

Carrier/ICP Two-Stage IFC

21V51D-751

2017 Launch

6/23/2017



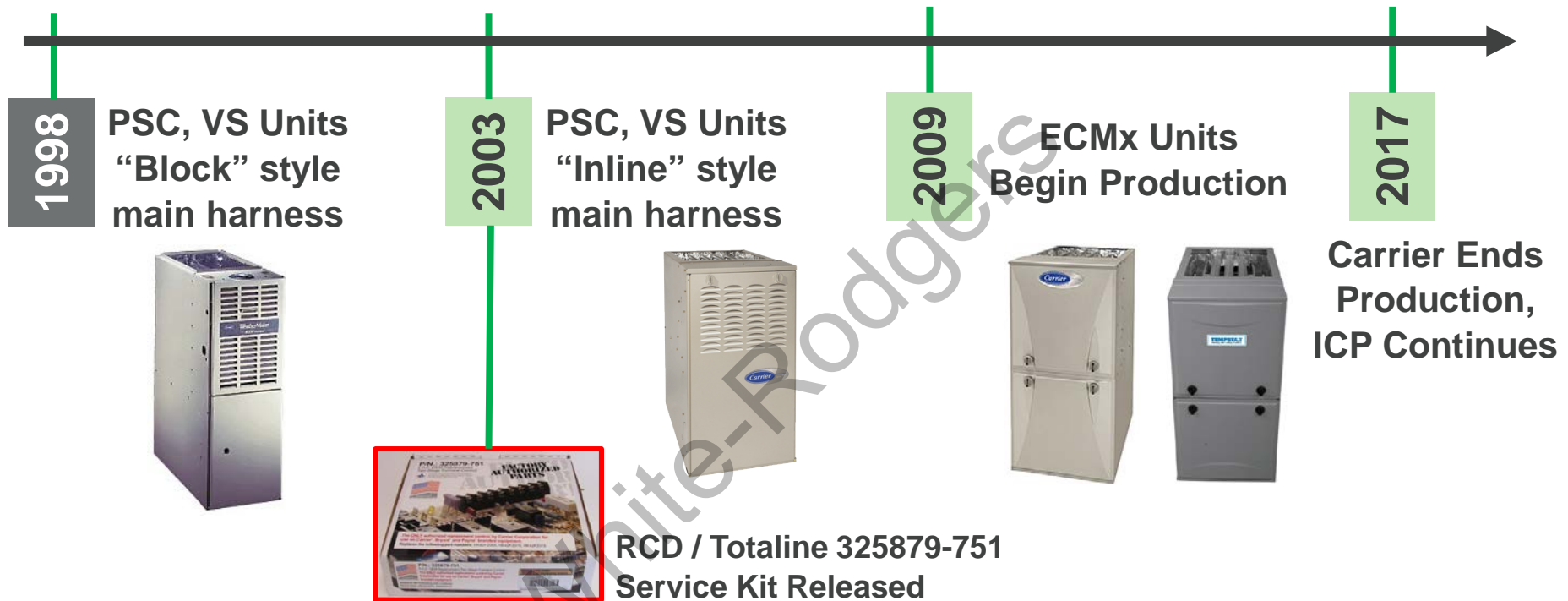
The Target Market

Why We Developed The 21V51D-751 Product



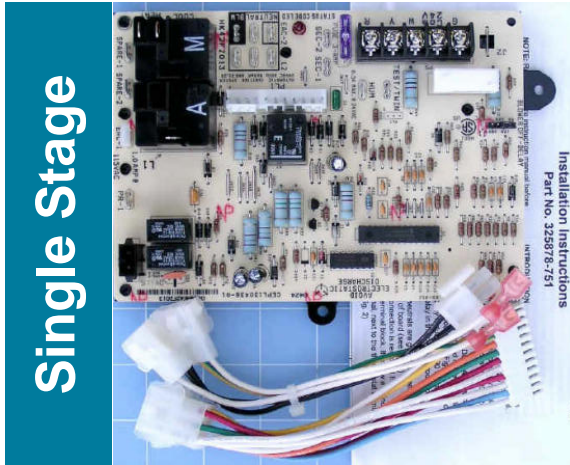
- United Technologies HVAC Family is ~ 27% Market, the #1 Brand
- Two-Stage Furnaces are now ~ 30% of the Annual Units Produced
- There are Two Design Platforms (Carrier/ICP) and Multiple Blower Types (PSC, VS, ECMx). This Created a Product Differentiation Opportunity by Servicing All with 1 SKU

Large Installed Equipment Base, Still Used In Current Production



- An Average of 2.8M Gas Furnaces Shipped Yearly Since 1998 (AHRI data)
- 18 Years x 2.8M Per Year = ~ 50M Units
- 27% Carrier Brands Participation = ~ 13.6M Units
- An Average of 22% Two-Stage Mix Over Those 18 Years
= **~ 3M Unit Potential Installed Base**

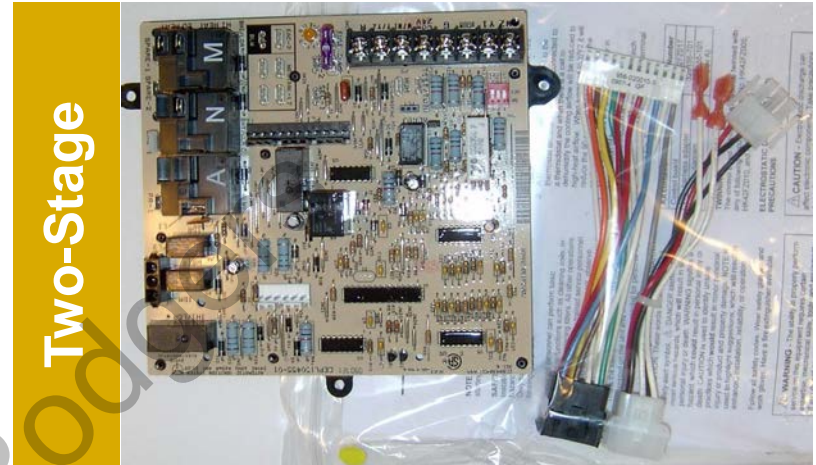
Carrier Offers Two IFC Service Kits Now You Can Offer A Replacement For Both!



Carrier 325878-751
ICM282

W-R 50M56U-751

2014



325879-751
ICM2807


W-R 21V51D-751

2017

White-Rodgers®
Integrated Furnace Control
50M56U-751 | Carrier

D
OEM Direct

Single Stage Applications
PSC Blower Motor
120V HSI Ignition



Wiring adapters for old style block and new style in-line main harnesses

Trusted by PROs

1-Year Limited Warranty

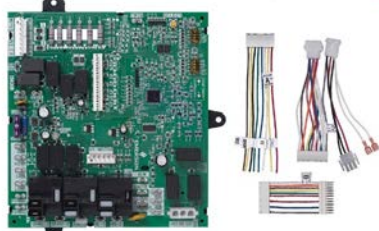
EMERSON
Climate Technologies

White-Rodgers®
Integrated Furnace Control
21V51D-751 | Carrier/ICP

D
OEM Direct

Two-Stage Applications
PSC/VJS or ECMx
Blower Motors
120V HSI Ignition

One Board for
All Carrier/ICP
Blower Motor Types



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EMERSON

Carrier/ICP Two-Stage Furnace Control For PSC/VS Or ECMx Blower Motors

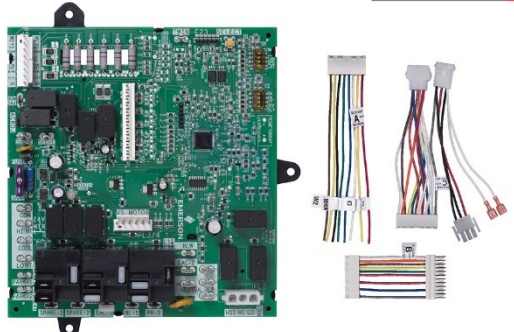
July 2017 First Launch

White-Rodgers™
Integrated Furnace Control
 21V51D-751 | Carrier/ICP

OEM Direct

Two-Stage Applications
 PSC/VS or ECMx Blower Motors
 120V HSI Ignition

One Board for All Carrier/ICP Blower Motor Types



Trusted by **PROs**

1-Year Limited Warranty

EMERSON

21V51D-751



Overview

- OEM Direct Replacement Board for Carrier and ICP Brands
- **INDUSTRY FIRST:** Service PSC, VS or ECMx (X13) Furnaces with One Control
- Drop-in Mounting Uses OEM Type Tray
- Simple Dipswitch Blower Type Selection
- Replaces ICM2807 (L47-029 PSC), Carrier 325879-751 / HK42FZ017 (PSC), Carrier HK42FZ040 (ECMx), ICP HK42FZ041 (ECMx) and More

White-Rodgers - Confidential

Features


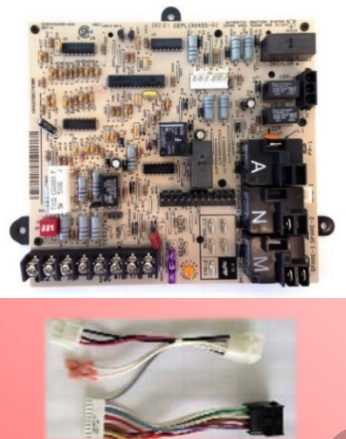


- Easy to Install
- Full Color Box
- Complete Cross Reference on Box
- Instruction Sheet
- Adapter Harness for Older Units
- ICP Harness
- Updated Fault Code Label
- Reduces Inventory, 1 SKU for Multiple Blower Motor Types and Equipment Brands

Competition

W-R	ICM	HON
✓	✓ PSC	X
	X ECMx	X
	X ICP	X

Replaces 4 OEM SKUs

Industry Best Features: Covers The Most Brands And Blower Types, Most Install and Service Friendly

	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Carrier / ICP</p> 	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">ICM2807</p> 	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">WR 21V51D-751</p> 
Brands Serviced	Carrier/ICP (4 SKU)	Carrier Only (1 SKU)	Carrier/ICP (1 SKU)
Blower Motors Supported	PSC, VS, ECMx	PSC, VS	PSC, VS, ECMx
PCB Material	Cheaper CEM-1	Robust FR4	Robust FR4
Flame Current Test Pads	No	No	Yes
LED	Single Color	Single Color	Tri-color
Status Codes (Cool & Heat Stages, Fan)	N/A	N/A	8 Codes
Retrieve & Clear Faults	Unplug Limit Wire	Pushbutton	Pushbutton
Control Field Self-Test	Short 2 terminals with a wire	Short 2 terminals with a wire	Pushbutton
Fan Only Speed Setup	Via Thermostat	Jumper	Dipswitch

Carrier Fan Only Speed Setup It's Confusing And Creates Warranty Returns

DEALER SERVICE BULLETIN

Number: DSB 07-0041

Date: 10/10/07 **Supersedes:** New

Title: Continuous Blower Speed Selection From
the Thermostat

PRODUCT CATEGORY: Residential Furnaces

SITUATION:

There have been furnace controls returned under warranty due to an apparent misunderstanding of the continuous fan toggle feature. This occurs when the G terminal gets "toggled" with 24VAC by accident. For example, the furnace is powered and when the G wire makes intermittent contact while connecting it to the G terminal on the control board or thermostat. This causes the blower to switch to the heat speed or cool speed for the single stage control. It also causes the blower to switch to high heat or cool speed for the two stage control. The result is the impression of incorrect continuous fan speed operation. Replacing the control "fixes" the problem, since replacement controls are set for the default setting for continuous fan operation.

SOLUTION:

To reduce the number of incorrectly diagnosed controls, it is important to understand how the Continuous Blower Speed Selection From The Thermostat operates. Once the operation is understood, a control with the incorrect continuous fan speed can be stepped through the speed selections available, until the correct speed is reached.

For the Continuous Blower Speed Selection From The Thermostat feature to operate properly, the fan must be first turned "ON" at the thermostat, then cycled "OFF" (or back to "AUTO") then turned back "ON" within 1 to 3 seconds. The furnace control board will not shift to the next higher fan speed if the fan switch is cycled too quickly or too slowly.

21V51D-751
Set 2 Dipswitches
and done!

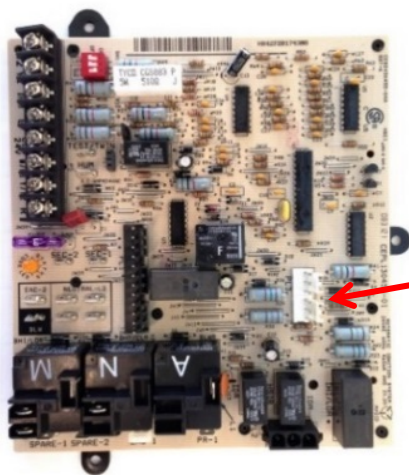
Understanding The Blower Motor Types Supported by 21V51D-751

	Type	AC or DC Motor ?	Speed Taps	Outputs from Control Board	Daughter Board ?
OEM SKU 1	PSC	AC	5	120VAC	No
	Variable Speed (VS) ECM	DC	Custom Programmed in Software Dipswitch Selectable	24VAC	Yes
OEM SKU 2	ECMx (X13)	DC	5	24VAC	No

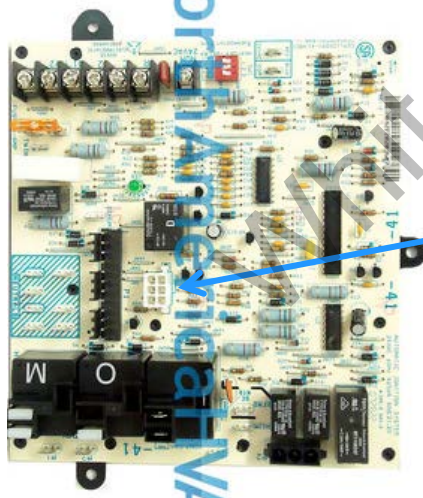
Background: The Carrier and ICP OEM boards support either PSC + VS, or ECMx. When a VS furnace was built, they used the high volume PSC board and added a daughter board to configure the VS motor. This was at the advent of VS when the volume was fairly low.

Today, VS blower furnaces are mainstream and OEMs have moved to dedicated VS control boards for those applications.

Why Don't We Replace ICP Variable Speed Motor Applications?



6-pin inline connector with only 5 pins active, unique drive scheme outputs versus ICP

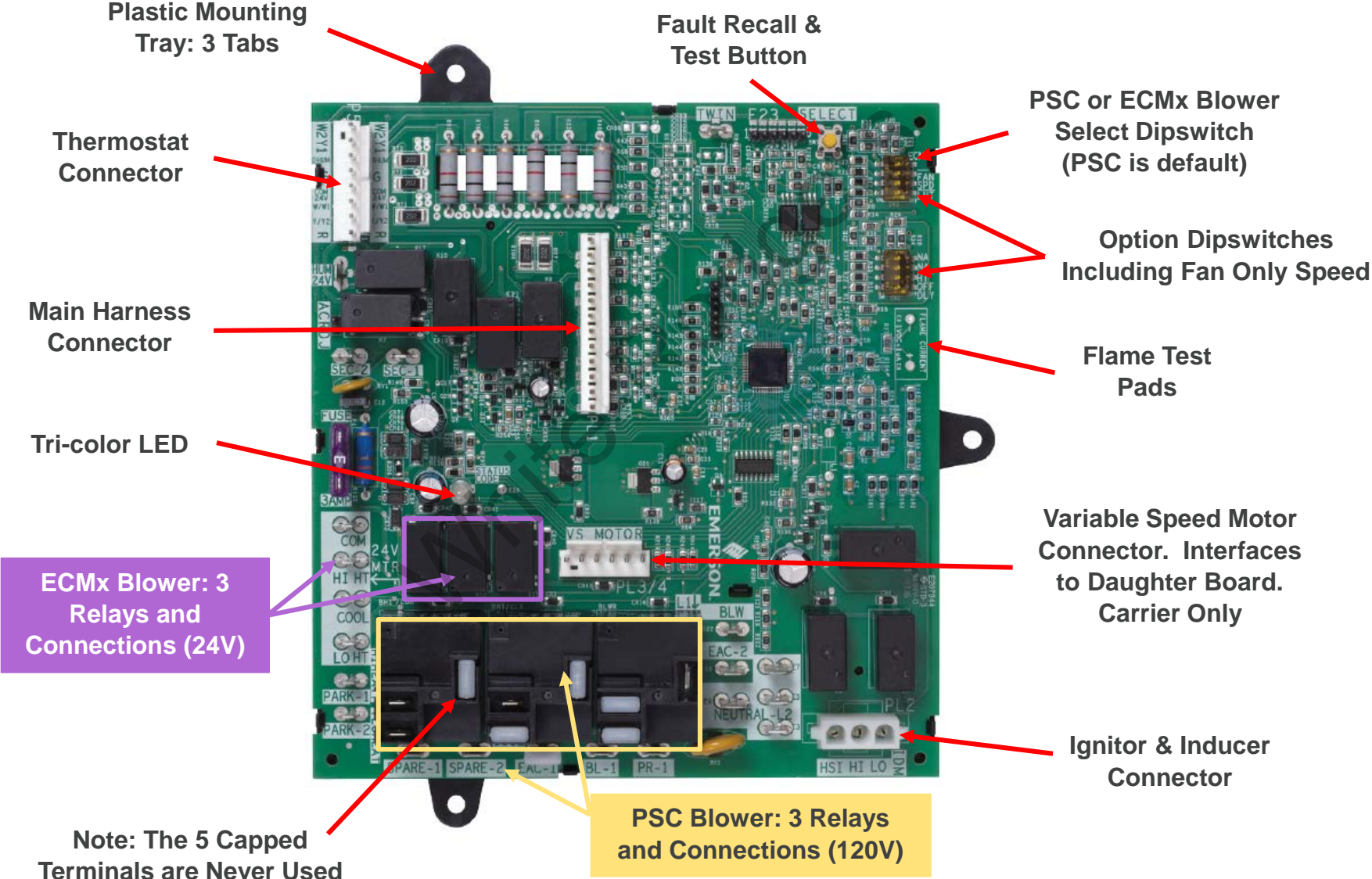


6-pin block connector with all 6 pins active, unique drive scheme outputs versus Carrier

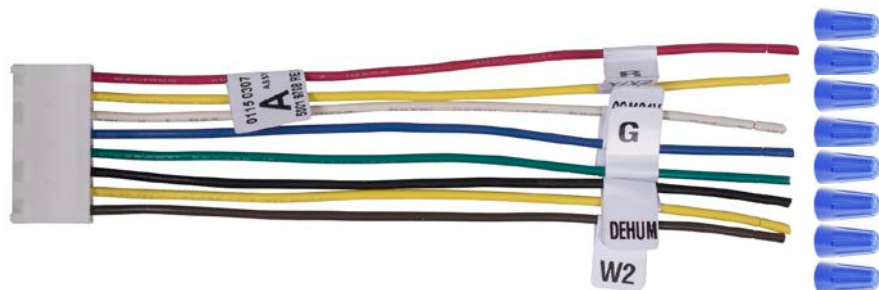
Rationale: Because of completely different drive schemes it was not possible to do both on one board, so we matched the Carrier design due to larger installed base

21V51D-751 Board Layout

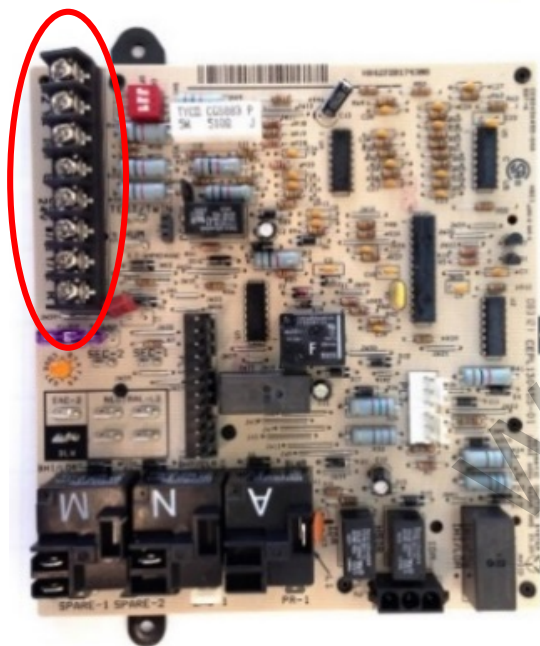
Some Key Parts to be Familiar With



Understanding The Accessory Wiring Adapters Harness “A” – Thermostat

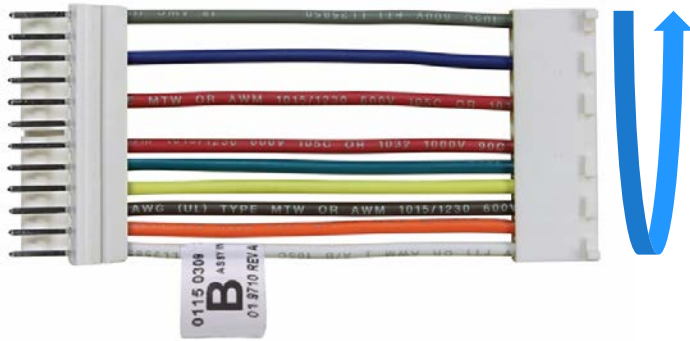


Used with the included wire nuts to make the thermostat connections, then plug onto control. Wires are color coded and tagged for easy ID.



Rationale: The Carrier screw terminal block is big and consumes a lot of space on their board. In order for W-R to add the extra relays to do multiple blower types on one board we used a pin header with plug-on harness to free up space

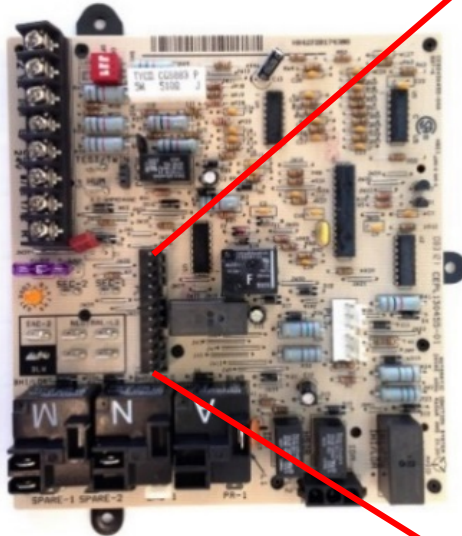
Understanding The Accessory Wiring Adapters Harness "B" – The ICP "Flip"



Used to convert the inline main harness pinout to the reversed ICP pinout. Because of the polarized or locking tabs on the mating connectors you can't simply invert the existing wiring to "make it work".

Note 1: For ICP PSC only, Not Req'd for ICP ECMx board

Note 2: In use, the harness will have a ~ 180 degree twist for correct alignment

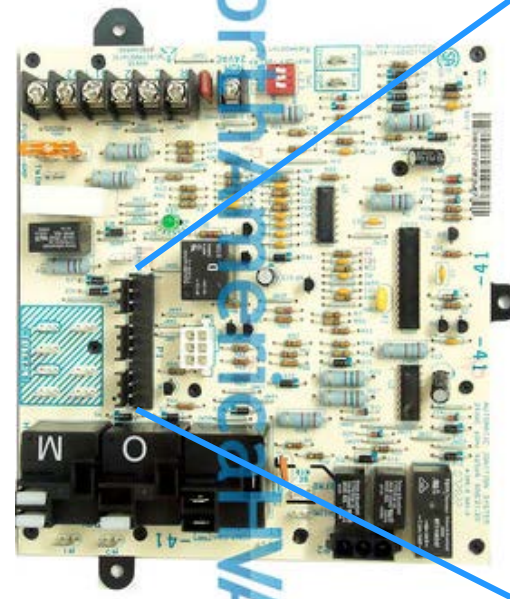


1-2-3-4-5-6-7-8-9-10-11-12

Flame Sense (white)

Gas Valve, Limits, Etc

High PS (gray)



12-11-10-9-8-7-6-5-4-3-2-1

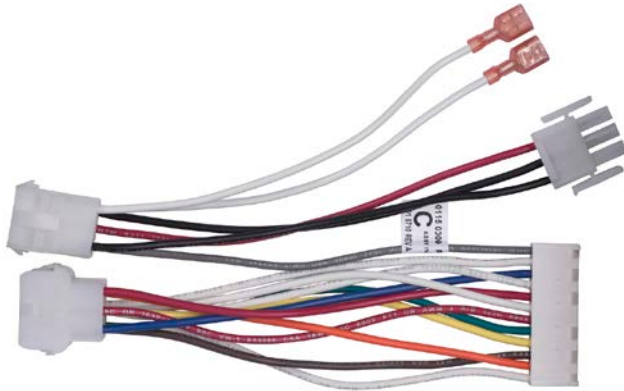
High PS (gray)

Gas Valve, Limits, Etc

Flame Sense (white)

Understanding The Accessory Wiring Adapters Harness “C” – Block to Inline Converter

BLOCK – Plugs into
furnace wiring

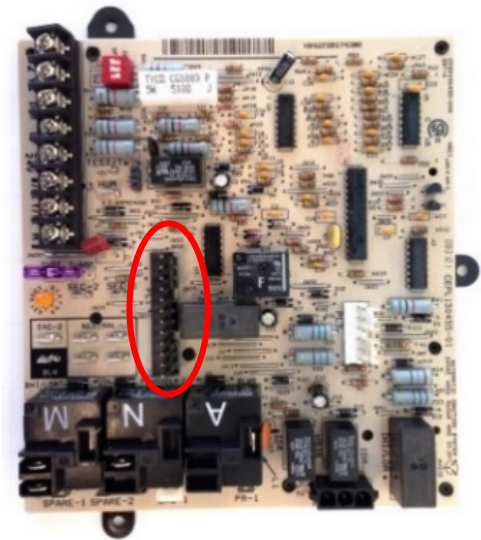


INLINE – Plugs into
the board

Used with older style furnaces having “block” style main system connector. Converts wiring to use new style board with “inline” style connector. Carrier and ICM have a similar harness in their kits.



“Block” style circa 1998



“Inline” style started ~ 2003

Understanding the OEM SKU's / Count And When To Use The Different Harnesses

W-R: 20 Xrefs
ICM: 6 Xrefs

SKU 1

SKU 2

ICM only
replaces
SKU 2

SKU 3

SKU 4

Control	Brand	Blower	Thermostat "A"	ICP Flip "B"	Old Style Carrier "C"	Control
CEPL130948-01	Carrier	ECMx	✓			CEPL130948-01
CEPL130948-02						CEPL130948-02
HK42FZ028						HK42FZ028
HK42FZ040						HK42FZ040
325879-751		PSC / VS				325879-751
CEPL130455-01						CEPL130455-01
HK42FZ017						HK42FZ017
HK42FZ005						HK42FZ005
HK42FZ010						HK42FZ010
HK42FZ015						HK42FZ015
ICM2807	ICM	PSC / VS	ICM2807			
1184408	ICP	ECMx	1184408			
CEPL131043-01			CEPL131043-01			
HK42FZ041			HK42FZ041			
1172551			1172551			
1172809		1172809				
CEPL130591-01		PSC Only	CEPL130591-01			
CEPL130591-41			CEPL130591-41			
HK42FZ019			HK42FZ019			
HK42FZ020	HK42FZ020					

Totaline / RCD Kit 325879-751 contains board HK42FZ017

Carrier/ICP Two-Stage IFC Control In Summary

- #1 Market Share Equipment OEM
- A Large, and Still Growing Installed Base Since 1998
- W-R **21V51D-751** Covers the Most Applications
 - 20 Cross References, 4 OEM SKU's, All Carrier/ICP Brands
- W-R **21V51D-751** Has The Most Install and Service Friendly Features
- Price is Competitive with ICM
- Honeywell isn't Even in the Game