CONTROLS

Quantum™ HD Unity

System Controller and Energy Management Solution

Frick®
BY JOHNSON CONTROLS

Quantum™ HD Unity.

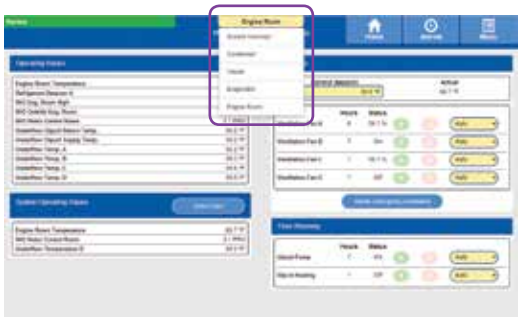
System Controller And Energy Management Solution

The Quantum HD Unity System Controller and Energy Management Solution is your 24/7 Virtual Refrigeration Operator.

The Quantum HD Unity System Controller incorporates best refrigeration control practices with proven hardware and software for a reliable, easy to use central control system for Cold Storage and other similar refrigeration processes.

It's all in the name, "Unity!"

The Quantum HD Unity concept unifies multiple controllers to one display. Easily navigate from Engine Room control to Evaporator control to Condenser or Vessel control by touching the product banner at the top of the display and selecting where you want to go next.



Easily navigate between system component control pages by touching the component banner at the top center and selecting where you want to go.

The analog and digital I/O control has also been unified where it made sense to do so. The I/O for the Condenser, Vessel and Engine Room Control is located in the main Quantum HD Unity System Controller. Due to the distributed nature of evaporators within a facility, the control I/O for the evaporators are in separate enclosures.

Having the I/O for the evaporators in separate, smaller enclosures provides flexibility to their mounting location which may help to control installation costs. Each remote evaporator I/O panel controls up to three zones/valve stations.

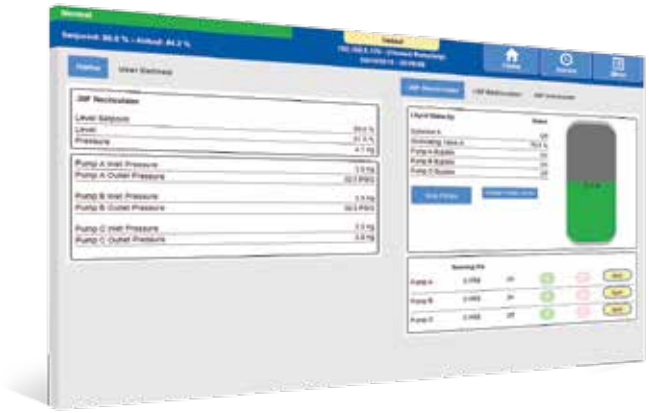
To reduce installation cost, the Evaporator Remote I/O Panel can be mounted anywhere there is a 28" x 24" space.

Evaporator Control

- Up to 30 zones of evaporator control
- Four (4) temperature control modes per zone
- VSD Fan Control per zone
- Modulating liquid control
- Dehumidification control
- Defrost by Schedule, Liquid On or Demand Defrost
- Defrost Grouping
- Load Shedding by Schedule, kW, Schedule/kW or On Demand

Condenser Control

- Sixteen (16) steps of condenser control
- Eight (8) steps can be configured for VSD control
- "Dynamic" or floating head pressure control
- Winter and summer modes
- Non-condensable Gas Alarm with refrigerant selection
- Condenser bleed control
- Alternate pressure control for Defrost or System Standby



Vessel Control

- Controls up to three vessels with up to four pumps
- Analog or digital level control
- Solenoid or modulating valve liquid make-up
- Two (2) liquid makeup circuit control
- Rotate the pump operating order automatically or manually
- Pressure differential (cavitation) protection
- Auto Pump Bypass ensures minimum pump flow

Engine Room Control

- Four (4) ventilation fan outputs operate based on temperature or NH_3 level
- All fan outputs can be configured for VSD operation
- Four (4) NH_3 refrigerant sensing analog inputs
- Initiate emergency ventilation based on refrigerant concentration, a simple on-screen touch or by digital input
- Refrigerant Warning 2 initiates emergency ventilation automatically
- Underfloor warming control
- In the event of a refrigerant leak, the level of urgency is managed by separate alarms: "Refrigerant Warning 1" & "Refrigerant Warning 2"

Quantum HD Unity SYSTEM CONTROLLER

AcuAir® Under Development

-20 °F
Evaporators
Remote I/O

-5 °F
Evaporators
Remote I/O

+35 °F
Evaporators
Remote I/O

AGHN Powder Coated Galvanized Steel Evaporators

Access Securely From The Internet

Together with your IT department configure safe, secure access to the Quantum™ HD Unity System Controller from your offsite location – wherever that may be.

Additional proprietary software is NOT needed, as access is available through your internet browser.

Quantum™ HD Unity
SYSTEM CONTROLLER

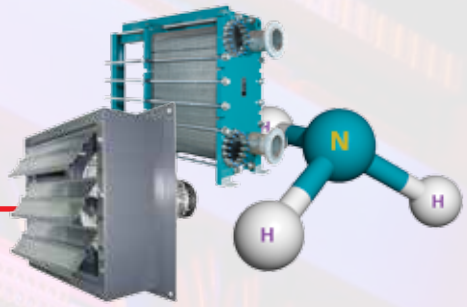
ECOSS
Stainless Steel
Condensers
with EC VSD
Fan Technology

Horizontal
Liquid Recirculator
Units

-30 °F
Recirculator

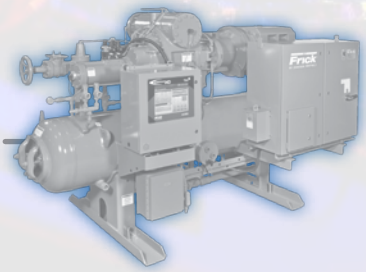
-15 °F
Recirculator

+20 °F
Recirculator



Engine Room Control

- Refrigerant Detection
- Ventilation Control
- Temperature Control
- Underfloor Warming
- Field Configurable P/I Control Loops, Analog & Digital I/O



Quantum HD Unity SYSTEM CONTROLLER

Compressor Package
Under Development

Evaporator Control Features and Scope of Operation

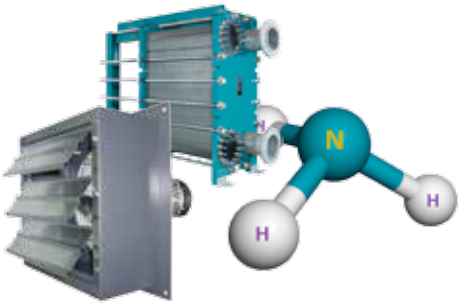
- Control up to 30 zones or valve stations.
- Control up to 3 zones from one Remote I/O Panel.
- The Evaporator control can be done from one of three temperature inputs including one User Defined.
- In addition to cooling, other space conditioning features such as Heating, Re-Heat and De-humidification are included.
- Modulating control for both liquid and fan operation is standard.
- In the event of a power outage during defrost, the control always goes to the bleed step when power is returned (avoids possible vapor propelled liquid slugging).
- High and low pressure warnings are active during defrost.
- Defrost groups are available to manage the number of units that are in defrost at any one time.
- Fan cycling prevents stratification in the room by running the fans at a determined interval and duration when otherwise not needed.
- Load Shedding saves energy by turning off units. This can be configured to occur based on a set schedule, kW limitations, Schedule and kW Limitations or On Demand.
- HOA switches for each “basic control” valve (optional).

Condenser Control Features and Scope of Operation

- The condenser control allows the system to operate from a fixed setpoint or it can be optimized by a dynamic setpoint that adjusts based on ambient conditions and the approach value of the condenser.
- Minimum Condensing and/or Alternate Pressure Control setpoints ensures adequate hot gas for defrost is always available.
- Condenser control is also equipped with “Quick Step” setpoints that react quicker to system upset conditions than standard control setpoints.
- VSD ramping is selectable between “Ramp After All Steps Are On” or “Ramp After Each Step.”
- Condensing Pressure A and Condensing Pressure B ensure seamless transition of control if a pressure sensor failure occurs.
- Non-condensible Gas Warning based on pressure, liquid temperature and refrigerant.
- Bleed Control manages the concentration or TDS levels in the condenser by periodically bleeding off water from the condenser at a determined interval and duration.
- Condenser Override settings for High and Low pressure.
- Field configurable analog and digital I/O along with P/I control loops expands the condenser control to control other more ancillary items.
- HOA switches provided for each step of condenser control (up to 16).

Vessel Control Features and Scope of Operation

- Control for 3 vessels with up to 4 pumps each
- Analog and digital level control
- Modulating , solenoid or combination liquid makeup
- Control for 2 liquid makeup circuits
- High Level Safety from high level float switch
- Pump cavitation protection by monitoring the pump inlet and outlet pressure. If the pressure differential drops below a set value (default value is 10 psi) the pump will be stopped. The pump can restart automatically after a set period of time. The number of restarts allowed before the pump is locked out through control is adjustable by the operator.
- Automatic pump bypass for pump minimum flow based on pump inlet and outlet pressure differential.
- Pump operation is selectable between Run With Compressors, Off On High Level or Run Continuously.
- Field configurable Proportional/Integral control for modulating devices.
- Field configurable digital and analog I/O for ancillary control requirements.
- HOA switches provided for each pump.



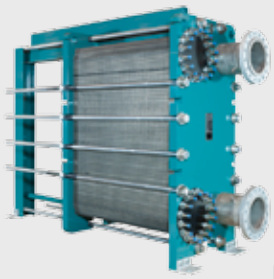
Engine Room Control Features and Scope of Operation

- Four (4) ventilation fan outputs for both temperature and air quality control
- Each ventilation fan can be configured for VSD operation
- Four (4) Analog Ammonia (Refrigerant) Detection inputs
- Two (2) digital inputs for Refrigerant Warnings 1 & 2
- Ammonia detection is tied directly to the ventilation control for normal and emergency ventilation requirements.
- Floor warming control for glycol pump and glycol heating based on glycol return and floor temperatures.
- Initiate Emergency ventilation and to Return to Normal Ventilation with on screen button or digital input.
- Separate “Refrigerant Warning 1” and “Refrigerant Warning 2” alarms manage the level of urgency.
- “Refrigerant Warning 2” initiates emergency ventilation automatically.
- E-stop interrupts all normally closed operation except Ventilation Fans
- HOA switches provided for each ventilation fan.

- Much more to come...

Single Source Industrial Refrigeration Solutions!

Heat Exchangers



Packaged Equipment

Hygienic Air Units

Vessels

Frick
BY JOHNSON CONTROLS

Controls

Evaporators

Compressors

Condensers

Johnson Controls

Johnson Controls Inc.
100 CV Avenue
Waynesboro, PA 17268-1206 U.S.A.
Tel: 717-762-2121 · Fax: 717-762-8624
www.jci.com/frick

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