

**Digi-CRAC/H™**

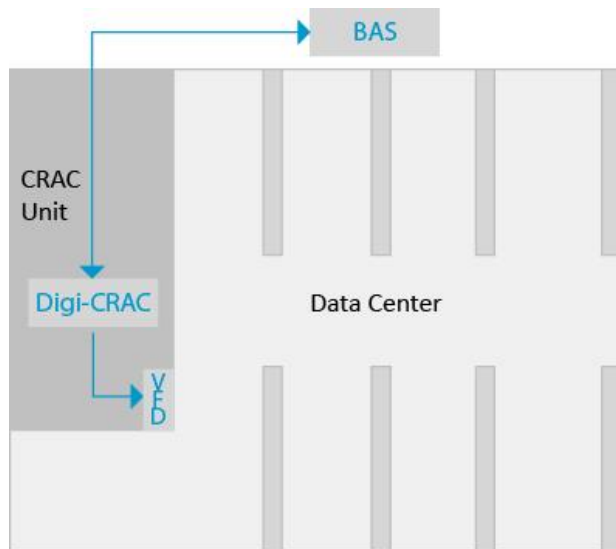


**Bes-Tech**

Saving Energy. Building Comfort.

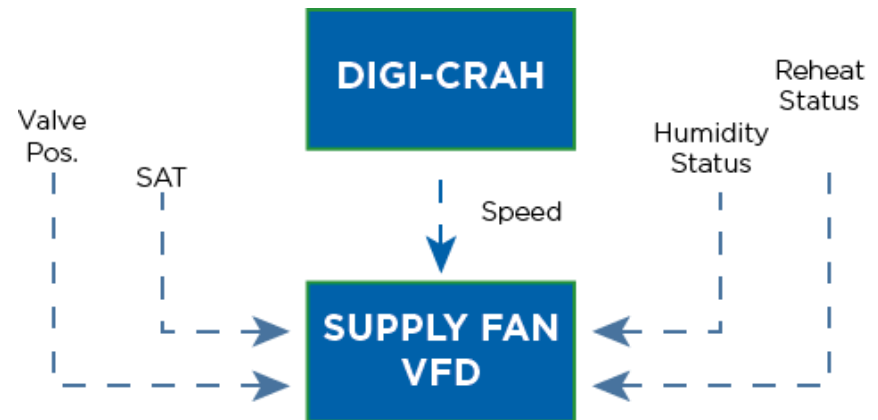
# DIGI-CRAC

Digi-CRAC is an aftermarket control package designed for DX data center air-conditioning units. Modulating the compressor and fan speed to match output to the space needs.



# DIGI-CRAH

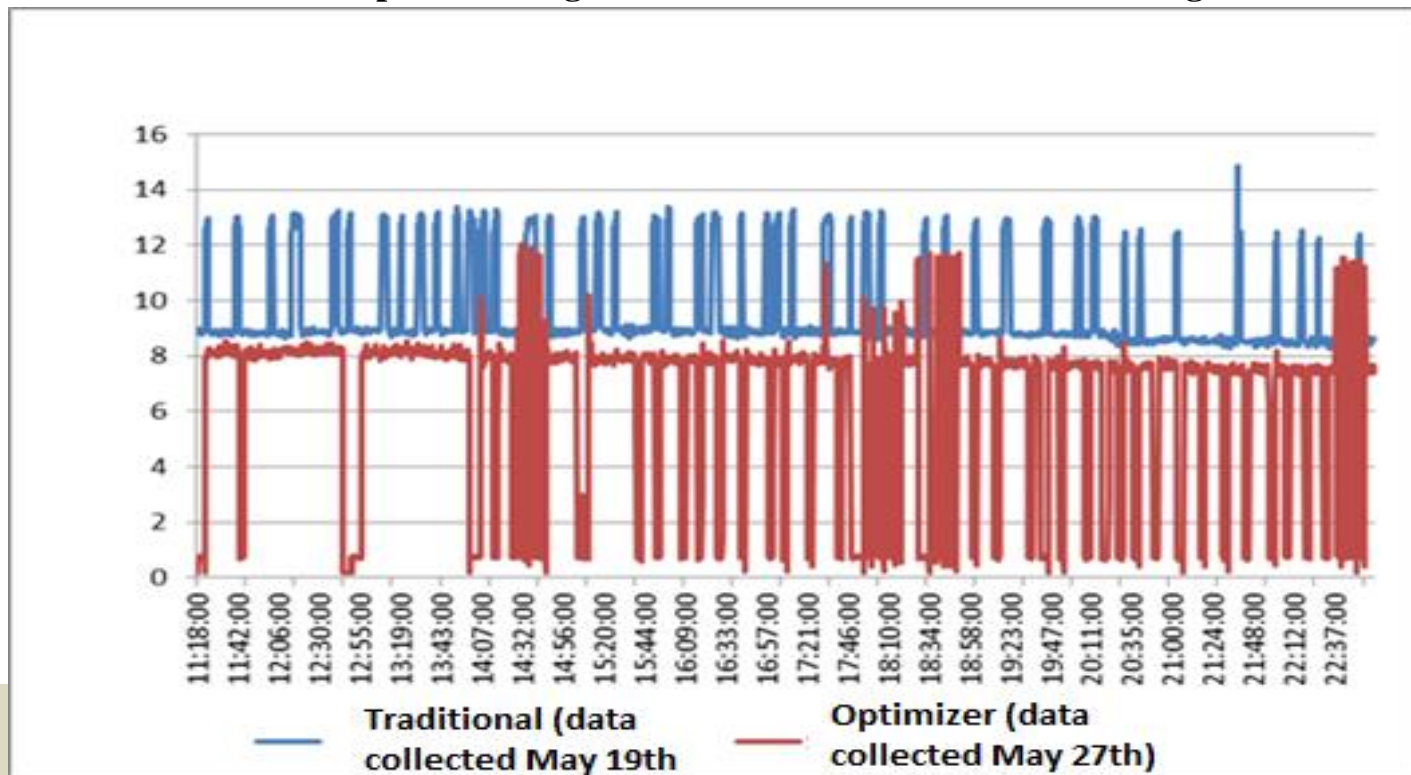
Digi-CRAH is an aftermarket control package designed for constant air volume CRAH unit (w/ chilled water coil). Optimizes supply fan speed and supply air temperature based on the space load.



# Digi-CRAC/H

- **Traditional Control:** Compressor start-stop controls the return air temperature
- **Digi-CRAC Control:** Return air temperature is controlled through modulation of the fan and compressor speeds

**Instantaneous power rating difference between traditional and Digi-CRAC**



# Applications of Digi-CRAC/H

- **Size: 3 to 30 tons**
- **Brands**
  - *Leibert*
  - *APC*
  - *Stultz*
- **Units with multiple fan and compressors**
- **Condenser: water, glycol or air cooled**
- **Evaporator: DX coil**
- **Compressor: Scroll or reciprocating compressor**
- **Power: 200V-240V/3ph/50Hz, 60Hz, 380V-480V/3ph/50Hz, 60Hz.**

# Digi-CRAC/H Features

- Open communication integrates with existing CRAC management system
- Centralized control remote monitoring remain
- Automatic emergency by-pass
- Demand response available
- Provides soft start and stop for fans and compressors
- Mounts inside exiting CRAC unit or on the wall

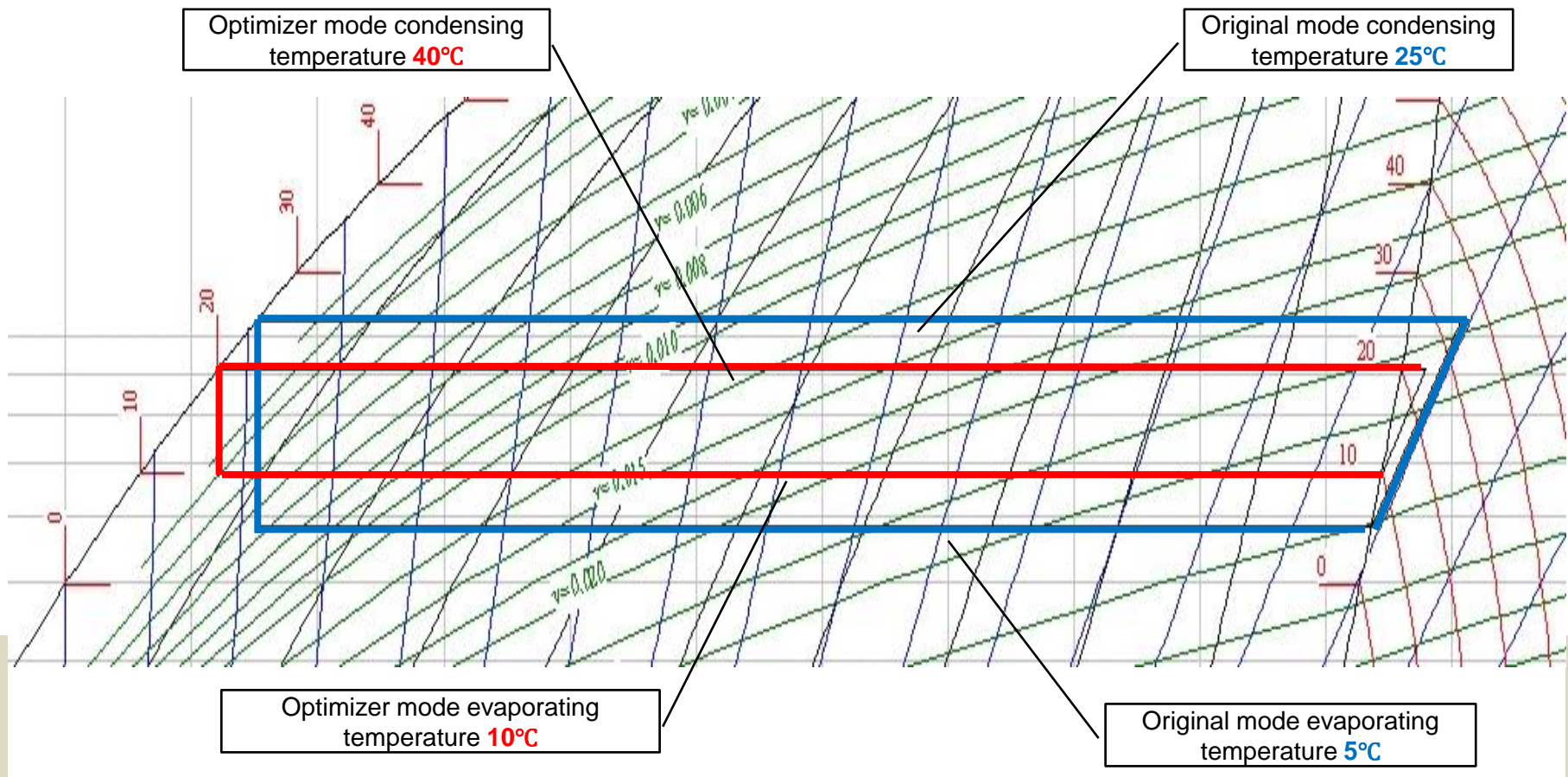


# Digi-CRAC/H Benefits

- Significantly improves the PUE (performance use energy) to 1.5
- Improves energy efficiency 30 – 40% (2,000 to 3,000 kWh/ton-yr )
- Reduces peak electrical demand up to 50% (0.3 to 0.6 kW/ton)
- Running 80% speed at peak, savings are 30% due to reduced compressor lift
- 60-70% fan (CRAH) power savings
- Smooth space temperature and humidity control
- Reduces thermal stress on mission critical equipment
- Soft start and stop extends life of the fan and compressor
- Compressor cycling reduced by 70%

# COMPRESSOR ENERGY SAVINGS: FULLY UTILIZE EVAPORATOR AND SURFACE AREA OF THE CONDENSER

In winter temperature conditions (outdoor air temperature 15°C), the energy use of the compressor is reduced by 50%



# FAQ

## How does Digi-CRAC/H saves energy?

- *Typical datacenter annual load is between 40 to 80% of designed cooling capacity*
- *Running lower speeds and reducing compressor lift creates greater capacity in the existing heat exchanger, resulting in 20-30% compressor savings*
- *Running the CRAC unit at 80% speed results in 50% fan power savings due to the cube rule of fan law for power vs. speed*

## How does Digi-CRAC control CRAC units with humidifier and reheat?

- *Digi-CRAC receives input of the humidifier and reheat status, and responds accordingly with a run speed of compressor /fan.*



# FAQ

## How does the emergency bypass system work?

- *Emergency by-pass, built into the Digi-CRAC, automatically reverts the system back to its original status, removing the Digi-CRAC from any controls*

## Does the existing CRAC unit controller remain?

- *Yes*
- *The Digi-CRAC intercepts cooling calls, sending them to the corresponding component (fan and compressor)*

## Does Digi-CRAC have networking capability?

- *Yes*

# FAQ

## What maintenance is required for Digi-CRAC

- ***Twice annual to review the variable frequency drive and ensure cooling fan is functioning and free of blockage***

# DIG-CRAC CASE STUDY

- Installed five (5) Digi-CRAC on each of the 5 CRAC Liebert Units
- Seamlessly integrate with the existing control system
- One-click auto-switch to the original mode under fault conditions
- Variable speed control for fan and compressors enabled smooth and lower overall costs
- Improved temperature and humidity control
- In operation since 2011

## Benefits

- Resolved issues relating to unstable operation of the Liebert units
- Resolved high indoor temperature & humidity issues
- Improved operational stability of the data center and computer room equipment
- Annual electricity savings of 32% (250,000 kWh/ton) achieved



# DIG-CRAC CASE STUDY

## Beijing, China

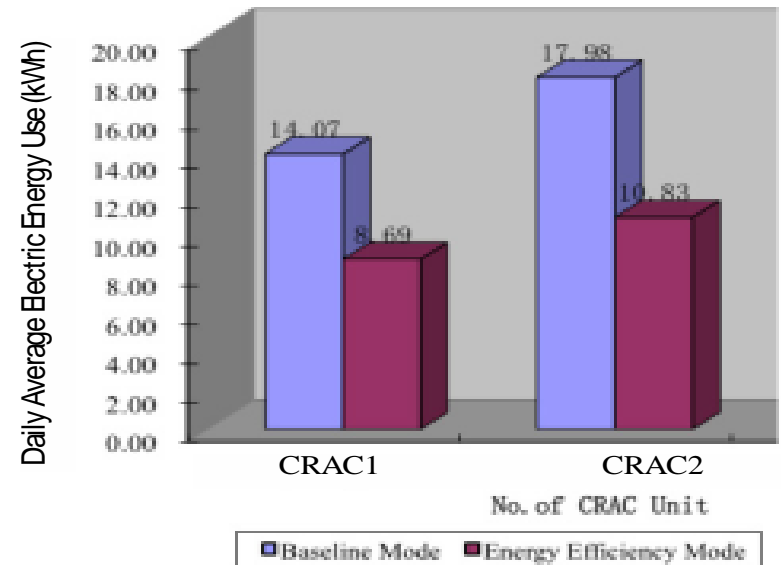
- Space temperature requirements are 18-26° C 45%-65% relative humidity
- Set-points are 20-22° C
- Set-points are 45% relative humidity
- 25-ton DX units with two compressors

## Electric energy savings:

CRAC 1 (38.3%)

CRAC 2 (39.7%)

Electric Energy Use Comparison



Total Electric Energy Use Comparison

