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University of Lincoln



Double first in decarbonisation as university graduates to VRV5 technology

It's a first for the University of Lincoln – and Daikin – as R32-based VRV5 heat recovery air conditioning makes its UK debut at an administrative and services building in the student village.

Not only does the new system at One Campus Way combine greater comfort and efficiency, it also underlines the university's commitment to environmental improvement and is a significant move towards its net zero targets.

Daikin's VRV5 is a major step towards decarbonising the HVAC sector by marrying engineering improvements with a refrigerant of significantly reduced global warming potential. Compared to earlier VRV systems based on R410A refrigerant, R32 reduces GWP by 71% – and it is easier to recycle and reuse.

The university's engineering manager Jason Devlin – himself an experienced refrigeration and heating engineer – says: "I wanted to future-proof the building by not simply replacing the system with another R410A system.

"Some students may have climate anxiety, so it is important for us as an estates department to show that we care about the environment and that we're installing the most energy efficient equipment we can get."

The building houses three administrative departments – one on the ground floor and two upstairs – in mostly open plan offices, but with some separate rooms. A launderette, which is not air conditioned, occupies part of the ground floor.

Open plan office areas are served by Roundflow cassettes of four capacities, sized to suit room sizes and occupancies. Two smaller offices have fully flat cassettes, while a meeting room and another small office have wall mounted units. The indoor units as specially designed indoor units for R32, ensuring low sound and maximum efficiency.

The total load of 33.5kW is served via a single branch selector box mounted in a ground floor communications room at the rear of the building. It's a short pipe-run from the outdoor units – which are closer to the building than the previous units.

The outdoor installation consists of an 8hp primary unit and a 5hp secondary unit. This arrangement makes for more economical operating costs as the secondary unit runs only at times of peak demand for cooling or heating.

Year of installation

› 2023

Project requirements

- [x] Air conditioning
- [ ] Air curtain
- [ ] Air purification
- [x] Control
- [ ] Heating
- [ ] Hot water
- [ ] Refrigeration
- [x] Ventilation

Installed systems

› VRV5
› Fully Flat cassettes
› Roundflow cassettes
› i-Touch Manager
› VAM Heat Recovery
› Madoka controllers

Jason Devlin says: "The old unit was in a compound near the building, but this was not a good place because it was surrounded by trees. Putting the new ones in a larger area with more airflow and fewer trees is much more advantageous. And as we did not have to start digging up the ground, it made a better installation."

He says staff in the three departments that share the building are pleased with the new system. "But I suppose they don't really notice the difference. We have our own thermal comfort policy of heat to 20°C, cool to 23°C so for them things stayed much the same. There have been no complaints – and the new system is much quieter.

"They are all happy because alongside the VRV we also fitted some heat recovery VAM ventilation units, so we have supply and extract air in there as well to make it an all-round better system."

The VAM units are rated at 350m³/hr with a sound power of just 51dB.

The heat recovery aspect of the VRV and VAM systems improves overall performance and reduces operating costs by using outgoing waste energy to temper incoming refrigerant and airflows.

Indoor units are individually controlled by Daikin white Madoka wired controllers, with overall system control through a Daikin Intelligent Touch Manager and BACnet gateway. Jason Devlin says: "We've locked most of the local controls and control everything via the building management system."









The new system was installed over three weeks during the university's summer recess by Airco Refrigeration and Air Conditioning, Hull-based nationwide specialist and Daikin D1+ Partner.

Airco's Rob Murray says: "We had earlier been asked to survey the building for replacement of the 15-year-old R410A system. We were asked about the possibility of an R32 system – and we said: 'Daikin can do it.'"

In addition to the sustainability benefits of R32, Daikin VRV5 systems incorporate Shirudo technology which ensures safe deployment of refrigerants. Its branch selector boxes – which enable the three-pipe DX system to deliver heating and cooling simultaneously to different branches – have been specially designed for R32 and incorporate automatic shutoff valves for each branch to prevent loss of refrigerant.

Code	Description	No of units
REYA-A	VRV5 outdoor unit (primary)	1
REMA-A	VRV5 outdoor unit (secondary)	1
BS10A14AV1B	Branch selector box	1
FXAA–A	Wall mounted indoor unit	2
FXFA-A	Roundflow cassette	7
VAM-J8	Heat recovery ventilation unit	3
BRC1H52W	i-Touch Manager	10
DCM601851	I-Touch Manager	1
DMS502A51	BACnet Interface	1



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