

## Case Study

# Devon hospital gets ready for a low carbon future

When a secure hospital facility in Devon needed to replace an aging heating and cooling system, the NHS Trust involved needed a reliable and sustainable, low carbon solution.



With the site located less than a mile from the sea, the existing units had become unreliable because of the high salt content in the atmosphere and the Trust needed a suitable replacement that could not only cope with a harsh environment but also had a strong emphasis on energy efficiency, reliability and in-built resilience.

The Trust also needed it to be fitted and supported by a manufacturer that could deal with every aspect of the design in a secure, restricted facility and cope with the M&E and plumbing installation involved in the on-site works.

“The energy costs for the old chillers were increasing significantly year on year and they were becoming more unreliable, so we needed to replace the system and wanted a low carbon solution” explained Collette Germon, Sustainability and Energy manager for the Trust.

“Devon Partnership Trust is working in line with the wider NHS target to meet net zero by 2040 so that means we will be reducing our carbon footprint in line with the detailed Green Plan that we’ve set out” added Collette.

The solution involved three e-Series EAHV1500 YCL modular heat pump units for the heating and two e-Series EACV1800 YCL modular chillers for the cooling. Mitsubishi Electric provided a full mechanical, electrical, and plumbing (MEP) design package, as well as an extended 7-year warranty and a full service and maintenance contract for the equipment.



Devon Partnership NHS Trust, Langdon Hospital Dawlish is a medium secure facility located near to the seaside town of Dawlish in southwest England.

The Dewnans Centre is part of the secure services located within the hospital grounds.



“In the winter months we have underfloor heating which the e-Series manages and in the summer months we have underfloor cooling from the system,” said Rod Butler, Estates Officer, Langdon Hospital.

The Centre has 60 beds spread over four wards - Ashcombe, Holcombe, Warren and Cofton. Here the Trust provides medium secure accommodation for men with mental health needs. There are also critical rooms that require 24/7 cooling and heating. Given the sensitivities of a medium security facility, special attention had to be paid to the safety of both patients and contractor staff.

This meant strict site-specific rules that needed to be adhered to at all times, with special attention to how the team was to interact with patients, restrictive working activities and managing the movement of both plant and equipment.

Rod added: “We were looking for a manufacturer that could offer an extended warranty and help with readily available spares should any part ever fail. We’ve worked with Mitsubishi Electric for a number of years so the natural thing to do was to take their advice on the equipment that we should be installing”.

Paul Lewis, Turnkey Contracts Manager at Mitsubishi Electric visited the site to meet with Rod and together, they looked at the different available options before running a desktop exercise to demonstrate the suitability of the e-Series units.

“This was a full turnkey project for us encompassing everything including design, equipment selection, and upgrade of mechanical and electrical items associated with that plant,” explained Paul.



Paul and his Turnkey team collaborated with an M&E designer who undertook a front-end engineering review of the existing M&E infrastructure. This was to assess suitability for the e-Series chiller, and to highlight and provide solutions to any inherent issues within the existing system.

The project was carried out under CDM (Construction Design Management) where Mitsubishi Electric was appointed by the NHS Trust as Principal Contractor.

“The new system is fully inverter-driven with inverter fans and inverter compressors, which is much more energy efficient than the previous system,” added Paul Lewis.

Three EAHV1500 heat pumps deliver heating to the underfloor circuit while two EACV1800 chillers provide chilled water to the circuit during summer months. To reduce both cost and installation time, the units were connected together using the e-Series unique internal header, which removes the need for separate piping connections, valves and commissioning.

“The maintenance of the chillers is now only 6 monthly rather than four times a year, which brings down the general running costs for maintenance”, explained Graham Martin, Maintenance Manager at Mitsubishi Electric. In addition, all parts are kept in our Milton Keynes warehouse on 24 hour delivery, so in the unlikely event that there was a fault we can be fixing it the next day”.

The e-Series units were also sent for special ‘Blygold’ treatment to the condenser coils and panels. This added extra protection against the harsh, saline atmosphere of the coastal location. The previous heat pumps had on-board pumps which had been very difficult to access due to their location. With the new design, two sets of Grundfos twin-head inverter pumps were installed in an adjacent plantroom along with local primary circuit flow and return pipework.

“It’s early days and we’ve yet to see the savings that can be made but we’ve already seen an overall reduction in energy consumption so we are very hopeful that, in addition to reducing carbon emissions, we will also be reducing our running costs,” ended Collette Germon.



# Installation Summary

## Outdoor Units:

X 3 e-Series EAHV1500 YCL modular heat pump units

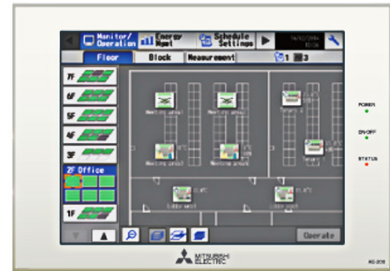
X 2 e-Series EACV1800 YCL modular chillers

e-series



## Controls:

X 1 AE200 centralised controller

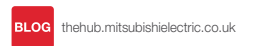
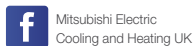


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Note: The fuse rating is for guidance only and please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R290 (GWP:3), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R454C (GWP:148), R1234ze (GWP:7) or R1234yf (GWP:4). \*These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.826/2011 from IPCC 3rd edition, these are as follows: R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

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