

Furnace Twinning Kit Model FTK02A

Installation Instructions

Description

This kit allows two Amana Air Command gas furnaces containing the White-Rodgers 50A50 control to operate at the same time from a single thermostat. The two furnaces to be "twinning" must be the exact same model with their circulating air blowers set to deliver the same air flow at the same time. The furnaces may deliver different CFMs in the cooling mode, if appropriate.

This kit cannot be used to control more than two furnaces.

This Twinning Kit Installation Instruction is divided into two sections. Section I deals with Air Command furnaces that will accept this kit, furnace opening sizes, recommended filter sizes and maximum CFM per furnace. Section II details the installation of the twinning kit.

For items not covered in this manual, follow the installation instructions shipped with the furnaces.

When properly installed, these furnaces will achieve the operational and performance specifications described in the installation instructions.



WARNING

Each furnace must be equipped with its own gas shutoff valve as required by the National Fuel Gas Code.

I. Duct Connections

It is very important to properly size ductwork and supply the appropriate filters for your furnaces. Following are four possible ducting methods:

- I. Bottom Return.
- II. Side Return - One Return per Furnace.
- III. Two Side Returns.
- IV. Top Return

IMPORTANT NOTE: Back return to furnaces is not permitted. Airflow would be very low resulting in poor performance and equipment damage. Back return would be considered improper installation and would void warranty coverage.



RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION

ATTENTION INSTALLING PERSONNEL

As a professional installer you have an obligation to know the product better than the customer. This includes all safety precautions and related items.

Prior to actual installation, thoroughly familiarize yourself with this Instruction Manual. Pay special attention to all safety warnings. Often during installation or repair it is possible to place yourself in a position which is more hazardous than when the unit is in operation.

Remember, it is your responsibility to install the product safely and to know it well enough to be able to instruct a customer in its safe use.

Safety is a matter of common sense...a matter of thinking before acting. Most dealers have a list of specific good safety practices...follow them.

The precautions listed in this Installation Manual should not supersede existing practices but should be considered as supplemental information.

Affix this manual adjacent to the furnace.

GENERAL NOTES

- Maximum CFMs are limited by a maximum filter velocity of 650 feet per minute, or by circulator high speed at 0.5 inches External Static Pressure (ESP) (whichever CFM is lower). THIS REQUIRES A HIGH VELOCITY FILTER. THROWAWAY FILTERS MUST NOT BE USED. If using anything other than a permanent high velocity filter, consult filter manufacturer recommendations for maximum allowable velocity.
- Actual CFM at the job should be established by carefully setting the furnace input and measuring the temperature rise. The ESP/CFM Tables in the furnace specification sheets and installation manuals are based on side return(s) for a single furnace. For twinned installations - especially those with bottom return - the relationship between ESP and CFM may be different. The most accurate way to estimate airflow on twinned installations is to use temperature rise:

$$\text{CFM} = \frac{\text{Btuh Output}}{1.085 \times (\text{Supply Air Temperature} - \text{Return Air Temperature})}$$

- Cooling CFM should be 350 to 450 CFM per nominal ton of cooling capacity. Heating CFM must produce a temperature rise within the range(s) specified on the furnace nameplate.

1. Bottom Return

In most cases, bottom return air to both furnaces will be more practical. When bottom return air is used, the furnaces should be set as close together (0 to 3 inches) as is practical. This separation distance is variable, depending upon the needs of the particular job.

See Table 1 for furnace opening sizes, recommended filter sizes, and maximum CFM per furnace.

Furnace Model	Opening WxD (Inches)	Maximum CFM @ .5" ESP	Permanent Filter Size, Inches
GUI_045_30	12 X 23	1200	14 X 25 X 1
GUI_070_30	12 X 23	1290	14 X 25 X 1
GUI_070_40	12 X 23	1450	14 X 25 X 1
GUI_090_30	16 X 23	1380	16 X 25 X 1
GUI_090_50	16 X 23	1975*	16 X 25 X 1
GUI_115_40	18 X 23	1590	20 X 25 X 1
GUI_115_50	18 X 23	1985*	20 X 25 X 1
GUI_140_50	18 X 25	2050*	20 X 25 X 1
GUC045_30	10½ X 23	1197	14 x 25 x 1
GUC070_30	14½ X 23	1274	16 x 25 x 1
GUC070_40	14½ X 23	1633	16 x 25 x 1
GUC090_35	18½ X 23	1599	20 x 25 x 1
GUC090_50	18½ X 23	1961*	20 x 25 x 1
GUC115_50	18½ X 23	1939*	20 x 25 x 1
GUD045_30	10½ X 23	1197	14 x 25 x 1
GUD070_30	14½ X 23	1274	16 x 25 x 1
GUD070_40	14½ X 23	1633	16 x 25 x 1
GUD090_35	18½ X 23	1599	20 x 25 x 1
GUD090_50	18½ X 23	1961*	20 x 25 x 1
GUD115_50	18½ X 23	1939*	20 x 25 x 1
GUX045_30	10½ X 23	1339	14 x 25 x 1
GUX070_30	14½ X 23	1283	16 x 25 x 1
GUX070_40	14½ X 23	1723	16 x 25 x 1
GUX090_35	18½ X 23	1510	20 x 25 x 1
GUX090_50	18½ X 23	1890*	20 x 25 x 1
GUX115_50	18½ X 23	1978*	20 x 25 x 1

Asterisks indicate a CFM based on 2 side returns. Actual CFM through bottom return could be significantly lower.

Table 1
Bottom Return Data

II. Side Return - One Return per Furnace

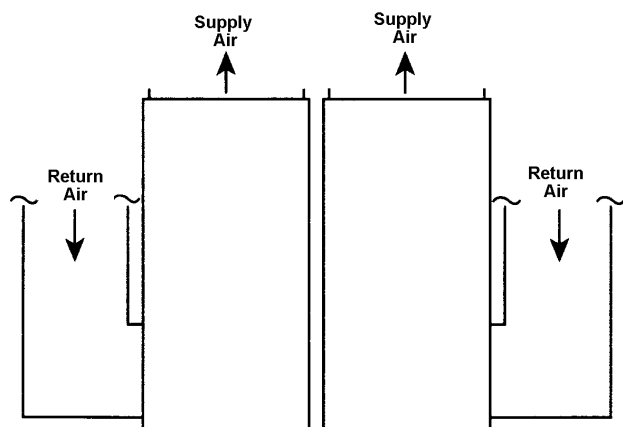
This is applicable only for the models listed in Table 2.

Furnace Model	Max CFM 0.5" ESP (Per Furnace)
GUI_045_30	1200
GUI_070_30	1290
GUI_070_40	1450
GUI_090_30	1380
GUI_115_40	1590
GUC045_30	1197
GUC070_30	1274
GUC070_40	1633
GUC090_35	1599
GUD045_30	1197
GUD070_30	1274
GUD070_40	1633
GUD090_35	1599
GUX045_30	1339
GUX070_30	1283
GUX070_40	1723
GUX090_35	1510

Table 2
Single-Side Return Data

A. Preferred Method

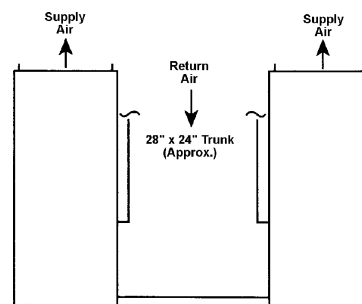
Ordinarily, it will be easiest to set the furnaces close together and to bring a return air drop to the outside of each furnace. (See sketch below)



Preferred Method
Single-Side Return Per Furnace
Both Side Knockouts Are 14" x 23"
(All Furnaces)

B. Alternate Method

Occasionally, the installer may be forced to use one return per furnace with the furnaces set a maximum of 30 inches apart (approximately 28 x 24 return trunk duct). When this is done, it will be applicable for only the models listed in Table 2.



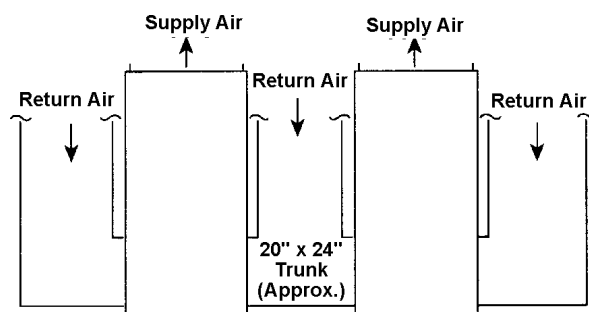
Alternate Method
Single-Side Return per Furnace
Both Side Knockouts are 14" x 23"
Furnaces are 30" Apart

III. Two Side Returns

Two side returns per furnace will ordinarily be used only when 8 or 10 tons of cooling are required and bottom return is not practical. Two side returns require a large amount of floor space. The furnaces should be from 24 to 30 inches apart. Two side returns are applicable only for the models listed in Table 3.

Furnace Model	Max CFM 0.5" ESP (Per Furnace)
GUI_090_50	1975
GUI_115_50	1985
GUI_140_50	2050
GUC090_50	1961
GUC115_50	1939
GUD090_50	1961
GUD115_50	1939
GUX090_50	1890
GUX115_50	1978

Table 3
Two-Side Return Data



Two Side Returns Per Furnace
All Side Knockouts Are 14" x 23 "
(All Furnaces)

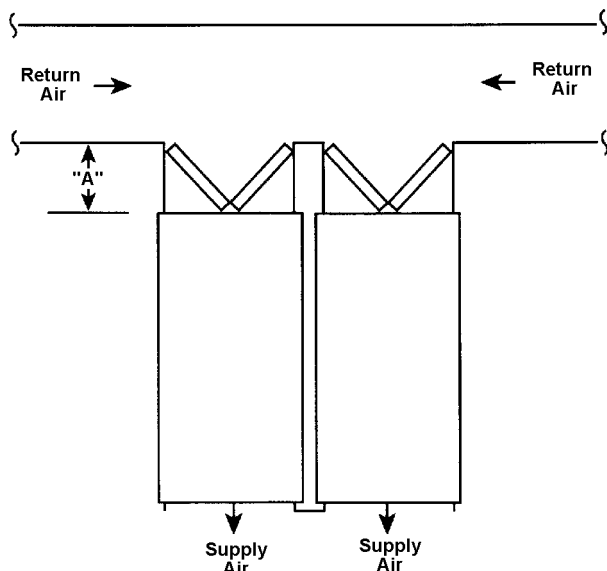
IV. Top Return

Occasionally, counterflow furnaces will be twinned. With counterflow furnaces, the return air must enter through the top of the furnace.

See Table 4 for minimum plenum height and maximum CFMs per furnace. All furnaces ship with filters and filter rack.

Furnace Model	Max CFM 0.5" ESP (Per Furnace)	Minimum Plenum Height, (Inches)
GCI_045_30	1160	8
GCI_070_30	1145	8
GCI_070_40	1366	8
GCI_090_30	1265	13
GCI_090_50	1780	13
GCI_115_40	1660	11 1/4
GCI_115_50	1840	11 1/4
GCI_140_50	1845	11 1/4
GCC045_30	1300	13
GCC070_30	1300	11 3/4
GCC070_40	1750	13
GCC090_40	1800	11 1/4
GCC090_50	2115	11 1/4
GCC115_50	2085	11 1/4

Table 4
Top Return Data



Twinned Counterflow Furnaces
"A" = Minimum Plenum Height
Furnaces from 0 to 30" Apart

II. Installation Instructions



CAUTION

To avoid personal injury due to electrical shock, wiring to each furnace must be properly polarized and grounded.



WARNING

To avoid death or personal injury due to electrical shock, disconnect electrical power before changing any electrical wiring.

This Installation Kit includes:

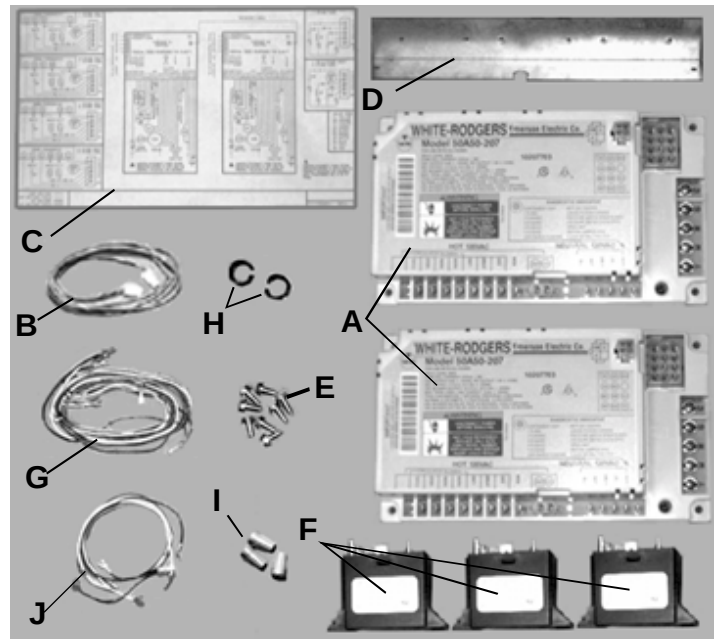


Figure 1

Item	Qty	Description
A	2	White Rodgers 50A50-207 Twinning Controls
B	1	6 Foot Twinning Cable With Amp Connectors
C	1	Furnace Twinning Schematic
D	1	Relay Mounting Bracket
E	8	3/8 Inch #6 Sheet Metal Screws
F	3	Relays
G	1	6 Foot Wiring Harness
H	2	Snap Ring Bushings
I	3	Wire Nuts
J	5	Jumper Wires

Tools required for kit installation include:

- Ratchet with a 1/4" socket
- Drill
- 3/32" bit
- Phillips head screwdriver or bit
- Needle nose pliers for removing & connecting wires
- Silicon Caulk (RTV 732 or Equivalent)
- 3/4" diameter round knockout punch

Before Installing the Twinning Kit

There are important items which must be determined before installing the twinning kit. Read all of these instructions before you begin installing either furnace.

Continuous Fan Operation

Furnaces that are twinned using this kit **cannot** be set-up for three fan speed operation. When the furnaces are set for continuous fan operation, it will be at the cooling fan speed. They will both switch to heating fan speed when either furnace has a call for heat.

Condensate Disposal

When installing condensing furnaces, be sure to plan for adequate condensate drainage. This is especially important on counterflow installations. Follow the condensate disposal piping directions shipped with the furnace.

Controlling Furnace

For these instructions we will designate the left furnace as the controlling furnace. It will be referred to as furnace #1. The right furnace will be furnace #2.

Unit Wiring

This kit allows the furnaces to be placed a maximum of 30 inches apart. Wire routing between furnaces is determined by the distance between furnaces or the type furnace being installed. There are three basic types of installations covered in this manual:

Type I Upflow Installations - Installations where the distance between furnaces is no more than 3 inches.

Type II Upflow Installations - Installations where the distance between furnaces is greater than 3 inches, but not exceeding the 30 inch maximum limit.

All Counterflow Installations

Make sure you follow the instructions appropriate for your installation.

IMPORTANT NOTE: The wires in this kit allow furnaces to be installed up to 30 inches apart. On installations where they are closer than the 30 inch maximum, excess wire must be routed such that it cannot become entangled in either blower, or damaged by either set of burners.

To Begin Installing the Kit

1. Disconnect all electrical power to unit.

2. Wire Routing

a. **Type I Upflow Installations.** The existing hole in the side of each furnace normally used for low voltage wiring can be used for routing twinning kit wires. Other than final wiring, completely install both furnaces. Remove the doors from both furnaces. Remove the right plug in the blower deck of furnace #1 and the left plug in furnace #2. Proceed to step 3.

b. **Type II Upflow Installations.** You must add a hole in the side of the blower compartment of both furnaces before installing the furnaces.

Remove the blower compartment door of both furnaces. Using your hole knockout tool, make a 3/4 inch hole in the side of each furnace approximately 12 inches below the blower deck and 1-1/4 inches from the front of the furnace.

After making the two holes, completely install both furnaces except for final wiring. Proceed to step 3.

c. **All Counterflow Installations.** You must add a hole in the side of the blower compartment of both furnaces before installing the furnaces.

Remove the blower compartment door of both furnaces. Using your hole knockout tool, make a 3/4 inch hole in the side of each furnace approximately 12 inches above the blower deck and 1-1/4 inches from the front of the furnace.

After making the two holes, completely install both furnaces except for final wiring. Proceed to step 3.

Installing Kit in Furnace #1

3. Disconnect all wires from the control and remove from the control panel.
4. Remove the three, 1/4 inch screws in the blower housing that hold the control panel in place.
5. Separate the control module from the control mounting plate by removing the two screws in the corners of the control module and set the old control aside.
6. Locate the relay mounting plate on the right side of the control mounting plate by drilling two, 3/32 inch holes through the two mounting holes provided. Secure the relay mounting plate to the control mounting plate with two screws that are provided.
7. Using the six sheet metal screws supplied, mount the 3 relays to the relay mounting plate. All three relays are identical and can be mounted in any order.
8. Install the control mounting plate to the blower housing using the same screws that were removed previously.
9. Install one of the new control modules to the control mounting plate with the two screws that held the old control module in place.
10. Connect the wires removed in step 6 to the new control. For proper wire location, refer to the wiring diagram on the inside of the blower compartment door.

NOTE: Figure 2 is a point-to-point diagram of the wiring as it should look after you have completed the remaining wiring steps.

11. Insert the spade terminal end of wire Black 3 (BK-3) to "C" on the terminal strip.
12. Connect the female connectors on wire BK-3 to terminal #1 on relay Y2R and terminal #1 on Relay W2R.
13. Insert the spade terminal end of wire Red 4 (RD-4) to "R" on the terminal strip.
14. Connect the female connector on wire RD-4 to terminal #4 on Relay TR.
15. Connect the female connector of wire Red 5 (RD-5) to terminal #2 on relay TR.
16. Connect the stripped end of wire RD-5 to "R" on the thermostat when the thermostat connections are completed.

Installing Kit in Furnace #2

17. Disconnect all wires from the control.
18. Separate the control from the control box by removing the two screws in the corners of the control and set the old control aside.
19. Install one of the new control modules to the control mounting plate with the two screws that held the old control module in place. Be sure to locate the thermostat terminal end of the control module to the top of the control mounting plate.
20. Connect the wires removed in step 17 to the new control. For proper wire location, refer to the wiring diagram on the inside of the blower compartment door.
21.
 - a. **Type I Upflow Installations.** Locate the hole in the blower deck vacated by the plug in step 1. Feed one end of the twinning cable through this hole and connect it to the female Amp connector on the new control.
 - b. **Type II Upflow and All Counterflow Installations.** Feed one end of the twinning cable through the hole created in step 1 and connect it to the female Amp connector on the new control.
22. Feed the spade terminal end of the wiring harness through the same hole.
23. Connect the spade terminal on wire Black 2 (BK-2) to C on the terminal strip.
24. Connect the spade terminal on wire Red 2 (RD-2) to R on the terminal strip.
25. Connect the spade terminal on wire White 2 (WH-2) to W on the terminal strip.
26. Connect the spade terminal on wire Yellow 2 (YL-2) to Y on the terminal strip.
27.
 - a. **Type I Upflow Installations.** Run the other end of both the twinning cable and wiring harness out of furnace #2 into furnace #1 through the low voltage holes in the cabinet sides.
 - b. **Type II Upflow and All Counterflow Installations.** Run the other end of both the twinning cable and wiring harness into furnace #1 through the hole made in step 2. Go to step 29.

Move back to furnace #1.

28. **For Type I Upflow Installations Only** Locate the hole in the blower deck vacated by the plug removed in Step 2. Feed the cable and wiring harness through this hole.
29. Connect wire BK-2 to terminal #1 on relay IR.
30. Connect the 3 female connectors on wire RD-2 to:
 - terminal #2 on relay W2R .
 - terminal #2 on relay Y2R.
 - terminal #3 on relay IR.
31. Connect wire WH-2 to terminal #4 on relay W2R.
32. Connect wire YL-2 to terminal #4 on relay Y2R.
33. Connect the female connector on wire Yellow 7 (YL-7) to terminal #3 on relay Y2R.
34. Connect the female connector on wire White 6 (WH-6) to terminal #3 on relay W2R.
35. The stripped ends of wires YL-7 and WH-6 will be used when making final thermostat connections.
36. Connect the plug connector on the twinning cable to the female connector on the new control.
37. Snap ring bushings.
 - a. **Type I Upflow Installations.** Place the snap ring bushing around both the twinning cable and wiring harness and insert into blower deck hole.
 - b. **Type II Upflow and All Counterflow Installations.** Place the snap ring bushing around both the twinning cable and wiring harness and insert into the hole made in step 2.
38. Use caulk around twinning cable and wiring harness to seal any air leaks in snap ring bushing.
39. Repeat steps 37 and 38 in furnace #2.
40. Make final thermostat and low voltage condensing unit connections as required according to wiring diagram. Indicate the thermostat wiring selected by circling the matching diagram on the wiring schematic, both Figure 5 in this manual and on the schematic in the kit. **IMPORTANT:** If your thermostat requires a common connection ("C", "X", or "X1" terminal), connect it to "C" on the terminal strip of furnace #1. Indicate this on the schematics.
41. Check the fan table in the furnace installation manual and the airflow information in Section I of this manual for appropriate blower speed(s). Heating speed on furnace #1 must equal heating speed on furnace #2. Cooling speed on furnace #1 must equal cooling speed on furnace #2. Check the furnace wiring diagram to see which blower lead(s) corresponds to the blower speed(s) selected. Connect the appropriate blower leads to the correct terminals on each control. All unused blower leads must either be connected to the "PARK" terminals on the control, or taped to prevent shorts.
42. Replace all four furnace doors in their original locations.
43. Remove backing from wiring schematic and affix to the blower compartment door of furnace #1 taking care not to cover any existing warning labels. Covering the yellow energy guide label is acceptable.

III. Point-to-Point Wiring Diagram



WARNING

To prevent death, personal injury or property damage due to electrical shock, disconnect electrical power to both furnaces before installing this kit. Wiring to both furnaces must be properly polarized and grounded, and both transformers must be in phase.

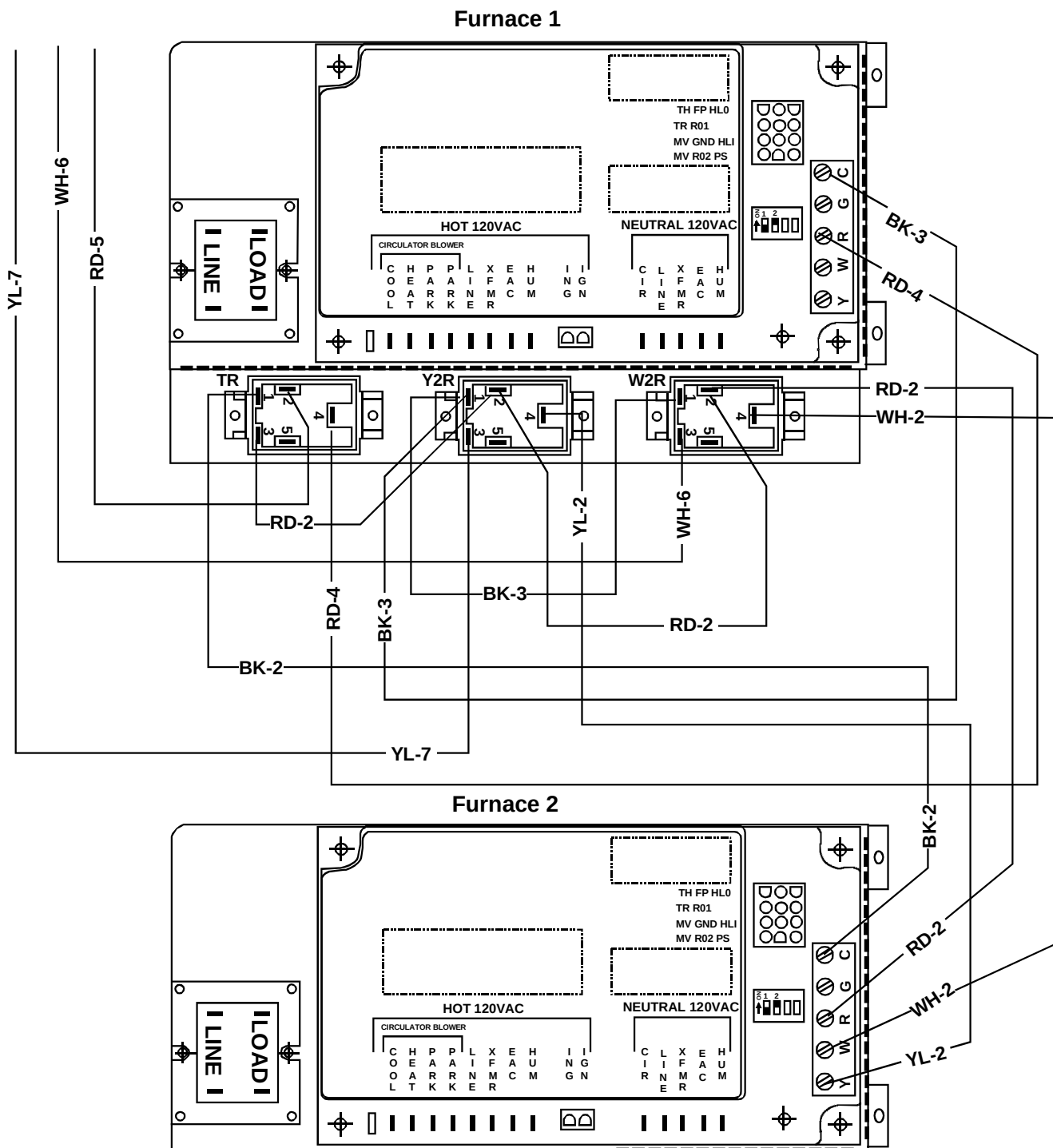


Figure 2

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To prevent death, personal injury or property damage due to electrical shock, disconnect electrical power to both furnaces before installing this kit. Wiring to both furnaces must be properly polarized and grounded, and both transformers must be in phase.

