

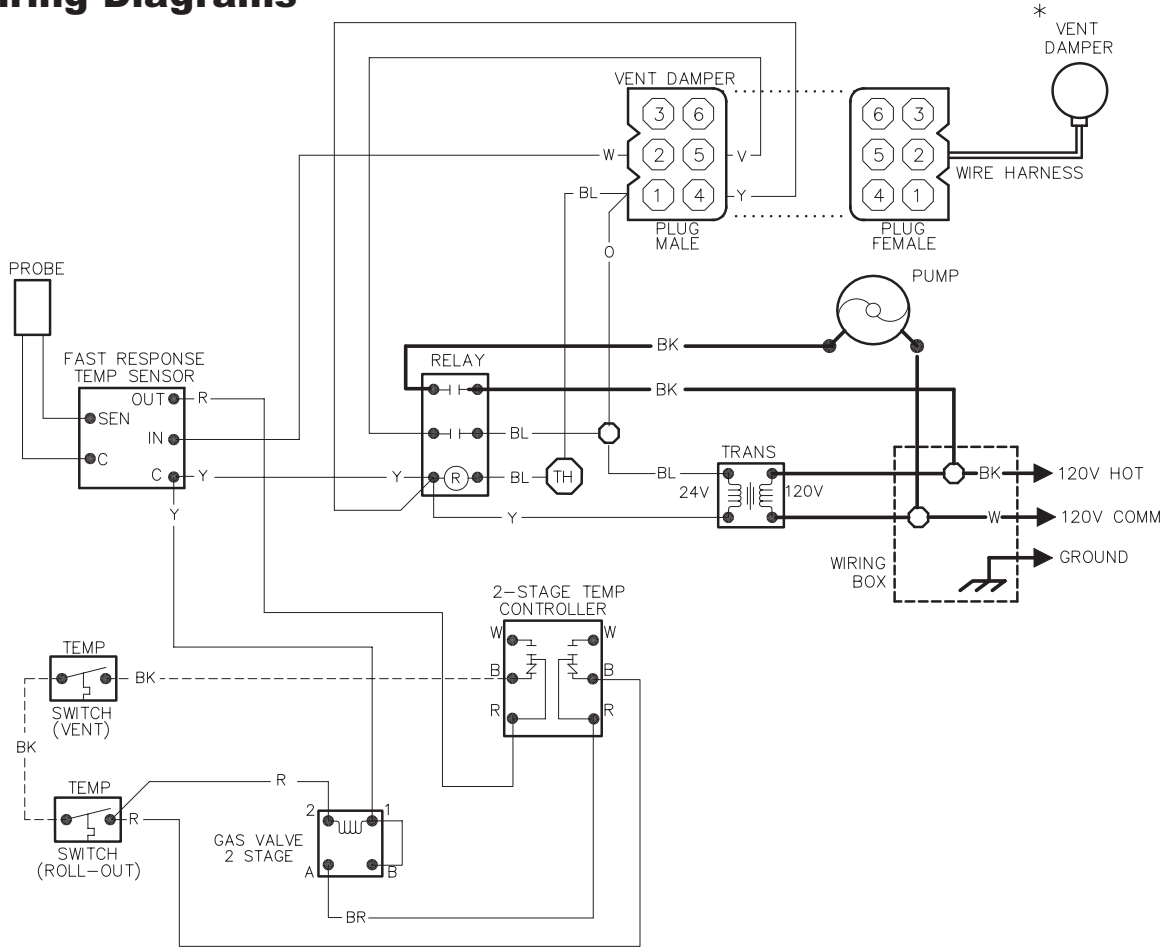
TROUBLESHOOTING

These instructions are primarily intended for the use of qualified personnel specifically trained and experienced in the installation of this type of heating equipment and related system components. Installation and service personnel may be required by some states to be licensed. Persons not qualified shall not attempt to install this equipment nor attempt repairs according to these instructions.

PROBLEM	CAUSES	SOLUTIONS
1)When room thermostat is turned on, boiler does not operate.	1)No power to the boiler. 2)Defective room thermostat or disconnected wire in thermostat circuit. 3)Defective transformer. 4)Defective pump relay. 5)Defective pump.	1)Check circuit breakers, disconnect switch. Make sure power is on. 2)Check continuity on thermostat and wiring circuit. Replace thermostat, or repair wiring connections. 3) Check secondary voltage. If no 24V, replace transformer. 4) Check relay coil or contacts. Replace as required. 5) Replace pump.
2)When room thermostat is calling for heat, pump is on, but burners will not turn on.	1)For standing pilot models, pilot burner not lighted. 2)If pilot burner will not stay lighted, thermocouple or gas valve may be defective. 3)Gas knob in "Pilot" position. 4)For automatic ignition models, gas valve knob is in "OFF" position. 5)Vent switch is open. 6)Roll-out switch is open. 7)High limit is open. 8) Fast Response Temperature Sensor probe is defective. 9) Fast Response Temperature sensor board is defective.	1)Light pilot burner. (Follow lighting instructions on rating plate.) 2)Check thermocouple MV generation. If less than 25MV (open circuit), replace thermocouple. If between 25-35 MV, replace gas valve. 3)Turn knob to "ON" position. 4)Turn gas knob to "ON". If ignition module locks out, reset by interrupting power to boiler. 5) Check for blockage of venting system or disconnected vent piping. After problem is corrected push button to reset, or replace single-use type vent switch. 6)Check for blockage of flue or sooted heat exchanger. After problem is corrected push button to reset or replace single use type roll-out switch. 7)Setting may be too low. Check water flow and adjust setting to obtain 20-30°F temperature rise. 8)Red LED on circuit board will be <u>ON</u> to indicate a loose sensor connection or a shorted sensor. Check terminal connectors or replace sensor as required. NOTE: Red LED will also be <u>ON</u> if sensor temperature exceeds 300°F or drops below - 20°F. It will turn <u>OFF</u> when sensor temperature returns to the proper range. Yellow LED will be <u>ON</u> if temperature exceeds 240°F. It will turn off when sensor temperature falls below 180°F. When either Red or Yellow LED is ON, boiler will be shut down. 9)Check voltage across output and common terminals. If no 24V is present, replace board.

	10) Defective ignition module or defective gas valve.	10) Before module goes into a lock-out, check voltage across MV and MV/PV. If no 24V is present, replace module. If 24V is present, replace gas valve.
3) Pilot Outage. (Standing pilot models)	1) Too low or too high gas pressures. 2) Restricted pilot. 3) Weak thermocouple.	1) Adjust inlet gas pressure as shown on rating plate. 2) Clean pilot orifice. 3) Replace thermocouple.
4) Yellow lazy flame.	1) Too low gas pressure. 2) Restricted burner intake ports. 3) Restricted gas line.	1) Adjust manifold pressure as shown on rating plate. 2) Clean burners free of debris or insects. 3) Clean gas line or increase gas line piping.
5) Sooting	1) Insufficient combustion air. 2) Improper venting. 3) Severe yellow burner flames.	1) Refer to installation instructions regarding combustion air requirements. 2) Refer to installation instructions. 3) See yellow flame section above.

Wiring Diagrams



APPROVED BY:	
CHECKED BY:	
ORIG E.O. 2327	
02/02/88	
CHG E.O. 3265	
11/5/99	
Raypak	

* REFER TO INSTALLATION/OPERATION INSTRUCTIONS AND WIRING DIAGRAM SUPPLIED WITH VENT DAMPER.

REPLACE WIRING WITH 105°C WIRE ONLY AND 150°C AS NOTED.

WIRING DIAGRAM STG FIRE DOE FIRING MODE-2 STAGE

BOILER INPUTS: 90,000-180,000 BTUH

BOILER SIZE: 90-180

BOILER TYPE:

H3

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6

KEY

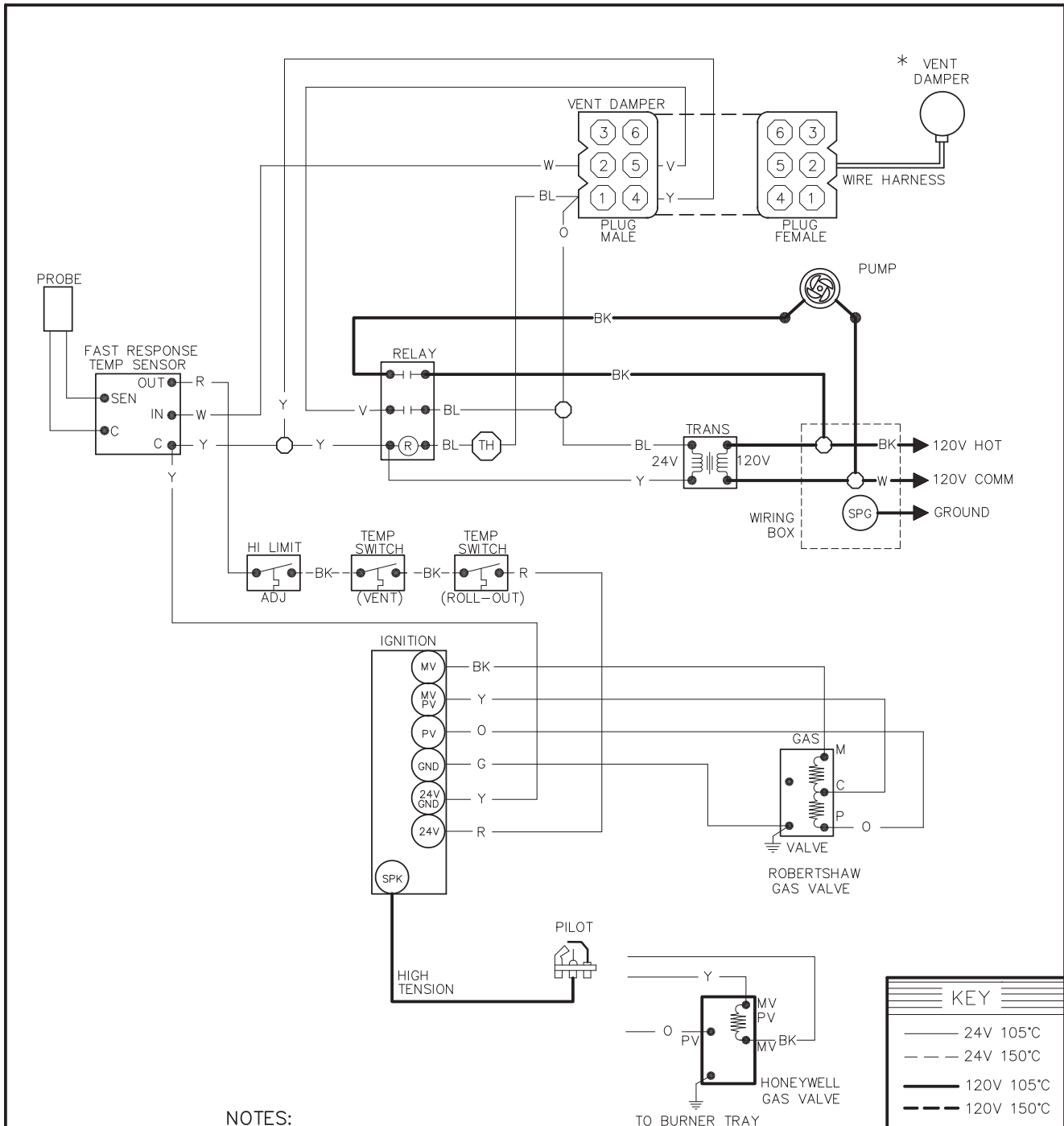
- 24V
- 120V
- - - - 150°C
- - - - 120V FIELD WIRE

○ WIRE NUT

- BK - BLACK
- BR - BROWN
- BL - BLUE
- R - RED
- O - ORANGE
- Y - YELLOW
- G - GREEN
- V - VIOLET
- W - WHITE

⏏ CABINET GROUND

⊠ THERMOSTAT



NOTES:

* REFER TO INSTALLATION/OPERATING INSTRUCTIONS AND WIRING DIAGRAM SUPPLIED WITH VENT DAMPER.

IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE BOILER MUST BE REPLACED, IT MUST BE REPLACED WITH 105°C WIRE OR ITS EQUIVALENT, AND 150°C AS NOTED.

CHECKED BY:	
APPROVED BY:	
ORIG E.O. 2866	
07/06/94	
CHG E.O. 3944	
01/17/07	
Raupak	

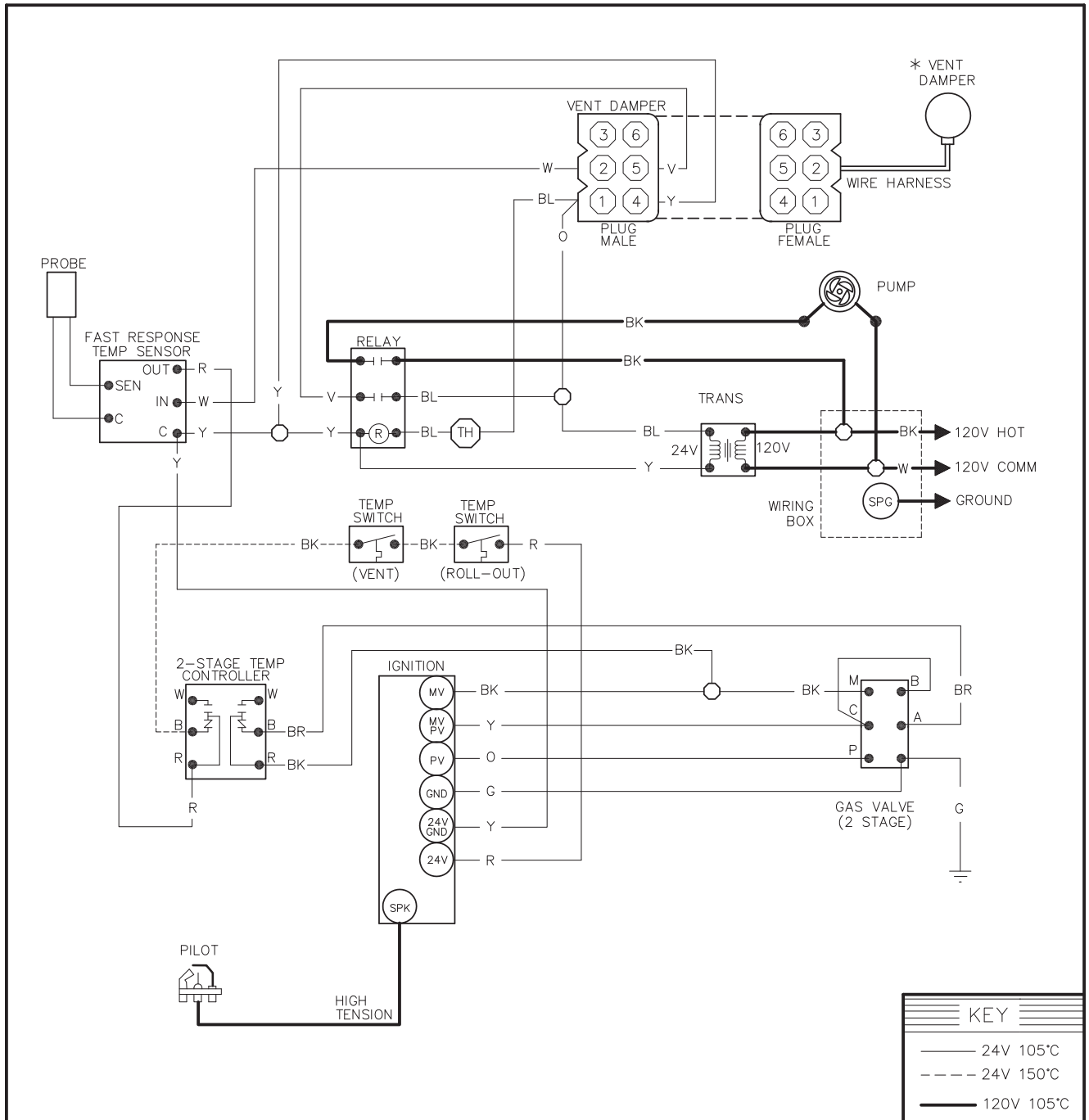
**WIRE DIAGRAM IID
FIRING MODE - ON/OFF**

BOILER INPUTS: 42,000 THRU 66,000 BTUH

BOILER SIZE: **42-66**

BOILER TYPE: **H4**

KEY	
—	24V 105°C
- - -	24V 150°C
—	120V 105°C
- - -	120V 150°C
○	WIRE NUT
⊕	GROUND
⊕	THERMOSTAT
BK	BLACK
BR	BROWN
R	RED
O	ORANGE
Y	YELLOW
G	GREEN
BL	BLUE
V	VIOLET
W	WHITE
152357	3



NOTES:

* REFER TO INSTALLATION/OPERATING INSTRUCTIONS AND WIRING DIAGRAM SUPPLIED WITH VENT DAMPER.

IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE BOILER MUST BE REPLACED, IT MUST BE REPLACED WITH 105°C WIRE OR ITS EQUIVALENT, AND 150°C AS NOTED.

APPROVED BY:	
CHECKED BY:	
ORIG E.O. 2866	
07/06/94	
CHG E.O. 3944	
01/15/07	
Raupak	

WIRE DIAGRAM IID	
FIRING MODE - 2 STAGE	
BOILER INPUTS: 90,000 THRU 180,000 BTUH	
BOILER SIZE: 90-180	BOILER TYPE: H3

KEY	
—	24V 105°C
- - -	24V 150°C
—	120V 105°C
- - -	120V 150°C
○	WIRE NUT
⊕	GROUND
⊕	THERMOSTAT
BK	BLACK
BR	BROWN
R	RED
O	ORANGE
Y	YELLOW
G	GREEN
BL	BLUE
V	VIOLET
W	WHITE

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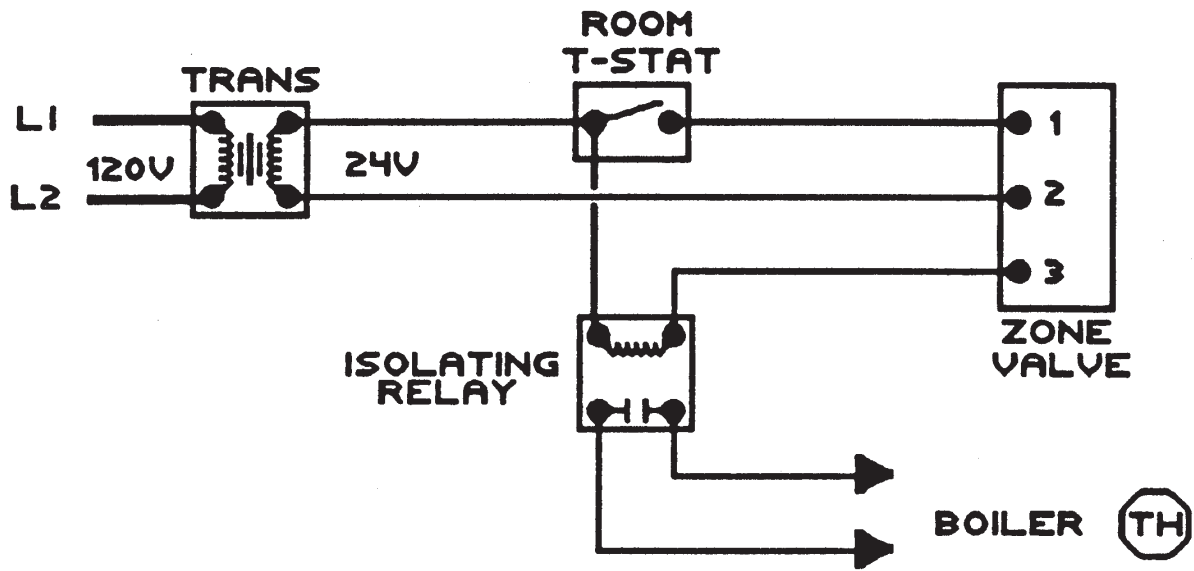
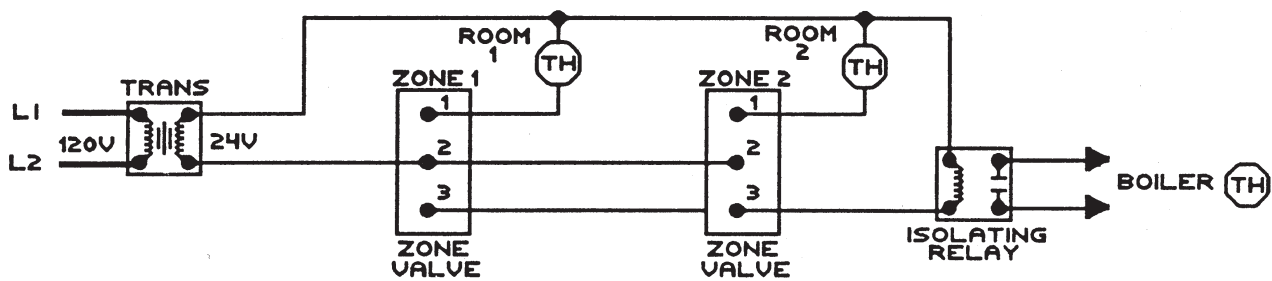
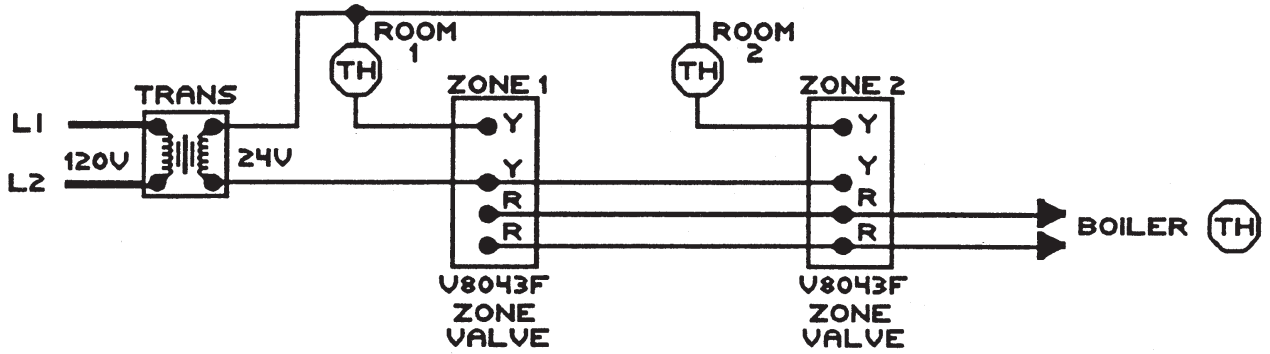


Fig. 17: Single-Zone Taco Valve



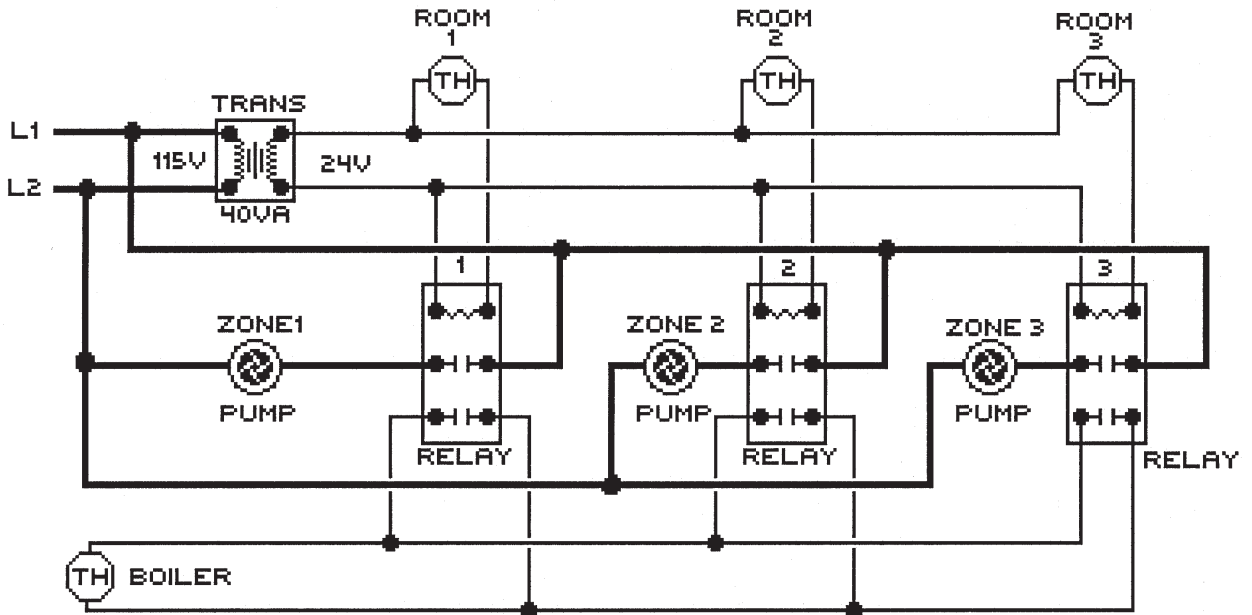
NOTE: Maximum three (3) zone valves per one (1) 40 VA transformer.

Fig. 18: Dual-Zone Taco Valve



NOTE: Maximum five (5) zone valves per one (1) 40 VA Transformer.

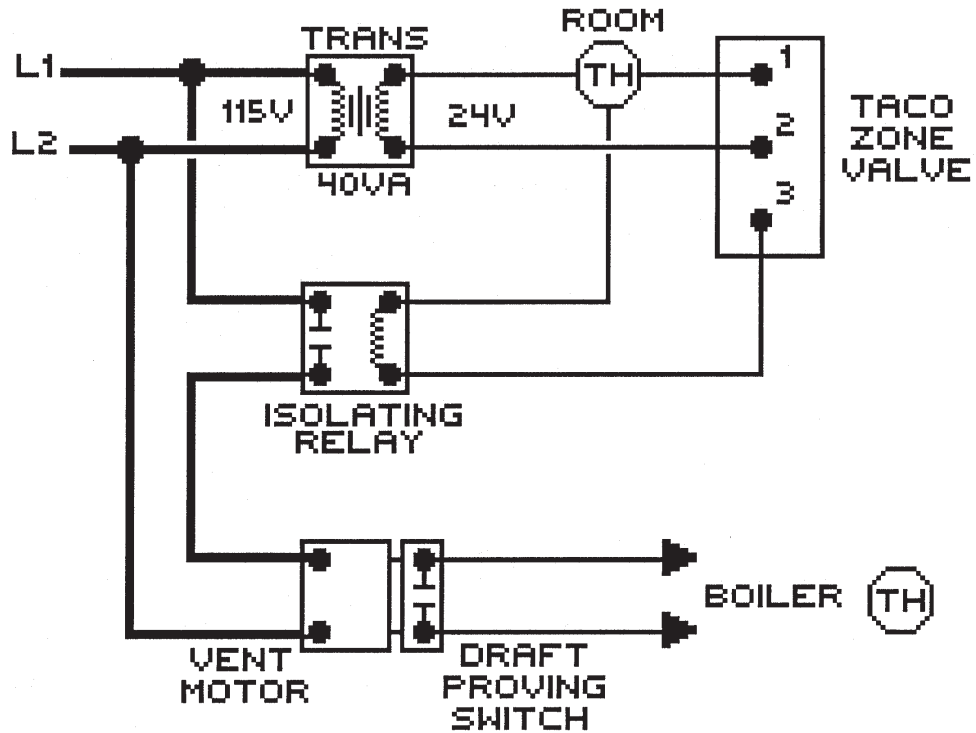
Fig. 19: Dual-Zone Honeywell Valve



NOTE: Check VA rating of each relay coil. Total load must not exceed VA rating of transformer.

Fig. 20: System with Three (3) Zone Pumps

Taco Zone Valve



Honeywell Zone Valve

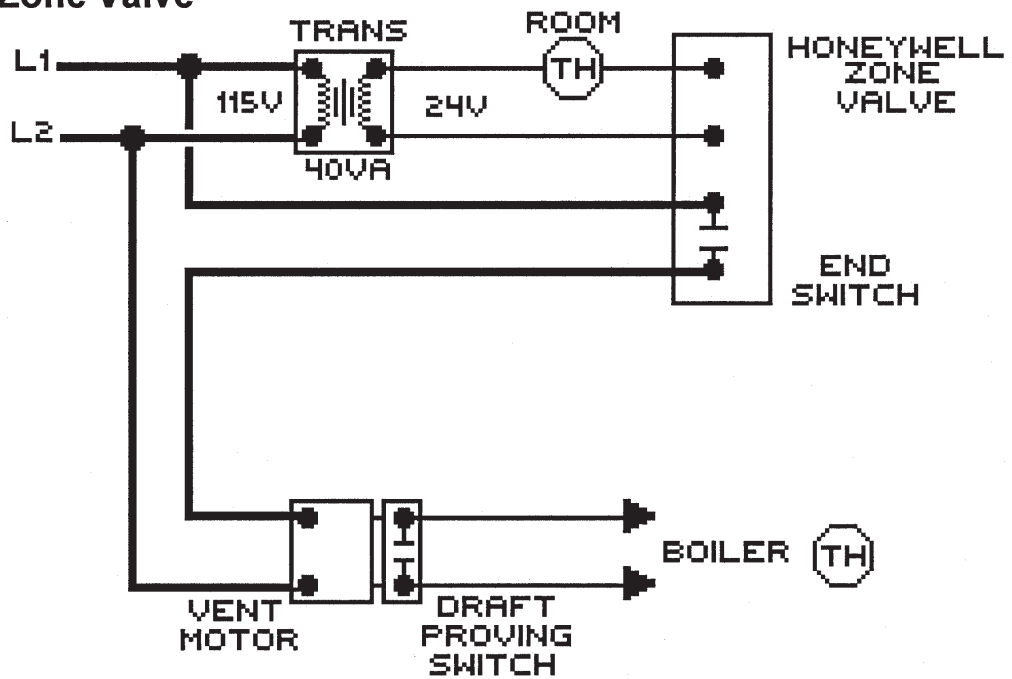
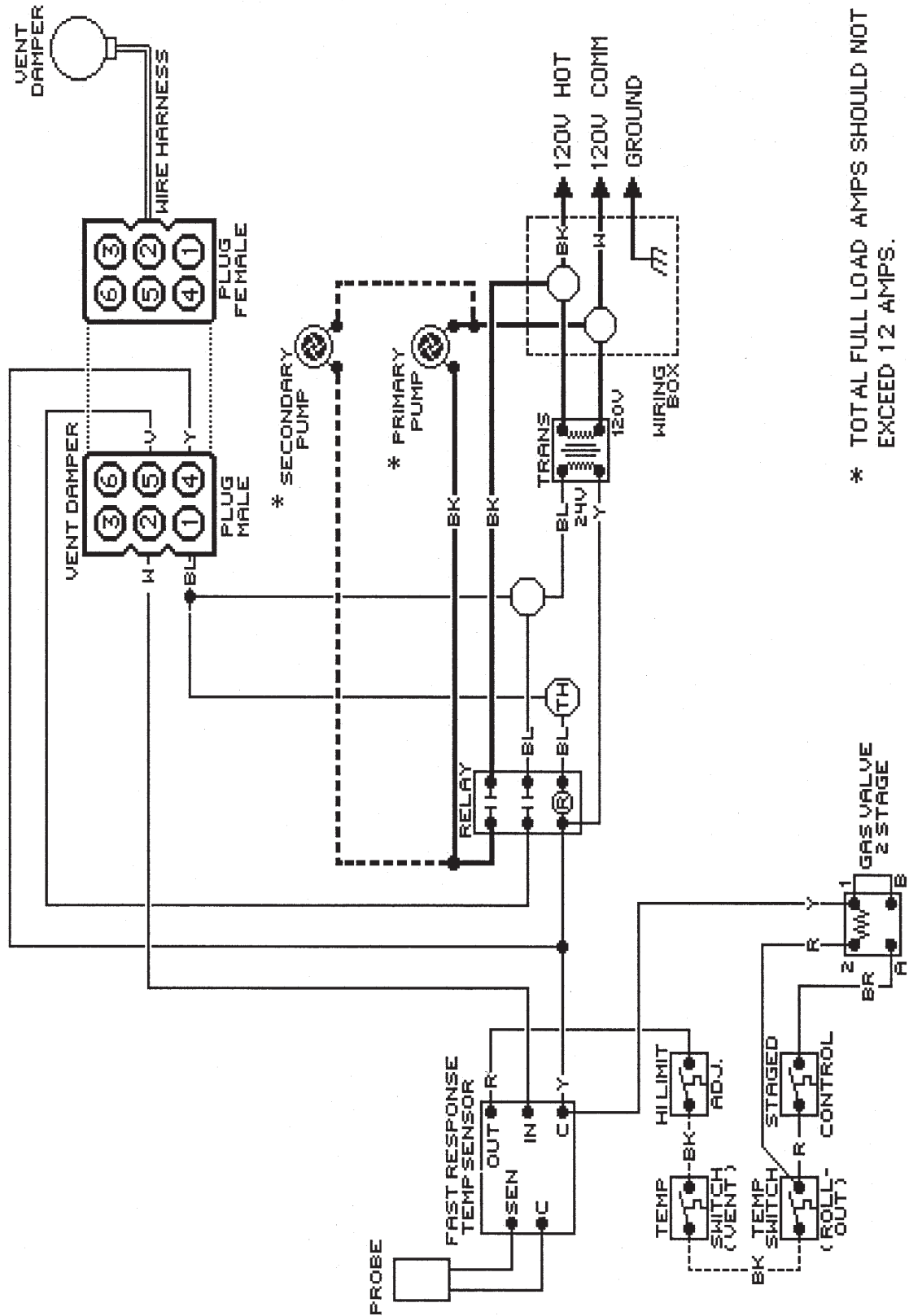


Fig. 21: Power Vent System with Zone Valve



* TOTAL FULL LOAD AMPS SHOULD NOT EXCEED 12 AMPS.

Fig. 22: Primary/Secondary Pumping System

Adjustment & Replacement of Components

DANGER—SHOCK HAZARD: Make sure electrical power to the boiler is disconnected to avoid potential serious injury or damage to components.

Gas Valve Replacement

1. Shut-off electrical power and gas supply to the boiler.
2. Remove gas piping to gas valve inlet.
3. Disconnect wiring connections, pilot tubing (when present).
4. Remove screws (2) holding the burner tray.
5. Slide burner tray out.
6. Remove gas valve bracket screws and bracket.
7. Unscrew gas valve from gas pipe.
8. Reverse above procedure to re-install.

Pilot Burner Cleaning or Replacement (Standing Pilot)

1. Shut-off electrical power and gas supply to the boiler.
2. Disconnect gas piping to gas valve.
3. Disconnect wiring connections to gas valve.
4. Remove screws (2) holding the burner tray.
5. Slide burner tray out.
6. Remove screw holding pilot lighter tube.
7. Remove screws (2) holding pilot bracket on the burner tray.
8. Disconnect thermocouple and pilot tubing from the gas valve.
9. Remove pilot burner from pilot bracket.
10. Remove pilot orifice and blow away lint or dirt. Clean with wire or small brush. NOTE: Make sure pilot orifice is clear, but do not enlarge the hole.
11. Reverse above procedure to re-install.

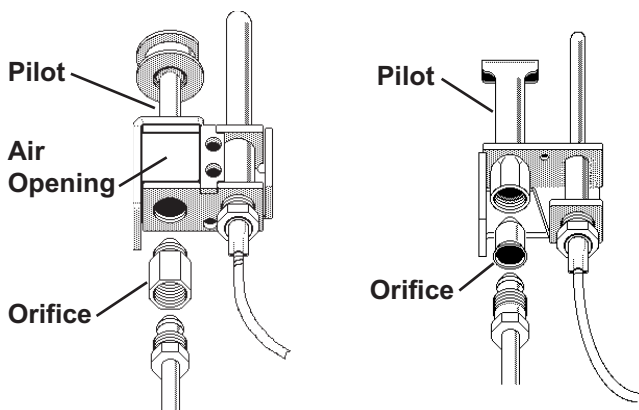


Fig. 35: Pilots, Honeywell (Left) and Robertshaw (Right)

Flame Roll-out Switch Replacement

1. Shut-off electrical power to the boiler.
2. Remove wiring connections to switch.
3. Remove screws (2) holding the switch.
4. Reverse above procedure to re-install.

Vent Thermal Switch Replacement

1. Shut-off electrical power to the boiler.
2. Remove wiring connections to switch.
3. Remove the screws (2).
4. Reverse above procedure to re-install.

Ignition Module Replacement

1. Shut-off electrical power to the boiler.
2. Remove control cover screws and open control compartment.
3. Disconnect wiring connections to module.
4. Remove screws (2) holding module.
5. Reverse above procedure to re-install.

Transformer Replacement

1. Shut-off electrical power to the boiler.
2. Remove control cover screws and open control compartment.
3. Disconnect wiring connections from transformer leads.
4. Remove screws (2) holding transformer.
5. Reverse above procedure to re-install.

Pump Relay Replacement

1. Shut-off electrical power to the boiler.
2. Remove control cover screws and open control compartment.
3. Disconnect wiring to the relay.
4. Remove screws (2) holding relay.
5. Reverse above procedure to re-install.

High Limit Control

1. Shut-off electrical power to the boiler.
2. Remove control cover screws and open control compartment.
3. The control is factory set at 180°F. To adjust setting, use a small screw driver and turn dial clockwise to lower the temperature or counter-clockwise to raise the setting.
4. To replace the limit control, disconnect the wiring connections.
5. Remove screws (2) holding the limit control.
6. Remove upper access panel.

7. Remove the wedge or retaining clip holding the sensing bulb in the control well in the in/out header.
8. Pull out the sensing bulb carefully from the control well.
9. Remove the limit control with capillary from unit.
10. Reverse above procedure to re-install.

Fast-Response Temperature Sensor Module Replacement

1. Shut-off electrical power to the boiler.
2. Remove control cover screws and open control compartment.
3. Disconnect wiring to the board.
4. Carefully pull out the control board from the nylon pin supports.
Reverse above procedure to re-install.

Fast-Response Temperature Sensor Probe Replacement

1. Shut-off electrical power to the boiler.
2. Shut-off water supply to the boiler and open drain valve to remove water to the sensor probe level.
3. Remove control cover screws and open control compartment.
4. Disconnect wire leads from control board.
5. Remove upper access panel.
6. Remove sensor probe from in/out header.
7. Reverse above procedure to re-install.

Circulator Replacement

1. Shut-off electrical power to the boiler.
2. Shut-off water supply and open drain valve to remove water in the piping at the pump level.

CAUTION: To avoid damage to electrical components, keep water from getting into the control compartments and gas valve.

3. Disconnect wiring and conduit connections to the pump.
4. Disconnect the bypass tube connections to the inlet flange.
5. Remove the nuts and bolts at the inlet and outlet flanges. Remove old gaskets.
6. Remove the pump.
7. Reverse the above procedure to re-install. Use new gaskets and make sure they are seated properly when tightening the nuts and bolts.

2-Stage Controller (Models 0090, 0135 & 0180)

1. Shut-off electrical power to the boiler.
2. Remove control cover screws and open control compartment.
3. The control is factory set at 160°F. To adjust to another setting, use a small screw driver and turn dial clockwise to lower the temperature or counter-clockwise to raise the setting.
4. To replace the stage controller, disconnect the wiring connections.
5. Remove screws (2) holding the staged controller.
6. Remove upper access panel.
7. Remove the wedge or retaining clip holding the sensing bulb in the control well in the in/ out header.
8. Pull out the sensing bulb carefully from the control well.
9. Remove the stage control with capillary from unit.
10. Reverse above procedure to re-install.

Replacement Parts List (see Raypak Catalog No. 9300.9.1)

NOTE: To supply the correct part it is important that you supply the model number, serial number and type of gas when applicable.

Any part returned for replacement under standard company warranties must be properly tagged with Raypak return parts tag, completely filled in with the heater serial number, model number etc., and shipped to Raypak freight prepaid.

If determined defective by Raypak and within warranty, the part will be returned in kind or equal substitution, freight collect. Credit will not be issued.

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