ColdLogik™

Perfect climate - Perfect control

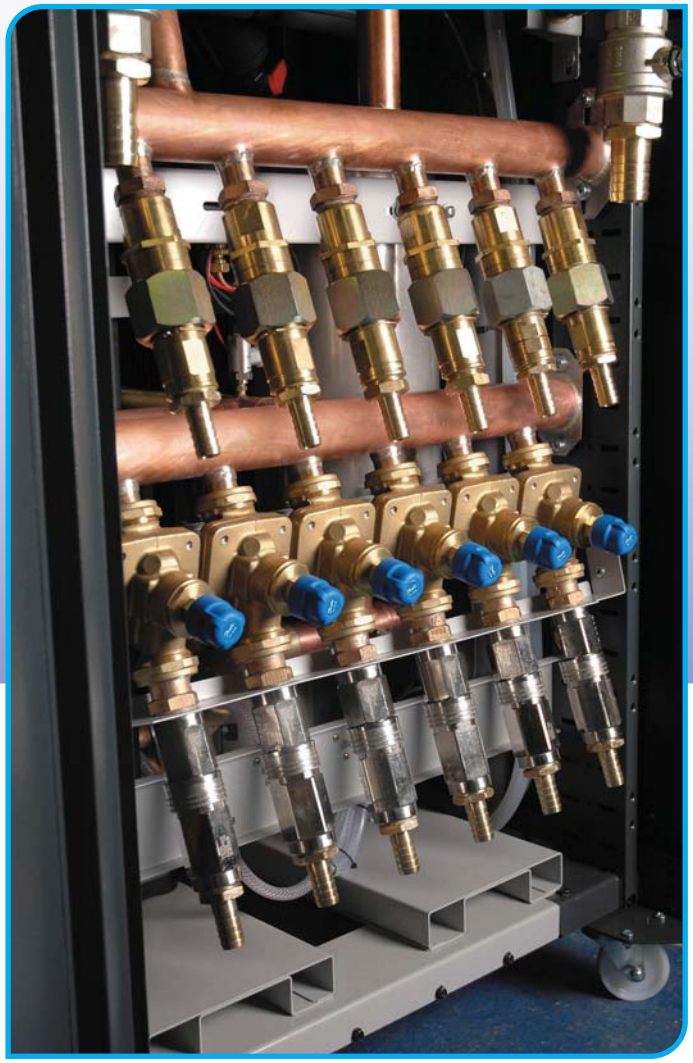
High Density Cooling Solutions From USystems

Incorporating Eaton Williams

Systems

Eaton Williams

High Density Cooling



It is well documented that packaging densities of computer systems are set to continue to increase at the same time processor capacity is growing, the natural consequence; ever greater heat generation. It is also known that 55% of electronic failure is due to temperature with the obvious consequence of system failure, costly down time, revenue stream affected, lack of customer confidence etc. Traditional data centre temperature control systems and concepts have up until the past few years kept pace, but now they’re reaching their limitations. Some companies are finally reduced to limiting the amount of equipment being housed within each rack or reducing the number of racks in each room, this might be acceptable in the short term but real estate cost seldom allow this option to be viable in the medium to long term.

It must be every Data Centre Manager’s ambition to prevent high on-going operating costs; ensuring levels of efficiency are maintained to the highest levels possible and that operational reliability is guaranteed – all with the single purpose of achieving ‘zero-downtime’.

So, what can be done to overcome the heat problems?
The answer cannot be given with one product, but a range of products designed to integrate with each other to provide a scalable modular approach, to deliver a number of logical solutions.
It’s as simple as ColdLogik!

As recently as the late 1980's water was used to cool more than 90% of the world's mainframes.
Within the last couple of years there has been a resurgence in the use of water cooling as an effective means of dealing with heat problems in data cabinets. Given that water is 3,500 times more effective than air by volume, it would be logical to conclude that enhancing this resource combined with today's technology the arrival of a new range of precision based solutions which can meet the exacting demands now being placed on Data Centres.

Based on this principle, and incorporating Eaton Williams technology, USystems have developed a range of water cooled products to sit within the existing range of high density cooling solutions.

Eaton Williams water cooling technology has a proven track record and is widely used. In fact there are already over 7000 installations worldwide; such as cooling rack mounted sensitive medical amplifiers and electronics where performance, reliability and global compliance are absolutely critical.

USystems' range of modular products allows us to identify a solution tailored to suit the exact requirements of each individual client.

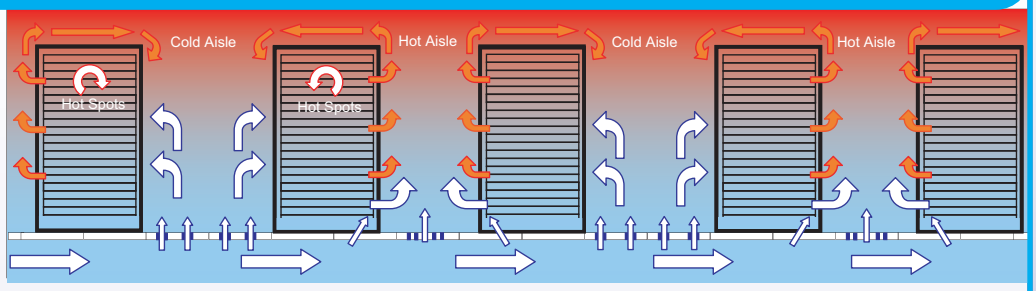
Cooling Logically

- Precision cooling, 100% efficiency
- Heat removed at source, no recirculation of hot air
- Dynamic condensate management as standard, no need for drip trays
- Full Redundancy
- Low energy use, potential cost savings
- Processor controlled technology
- Zero thermal impact
- Optional Power and Environmental Remote Monitoring and Administration
- Modular in design – expand the system as you grow
- Data centres can be planned with low real estate requirements
- Utilises existing infrastructure
- 42U and 48U heights as standard
- 600mm, 800mm and bayed widths as standard
- 1000mm and 1200mm depths as standard
- 1000Kg Cabinet weight loading as standard

A Balanced Approach

Conventional 'Hot Aisle / Cold Aisle' Rack Layout

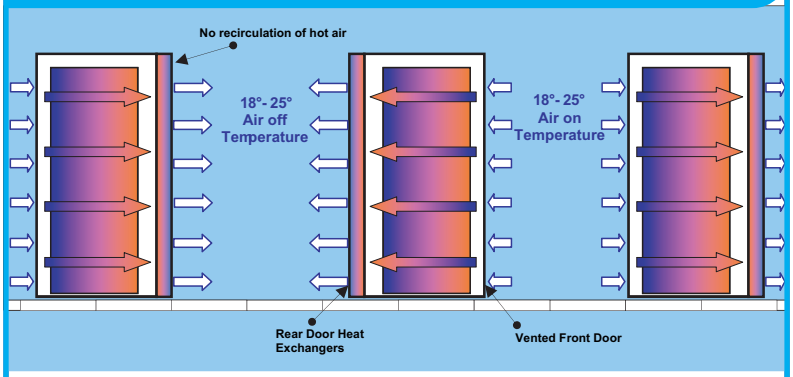
'Hot Aisle / Cold Aisle' Rack Layout



This is the recommended rack layout now being adopted by most new Data Centres. Although there are various points of reference it is commonly understood that if best practice is continuously adopted throughout the life of the Data Centre, this type of modern layout allows each rack between 3 to 4Kw of heat dissipation, any higher than that, then there is a very real danger of equipment overheating and eventually failing.
The problem is quite simple (as quoted by the Uptime institute) '*only 28% of air conditioning is actually going where it's needed while 72% of air is just mixing with return air, essentially being wasted*'.

The argument against staying with CRAC units is only further compounded when you consider that air conditioning uses as much if not more energy than the hardware it's trying to chill. As all major manufacturarswill forecast that heat densities are to increase, HVAC units alone cannot be the solution - it is clear a new way forward is needed.

Cold Aisle only Rack Layout



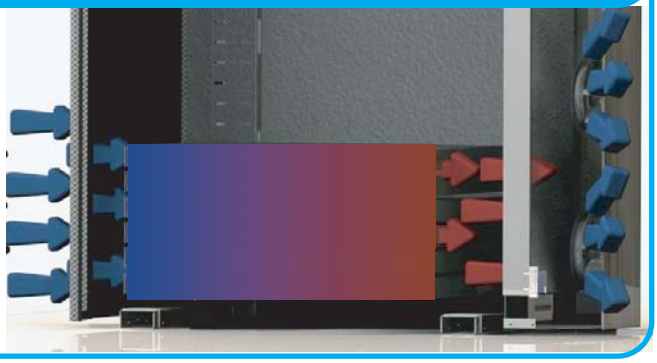
'Cold aisles only' Rack Layout & Existing Data Centres

USystems now give Data Centres the option of replacing impractical and expensive hot and cold aisles over to cost effective and space optimised cold aisle only Data Centres, thanks to the technological breakthrough of the CL20 Data Cabinet. This solution can also be adopted in existing Data Centres, helping to balance the room temperature.

- Water is 3,500 times more effective than air by volume
- Precision cooling removes heat at source preventing 'Hot Spots'
- Data Centres can be planned with low real estate requirements
- More effective and lower energy consumption
- Taps onto existing infrastructure
- Modular in design, add additional CDU's and RDHx's to the system as the Data Centre expands
- Built in redundancy
- Full rack space available
- Zero thermal impact
- Remote monitoring available
- Especially recommended for use in existing Data Centres – Assisting in lowering the ambient temperature of the room

CL20 SC 'Server Cabinet' and Rear Door Heat Exchanger

Ambient air is drawn through an impressive 80% vented AirTech Plus door. Six Hot swap fans mounted in the rear door draw the hot air over a chilled water filled coil. This acts as the heat exchanger and removes 100% of the delta T, passing the air back into the room at ambient temperature.



CL20 SC 'Server Cabinet' and Rear Door Heat Exchanger

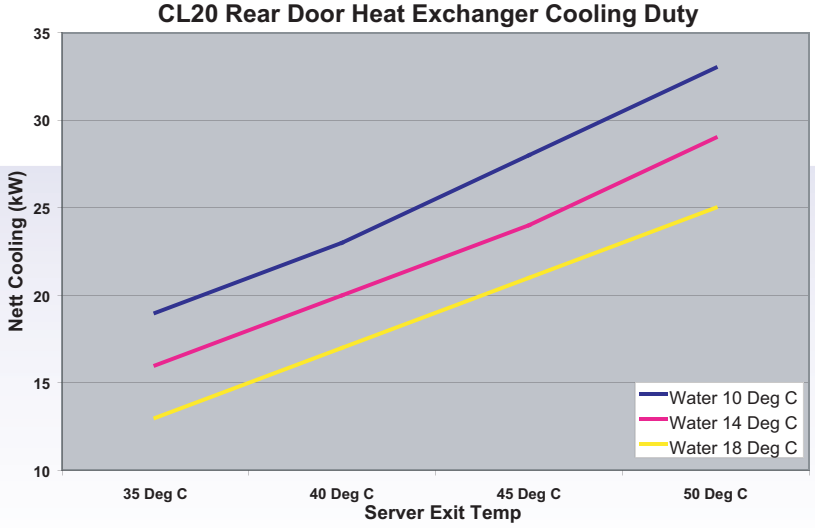
CL20 Data Cabinet Features:

- 20kw (nominal) I Rear Door Heat Exchanger and 35kw (nominal) Rear Door Heat Exchanger
- Precision cooling
- No need for 'Drip Tray'
- Six hot swap fans
- Fan fail alarm as standard, visual and data line transmission
- Variable speed fans
- Built in redundancy
- 80% venting on front door
- Optional remote monitoring and administration
- Unique styling
- 1000kg weight loading as standard
- Full range of accessories

AirTech Plus ™ Front Door

Rear Door Heat Exchanger

CL20 Rear Door Heat Exchanger Cooling Duty

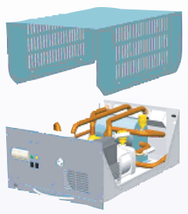


CL150 Cooling Distribution Unit (120 – 150kw) - System Overview

CL 150 CDU Key Features

- Full Redundancy
- Dew point tracking for maximum heat removal
- Auto fill & bleed of cooling system
- Remote Monitoring
- Manifold can be mounted in the rack or in the raised floor
- Plug & Go Manifold with leak free couplings

Also available
CL6.2 CDU (5 – 20KW)
6U Modular Cooling Distribution Unit



6U 19" Rack Mountable Unit, retaining all the same features as its bigger brother but allowing the user to add to their system as they expand. Can be mounted in existing rack or purpose built cabinet.

CL20 Server Cabinets with 20kw Rear Door Heat Exchangers

Connection to existing water loop

- Graphic Display
- Data Collection
- Remote Monitoring
- Leak Detection
- 50/60Hz inverter drive, allowing soft start & system pressure control.
- Dew point monitoring, allowing maximum cooling at varying room temperatures and humidity - eliminates the issue of condensation.

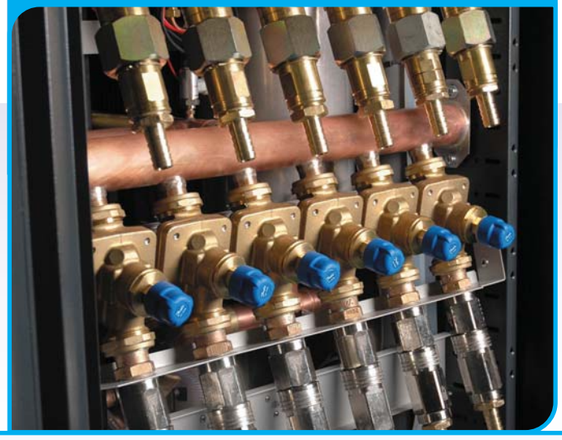
Display & Inverter

- Primary water flow monitoring
- Primary filter condition monitoring
- Auto fill of coolant
- Self cleaning inline filter
- Data collection facility

Inline Filter

- Quick fit manifold for up to six CL20 Server Cabinets.
- Optional automatic balancing of process water flow to rear door heat exchangers.

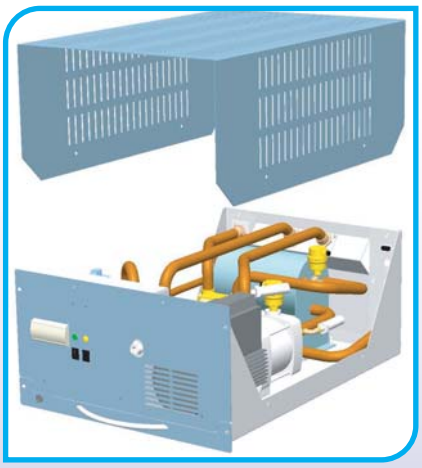
Six Way Manifold



- Full run & standby redundancy of all critical components with duty sharing and auto change-over.
- High flow, high power pumps.

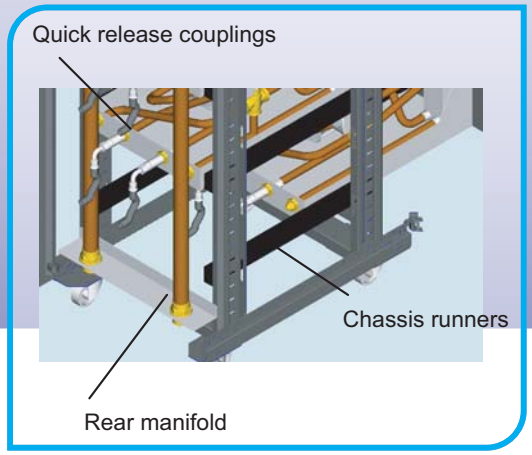
Run & Redundant Pumps

Modular by Design



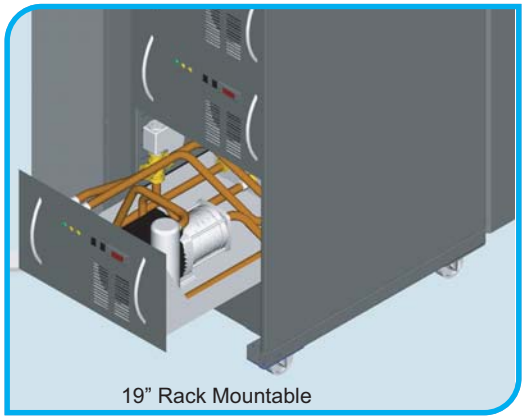
CL6.2 CDU 'Cooling Distribution Unit' (5 – 20KW)

The CL6.2 CDU is a 6U 19" Rack Mount Module which retains all the same features as its bigger brother the CL150.
Designed to offer a greater modularity the CL6.2 CDU allows the user to slowly expand their system to meet any future demand. The modules can then be housed in their own dedicated cabinets (fitted with a rear manifold) or directly in the cabinet which is to be cooled.
The CL6.2 has sufficient capacity to support one RDHx rated at 20Kw (or as an option, two RDHx at reduced capacity.)
Each Cooling Module will consist of a pump, plate heat exchanger, modulating control valve, reservoir tank, pressure & temperature sensors and all associated pipework connected to quick release couplings. Also incorporated is a dedicated stand alone controller with an alpha-numeric display, which will read the process temperature as a default; but can be interrogated to display: valve position, pump flow rate, system pressures and temperatures. The controller also has the option of a plug-in networking communications card allowing 'all' alarm functions to be remotely monitored.
For ease of installation each CL6.2 is supported by chassis runners, once in position the unit is easily connected to the rear manifold by quick release couplings.



USpace 6210 Cabinet

The CL6.2 CDU's can then be housed in their own dedicated cabinets (fitted with a rear manifold) or directly in the cabinet which is to be cooled.



USpace 6210 Cabinet

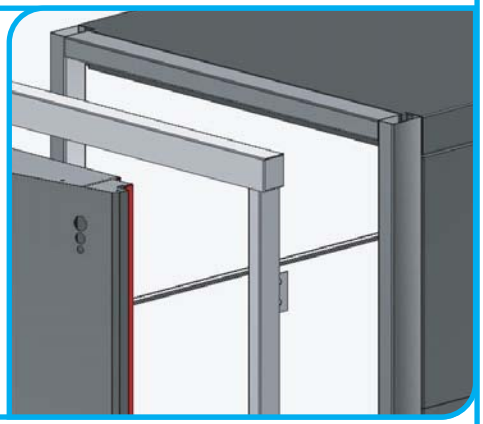
USpace 7210 Cabinet

CL20 RF 'Retrofit Frame' & Rear Door Heat Exchanger

IBM 9308 Cabinet plus CL20 RDHx

Invariably 'Hot Spots' develop over a period of time and not at the beginning when first setting up a Data Centre. Many Data Centres represent a city skyline with a host of different manufactures cabinets.
Should a 'Hot Spot' occur it could be cost prohibitive to make major infrastructure changes, with this in mind USystems have developed the CL20 Retrofit Frame.
The CL20 Retrofit Frame has been designed for easy assemble onto third party cabinets enabling the CL20 RDHx to be fitted providing precision cooling exactly where it is wanted/needed.
This in turn is linked up with either the CL150 or CL6.2 Cooling Distribution Unit, providing a cost effective solution.
The CL20 Retrofit solution assists the incumbent CRAC units in lowering the ambient temperature in the room at the same time as stopping hot spots from developing by preventing recycling of the hot air waste.
NB. Due to the numerous cabinet frame designs in the market, different framework will be required to support the door and a site visit will be required. It may also be necessary to replace the front door owing to inadequate air to metal perforation.

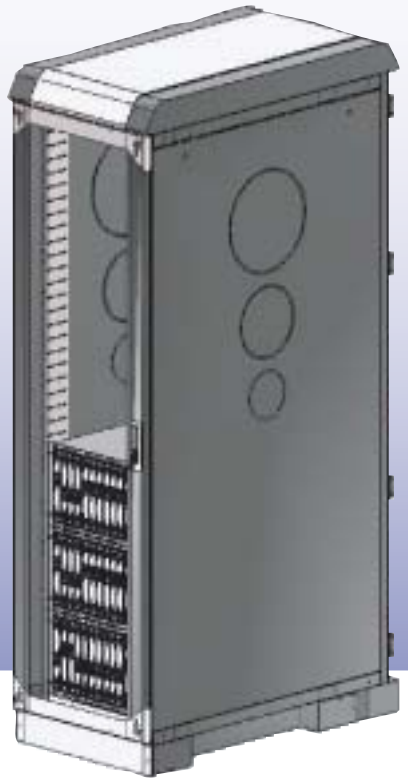
The Retrofit CL20 Frame is fitted directly to the to the IBM frame. Providing the necessary structural support for the CL20 RDHx



SAR Cabinet plus CL20 RDHx

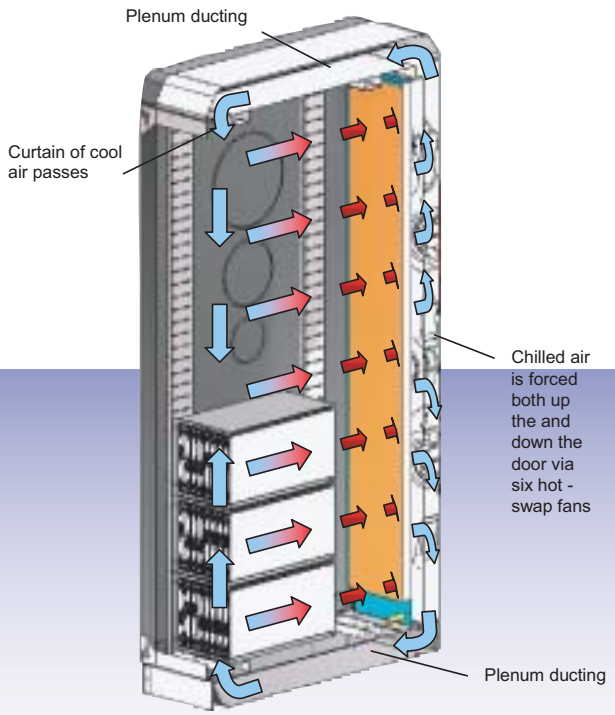
CL20 DC 'Data Centre' Cabinet

The CL20 Data Centre Cabinet is designed to provide the perfect rack space for housing all Servers and Processors. A self contained temperature-controlled environment provides the necessary stable platform required for looking after the most demanding of heat producing servers. Air is re-circulated and not drawn away from the air-conditioning, potentially eliminating the need for CRAC units.
Utilising the unique patented dual closed-loop air system the cabinet provides uniform vertical cooling and is capable of 20Kw to 35Kw of heat dissipation. Hot air produced by the equipment is drawn over the rear door heat exchanger cooling as it does so. The chilled air is then re-circulated through plenum ducting in both the top cover and bottom plinth in dual loops, providing a steady stream of cool air to the front face of the cabinet.
Ideal for remote site locations and for deploying ready to go Data Centres without the need for costly infrastructure associated with building complete Data Centres.

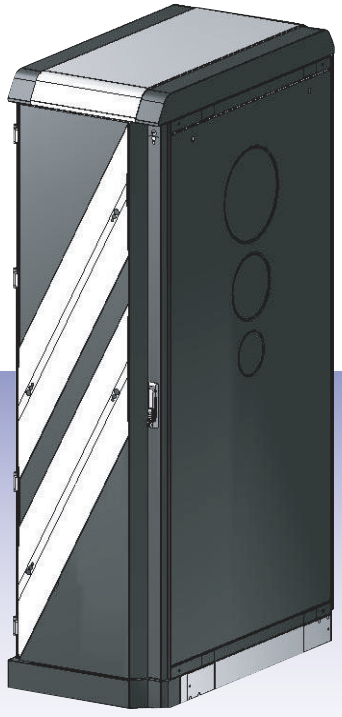


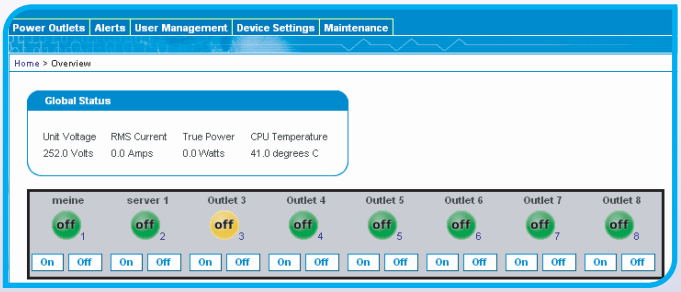
CL20 DC Cabinet Features

- 20kw (nominal) Rear Door Heat Exchanger and 35kw (nominal) Rear Door Heat Exchanger
- Precision cooling
- No need for 'Drip Tray'
- Six hot swap fans
- Fan fail alarm as standard – visual and data line transmission
- Variable speed fans
- Built in redundancy
- Optional remote monitoring and administration
- Unique styling
- 1000kg weight loading as standard
- Full range of accessories



CL20 Data Centre Cabinet rear view





Environmental and Power monitoring

Local monitoring & Remote monitoring from anywhere in the world:
RMS Current
RMS Voltage
WATTS
VA
Maximum current detected
Outlet circuit breaker status, set power threshold
Temperature
Humidity
Smoke

The ability to reboot remote servers and other network devices.

The ability to power on and off devises connected to each.

LED to each outlet providing status in accordance with IEC recommendations

Asset tracking and facility planning
GUI – Status home browser
Billing Module –

Per outlet billing
Cost per KWh
Accounting cycles

Intelligent Power Distribution Units

In addition to the built in intelligence on both the CDU 'Controller Distribution Units' and the RDHx 'Rear Door Heat Exchangers' USystems are able to provide an even greater level of Intelligence via the Power Distribution Unit.

It is estimated that volume-server power consumption costs roughly 10% of the upfront hardware price each year in operation – rising to 30%+ in more intensive IT environments. In this environment power control and monitoring is vital

Managers can truly manage what is going on, have valid information about specific key demands of server processes, turn off if not doing anything of value and prevent rogue overloading, e.g. by connection of unauthorised plug-ins

The only PDU with outlet-level metering

The only PDU with 256-bit AES encryption

The only PDU that supports IPMI and SMASH

Circuit breakers as standard – no fuses!

Compliant with new UL60950 3rd Edition

Intelligence courtesy of the KIRA™ 100 chip

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