



# ARTS CENTRE

## Melbourne

### *Johnson Controls upgrades chiller and boiler system for Arts Centre Melbourne*

Located in Southbank overlooking the Yarra River, Arts Centre Melbourne is Australia's largest performing arts venue, including three theatre spaces and a concert hall. Arts Centre Melbourne recently completed an upgrade of its chiller and heating hot water systems - an eighteen-month project that commenced in January 2016.

Johnson Controls was appointed by Arts Centre Melbourne to manage the project, which involved removing all end of life equipment, refurbishing the plant room, installing six YORK chillers and two natural gas burners. Two boilers and six cooling towers were also refurbished and a CPO 10 Plant Manager system integrated to automate the chiller plant room.

This major project came with many challenges as the entire system needed to remain fully operational while the work was carried out. Johnson Controls was also required to collaborate with the National Gallery of Victoria as Arts Centre Melbourne supplies the gallery with chilled and heated hot water. This meant taking into consideration major events that were being hosted at the time, which was particularly important for the National Gallery of Victoria due to strict guidelines with space conditions for its valuable, priceless artworks.

The busy St Kilda Road location also presented a number of challenges which included managing large deliveries, craning and rigging, and at times overseeing road closures.

## 1

### THE BRIEF

Johnson Controls was awarded the Arts Centre Melbourne project following a competitive tender process. The project included the decommissioning all end of life equipment, installing a new chiller

plant, refurbishing the heating hot boilers and modernising the heating hot water distribution system. Additionally, the large mechanical plant inside the basement plant room was to be demolished and a new direct digital control (DDC) plant manager system integrated with an existing Honeywell building automation system. It was also imperative that the system remained operational throughout the project.

## 2

### THE DECOMMISSIONING PROCESSES

Johnson Controls decommissioned the chillers in stages to ensure that the installation of large components was managed efficiently and

that the system was able to function while the project was being carried out.

To allow Arts Centre Melbourne to continue supplying water to the National Gallery of Victoria, Johnson Controls began the preparation work and boiler refurbishment during the warmer months.



As the weather cooled, the six chillers were decommissioned two at a time, along with associated pumps and pipework. The two new chillers and equipment were installed and fully operational before the next two chillers were withdrawn from service. This process helped control the site conditions and minimise disruptions.

## 3

### THE EQUIPMENT

The Johnson Controls YORK YMC2 1800kW magnetic bearing centrifugal chiller was chosen for its superior energy efficiency and flexible control options under different loads. Arts Centre Melbourne had YORK chillers

installed previously and wanted to remain with the YORK brand for the new upgrades. A Johnson Controls Chiller Plant Optimizer (CPO 10) was selected for optimal efficiency.

Replacing the chiller plant involved managing many large components including:

- 6 x new 1800 kW York YMC2 variable speed centrifugal water-cooled chillers with a total plant capacity of 10,800kw
- 12 x new primary chilled water pumps with two new condenser water pumps
- 9 x new secondary chilled water pumps
- Primary control system integration
- Chemical treatment system
- Refurbishment of six cooling towers located in the forecourt of the National Gallery of Victoria
- Side stream filtration system and condenser water treatment upgrade
- Chilled water pipe work replacement from primary header isolation point to chillers only.

A new high-performance, energy-efficient heating hot water loop was also installed, consisting of:

- 2 x new natural gas fired variable speed enterprise burners (boiler 3 being a dual fuel diesel) with a total plant capacity of 7,200kw
- 3 x new primary heating hot water pumps
- Refurbishment of boilers 1 and 3 including new stay and flu tubes
- Air dirt separator
- Pipe work alteration to create a primary and secondary system.

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## 4

### THE OUTCOME

Johnson Controls Australia successfully completed this project within eighteen months, while keeping the central plant rooms for both Arts Centre

Melbourne and the National Gallery of Victoria fully operational throughout all seasons with minimal disruption.

Due to the number of technical and logistical challenges, a high level of engineering expertise was required as was meticulous project management. There were up to twenty sub-contractor companies working simultaneously on site, which the Johnson Controls team was required to work around.

According to Jim Grayson, Buildings Engineer at Arts Centre Melbourne, “This was a major project for us and we’ve been suitably impressed with Johnson Controls. They’ve been a pleasure to work with and remained flexible, solutions focused and cooperative – nothing was too hard for them.”

“While the assets had reached the end of life phase, we took the opportunity to push for energy savings and given the size of the plant and equipment, we’ve achieved a very positive outcome.”

Arts Centre Melbourne is now enjoying the benefits from the new equipment installation, which is delivering greater energy efficiency. The YORK chillers alone are saving the venue approximately 1,029,234 kWhrs (November 2016 to June 2017) – an average of 27 percent in energy reduction.

This project was one of the largest retrofit projects undertaken by Johnson Controls Australia, and was symbolic as it was the 100th YORK YMC2 chiller installed in Australia, a testament to the YORK brand’s reliability and superior performance.

