

# Elite Ducted Air

## Control Philosophy



Ata Touch air ducted systems incorporate advanced control algorithms to manage climate through multiple zones and to balance air flow between rooms.

### Overview

Heat pumps designed for domestic and light commercial applications are not ideally suited for multi-zone ducted systems and only provide crude on/off control. Because of this they don't provide the best energy efficiency as they tend to switch between heating and cooling as the temperature changes throughout the day.

Ata Touch Air & Water Ducted is designed to alleviate these issues by managing airflow and climate mode externally with the heat pump's internal control.

### Damper Control

Each air vent is individually damper controlled and the temperature is measured independently in the designated area. The dampers are controlled 0 to 100% open (as opposed to others which only control open or closed). As the zone gets close to set point the air flow will start shutting down to avoid overshoot and to allow better temperature control.

### Balancing

As well as the individual zone temperature control, the system is also aware of the other zones' requirements and the influence that is imposed with adjoining rooms. The system looks at the rate of rise or decline and effects air flow change accordingly depending on the zones' needs.



### Static pressures

Maintain static pressures in a ducted unit is a combination of duct installation and sizing and maintaining a minimum air flow requirement. As the areas reach set point the system ensures that a minimum static pressure is maintained. It does this based on fan speed, duct sizing, percentage damper requirement and temperature differential. Each variable is applied to a rule-based fuzzy logic algorithm to help control all aspects of the climate needs.

### Voting

As domestic heat pumps are only two pipe systems, the units can only heat or cool at any given time. Carefully control calculations are made to provide a level individual temperature set point control. It achieves this by voting on the consensus of requirements along with temperature trending between zones, allowing some zones to drift to setpoint and knowing the set point differentials of each zone. While this will never achieve absolute temperatures in each zone it provides a far greater control while conserving as much energy as possible.

### Refrigerant Gas Control

With the VRF systems, each ceiling ducted unit has an "EEV" to manage the refrigerant gas requirement based on the total zone temperature feedback differential to determine the effort required from the outdoor heat pump to meet its demand.

With the split ducted systems, refrigerant gas is managed in the ceiling duct EEV valve as well as the Air & Water kit EEV to give a balanced control and to maintain efficiencies.

### Fan Control

There are two layers of fan speed control which are calculated independently. The first layer is the fan speed control which looks at the ducted unit's output requirements along with the gas pressures and ensures that heat is removed to maintain gas pressures. Ata Touch also supervises fan speed and, depending on comfort level, it can automatically compensate for any errors in the fan speed control algorithm.

### Zone Control

Each zone can have its own temperature set point (within limits) by moving the zone set point higher or lower. Although this is infinitely variable between zones Ata Touch never allows impossible settings. It looks at the average set point and makes an internal adjustment to give heat where required in the winter or cool where needed in the winter. Control algorithms monitor all requirements and aim to please without trying to achieve the impossible.

### Touch Switches

Located in each zone is a touch switch that has a temperature sensor. The touch switch allows the user to turn the zone off or on and set the temperature desired.

These same touch switches can be used for other home automation functions as well, take time to look at Ultimate.

### Touch Screen Controller

The heart of the Ata Touch Air & Water ducted system is the touch screen controller. This is the brain that performs most of the algorithms and manages the interaction between each of the devices. It also provides a simple user interface and a raft of control capabilities via easy to use icons.

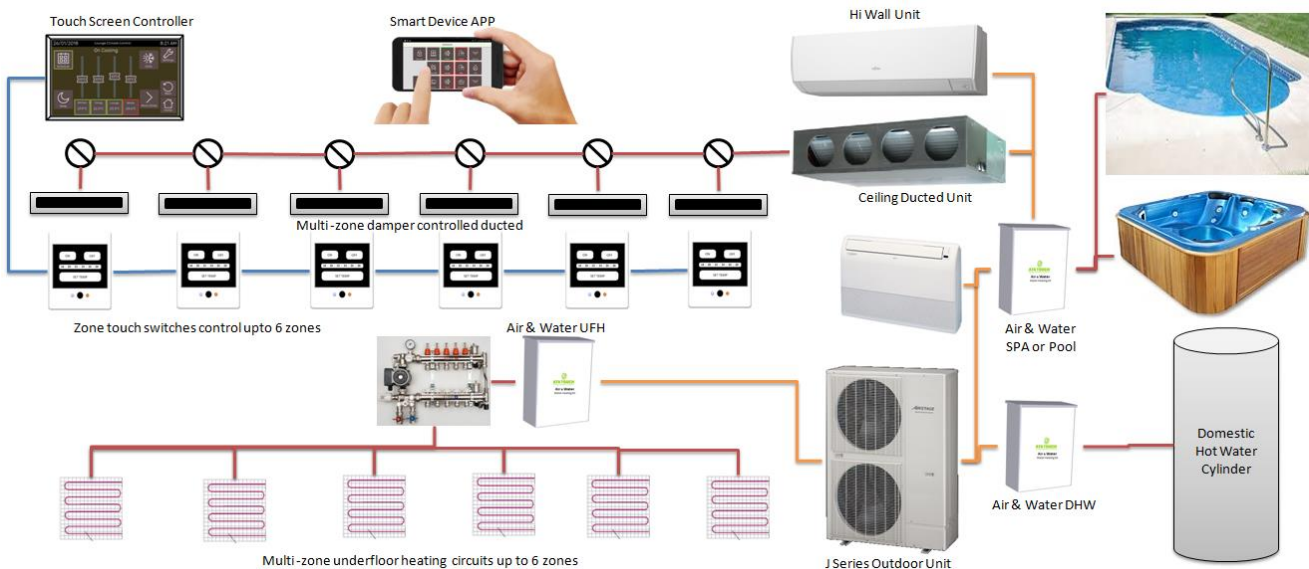
### Control

The main control screen is simple to use with on-off for each zone and simple slide control for the temperature set point. From this screen you can navigate to the schedule and set day and night scheduling to automatically start and stop climate control. If you want to have heating or cooling outside of the schedule then simply activate the force icon.

Setup icon allows you to view individual zone temperatures and damper positions or adjust your desired night-time set point and schedule.

In addition to the basic control functions, the Ata Touch system comes with away mode to automatically shut down non-critical energy usage but restart before you return.

The Touch screen controller when connected to your internet wireless router provides you with smart phone access and you can control your climate both locally or remotely with a small annual connection fee.



### Ata Touch Air & Water

Unlike other climate control systems available on the market, Ata Touch provides a holistic approach to an energy efficient smart home. The Air & Water is exactly that "AIR & WATER" with the unique ability to heat both air and water from a common heat pump source. With Advanced you can combine climate control and domestic hot water heating. With Elite you can have multiple air handlers (hi-wall, ducted, floor console and cassette) along with multiple water heating (domestic hot water and spa pool and under floor heating and swimming pool). As both use the Touch Screen controller, why not extend to lighting, security, smoke detection and a raft of other smart home control features?