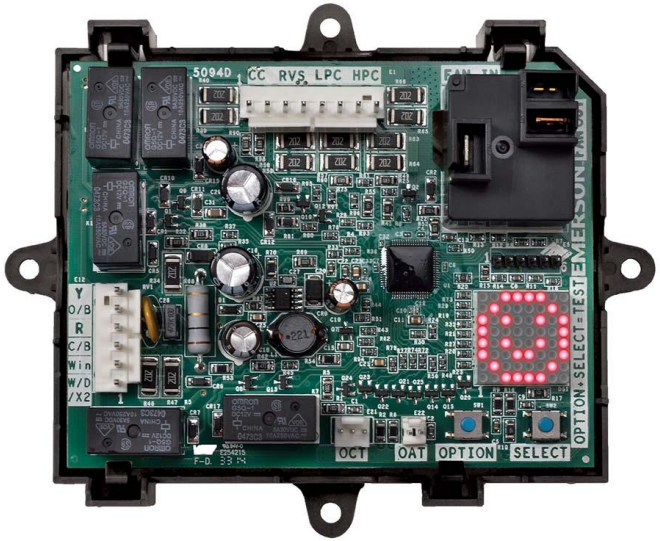
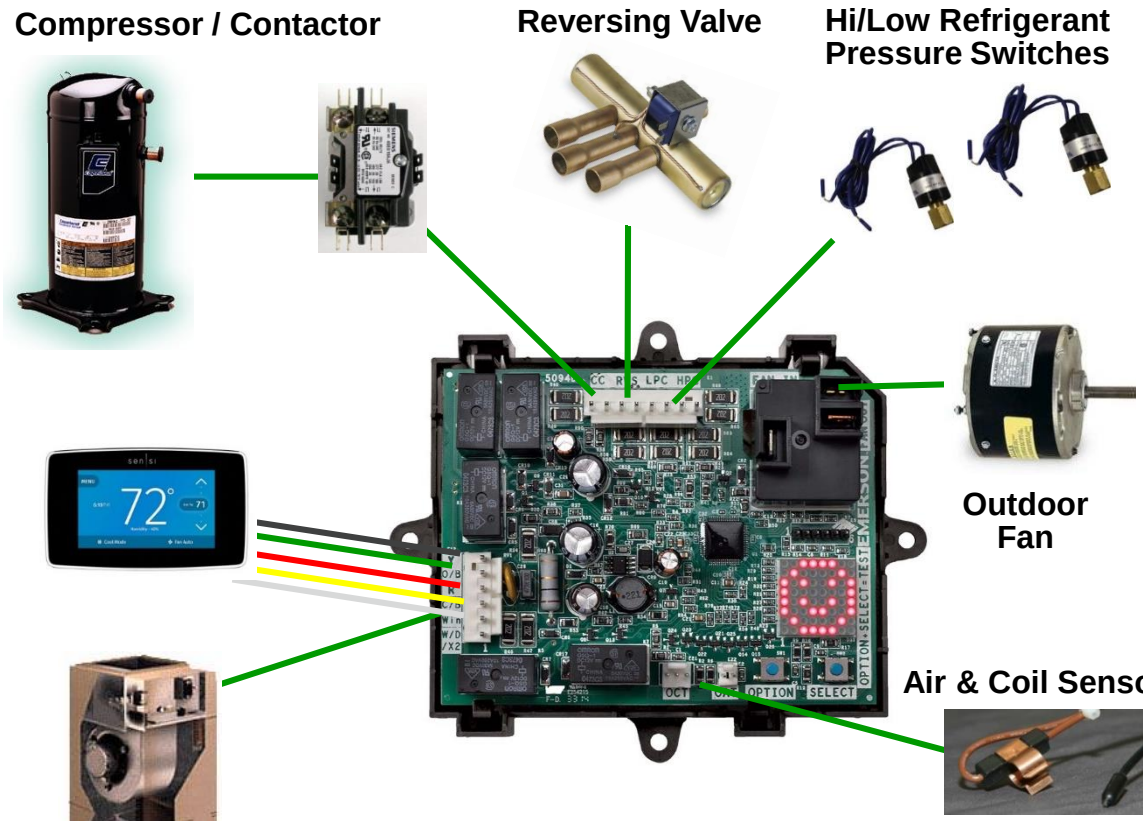
Universal Heat Pump Defrost Control, 47D01U-843

Overview



EMERSON

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

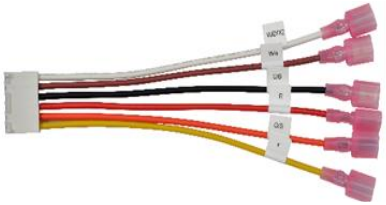
Everything You Need for a Complete Upgrade

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

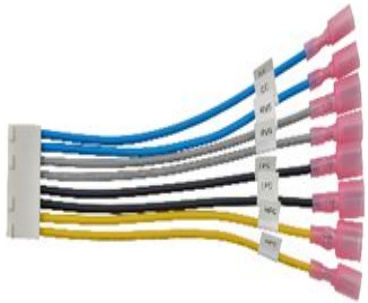
Thermostat Harness

- 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

Feature	Benefits	Value
One Universal SKU	Reduce inventory with a single SKU to replace virtually all single-stage defrost controls	Easy to Install / Easier to Service
Versatility	Comprehensive default settings Fully adjustable parameters Compatible with O or B reversing valve configurations	
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

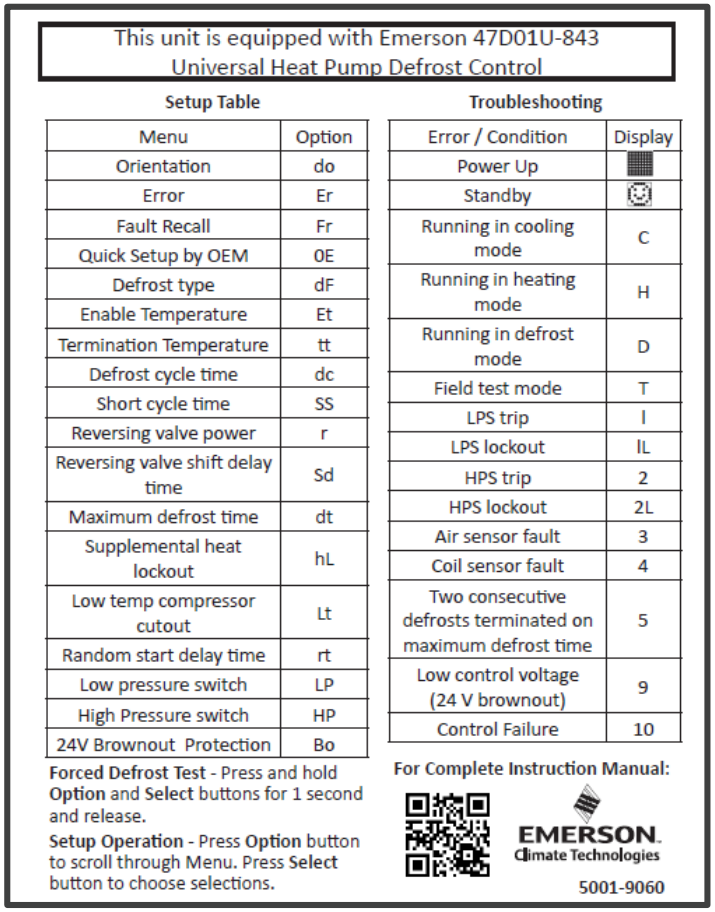
Troubleshooting

- 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

Fault Code / Service Sticker



This unit is equipped with Emerson 47D01U-843 Universal Heat Pump Defrost Control

Setup Table

Menu	Option
Orientation	do
Error	Er
Fault Recall	Fr
Quick Setup by OEM	OE
Defrost type	dF
Enable Temperature	Et
Termination Temperature	tt
Defrost cycle time	dc
Short cycle time	SS
Reversing valve power	r
Reversing valve shift delay time	Sd
Maximum defrost time	dt
Supplemental heat lockout	hL
Low temp compressor cutout	Lt
Random start delay time	rt
Low pressure switch	LP
High Pressure switch	HP
24V Brownout Protection	Bo

Troubleshooting

Error / Condition	Display
Power Up	▦
Standby	☺
Running in cooling mode	C
Running in heating mode	H
Running in defrost mode	D
Field test mode	T
LPS trip	l
LPS lockout	lL
HPS trip	2
HPS lockout	2L
Air sensor fault	3
Coil sensor fault	4
Two consecutive defrosts terminated on maximum defrost time	5
Low control voltage (24 V brownout)	9
Control Failure	10

Forced Defrost Test - Press and hold **Option** and **Select** buttons for 1 second and release.

Setup Operation - Press **Option** button to scroll through Menu. Press **Select** button to choose selections.

For Complete Instruction Manual:

EMERSON. Climate Technologies

5001-9060

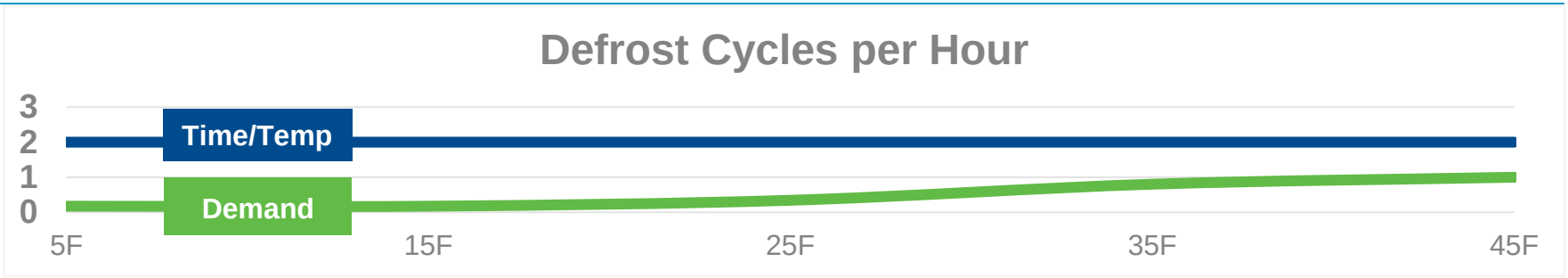
Lack of diagnostic capabilities can cause unnecessary early replacement

Integrated Features Add Value Over Competition

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

Up to a $60 value add included

Demand Defrost Provides Homeowner Savings
Demand Defrost vs. Time/Temp Comparison



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.

Metric (Temp stays below 35F)	Time/Temp set at 30 min	Demand	Extra with Time/Temp
# Defrosts in 24 hours	48X	8X	40 cycles
# Defrosts in 90 days	4,320X	720X	3600 cycles
Average defrost time of 6 minutes	25,920 minutes in defrost	4,320 minutes in defrost	21,600 minutes or 360 hours
Average cost electric/hour to run 10KW backup electric			$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**