

# ORTO-MATE

## Overview

The ORTO-MATE system is used to monitor and control power and water usage in Marinas, Holiday Parks, Retirement Villages and other sub-metering environments.

The system consists of four main modules – the EPM, the Gateway, the App and the API.

## The EPM (End Point Module)

The EPM (also known as a Transmitter) is powered by a 3.6V long life battery, has a built in antenna , and can monitor/control up to 4 meters via separate channels. Each EPM has a unique ID which is used for communicating with the Gateway. There is no limit to how many EPM's can exist in a single environment.

The EPM has four main functions.

### **1. Pulse Counter / Data logger**

Counts pulses output by the meters.

Each pulse represents a single unit of power / water flowing through a meter.

The “Single Unit” may vary from one meter to another.

For example, a pulse on a single phase power meter may represent 1 watt hour, whereas, a pulse on a 3-phase meter may represent 100 watt hours.

In the above example, the single phase meter would output 1000 pulses to represent 1kWh of power used. The 3-phase meter would output just 10 pulses to represent 1kWh of power used.

Generally, water meters output 2 pulses per litre of water used.

The EPM stores pulse counts for up to 4 meters.

### **2. Switcher**

When requested by the Gateway, the EPM can switch power on or off via a latching relay.

The power will remain in the current state (on or off) until the EPM is requested to perform the switching operation again.

The EPM can also switch water on and off via a latching solenoid.

### **3. Transmitter**

The transmitter component of the EPM is used to send and receive messages from the Gateway. All communication between transmitters and the gateway is over the 433mHz Radio Band and has a range of up to 1Km.

The transmitter can be requested by the gateway to perform the following functions:-

- Send the current pulse counts (for all 4 meters) back to the Gateway
- Switch one of the outlets on/off (power or water)
- Provide the current signal strength back to the Gateway. The signal strength provides an indication of how good the radio signal is between the Gateway and the EPM. This will be somewhere in the range of 0 to 100%

## 4. Repeater

The EPM can also act as a “signal repeater” to other EPM’s in the network. This allows the ORTO-MATE system to build a network of EPM’s over large areas by “bunny-hopping” the signals from one EPM to another. Up to 3 repeaters can be used to communicate with a single EPM.

\*\* Stand-alone repeaters powered by long-life batteries and with long-range external antennas are also available, and can be used to communicate with EPM’s over larger areas.

## The Gateway

The Gateway (also known as the Data Collector) is the ‘hub’ of the ORTO-MATE network and handles all of the communication between the App, API and the EPM’s.

The Gateway has three connections, for power, network and radio communication.

- The power connection (5 volts) is via a Mini USB cable, so it can be connected to any USB port or power supply (eg. USB charger).
- The network connection is via an Ethernet cable. The Gateway is configured to have a fixed IP address which allows it to be connected to your computer network. It can be connected to a single computer, an internet router, a network hub/switch, or even a mobile network router (3G/4G/5G) that is configured to be part of your Wide Area Network (WAN).
- The radio communication connection is to an external 433MHz antenna via a 50ohm coaxial cable

All communication between the APP, API and the Gateway is via the fixed IP address pre-configured in the Gateway.

All communication between the Gateway and EPM’s is via the 433MHz radio band, and includes all of the requests described in section 3 of The EPM.

## The App

The ORTO-MATE App runs on a Windows environment and can be installed on a single PC, a network server or via a Virtual Machine.

The App is used to configure all of the EPM’s in the network, and match power and water outlets to the 4 channels on the EPM. Each Channel is then registered to a particular user, which can be (for example) a site or cabin in a holiday park, or a berth in a Marina.

All of the above configuration details are stored in an Industry standard Microsoft SQL Server database.

Once configured, all of the communication functions described in section 3 of The EPM can be instigated by a user of the system, via The App.

Many reporting functions including historical meter reads are also available via the App.

## The API

The API provides a link between ORTO-MATE and other software applications, including WEB based systems.

Via standard HTTP calls made available through The API, external systems can get access to the following ORTO-MATE functions.

- Meter Readings for a single, group, meter type (power or water) or all meters.
- Switch outlets On/Off for a single, group, meter type (power or water) or all meters.
- Get Signal strength (for a single EPM)
- Lists of EPM's, Meters and Meter Types

The API allows the above information to be seamlessly integrated into your existing booking and billing systems.

**Diagram 1 – ORTO-MATE Network Configuration.**

