Universal Heat Pump Defrost Control, 47D01U-843

Overview
What Does a Heat Pump Defrost Control Do?

Basic Defrost Operation

1. Monitors air & coil sensors
2. Determines need to defrost
3. Turns on indoor heat
4. Turns off the outdoor fan
5. Switches the reversing valve
6. Determines coil is defrosted
7. Turns off indoor heat
8. Turns outdoor fan back on
9. Switches the reversing valve

Heat pumps frost over because the coil is colder than 32F and there is moisture in the air. The frost needs to be removed because the heat pump is losing capacity.
What’s the Opportunity?
Heat Pump Market Facts

25M Units
Installed Base
• Every unit has a Defrost Control

2.6M Units
Shipments in 2017
Heat pump market*
• 20% 1997
• 34% 2017

250K Units
Defrost Controls
• Estimated annual service market

*Percentage of condensing units that are heat pumps

Why stock multiple sku’s when you can stock one Universal Heat Pump Defrost Control?
Industry’s Only Universal Heat Pump Defrost Control

Universal
- Selectable demand or timed defrost
- O or B reversing valve with adjustable shift delay

Easy Installation and Set Up
- Universal mounting with rotating display
- One-button configuration to any OEM system
- Complete kit includes outdoor sensors
- Test button for system verification

Diagnostics with a Versatile Matrix Display
- Access set up and diagnostic menus from any orientation
- Fault recall

System Protection & Integrated Features
- Brownout and short-cycle protection plus hi/low pressure inputs
- Outdoor thermostat

Replaces over 200 defrost controls
Everything You Need for a Complete Upgrade

**Heat Pump Defrost Control**
- Universal plastic mounting tray
- Designed to fit in virtually all outdoor units
- LED display rotates to be readable in any orientation

**Thermostat Harness**
- Connect thermostat inputs using the supplied spade terminal harness or clip and use wire nuts

**Heat Pump Harness**
- Connect other unit inputs
- Reversing valve, contactor, low and high pressure switches

**Thermistors (OCT and OAT)**
- OCT-Outdoor Coil temperature sensor
- OAT-Outdoor Air temperature sensor
- Enables Outdoor thermostat functions

Note: Replace the old thermistors with the new ones
## Universal Heat Pump Defrost Control Provides Value for the Contractor & Homeowner

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefits</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Universal SKU</td>
<td>Reduce inventory with a single SKU to replace virtually all single-stage defrost controls</td>
<td></td>
</tr>
</tbody>
</table>
| Versatility                     | Comprehensive default settings  
                                       | Fully adjustable parameters  
                                       | Compatible with O or B reversing valve configurations | Easy to Install / Easier to Service |
| Matrix Display                  | 9 diagnostic fault codes  
                                       | 6 operation codes  
                                       | Multi-position display |                            |
| Integrated Outdoor Thermostat   | Manage aux heat and compressor lockouts | Customized Comfort         |
| Demand Defrost Option           | Reduces energy usage compared to time/temp  
                                       | (Standard on carrier & goodman Systems) | Increased Efficiency |
| Reversing Valve Shift Delay     | Limits excessive noise in and out of a defrost cycle | Improved Reliability       |
| Compressor Protection           | Prevent compressor operation under harmful conditions                  |                            |
Simplified Install & Troubleshooting

Flexible Orientation
- Matrix display rotates for vertical or horizontal position

Status Indicator
- Power up or stand by
- Heating / cooling / defrosting
- Test mode

Troubleshooting
- Fault conditions present
- Highest priority and operating condition toggling
- Remaining errors “ER” menu
- Correct condition to remove errors

Retain Historical Data
- Recall up to last four faults

Lack of diagnostic capabilities can cause unnecessary early replacement
# Integrated Features Add Value Over Competition

<table>
<thead>
<tr>
<th>Universal Defrost Differentiator</th>
<th>Industry Value</th>
<th>Emerson 47D01U-843</th>
<th>Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defrost Thermostat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kit includes new coil and air temperature sensors</td>
<td>$25-30</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Replace old snap disc coil temperature sensor</td>
<td></td>
<td>Thermistors Included</td>
<td></td>
</tr>
<tr>
<td>Outdoor Heat Pump Thermostat</td>
<td>$30</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Connect thermistor inputs to control</td>
<td></td>
<td>Integrated Feature</td>
<td></td>
</tr>
<tr>
<td>Manage Aux Heat and Compressor Lockouts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Up to a $60 value add included
### Demand Defrost vs. Time/Temp Comparison

#### Defrost Cycles per Hour

<table>
<thead>
<tr>
<th>Metric</th>
<th>Time/Temp set at 30 min</th>
<th>Demand</th>
<th>Extra with Time/Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td># Defrosts in 24 hours</td>
<td>48X</td>
<td>8X</td>
<td>40 cycles</td>
</tr>
<tr>
<td># Defrosts in 90 days</td>
<td>4,320X</td>
<td>720X</td>
<td>3600 cycles</td>
</tr>
<tr>
<td>Average defrost time of 6 minutes</td>
<td>25,920 minutes in defrost</td>
<td>4,320 minutes in defrost</td>
<td>21,600 minutes or 360 hours</td>
</tr>
</tbody>
</table>

#### Average cost electric/hour to run 10KW backup electric

Average: $1.05

**Added cost per 90 day heating season**

360 hrs x $1.05 = $378

**Discount 50% for temperature being above 35F (half as many defrosts)**

1800 cycles

$189 / season

---

The demand defrost algorithm, using the outdoor air temp sensor input, is “smarter” than time/temp and knows that as temperature and humidity drops there is less opportunity for frost to form.