

PRODUCT DESIGN

NORMAL SEQUENCE OF OPERATION

Goodman / Amana® Distinctions™ Brand Single-Stage 80% or 90% Furnaces

White-Rodgers 50A55 Integrated Ignition Control

POWER UP

1. 115 VAC power applied to furnace.
2. Integrated ignition control module performs internal checks.
3. Integrated ignition control module LED will light.
4. Integrated ignition control monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

NORMAL HEATING SEQUENCE

1. R and W thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. The induced draft blower is energized causing pressure switch contacts to close. Induced draft blower remains energized for pre-purge period. Humidifier terminals are energized with induced draft blower.
4. Ignitor warm up begins after pre-purge is completed. The White-Rodgers 50A55 ignition control has a variable ignitor warm up period between a *9-second maximum and a 5-second minimum*.
5. Gas valve opens at end of ignitor warm up period, delivering gas to burners to establish flame.
6. The control checks for a signal from the flame sensor within seven (4) seconds after the gas valve is energized. Gas will only continue to flow if a flame signal is present.
7. Circulator blower is energized on heat speed following a fixed thirty (30) second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
8. Furnace runs, integrated control module monitors safety circuits continuously.
9. R and W thermostat contacts open, allowing the gas valve to cycle off.
10. Induced draft blower is de-energized following a fifteen (15) -second post purge. Humidifier terminals are de-energized.
11. Circulator blower is de-energized following a selectable heat off delay period (90, 120, 150 or 180 seconds). Electronic air cleaner terminals are de-energized.
12. Furnace awaits next call from thermostat.

The adjustable delay-off timing allows the installer to customize the comfort level.

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized on cool speed following a fixed five (5) second on delay. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run, integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower is de-energized following a fixed forty five (45) second cool off delay period. Electronic air cleaner terminals are de-energized.
9. Furnace awaits next call from thermostat.

Fan Only Mode

The normal operational sequence in fan only mode is as follows:

1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on **heat speed**. Electronic air cleaner terminals are energized.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
7. Furnace awaits next call from thermostat.

PRODUCT DESIGN

NORMAL SEQUENCE OF OPERATION

Goodman Two-Stage 80% or 90% Furnaces White-Rodgers 50M56 Integrated Ignition Control

POWER UP

The normal power up sequence is as follows:

- 115 VAC power applied to furnace.
- Integrated control module performs internal checks.
- Integrated control module LED will light.
- Integrated control module monitors safety circuits continuously.
- Furnace awaits call from thermostat.

HEATING MODE

(MODE DIP SWITCH IS SET TO "1 STG" POSITION)

The normal operational sequence in heating mode is as follows:

- R and W thermostat contacts close, initiating a call for heat.
- Integrated control module performs safety circuit checks.
- Induced draft blower is energized for 15 second prepurge period causing pressure switch contacts to close.
- Igniter warm up begins after 15 second prepurge expires.
- Low and high stage gas valves open at end of igniter warm up period, delivering gas to burners and establishing flame.
- Integrated control module monitors flame presence. Gas valve will remain open only if flame is detected.
- Circulator blower is energized on high heat speed following a fixed thirty second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
- Furnace operates; integrated control module monitors safety circuits continuously.
- R and W thermostat contacts open, completing the call for heat.
- Gas valve closes, extinguishing flame.
- Induced draft blower is de-energized following a fifteen second post purge.
- The circulator blower remains at high heat speed for thirty seconds. The circulator blower then switches to low heat speed for the remainder of the selected heat off delay period. For example, the selected heat off delay period is 150 seconds. The circulator blower operates at high heat for 30 seconds and at low speed for $150 - 30 = 120$ seconds.
- Furnace awaits the next call from thermostat.

(MODE DIP SWITCH IS SET TO "2 STG" POSITION)

The normal operational sequence in sequence is as follows:

- R and W thermostat contacts close, initiating a call for heat.
- Integrated control module performs safety circuit checks.
- Induced draft blower is energized for 15 second prepurge period causing pressure switch contacts to close.
- Igniter warm up begins after 15 second prepurge expires.
- Low and high-stage gas valves open at end of igniter warm up period, delivering gas to burners and establishing flame.
- High-stage gas valve closes after five seconds; low-stage gas valve remains open.
- Integrated control module monitors flame presence. Gas valve will remain open only if flame is detected.
- Circulator blower is energized on low heat speed following a fixed thirty second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
- Furnace is now operating in low-stage heating mode.
- Furnace operates; integrated control module monitors safety circuits continuously.
- If low-stage delay period expires, control will shift operation from low-stage heating mode operation to high-stage heating mode operation. Control will energize circulator blower high heat speed and high stage gas valve.
- Furnace is now operating in high-stage heating mode.
- R and W thermostat contacts open, completing the call for heat.
- Induced draft blower is de-energized following a fifteen second post purge.
- Circulator blower is de-energized following a heat off delay period (selectable 100 or 150 seconds; factory set at 150 seconds).
If the furnace is operating in the low-stage heating mode when thermostat contacts open, circulator remains at low heat speed for the selected delay off period.
If the furnace is operating in high-stage heating mode when the thermostat contacts open, the circulator blower remains at high heat speed for thirty seconds. The circulator blower then switches to low heat speed for the remainder of the selected heat off delay period. For example, the selected heat off delay period is 150 seconds. The circulator blower operates at high heat for 30 seconds and at low speed for $150 - 30 = 120$ seconds.
- Furnace awaits the next call from thermostat.

PRODUCT DESIGN

COOLING MODE

The normal operational sequence in cooling mode is as follows:

- R and Y thermostat contacts close, initiating a call for cool.
- Integrated control module performs safety circuit checks.
- Outdoor fan and compressor are energized.
- Circulator blower is energized on cool speed following a fixed five second on delay. Electronic air cleaner terminals are energized with circulator blower.
- Furnace circulator blower and outdoor cooling unit run, integrated control module monitors safety circuits continuously.
- R and Y thermostat contacts open, completing the call for cool.
- Outdoor fan and compressor are de-energized.
- Circulator blower is de-energized following a fixed forty five second cool off delay period. Electronic air cleaner terminals are de-energized.
- Furnace awaits the next call from thermostat.

FAN ONLY MODE

The normal operational sequence in fan only mode is as follows:

- R and G thermostat contacts close, initiating a call for fan.
- Integrated control module performs safety circuit checks.
- Circulator blower is energized on low heat speed. Electronic air cleaner terminals are energized.
- Circulator blower runs, integrated control module monitors safety circuits continuously.
- R and G thermostat contacts open, completing the call for fan.
- Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
- Furnace awaits the next call from thermostat.

PRODUCT DESIGN

NORMAL SEQUENCE OF OPERATION

Goodman Two-Stage 80% or 90% Furnaces White-Rodgers 50V51 Integrated Ignition Control

POWER UP

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module LED will light.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

HEATING MODE

The normal operational sequence in heating mode is as follows:

1. R and W1 (or R and W1/W2) thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized on high speed for a 15-second prepurge. Humidifier terminals are energized with induced draft blower.
4. Induced draft blower steps to low speed following prepurge. Low stage pressure switch contacts are closed.
5. Igniter warm up begins upon step to low speed and presence of closed low stage pressure switch contacts.
6. Gas valve opens at end of igniter warm up period, delivering gas to burners and establishing flame.
7. Integrated control module monitors flame presence. Gas valve will remain open only if flame is detected.
8. If the thermostat call is for low heat, gas valve and induced draft blower will continue on low stage. If the call is for high heat, the gas valve and induced draft blower will change to high stage.
9. Circulator blower is energized on heat speed following a fixed thirty (30) second blower on delay. The circulator blower requires thirty (30) seconds to ramp up to full speed. Electronic air cleaner terminals are energized with circulator blower.
10. Furnace is now operating on the specified stage called for by the two-stage thermostat.
11. Furnace runs, integrated control module monitors safety circuits continuously.
12. If the two-stage thermostat changes the call from low heat to high heat, the integrated control module will immediately switch the induced draft blower, gas valve, and circulator blower to their high stage settings.
13. If the two-stage thermostat changes the call from high heat to low heat, the control will immediately switch the induced draft blower and gas valve to their low stage settings. The circulator blower will remain on high heating speed for thirty (30) seconds before switching to the low heat circulating speed.

14. R and W1 (or R and W1/W2) thermostat contacts open, allowing the gas valve to cycle off.
15. Induced draft blower is de-energized following a fifteen (15) second post purge. Humidifier terminals are de-energized.
16. Circulator blower continues running for the selected heat off delay period (90, 120, 150 or 180 seconds). The speed run during this period depends on the last heat call provided by the thermostat.

If the last call for heat was a call for low heat, the air circulator motor will run on low heat speed for the duration of the heat off delay period (90, 120, 150 or 180 seconds).

If the last call for heat was a call for high heat, the air circulating motor will run on the high heating speed for thirty (30) seconds and then switch to the low heating speed for the **balance** of the heat off delay period (60, 90, 120 or 150 seconds).
17. Circulator blower and electronic air cleaner terminals are de-energized.
18. Circulator blower ramps down to OFF during the 30 seconds following the heat off delay period.
19. Furnace awaits next call from thermostat.

COOLING MODE

The normal operational sequence in cooling mode is as follows:

1. R and YLO/G or Y/G thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized to their appropriate speed.
4. Circulator blower is energized on the appropriate cool speed at the level and time determined by the selected ramping profile. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run their appropriate speed, integrated control module monitors safety circuits continuously.
6. R and YLO/G or Y/G thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower continues running during a cool off delay period. The OFF delay time and airflow level are determined by the selected ramping profile.
9. Electronic air cleaner terminals and circulator blower are de-energized.
10. Furnace awaits next call from thermostat.

PRODUCT DESIGN

FAN ONLY MODE

The normal operational sequence in fan only mode is as follows:

1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on continuous fan speed (56% of high stage cooling) following a five (5) second delay. Electronic air cleaner terminals are energized.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
7. Furnace awaits next call from thermostat.

DEHUMIDIFICATION MODE

The normal operational sequence in dehumidification mode is as follows:

1. R and YLO/G or Y/G thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized to their appropriate speed.
4. Circulator blower is energized on the appropriate cool speed at the level and time determined by the selected ramping profile. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run their appropriate speed, integrated control module monitors safety circuits continuously.
6. Dehumidistat opens on humidity rise allowing the furnace circulator blower to operate at 80% of the cooling speed during combined thermostat call for cooling and dehumidistat call for dehumidification.
7. Humidistat opens on humidity fall allowing furnace circulator blower to switch back to normal cooling speed.
8. R and YLO/G or Y/G thermostat contacts open, completing the call for cool.
9. Outdoor fan and compressor are de-energized.
10. Circulator blower continues running during a cool off delay period. The OFF delay time and airflow level are determined by the selected ramping profile.
11. Electronic air cleaner terminals and circulator blower are de-energized.
12. Furnace awaits next call from thermostat.