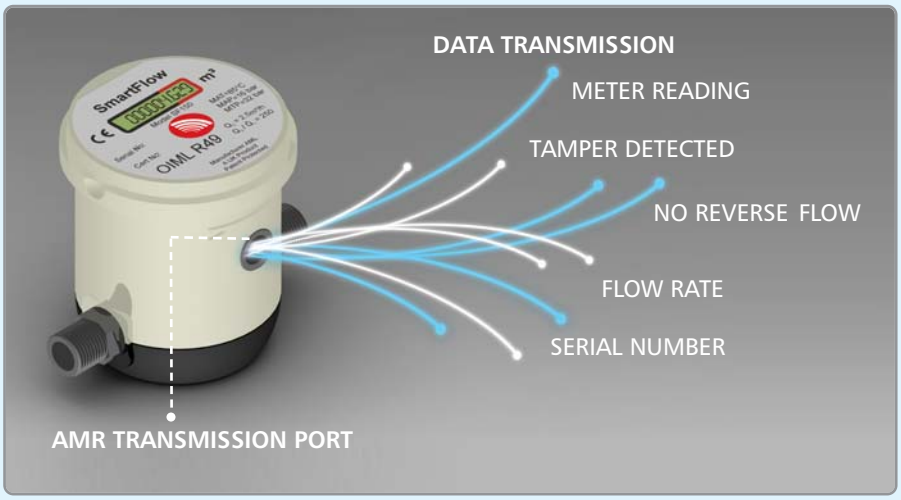



**This schematic illustrates how the individual components may be linked.**

## The Intergrated Meter Transmitter

- IP68 Sealed within meter
- Range is up to 200m
- Low power consumption
- Power supply based on lithium cells
- Battery life up to 10 years (depends on transmission rate and frequency)
- Local battery life monitoring
- Simple RF transceiver and antenna
- Configurable periodic data broadcast
- Channel and transmit power selection based on RSSI to enhance battery life
- Data messages are identified by an unique physical address for each transmitter

## AMR Transmission Port




## Repeater device

- More complex and powerful RF transceiver / antenna than a meter transmitter
- Range is up to 400m
- Repeats and routes messages from all meters and repeaters inside its range
- Enhances the range as well as the number of transmitters in the overall system, thus expanding the network
- Number of repeaters in an area or network is not limited
- Mesh structure, AODV (Ad hoc on distance vector) routing protocol
- Automatic network discovery and maintenance
- Alarm and network specific messages (repeater to repeater and concentrator to repeater)
- Low cost design
- Power
  - Power line
  - Solar cells
  - Batteries

## Receiver/Concentrator

- Creates a local network of transmitters and repeaters
- Range is unlimited
- Message reception from all transmitters and repeaters in its area, channel and network
- Verifies duplicated messages, variables status, alarms, etc
- Communication failure log
- Local readout of all meter information (for example, using a notebook or PDA)
- Access point for WAN / VLAN networks, supplying AMR information directly for company software and database:
  - GPRS / CDMA / WCDMA, VPN or public
  - Private line (Ethernet) or ADSL, VPN or public, etc.
- Power
  - Power-line
  - Solar cells
  - Batteries

As the system is fully integrated, the individual components offer not only complete flexibility, but are also highly cost competitive to even inductive touch pad setups, making it the most economically viable RF AMR solution available.

# Prepayment

The **SmartMeter Prepayment™** system is a revolutionary, complete water solution. **SmartMeter Prepayment™** water metering provides many benefits to both water companies and their customers, including guaranteed revenue and arrears collection, extensive management tools through detailed report functionality and the ability for customers to manage their budgets more easily.

**SmartMeter Prepayment™** ensures guaranteed payment prior to water distribution, as well as dramatically reduced operating overheads, as there is not a requirement for a billing department or meter readers. The **SmartMeter Prepayment™** system is truly the safest bet in Water Metering today.

SmartMeter Prepayment™

**UNIVERSAL METERING LTD.**
Salter's House
Salter's Lane Industrial Estate
Sedgefield
Stockton on Tees TS21 3EE
United Kingdom

t. +44 (0) 1740 629185
f. +44 (0) 1740 629185
sales@universalmetering.co.uk
www.universalmetering.co.uk