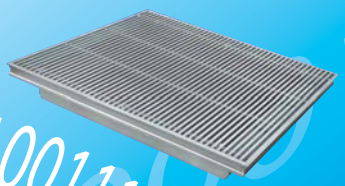
SURVEY | DESIGN | MANUFACTURE | INSTALL | COMMISSION | SERVICE

ServerCool®
An Eaton-Williams Group Brand

Blade Server & Data Room Cooling Specialists

COOLING IT



RDHx

Manufactured in the UK

Eaton-Williams®

ServerCool® Cooling IT

Cooling mission-critical data centres presents a number of challenges. With the power and heat densities of Blade Servers continuing to rise, managing the heat density and minimising the energy used for cooling are the highest priorities. After that, being future-proof and able to scale-up as the data centre evolves, are the next requirements. ServerCool® delivers all these benefits and more.

ServerCool® removes heat from the server rack at source by means of a rear door heat exchanger (RDHx). The RDHx then discharges the heat to the building chilled water system via a Cooling Distribution Unit (CDU). ServerCool® has no thermal impact upon the white space and minimal footprint. It was evaluated along with competing systems by the Silicon Valley leadership group and judged to be the most energy efficient for medium to high heat density server racks and has been shown to use just 20% of the energy used by conventional close control air conditioning unit based systems.

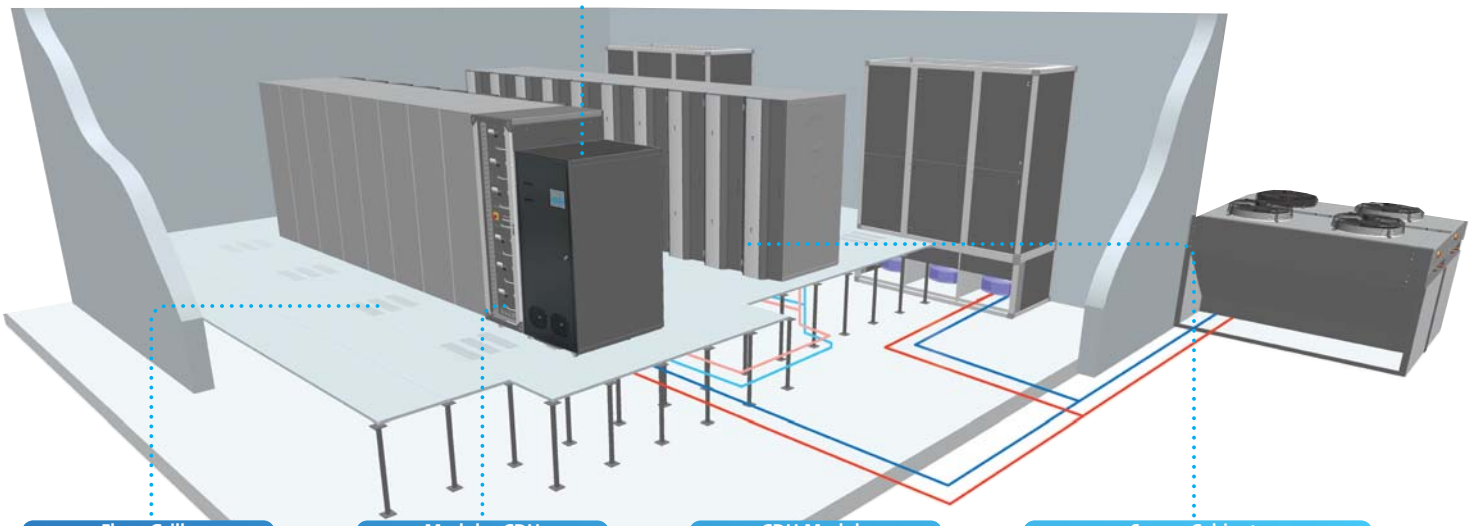
The CDU is an all important part of the system as:

- It controls the flow of clean, treated water to one or more RDHx's at above dew point to ensure condensation free operation.
- Water volume is limited to a few litres at controlled low pressure.
- Individual racks can be isolated without impacting on others.
- It has N+1 reliability built in and if two CDUs are used in tandem can provide tier 4 resilience.
- Plug and play manifold provides scalability and white space flexibility upgrade path.
- Only 5kW of power provides 260kW of cooling.

The CDU has an impeccable pedigree; it was initially developed for IBM to work with their Cool Blue® and iDataplex® RDHx's and Eaton-Williams are the only CDU manufacturer specified worldwide by IBM in their RDHx planning guides.

The complete solution for all your data centre cooling requirements:

- Rear Door Heat Exchangers (RDHx)
- Cooling Distribution Units (CDU)
- Cooling Distribution Unit Modules
- Close Control Air Conditioning Units
- Data Room Floor Grilles
- Surveys, Design, Install, Commissioning & Service



Floor Grille

Modular CDU

CDU Module

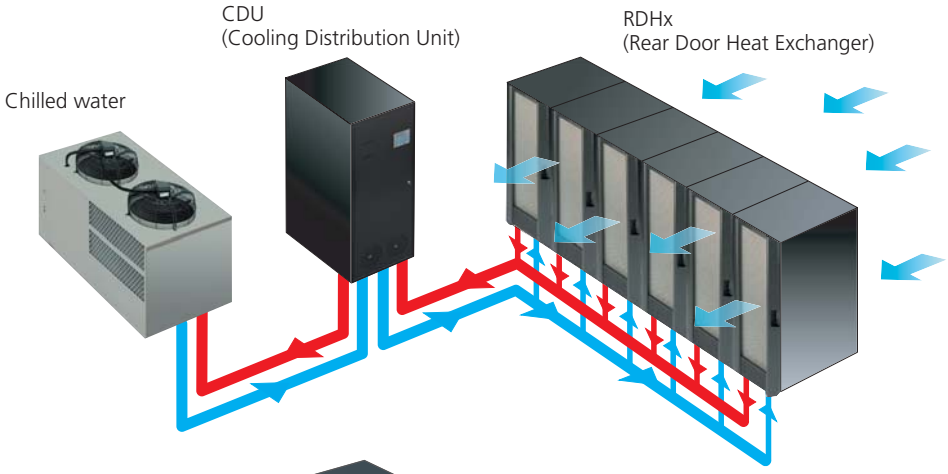
Server Cabinets

Rear Door Heat Exchangers

Removing Heat at source with ServerCool®

Up to 50kW Cooling per rack!

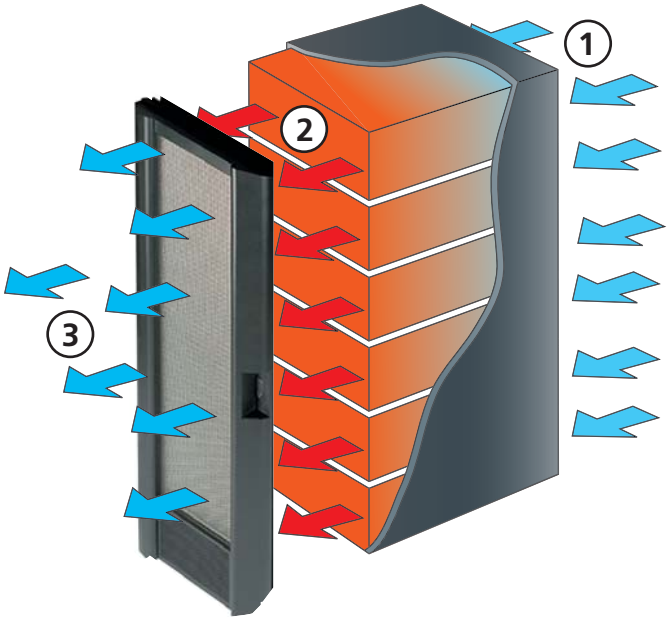
Cooling Server Racks at Source with ServerCool® is the most energy and space-efficient solution for reducing Data Centre Costs.



Rear Door Heat Exchanger

Advantages

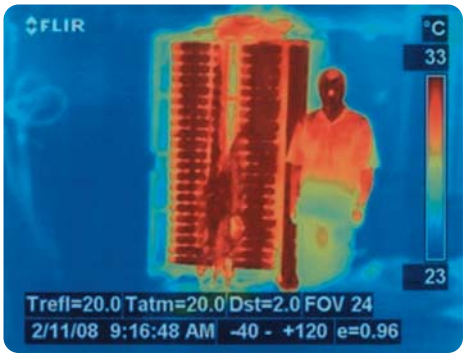
- The world's most energy efficient cooling.
- The world's most space efficient cooling.
- 100% sensible cooling – no condensate.
- Installs in minutes and retrofittable.
- Most flexible upgrade path.
- No re-arrangement of enclosures required.
- Allows up to 5 × the computer power versus air conditioning.
- Reduces cooling energy by 90% or more.
- Reduces space requirement by 80% or more.
- Reduces capital and operational TCO by 50%.
- Compatible with most enclosures and racks.
- Top feed or bottom feed connections.



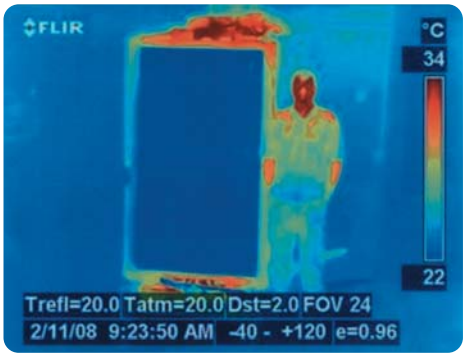
1
Ambient air enters front of cabinet.

2
Servers generate heat up to 55°C.

3
Exit air is cooled via the rear door heat exchanger and returned to data centre at around ambient temperature.



Thermal image of rear of server rack showing 32kW of heat dissipating into data centre.



Thermal image with Rear Door Heat Exchanger (RDHx) fitted showing heat neutralised at source.

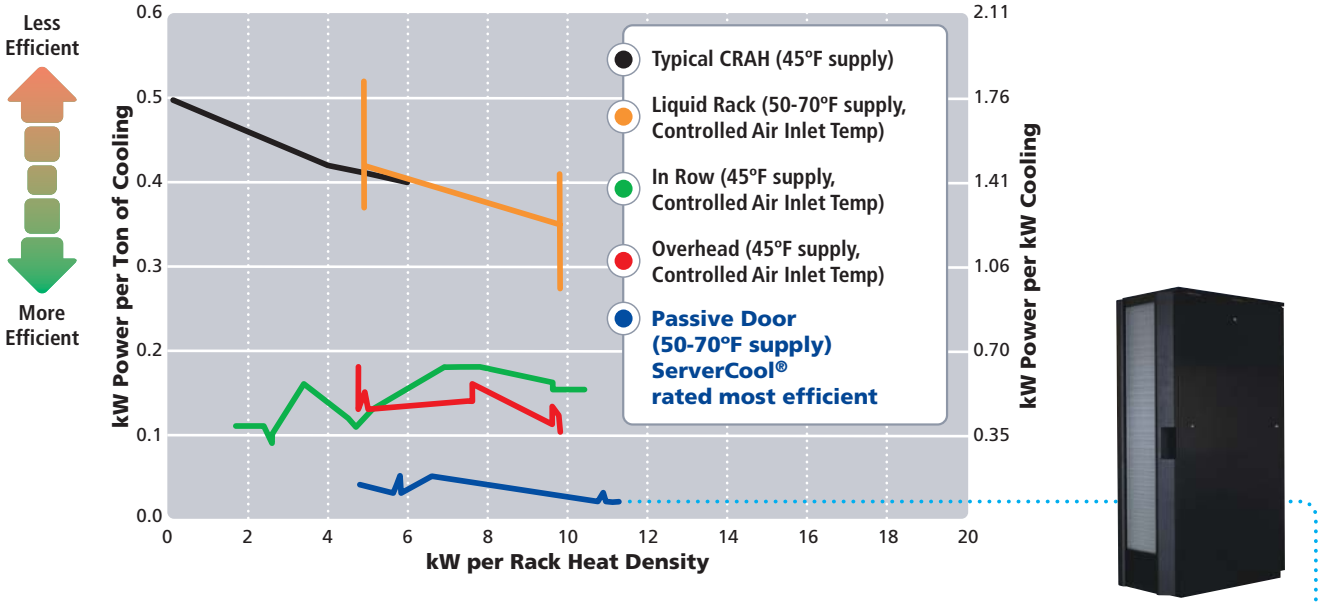
Passive RDHx
up to 30kW of cooling

Microchannel MCHx
up to 20kW of cooling

Active RDHx
up to 50kW of cooling

Silicon Valley judge Passive Door best system

The RDHx and CDU were independently tested against the five leading Data Centre cooling solutions by the Silicon Valley Leadership Group at Lawrence Berkley National Labs in California to establish an efficiency rating over a range of heat densities up to 12kW rack load. The graphic below represents the results; illustrating that the ServerCool® system is rated by far the most efficient cooling system at all heat densities.



Water Cooled System Comparisons

Water Cooled Systems	Close Control Air Conditioning Cooling	Cold/Hot Aisle Containment	In-Row Cooling	Recirculating Rack Cooling	ServerCool® RDHx's/CDU Cooling
Range of Effective Cooling (kW per rack)	0.5 - 3.0	3.0 - 12.0	5.0 - 15.0	8.0 - 18.0	**5.0 - 30.0**
Energy per 150kW Cooling (kW)	14.0	12.0	10.5	10.5	**2.8**
Approx. Capital Expenditure + Energy Cost for 150kW Cooling for 5 Years	€144,000	€168,000	€144,000	€156,000	**€87,600**
CO_2 Emissions for 150kW Cooling for 5 Years	288,204 kg	247,032 kg	216,153 kg	216,153 kg	**53,524 kg**
Footprint per 150kW Cooling (m^2)	3.35	3.35	2.25	2.0	**0.4**
Upgrade Path and Flexibility	Space Needed	Layout Restrictions	Racks need moving	Racks need moving	**Easy Retrofit**
Noise Addition in Data Centre	High	High	Very High	High	**Low**
Built-in Redundancy of Moving Parts	No	No	No	No	**Yes**
Condensate-Free Operation	No	No	No	No	**Yes**
Low (<3 bar) Operating Pressure for Safety	No	No	No	No	**Yes**
Consequence of Failure or Leak	Large Volume of Building Chilled Water	Loss of Cold Aisle Pressure and Capacity	Large Volume of Building Chilled Water at Rack	Almost Instant Server Inlet Overheat/ Shutdown	**Small Volume Secondary Water Loop, No Impact on Shut Down**

ServerCool® can save up to 80% of the energy consumed in removing heat from the Data Centre.

ServerCool® CDU

The Cooling Distribution Unit (CDU) is designed to provide cooling water, close controlled and above dew point for up to 20 rear door heat exchangers. It is capable of 260kW cooling capacity. Designed and approved to work with IBM's 'Cool Blue®' and 'iDataplex®' RDHx (Rear Door Heat Exchangers) and 'Blue Gene®' racks.

Why use a CDU and Secondary Loop

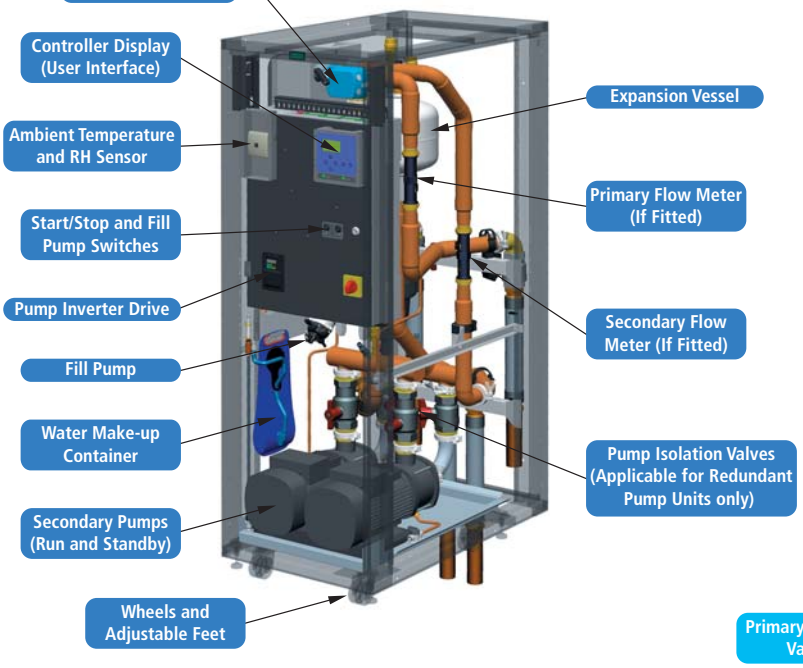
The CDU provides essential separation of primary chilled water from cooling water to the racks / RDHx's, meaning:

- Low pressure, clean water in rack environment.
- Low volume of water in secondary loop, reducing risk.
- Water flow controlled to maintain optimum operation and minimise energy use.
- Water temperature controlled at above dew point to maximise cooling and ensure condensate-free operation.
- Ensures 100% sensible cooling reducing the need for humidification and saving energy.
- Provides upgrade path and flexibility without major M&E upgrade work – plug and play.
- Provides essential monitoring of the racks being cooled and system health.
- Enables system redundancy through secondary manifold design.
- No potentially unreliable condensate pumps required anywhere in the system.

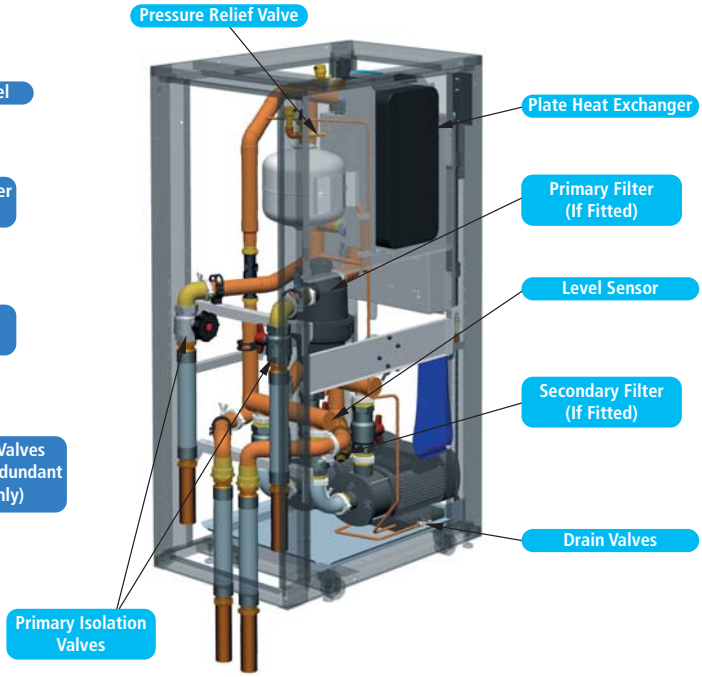
CDU Features

- Cooling capacities ranging from 20kW to 260kW.
- Full run/standby capability with redundant pumps.
- Optional internal manifold with leak-free quick-release couplings.
- Easy to install and retrofit.
- Dew point temperature control of cooling water.
- Auto-fill and bleed of coolant.
- Full alarm monitoring and connectivity.
- Modbus + SNMPv3.

CDU FRONT



CDU REAR



ServerCool® for small Server Rooms

The CDU Module is designed to provide close controlled cooling water for up to 3 RDHx's with a total maximum cooling capacity of 20kW. It is the ideal system to start a planned upgrade path and is particularly suitable where space is restricted.

CDU Module Features

- Cooling capacity up to 20kW.
- Full run/standby capability.
- Leak-free quick-release couplings.
- Easy to install and retrofit.
- Dew point temperature control of cooling water.
- Auto-fill and bleed of coolant.
- Full alarm monitoring and connectivity.

Small Server Room Cooling

The Modular CDU combined with the RDHx is the perfect solution for the small IT installation. The CDU is installed within a standard rack; taking up just 6U of space so leaving room for the servers above. The CDU Module provides up to 20kW of cooling and can be connected to a maximum of three RDHx's. As room temperature is not critical to cooling the servers, the rack can stand in the corner of a room or even in a cupboard.

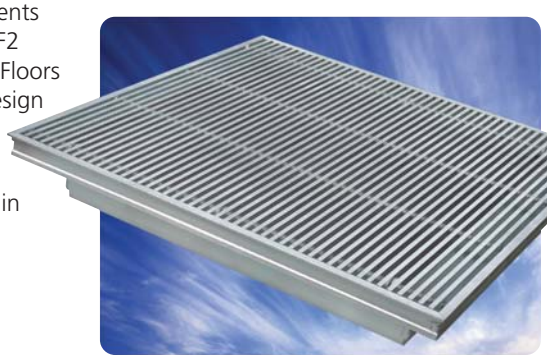
Heavy Duty Floor Grilles and Fan Assisted Floor Grilles

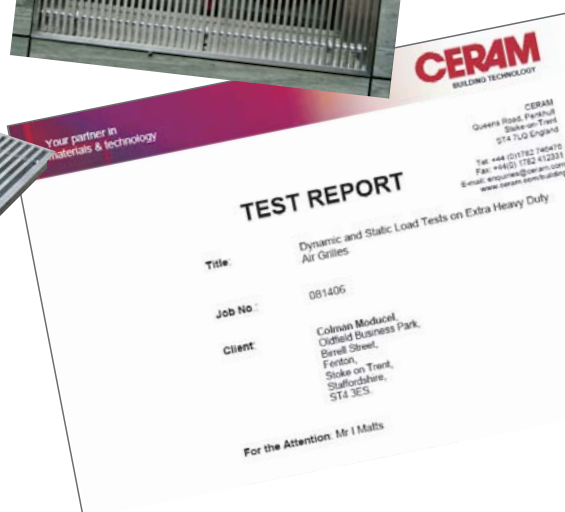
Our heavy duty floor grilles have been specifically designed to suit current industry requirements employing raised access floors in Data Centres. They are designed to replace a 600mm square tile and are aesthetically pleasing air distribution devices providing cool air exactly where required, eliminating high temperatures and reducing the risk of equipment failure.

The Model TJH — Heavy / Extra Heavy duty floor grille complies with the requirements of the relevant sections of PSA MOB PF2 PS/SPU specification for Raised Access Floors March 1992 and IBM Management Design Guide for Raised Access Floors.

Our fan assisted floor grille has been designed to boost airflow and cooling in areas with low or even negative floor pressure.

The grille can direct airflow towards the rack inlet at up to 15 deg from vertical, this and speed control of the fans ensures that cooling is maximised efficiently. With up to 5 times the cooling airflow delivery of a standard grille in a low floor pressure area, this makes it an ideal solution for hotspots and problem areas that lack effective cooling.

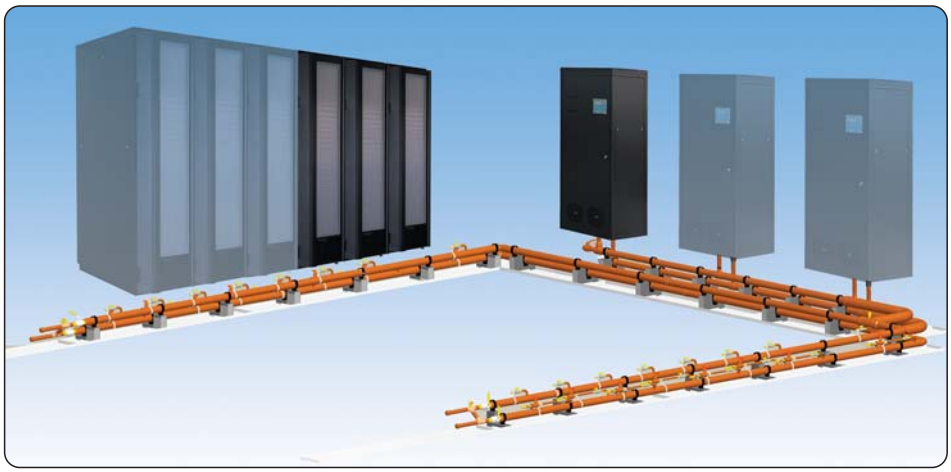




Flexibility, Scalability and other services

Minimising initial Capex whilst building in the most efficient cooling system with upgrade potential are challenges faced by many Data Centre and IT managers. The Eaton-Williams ServerCool® system provides the perfect answer, enabling the system resilience, scalability, efficiency of space and power to be built in day 1 with excellent upgrade potential.

The system can then be upgraded rack by rack or row by row by simply fitting and plugging in additional RDHx's to a common under-floor or over-head manifold. New RDHx's can be fitted in as little as 15 minutes without down-time. There is no need to re-position racks or use valuable additional space.



Top feed

Bottom feed

Installing our unique and highly resilient plug and play manifold system, either overhead or under-floor, enables an upgrade path with low initial Capex. CDU's and RDHx's can be added with minimal disruption as the IT load increases and additional cooling is required. The manifold is tested to 5 × its' working pressure.

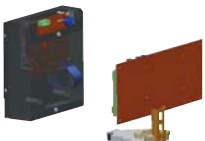
Optimum use of the White Space

The RDHx takes up minimal space and, if required, the CDU's can be installed outside the white space. Because the heat is removed at source, computer racks can be positioned close together.

Minimising Carbon Footprint

ServerCool® will save you 40% plus compared with other systems but the energy savings do not stop there. Because ServerCool® cools at source you can allow the white space to operate at a higher temperature, up to 27°C, which saves more energy, and if you use the Eaton-Williams Close Control Products with high efficiency fans and free cooling you save even more energy.

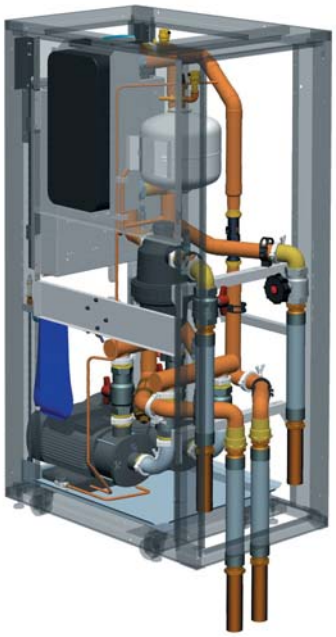
Connection Options and Features

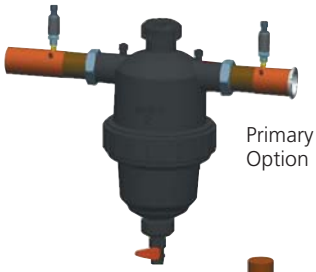


Comms

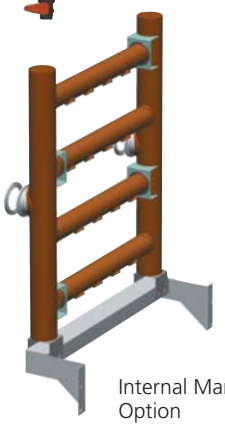
Secondary Filter Options

Primary Flow Option





Primary Filter Option



Internal Manifold Option

Connection Options and Features

The CDU can be fitted with an internal manifold allowing connection up to 8 racks with heat loads of up to 30kW. Alternatively, Flextails can be fitted, allowing multiple connections via an over-head or under-floor external manifold. Other optional features include Primary/Secondary Filters, ATS, Primary Flow Meter and Voltage options.

Group Products and Services

We design, manufacture, install, commission and service your data room equipment and keep your system running at peak performance. In addition, we manufacture, service and supply a wide range of compatible equipment including chillers, chilled water and DX close control air conditioning units, floor grilles, direct and indirect free cooling units, air handling units and humidifiers.

DRU Close Control Air Conditioning Unit

DRU Data Room air conditioning units are designed for high density load areas where a large cooling duty is required, from a compact footprint, but without compromising the critical application of data centre cooling.

80/100/120kW cooling capacities.

Available in chilled water, DX, DX with water cooled condenser and glycol free cooling configurations. A full range of options and ancillaries are available including inbuilt humidifier for room humidity control.

IPAC Close Control Air Conditioning Unit

IPAC floor standing air conditioning units are available in chilled water, DX/air cooled or DX with water cooled condenser allowing indirect free cooling. 15 to 80kW cooling capacities are available in configurations including up-flow, down-flow or direct free cooling. A full range of options are available including inbuilt humidifier for room humidity control.

eBTX Unit

eBTX self contained DX air handler is designed specifically for communications networks and data centres; the eBTX primarily uses outside air for cooling with DX available to deal with peak temperatures. It uses a fraction of the energy of conventional close control air conditioning units. It is available in four sizes: 15, 22, 30 and 45kW.

Chillers

Energy efficient chillers up to a capacity of 2000kW with the full run/standby (N+1) capability can be offered. These can also be fitted with free cooling capability and qualify for ECA (Enhanced Capital Allowance) under the Carbon Trust Scheme.

Installation

Services include pre-fabricated manifold systems significantly reducing installation time. Our managed services team can also, design, plan, project manage and install the entire system on a turnkey basis, with first class product and system knowledge giving peace of mind and problem free implementation.

Commissioning and Service

Commissioning and service capability ensures first class start-up services, technical support, after-sales service and care through the life cycle of the product.

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