Beacon II ™
REFRIGERATION SYSTEM

You need a refrigeration system that arrives pre-assembled, preset and ready to install

• a refrigeration system that is easy to monitor or change settings and conditions and even alerts you when something is wrong

• a refrigeration system that is so reliable and dependable that you don't have to think about it

Beacon II™
REFRIGERATION SYSTEM

The patented Beacon II™ Refrigeration System is the next level electronic based refrigeration control system for commercial applications.
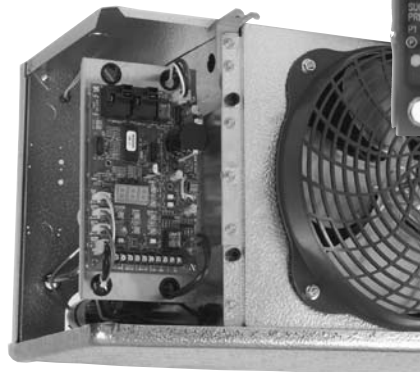
In the past, Beacon technology has produced the Beacon Smart Controller™ which made the Beacon system even more convenient. Beacon technology again introduced an astounding product advancement to be incorporated into the Smart Controller™ called Beacon Smart Defrost™, which allows your Beacon system to defrost only when it's necessary.

With Beacon II™ level of technology, convenience, product reliability, and cost savings over conventional systems, choosing a Beacon II™ system is a no-brainer!

The Beacon II™ Refrigeration System

A Brilliant Approach to Refrigeration Control Systems

The Beacon II™ Refrigeration System is pre-assembled with factory tested and mounted components, featuring an integrated microcomputer-based electronic control board, preset for common industry settings. The installed cost of a Beacon II™ system is less than that of conventional refrigeration systems, due to substantial reductions in system installation time. With Beacon II™, you are truly getting the best in refrigeration technology for less than you might pay for conventional refrigeration systems.
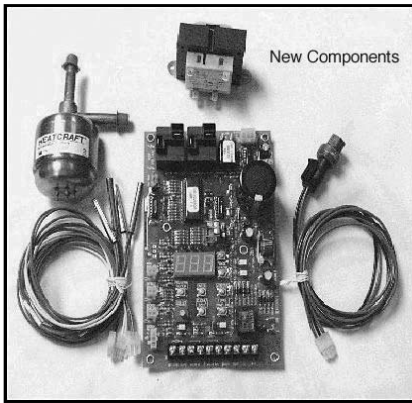
The Beacon II™ Controls Technology is patented (U.S. Patent Nos. 5,551,248; 6,138,464; 5,970,726)
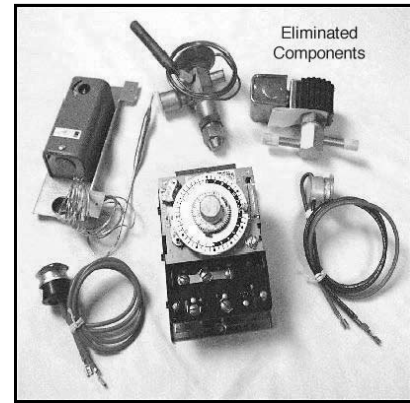
Compare

		Beacon II™ System	Conventional System
Performance	Pressure transducer and temp. sensor for better evaporator superheat adjustments	Standard	Not Available
	Bipolar stepper motor valve for better control	Standard	Not Available
	Anti-short cycling - 4 minutes hold off and 2 minutes hold on	Standard	Option
	Head pressure controls: 100 psig on Scroll® compressor models, 170 psig on Discus® and other compressors models	Standard	Option
	Box temp. set-point set with a push button and a rotary adjustment in 1°F increments	Standard	Not Available
	Defrost schedule never lost. Keeps defrost schedule and elapsed time in memory. If power is lost, defrost schedule is not lost	Standard	Standard
	Superheat selectable in 1°F increments from 4°F to 20°F.	Standard	Not Available
	Defrost end temperature selectable in 1°F increments from 40°F to 100°F.	Standard	Not Available
	Hi and low box temp. alarm and alarm time is adjustable	Standard	Option
	Low pressure switch time delay factory set at 1 minute	Standard	Option
	Can be placed in service mode to keep system turned off. This is useful while working on system or for implementation of redundant systems	Standard	Not Available
	Programmable delay time for start of defrost schedule	Standard	Not Available
	Spare sensor input provided. Can be used to monitor product temperature	Standard	Not Available
	Board settings can be locked	Standard	Not Available
Servicing	Alphanumeric 3 character LED displays mode, alarms and errors. Shows box temp. when running	Standard	Not Available
	Push-button switches and rotary selector used to program board	Standard	Not Available
	Board is completely programmable	Standard	Not Available
	Beacon II™ can be programmed to 1-6, 8, 10, or 12 defrosts per day	Standard	Not Available
	Test mode runs three times then stops automatically	Standard	Not Available
	Quick Ship program	Standard	Not Available
	Can monitor suction pressure from Beacon II™ board	Standard	Not Available
	Service mode shuts system down from the evaporator	Standard	Not Available
	EXV automatically closes on loss of power	Standard	Standard
	Monitors outdoor temp	Standard	Not Available
	3-Year warranty	Standard	Option
Beacon II™ Smart Controller	Beacon II™ Smart Controller shows alarms and errors while sounding a buzzer for alarms	Standard	Not Available
	Beacon II™ Smart Controller controls up to 4 separate systems	Standard	Not Available
	Beacon II™ Smart Controller uses Windows-based PC communication software	Option	Not Available
	Beacon II™ Smart Controller has data logging capability. Up to 30 days for 1 system: mode, box temp., superheat, evaporator suction pressure, spare aux. temp., and accumulated compressor cycles since midnight	Standard	Not Available
	All parameters can be programmed and monitored from the PC	Option	Not Available
	Beacon II™ Smart Defrost for energy savings	Standard	Not Available
	Smart Controller™ settings are lockable	Standard	Not Available
	Powerful new software for data logging, changes and monitoring remotely	Option	Not Available
	Ability to connect up to 64 systems on one communication port	Option	Not Available

Heatcraft Refrigeration Products' Continuing Advancements to Meet and Exceed Your Refrigeration Needs

New Components

Eliminated Components

Beacon II™
Main Control
Functions

Components That Are Eliminated With Beacon II™ Control System

• Liquid line solenoid valve
• Room thermostat
• Defrost time clock
• Defrost heater contactor
• Evaporator fan contactor
• Defrost termination/fan delay thermostat
• Thermal expansion valve(s)

New Components - All Factory Installed

• Beacon II™ control board with easy to read alphanumeric LED display (1 per evaporator)
• Program settings can be locked and unlocked on Beacon II™ board
• Solid state temperature sensors (3 per evaporator; 1 per condensing unit)
• Electric expansion valve that closes automatically on loss of power
• 24-volt transformer (1 per evaporator)
• Low pressure time delay switch
• Suction pressure transducer

Box Temperature

• Adjustable from -30°F to 70°F with onboard thermostat
• Alphanumeric LED displays box temperature
• Precise room temperature control
• Built in minimum compressor on/off times
• Uses 24-volt coil compressor contactor coil

Evaporator Superheat

• Fully selectable from 4°F to 20°F (factory set at 8°F)
• Liquid line solenoid valve is eliminated by the use of a reliable stepper motor type electric expansion valve
• Actual superheat is measured with use of suction pressure transducer and suction sensor

Initiates and Terminates Defrost

• Time-initiated, temperature or time-terminated
• Number of defrosts is programmable from one per day to 12 per day
• Initial defrost can be delayed in 1/2 hour rements up to 23 hours
• Defrost schedule and elapsed time are kept in memory. Schedule is not affected by short power loss
• Fail-safe time is selectable from 10 minutes to 200 minutes
• Termination temperature is adjustable from 40°F to 100°F
• Fan delay and residual water drain down at end of defrost
• For multiple evaporator systems, one   evaporator is designated as "master" and controls defrost initialization, "fail-safe time" termination and room temperature
• Manual defrost initiation capability

Beacon II™ Main Control Functions (continued)

Condenser Fan Cycling
• Fan cycling control is based on condensing pressure on multiple fan units only

Alarm
• Alarm contacts provided on control board
• Alarm contacts activate on power failure
• Alarm contacts activate if room temperature is above or below set-point range for a specified time
• Alarm activates for system failure to restart after 3 attempts
• Alarm activates for input failure from suction transducer, suction sensor or room sensor

Status Indication
• Box temperature
• Operation mode
• Failure indication mode/codes
• Error code will indicate if communication wiring is incorrect

Remote Adjustments/Monitoring/Data Logging
• Beacon II™ Smart Controller allows for remote adjustments and monitoring of up to 4 systems
• Smart II software (Windows only) allows for remote adjusting/monitoring via modem plus minute-by-minute system conditions data capture while connected to Beacon II™ Smart Controller
• Smart II software also allows for downloading of up to 30 days of data logged on select system functions and errors, faults or alarms taken every 15 minutes

Quick Ship Order Capabilities
• Emergency in-warranty shipments of unique Beacon II™ parts are available after normal business hours until 1:00 AM Eastern Standard Time for coast-to-coast morning delivery. Call the InterLink Parts Department at 1-800-686-7278 for complete details on how to utilize this service.
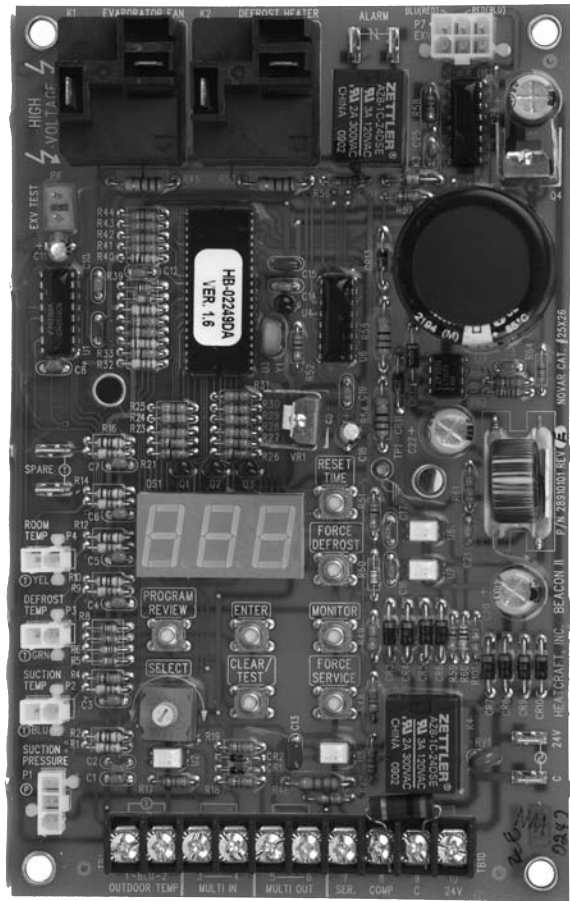
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BEACON II™ SYSTEM
ALARM CODES
A1 - HIGH ROOM TEMP.
A2 - LOW ROOM TEMP.
A3 - SYSTEM START-UP FAILURE
A4 - INPUT FAULT
ERROR CODES
E1 - ROOM TEMPERATURE SENSOR SHORTED
E2 - DEFROST TEMPERATURE SENSOR SHORTED
E3 - SUCTION TEMPERATURE SENSOR SHORTED OR OPEN
E4 - SUCTION PRESSURE TRANSDUCER SHORTED OR OPEN
E5 - OUTDOOR TEMPERATURE SENSOR SHORTED
E6 - LOW SUPERHEAT DURING COOLING
E7 - COMPRESSOR SHUTDOWN (HIGH OR LOW
     REFRIGERANT PRESSURE OR LOW OIL PRESSURE)
E9 - MULTI-IN/MULTI-OUT WIRING ERROR
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Beacon II™ has error and alarm codes to help you quickly diagnose system problems

Beacon II™ Yields Time and Cost Savings through Simplified Installation

Because the Beacon II™ Refrigeration System is completely installed, adjusted and tested at the factory, field assembly and fine tuning at the job site are substantially reduced. With Beacon II™, the installing contractor needs only to mount, pipe, wire and leak check the new system. Superheat is factory preset, so installation is much quicker than with conventional systems.

Beacon II's™ significantly simplified installation process results in a far more reliable and efficient refrigeration system with far fewer callbacks and dramatically reduced system down time. The 24-volt control wiring is also safer, easier and less expensive to install. All of Beacon II's™ installation efficiencies mean a substantially more profitable installation for contractors and end users.

Beacon II's™ control board and electric expansion valve are factory installed for dramatically reduced field assembly time and minimal adjustments on the job site

Beacon II's™ electric expansion valve more accurately controls the flow of refrigerant into and out of the system. It replaces traditional expansion and solenoid valves

Control and Monitor
Beacon II™ Outside the Box!

Beacon II™ Smart Controller: Superior Technology at Your Fingertips

How did Beacon II™ Engineers improve upon the Beacon II™ Refrigeration System? They made advances with the Beacon II™ Smart Controller, making Beacon II™ even easier to monitor and adjust. The Beacon II™ Smart Controller is an optional Beacon II™ system monitoring and programming control device, and it has already made traditional refrigeration monitoring and programing systems obsolete. It allows for adjustments to be made at the push of a button from a conveniently mounted location. In addition, you can monitor one or more systems and make system changes via modem connection from anywhere in the world. No product ever developed provides higher levels of control and reliability.

Adjust or Inspect Your System From Anywhere In The World!

The Beacon II™ Smart Controller displays current settings, any changes in the system and can tell you what adjustments need to be made. No more sending a technician to the roof or inside the cooler or freezer to make adjustments or monitor systems.

The Beacon II™ Smart Controller allows you to diagnose the system remotely. Adjustments can be made from the conveniently located controller and can be monitored from a PC, via modem. Additionally, the system has a lockout feature, giving you control over who has access to make system adjustments. The Beacon II™ Smart Controller option can only be utilized with a Beacon II™ Refrigeration System.

For even more convenience and data logging capabilities, the Beacon II's™ Smart II software is available. The Windows-based software allows you to connect to the Beacon II™ Smart Controller from anywhere in the world to monitor the systems, make adjustments and capture minute by minute system conditions. This data logging capability is critical in the food service industry. With this ease of operation and level of control, why refrigerate without Beacon II™?

Beacon II's™ Smart II software makes it easy to adjust and monitor one or more. Refrigeration Systems as well as capture minute by minute system conditions

Beacon II's™ Smart Controller remote terminal makes it easy to adjust and monitor one or more Refrigeration Systems

Monitoring and Adjusting Your Beacon II™ System Using Beacon II™ Smart Controller

These Functions May Be Set Using the Beacon II™ Smart Controller

- Defrost Type (Electric or Air)
- Refrigerant Type (R-22, R-404A, R-507)
- Box Temperature (-30°F to 70°F) or (-34°C to 21°C)
    - Switch off cooling cycle manually
- Superheat Setting
    - From (4°F to 20°F) or (2°C to 11°C) (for all evaporators on the system)
- Defrost Cycle
    - Frequency (up to 12 defrosts per day)
    - Start Times (actual time of day)
    - Fail Safe Time (in minutes) (10-200)
    - Termination Temperature (40°F to 100°F) or (4°C to 38°C)
    - Force 'extra' defrost cycle manually
- Smart Defrost
    - On/off setting
    - Built-in logic to determine if a defrost is needed
    - User programs at least 8 times for potential defrosts per day
    - Will automatically defrost at least once per 24 hours of compressor run time

- Alarm Set Points
    - High temperature (-40°F to 70°F) or (-40°C to 21°C)
    - Low temperature (-40°F to 70°F) or (-40°C to 21°C)
    - Fail-safe time that temperature exceeds set points (2 min. -120 min.)
    - Audible buzzer sounds on alarm
- Temperature Readout units (in °F or °C)

- Clock/Date (time of day in 12H or 24H/ international format)
- Test - Puts all Beacon II™ components in test mode (use for diagnostics/troubleshooting)
- Service Mode (on or off)
- Programming Lockout (to prevent unauthorized changes)

Beacon II™ Smart Controller Allows You To Monitor These System Conditions

- Box Temperature
- Superheat Condition for each evaporator on the system
- Suction Temperature & Pressure
- Electric Expansion Valve Position
- Outdoor Temperature (°F/°C)
- Compressor Run Time (in minutes/accumulation since midnight)
- Compressor Cycles (accumulation since midnight)
- Evaporator Coil Temperature
- Length of last Defrost Elapsed Time (in minutes/ accumulation since midnight)
- Operational Mode: On, Off, Cooling, Defrost
- Spare Sensor Temperature
- Versions of connected Beacon II™ boards
- Version of Smart II software

Beacon II's™ Smart Controller Provides You with Ultimate Control

Beacon II™ Smart Controller Features

- Monitor one or more complete Beacon II™ Refrigeration Systems (up to 4 separate systems)
- Capability to program a variety of parameters for optimum performance of the Beacon II™ Refrigeration System
- Beacon II™ Smart Defrost Capabilities
- May be placed apart from the system being controlled (500 - 1000 ft.)
- Locking feature to prevent unauthorized access to program settings
- Each Beacon II™ Smart Controller can control multiple evaporators on a system (up to 4 evaporators)
- An RS232 port is provided on the Beacon II™ Smart Controller with purchase of software
- Smart II software, optional Windows-based software, is available for remote system monitoring, system adjustments and data logging of system conditions
- Audible alarm buzzer
- Backup battery will maintain the clock settings for 10-years

- Double E ROM Chip will maintain program settings indefinitely
- Large, easy to read Liquid Crystal Display (LCD) screen
- Easy to use function keys
  - Cooling mode toggle
  - Defrost mode toggle
  - Monitor mode switch
  - Programming mode switch
  - Slide switches for selecting settings

Beacon II's™ Smart Controller features an easy to read LCD screen and easy to adjust keys

Beacon II™ Smart Defrost:
The Most Intelligent Approach to Refrigeration System Defrosting

How did Heatcraft Refrigeration Products' engineers make Beacon II™ Smart Controller even smarter? They developed Beacon II's™ Smart Defrost, a significant breakthrough in refrigeration technology, standard on all Beacon II™ Smart Controllers. Simply put, when the Beacon II™ Smart Defrost mode is enabled, the system predicts frost accumulation and defrosts on an as-needed basis.

Why Defrost When You Don't Have To?

Variances in ambient conditions, product load, and humidity affect the amount of frost accumulation on evaporators. Conventional systems defrost at preset times of the day, whether the system needs to be defrosted or not. With Beacon II™ Smart Defrost, the system first checks to determine if frost buildup is significant enough to require a defrost.

Beacon II's™ Smart Defrost is the first system in the industry capable of predicting frost accumulation, and initiating defrost only when it is necessary.

How Does Beacon II™ Smart Defrost Work?

Beacon II™ Smart Defrost, an optional setting within every Beacon II™ Smart Controller, is enabled by initiating the defrost mode from the main menu. Simply program defrost times (at least eight a day), then set Beacon II™ Smart Defrost to on. Now Beacon II™ Smart Defrost is working. At the user programmed defrost times, the system will determine if a defrost is necessary. If so, defrost will begin, but if it is not necessary, the

system continues normal function until the next programmed defrost time occurs. The Beacon II™ Smart Controller will continue to monitor system performance at every programmed interval to determine a need for defrost, before actually defrosting. The system has a programmed default to run at least one defrost cycle per 24 hours of compressor run time. At any time, the system can be reset to conventional timed defrost.

Beacon II™ Smart Defrost is Efficient Defrost

Beacon II™ Smart Defrost provides improved efficiency due to overall defrost reductions, better product integrity, extended compressor life and a more consistent box temperature. Not only does the system save energy by not energizing heaters during unnecessary defrosts, it also saves energy by not expending energy to bring the room temperature back down after defrosting.

Beacon II's™ Smart Defrost is the first system in the industry capable of predicting frost accumulation, and initiating defrost only when it is necessary

Proven Results in the Lab and on Your Energy Bill

In laboratory and field tests, on a system with 4 programmed defrost times, Beacon II™ Smart Defrost eliminated an average of 2 defrost cycles per day, 180 days of the year. This adds up to substantial energy savings, especially for light frost load applications. At a rate of 7.5 cents per kW, annual cost savings amount to $115 per low profile evaporator.

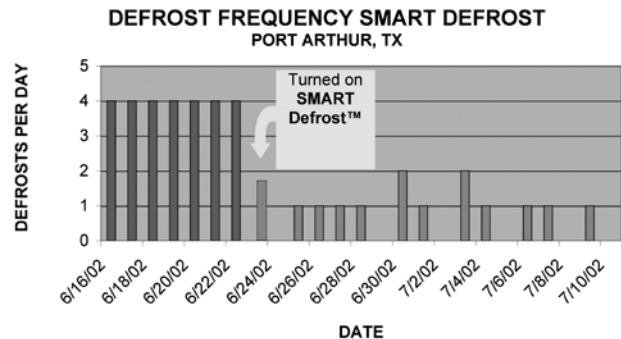## Beacon II™ Smart Controller Works Hard, So the Refrigeration System Doesn't

By eliminating unnecessary defrosts, the system doesn't work any harder than it should, eliminating excess wear on the equipment, extending product life, and maintaining a more consistent box temperature, thereby assuring the most ideal environment for your refrigerated goods. Best of all, there is no cost added to the system, because Beacon II™ Smart Defrost is built into the Beacon II™ Smart Controller as one of the many programmable settings.

Beacon II™ Training

Heatcraft Refrigeration Products understands that the Beacon II™ is new and innovative and takes advantage of the latest technology. To make sure that installers keep up, we provide training on how to install and troubleshoot Beacon II™ systems. We know you won't experience nearly the problems with a Beacon II™ system as you might with a traditional refrigeration system, but if you do have a problem, there will be qualified service people who can help you with your Beacon II™ system.

Smart Defrost Energy Savings	Low Profile Evaporator	Med. Profile Evaporator	Large Unit Cooler
Evaporator	LET120	BML330	BHL1440
Cond. Unit @ 90°F cond. & -20°F suction	3 HP	7.5 HP	30 HP
Heater Watts	2.7 kW	7.8 kW	37.1 kW
Compressor Watts	2.7 kW	5.6 kW	18.3 kW
Defrost Per Day	1	1	2
Estimated Yearly Savings @ $0.08/kW	$163	$704	$2,053

Calculations for the Low Profile and the Medium Profile are based on actual data from systems running for our customers in the USA Data for the Large Unit Cooler is projected
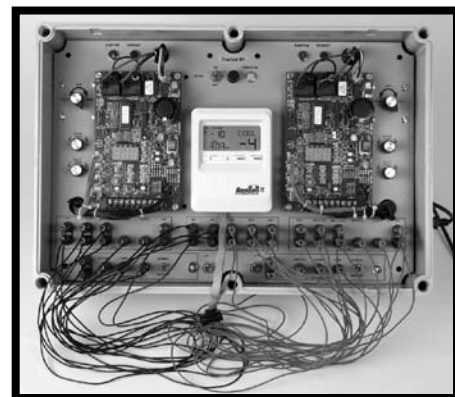

DEFROST FREQUENCY SMART DEFROST
PORT ARTHUR, TX

Standard Defrost
6/16/02 to 6/22/02
7 Days at 4/Day = 28 Defrost

Smart Defrost
6/26/02 to 7/02/02
7 Days = 7 Defrost

Beacon II™, A Shining Example of Heatcraft's Continuing Technological Excellence

The Beacon II™ system continues as a true breakthrough. No other system delivers the safety, the simplicity, the speed of installation, the level of system control or the significant improvements to system performance provided by this entirely innovative concept in refrigeration. When making your equipment selection, it's a no-brainer to choose Beacon II™.

Training Seminar Trainer

Heatcraft trains service technicians to provide you with superior service if you ever need service on your Beacon II™ Refrigeration System

Beacon II™

REFRIGERATION SYSTEM

Communications Hub

For connection of multiple Beacon II™ Smart Controllers to a
single communication device (PC or modem)

Maximum configuration:

- 4 Beacon II™ Smart Controllers connected to one Communications Hub (4 systems per Beacon II™ Smart Controller equals 16 systems with maximum of 64 evaporators)
- 16 Beacon II™ Smart Controllers connected to five Communications Hubs (4 systems per Beacon II™ Smart Controller equals 64 systems with maximum of 256 evaporators; Communications Hubs can only be cascaded once)

Beacon II™ Communications Hub Kit (Part #89708001):

- Communications Hub
- 24-volt AC power supply
- 4 ribbon cables
- 4 null modem cables

Visit our website at www.heatcraftrpd.com for technical literature online.

Since product improvement is a continuing effort, we reserve the right to make changes
in specifications without notice.

HEATCRAFT
Worldwide Refrigeration