

# **E-PAK TECHNOLOGY**

## **CRITICOOL**

An integrated system solution that provides reliable, efficient cooling for mission critical applications



### **E-Pak CritiCool Systems Feature:**

- Reliability
- Lower connected power requirements
- Flexibility in design
- Ease of expandability and project phasing
- Operating efficiency and maintainability
- Low noise generation
- National service network
- Air cooled systems also available

# E-PAK CRITICool

Now, Data Centers, COs, and all other mission critical applications can take advantage of the unique integrated reliability and superior energy efficiency of the E-Pak CritiCool System.

## THE E-PAK CritiCool MISSION CRITICAL SYSTEM

Each ring represents the major arteries of the typical mission critical cooling system. These rings illustrate the primary and redundant path of services to the facility air handlers or CRAC (Computer Room Air Conditioning) Units.

The CritiCool "Rings of Reliability" philosophy is to design primary and redundant 'A-B' systems that can service the facility through either the 'A' or the 'B' path.

Each break in the segment of the CritiCool "Rings of Reliability" illustrates junctions. These are where valves, power connections, or control system gateways would offer both a point of integration, as well as separation, of the major critical systems.

## COOLING RELIABILITY RING

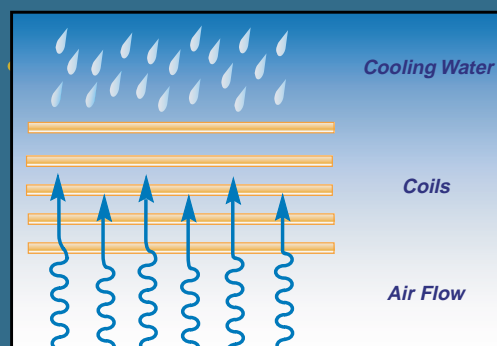
This inside ring represents the cooling water service for the facility. The cooling medium can be chilled water or glycol. Each segment is designed to allow back-feed from either direction. By providing the primary pumps in each CritiCool module, any CritiCool cooling ring segment can be isolated from the other. In a conventional system all the water would run through a central pumping station or two pumping stations for a true ring design. This is eliminated by using the distributed pumping concept of the CritiCool system.

The CritiCool chiller standard design provides reduced capacity operation in case of a loss of condenser make up water. In situations like this, the standard "E-Pak" integral compressor, pump, and fan controls assure continued operation of the module rather than a simple shut down.

## Evaporative Condensing — The CritiCool Power and Energy Advantage

The key to the unique CritiCool advantage is evaporative condensers. While generally applied only in large field erected industrial process, refrigeration and air conditioning systems, evaporative condensers are widely used for condensing refrigerated vapor in mechanical refrigeration systems. The inherent efficiency of evaporative condensing provides lower condensing temperatures (95°) compared to other condensing methods, i.e. air cooled (115°F to 120°F) or water cooled (105°). This results in significantly reduced kW per ton (.70 system kW per ton and 17+ system EER).

E-Pak offers the advantages of evaporative condensing on a single skid utilizing world class components. If evaporative condensing is not desirable, E-Pak also offers a full range of air cooled systems.



## POWER RELIABILITY RING

Each CritiCool module can be provided with either one or two power connections. Each connection would feed a high reliability power distribution center. In the two feed 'A-B' design, a single module provides two completely independent power systems. Each chiller, condenser, pumping system, and freeze protection system now has separate power distribution breaker panels. As an option, automatic transfer switches, and supervised breakers can be provided.

## CONTROL RELIABILITY RING

The CritiCool Mission Critical Automation System utilizes data center grade components, designed for high reliability. Any communications and facility interface can be made on a single buss, or through the CritiCool "dual buss" concept. This "dual buss" system provides each chiller with separate 'A-B' controllers each on an independent buss. Also, with either buss design, the system interface to CRAC unit manufacturers is a standard option. This interface provides user selectable control and monitoring of the CritiCool chiller modules. Monitoring information and alarms from the CritiCool can be routed to the facility, or to other systems, using system gateways, modem, or Ethernet connections. To assure reliability of the control system components, each module is provided with a separate 115 Volt connection to the facility UPS system. This assures full control through transients or power failure.

Each module is designed for fail-over operation in case of the loss of control to assure delivery of cooling.

**"A" MODULE**

**E-PAK**

**"B" MODULE**

**E-PAK CONTROL BUSS**

**GATEWAY  
TO OTHER  
DDC SYSTEMS**

**INTERNET**

**POWER A**

**POWER B**

**FREE  
COOLING**

**E-PAK CHILLERS**

**E-PAK CHILLERS**

**COOLING**

**E-PAK  
CritiCool System**

**RINGS OF  
RELIABILITY**

**SYSTEM "A"**

**SYSTEM "B"**

**COMPUTER  
ROOM  
AC UNITS**

**COMPUTER  
ROOM  
AC UNITS**

**POWER A**

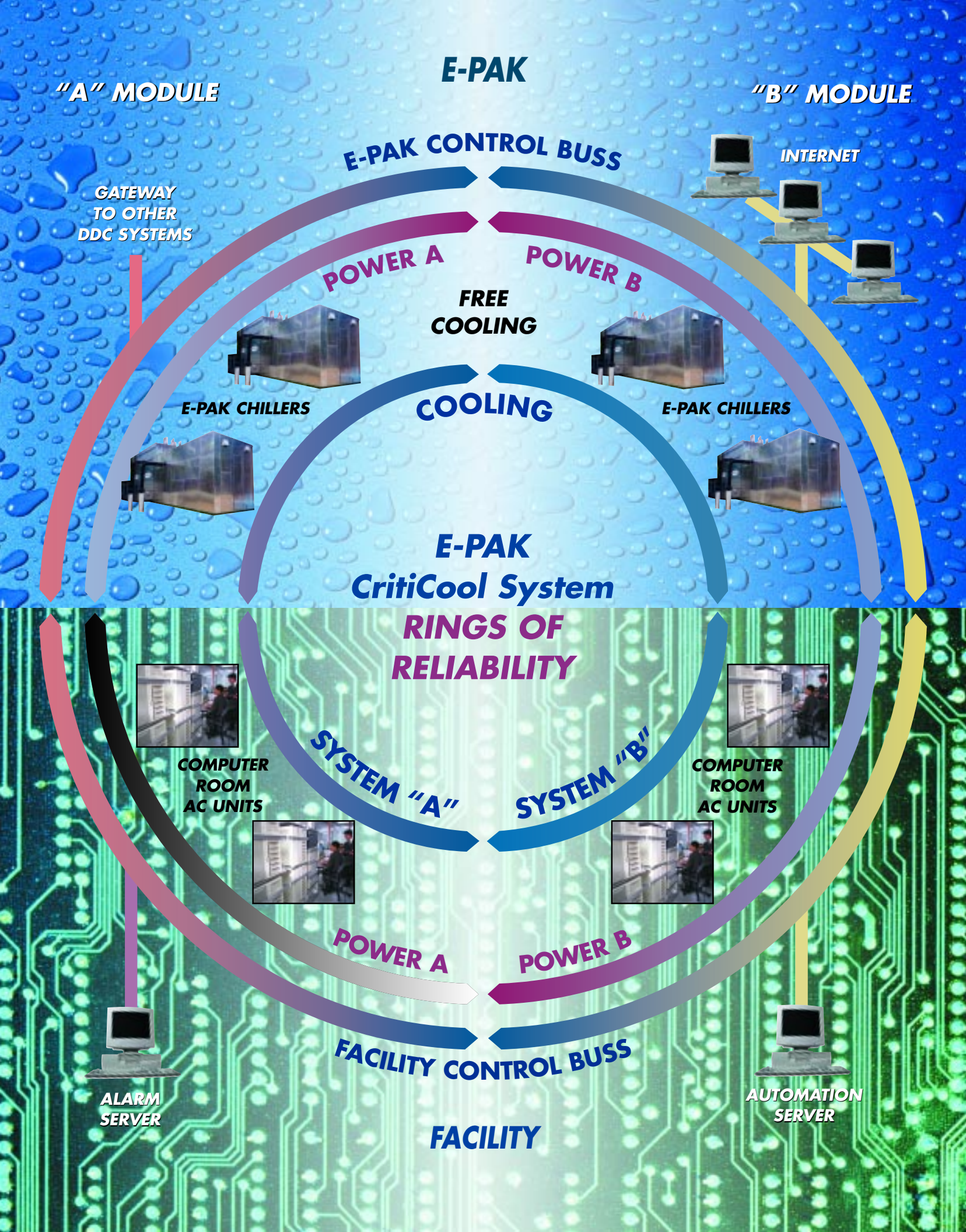
**POWER B**

**FACILITY CONTROL BUSS**

**ALARM  
SERVER**

**AUTOMATION  
SERVER**

**FACILITY**



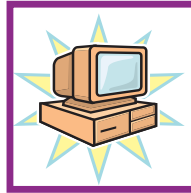
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**Chillers** – Each Criticool Module is provided with a State of the Art Screw Chiller that is supplied and warranted by major manufacturers. Depending on the chiller size, two independent chillers are provided in the standard design. When combined with pumps, evaporative towers, and other equipment; the resulting Criticool module is essentially two independent chiller plants. In addition, each chiller has multiple compressors with independent refrigeration circuits for greater reliability and better control. Either chilled water, or “glycol” cooling fluids, can be cooled to suite specific temperature or environmental conditions.



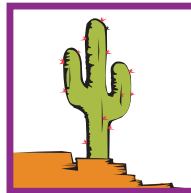
**Evaporative Cooling Tower** – Evaporation of a small quantity of water sprayed over the warm refrigerant circuits significantly reduces the power required to remove heat. When compared to air-cooled chiller designs, the cooling capacity is virtually independent of abnormally high outside air temperatures. Each Criticool module is designed to provide redundancy for the major cooling tower components.



**Automation and Control** – Each chiller system is controlled independently using state of the art DDC controls and automation technology. To assure immediate service, the Criticool DDC controllers are supported worldwide through E-Pak factory service, as well as OEM agreements. Designed for the specific needs of the facility, DDC or PLC designs are standard. Gateways to other automation systems and protocols are offered as standard options.



**Low Power Requirements and Efficient Operation** – The Criticool design requires a smaller power feed than air-cooled chillers, which helps to reduce the size of back-up generation and the power infrastructure. Better seasonal efficiency further reduces the cost of cooling. When compared to air-cooled designs, the installation and life cycle cost of the Criticool system becomes very attractive.



**Dry Run Capability** – The Criticool evaporative tower requires domestic water for normal cooling operation. In the event of the loss of evaporative tower make-up water supply, the Criticool will continue to operate in the air-cooled mode. Depending on outside air temperature, the unit automatically adjusts its capacity to maintain partial cooling capacity instead of shutting the unit down.



**A-B Power Center** – The Criticool Module Power Center provides independent power feeds for each chiller, evaporative tower, and associated equipment. Each power distribution center provides separate breakers and feeds to assure that one half of the unit can operate in case of an interruption to the primary power system.



**Free Cooling (Optional)** – Where the climate conditions are favorable, free cooling may be an attractive option. The Criticool Evaporative tower cools an independent glycol loop, which in turn cools the facility cooling medium. This option offers utility savings, as well as a lower-cost “back up” chiller for routine winter maintenance.

**For more information,  
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