NORTEK™
DATA CENTER
COOLING

StatePoint®

Indirect Cooling Technology

Nortek StatePoint Indirect Cooling Technology, a patented innovation by Nortek, is an industry-first in data center cooling.

StatePoint systems lower power and water usage by as much as 30%.

KEY ADVANTAGES AND CORE BENEFITS

- 20 to 30% reduction in the annual power consumption over existing technologies
- 20 to 30% reduction (or more) in annual water consumption
- Significant reduction in peak power consumption
- Reduces or eliminates mechanical cooling in most locations
- Simplified installation of packaged cooling system is ideal for multi-story and high-rise buildings
- Flexible packaging for penthouse constructions
- Reduces maintenance and operation cost vs. chilled water/cooling tower design
- Indirect system minimizes fluctuations in data center humidity and protects against contaminants
- Contains no refrigerants
- Lowered/reduced CO_2 emissions
- Controls and wetting/process pumps are self contained in the unit
- Glycol-free unit
- Membrane technology eliminates legionella risks
- 40 to 60% reduction in peak 24-hour water storage tanks over cooling towers
- Noise reduction and the ability to operate in “whisper” mode
- FANWALL® array with EC motors providing best in class performance

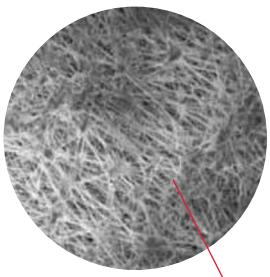
MEMBRANE EXCHANGER (SPEX)

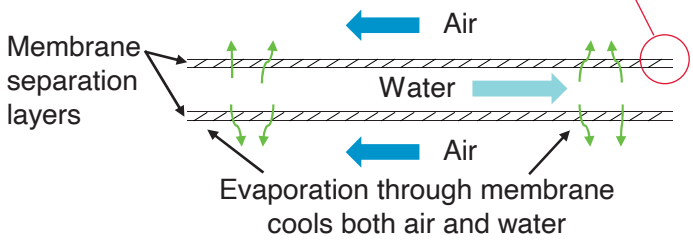
StatePoint® breakthrough membrane exchanger technology enables evaporative cooling through a microporous membrane.

TECHNICAL ADVANTAGES

- Multiple patents awarded or pending
- High cooling performance in a compact exchanger – cooling is produced in both the air and water flow
- Thin, flexible, hydrophobic membrane is highly resilient to scale formation and poor water quality
- Water flow is sealed behind the vapor permeable membrane eliminating water carryover into the air stream
- Eliminates aerosols and plume from unit exhaust
- Exchanger is configured for horizontal airflow and can be packaged into conventional air handling units
- Membrane can use reclaimed water when necessary

heat exchanger





FLEXIBLE CONFIGURATION

StatePoint® is specifically designed for minimal impact to data center designs. It is the ideal cooling solution for new buildings, hyper-scale and other perimeter space-available environments.

The StatePoint cooling solution is ideal for data centers that are located inside larger buildings, as well as space-constrained environments such as city-center locations.

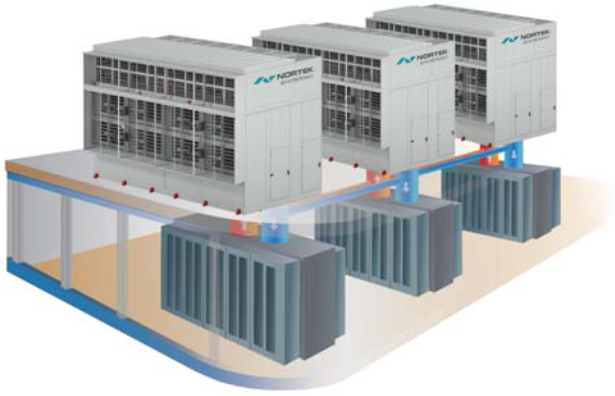
StatePoint features a self-contained configuration that includes all necessary components. This includes all required pumping and water management controls along with piping infrastructure, minimizing the piping work required onsite.

THE END-ON UNIT

The ideal cooling solution for new builds, hyperscale and other perimeter space-available environments.

THE ROOFTOP UNIT

The optimal solution for data centers located inside larger buildings and space-constrained city center environments.



THE STACKED UNIT

Stacked units are a logical choice for multi-story environments. Because it offers different size solutions, Nortek StatePoint can meet your flexible configuration needs.

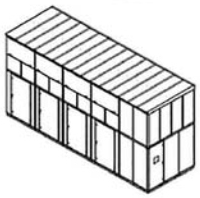
Multiple Options to Deliver Cooling to IT Equipment.

- Cooling water can be supplied to a number of different cooling delivery methods
- Supports flexible cooling delivery and rapid deployment architectures
- Allows for higher density server configurations

Nortek StatePoint Indirect Cooling Technology has four modes of operation – no mechanical cooling (DX) required.

Cold Plate

Rear Door HX



Modular Data Centers

Computer Room AHU (CRAH)

Coil Wall

Hot Aisle Enclosure w/ FANWALL

Operating Modes.

WINTER RECIRCULATION

During freezing conditions, warm exhaust air is mixed with entering outdoor air to maintain above-freezing conditions in the StatePoint cabinet. The heat recovery coil is used in conjunction with Nortek FANWALL TECHNOLOGY® for cooling.

DRY MODE

The recovery coil is used for cooling. Air is allowed to bypass the StatePoint heat exchanger (SPEX) to maximize PUE and reduce wet mode operating hours.

ADIABATIC

The SPEX and recovery coil are used together to evaporatively cool the intake air. Some air is bypassed around the SPEX to maximize water efficiency when some evaporative cooling is needed.

EVAPORATIVE

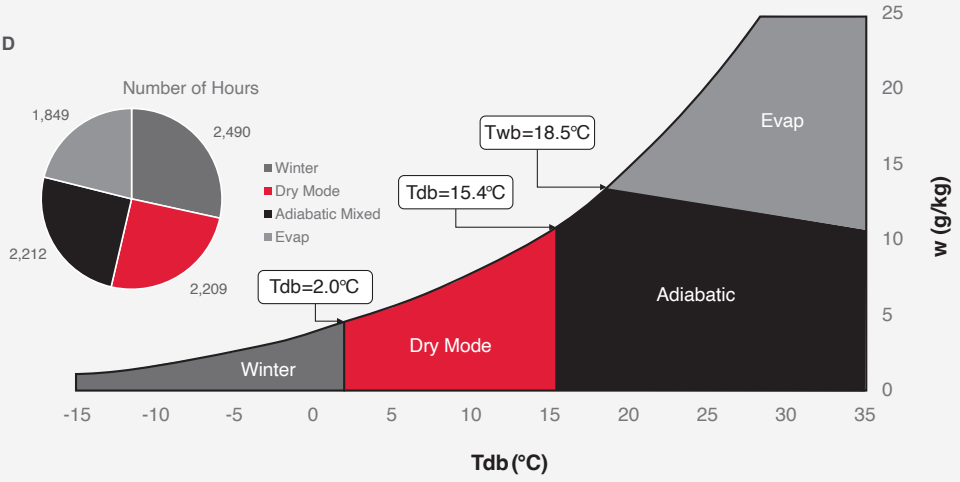
This is the most powerful cooling mode used when maximum cooling capacity is needed or to reduce PUE. It is used during peak outdoor air conditions. It can also be used to reduce energy consumption when PUE is prioritized over WUE. The SPEX is used to evaporatively cool the supply water.

StatePoint Operating Modes continued.

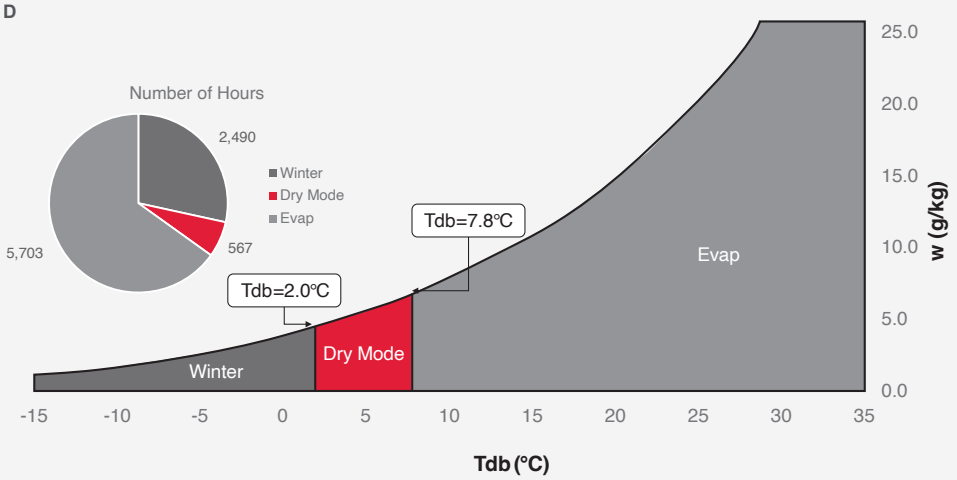
- High-efficiency membrane exchanger improves unit wet bulb effectiveness and capacity
- EC fan technology delivers industry-leading fan efficiency
- Compact unit design reduces unit size and weight
- Dry mode operation for up to 85-95% operating hours depending on climate zone
- Smart controls enable several WUE-optimized and PUE-optimized modes
- Flexibility of supply water temperature (55-85°F) depending on heat loads and outdoor air conditions
- Integrated heat recovery coil for improved wet mode water usage efficiency over other cooling technologies
- The majority of the year is spent in economizer mode with the membrane exchanger off and drained

Example of Operating Hours: Cheongju, South Korea

WATER OPTIMIZED



POWER OPTIMIZED



ANNUAL PUE & WUE EFFICIENCY IS SUPERIOR

Nortek StatePoint® Indirect Cooling Technology's smart controls enable a wide range of operating modes, from water-optimized to power-optimized mode.

In water-optimized mode, the system minimizes water usage and facility WUE by operating in dry mode with zero water usage for most operating hours.

In power-optimized mode, the system's highest priority is minimizing energy usage, which is achieved by additional water evaporation.

The figure below shows the wide range of pPUE and WUE that Nortek StatePoint Indirect Cooling Technology can deliver worldwide.

WATER USAGE EFFECTIVENESS (WUE)

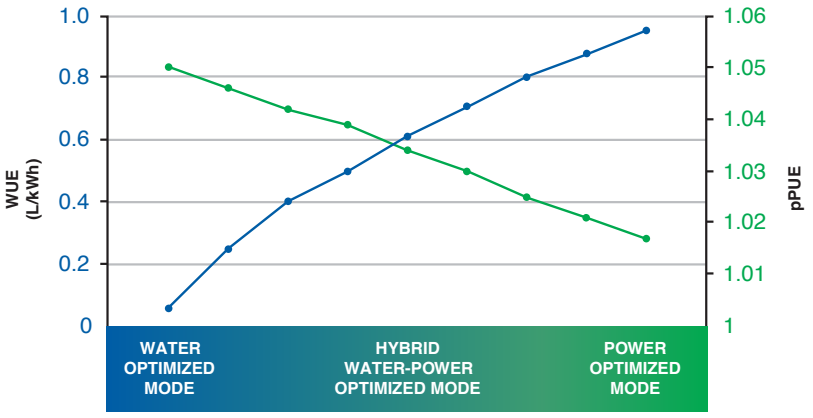
$$WUE = \frac{(\text{Annual water usage})}{(\text{IT equipment energy})}$$

is a metric that quantifies the water efficiency of a cooling system in rejecting heat load from IT equipment. The formula for calculating WUE is the annual water usage (in liters) consumed by the entire datacom facility, divided by the IT equipment energy usage (in kWh).

PARTIAL POWER USAGE EFFECTIVENESS (PPUE)

$$pPUE = \frac{(\text{IT+Cooling equipment energy})}{(\text{IT equipment energy})}$$

is a cooling energy efficiency metric that evaluates how efficient the entire cooling system (cooling units, fans, pumps, etc.) is in rejecting heat generated by the IT equipment in the data center. The formula for calculating pPUE is the annual energy consumption by IT and cooling equipment (in kWh), divided by the IT equipment energy usage (in kWh).



Superior Operating Efficiency.

20 MW data centers in various locations worldwide. Supply air temperature is 32°C (89.6°F).

WATER-OPTIMIZED MODE

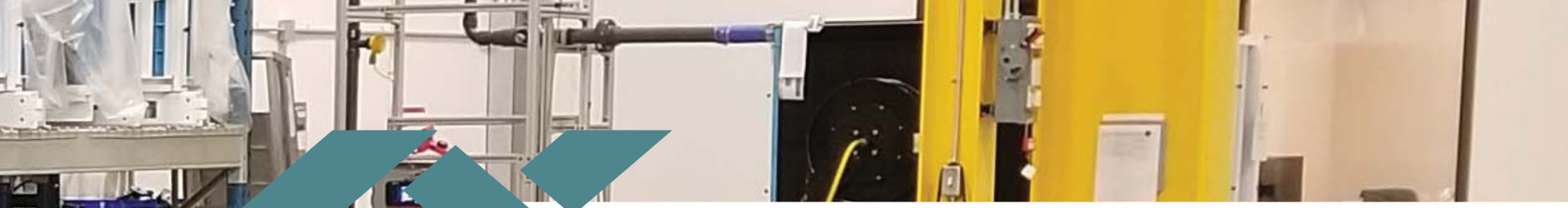
Water-optimized mode MINIMIZES water usage by:

- Maximizing dry-mode operation (due to the low DBT-approach of the unit)
- Smart controls enable hybrid wet-dry mode (hybrid wet-dry mode is a unique mode for StatePoint units)

POWER-OPTIMIZED MODE

Power-optimized mode MINIMIZES energy usage by:

- Direct evaporative cooling of the supply water that enables use of less airflow in the unit
- Smart controls enable by-pass mode (by-pass mode MINIMIZES pressure drop and fan power)



STATEPOINT® LIQUID COOLING SYSTEM

Natural Way to Cool Data Centers.

- Water used as primary cooling medium instead of air (heat capacity of water is four times that of air)
- Patented membrane exchanger allows some water to evaporate through membrane pores to cool the water
- Evaporative cooling produces cold water that cools inside air to cool the servers
- Membrane keeps the cooling water circuit separated from the air stream

Inside the StatePoint Unit

Over the past three decades, we have provided cooling solutions to mission-critical facilities. Here are examples of how we have helped data centers achieve their goals.

HYPERSCALE DATA CENTER COMPANY - DUBLIN, IRELAND

68 StatePoint units introduced significant PUE and WUE savings to a data center in Dublin.

COLOCATION DATA CENTER COMPANY - NEW YORK, NEW YORK

20 energy-efficient, direct evaporative cooling units reduced WUE and brought significant energy savings to a savings to a leading colocation data center in New York.

COLOCATION DATA CENTER COMPANY - LAS VEGAS, NEVADA

A one-megawatt, multimode cooling system now cools a cools a state-of-the art colocation data center in Las Vegas.

CLEANROOM FACILITY - HILLSBORO, OREGON

More than, 800,000 square feet of CleanPak® welded ceiling grid modules and more than 20 million CFM of recirculating air controlled by hundreds of CleanPak recirculating air handlers, maintain precise temperature and clean air requirements in a cleanroom facility in Hillsboro.

HYPERSCALE DATA CENTER COMPANY - PRINEVILLE, OREGON

Nortek patented FANWALL TECHNOLOGY® brings optimized total cost of ownership (TCO) airflow efficiency, system redundancy and minimized turbulence to the data center cooling equipment of a hyperscale data center in Prineville.

VERNE GLOBAL DATA CENTER - KEFLAVIK, ICELAND

Verne Global achieved an impressive 1.11 PUE with efficiency contributed by a unique modular free cooling system from Nortek.

VANTAGE DATA CENTER - SILICON VALLEY, CALIFORNIA

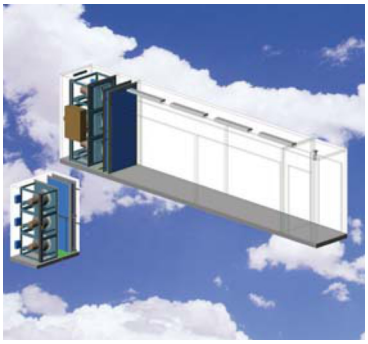
Vantage data center Mega CRAH units significantly reduced TCO for this colocation company.

Nortek Data Center Cooling Line Up.

Nortek Data Center Cooling builds thoroughly tested and proven data center cooling systems that eliminate downtime, maximize potential and minimize environmental and physical footprints in both small- and large-scale data centers. Nortek Data Center Cooling StatePoint®, ServerCool™ and FANWALL® technology deliver sustainable, efficient results that keep companies up and running.

Computer Room Air Handler (CRAH)

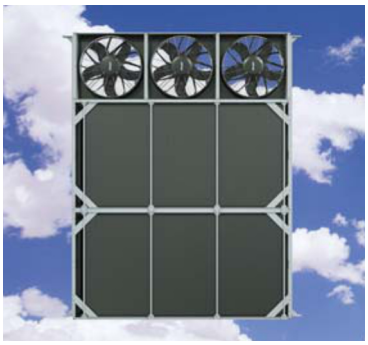
CD6 Cooling Distribution Unit



Hot/Cold Aisle Enclosures

FANWALL TECHNOLOGY®

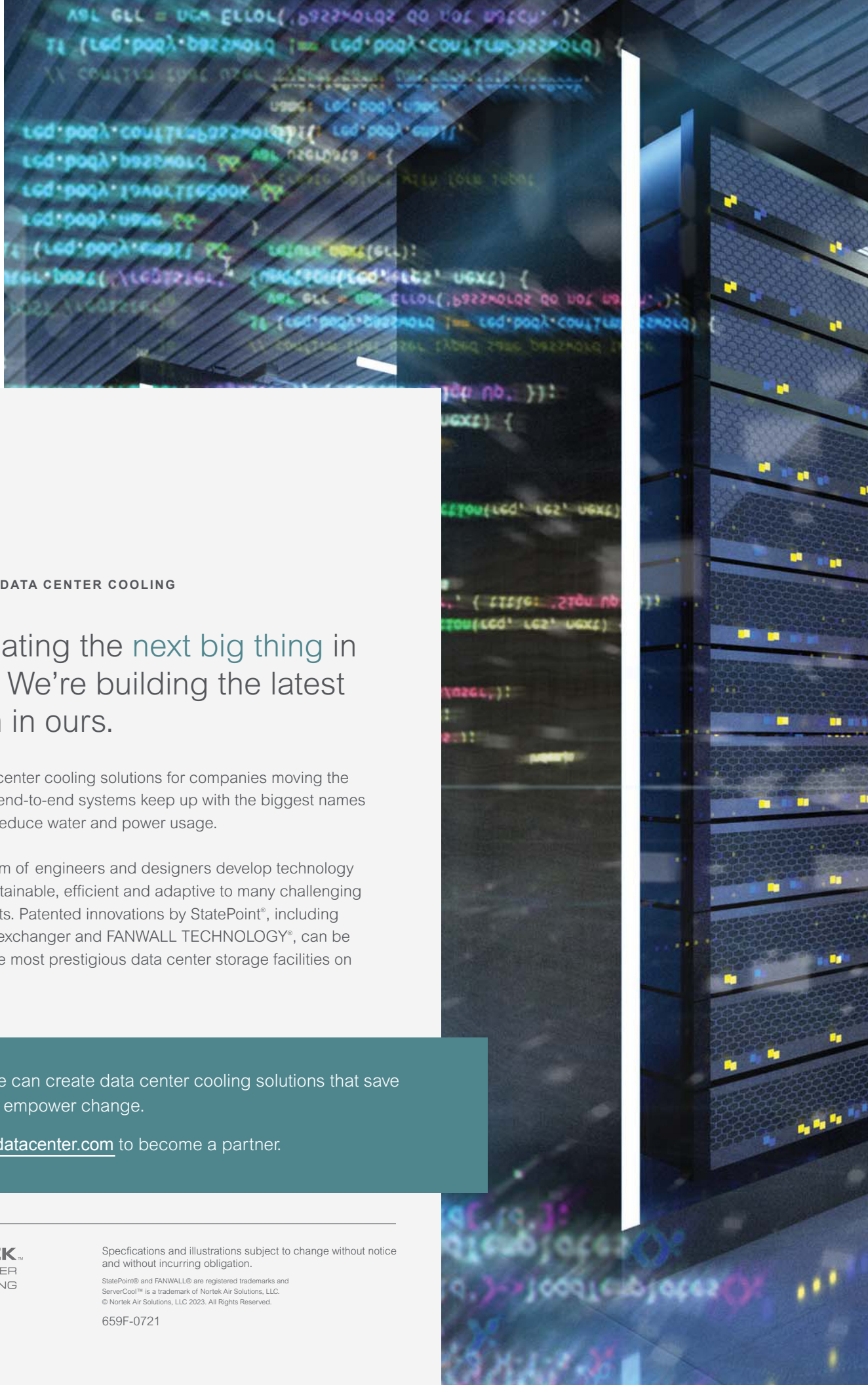
Fan Coil Wall™



Coil Wall

Custom Air Handlers and Packaged DX Units

Retrofits and Upgrades



BUILT BY NORTEK DATA CENTER COOLING

You're creating the next big thing in your field. We're building the latest innovation in ours.

Nortek builds data center cooling solutions for companies moving the world forward. Our end-to-end systems keep up with the biggest names in technology, and reduce water and power usage.

Our world-class team of engineers and designers develop technology that is effective, sustainable, efficient and adaptive to many challenging cooling environments. Patented innovations by StatePoint®, including its membrane heat exchanger and FANWALL TECHNOLOGY®, can be found in some of the most prestigious data center storage facilities on the planet.

Together, we can create data center cooling solutions that save energy and empower change.

Visit nortekdatacenter.com to become a partner.

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COOLING

Specfications and illustrations subject to change without notice and without incurring obligation.

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