

TROX AIR CONDITIONING SOLUTION PERFECT FOR PRESTIGIOUS CENTRAL LONDON REVITALISATION PROJECT

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date

28.06.2019

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company / press / products / projects

For the prestigious redevelopment project at 21 Dartmouth Street, London, a premium occupant experience was essential to complement the enviable location. The installation of a TROX air conditioning solution, including TROX X-CUBE air handling units (AHUs), and X-AIRCONTROL modules, with the X-AIRCONTROL Zonemaster, is enabling the building to achieve outstanding levels of efficiency alongside elite levels of comfort.

The 21 Dartmouth Street building is situated in the heart of St. James's Park, between Buckingham Palace and the Palace of Westminster, a short stroll from Sloane Square's series of specialist boutiques. The address features a magnificent new rooftop, a majestic lobby and modern business amenities befitting its architectural grandeur. A total of 53,000 sq ft of office space is offered across nine floors, naturally commanding an extremely high degree of occupant comfort.

When specifying the air conditioning system for the building, the main contractor, mac group, and their M & E services consultants, Max Fordham, required a solution which would combine optimum comfort conditions with outstanding environmental performance. The solution, provided by air conditioning specialists TROX UK, incorporates precision-engineered air handling units, and provides the latest VAV capability featuring advanced zone control technology to deliver best-in-class energy efficiency and occupant comfort.

Air handling

At the heart of the system are two TROX X-CUBE air handling units. Each X-CUBE incorporates TROX's integrated controls package, whereby damper actuators, pressure, temperature and humidity sensors, as well as heat recovery control and fan control strategy, are linked into the X-CUBE digital control network. Both units incorporate thermal wheels with pre-programmed strategies, selected to meet BVU efficiency in accordance of the ErP 2018 standard. This is the highest level of smart technology, combining pre-set algorithms, developed by TROX, to facilitate rapid reactions to changes in building load.

Zone-based VAV control

To deliver outstanding levels of comfort and energy efficiency, the system utilises TROX's X-AIRCONTROL variable air volume functionality. This is integrated seamlessly with the X-CUBES and with a TROX X-AIRCONTROL Zonemaster to address the needs of the different occupied spaces across the site. The building is divided into 20 X-AIRCONTROL zones, each of which has a TROX TZ-Silenzio supply controller and a TROX TA-Silenzio extract controller. The X-AIRCONTROL zone modules combine information from humidity, temperature and PIR sensors and ensure the perfect interaction of all air handling components in a room. The system recognises all digital sensors automatically and uses measured values to initiate control procedures.

The X-AIRCONTROL modules also collect information from air quality (VOC) sensors, which can be an invaluable tool in refurb projects, where large amounts of volatile organic compounds can remain present due to new furnishings/fittings and decorative work. Whilst the VOC sensor does not measure CO2 directly, it measures VOC's exhaled by human beings which are directly proportional to the amount of CO2 exhaled. The VOC sensors detect many potentially harmful compounds (unlike simple CO2 sensors) and can communicate with the system to change the air flow rates, increasing them until acceptably low VOC levels are reached, and reducing again once the compounds have sufficiently dissipated. For a prestige office project such as 21 Dartmouth Street, this monitoring of VOC levels was vital to avoid poor ventilation and its negative impacts on productivity for building occupants.

The 20 zone modules are integrated with the TROX X-AIRCONTROL Zonemaster. This is an intelligent controller which provides a single point connection to the BMS for all of the zones via Modbus TCP or BACnet IP. For larger systems it is possible to connect five Zonemasters together

creating a network of up to 125 zones. All configuration of the zones can be achieved easily using the on-board web server located on the Zonemaster. It simply requires a web browser for access, and no specialist skill sets or specialist software are necessary.

Energy efficiency and acoustics

Inherent within the TROX system supplied for 21 Dartmouth Street is a fan optimisation strategy, controlling fan speeds based on damper blade position, which enables energy consumption to be reduced significantly. The Zonemaster monitors the position of all damper blades on the system and adjusts fan speeds in response to changing demands in each zone of the building, ensuring that fans are never operating at a higher level than necessary to meet demand. This provides significant energy savings compared to conventional fan speed control where the fan is commissioned to deliver a maximum system pressure at all times. Another advantage of the reduced system pressures/fan speeds is a reduction in noise, providing acoustic levels that are ideal for office applications.

Practical considerations

To ensure that the building was ideal for IT-intensive office premises, TROX Silenzio air supply and extract units were selected for each zone. These units can obtain an accurate airflow measurement without the requirement for lengths of straight air duct in advance of each module. This reduces the space and ducting requirements, making it much easier to integrate the units in a congested ceiling space.

Ian Thomas, Product Technical Manager – Air Products at TROX UK, commented, ‘Increasingly, designers of HVAC systems for prestige commercial properties are exploiting the advanced control capabilities incorporated into the air handling equipment itself. This provides an extremely effective alternative to bespoke programming of the BMS, and delivers increased levels of zone-based control for occupants of the building. The 21 Dartmouth Street project is an excellent example of this approach, and we are proud to have played our part in the redevelopment of this prestigious site.’

Photography by Nicholas Worley

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TROX is leading in the development, manufacture and sale of components, units and systems for the ventilation and air conditioning of rooms. With 27 subsidiary companies in 25 countries on 5 continents, 14 production facilities, and importers and representatives, TROX is present in over 70 countries. Founded in 1951 and with a staff of 3,750 employees around the globe, TROX, whose international head office is in Germany, generated revenues of nearly €500 million in 2017.

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