

**FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY  
BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE  
PERSONAL INJURY AND/OR PROPERTY DAMAGE.**

### DESCRIPTION

The 50V54-820 is an Integrated Furnace Control for aftermarket service of Trane and American Standard Two-Stage furnace products with variable speed blower and inducer motors. The 50V54-820 Control Board kit includes a 120V Silicon Nitride Ignitor and can service systems with both 80V and 120V HSI ignition and is a replacement for Trane KIT15816.

#### Parts included:

- 50V54-820 Integrated Furnace Control
- 789A-820 Ignitor Kit (120V HSI Ignitor, Mounting Bracket, 3 Screws)
- Ignitor Adapter Harness for Older 80V HSI Units
- 4 Wire Ties
- Installation Instructions

### SPECIFICATIONS

#### ELECTRICAL RATINGS:

**Input Voltage:** 25VAC, 60 Hz

**Max Input Current:** @ 25 VAC 525 mA + MV

**Inducer Output:** 3 Phase

#### Relay Contact Ratings:

Gas Valve Relay: 1.5 A @ 30 VAC, 0.6 pf

Ignitor Relay: 2.0 A @ 120 VAC

Humidifier Load: 1.0 A @ 120 VAC

Electronic Air Cleaner Load: 1.0 A @ 120 VAC

#### Flame Current Requirements:

Min current to insure flame detection: 1.0  $\mu$ A DC

Max current for non-detection: 0.1  $\mu$ A DC

Max allowable leakage resistance: 100 M ohms

\* Measured with a DC microammeter in series with the flame probe lead

#### OPERATING TEMPERATURE RANGE:


-40° to 175°F (-40° to 80°C)

#### HUMIDITY RANGE:

5 to 95% relative humidity (non-condensing)

**AGENCY APPROVALS:** CSA USA / Canada

**GASES APPROVED:** Natural, Manufactured, Mixed, Liquid Petroleum, and LP Gas Air Mixtures.



### CAUTION

**Risk of Electric Shock.** Disconnect electric power to system until installation is complete. Do not use on circuit exceeding specified voltage. Higher voltage will damage control and could cause shock or fire hazard.

**This control is not intended for use in locations where it may come in contact with water.**

**May cause flame rollout.** Shut off main gas to heating system until installation is complete.

### INSTALLATION

#### MOUNTING AND WIRING

**NOTE:** All wiring should be installed according to local and national electrical codes and ordinances.

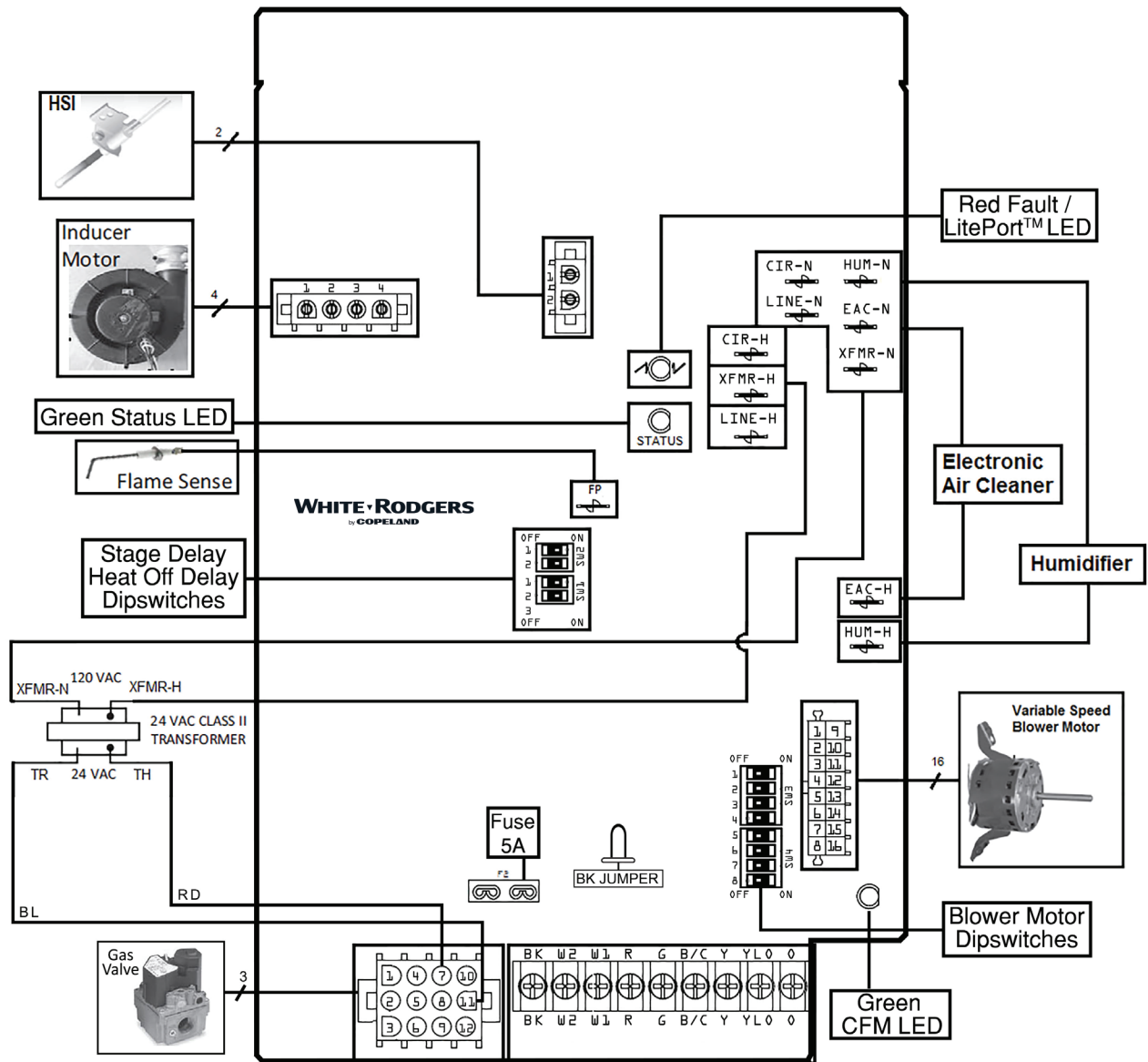
1. Disconnect electrical power and gas supply to unit, then remove unit access panels.
2. Mark and disconnect all wires from the existing control, then remove existing control.
3. Mount the new control board in the unit and reconnect all the wires.
4. **Units originally equipped with 80V ignitors must be updated using the supplied 120V Ignitor and Adapter**

**Harness.** Ignitor replacement on existing 120V HSI units is optional.

5. Verify Stage Delay, Heat Off Delay, and Blower Motor Dipswitch settings by matching prior boards configuration or refer to Dipswitch Configuration section of instructions and original OEM install manual and wiring diagrams.
6. Secure any wiring with the provided cable ties as necessary.
7. Reinstall unit access panels and reconnect electric power and gas supply to the unit.
8. Verify unit operation by placing thermostat in heating mode and initiating a call for heat by adjusting thermostat 5 degrees above room temperature.



# WIRING DIAGRAM



| INDUCER         |        |          |
|-----------------|--------|----------|
| 4 PIN CONNECTOR |        |          |
| 1.              | IND-01 | INDUCER  |
| 2.              | IND-02 | INDUCER  |
| 3.              | IND-03 | INDUCER  |
| 4.              |        | NOT USED |

| IGNITOR         |       |                 |
|-----------------|-------|-----------------|
| 2 PIN CONNECTOR |       |                 |
| 1.              | IGN-N | IGNITOR NEUTRAL |
| 2.              | IGN   | IGNITOR         |

| MAIN HARNESS     |     |                            |
|------------------|-----|----------------------------|
| 12 PIN CONNECTOR |     |                            |
| 1.               | PSO | PRESSURE SWITCH OUTPUT     |
| 2.               | HLI | HIGH LIMIT INPUT           |
| 3.               | MVH | VALVE HIGH STAGE           |
| 4.               | MVL | VALVE LOW STAGE            |
| 5.               | GND | GROUND                     |
| 6.               | PS2 | HIGH PRESSURE SWITCH INPUT |
| 7.               | TH  | 24VAC                      |
| 8.               | MVC | VALVE COMMON               |
| 9.               | HLO | HIGH LIMIT OUTPUT          |
| 10.              | ILI | INDUCER LIMIT INPUT        |
| 11.              | TR  | 24V RETURN                 |
| 12.              | PSI | LOW PRESSURE SWITCH INPUT  |

| BLOWER MOTOR     |            |  |
|------------------|------------|--|
| 16 PIN CONNECTOR |            |  |
| 1.               | C1 (BLUE)  |  |
| 2.               | W / W1     |  |
| 3.               | C2         |  |
| 4.               | DELAY      |  |
| 5.               | COOL       |  |
| 6.               | Y1         |  |
| 7.               | ADJUST     |  |
| 8.               | OUT-       |  |
| 9.               | O (ORANGE) |  |
| 10.              | BK / PWM   |  |
| 11.              | HEAT       |  |
| 12.              | R          |  |
| 13.              | EM / W2    |  |
| 14.              | Y / Y2     |  |
| 15.              | G          |  |
| 16.              | OUT+       |  |

## DIPSWITCHES

### SW1 – TIME DELAY FOR SECOND STAGE (W1/W2 JUMPERED FOR SINGLE STAGE THERMOSTAT)

| Time     | SW1-1 | SW1-2 |
|----------|-------|-------|
| 1/2 min. | On    | Off   |
| 5 min.   | Off   | On    |
| 10 min.* | Off   | Off   |
| 15 min.  | On    | On    |

\*Default = Off, Off

### SW2 - HEAT OFF DELAY FOR BLOWER

| Time       | SW2-1 | SW2-2 |
|------------|-------|-------|
| 60 sec.    | On    | Off   |
| 100 sec. * | On    | On    |
| 140 sec.   | Off   | On    |
| 180 sec.   | Off   | Off   |

\*Default = On, On

### SW3, SW4 - BLOWER MOTOR SETUP

|   |                    |
|---|--------------------|
| SW3-1,2 select the Outdoor Unit Size in Tons.     | Default = Off, Off |
| SW3-3,4 select the Cooling Airflow CFM.           | Default = Off, Off |
| SW4-5,6 select the Cooling Airflow Delay Options. | Default = Off, Off |
| SW4-7,8 select the Heating Airflow CFM.           | Default = Off, On  |

See original Unit wiring diagram on blower door for details before changing these settings.

**NOTE:** Cycle power after changes are made.

### BK JUMPER (HUMIDISTAT OPERATION)

The factory installed jumper between R and BK on the circuit board must be cut if an optional Humidistat is installed.

# OPERATION

## HEAT MODE

| Output                                      | Standby | Call for Heat | Self-Check | Ignitor Warm-Up | Ignition Activation Period | Heat ON Delay | Heating until Thermostat is Satisfied | Post-Purge | Blower Off Delay<br>* = Default | System Off |
|---|---------|---------------|------------|-----------------|----------------------------|---------------|---------------------------------------|------------|---------------------------------|------------|
|   |         |               |            | 20 sec          | 2 sec                      | 45 sec        |                                       | 5 sec      | 60, *100, 140, 180 sec          |            |
| Thermostat - W2<br>Thermostat - W1          |         |               |            |                 |                            |               |                                       |            |                                 |            |
| Second Stage Inducer<br>First Stage Inducer |         |               |            |                 |                            |               |                                       |            |                                 |            |
| Pressure Switch (PS2)                       |         |               |            |                 |                            |               |                                       |            |                                 |            |
| Pressure Switch (PS1)                       |         |               |            |                 |                            |               |                                       |            |                                 |            |
| Ignitor                                     |         |               |            |                 |                            |               |                                       |            |                                 |            |
| Second Stage Gas<br>First Stage Gas Valve   |         |               |            |                 |                            |               |                                       |            |                                 |            |
| Flame Sensor                                |         |               |            |                 |                            |               |                                       |            |                                 |            |
| Blower (High Speed)<br>Blower (Low Speed)   |         |               |            |                 |                            |               |                                       |            |                                 |            |
| Humidifier                                  |         |               |            |                 |                            |               |                                       |            |                                 |            |
| EAC   |         |               |            |                 |                            |               |                                       |            |                                 |            |
| LED   |         |               |            |                 |                            |               | Fast Flash                            |            | Slow Flash                      |            |

\*default

## OPERATION

### COOL MODE

| Output                                    | Standby    | Call for Heat | Cooling until Thermostat is Satisfied | System Off |
|---|------------|---------------|---------------------------------------|------------|
| Thermostat - Y2<br>Thermostat - Y1        |            |               |                                       |            |
| Compressor                                |            |               |                                       |            |
| Outdoor Fan                               |            |               |                                       |            |
| Second Stage Blower<br>First Stage Blower |            |               |                                       |            |
| EAC                                       |            |               |                                       |            |
| LED                                       | Slow Flash |               |                                       |            |

Cooling Blower On Delay = 0 sec.

### FAN MODE

| Output             | Standby    | Call for Fan | Fan until Thermostat is Satisfied | System Off |
|--------------------|------------|--------------|-----------------------------------|------------|
| Thermostat - G     |            |              |                                   |            |
| Blower (Fan Speed) |            |              |                                   |            |
| EAC                |            |              |                                   |            |
| LED                | Slow Flash |              |                                   |            |

## TROUBLESHOOTING

### START UP AND DIAGNOSTICS

This control will continuously monitor its own operation as well as the operation of the system. If a failure occurs, the Red LitePort™ LED on the control board will flash a failure code. At start up, both Green and Red LEDs will flash once at power up.

| Green LED Flash | Red LED Flash | Status / Error Condition                                     |
|-----------------|---------------|--|
|                 | 1             | Normal Operation - LitePort™ data (1 flash every 20 seconds) |
|                 | 2             | Retries or recycles exceeded                                 |
|                 | 3             | Inducer or pressure switch error                             |
|                 | 4             | Open high limit switch or rollout switch                     |
|                 | 5             | Flame sensed when no flame should be present                 |
|                 | 6             | Line reverse polarity  |
|                 | 7             | Gas valve circuit error                                      |
|                 | 8             | Weak flame   |
|                 | 9             | Open inducer limit error                                     |
| Slow Flash      |               | Normal, no call for heat (¼ sec. On, ¾ sec. Off)             |
| Fast Flash      |               | Normal, call for heat present (¼ sec. On, ¼ sec. Off)        |
| On              | On            | Fuse open or internal control failure                        |

### GREEN CFM LED

The CFM LED will flash once per 100 CFM requested. Example 4 flashes = 400 CFM.

### FAULT CODE RETRIEVAL

After power up, the control will display the last 4 fault codes that have occurred within the last 14 days on the Red LED. The control will display the newest error first and the oldest one last, with a 2 second pause between flash codes. The Green LED will remain on while the Red LED displays the error codes.

### FAULT CODE RESET

The last 4 fault codes can be erased from memory by powering up the control with G energized and then applying R to the W1 terminal 3 times within 6 seconds. The control will acknowledge the reset by turning on the Green and Red LEDs for 2 seconds.

### CONTROL RESET

1. Removing 24VAC power to the control for greater than 10 seconds will reset the control.
2. Interrupting a call for heat at the thermostat for at least 1 second and less than 20 seconds will reset the control.
3. Control automatically resets after 1 hour in lockout.

**TECHNICAL SUPPORT: 1-888-725-9797**