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GAS KITS AND ACCESSORIES

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**IGNITION CONTROL  
REPLACEMENT KIT**

**INSTALLATION INSTRUCTION FOR IGNITION CONTROL REPLACEMENT KIT (40W53)  
USED WITH G24E-2T/4T/6T/7T, G24M-2T/4T/6T, G24MCE-2T/4T/5T/6T, G29M-1T/2T, GH30  
AND GH90**

**RETAIN THESE INSTRUCTIONS  
FOR FUTURE REFERENCE**

**⚠ WARNING**

**This conversion kit is to be installed by a licensed professional installer (or equivalent) or a service agency according to the manufacturer's instructions and all requirements of the current United States National Fuel Gas Code (ANSI-Z223.1/NFPA 54), or the current National Standard of Canada CSA-B149 Natural Gas and Propane Installation Codes. If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage, personal injury or loss of life. The qualified agency performing this work assumes responsibility for this conversion.**

**Shipping and Packing List**

**Package 1 of 1 contains the following:**

- 2 — Mounting plates
- 2 — Control boards
- 1 — Terminal strip
- 1 — Wiring harness (12-pin to 15-pin)
- 1 — Wiring harness (12-pin to 9-pin)
- 1 — Wiring harness (12-pin to 12-pin)
- 1 — Bag assembly that includes the following:
  - (1) Ignition cable
  - (8) #8 - 18 x 1/2 hex-head self-tapping screws
  - (4) #6 - 32 x 7/8 hex-head thread forming screws
  - (2) #8 - 18 x 3/4 hex-head thread forming screws
  - (10) Unused hole stickers
  - (6) Wires
  - (1) Diagnostic label
  - (1) Conversion label
  - (10) Wiring diagrams

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

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**Application**

See table 1 for the application of this ignition control replacement kit.

**Table 1. Ignition Control Kit Application**

Kit-Provided Control	Existing Control Being Replaced	Furnace Models using the Existing Control
<b>United Technologies Electronic Controls (UTEC) (101707-01 and 101700-01) 40W53</b>	RAM (3MC5) 33J6201	G24M-2T/4T G24E-2T/4T/6T
	RAM (3MC6) 82J7401	G24MCE-2T/4T/5T
	EGC-3A (23L5101)	G24E-7T G24MCE-6T G29M-1T
	EGC-3ACE (49L9401)	G24MCE-6T G29M-2T GH30 - T GH90 - T

**⚠ CAUTION**

**Physical contact with metal edges and corners while applying excessive force or rapid motion can result in personal injury. Be aware of, and use caution when working near these areas during installation or while servicing this equipment.**

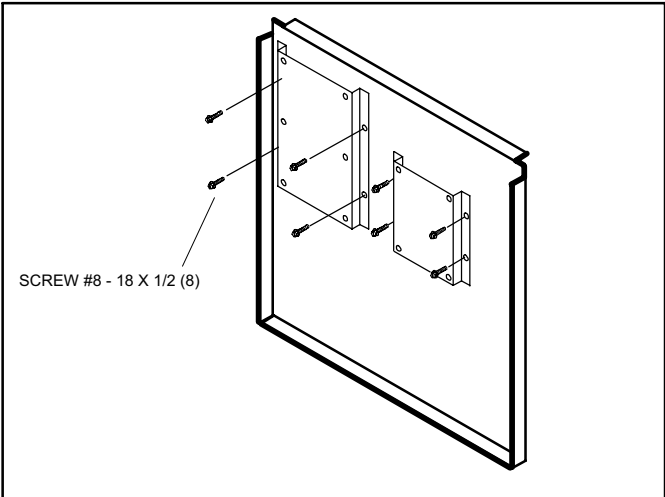
**⚠ WARNING**

**Before installing or servicing unit, be sure ALL power to unit is OFF. More than one disconnect switch may be present. Electrical shock can cause personal injury or death.**

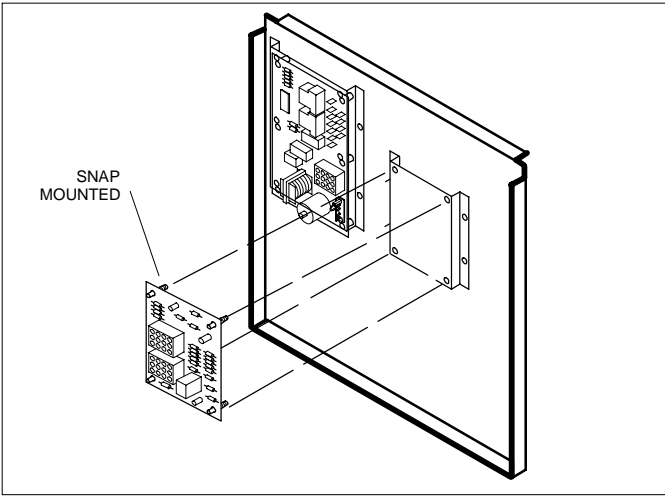


**Installation Illustrations — G24E, G24M, G24MCE and G29M**

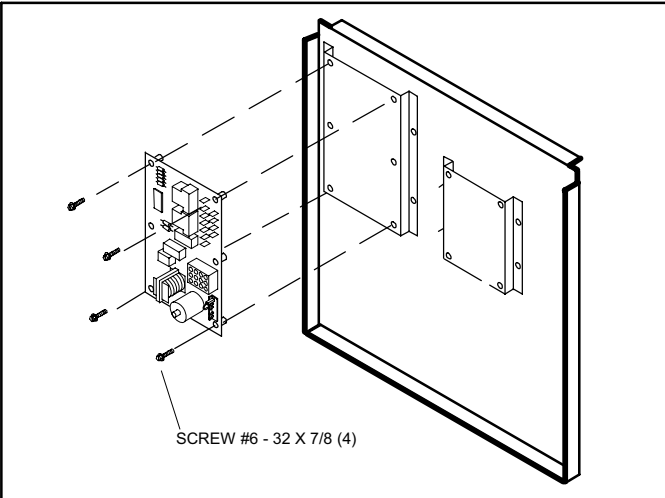
Use the following instructions along with the specific unit model instructions in the next section when installing the new control boards.



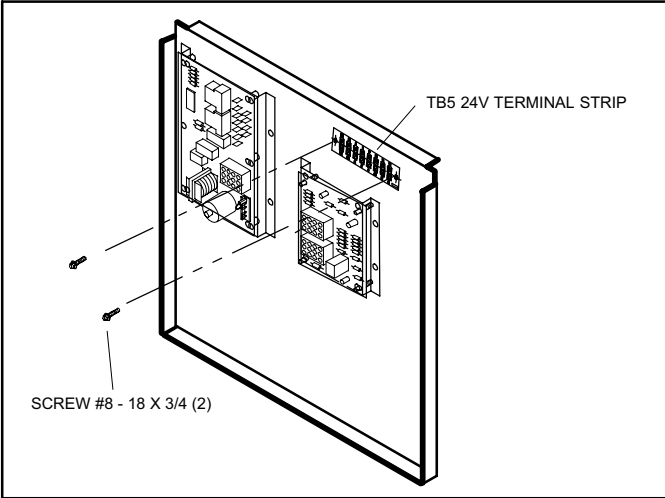
**Figure 1. Mounting Plates Installation**



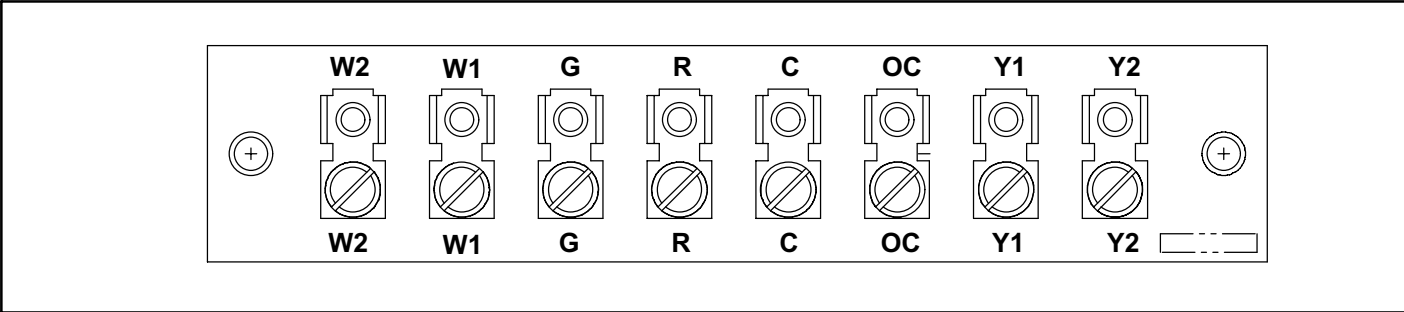
**Figure 3. 101700-01 Control Board Installation**



**Figure 2. 101707-01 Control Board Installation**



**Figure 4. TB5 24V Terminal Strip Installation**



**Figure 5. TB5 24V Terminal Strip**

## Installation — G24E — 2T/4T/6T/7T

1. Set the thermostat to the lowest setting. Shut off gas supply and disconnect electrical power from the unit.
2. Remove access door and turn gas valve knob to OFF.

### Removal of 3MC5 or 3MC6 Control Board and Related Wiring

1. Disconnect the ignition cable from the spark electrode and control board and discard.
2. Mark and disconnect all wires from control board.
3. Disconnect the main wire harness at the control board socket.
4. Remove and discard control board.
5. Remove the wire from the pressure switch terminal that connects to the limit switch. Trace the wire back to the limit switch and cut the wire at the limit switch terminal. Tape the terminal with electrical tape.
6. Remove the flame sense wire connected to the flame sensor terminal.
  - a. Trace the wire from the flame sensor terminal to the 15-pin plug connector pin **12**.
  - b. Clip the flame sense wire flush with the plug connector.

### Removal of EGC-3A (23L5101) or EGC-3ACE (49L9401) Control Board and Related Wiring

1. Disconnect and discard the ignition cable from the spark electrode and control board.
2. Mark and disconnect all wires from the EGC control board.
3. If the unit has an EGC-3ACE conversion sticker, disconnect and remove the 15-pin to 9-pin conversion harness from the control board and the main unit harness.
4. Disconnect the main wire harness from the control board socket.
5. Remove and discard the EGC control board.
6. Remove the wire from the pressure switch terminal that connects to the limit switch. Trace the wire back to the limit switch and cut the wire at the limit switch terminal. Tape the terminal with electrical tape.
7. Remove the flame sense wire connected to the flame sensor terminal and discard the wire..

### Installation of 40W53 Ignition Control Replacement Kit

Use the following illustration and procedures to install the 40W53 Ignition Control Replacement kit in G24E units:

1. Cover any unused blower access panel holes with the small blank stickers provided in the kit.
2. Secure both control mounting plates to the blower access panel as illustrated in figure 1, using the eight self-tapping screws (#8 - 18 x 1/2) provided.

3. Secure the 101707-01 control board to the mounting plate with the four self-tapping sheet metal screws (#6 - 32 x 7/8) provided as illustrated in figure 2.
4. Snap-mount the 101700-01 control board on the mounting plate positioned as illustrated in figure 3.
5. Secure the 24V terminal strip to the blower access panel as illustrated in figure 4, with the two hex-head sheet metal screws (#8 - 18 x 3/4) provided.

*NOTE - Use a #32 - 0.116 drill bit to make the two pilot holes required to mount the 24V terminal strip with the fasteners provided.*

6. If replacing the:
  - a. 33J6201 or 82J7401 RAM controls, use the 12-pin to 15-pin conversion harness provided.
  - b. 23L5101 or 49L9401 Heatcraft controls, use the 12-pin to 9-pin conversion harness provided.
7. When using the 15-pin or 9-pin conversion harness, connect the 12-pin plug into the white 12-pin **P1** socket on the 101700-01 control board.
8. Reconnect existing wires as follows:
  - a. Reconnect the blue wire from the circuit breaker to the blue wire with the male quick-connect terminal of the 12-pin plug pin **1**.
  - b. Reconnect yellow wire from 24V side of transformer **T1** to **C** on the 24V terminal strip.
  - c. Reconnect black wire from 240V terminal on transformer **T1** to **L1** terminal on 101707-01 control board
  - d. Reconnect the white wire from the 240V neutral terminal on transformer **T1** and common blower terminal to **L2** terminal on 101707-01 control board.
  - e. Reconnect the black wire from door switch to **L1** terminal on 101707-01 control board.
  - f. Perform the applicable procedure:
    - **G24E-2T/4T/6T**: Reconnect the red, brown, white, and yellow (R,G,W,Y) thermostat wires from the A4 interface control.
    - **G24E-7T**: Connect the red, brown, white, yellow and blue (R,G,W,Y,C) thermostat wires from TB1 terminal strip to TB5 24V terminal strip.
  - g. Connect the provided green/yellow wire with a ring terminal on one end and a male quick-connect terminal on the other end to the metal standoff marked **MOUNT SCREW REQUIRED** on the 101707-01 control board.
  - h. Reconnect the piggyback terminated green/yellow wire from ground bar and gas valve ground to the male quick-connect terminal of green/yellow wire that was connected in paragraph g above.
9. Connect ignition cable provided to 101707-01 control board and spark electrode 1/4" quick connect terminals.

## IMPORTANT

**Do not include ignition lead in any group or bundled wires. Route ignition lead separately.**

Steps 10 and 11 are for G24E-2T,-3T,4T or 6T furnaces that were converted to use an EGC-3ACE control board.

*NOTE - If the main wire harness in the unit is a 9-pin connector control then skip to step 12.*

10. Connect the white wire from pin **1** of the 15-pin interface wire harness to **L2** terminal of the 101707-01 control board.
11. Connect the black wire from pin **2** of the 15-pin socket interface wire harness to **D1** terminal of the 101707-01 control board and skip to step 14.

If the EGC-3ACE was the original control board, or the main unit wire harness has a 9-pin plug then continue with step 12:

12. Reconnect the inducer motor **CMB BL WR** wire to **D1** on the 101707-01 control board.
13. Reconnect the inducer motor **L2** wire to **L2** on the 101707-01 control board.
14. Reconnect the provided flame sense white wire with 3/16 x 0.020 bare quick-connect to the **FS** terminal on the 101700-01 control board.
15. Connect the blower heating speed tap to **HEAT** terminal, cooling speed tap to **COOL**, and the low speed tap to one of the **UNUSED** terminals on the 101707-01 control board.
16. Connect the 12-pin to 12-pin white wiring harness to the black 12-pin P2 socket on the 101700-01 control board and the white 12-pin socket on the 101707-01 board.

*NOTE - The wiring harness is polarized so it will only connect one way. Match the male pins in the harness to the female pins in the white 12-pin socket on the 101707-01 control board. Match the female pins in the harness to the male pins in the black socket on the 101700-01 control board.*

17. Connect the black wire with the insulated 3/16 connectors provided in the assembly bag to the **FS** terminal on the 101700-01 control board and to the **FS** terminal on the 101707-01 control board.
18. Connect the long purple wire attached to pin 8 on the 12-pin conversion plug to the empty terminal on the pressure switch.
19. On the 12-pin harness plug connection to 101700-01, connect the following wires to the TB5 24V terminal strip:
  - a. Yellow wire from pin **2** to **C**.
  - b. Green wire from pin **7** to **G**.
  - c. Red wire from pin **9** to **R**.
  - d. White wire from pin **10** to **W1**.
  - e. Blue wire from pin **11** to **Y1**.
20. Apply wiring diagram sticker:

- a. 537044-01 over existing sticker which is located on the inside surface of the G24E-2T/4T/6T access panel.
  - b. 537050-01 over existing sticker which is located on the inside surface of the G24E-7T access panel.
21. Apply the 580041-01 diagnostic sticker provided on blower access panel over the existing sticker.
  22. Apply the 580040-01 conversion sticker provided next to the existing rating plate located on the inside vestibule area of the cabinet.

### Installation — G24M — 2T/4T/6T

1. Set the thermostat to the lowest setting. Shut off gas supply and disconnect electrical power from the unit.
2. Remove access door and turn gas valve knob to OFF.

#### Removal of 3MC5 or 3MC6 Control Board and Related Wiring

1. Disconnect and discard the ignition cable from the spark electrode and control board.
2. Mark and disconnect all wires from control board.
3. Disconnect the main wire harness from the control board socket.
4. Remove and discard control board.
5. Remove the wire from the pressure switch terminal that connects to the limit switch. Trace the wire back to the limit switch and cut the wire at the limit switch terminal. Tape the terminal with electrical tape.
6. Remove the flame sense wire connected to the flame sensor terminal.
  - a. Trace the wire from the flame sensor terminal to the 15-pin plug connector pin **12**.
  - b. Clip the flame sense wire flush with the plug connector.

#### Removal of EGC-3A (23L5101) or EGC-3ACE (49L9401) Control Board and Related Wiring

1. Disconnect the ignition cable from the spark electrode and control board and discard.
2. Mark and disconnect all wires from the control board.
3. If the unit has an EGC-3ACE conversion sticker, disconnect and remove the 15-pin to 9-pin conversion harness from the control board and the main unit harness.
4. Disconnect the main wire harness at the control board socket.
5. Remove and discard the EGC control board.
6. Remove the wire from the pressure switch terminal that connects to the limit switch. Trace the wire back to the limit switch and cut the wire at the limit switch terminal. Tape the terminal with electrical tape.
7. Remove the flame sense wire connected to the flame sensor terminal and discard the wire.

## Installation of 40W53 Ignition Control Replacement Kit

Use the following illustration and procedures to install the 40W53 Ignition Control Replacement kit in G24M units:

1. Cover any unused blower access panel holes with the small blank stickers provided in the kit.
2. Secure both control mounting plates to the blower access panel as illustrated in figure 1, using the eight hex-head self-tapping screws (#8 - 18 x 1/2) provided.
3. Secure 101707-01 control board to mounting plate with the four hex-head thread forming screws (#6 - 32 x 7/8) provided as illustrated in figure 2.
4. Snap-mount 101700-01 control board to the mounting plate as illustrated in figure 3.
5. Screw the 24V terminal strip to the blower access panel as illustrated in figure 4, with the two hex-head sheet metal screws (#8 - 18 x 3/4) provided.

*NOTE - Use a #32 - 0.116 drill bit to make the two pilot holes required to mount the 24V terminal strip with the fasteners provided.*

6. If replacing the:
  - a. 33J6201 or 82J7401 RAM controls, use the 12-pin to 15-pin conversion harness provided.
  - b. 23L5101 or 49L9401 Heatcraft controls, use the 12-pin to 9-pin conversion harness provided.
7. When using the 15-pin or 9-pin conversion harness, connect the 12-pin plug into the white 12-pin socket **P1** on the small 101700-01 control board.
8. Reconnect existing wires as follows:
  - a. Reconnect the blue wire from the circuit breaker to the blue wire with the male quick-connect terminal of the 12-pin plug terminal **1**.
  - b. Reconnect yellow wire from 24V side of transformer to **C** on the 24V terminal strip.
  - c. Reconnect black wire from 240V terminal on transformer to **L1** terminal on 101707-01 control board.
  - d. Reconnect the white wire from neutral 240V power supply connection to **L2** terminal on 101707-01 control board.
  - e. Reconnect black wire from door switch to **L1** terminal on 101707-01 control board.
  - f. Reconnect R, G, W, and Y thermostat wires to the corresponding screw terminal on the TB5 24V terminal strip.
  - g. Connect the provided green/yellow wire ring terminal to the mounting screw of 101707-01 control board marked with **MOUNT SCREW REQUIRED** and connect the male quick-connect terminal to ground terminal of the gas valve.

9. Connect ignition cable provided to control board and spark electrode 1/4" quick connect terminals.

## **IMPORTANT**

**Do not include ignition lead in any group or bundled wires. Route ignition lead separately.**

Steps 10 and 11 are for G24M-2T/4T furnaces that were converted to use an EGC-3ACE control board.

*NOTE - If the main wire harness in the unit is a 9-pin connector control then skip to the step 12.*

10. Connect the white wire from pin 1 of the 15-pin socket interface wire harness to **L2** terminal of the 101707-01 control board.
11. Connect the black wire from pin 2 of the 15-pin socket interface wire harness to **D1** terminal of the 101707-01 control board and skip to step 14.

If the EGC-3ACE was the original control board, or the main unit wire harness is a 9-pin plug then continue with step 12:

12. Reconnect the inducer motor **CMB BL WR** wire to **D1** on the 101707-01 control board.
13. Reconnect the inducer motor **L2** wire to **L2** on the 101707-01 control board.
14. Reconnect the provided flame sense white wire with 3/16 x 0.020 bare quick-connect terminal to the **FS** terminal on the 101700-01 control board.
15. Connect the blower heating speed tap to **HEAT** terminal, cooling speed tap to **COOL**, and the low speed tap to one of the **UNUSED** terminals on the 101707-01 control board.
16. Connect the 12-pin to 12-pin white wiring harness provided to the black 12-pin socket **P2** on the 101700-01 control board, and the white 12-pin socket on the 101707-01 control board.

*NOTE - The wiring harness is polarized so it will only connect one way. Match the male pins in the harness to the female pins in the white 12-pin socket on the 101707-01 control board. Match the female pins in the harness to the male pins in the black socket on the 101700-01 control board.*

17. Connect the black wire with the insulated 3/16 connectors provided in the assembly bag to the **FS** terminal on the 101700-01 control board and to the **FS** terminal on the 101707-01 control board.
18. Connect the long purple wire attached to pin **8** on the 12-pin conversion plug to the empty terminal on the pressure switch.

19. On the 12-pin harness plug connection to 101700-01, connect the following wires to the **TB5** 24V terminal strip:
  - a. Yellow wire from pin **2** to **C**.
  - b. Green wire from pin **7** to **G**.
  - c. Red wire from pin **9** to **R**.
  - d. White wire from pin **10** to **W1**.
  - e. Blue wire from pin **11** to **Y1**.
20. Apply wiring diagram sticker:
  - a. 537043-01 over existing sticker which is located on the inside surface of the G24M-2T/4T access panel.
  - b. 537051-01 over existing sticker which is located on the inside surface of the G24M-6T access panel.
21. Apply the 580041-01 diagnostic sticker provided on blower access panel over the existing sticker.
22. Apply the 580040-01 conversion sticker provided next to the existing rating plate located on the inside vestibule area of the cabinet.

### Installation — G24MCE — 2T/4T/5T/6T

1. Set the thermostat to the lowest setting. Shut off gas supply and disconnect electrical power from the unit.
2. Remove access door and turn gas valve knob to OFF.

#### Removal of 3MC5 or 3MC6 Control Board and Related Wiring

1. Disconnect and discard the ignition cable from the spark electrode and control board.
2. Mark and disconnect all wires from the control board.
3. Disconnect the main wire harness from the control board.
4. Remove and discard the control board.
5. Remove the wire from the pressure switch terminal that connects to the limit switch. Trace the wire back to the limit switch and cut the wire at the limit switch terminal. Tape the terminal with electrical tape.
6. Remove the flame sense wire connected to the flame sensor terminal.
  - a. Trace the wire from the flame sensor terminal to the 15-pin plug connector pin **12**.
  - b. Clip the flame sense wire flush with the plug connector.

#### Removal of EGC-3A (23L5101) or EGC-3ACE (49L9401) Control Board and Related Wiring

1. Disconnect the ignition cable from the spark electrode and control board and discard.
2. Mark and disconnect all wires from the control board.
3. If the unit has an EGC-3ACE Conversion Sticker, disconnect and remove the 15-pin to 9-pin conversion harness from the control board and the main unit harness.
4. If the unit has a 23L5101 or 49L9401 control board, disconnect the main wire harness from the EGC control board socket.
5. Remove and discard the EGC control board.

6. Remove the wire on the pressure switch terminal that connects to the limit switch. Trace the wire back to the limit switch and cut the wire at the limit switch terminal and tape the terminal with electrical tape.
7. Remove the flame sense wire connected to the flame sensor terminal and discard the wire.

#### Installation of 40W53 Ignition Control Replacement Kit

Use the following illustration and procedures to install the 40W53 Ignition Control Replacement kit in G24MCE units:

1. Cover any unused blower access panel holes with the small blank stickers provided in the kit.
2. Secure both control mounting plates to the blower access panel as illustrated in figure 1, using the eight hex-head self-tapping screws (#8 - 18 x 1/2) provided.
3. Secure 101707-01 control board to mounting plate as illustrated in figure 2, with the four hex-head self-tapping sheet metal screws (#6 - 32 x 7/8) provided.
4. Snap-mount 101700-01 control board to the mounting plate as illustrated in figure 3.
5. Screw the 24V terminal strip to the blower access panel as illustrated in figure 4, with the two hex-head sheet metal screws (#8 - 18 x 3/4) provided.

*NOTE - Use a #32 - 0.116 drill bit to make the two pilot holes required to mount the 24V terminal strip with the fasteners provided.*

6. If replacing the:
  - a. 33J6201 or 82J7401 RAM controls, use the 12-pin to 15-pin conversion harness provided.
  - b. 23L5101 or 49L9401 Heatcraft controls, use the 12-pin to 9-pin conversion harness provided.
7. When using the 15-pin or 9-pin conversion harness, connect the 12-pin plug into the white 12-pin socket P-1 on the 101700-01 control board.
8. Reconnect existing wires as follows:
  - a. Reconnect the blue wire from the circuit breaker to the blue wire with the male quick connect terminal of the 12-pin plug terminal **1**.
  - b. Reconnect yellow wire from 24V side of transformer **T1** to **C** on the 24V terminal strip.
  - c. Reconnect black wire from 240V terminal on transformer **T1** to **L1** terminal on 101707-01 control board
  - d. Reconnect the white wire from the 240V neutral terminal on transformer **T1** and common blower terminal to **L2** terminal on 101707-01 control board.
  - e. Reconnect black wire from door switch to **L1** terminal on 101707-01 control board.
  - f. Reconnect the red, brown, white, yellow and blue thermostat wires (R, G, W, Y, C) to the TB5 24V terminal strip from the TB1 terminal strip.
  - g. Connect the provided green/yellow wire with a ring terminal on one end and a male quick-connect terminal on the other end to the metal standoff marked **MOUNT SCREW REQUIRED** on the 101707-01 control board.

- h. Reconnect piggyback terminated green/yellow wire from ground bar and gas valve ground to the male quick-connect terminal of green/yellow wire connected in (g) above.
- 9. Connect ignition cable provided to 101707-01 control board and spark electrode 1/4" quick connect terminals.

## **IMPORTANT**

**Do not include ignition lead in any group or bundled wires. Route ignition lead separately.**

Steps 10 and 11 are for G24MCE — 2T/4T/5T furnaces that were converted to use an EGC-3ACE control board.

*NOTE - If the main wire harness in the unit is a 9-pin connector control then skip to the step 12.*

- 10. Connect the white wire from pin 1 of the 15-pin socket interface wire harness to **L2** terminal of the 101707-01 control board.
- 11. Connect the black wire from pin 2 of the 15-pin socket interface wire harness to D1 terminal of the 101707-01 control board and skip to step 14

If the EGC-3ACE was the original control board, or the main unit wire harness is a 9-pin plug then continue with step 12:

- 12. Reconnect the inducer motor **CMB BL WR** wire to **D1** on the 101707-01 control board.
- 13. Reconnect the inducer motor **L2** wire to **L2** on the 101707-01 control board.
- 14. Reconnect the provided flame sense white wire with 3/16 x 0.020 bare quick-connect terminal to the **FS** terminal on the 101700-01 control board.
- 15. Connect the blower heating speed tap to **HEAT** terminal, cooling speed tap to **COOL**, and the low speed tap to one of the **UNUSED** terminals on the 101707-01 control board.
- 16. Connect the 12-pin to 12-pin white wiring harness to the black 12-pin socket **P2** on the 101700-01 board and the white 12-pin socket on the 101707-01 control board.

*NOTE - The wiring harness is polarized so it will only connect one way. Match the male pins in the harness to the female pins in the white 12-pin socket on the 101707-01 control board. Match the female pins in the harness to the male pins in the black socket on the 101700-01 control board.*

- 17. Connect the black wire with the insulated 3/16 connectors provided in the assembly bag to the **FS** terminal on the 101700-01 board and to the **FS** terminal on the 101707-01 control board.
- 18. Connect the long purple wire attached to pin **8** on the 12-pin conversion plug to the empty terminal on the pressure switch.
- 19. On the 12-pin harness plug connection to 101700-01, connect the following wires to the TB5 24V terminal strip:
  - a. Yellow wire from pin **2** to **C**.
  - b. Green wire from pin **7** to **G**.

- c. Red wire from pin **9** to **R**.
- d. White wire from pin **10** to **W1**.
- e. Blue wire from pin **11** to **Y1**.
- 20. Apply wiring diagram sticker:
  - a. 537045-01 over existing sticker which is located on the inside surface of the G24MCE-2T/4T/5T access panel.
  - b. 537049-01 over existing sticker which is located on the inside surface of the G24MCE-6T access panel.
- 21. Apply 580041-01 diagnostic sticker provided on the blower access panel over the existing sticker.
- 22. Apply 580040-01 conversion sticker provided next to the existing rating plate located on the inside vestibule area of the cabinet.

### Installation — G29M — 1T/2T

- 1. Set the thermostat to the lowest setting. Shut off gas supply and disconnect electrical power from the unit.
- 2. Remove access door and turn gas valve knob to OFF.

#### Removal of EGC-3A (23L5101) or EGC-3ACE (49L9401) Control Board and Related Wiring

- 1. Disconnect and discard the ignition cable from the spark electrode and control board.
- 2. Mark and disconnect all wires from the control board.
- 3. Disconnect the main wire harness at the control board socket.
- 4. Remove and discard the control board.
- 5. Remove the wire on the pressure switch terminal that connects to the limit switch. Trace the wire back to the limit switch and cut the wire at the limit switch terminal and tape the terminal with electrical tape.
- 6. Disconnect and discard the flame sense wire connected to the flame sensor terminal.

#### Installation of 40W53 Ignition Control Replacement Kit

Use the following illustration and procedures to install the 40W53 Ignition Control Replacement kit in G29M units:

- 1. Cover any unused blower access panel holes with the small blank stickers provided in the kit.
- 2. Secure both control mounting plates to the blower access panel as illustrated in figure 1, using the eight hex-head self-tapping screws (#8 - 18 x 1/2) provided.
- 3. Secure 101707-01 control board to mounting plate as illustrated in figure 2, with the four hex-head sheet metal screws (#6 - 32 x 7/8) provided.
- 4. Snap-mount 101700-01 control board to the mounting plate as illustrated in figure 3.
- 5. Screw the 24V terminal strip to the blower access panel as illustrated in figure 4, with the two sheet metal screws (#8 - 18 x 3/4) provided.

*NOTE - Use a #32 - 0.116 drill bit to make the two pilot holes required to mount the 24V terminal strip with the fasteners provided.*

- 6. Install the 12-pin to 9-pin conversion harness provided.
- 7. Connect the 12-pin plug into the white 12-pin socket P1 on the 101700-01 control board.

8. Reconnect existing wires as follows:
  - a. Reconnect the blue wire from the circuit breaker to the blue wire with the male quick-connect terminal of the 12-pin plug terminal **1**.
  - b. Reconnect yellow wire from 24V side of transformer **T1** to **C** on the 24V terminal strip.
  - c. Reconnect black wire from 240V terminal on transformer **T1** to **L1** terminal on 101707-01 control board
  - d. Reconnect the white wire from the 240V neutral terminal on transformer **T1** and common blower terminal to **L2** terminal on 101707-01 control board.
  - e. Reconnect black wire from door switch to **L1** terminal on 101707-01 control board.
  - f. Reconnect thermostat wires (R,G,W1,Y and W2 if used) from room thermostat **S1** to the TB5 24V terminal strip.
  - g. Connect the provided green/yellow wire with a ring terminal on one end and a male quick-connect terminal on the other end to the metal standoff marked **MOUNT SCREW REQUIRED** on 101707-01 control board.
  - h. Reconnect green/yellow ground wire to the male quick-connect terminal of green/yellow wire that was connected in paragraph **g** above.
9. Connect ignition cable provided to the 101707-01 control board and spark electrode 1/4" quick connect terminals.

**⚠ IMPORTANT**

**Do not include ignition lead in any group or bundled wires. Route ignition lead separately.**

10. Reconnect the inducer motor **CMB BL WR** wire to **D1** on the 101707-01 control board.
11. Reconnect the inducer motor **L2** white wire to **L2** on the 101707-01 control board.
12. Reconnect the provided flame sense white wire with 3/16 x 0.020 bare quick-connect to the **FS** terminal on the 101700-01 control board.

13. Connect the blower heating speed tap to **HEAT** terminal, cooling speed tap to **COOL** terminal, and the low speed tap to one of the UNUSED terminals on the 101707-01 control board.
14. Connect the 12-pin to 12-pin white wiring harness to the black 12-pin socket **P2** on the 101700-01 control board and the white 12-pin socket on the 101707-01 control board.

*NOTE - The wiring harness is polarized so it will only connect one way. Match the male pins in the harness to the female pins in the white 12-pin socket on the 101707-01 control board. Match the female pins in the harness to the male pins in the black socket on the 101700-01 control board.*

15. Connect the black wire with the insulated 3/16 connectors provided in the assembly bag to the **FS** terminal on the 101700-01 control board and to the **FS** terminal on the 101707-01 control board.
16. Connect the long purple wire attached to pin 8 on the 12-pin conversion plug to the empty terminal on the pressure switch.
17. On the 12-pin harness plug connection to 101700-01, connect the following wires to the TB5 24V terminal strip:
  - a. Yellow wire from pin **2** to **C**.
  - b. Green wire from pin **7** to **G**.
  - c. Red wire from pin **9** to **R**.
  - d. White wire from pin **10** to **W1**.
  - e. Blue wire from pin **11** to **Y1**.
18. Apply wiring diagram sticker:
  - a. 537042-01 over existing sticker which is located on the inside surface of the G29M-1T access panel.
  - b. 537041-01 over existing sticker which is located on the inside surface of the G29M-2T access panel.
19. Apply provided diagnostic sticker 580041-01 on blower access panel over the existing sticker.
20. Apply conversion sticker 580040-01 provided beside existing rating plate located on the inside vestibule area of the cabinet.



## Installation — GH30 and GH90

1. Set the thermostat to the lowest setting. Shut off gas supply and disconnect electrical power from the unit.
2. Turn gas valve knob to OFF and remove control box cover.

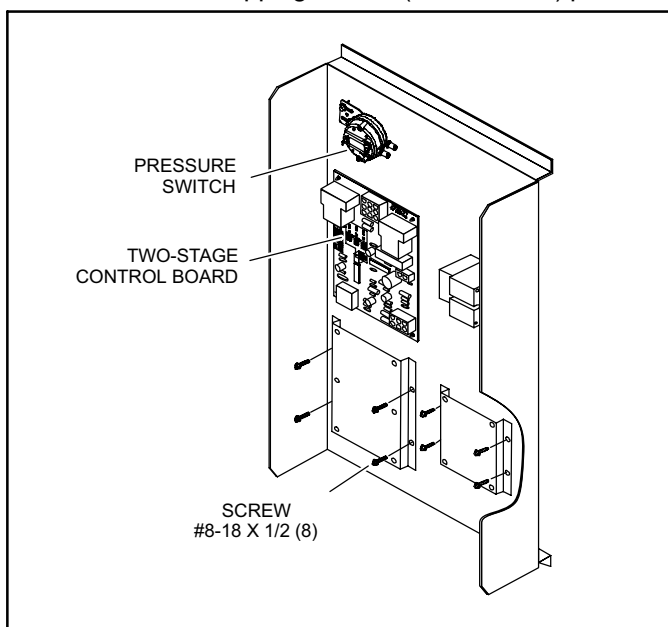
### Removal of EGC-3A (23L5101) or EGC-3ACE (49L9401) Control and Wiring

1. Disconnect and discard the ignition cable from the spark electrode and control board.
2. Mark and disconnect all wires from the EGC control board.
3. Disconnect the the main wire harness at the control board plug.
4. Remove and discard the EGC control board.
5. Remove the wire from the pressure switch terminal that connects to the limit switch. Trace the wire back to the limit switch and cut the wire at the limit switch terminal. Tape the terminal with electrical tape.
6. Remove the flame sense wire from the flame sensor terminal and discard the wire.

### Installation of 40W53 Ignition Control Replacement Kit

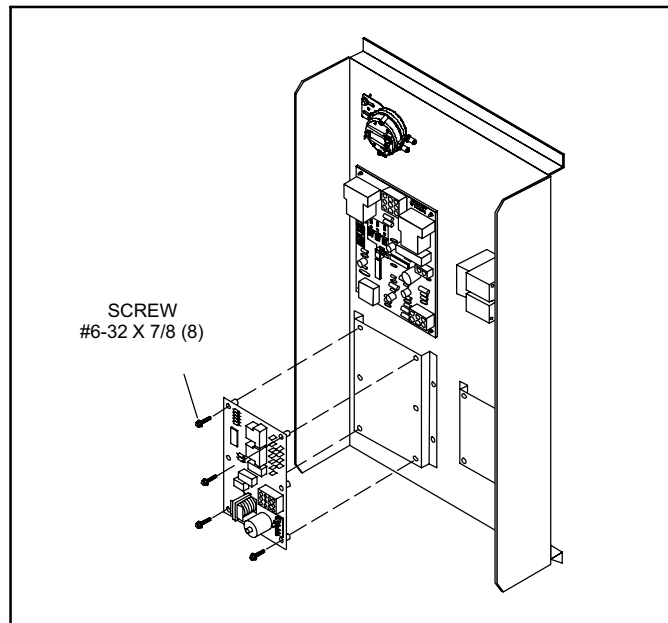
Use the following illustration and procedures to install the 40W53 Ignition Control Replacement kit in GH30 and GH90 units:

1. Secure both control mounting plates to the blower access panel as illustrated in figure 6, using the eight hex-head self-tapping screws (#8 - 18 x 1/2) provided.



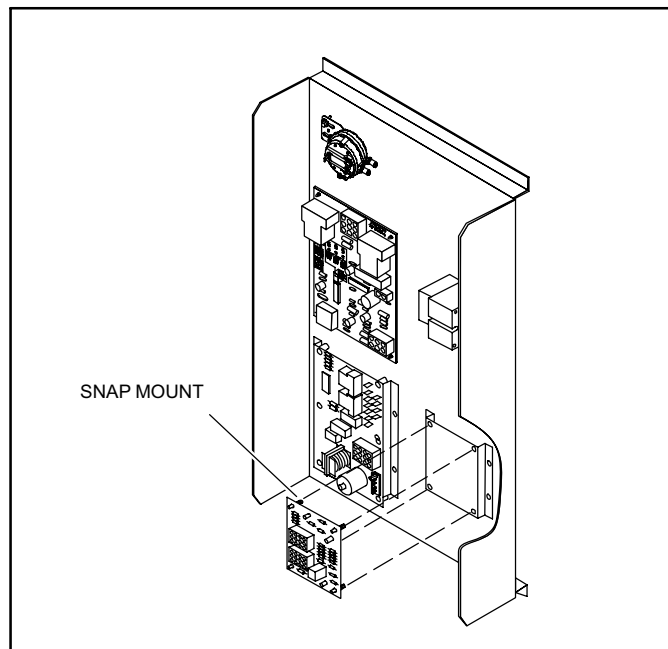
**Figure 6. Mounting Plates Installation (GH30 and GH90)**

2. Secure 101707-01 control board to mounting plate as illustrated in figure figure 7, with the four hex-head self-tapping screws (#6 - 32 x 7/8) provided.



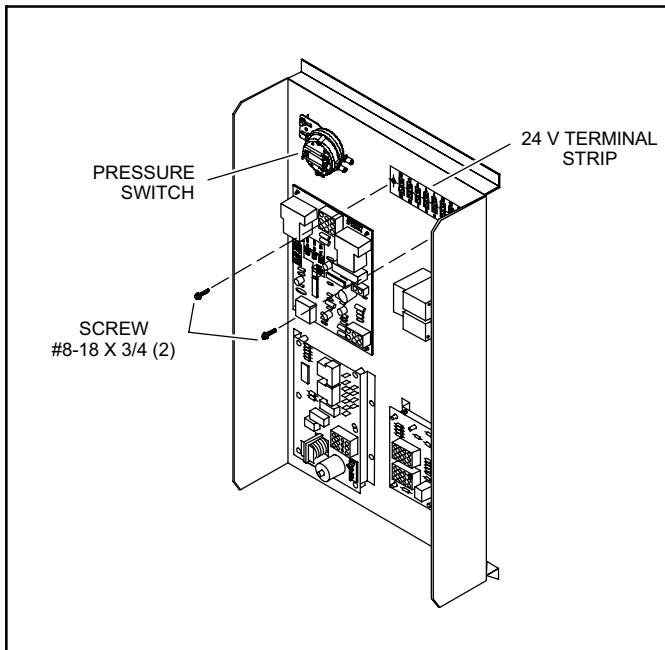
**Figure 7. 101707-01 Control Board Installation (GH30 and GH90)**

3. Snap mount the 101700-01 control board into the control box as illustrated in figure 8,



**Figure 8. 101700-01 Control Board Installation (GH30 and GH90)**

4. Screw the 24V terminal strip to the control box as illustrated in figure 9, with the two #8-18 x 3/4 sheet metal screws provided. Locate the terminal strip at the top of the box, right of the pressure switch.



**Figure 9. 24V Terminal Strip Installation (GH30 and GH90)**

*NOTE - Use a #32 - 0.116 drill bit to make the two pilot holes required to mount the 24V terminal strip with the fasteners provided.*

5. Install the 12-pin to 9-pin conversion harness provided.
6. Connect the 12-pin plug into the white 12-pin socket P1 on the 101700-01 control board.
7. Reconnect existing wires as follows:
  - a. Reconnect the blue wire from the circuit breaker to the blue wire with the male quick connect terminal of the 12-pin plug terminal 1.
  - b. Reconnect the yellow wire from the 24V side of transformer T1 to the C on the 24V terminal strip.
  - c. Reconnect the black wire from the 240V terminal on transformer T1 and the black wire from the door interlock switch to the L1 terminals on 101707-01 control board
  - d. Reconnect the four white neutral wire terminals to L2 on the 101707-01 control board from the:
    - Transformer T1 240V
    - B3 blower
    - Power supply
    - Two-stage A86 control board's 9-pin connector, pin 2.
  - e. Reconnect the thermostat wires (R,G,W1,Y and W2 if used) from S1 thermostat to the TB5 24V terminal strip.

- f. Connect the provided green/yellow wire with a ring terminal on one end, and a male quick-connect terminal on the other end to the metal standoff marked **MOUNT SCREW REQUIRED** on the 101707-01 control board.
  - g. Reconnect the green/yellow ground wire to the male quick-connect terminal of the green/yellow wire connected in the previous step.
8. Connect the ignition cable provided to 101707-01 control board and ignitor.

## **⚠ IMPORTANT**

**Do not include ignition lead in any group or bundled wires. Route ignition lead separately.**

9. Reconnect the inducer motor **CMB BL WR** wire to **D1** on the 101707-01 control board.
10. Reconnect the white **L2** wire from the two-stage 9 pin pin 2 to **L2** on the 101707-01 control board.
11. Reconnect the provided flame sense white wire with 3/16 x 0.020 bare quick-connect to the **FS** terminal on the 101700-01 control board.
12. Connect the blower heating speed tap to **HEAT** terminal, cooling speed tap to **COOL**, and the low speed tap to one of the **UNUSED** terminals on the 101707-01 control board.
13. Connect the 12-pin-to-12-pin white wiring harness to the black 12-pin socket **P2** on the 101700-01 control board and the white 12-pin socket on the 101707-01 board.

*NOTE - The wiring harness is polarized so it will only connect one way. Match the male pins in the harness to the female pins in the white 12-pin socket on the 101707-01 control board. Match the female pins in the harness to the male pins in the back socket on the 101700-01 control board.*

14. Connect the black wire with the insulated 3/16 connectors provided in the assembly bag to the **FS** terminal on the 101700-01 control board and to the **FS** terminal on the 101707-01 control board.
15. Connect the long purple wire attached to pin 8 on the 12-pin conversion plug to the empty terminal on the pressure switch.
16. On the 12-pin harness plug connection to 101700-01, connect the following wires to the TB5 24V terminal strip:
  - a. Yellow wire from pin 2 to **C**.
  - b. Green wire from pin 7 to **G**.
  - c. Red wire from pin 9 to **R**.
  - d. White wire from pin 10 to **W1**.
  - e. Blue wire from pin 11 to **Y1**.

17. Apply the 537040-01 wiring diagram sticker provided over the existing sticker located on the inside of unit access panel.
18. Apply the 580041-01 diagnostic sticker provided on the control box cover over the existing sticker.
19. Apply the 580040-01 conversion sticker provided next to the existing rating plate located on blower access door.

### DSI Control Board Operation

The DSI control boards 101707-01 (see figure 11), 101700-01 (see figure 12) control the indoor and combustion air blowers along with:

1. Burner ignition control
2. Diagnostic LED (see table 2 for flash codes, or the diagnostic code sticker provided in the kit)

See table 3 for complete details on *control operations* and table 4 for *fault code conditions*.

**Table 2. 101707-01 Control Board Green LED Status Indicator**

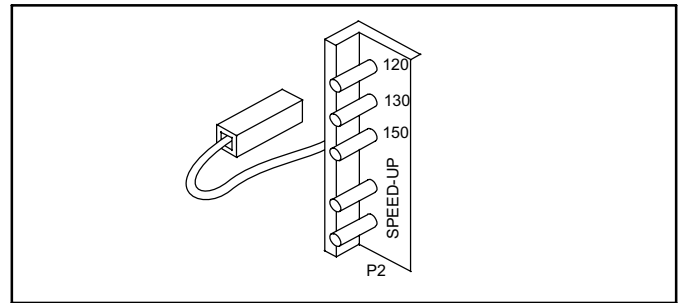
LED (GREEN)	STATUS
STEADY ON	Control OK in standby, call for heat, cool, or fan modes.
STEADY OFF	Internal control fault or no power.
1 FLASH	Lockout due to failed ignition or flame dropouts.
2 FLASHES	Pressure switch is open with inducer on.
3 FLASHES	Pressure switch is closed with inducer off.
4 FLASHES	Limit switch is open.
5 FLASHES	Flame detected with gas valve closed.
6 FLASHES	Compressor output delayed from short cycle/staging timer.
7 FLASHES	Fault detected in 1104-3 operation.

### Blower Speed/Timing Adjustment

#### ! IMPORTANT

**Turn electrical power off before making any adjustments.**

The fan **ON** time of 30 seconds is not adjustable. Fan **OFF** time (time that the blower operates after the heat demand has been satisfied) can be adjusted by moving the jumper on the 101707-01 control board as illustrated in figure 10. The unit is shipped with a factory fan OFF setting of 150 seconds. Valid options for fan OFF is 120, 130 and 150 seconds. Fan OFF time will affect comfort and is adjustable to satisfy individual applications.



**Figure 10. 101707-01 Control Board Fan OFF Time Setting**

### Start-Up

#### ! IMPORTANT

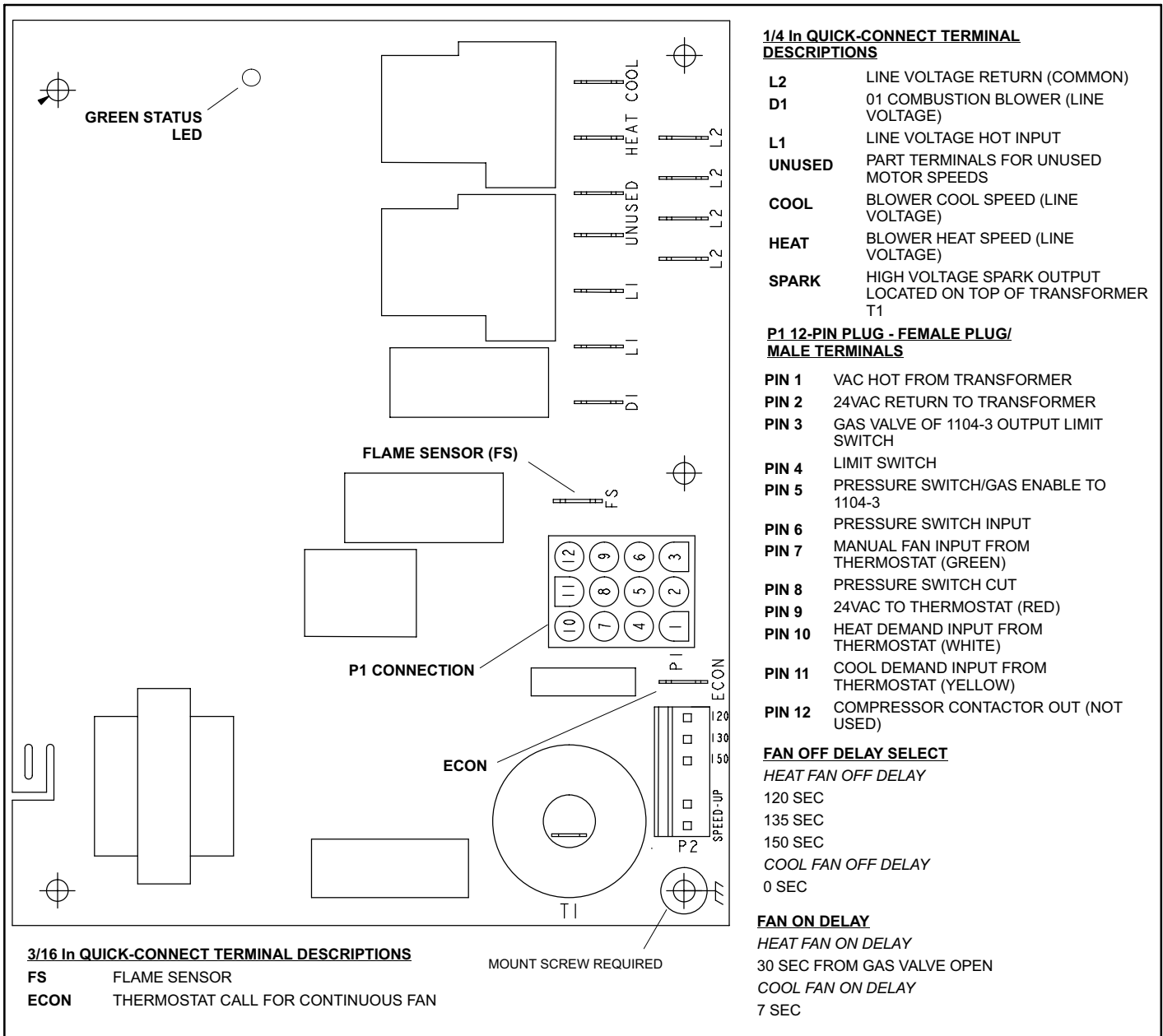
**Before lighting, smell all around the appliance area for gas. Be sure to smell next to the floor because some types of gas are heavier than air and will settle on the floor.**

#### ! CAUTION

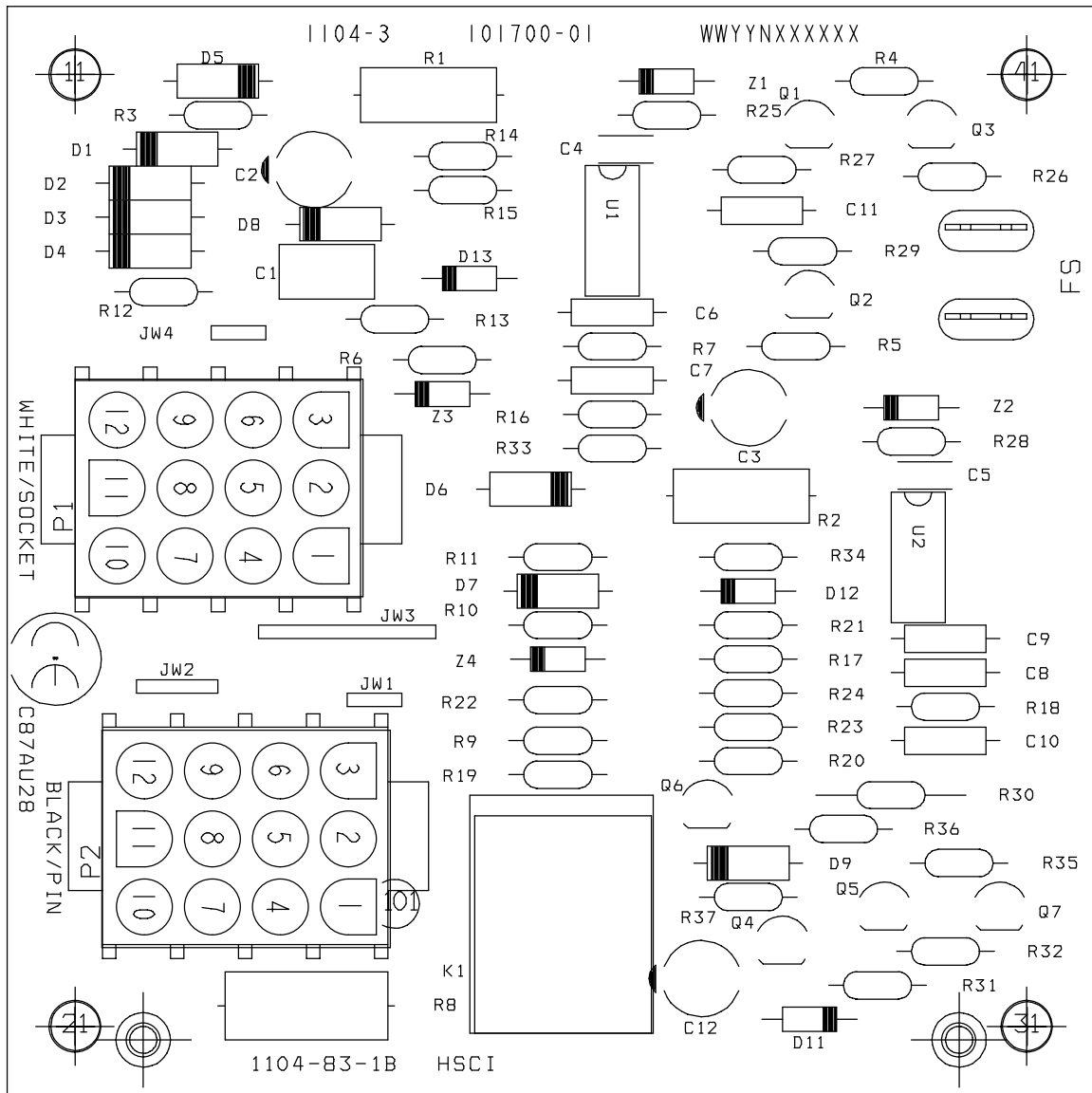
**Use only your hand to move the gas control knob. Never use tools. If the knob will not move by hand, do not try to repair it, call a licensed professional installer (or equivalent) or a service agency. Force or attempted repair may result in a fire or explosion.**

### Placing Furnace into Operation

1. Make sure thermostat is set below room temperature and power is turned off to unit.
2. This appliance is equipped with an ignition device which automatically lights the burner. **DO NOT** try to light the burner by hand.
3. Place the gas valve control in the **OFF** position. Do not force.
4. Wait 15 minutes to clear out any gas. If you then smell gas, immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
5. Place the gas valve control knob in the **ON** position.
6. Turn on all electrical power to unit.
7. Set thermostat above room temperature.
8. Check gas line supply pressure with unit operating. The minimum pressure as shown on the rating nameplate must be available. Then check and adjust manifold pressure to the value indicated on the unit name plate.
9. Set heat anticipator to 0.65 for Honeywell gas valve and 0.50 for White Rogers gas valve.
10. Run unit through a minimum of three complete cycles to check for normal operation.
11. Set thermostat to desired settings.
12. Replace access panel.



**Figure 11. 101707-01 Control Board**



**P1 12-PIN SOCKET- FEMALE CONTACTS**

- PIN 1** SYSTEM PASS-THROUGH (CONTINUOUS 24VAC FROM TRANSFORMER)
- PIN 2** 24VAC COMMON (CHASSIS GROUND)
- PIN 3** GAS VALVE OUTPUT
- PIN 4** SYSTEM PASS-THROUGH (LIMIT SWITCH OUTPUT)
- PIN 5** LIMIT SWITCH INPUT (COMMON WITH PIN 9)
- PIN 6** PRESSURE SWITCH INPUT
- PIN 7** SYSTEM PASS-THROUGH (THERMOSTAT FAN INPUT)
- PIN 8** SYSTEM PASS-THROUGH (PRESSURE SWITCH OUTPUT)
- PIN 9** SYSTEM PASS-THROUGH (THERMOSTAT "R")
- PIN 10** THERMOSTAT CALL FOR HEAT INPUT (W)
- PIN 11** SYSTEM PASS-THROUGH (THERMOSTAT CALL FOR COMPRESSOR INPUT)
- PIN 12** SYSTEM PASS-THROUGH (COMPRESSOR CONTACTOR OUTPUT)

**P2 12-PIN SOCKET- MALE PIN CONTACTS**

- PIN 1** SYSTEM PASS-THROUGH (CONTINUOUS 24VAC FROM TRANSFORMER)
- PIN 2** 24VAC COMMON (CHASSIS GROUND)
- PIN 3** GAS VALVE OUTPUT
- PIN 4** SYSTEM PASS-THROUGH (LIMIT SWITCH OUTPUT)
- PIN 5** PRESSURE SWITCH ENABLE INPUT FORM 1068-406
- PIN 6** PRESSURE SWITCH INPUT
- PIN 7** SYSTEM PASS-THROUGH (THERMOSTAT FAN INPUT)
- PIN 8** SYSTEM PASS-THROUGH (PRESSURE SWITCH OUTPUT)
- PIN 9** SYSTEM PASS-THROUGH (THERMOSTAT "R")
- PIN 10** THERMOSTAT CALL FOR HEAT INPUT (W)
- PIN 11** SYSTEM PASS-THROUGH (THERMOSTAT CALL FOR COMPRESSOR INPUT)
- PIN 12** SYSTEM PASS-THROUGH (COMPRESSOR CONTACTOR OUTPUT)

**0.187" X 0.020" MALE QUICK-CONNECT TERMINALS (TWO PLACES)**

**FS** FLAME SENSE INPUT

**Figure 12. 101700-01 Control Board**

**Table 3. Control Operation**

INPUT						
Mode	B - ON	W - OFF	G - ON	G - OFF	Y - ON	Y - OFF
STANDBY	Call for heat mode.	Normal	In steady fan mode	Normal	Goes to steady cool.	Normal
CALL FOR HEAT	Normal	Goes into standby.	Indoor blower energized on heat speed. Ignition cycles continues.		Indoor blower energized on cool speed. Ignition cycle continues.	
PRE-PURGE						
IGNITION						
HEAT WARM-UP					Gas valve de-energized. Blower energized on heat speed. Goes to post-purge mode.	
STEADY HEAT	Call for heat mode. Blower remains on through re-ignition unless blower off delay expires.	Normal	Indoor blower already energized on heat speed.	Indoor blower energized on heat speed, heat cycle continues.		
POST PURGE						
HEAT OFF DELAY						
STEADY FAN	Runs normal heat mode except blower is on cool speed.		Normal	Goes to standby mode.	Normal	Goes to cool off delay.
STEADY COOL			G ignored, cooling has priority.	Normal		
COOL OFF DELAY				Goes to steady cool.		
LOCKOUT	Remains in lockout for one hour.	Reset lockout if <b>W</b> off more than three seconds.	Run heat speed fan.		Runs cool speed fan (if <b>W</b> is off).	Normal

**Table 4. Fault Code Conditions**

INPUT						
Mode	LIMIT SWITCH OPEN		PRESSURE SWITCH OPEN	PRESSURE SWITCH CLOSED	FLAME NOT PRESENT	FRAME PRESENT
STANDBY	Energize inducer and heat speed blower	LED flashes four times while limit is open. When limit switch re-closes, inducer runs through post-purge and begins heat blower off delay. If call for heat is present when post purge completed, restart call for heat.	Normal	Ignored while <b>W</b> is off.	Normal	Energizes inducer and heat speed blower, LED flashes five times. Goes to lockout.
CALL FOR HEAT			Normal			
PRE-PURGE	Energize heat speed blower.		Flashes two times until pressure switch closes, pre-purge time begins when pressure switch closes.	Normal	Goes to inter-purge	Goes to heat on delay.
IGNITION	De-energize gas valve, energize heat speed blower.					
HEAT WARM-UP						
STEADY HEAT	De-energize gas valve.					
POST-PURGE	Inducer and heat speed blower remain on.					
HEAT OFF DELAY	Runs cool speed blower until off delay over, then switch to heat speed blower and inducer energized.		Ignored while <b>W</b> is off.	Ignored while <b>W</b> is off.	Normal	Energizes inducer and heat speed blower, LED flashes five times.
STEADY FAN						
STEADY COOL						
COOL OFF DELAY						Energizes inducer blower remains on cool speed. LED flashes five times.
LOCKOUT						Inducer and heat speed is on. LED flashes five times.

# Wiring Diagrams

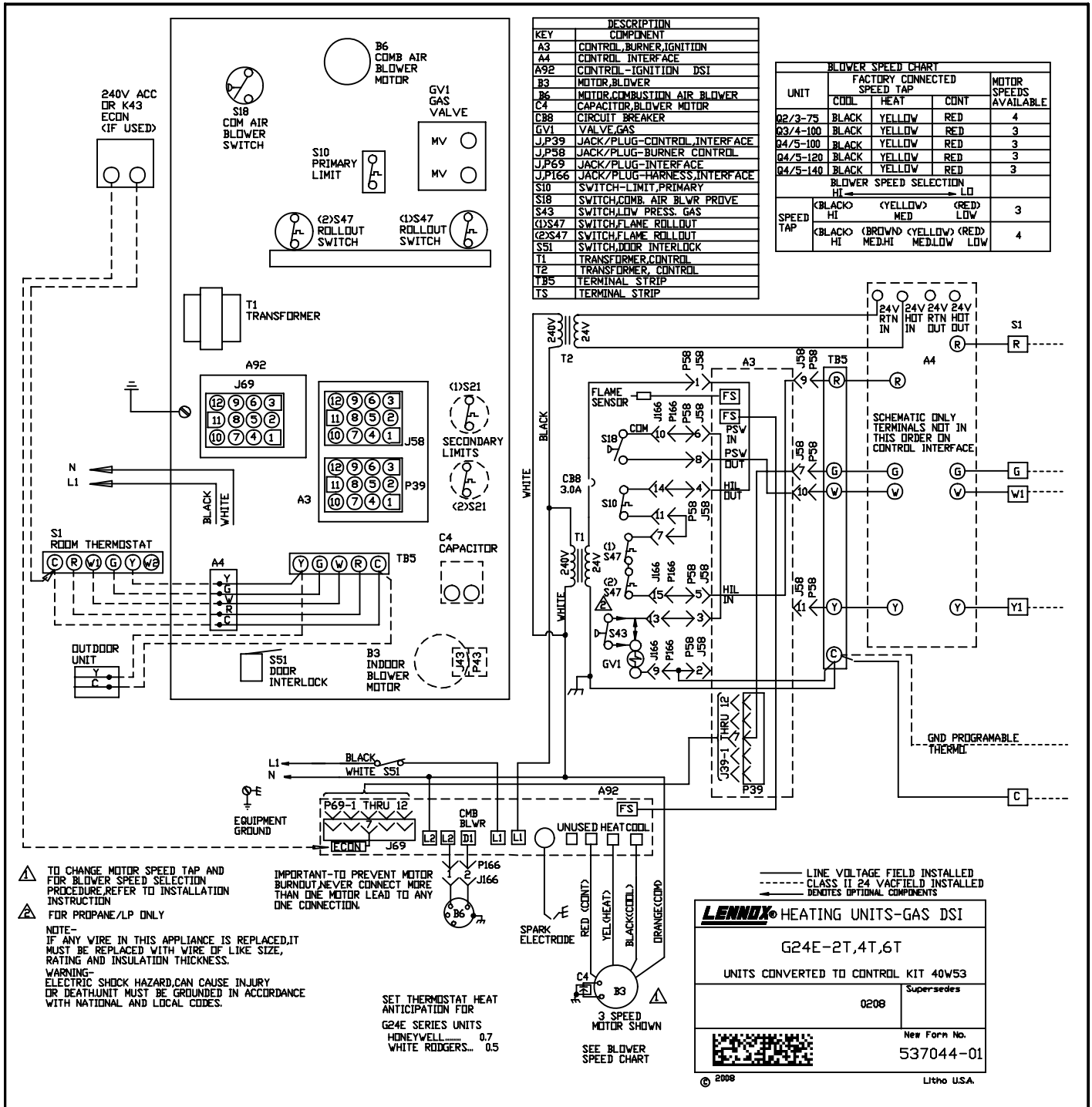


Figure 13. G24E-2T, 4T, and 6T Typical Unit Wiring Diagram

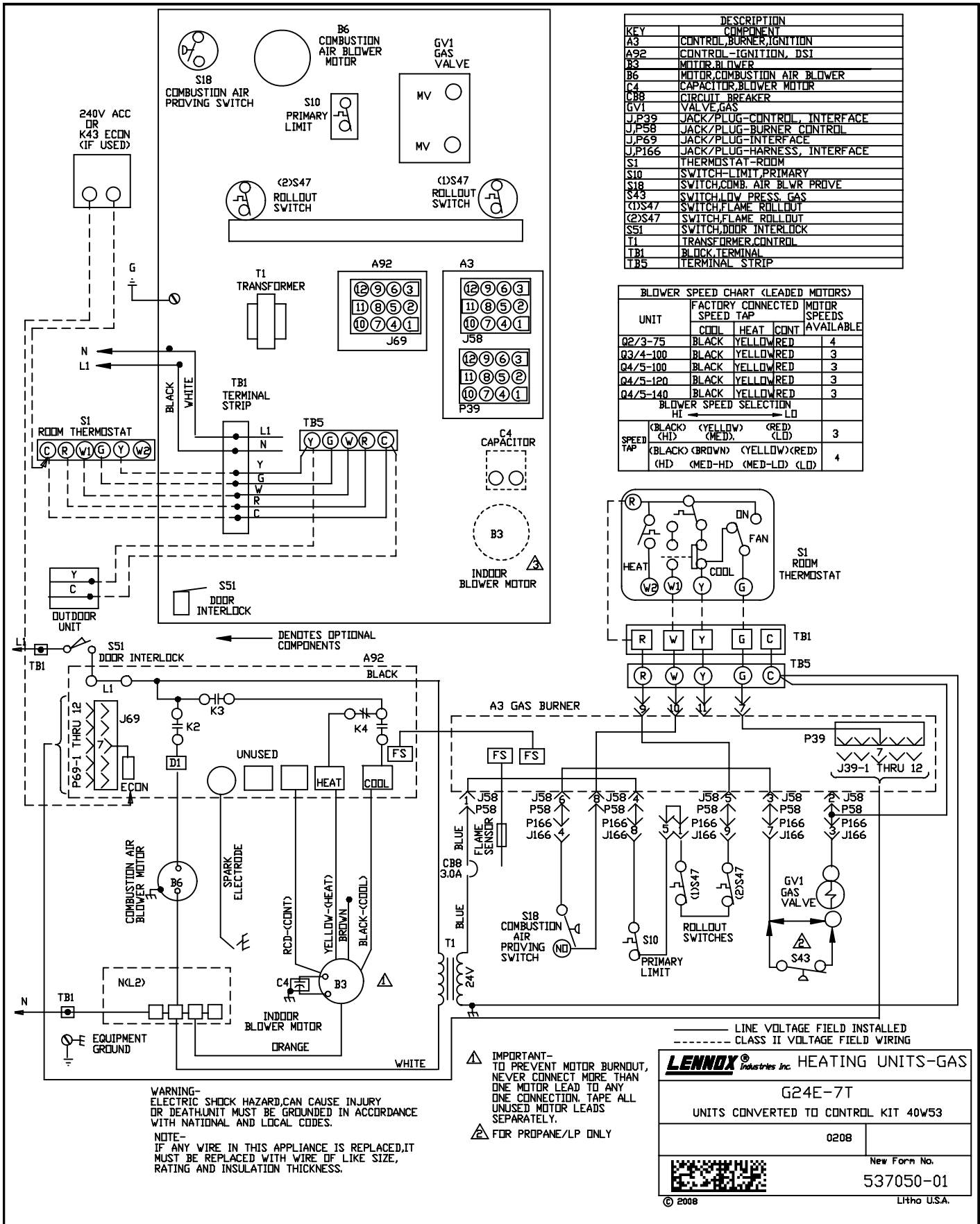


Figure 14. G24E-7T Typical Unit Wiring Diagram



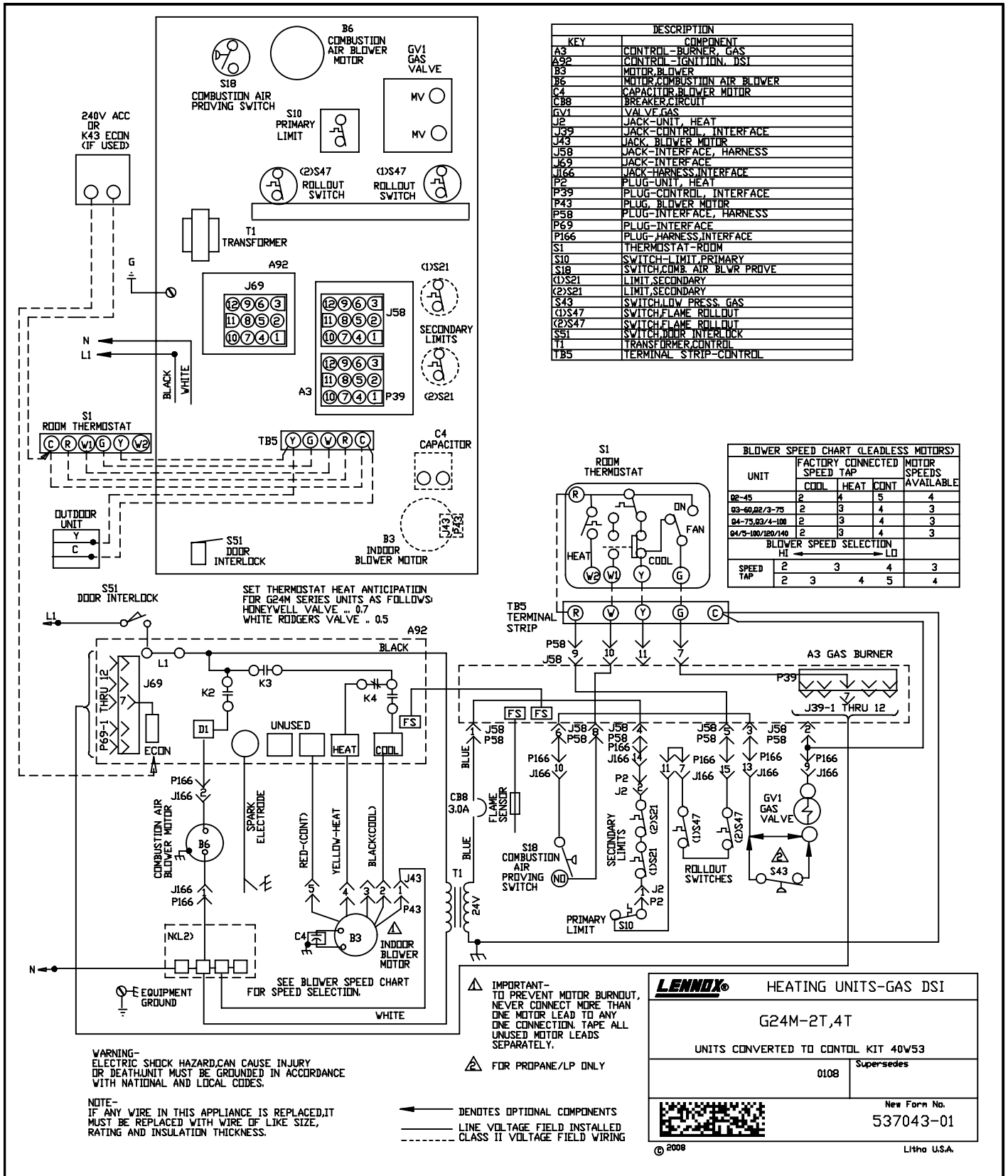


Figure 15. G24M-2T and 4T Typical Unit Wiring Diagram

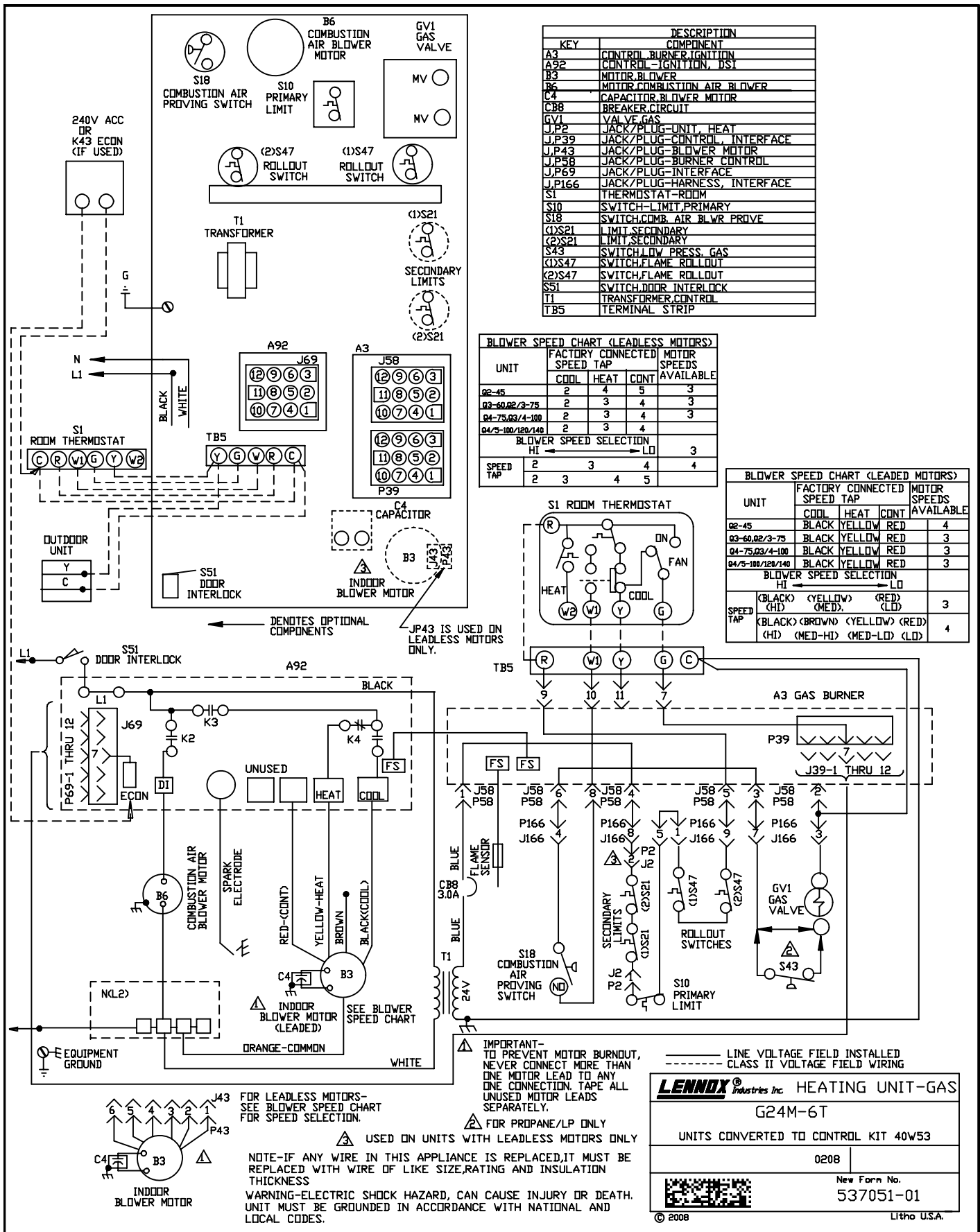


Figure 16. G24M-6T Typical Unit Wiring Diagram



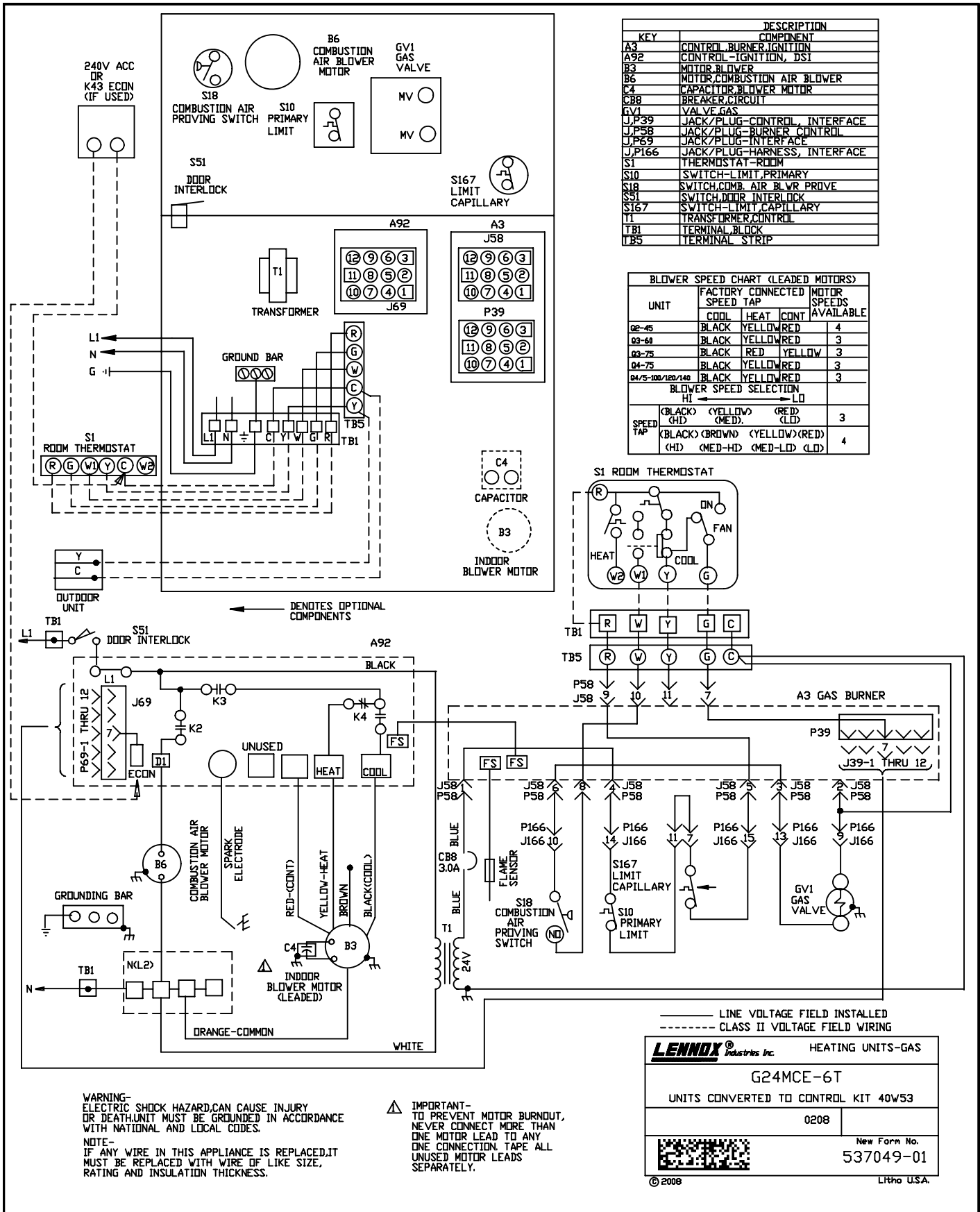


Figure 18. G24MCE-6T Typical Unit Wiring Diagram

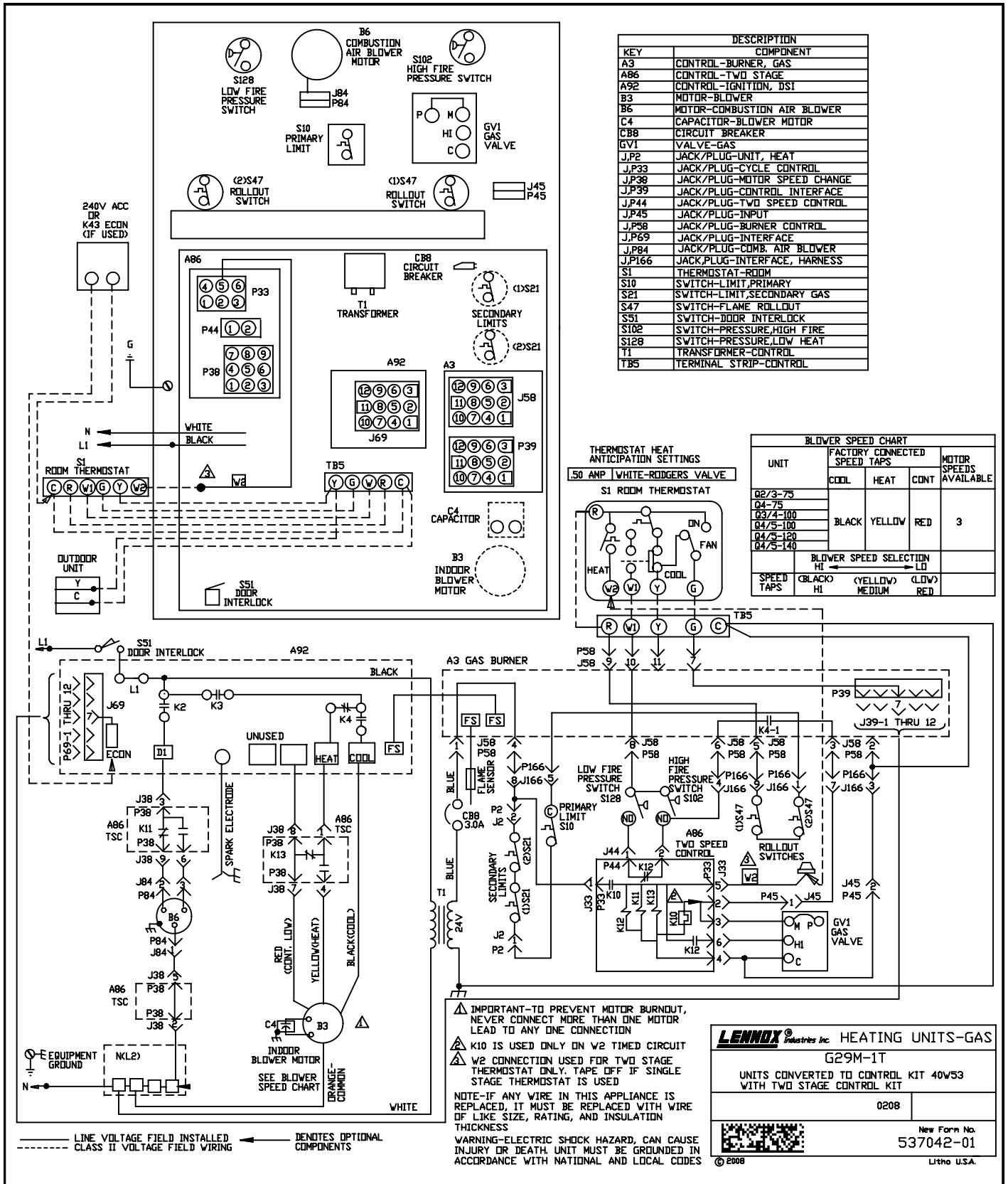


Figure 19. G29M-1T Typical Unit Wiring Diagram

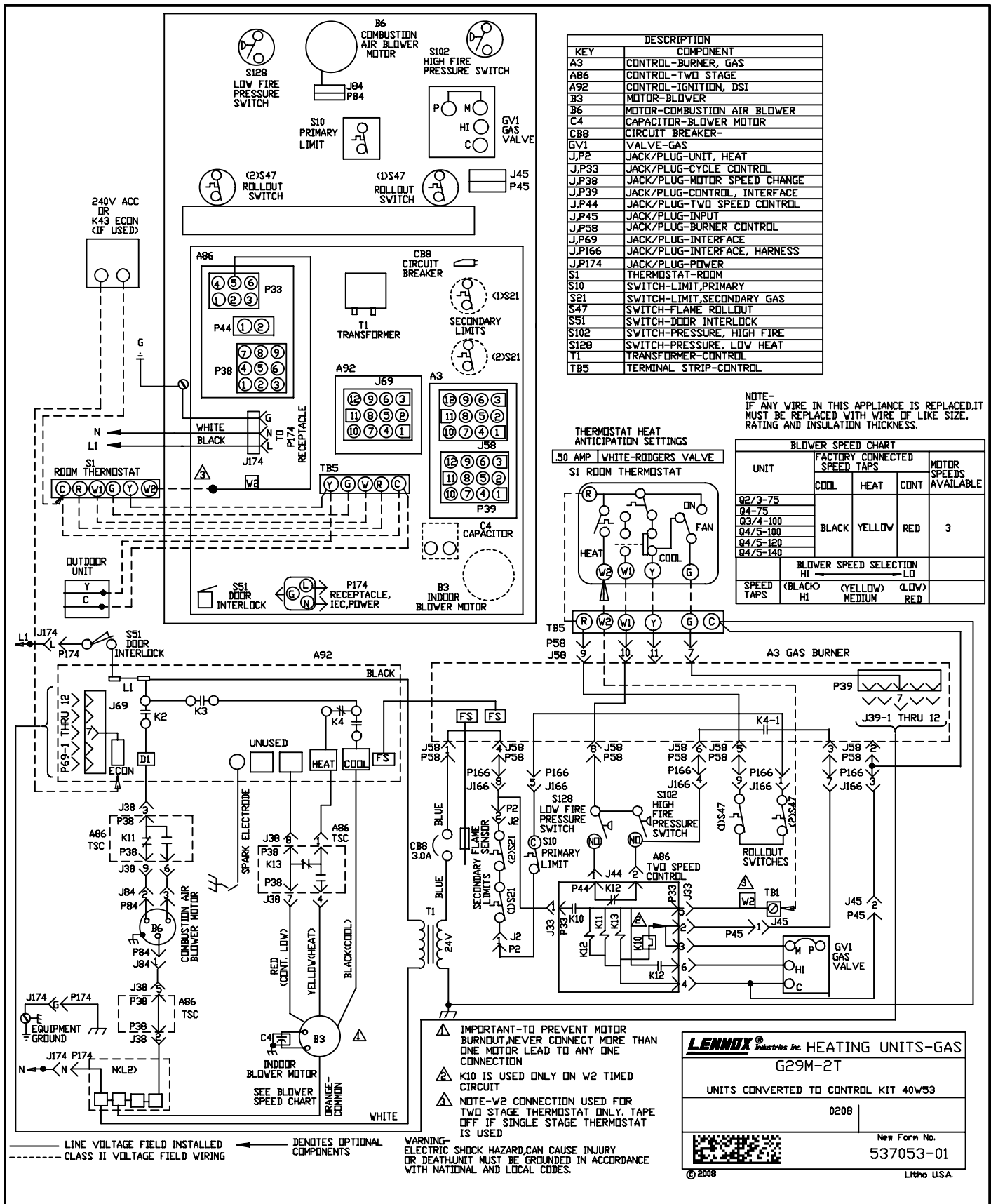


Figure 20. G29M-2T Typical Unit Wiring Diagram

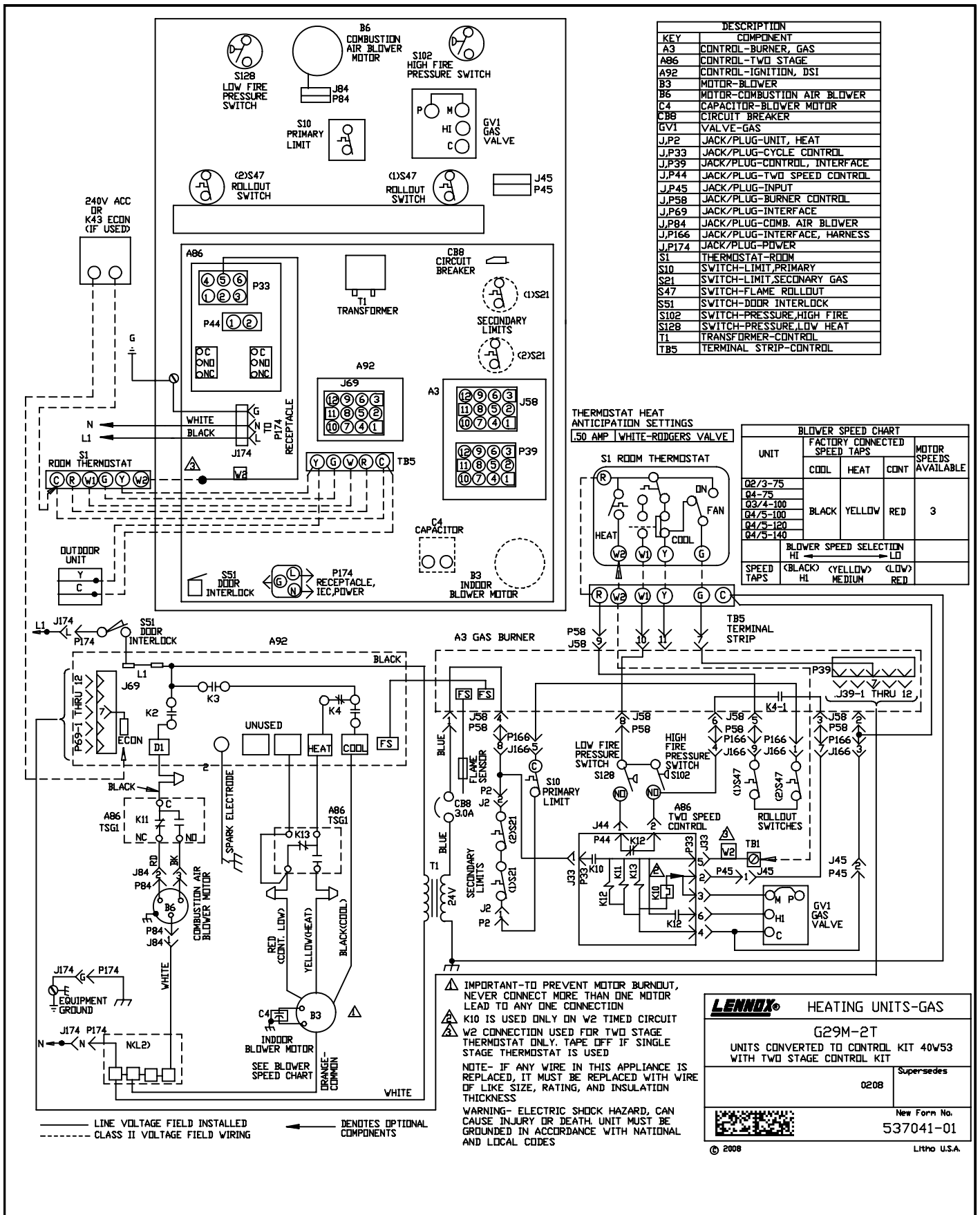


Figure 21. G29M-2T (Two-Stage) Typical Unit Wiring Diagram

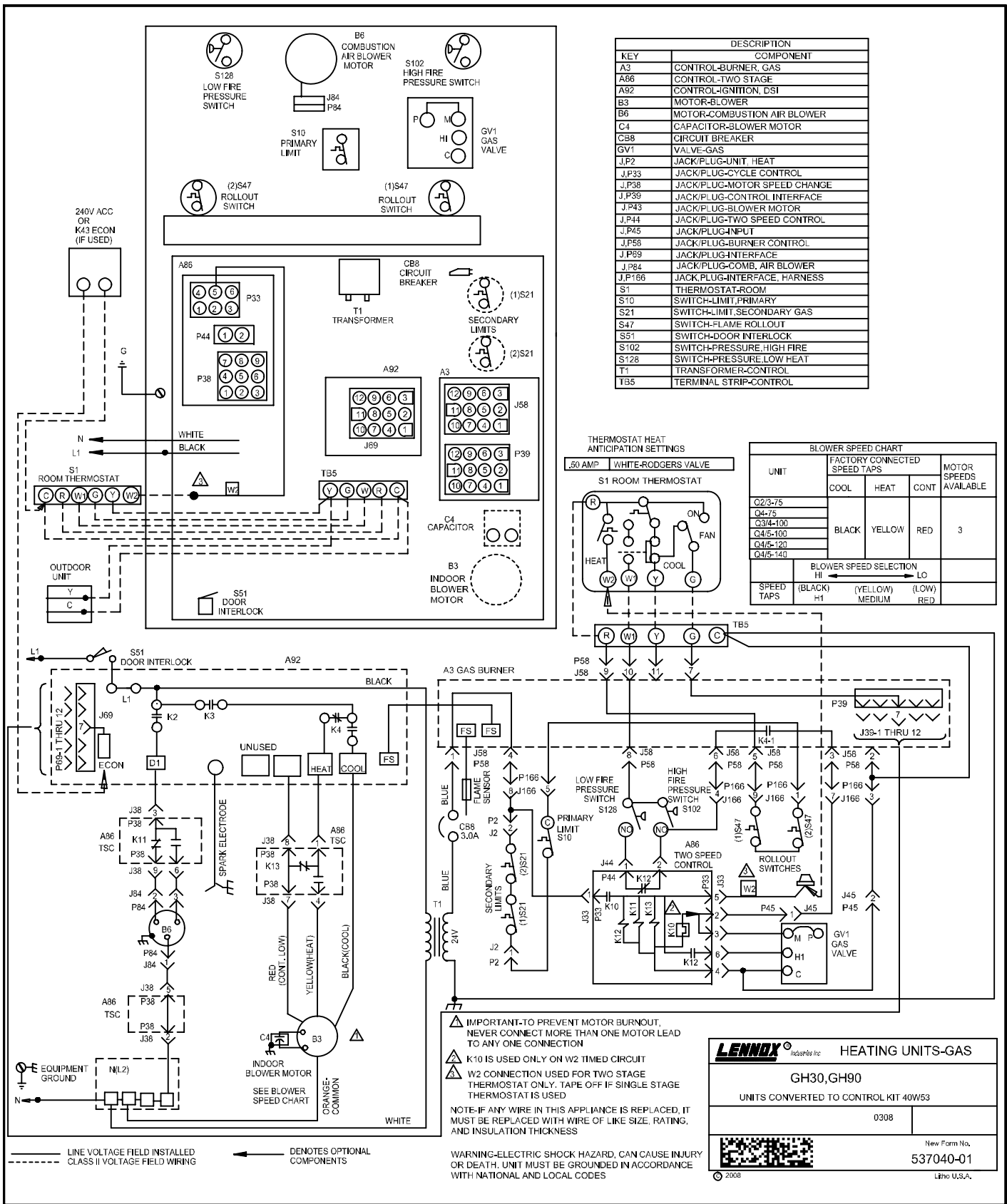


Figure 22. GH30 and GH90 Typical Unit Wiring Diagram