

SERVICE

If status code recall is needed, briefly remove then reconnect one main limit wire to display last stored status code. Repeat remove-and-reconnect four more times for previous four status codes, after which the five codes repeat. Status code 11 will display when less than four previous status codes exist. On RED LED controls do not remove power or blower door before initiating status code recall.

LED CODE

STATUS

- CONTINUOUS OFF** - Check for 115VAC at L1 & L2, & 24VAC at SEC-1 & SEC-2.
CONTINUOUS ON - Control has 24VAC power.
RAPID FLASHING - Line voltage (115VAC) polarity reversed. If twinned, refer to twinning kit instructions.

EACH OF THE FOLLOWING STATUS CODES IS A TWO DIGIT NUMBER WITH THE FIRST DIGIT DETERMINED BY THE NUMBER OF SHORT FLASHES AND THE SECOND DIGIT BY THE NUMBER OF LONG FLASHES.

- 11 NO PREVIOUS CODE** - Stored status codes are erased automatically after 72 hours. On RED LED boards stored status codes can also be erased when power (115 VAC or 24 VAC) to control is interrupted.
- 12 BLOWER ON AFTER POWER UP** (115 VAC or 24 VAC) - Blower runs for the selected blower off-delay time, if unit is powered up during a call for heat (R-W/W1 closed) or (R-W/W1) opens during blower on-delay.
- 13 LIMIT CIRCUIT LOCKOUT** - Lockout occurs if a limit or flame rollout switch is open longer than 3 minutes. - Control will auto reset after three hours.
- Refer to #33.
- 14 IGNITION LOCKOUT** - Control will auto-reset after three hours. Refer to #34.
- 21 GAS HEATING LOCKOUT** - Control will NOT auto reset.
Check for: - Mis-wired gas valve - Defective control (valve relay)
- 22 ABNORMAL FLAME-PROVING SIGNAL** - Flame is proved while gas valve is de-energized. Inducer will run until fault is cleared. Check for:
- Leaky gas valve - Stuck-open gas valve
- 23 PRESSURE SWITCH DID NOT OPEN** Check for:
- Obstructed pressure tubing - Pressure switch stuck closed
- 24 SECONDARY VOLTAGE FUSE IS OPEN** Check for:
- Short circuit in secondary voltage (24VAC) wiring.
- 31 HIGH-HEAT PRESSURE SWITCH OR RELAY DID NOT CLOSE OR REOPENED**
Control relay may be defective, refer to status code #32
- 32 LOW-HEAT PRESSURE SWITCH DID NOT CLOSE OR REOPENED** - If open longer than five minutes, inducer shuts off for 15 minutes before retry. If opens during blower on-delay period, blower will come on for the selected blower off-delay. Check for: - Excessive wind - Restricted vent
- Defective inducer motor - Low inlet gas pressure (if LGPS used)
- Defective pressure switch - Low inducer voltage (115 VAC)
- Inadequate combustion air supply - Proper vent sizing
- Disconnected or obstructed pressure tubing
- 33 LIMIT CIRCUIT FAULT** - Indicates a limit or flame rollout, switch is open. Blower will run for 4 minutes or until open switch remakes whichever is longer. If open longer than 3 minutes, code changes to lockout #13. If open less than 3 minutes status code #33 continues to flash until blower shuts off. Flame rollout switch requires manual reset. Check for: - Dirty filter or restricted duct system
- Proper vent sizing - Restricted vent - Loose blower wheel - Excessive wind
- Defective blower motor or capacitor - Defective switch or connections
- Inadequate combustion air supply (Flame Roll-out Switch open).
- 34 IGNITION PROVING FAILURE** - Control will try three more times before lock out #14 occurs. If flame signal lost during blower on-delay period, blower will come on for the selected blower off-delay. Check for:
- Oxide buildup on flame sensor (clean with fine steel wool)
- Proper flame sense microamps (.5 microamps D.C. min., 4.0 - 6.0 nominal)
- Manual valve shut-off - Control ground continuity
- Gas valve defective or gas valve turned off - Low inlet gas pressure
- Inadequate flame carryover or rough ignition - Defective Hot Surface Ignitor
- Flame sensor must not be grounded
- Green/Yellow wire **MUST** be connected to furnace sheet metal
- 43 LOW-HEAT PRESSURE SWITCH OPEN WHILE HIGH-HEAT PRESSURE SWITCH IS CLOSED** - Check for: - Disconnected or obstructed pressure tubing
- Mis-wired pressure switches - Low-heat pressure switch stuck open
- Low inlet gas pressure (if LGPS used)
- 45 CONTROL CIRCUITRY LOCKOUT** Auto-reset after one hour lockout due to:
- Gas valve relay stuck open - Flame sense circuit failure
- Software check error
Reset power to clear lockout. Replace control if status code repeats.

COMPONENT TEST

To initiate the component test sequence, shut OFF the room thermostat or disconnect the "R" thermostat lead. Briefly short the TEST/TWIN terminal to the "Com 24V" terminal. Status LED will flash last status code and then turn ON the inducer motor. The inducer motor will start in HIGH speed and remain on HIGH speed until the end of the test then shift to LOW speed for 7 to 15 seconds. The hot surface ignitor, blower motor LO HEAT speed, blower motor HI HEAT speed, and blower motor COOL speed will be turned ON for 10-15 seconds each. Gas Valve and Humidifier will not be turned on. When the blower is turned OFF the inducer will be switched to low-speed for 10 seconds.

327885-101 REV. B

Two-Speed Furnace Control Replacement Kit

Cancels: New

IHK340M-40-82

11-02


Installation Instructions Part No. 325879-751


NOTE: Read the entire instruction manual before starting the installation.

SAFETY CONSIDERATIONS


Installing and servicing heating equipment can be hazardous due to gas and electrical components. Only trained personnel should install or service heating equipment.

Untrained personnel can perform basic maintenance functions such as cleaning coils, or cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on heating equipment, observe precautions in the literature, on tags, and on labels attached to the unit. Recognize safety information.

This is the safety-alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol, . DANGER identifies the most serious hazards, which **will** result in severe personal injury or death. WARNING signifies a hazard, which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **would** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions, which **will** result in enhanced installation, reliability, or operation.

Follow all safety codes. Wear safety glasses and work gloves. Have a fire extinguisher available.

 **WARNING** - The ability to properly perform service on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any service on this equipment other than those procedures recommended in the User's Manual. A failure to follow this warning could result in possible damage to this equipment, serious personal injury, or death.

INTRODUCTION

This kit is a direct replacement for circuit boards Part No. HK42FZ005, HK42FZ010, and HK42FZ015. Changes to the operation of this control include:


1. The blower off delay selections are: 90, 120, 150 and 180 seconds.
2. A DHUM connection has been added to the thermostat terminal block. When connected to a thermidistat and when there is a call to dehumidify the cooling airflow will be reduced to high-heat airflow. When jumpered to Y/Y2 it will reduce the 90 second blower-off delay in the cooling mode, to 5 seconds.
3. All 115-volt neutrals are grouped together in one location of board (see Fig. 2)
4. Humidifier connection is removed from thermostat terminal block. It is now a ¼ inch spade terminal, next to the thermostat terminal block (see Fig. 2)

| Kit contains: | Part Number |
|----------------------|-----------------------|
| Control board | HK42FZ017 |
| Wire harness adapter | 328156-701 |
| Kit Wiring diagram | 328155-101 (rev A) |

TWINNING

The control board in this kit **CAN** also be twinned with any of following circuit boards Part No. HK42FZ005, HK42FZ010, and HK42FZ015.

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS


 **CAUTION** - Electrostatic discharge can affect electronic components. Take precautions during furnace installation and servicing to protect the furnace electronic control. Precautions will prevent electrostatic discharges from personnel and hand tools, which are held during the procedure. These precautions will help to avoid exposing the control to electrostatic discharge by discharging static electricity build-up to ground.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.


1. Disconnect all power to the furnace. **DO NOT TOUCH THE CONTROL OR ANY WIRE CONNECTED TO THE CONTROL PRIOR TO DISCHARGING YOUR BODY'S ELECTROSTATIC CHARGE TO GROUND.**
2. Ground yourself by touching your hand and tools to clean, unpainted, metal surface of furnace close to control.
3. After touching chassis, you may proceed to service the furnace. You will recharge your body with static electricity by moving about or shuffling your feet. Reground yourself.
4. If you touch ungrounded objects (recharge your body with static electricity), reground yourself. Use this procedure for installed and uninstalled (ungrounded) furnaces.
5. Ground yourself again before handling a new control to protect control from damage. If control is to be installed in furnace, follow items 1 through 5 again before installing control. Put all used **AND** new controls into containers before touching ungrounded objects.
6. An ESD service kit (available from commercial sources) may also be used to prevent ESD damage.

INSTALLATION

Step 1—Removal of Existing Control

 **CAUTION** - Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

1. Turn thermostat to OFF or set temperature to the lowest setting.
2. Turn off electrical supply to furnace.
3. Turn off gas supply to furnace.

 **CAUTION** - Failure to turn off the gas and electric supply may result in explosion, fire, death or personal injury.





- 4a. For 80% furnaces remove control access and blower door.
- 4b. For 90% furnaces remove outer door assembly and remove the two screws from blower access panel and set aside.
5. Disconnect thermostat and humidifier wires (if equipped).
6. Disconnect line voltage, blower, EAC, (if equipped) and transformer wires.
- 7a. For 80% furnaces remove retaining screws and remove furnace control board from bracket.
- 7b. For 90% furnaces remove two screws from blower deck that hold the control box assembly. Lower control box assembly. Remove retaining

- screw(s) from board and remove board from control box assembly.
8. Remove wiring harness connectors from furnace control board.
9. Inspect control and control box for evidence of water staining.
10. Correct any sources of water leakage (humidifier, evaporator coil, vent system) into the control area.

Step 2—Installing the New Control

1. Ground yourself! Handle furnace control board by edges.
2. Insert tab(s) of board into slots of control box (if required).
3. Install furnace control board retaining screw(s). Install wiring harness adapter (part# 328156-701) to two connections of the existing furnace wiring harness (see Fig. 3).
 - a. The furnace harness 9-pin connector plugs into the mating 9-pin adapter harness connector.
 - b. The furnace harness 12-pin connector plugs into the mating 12-pin adapter harness connector.
4. Connect the other end of the adapter harness (part# 328156-701) to the new furnace control board.
 - a. The 12-pin connector connects to PL1 on the furnace control board, (see Fig. 2 & 3).
 - b. The 3-pin connector which has 2 black wires and 1 red wire connects to PL2 on the furnace control board, (see Fig. 2 & 3).
 - c. The 2 white wires connect to the 115-volt Neutral spade connections, located in front of PL1 on the new furnace control board (see Fig. 2 & 3).
5. Connect the transformer to the new furnace control board, (see Fig. 2).
 - a. Blue wire to SEC-2 terminal. SEC-2 terminal is located adjacent to the 3 amp fuse.
 - b. Red wire to SEC-1 terminal. SEC-1 terminal is located adjacent to the 3 amp fuse.
 - c. Black wire to PR-1 terminal. PR-1 terminal is located adjacent to PL2.
 - d. White wire to one of the 115-volt Neutral spade connections located in front of PL1.
6. Connect black wire from furnace auxiliary junction box to L1 on the new furnace control board. L1 is located on the blower enable relay. (see Fig. 2).
7. Connect white wire from furnace auxiliary junction box to one of the 115-volt Neutral spade connections located in front of PL1. (see Fig. 2).

8. Connect the blower motor leads to the new furnace control board, (see Fig. 2).
 - a. Connect the white blower motor lead to the BLW connection within the group of 115-volt Neutral spade connections.
 - b. Connect the blower motor high-heat tap to the blower relay connection marked HI HEAT.
 - c. Connect the blower motor low-heat tap to the blower relay connection marked LO HEAT.
 - d. Connect the blower motor cool tap to the blower relay connection marked COOL.
 - e. Connect the remaining blower motor leads to SPARE-1 and SPARE-2.
9. Connect all accessory wires.
10. For 90% furnaces reinstall control box assembly to blower deck, by installing the two screws previously removed from the blower deck.
11. Set blower off delay. **Blower Off Delay Dip Switches** are located on the top-center portion of board. (See Fig. 2) It is factory set at 120 seconds. Use the table below to select a different blower off delay.

| BLOWER OFF-DELAY SELECTION CHART | | | |
|--|--|--|--|
| 90 SEC. | 120 SEC. | 150 SEC. | 180 SEC. |
|  OFF |  OFF |  OFF |  OFF |

12. If you are using a two-stage thermostat put setup switch 1 in the ON position.
13. Install kit wiring diagram 328155-101 in close proximity to the furnace wiring diagram.
14. Do not connect thermostat wires to control board until **Start-up and System Check-out** is complete.

Variable Speed Systems

For variable speed systems also wire the new control board as follows:

1. The variable speed motor harness 6-pin connector that plugged into PL4 on the old style furnace control board plugs into PL3 on the new style furnace control board, (See Fig. 1 & 2).
2. The green wire from the variable speed motor labeled DEHUM connects to G on the furnace control if it was previously connected to G on the old style furnace control board.

- a. **If so**, you will have to cut the ¼ inch spade terminal off and strip the wire to do this.
 - b. **If not**, the green wire labeled DEHUM is probably spliced to a thermostat wire that is connected to the DHUM terminal of the Thermidistat. Leave it hooked up this way and **DO NOT** connect it to the DHUM terminal on the new furnace control board.
3. The 2 white wires previously connected to the ¼ inch HUM spade terminal of the old furnace control board need to be connected to the ¼ inch HUM spade terminal on the new furnace control board, (See Fig. 1 & 2).

SYSTEM CHECK-OUT

Step 1—Component Self Test

1. To initiate component test sequence, ensure thermostat is turned OFF or thermostat wires are disconnected. Turn power on and manually close blower door switch. With a short piece of wire, briefly short TEST/TWIN terminal to Com/24v terminal.

Component test sequence is as follows:

- a. Status LED will flash previous fault or status code #11 four times then turn ON the inducer motor at high-heat speed.
 - b. Inducer motor will run for entire component test.
 - c. Hot surface igniter will be turned ON for 15 seconds, then OFF.
 - d. Blower motor LO HEAT speed will be turned ON for 10 seconds.
 - e. Blower motor HI HEAT speed will be turned ON for 10 seconds.
 - f. Blower motor COOL speed will be turned on for 10 seconds.
 - g. When the blower motor is turned OFF the inducer motor will be switched to low-heat speed for 10 seconds.
2. Repair, replace or service any component that does not work properly during the self-test. The gas valve and humidifier are not energized during self-test.
 3. Turn power off.
 4. Release blower door switch.

NOTE: Current status code will be stored even when blower door is removed.

5. Connect thermostat wires.
6. Install blower and access doors.
7. Turn power back on.
8. Turn on gas supply to furnace.

Step 2—Flame Sensor Operation

Connect a DC microammeter in series with flame sensor. Initiate a call for heat. After burners ignite and stabilize, measure flame current. Nominal flame current is between 4.0 and 6.0 microamps DC. If flame current is below 4.0 microamps DC, remove and clean flame sensor with fine steel wool, or replace flame sensor.

The furnace control will lock-out when flame current falls to 0.5 microamps DC.

Check flame current in low-heat and high-heat.

Step 3—System Operation

1. Perform any other safety checks as deemed necessary (flame safety, limit switch, vent system etc.).
2. Run unit through 1 complete call for heat cycle.

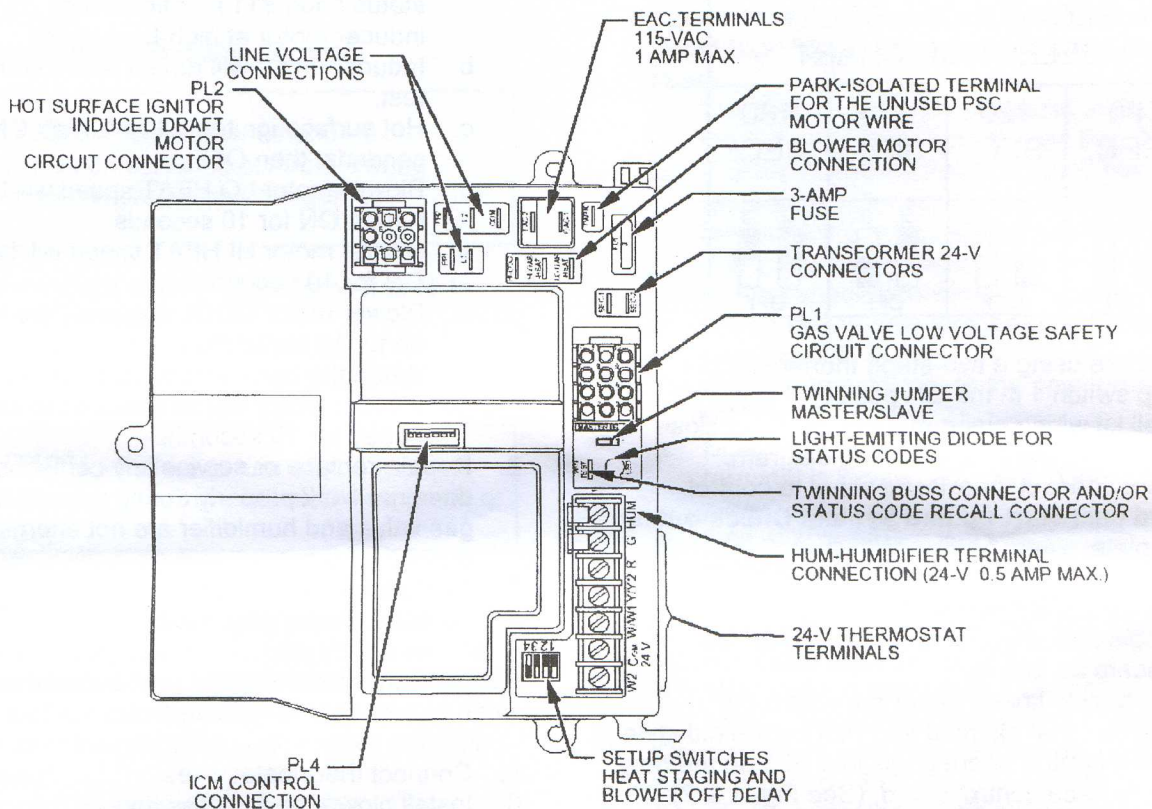


Figure 1 – Old Style Furnace Control Board

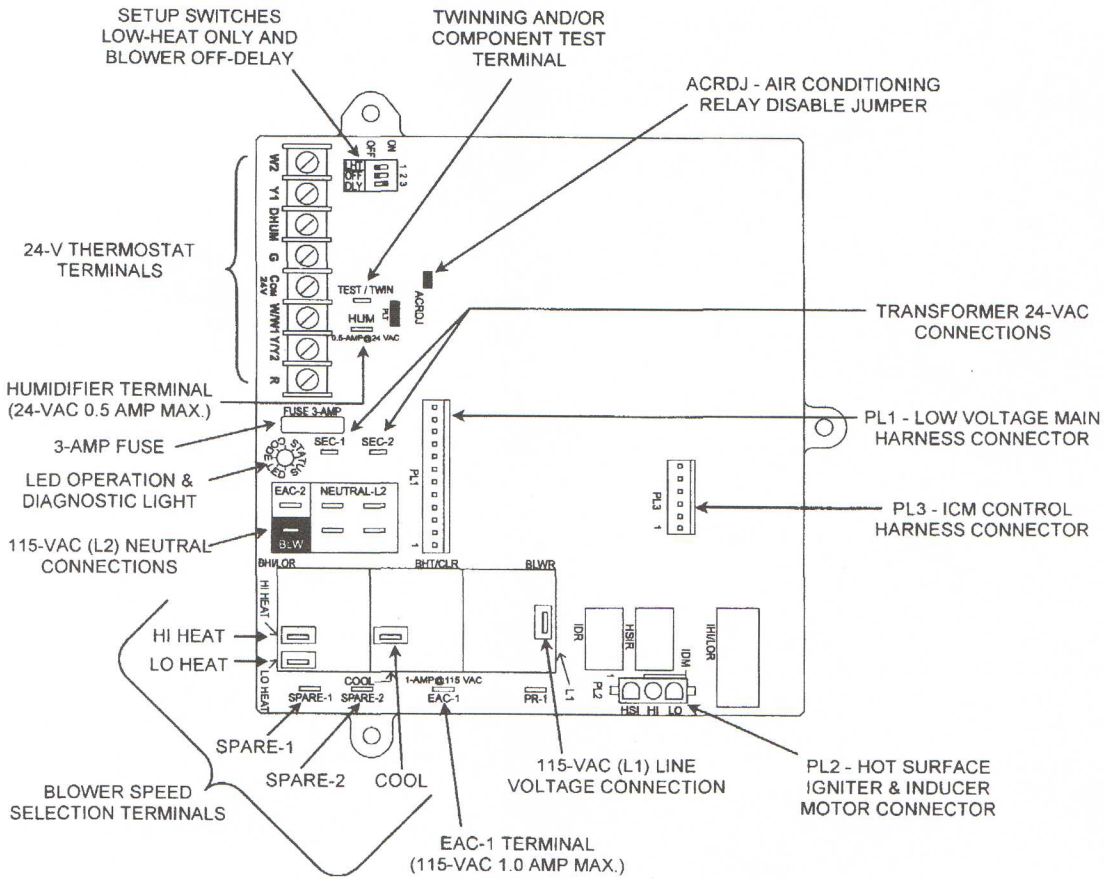


Figure 2 – New Style Furnace Control Board

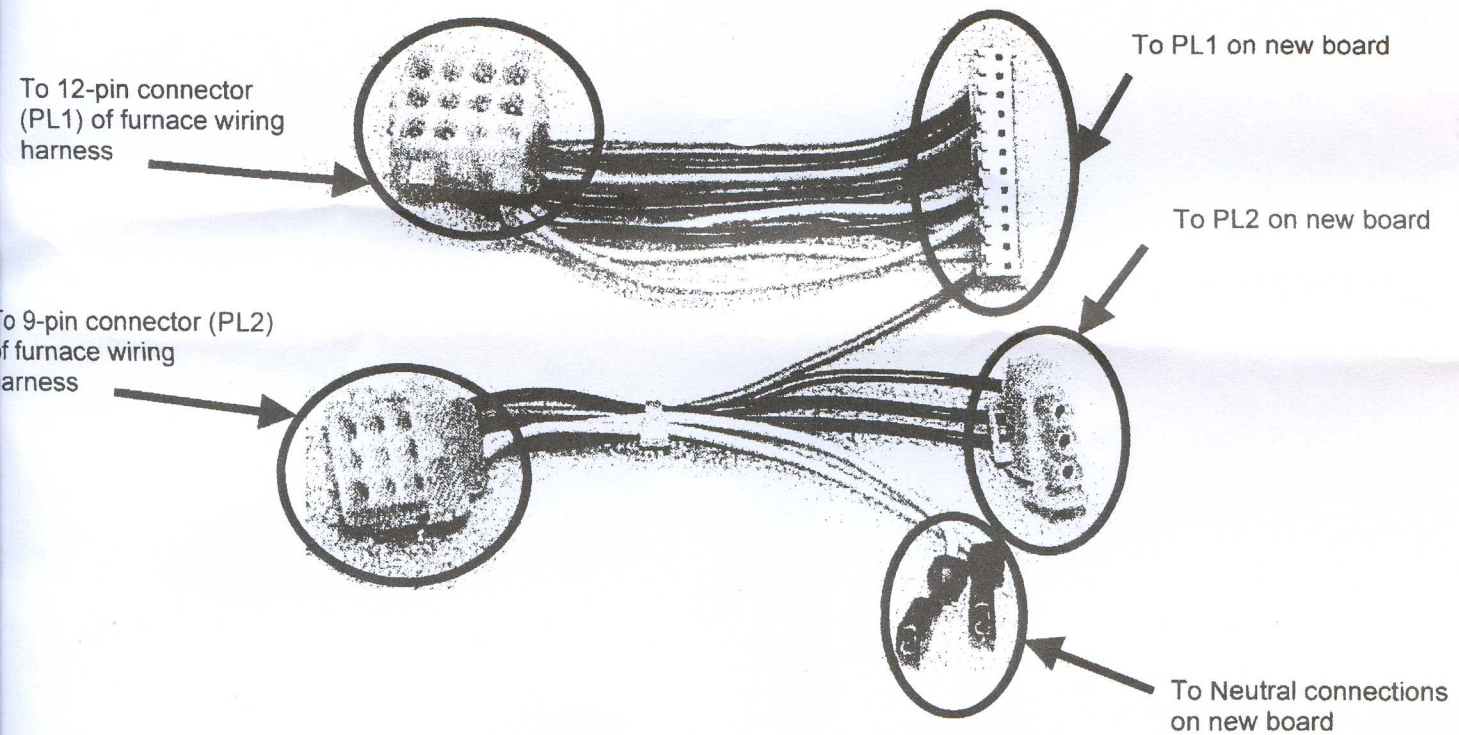


Figure 3 – Wire Harness Adapter