

# THE FACILITIES MANAGER'S GUIDE TO THERMAL COMFORT

## The Ingenious Air<sup>®</sup> Small Duct System



### *Air Conditioning Redefined*

✓ Draught Free

✓ Easy Maintenance

✓ Low Carbon Footprint

**CONTACT US TODAY FOR YOUR FREE QUOTATION**

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“We had ceiling cassettes installed during an office refurbishment. Apart from the draughts they weren’t too bad in the summer. In the winter the staff complained bitterly of being too cold. The heat from the cassettes was not reaching their feet and they were uncomfortable. We had two Ingenious Air® Small Duct Systems installed and straight away the problem was resolved to everyone’s satisfaction.”

**Mr. Alun Lewis, the Millennium Stadium, Cardiff**

## Why Choose The Ingenious Air® System?

The award winning Ingenious Air® Small Duct System is an energy efficient, draught-free, ducted air conditioning system. The system won 'Air Conditioning Product of the Year' at the UK's prestigious RAC Industry Cooling Awards in 2015.



The issue of thermal comfort is becoming increasingly important. In 2016 a survey by ACR News (Ref. 1) found that 76% of employees perceive the temperature of their office to be uncomfortable.

The Ingenious Air® System can help solve the thermal comfort challenges you may face in your jurisdiction as Facilities Manager:

- ✓ You can stop having to deal with temperature complaints as all points of the room are heated, cooled or purified evenly, efficiently and effectively.
- ✓ You can **stop** having to deal with **air conditioning arguments** caused by men and women feeling temperature differently. The system achieves a lower relative humidity in cooling mode, allowing men to feel comfortable at the higher temperatures which women often prefer.
- ✓ One system gives you multiple solutions. You can choose any or all modules, depending on what you want the system to do.
  - Cooling
  - Heating
  - Air Purification
  - Humidity control
  - Ventilation
- ✓ Easy to upgrade, you can add any of the optional modules years after the initial installation.
- ✓ You reduce your carbon footprint as the system is **kind to the environment** and has multiple 'green' credentials for sustainability.

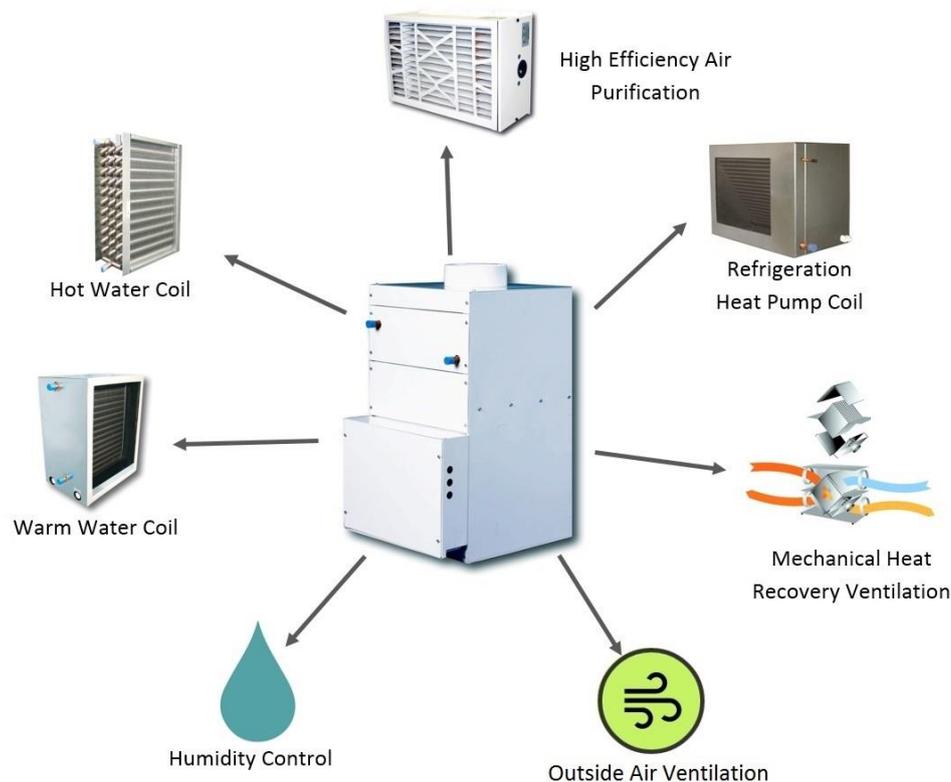
- ✓ You can **reduce** the time and cost of ongoing maintenance. Clever design reduces **disruption** as all serviceable parts except the thermostat can be located in convenient places away from occupied areas.
- ✓ You can **increase staff productivity** and **reduce sick days** by reducing the spread of airborne illness. High specification air purification removes airborne viruses and bacteria, harmful chemicals, volatile organic compounds (VOCs) and indoor allergens.
- ✓ You maintain the aesthetics. The outlets are **stylish and unobtrusive**. They can be discreetly positioned in 'out of traffic' areas in the ceilings, walls, bulkheads, pillars and floors. **Multiple outlet colour and composition choices** complement any interior design.
- ✓ You can **reduce installation times** as a straightforward design, flexible ducting and fewer components simplify the process. A choice of ductwork shapes and sizes allow the installer to avoid obstacles.
- ✓ You **save time and money** on office churn. Future alterations due to changed layout or usage can be made easily after installation. Air outlets can be re-sited far quicker and cheaper than radiators or air conditioning cassettes could be.
- ✓ You **enhance energy efficiency** and overall **building performance** through improved indoor air quality. This creates a healthier environment for the occupants.
- ✓ You have **good thermostatic control**, which saves energy, reduces costs and ensures comfort. Multiple controls options include the newest intelligent controls and easy connection to your building management system (BMS).



## How The System Works

A modular air handling unit (AHU) is at the core of the system. Each AHU is paired with a renewable technology heating /cooling source, such as an air conditioning heat pump or boiler.

Optional modules are connected to the AHU, depending on the environment you desire:



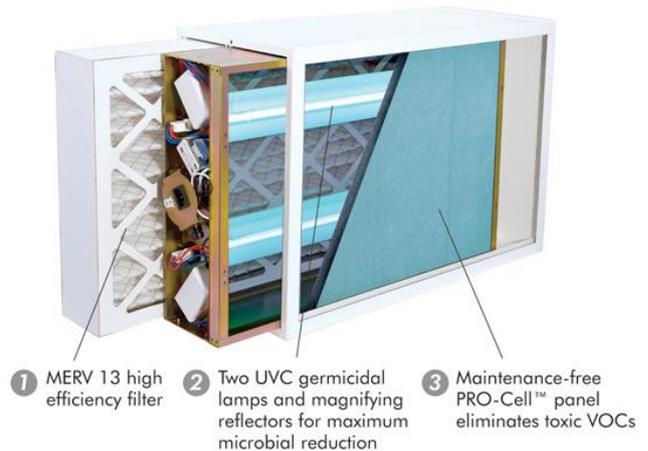
The AHU also connects to the main plenum ductwork. The plenum ductwork is connected to a series of flexible small diameter, sound attenuated ducts called mini ducts. These versatile smaller sized mini ducts fit into areas that are too restrictive for standard system ducting. They terminate in stylish and discreet air outlets.

Three model sizes and speed control inverter fan motors allow sizing to suit your project size and airflow required.

## Air Purification Module

The optional high specification air purification module achieves superior indoor air quality and creates a healthier work environment.

Improving indoor air quality (IAQ) can lead to a quick and direct improvement in staff attendance and productivity. Efficiency can also improve as common illnesses, such as headaches and colds, reduce efficiency and increase the risk of errors.



### The Air Purification Module Dramatically Reduces All Three Types Of Serious Indoor Air Pollutants

#### 1 Airborne Sources of Allergy

**High grade MERV13 (F9) filtration** trap particles as small as 0.3 microns including mould, dust, dander and pollen.

#### 2 Airborne Disease-causing Particles

**UVC germicidal light** neutralises airborne microbes such as bacteria, viruses, and fungi – that cause infectious diseases including influenza, common colds, and c.difficile.

#### 3 VOCs & Odours

Patented **PRO-Cell technology** removes odours, smoke and toxic VOCs - including nitrous oxide, carbon monoxide, and fumes from car exhausts, pesticides and cleaning fluids.



Dust Mites, Spores, Dust, Influenza, Bacteria, Pet Dander, Viruses, Pollen, Colds, Vehicle Exhaust

## Measuring Thermal Comfort

Thermal comfort is 'that condition of mind, which expresses satisfaction with the thermal environment' (Source: BS EN 7730).

There are a range of factors which can impact thermal comfort. One single factor or a combination can create thermal discomfort.



These are all affected by the air movement pattern caused by your heating, ventilating and air conditioning (HVAC) equipment. Thermal comfort with some HVAC systems can be hard to achieve.

1. **Air Temperature** - the temperature of the air surrounding your body.
2. **Radiant Temperature** - the heat that radiates from a warm object e.g. radiators, electric fires, ovens, cookers, dryers, machinery, the sun, etc.
3. **Air Velocity** - the speed at which air moves across a person e.g. fast moving cooler air feels cooling, while stationary, heated air feels stuffy.
4. **Relative Humidity** - the ratio between the amount of water vapour in the air and the maximum amount of water vapour that the air can hold at that air temperature.

## Traditional Air Conditioning Problems

Traditional air conditioning systems usually blow air downwards in a few different directions. This limited air movement pattern can create uneven temperatures and hot and cold spots, especially in large workplaces. The air will not travel to the further points of the room.

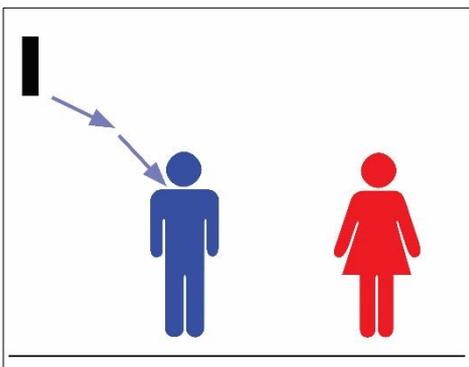
These types of systems are usually placed in a centralised location, often over workstations. This can create uncomfortable draughts and temperatures for those sitting below.

Workstations or desks which are close to the air conditioning unit will have cold or warm air blasted onto them, whilst those sitting further away will not be able to feel the benefit.

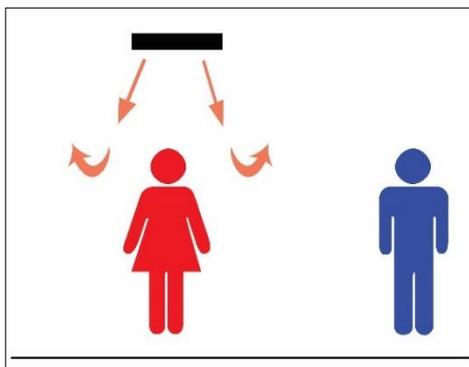
A further problem arises due to stratification. During winter months air conditioning units are often the only source of heating in commercial workplaces. The warm air provided by the air conditioning system will naturally rise and settle at ceiling level, leaving people with cold feet.

This results in arguments between colleagues over the temperature control and the use of inefficient methods of cooling and heating, such as electric under desk heaters.

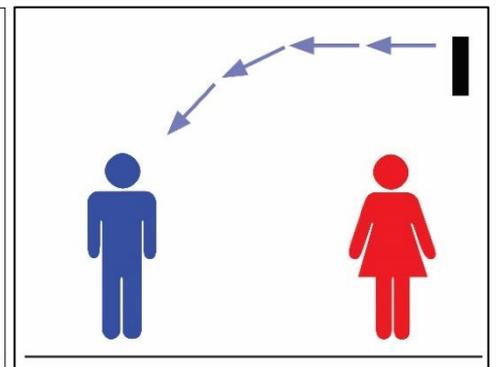
High Wall Unit



Ceiling Cassette



Ducted Unit



## The Induction Air Movement Pattern

The Ingenious Air® System uses the induction method of air delivery - a different air movement pattern from other air conditioning systems. Induction is an energy efficient, effective and well established method of air delivery.

This air movement pattern is imperceptible to human skin and creates a comfortable indoor environment. There are virtually **NO draughts**.

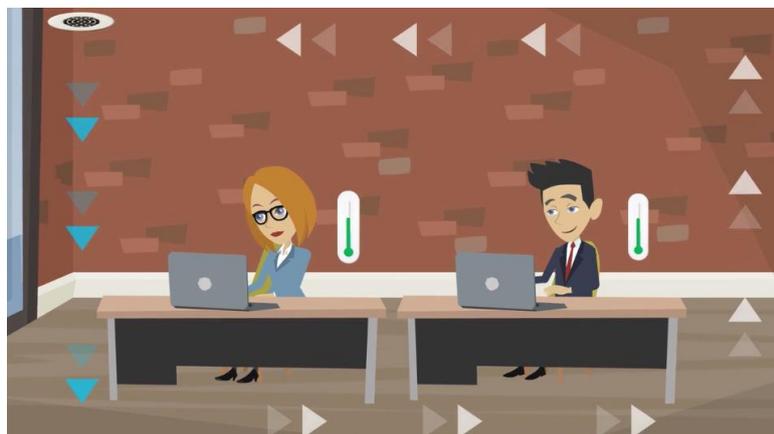
The air outlets gently and continuously distribute treated air throughout the entire conditioned area.

The low pressure of the treated air stream draws room air continuously and imperceptibly back towards the air outlets. Air is slowly drawn from all corners of the room and gently mixed with the treated air stream.

A **natural de-stratification effect** means that room coverage is equal, regardless of room size. All points of the room are heated, cooled or purified evenly, efficiently and effectively.

As **climate control is even**, extra heating/cooling is not needed to compensate for uncomfortable hot/cold spots. The room only needs to be heated or cooled to the required temperature.

A **natural de-humidification effect** removes excess humidity from the air in cooling mode. Achieving lower relative humidity allows occupants to feel more comfortable at higher temperatures in cooling mode.



## Top Four Air Conditioning Complaints

The Ingenious Air® System overcomes common air conditioning complaints:

### Uncomfortable Draughts

Traditional units can create uncomfortable draughts. Draughts are distracting and uncomfortable and can cause health issues such as headaches and muscle strains.



- ✓ ***The Ingenious Air® System is virtually draught-free.***

### Uneven Temperatures

Many systems blow air out in a few directions, which creates uneven temperatures and hot and cold spots. Occupants nearest the air conditioning feel too cold, whilst their colleagues a few feet away are too hot.

- ✓ ***The Ingenious Air® System has a natural de-stratification effect. Temperatures are even and consistent through-out.***

### Too Hot/Too Cold

There is often arguments over workplace temperature. This is because men usually prefer a cooler temperature to women.



- ✓ ***The Ingenious Air® System has a natural dehumidification effect. This allows men to feel comfortable at the higher temperatures that women prefer, which solves the arguments.***

### Disruptive Maintenance

Air conditioning systems are usually situated in busy occupied areas, often above desks. Access for routine maintenance can be costly and disruptive, especially if it needs to be carried out, outside of normal working hours.

- ✓ ***The Ingenious Air® System is designed so all serviceable parts are installed away from occupied areas. Maintenance can take place during normal working hours without huge disruption.***

**WINNER**  
**'Air Conditioning Product of the Year'**  
**UK's RAC Cooling Industry Awards**  
**2015**



## COMPANY OVERVIEW

At The Ingenious Air® Company we want to solve your biggest air conditioning headaches.

**The Ingenious Air® Small Duct System** is a new generation, award winning indoor climate control solution.

Modules allow you to choose what you want the system to do:

**AIR CONDITIONING · AIR PURIFICATION · HEATING · VENTILATION**

[www.ingenious-air.com](http://www.ingenious-air.com)

### THE INGENIOUS AIR® SMALL DUCT SYSTEM Resolves Air Conditioning Discomfort & Complaints



- ✓ Induction method of air delivery creates comfortable, even temperatures with NO hot/cold spots or uncomfortable draughts.
- ✓ High specification air purification creates superior indoor air quality and a cleaner, healthier environment. Removes airborne dust, bacteria, viruses, allergens and pollutants
- ✓ Wide choice of discreet air outlets complement any interior design & save space.
- ✓ Fewer components reduce carbon footprint and simplifies the installation process.
- ✓ Individual time & temperature control for up to eight areas with one system.
- ✓ Flexible duct design gives greater flexibility for room layout.
- ✓ Planned maintenance carried out away from occupied areas.
- ✓ Easily upgradeable & adaptable to future layout changes.

### COMPANY MILESTONES

**December 2010**  
Founded.

**February 2012**  
Won 'Most Innovative Company'  
UK's Business Excellence Awards.

**September 2015**  
Won 'Air Conditioning Product of  
the Year'  
UK's RAC Industry Cooling Awards.

**January 2016**  
Began working in partnership with  
the UK's Department of  
International Trade.

**October 2016**  
Completed new professional system  
installation & system design training  
programmes in partnership with The  
Ford Motor Company.

- ✓ Commercial
- ✓ Residential
- ✓ Medical & Laboratory
- ✓ Leisure
- ✓ Retail
- ✓ New Build & Retrofit.

"We chose the Ingenious Air System as it offered discreet styling without compromising the interior. We absolutely did not want our clients complaining that they were too cold."

**Chris Windram, Owner, Bake 'n' Grape, UK.**



**Joe Flanagan - Owner**  
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### CREATING A COMFORTABLE & CLEAN OFFICE CLIMATE

**The Problem:** Cardiff based designer and manufacturer of office equipment, Orangebox Ltd, understood the impact a poor working environment has on productivity: They had experienced reduced capacity caused by air conditioning draughts, uncomfortable hot and cold spots and uneven temperatures in their old building.

**The Solution:** When they moved to brand new 2500m<sup>2</sup> premises they relished the opportunity to create a comfortable working environment. Local Ingenious Air® Approved Installer, Celtic Cooling & Heating Ltd, installed 26 Ingenious Air® Small Duct Systems. Each was paired with a Mitsubishi 20kW inverter heat pump and the high specification air purification module.

**The Result:** The Ingenious Air® systems provide sustainable, virtually draught-free cooling and heating throughout the building. The systems have a natural de-stratification and de-humidification effect. In summer, Orangebox achieve comfortable, even temperatures by running the system at a constant, energy saving, 24.5°C in cooling mode. The superior air purification module cleans the air and removes airborne disease-causing bacteria, viruses, allergens and pollutants. The working environment is more comfortable, cleaner and healthier.



“We are extremely happy with all aspects of the equipment selection and installation. Everyone [in the office] is very comfortable.”

**Alun Ashcroft, Production Engineering Manager Orangebox Ltd, UK.**

### DISCREET INDOOR CLIMATE FOR LUXURY PENTHOUSE APARTMENTS

**The Problem:** Sager Group Ltd, the property developer, wanted to add comfort cooling to five penthouse apartments in their multiple storey project in North London. They needed a discreet system that would complement the tasteful interior design and fit into the limited space available within each apartment.

**The Solution:** One Ingenious Air® Small Duct System was installed in each penthouse. Each system was paired with a sustainable and efficient heat pump. Smaller sized, flexible ducting and multiple positioning options solved the issue of restricted space: the heat pumps and air handling units (core of the Ingenious Air® System) were installed on the roof. Discreet air outlets beautifully complement the stunning interior design.

**The Result:** The penthouse occupants enjoy perfect indoor climate control and feel comfortable all year round. Each room has a dedicated seven-day timer digital display temperature controller. One tenant took the opportunity to add the high specification air purification module as a retrofit after moving in. This significantly improves indoor air quality by removing airborne disease-causing bacteria, viruses, allergens and pollutants. It has considerably improved their allergy symptoms.



“The level of comfort achieved has proved to be second to none.”

**Stuart East, Director, John Noad (Building Environmental) Ltd, UK.**

## Contact Details

Call **+44 1268 544530**

or email **info@ingenious-air.com**

To discuss how the system will benefit your project  
or for your **FREE** Quotation



The Ingenious Air Company is a trading name of Hi-Velocity UK Ltd

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