

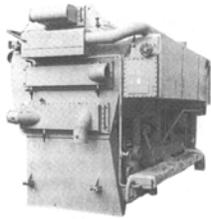
# YORK® INNOVATIONS IN ABSORPTION TECHNOLOGY

## LEADING THE INDUSTRY IN ABSORPTION COOLING AND HEATING SOLUTIONS

Johnson Controls absorption cooling and heating technology has been proudly serving the global market since the 1960s with more than 25,000 units shipped. For decades, our engineers have been the innovators, resulting in a long list of "firsts," including more than 80 patents like the first patented parallel flow cycle, double-effect steam chiller and the first type-I (heat amplifier) heat pump.

Today, we continue to invest in technology innovation. We provide our customers with the most advanced YORK® absorption chillers and heat pumps, combined with best-in-class manufacturing and our global service and parts network.

### Here are just some of the technology milestones:



**1972**

The first patented parallel flow, double-effect steam chiller



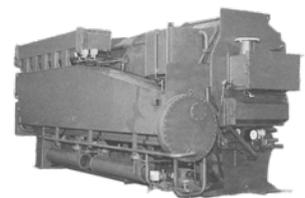
**1976**

Liquid (water) tube type high temperature generator, direct fired



**1980**

Small direct-fired 105 kW



**1981**

The first type-I heat pump



**2000**

The first low evaporator leaving temperature  $-5^{\circ}\text{C}$



**2001**

The first 2-step evaporator-absorber technology, highest efficiency (COP 1.5) for direct fired (EX)



**2012**

The first gene-link direct gas-fired + double-effect steam + hot water



**2017**

The first single-effect double-lift with 2-step evaporator and parallel flow cycle

## A HISTORY OF INNOVATION

In 2015, Johnson Controls and Hitachi Appliances created Johnson Controls-Hitachi Air Conditioning, which was comprised of the Hitachi Appliances' air-conditioning business, including absorption chillers and heat pumps.

In 2017, Johnson Controls completed the acquisition of the Johnson Controls – Hitachi Air Conditioning absorption chiller and heat pump business, gaining the design and engineering teams and all intellectual property related to absorption chillers and heat pumps.

The outcome is a portfolio of more than 450 YORK® absorption chillers and heat pumps featuring groundbreaking technology that has served global markets since 1960 – and continues to serve those global markets today. As a result, we've invested in our Johnson Controls Wuxi factory for multiple state-of-the-art test blocks. This gives us the ability to test chillers with a variety of driving heat sources and global test (rating) standards, supported by global engineering teams located in Japan, China, USA and Mexico.



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