

# CONTROL PANELS



Heatrex can provide a control system for any electric process heating application. Standard and custom sized enclosures, along with standard and custom designed control operation, give Heatrex the flexibility to supply a wide range of control panels to complete the heater control system.



# Introduction

Our experienced engineering staff can design control systems ranging from ON/OFF logic to fully proportional SCR, multiple channel and ramp/soak control with computer interface capability.

Heatrex offers two standard control panel designs: Fully proportional SCR control and ON/OFF contactor control. All components are factory mounted and wired in compliance with the National Electric Code and are UL and/or CSA Listed.

A Vernier control panel can also be supplied. Vernier control utilizes contactors, one SCR controller, and a microprocessor-based sequencer. The sequencer controls the staging of the contactors and the SCR controller. The SCR controller serves to fill in the gaps between the step-controlled stages. Vernier control is not quite as accurate as full SCR control, but more accurate than contactor (step) control.

Custom control panels, designed specifically for your application, are also available.

## Control Panel Quick Selection/Application Guide

|   | Agency Listing | NEMA Rating    |                |                | Max Amp Rating | Availability   | Cost | Page |
|---|----------------|----------------|----------------|----------------|----------------|----------------|------|------|
|   |                | 4              | 4X             | 12             |                |                |      |      |
| <b>873 Series Contactor Panel</b>         | UL             | X <sup>2</sup> | X <sup>2</sup> | X <sup>2</sup> | 96             | Stock          | \$   | 3    |
| <b>873 Series SCR Panel</b>               | UL             | X <sup>2</sup> |                | X <sup>2</sup> | 96             | Stock          | \$   | 4    |
| <b>870 Series Contactor Control Panel</b> | UL/CSA         | X              | X <sup>1</sup> | X              | 576            | Assembly Stock | \$\$ | 5-6  |
| <b>870 Series SCR Control Panel</b>       | UL/CSA         | X              | X <sup>1</sup> | X              | 576            | Assembly Stock | \$\$ | 7-8  |

(1) Available as Option.

(2) Although designed and tested for use in outdoor locations, agency rating is Type 1 only.

# 873 Series Quick Ship Contactor Control Panel

The **Quick Ship** Contactor Temperature Control panel provides fast shipment, compact packaging, and is pre-engineered for resistive load applications. The panel is completely assembled, pre-wired, tested, and ready for trouble free installation and operation.

Designed for use in industrial environments and outdoor installations.<sup>4</sup>



## STANDARD CONSTRUCTION FEATURES:

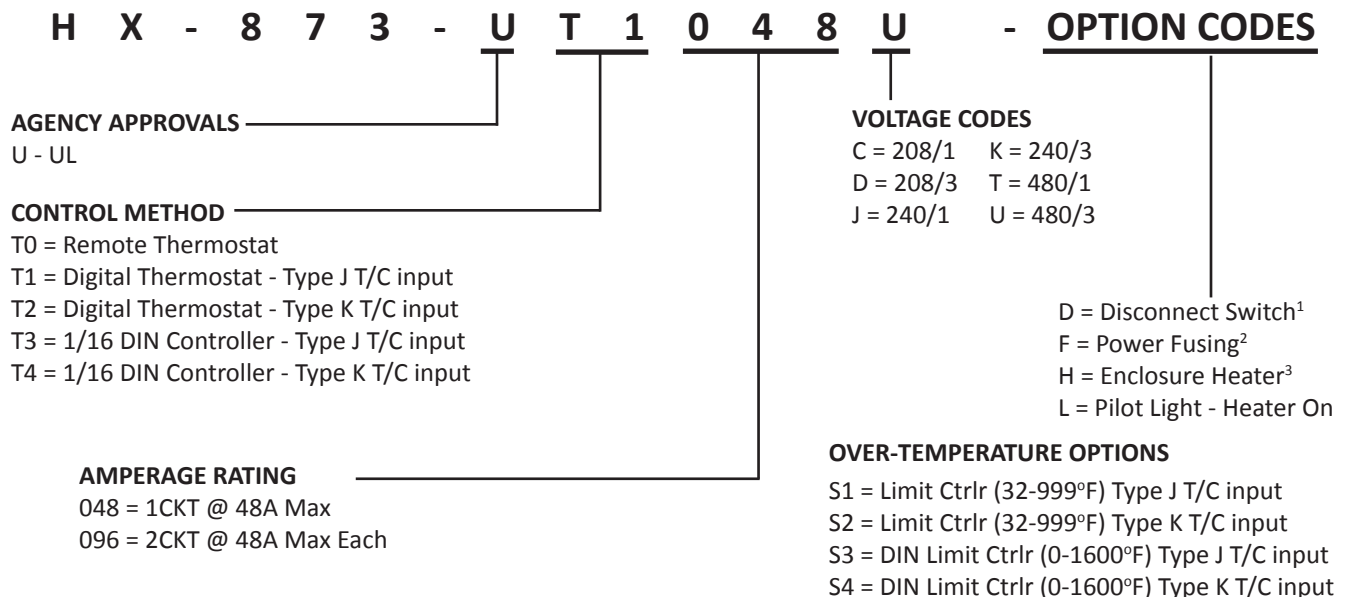
- NEMA 4X Fiberglass Enclosure
- 16”H x 14”W x 8”D Enclosure for 1 Circuit (48A max)
- 20”H x 16”W x 8”D Enclosure for 2 Circuits (48-96A)
- Single or Three Phase Loads
- 50 Amp Contactor for Resistive Loads (per circuit)
- 120 VAC Control Transformer
- UL Listed<sup>4</sup>
- Wiring Diagram Permanently Affixed to the Inside of the Cover
- Terminals for Customer Supplied Remote Interlock

## OPTIONAL FEATURES:

- Digital Indicating Thermostat (°F only) 32-999°F range
- Digital 1/16 th DIN Process Controller with RS485 Communications available (°F or °C) 0-1600°F range
- Disconnect Switch<sup>1</sup>
- Power Fusing<sup>2</sup>
- Enclosure Heater<sup>3</sup>
- Pilot Light for Indication of Heater “ON”
- Digital Indicating Limit Control with manual reset (°F only) 32-999°F range
- 1/16th DIN Digital Indicating Limit Control with manual reset (°F or °C) 0-1600°F range

## ORDERING INFORMATION

**Quick Ship**, build your catalog number



### Note:

1. NEC code requires disconnecting means within sight of a heater.
2. Power fusing is required by NEC for panels greater than 48 amps.
3. Heater is recommended for outdoor panels in cold environments with ambient below 32°F.
4. Although designed and tested for use in outdoor locations, UL rating is Type 1 only.

# 873 Series **Quick Ship** SCR Control Panel



The **Quick Ship** SCR Temperature Control panel provides fast shipment, precise temperature control, compact packaging, and is pre-engineered for resistive load applications. The panel is completely assembled, pre-wired, tested, and ready for trouble free installation and operation.

Designed for use in industrial environments and outdoor installations.<sup>4</sup>



## STANDARD CONSTRUCTION FEATURES:

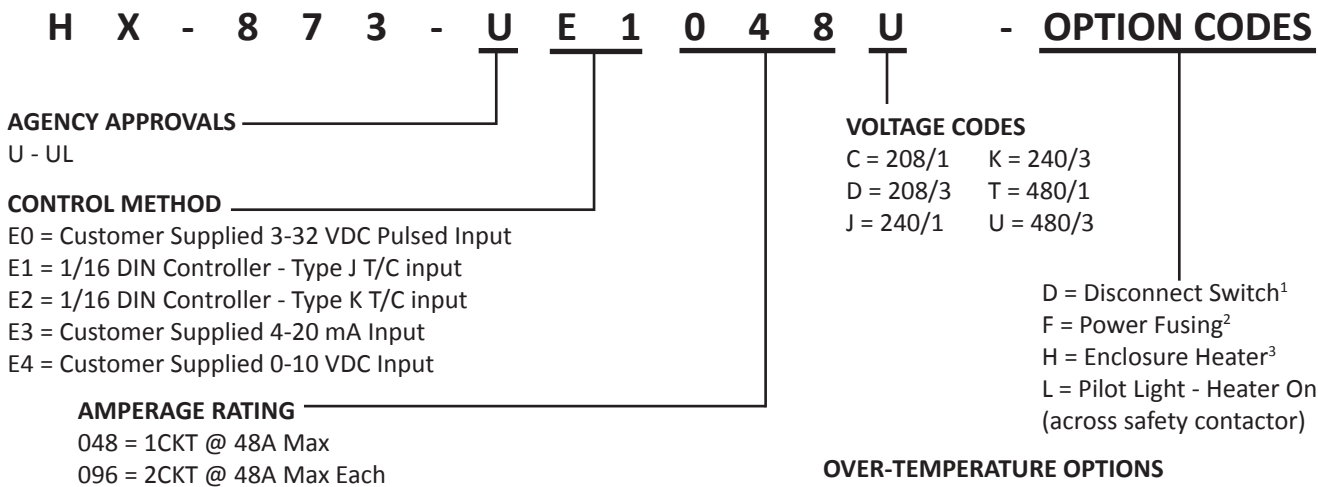
- NEMA 4/12 Painted Steel Enclosure
- 20”H x 16”W x 8”D Enclosure for 1 Circuit (48A max)
- 24”H x 20”W x 8”D Enclosure for 2 Circuits (48-96A)
- Single or Three Phase Loads
- 50 Amp SCR Power Controller (per circuit)
- 50 Amp Safety Contactor (per circuit)
- 120 VAC Control Transformer
- UL Listed<sup>4</sup>
- Wiring Diagram Permanently Affixed to the Inside of the Cover
- Terminals for Customer Supplied Remote Interlock

## OPTIONAL FEATURES:

- Digital 1/16th DIN PID Process Controller with RS485 Communications available
- Disconnect Switch<sup>1</sup>
- Power Fusing<sup>2</sup>
- Enclosure Heater<sup>3</sup>
- Pilot Light for Indication of Power “ON”
- Digital Indicating Limit Control with manual reset (°F only) 32-999°F range
- 1/16th DIN Digital Indicating Limit Controller with manual reset (°F or °C) 0-1600°F range

## ORDERING INFORMATION

**Quick Ship**, build your catalog number



**Note:**

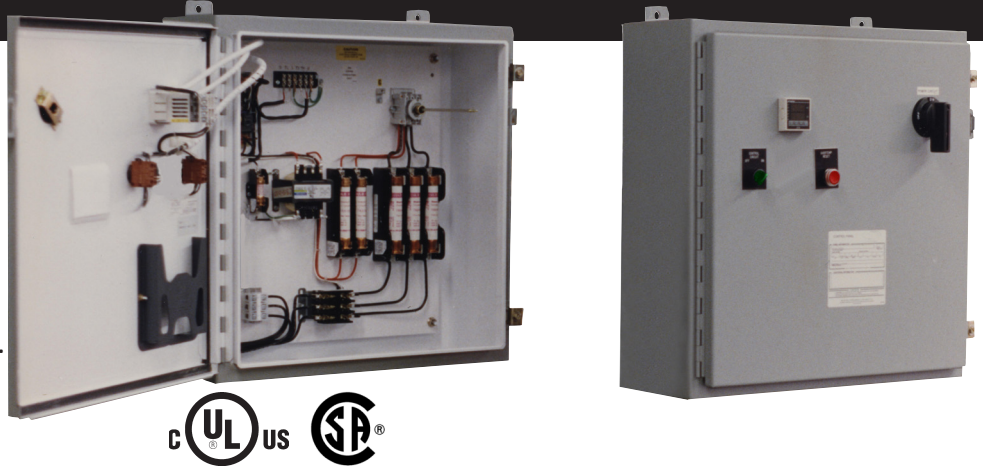
1. NEC code requires disconnecting means within sight of a heater.
2. Power fusing is required by NEC for panels greater than 48 amps.
3. Heater is recommended for outdoor panels in cold environments with ambient below 32°F.
4. Although designed and tested for use in outdoor locations, UL rating is Type 1 only.

**OVER-TEMPERATURE OPTIONS**

- S1 = Limit Ctrlr (32-999°F) Type J T/C input
- S2 = Limit Ctrlr (32-999°F) Type K T/C input
- S3 = DIN Limit Ctrlr (0-1600°F) Type J T/C input
- S4 = DIN Limit Ctrlr (0-1600°F) Type K T/C input

# 870 Series Contactor Control Panel

The **870 Series** Contactor Temperature Control panel is ON/OFF process temperature control and is recommended for applications that do not demand precise temperature control. Systems with two or more heating stages utilize an electronic sequencer (step controller) driven by a proportional output temperature controller to minimize the amount of load cycling while providing good temperature control. The panel is completely assembled, pre-wired, tested, and ready for trouble free installation and operation. Designed for use in industrial environments and outdoor installations.



## STANDARD CONSTRUCTION FEATURES:

- UL Listed/CSA Approved
- NEMA 4/12 Painted Steel Enclosure<sup>1</sup>
- PID self-tuning temperature controller (adjustable process temperature with standard type “J” thermocouple input)
- Over-temperature controller (adjustable temperature limit with standard type “J” thermocouple input)
- Disconnecting 50 Amp contactor for resistive loads (per circuit)
- 120 VAC control power transformer with primary and Secondary fusing
- Power circuit fusing
- Microprocessor-based sequencer (for panels with two or more heating stages)
- Door interlocking disconnect switch
- Manual reset pushbutton with built-in pilot light (red) for “OVER-TEMPERATURE” alarm
- Selector Switch – ON/OFF with built-in pilot light (green) for “POWER ON” indication
- Terminals for customer supplied remote interlock
- Wiring diagram permanently affixed to the inside of the cover

## OPTIONAL FEATURES:

- **Control Relays** – These relays are activated by safety devices, such as a flow switch or remote shutoff.
- **Indicator Lights** – Additional indicator lights may be specified for visual indication of system status, such as “LOW TEMPERATURE”.

- **Audible Alarm Package** – Includes a horn, pilot light, latching relay and a push button for silencing the horn.
- **Low Liquid Cutoff** – The relay is mounted and wired with sensing probe shipped loose for field installation.
- **Motor Starter** – This package consists of a motor starter for pump motor start-up. Motor starter is internally mounted and field connected to the pump motor.
- **Special Controllers** – The customer may specify the use of special process or over-temperature controllers for a different temperature range, sensor input, control mode, etc.
- **Panel Heater** – A heater and thermostat are provided to prevent condensation and maintain minimum ambient temperature for electrical components.
- **Wire Markers** – Identification markers are attached to both ends of all control and power wires.
- **Tagging of Internal Parts** – Permanent tags are attached to the subpanel near internal parts and marked with component titles as noted on the wiring diagram.
- **Explosion-Resistant Panel** – A cast aluminum enclosure is rated for Class I, Groups C & D and Class II, Groups E, F & G (NEMA 7, 9).
- **Purged Panels** – Type Z for Class I, Division 2 areas  
Type X for Class I, Division 1 areas.
- **Optional Temperature Inputs** – Type “K” thermocouple inputs or “RTD” inputs.
- **Stainless Steel Panel Enclosure (NEMA 4X)** – This construction provides extra corrosion resistance for harsh environments<sup>1</sup>.
- **Special Ratings** – 100 KA interrupting amp rating.

(1) Agency listed for NEMA 4 only.

# 870 Series Contactor Control Panel

## ORDERING INFORMATION

Build your catalog number

**H X - 8 7 0 - Z C 0 0 4 8 B U - 0 0 0 0 0 0**

**AGENCY APPROVALS**

- U - UL
- N = Non-UL
- \*Z = UL/CSA

**CONTROL METHOD**

- C = Contactor
- S = SCR

**AMP RATING**

(Rounded to the nearest Amp)

**NEMA TYPE**

- A = (1) Standard Indoor — non-hazardous location
- \*B = (4) Standard Outdoor — non-hazardous location
- C = (7,9) Standard Indoor — hazardous location
- D = (4,7,9) Standard Outdoor — hazardous location
- E = (4X,7,9) Outdoor w/salt spray — hazardous and non-hazardous locations
- F = (9) Indoor Class II, Groups E, F, G hazardous locations only
- G = (4X) Outdoor w/salt spray — non-hazardous location
- J = (12) Dust-tight Indoor — non-hazardous location

**SERIAL NUMBER**

(Only used with custom designs)

**VOLTAGE CODES**

- C = 208/1      T = 480/1
- D = 208/3      U = 480/3
- J = 240/1      X = 575/3
- K = 240/3      Z = 600/3
- O - custom voltage

\*Standard Catalog Construction

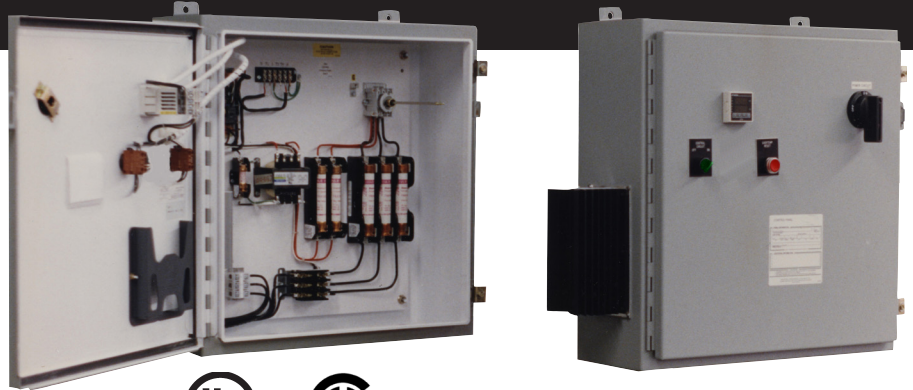
## CATALOG CONTACTOR CONTROL PANELS

| Max KW<br>240/3 | Max KW<br>480/3 | No. of<br>Circuits | Amps<br>Per<br>Circuit | Catalog Number with<br>Maximum Amps |                 | Dimensions (Inches) |       |       | Estimated<br>Weight (lbs) |
|-----------------|-----------------|--------------------|------------------------|-------------------------------------|-----------------|---------------------|-------|-------|---------------------------|
|                 |                 |                    |                        | 240V/3PH                            | 480V/3PH        | Height              | Width | Depth |                           |
| 19              | 39              | 1                  | 48                     | HX-870-UC0048BK                     | HX-870-UC0048BU | 24                  | 24    | 8     | 90                        |
| 39              | 79              | 2                  | 48                     | HX-870-UC0096BK                     | HX-870-UC0096BU | 30                  | 30    | 8     | 140                       |
| 59              | 119             | 3                  | 48                     | HX-870-UC0144BK                     | HX-870-UC0144BU | 36                  | 30    | 8     | 165                       |
| 79              | 159             | 4                  | 48                     | HX-870-UC0172BK                     | HX-870-UC0172BU | 42                  | 30    | 8     | 180                       |
| 99              | 199             | 5                  | 48                     | HX-870-UC0240BK                     | HX-870-UC0240BU | 48                  | 36    | 8     | 270                       |
| 119             | 239             | 6                  | 48                     | HX-870-UC0288BK                     | HX-870-UC0288BU | 48                  | 36    | 8     | 275                       |
| 139             | 279             | 7                  | 48                     | HX-870-UC0336BK                     | HX-870-UC0336BU | 60                  | 36    | 12    | 345                       |
| 159             | 319             | 8                  | 48                     | HX-870-UC0384BK                     | HX-870-UC0384BU | 60                  | 36    | 12    | 350                       |
| 179             | 359             | 9                  | 48                     | HX-870-UC0432BK                     | HX-870-UC0432BU | *60                 | 48    | 12    | 630                       |
| 199             | 399             | 10                 | 48                     | HX-870-UC0480BK                     | HX-870-UC0480BU | *60                 | 48    | 12    | 635                       |
| 219             | 438             | 11                 | 48                     | HX-870-UC0528BK                     | HX-870-UC0528BU | *60                 | 60    | 12    | 720                       |
| 239             | 478             | 12                 | 48                     | HX-870-UC0526BK                     | HX-870-UC0526BU | *60                 | 60    | 12    | 725                       |

\*These panels have double doors and 12" high floor stands.

# 870 Series SCR Control Panel

The **870 Series** SCR Control panel is a fully proportional process temperature control panel that utilizes SCR Power Controllers to modulate the entire heater load directly, varying the heater output from 0 to 100% of the total heater KW. Working on a four second time base, the heater will be energized only for the number of AC cycles necessary to produce the exact amount of heat required. The resulting precise control and rapid response make the 870 Series SCR Control Panel the best choice for applications that must accommodate material flow changes and still provide precise temperature control. The panel is completely assembled, pre-wired, tested, and ready for troublefree installation and operation. Designed for use in industrial environments and outdoor installations.



## STANDARD CONSTRUCTION FEATURES:

- UL Listed/CSA Approved
- NEMA 4/12 painted steel enclosure<sup>1</sup>
- PID self-tuning temperature controller (adjustable process temperature with standard type “J” thermocouple input)
- Over-temperature controller (adjustable temperature limit with standard type “J” thermocouple input)
- Disconnecting 50 amp safety contactor for resistive loads (per circuit)
- 120 VAC control power transformer with primary and secondary fusing
- Power circuit fusing
- Three-phase, zero cross-fired SCR power controllers
- Door interlocking disconnect switch
- Manual reset pushbutton with built-in pilot light (red) for “OVER-TEMPERATURE” alarm
- Selector Switch – ON/OFF with built-in pilot light (green) for “POWER ON” indication
- Terminals for customer supplied remote interlock
- Wiring diagram permanently affixed to the inside of the cover

## OPTIONAL FEATURES:

- **Control Relays** – These relays are activated by safety devices, such as a flow switch or remote shutoff.
- **Indicator Lights** – Additional indicator lights may be specified for visual indication of system status, such as “LOW TEMPERATURE”.

- **Audible Alarm Package** – Includes a horn, pilot light, latching relay and a push button for silencing the horn.
- **Low Liquid Cutoff** – The relay is mounted and wired with sensing probe shipped loose for field installation.
- **Motor Starter** – This package consists of a motor starter for pump motor start-up. Motor starter is internally mounted and field connected to the pump motor.
- **Special Controllers** – The customer may specify the use of special process or over-temperature controllers for a different temperature range, sensor input, control mode, etc.
- **Panel Heater** – A heater and thermostat are provided to prevent condensation and maintain minimum ambient temperature for electrical components.
- **Wire Markers** – Identification markers are attached to both ends of all control and power wires.
- **Tagging of Internal Parts** – Permanent tags are attached to the subpanel near internal parts and marked with component titles as noted on the wiring diagram.
- **Explosion-Resistant Panel** – A cast aluminum enclosure is rated for Class I, Groups C & D and Class II, Groups E, F & G (NEMA 7, 9).
- **Purged Panels** – Type Z for Class I, Division 2 areas  
Type X for Class I, Division 1 areas.
- **Optional Temperature Inputs** – Type “K” thermocouple inputs or “RTD” inputs.
- **Stainless Steel Panel Enclosure (NEMA 4X)** – This construction provides extra corrosion resistance for harsh environments<sup>1</sup>.
- **Special Ratings** – 100 KA interrupting amp rating.

(1) Agency listed for NEMA 4 only.

# 870 Series SCR Control Panel

## ORDERING INFORMATION

Build your catalog number

**H X - 8 7 0 - Z S 0 0 4 8 B U - 0 0 0 0 0 0**

**AGENCY APPROVALS**

- U - UL
- N = Non-UL
- \*Z = UL/CSA

**CONTROL METHOD**

- C = Contactor
- S = SCR

**AMP RATING**

(Rounded to the nearest Amp)

**NEMA TYPE**

- A = (1) Standard Indoor — non-hazardous location
- \*B = (4) Standard Outdoor — non-hazardous location
- C = (7,9) Standard Indoor — hazardous location
- D = (4,7,9) Standard Outdoor — hazardous location
- E = (4X,7,9) Outdoor w/salt spray — hazardous and non-hazardous locations
- F = (9) Indoor Class II, Groups E, F, G hazardous locations only
- G = (4X) Outdoor w/salt spray — non-hazardous location
- J = (12) Dust-tight Indoor — non-hazardous location

**SERIAL NUMBER**

(Only used with custom designs)

**VOLTAGE CODES**

- C = 208/1      T = 480/1
- D = 208/3      U = 480/3
- J = 240/1      X = 575/3
- K = 240/3      Z = 600/3
- O - custom voltage

\*Standard Catalog Construction

## CATALOG SCR CONTROL PANELS

| Max KW<br>240/3 | Max KW<br>480/3 | No. of<br>Circuits | Amps<br>Per<br>Circuit | Catalog Number with<br>Maximum Amps |                 | Dimensions (Inches) |       |       | Estimated<br>Weight (lbs) |
|-----------------|-----------------|--------------------|------------------------|-------------------------------------|-----------------|---------------------|-------|-------|---------------------------|
|                 |                 |                    |                        | 240V/3PH                            | 480V/3PH        | Height              | Width | Depth |                           |
| 19              | 39              | 1                  | 48                     | HX-870-US0048BK                     | HX-870-US0048BU | 24                  | **24  | 8     | 90                        |
| 39              | 79              | 2                  | 48                     | HX-870-US0096BK                     | HX-870-US0096BU | 30                  | **30  | 8     | 140                       |
| 59              | 119             | 3                  | 48                     | HX-870-US0144BK                     | HX-870-US0144BU | 36                  | **30  | 8     | 165                       |
| 79              | 159             | 4                  | 48                     | HX-870-US0172BK                     | HX-870-US0172BU | 42                  | **30  | 8     | 185                       |
| 99              | 199             | 5                  | 48                     | HX-870-US0240BK                     | HX-870-US0240BU | 48                  | **36  | 8     | 275                       |
| 119             | 239             | 6                  | 48                     | HX-870-US0288BK                     | HX-870-US0288BU | 48                  | **36  | 8     | 280                       |
| 139             | 279             | 7                  | 48                     | HX-870-US0336BK                     | HX-870-US0336BU | 60                  | **36  | 12    | 360                       |
| 159             | 319             | 8                  | 48                     | HX-870-US0384BK                     | HX-870-US0384BU | 60                  | **36  | 12    | 365                       |
| 179             | 359             | 9                  | 48                     | HX-870-US0432BK                     | HX-870-US0432BU | *60                 | **48  | 12    | 645                       |
| 199             | 399             | 10                 | 48                     | HX-870-US0480BK                     | HX-870-US0480BU | *60                 | **48  | 12    | 650                       |
| 219             | 438             | 11                 | 48                     | HX-870-US0528BK                     | HX-870-US0528BU | *60                 | **60  | 12    | 745                       |
| 239             | 478             | 12                 | 48                     | HX-870-US0526BK                     | HX-870-US0526BU | *60                 | **60  | 12    | 750                       |

\*These panels have double doors and 12" high floor stands.

\*\* Additional 9" clearance required for externally mounted heat sinks which may be mounted on one of both sides of the enclosure.