

## Toshiba Solutions Data Server Room Application

### The Project Team

- End-User
- Design Consultant
- Main Contractor
- M&E Contractor

### Application Details

- HQ Offices Central London
- 7No 2-Pipe Heat Pump Systems
- 34No Indoor Units
- Trend BMS Control
- Toshiba System & Control Commissioning
- 7Yr TPM Warranty



### The Challenge

The main emphasis of this project was to supply an air conditioning solution that was both resilient and could provide sufficient cooling capacity to each server room.

As the air conditioning systems provided cooling for critical server rooms they needed to be able to operate with an N+1 resilience in the event of an indoor or outdoor unit failing, this was a key requirement of the consultant's performance spec. There were also additional challenges regarding the BMS control of the system, where system fault and remote temperature control was required, plus the issue of limited void space to locate indoor air conditioning units due to raised floors in the server/data rooms. Outside of the system performance and control the end client also wanted the peace of mind that the new air conditioning systems could provide reliability during the operational period of the system's life.

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### The Solution

As detailed in the project challenge Toshiba had a number of application issues to overcome in the design of our air conditioning system, ranging from capacity back up and BMS control of the system to indoor unit selection type and system longevity.

To overcome these challenges Toshiba selected the energy efficient SMMSi heat pump VRF system providing **SEER/SCOP ratings of 6.37/5.02**. The capacity of the VRF systems was oversized to provide N+1 capacity, as Toshiba have the ability to continue to run the outdoor units even if a compressor failure due to the unique dual twin rotary compressor technology, whereby each outdoor unit has three individually controlled compressors. To overcome the issue of the restricted void space and to make sure units were not located above critical servers where any potential condensate leaks could cause fatal damage to them, floor mounted cabinet style indoor units were used. These units also helped with air distribution as the air is discharged from the top of the unit.

With regards to the BMS control of the air conditioning systems where connection was required onto the existing Trend controls platform, Toshiba selected their **Black Pear** controls solution to connect to this. This solution also provided the added benefit to the end user that in the event of the BMS controls failing the system could still be controlled via the Black Pear as it also acts as a central control device for the air conditioning system.

Finally to demonstrate that the product selected was reliable and that the client would have the knowledge that the system would remain operational in years to come, Toshiba (with a failure rate of **0.03%**) gave the client a 7yr parts and labour allowance on this project.

#### Seasonal Energy Efficiency Ratio (SEER's)

Total Project Cooling Output	Q	478.00	358.50	239.00	119.50	
Total Compressor & Outdoor Fan Power Consumption	W	138.00	68.23	32.15	14.60	
Overall Energy Efficiency Ratio		3.44	5.25	7.43	8.00	SEER
Load Profile - Unknown		25%	25%	25%	25%	6.03
Load Profile - General Office Type Accommodation		12%	32%	36%	20%	6.37
Load Profile ESEER - User Defined		3 %	33 %	41 %	23 %	6.73

#### Seasonal Co-efficient of Performance (SCOP)

Total Project Heating Output	Q	396.40	380.00	267.30	133.65	
Total Compressor & Outdoor Fan Power Consumption	W	128.00	81.48	48.22	23.06	
Overall Energy Efficiency Ratio		3.10	4.67	5.54	5.80	SCOP
Load Profile - Unknown		25%	25%	25%	25%	4.78
Load Profile - General Office Type Accommodation		12%	32%	36%	20%	5.02
Load Profile ESCOP - User Defined		3 %	33 %	41 %	23 %	5.78

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### How it all Works



#### Toshiba SMMSi VRF Heat Pump System

Toshiba's leading innovation 2-Pipe VRF Heat Pump systems were utilised to provide both energy efficient SEER/SCOP figures and also provide the ability of the system to operate even if a compressor fails to provide system capacity. This is achieved by using unique twin rotary inverter controlled compressor technology. As a result by increasing the capacity size of the outdoor units, N+1 was achieved without the need to double the outdoor unit foot print. In total Toshiba installed 5 x MMY-AP2614HT8-PE, 1 x MMY-AP2414HT8-PE & 1 x MMY-MAP1604HT8-PE systems

#### MMF-AP0564H-E

To over-come the void height issue and not being able to have air conditioning units installed over the top of the data servers, plus the restrictions on floor space, Toshiba were able to offer the Floor Mounted Cabinet Unit. With a height and depth of only 1750mm & 390mm respectively this unit provided the ideal solution to these issues. The units also provide excellent top air distribution that enables the air flow to blow directly across the data servers. In total 26 Floor Cabinet units were installed ranging from 8 to 16kW cooling capacity.

#### Floor Mounted Cabinet Unit



#### RBC-BPT1 - Black Pear Trend Control

The specified controls platform for this project was Trend BMS protocol. Toshiba's new Black Pear controls interface was therefore selected, this controls interface comes in a number of alternative controls protocols including Trend, Modbus & also BACNet. The controller is simple to set up and address. The added advantages that the end-user gains from this BMS interface is that it can also be used as a simple central controller in the event of the BMS failing.

#### Toshiba 7yr TPM Warranty

In addition to the air conditioning equipment selected to meet the requirements of the consultants specification, in support of the quality claims on the Toshiba equipment the end-user was provided with a 7yr TPM Warranty. As part of this 7yr warranty offering Toshiba supplied both air conditioning and controls system commissioning support with all commissioning documents being checked and signed off by our Technical Support Team.



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## Toshiba Services

Our vision is to be the No 1 supplier in the UK of the most technologically innovative, energy efficient and environmentally friendly comfort cooling solutions, combined with a first class level of customer support

Providing a number of key services to our customer, these include the following:

- **Spare Parts Availability**—Large stock, European warehouse based in the UK offering a 24hr turnaround from point of order, including online parts availability check and ordering.
- **Pre-Sales Support** - Offering project support and assistance, equipment schedules, mechanical and electrical schematics and equipment selection.
- **Dedicated Training Sessions** - Training sessions are offered to our customers throughout the year and cover all elements from design and application, installation through to servicing and fault finding. The extensive programme can be delivered at one of our dedicated centres free of charge or at the customer's site or premises.
- **Controls** - Full support with an extensive range of standard control systems, bespoke controls and full site support functions to maximise efficiency.
- **Additions Loyalty Scheme** - The original and best scheme in the industry offering the most innovative customer reward scheme that sets the bar in terms of support.
- **Energy Efficient** - Industry leading SEER & SCOP figures on our range of equipment, and a commitment to continuous development of energy efficient sustainable solutions
- **Warranty** - The only air conditioning manufacturer to offer a TPM (Total Peace of Mind) warranty scheme, which emphasises our commitment to our customers and confidence in our equipment, with up to 7 years available with full labour content.
- **Technology** - Leading innovation by introducing reliable, innovative and cutting edge technology in to our air conditioning systems.
- **24 Hour Helpline** - The only manufacturer in the UK to offer a 24hour, 7 days per week technical helpline where you can speak to a trained engineer for support as well as offering a full fault code text back service.
- **Support Tools** - We offer an extensive range of easily accessible support tools including smart phone apps and web based solutions.
- **Network** - A nationwide distribution network, providing easy access to Toshiba equipment, spares parts and services.
- **Technical Engineering Team** - An extensive range of site services available through our fully trained and highly experienced technical engineering team.
- **Carbon Neutral** - Toshiba are the only Carbon Neutral manufacturer of air conditioning products in the UK.
- **Leak Detection** - Toshiba provide the industry's only leak detection system capable of providing Bream points.

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