

HR Smith R&D Facility, Herefordshire



'Air ceiling' provides novel air conditioning solution for R&D facility

Complementing the high technology environment of an electronics research and development facility at Hereford, an 'exposed' installation of 41 Daikin four-way-blow fan coil units provides a novel 'air ceiling' at a constant 22°C to keep employees comfortable in all seasons.

The Daikin FXUQ units are installed in a newly built open-plan industrial building with no ceilings and exposed services. These units – more usually ceiling-suspended – are primarily designed for commercial spaces with solid ceilings or shallow ceiling voids and ceiling heights up to 3.5m. Air can be discharged at five different angles to suit room size and discharge flaps can be controlled individually. The units can be installed in new and existing buildings.

The new 1,860m² building – an extension of the company's existing premises – has a seven-bay 'Northern light' roof, 4.7m above floor level at its lowest points and 7.8m at the apex of the bays, to match its neighbours. North-facing glass panels maximise natural

light while avoiding direct sunlight that could lead to problems of solar gain.

Gareth Edwards, Special Projects Manager, says in choosing an air conditioning solution the company wanted a system that would deliver a constant temperature for the 50 staff in the building – but with the capability to vary temperatures if the need arises.

He says: "We were also looking for operational efficiency, a minimal carbon footprint and reliable performance. We chose Daikin because it has a good reputation and will last the course."

The Daikin installation has four separate air conditioning systems, each serving approximately 25% of the floor area. Each system has a pair of Daikin VRV IV Heat Recovery condensing units totalling between 24hp and 30hp.

Year of installation

> 2016

Project requirements

- Air conditioning
- Air curtain
- Air purification
- Control
- Heating
- Hot water
- Refrigeration
- Ventilation

Installed systems

- > VRV Heat Recovery
- > Sky Air Wall Mounted Fan Coil
- > VAM Heat Recovery
- > i-Touch Manager



He says: "It is essentially an open-plan workspace with a significant void above the heads of the people working there. It would be uneconomic to air condition the entire volume, so we selected the four-way-blow units to create the horizontal 'curtain'. This helps to overcome the natural tendency of hot air to rise, and therefore reduces energy wastage.

Indoors, each system has between eight and 12 fan coil units, which are rated at 9kW or 12.5kW nominal heating (8kW or 11.2kW nominal cooling). The units are suspended 3.5m above the floor, with the refrigerant pipes and power supplies in cable trays. Refnet joints are provided for each branch and there is a single branch selector box for every fan coil unit.

Controllers are wall-mounted with sensors at head height, to ensure that comfort is maintained at the level on which it is perceived."

The configuration of fan coil units and BS boxes provides flexibility for individual units to switch between heating and cooling as necessary. When there is simultaneous heating and cooling, waste heat from the hotter areas is an economical source of energy for warming the cooler areas.

Fan coil units are controlled in 10 groups, through Daikin premium wired remote controllers, which have a full text menu, energy features and a seven-day time clock.

A Daikin VRV IV Heat Recovery system has potential to deliver integrated climate control solutions that enhance energy efficiency levels and reduce carbon footprints. A heat recovery system can also provide hot water for wash rooms and kitchens at a much-reduced cost.

Overall, the systems are controlled via a Daikin i-Touch Manager a central touch-screen controller with integral web server and email function. There is also an i-Touch Manager expansion module, which can monitor up to 64 fan coil units and provides four kWh meters, facilitating precise monitoring of operating costs.

VRV IV Heat Recovery condensing units are produced in various capacities and can be installed singly or in multiple to meet system needs from 8hp to 54hp.

The Hereford installation also includes a Daikin Sky Air Seasonal Classic Inverter system, which provides 6.8kW cooling for a server room. This system is also controlled by a wall-mounted wired controller.

The Hereford installation has a Daikin VAM Heat Recovery ventilation unit associated with each of the four air conditioning systems. The VAM units (650 and 1,000m³/hr) add to the systems' overall efficiency by transferring heat to or from the fresh air supply so that the temperature difference between indoor and outdoor air does not impact the heating or cooling load on the VRV IV systems. In summer, the VAM units' heat recovery facility can effectively provide a source of 'free' cooling.

Kit List

Code	Description	No of units
REYQ-T	VRV IV Heat Recovery Condensing Unit	8
FXUQ-A	Ceiling suspended Four-Way Blow VRV Fan Coil Unit	41
BRC1E52A	Premium Controller With Energy Features	10
VAM-FB	Heat Recovery Ventilation Unit	9
DCM6601A51	i-Touch Manager	1

The solution was designed and installed by Hereford based Daikin D1 partner, West Mercia Air Conditioning.

RZQSG71L3V1	Sky Air Seasonal Classic Inverter	1
FAQ71C	Sky Air Wall Mounted Fan Coil Unit	1
BRC1E52A	Premium Controller With Energy Features	1

Installations Manager Adrian Baber says in addition to meeting immediate needs, the system has flexibility and spare capacity to future-proof the building – effectively ensuring that options remain open in case of changed requirements in the years ahead.