Bosch 80% AFUE Gas Furnace BGS80 Model
4-Way Multipoise Category I Fan-Assisted Furnace

Troubleshooting Guide
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1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings

Warnings in this document are identified by a warning triangle printed against a grey background. Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

The following keywords are defined and can be used in this document:

- **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.
- **NOTICE** is used to address practices not related to personal injury.

Important information

This symbol indicates important information where there is no risk to people or property.

1.2 Safety

Please read all instruction in the manual and retain all manuals for future reference.

**WARNING:**
- Untrained personnel (homeowners) may only clean and replace filters and replace fuses as required by basic maintenance. All other operations, including installation, repair, and service must be performed by a qualified installer, service agency, or the gas supplier.

**WARNING:** FIRE OR EXPLOSION HAZARD
- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS:
  - Do not try to light any appliance.
  - Do not touch any electrical switch; do not use any phone in your building.
  - Leave the building immediately.
  - Immediately call your gas supplier from a neighbor’s phone. Follow the gas supplier’s instructions.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

**WARNING:**
- Do not use this furnace if any part has been under water. A flood-damaged furnace is extremely dangerous. Attempts to use the furnace can result in fire or explosion. A qualified service agent must inspect the furnace and to replace all gas controls, control system parts, and electrical parts that have been wet, or the furnace if deemed necessary.

**WARNING:** FIRE OR EXPLOSION HAZARD
- The furnace is designed and approved for use with Natural Gas and (LP) Propane Gas ONLY.
- DO NOT BURN ANY LIQUID FUEL OR SOLID FUEL IN THIS FURNACE.
- Burning any unapproved fuel will result in damage to the furnace’s heat exchanger, which could result in Fire, Personal Injury, and/or Property Damage.
WARNING: FOLLOW ALL SAFETY CODES

- Wear safety glasses, protective clothing, and work gloves. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes as well as the current editions of the National Fuel Gas Code (NFGC) NFPA 54/ANSI Z223.1 and the National Electrical Code (NEC) NFPA 70.

WARNING: FIRE, EXPLOSION, ELECTRICAL SHOCK, AND CARBON MONOXIDE POISONING HAZARD

- Failure to follow this warning could result in dangerous operation, serious injury, death, or property damage. Improper installation, adjustment, alteration, maintenance, or use could cause carbon monoxide poisoning, explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified service agency, local gas supplier, or your distributor for information or assistance.

WARNING:

- Always install furnace to operate within the furnace’s intended temperature-rise range with a duct system which has an external static pressure within the allowable range, as specified in Section 11 of the Installation, Operation, and Maintenance Manual, or the furnace rating plate.

WARNING: FIRE HAZARD

- The furnaces must be kept free and clear of insulating materials. Inspect surrounding area to ensure insulation material is at a safe distance when installing furnaces or adding insulation materials. Insulation materials may be combustible. Maintain a 1 in. clearance from combustible materials to supply air ductwork for a distance of 36 in. horizontally from the furnace. See NFPA 90B or local code for further requirements.

- These furnaces SHALL NOT be installed directly on carpeting, tile, or any other combustible material other than wood flooring. In downflow installations, field supplied floor base MUST be used when installed on combustible materials and wood flooring. Special base is not required when this furnace is installed on industry standard Coil Assembly matching correct furnace width.

WARNING: FIRE, EXPLOSION

- Check entire gas assembly for leaks after lighting this appliance.

- Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections, as specified in the Installation, Operation, and Maintenance Manual.

WARNING: FIRE, EXPLOSION

- See instructions for lighting/shutdown operation (as shown on a sticker directly on the inside of the furnace panel). Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.

WARNING:

- Furnace operation requires air for combustion and ventilation. Do not block or obstruct air openings on furnace or spacing around furnace required for supplying sufficient combustion air and ventilation.

WARNING:

- This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.
2 Troubleshooting

Refer to the troubleshooting charts and associated figures on the following pages for assistance in determining the source of unit operational problems. The red diagnostic LED blinks to assist in troubleshooting the unit. The number of blinks refers to a specific code.

2.1 Electrostatic Discharge (ESD) Precautions

NOTICE:

- Discharge body’s static electricity before touching unit. An electrostatic discharge can adversely affect electrical components.

Use the following precautions during furnace installation and servicing to protect the integrated control module from damage. By putting the furnace control and the person at the same electrostatic potential these steps will help avoid exposing the integrated control module to electrostatic discharge. This procedure is applicable to both installed and uninstalled (ungrounded) furnaces.

1. Disconnect all power to the furnace. Do not touch the integrated control module or any wire connected to the control prior to discharging your body’s electrostatic charge to ground.

2. Firmly touch a clean unpainted metal surface of the furnace away from the control. Any tools held in a person’s hand during grounding will be discharged.

3. Service integrated control module or connecting wiring following the discharge process in step 2. Use caution not to recharge your body with static electricity; (i.e. do not move or shuffle your feet, do not touch ungrounded objects, etc.). If you come in contact with an ungrounded object, repeat step 2 before touching control or wires.

4. Discharge your body to ground before removing a new control from its container. Follow steps 1 through 3 if installing the control on a furnace. Return any old or new controls to their containers before touching any ungrounded object.

2.2 Resetting From Lockout

Furnace lockout results when a furnace is unable to achieve ignition after three attempts. It is characterized by a non-functioning furnace and a one flash diagnostic LED code from the red LED. If the furnace is in “lockout” it will (or can be) reset in any of the following ways.

1. Automatic reset. The integrated control module will automatically reset itself and attempt to resume normal operations following a one hour lockout period.


3. Manual thermostat cycle. Lower the thermostat so that there is no longer a call for heat for 1 - 20 sec.

WARNING: FIRE, EXPLOSION AND ASPHYXIATION HAZARD

- Installation and service must be performed by a qualified service agency or the gas supplier.
3 Error Flash Codes

3.1 No Flash and No Fan (System Does Not Start Normally)

Troubleshooting Chart

Start

Are there any loose wires or wrong connections? Yes → Correct wiring according to wiring diagram

No →

Is there power to the unit? See Figure 1

Yes → Is the door switch working properly? See Figure 2

Yes

No → Replace the transformer

Is the transformer working properly? See Figure 3

Yes

No → Replace the control board

Is there a blown fuse? Yes → Replace the fuse

No →

Is the PCB Board sending 18-31V signals? See Figure 4

Yes, Heating Yes, Fan Only

Is there a call for heat? See Figure 5

Yes → Replace the control board

No → Check the thermostat settings and/or replace the thermostat

Is there a call for fan? See Figure 6

Yes

No → Is there power to the circulating fan motor? See Figure 7

Yes

No → Replace the control board

Is the capacitor working properly? See Figure 8

Yes

No → Replace the circulating fan motor

No → Replace the control board

Leave “Park” terminals unused.
No Flash and No Fan (System Does Not Start Normally)

**Figures & Tables**


![Figure 1](image1.png)

1. Power off
2. Press the door switch
3. Use a multi-meter to measure the resistance. If it is 0 Ω, then the door switch is ok.

![Figure 2](image2.png)

1. Check for 18-31Vac power between R & C terminals with multi-meter.

![Figure 4](image4.png)

1. Check for 18-31Vac power between W & C terminals with multi-meter.

![Figure 5](image5.png)
1. Check for 18-31Vac power between “G” & “C” terminals with multi-meter.

Figure 6

1. Check for 115Vac power supply between Cir-N and Cool-H with multi-meter.

Figure 7

1. Check values and compare to Table 1 to see if the capacitor is working normally.

Table 1  Capacitor Values Per Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacitor Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGS80M050A3A</td>
<td>25uF</td>
</tr>
<tr>
<td>BGS80M080B4A</td>
<td>30uF</td>
</tr>
<tr>
<td>BGS80M100C5A</td>
<td>50uF</td>
</tr>
<tr>
<td>BGS80M120D5A</td>
<td>50uF</td>
</tr>
</tbody>
</table>

NOTICE:
- If capacitor must be replaced, a 440 or 450 Volt field supplied capacitor will also work. Do NOT replace with a 370 Volt capacitor, it will NOT work properly.
3.2 1 Flash (System Lockout - No Flame)

Troubleshooting Chart

```
Start

Are there any loose wires or wrong connections?
Yes → Correct wiring according to wiring diagram

No

Does the unit show 1 LED flash after restart?
Yes → Replace the ignitor
No → Replace the PCB Board

Unit should work normally

Is the ignitor “glowing” red/orange?
Yes → Is the ignitor working properly? See Figure 9
No → Is there power to the ignitor? Yes → See Figure 10

Is gas valve switched to “On” position?
Yes → Is there a flame? (visual check)
No → Replace the PCB board

Is there a signal to the gas valve? See Figure 11
Yes → Does the manifold gas pressure meet the requirement?
See Table 2

No

Is there a flame reaching the flame sensor? (visual check)
Yes → Is the flame sensor dirty or broken?
No → Is the wire grounded properly? See Figure 12

Yes

Are orifices blocked or clogged? (check burner)
Yes → Replace the PCB board
No → Properly ground the wire

Check the wire connections between ignitor and PCB Board

Clean with steel wool or replace the flame sensor

Remove the blockage

The flame sense signal should be 1-6 microamps.

Adjust the inlet gas pressure

Replace the gas valve if the pressure cannot be adjusted

Adjusting the inlet gas pressure

Check incoming gas supply quality

Adjust gas valve to ensure it meets gas pressure requirement

Replace the gas valve if the pressure cannot be adjusted

Is there a flame? (visual check)
Yes → Does the manifold gas pressure meet the requirement?
See Table 2

No

Is the inlet gas pressure meeting the requirement? See Table 3
Yes

No

The manifold gas pressure meet the requirement?
See Table 2

No

Is the manifold gas pressure meeting the requirement?
See Table 3

No
```

1 Flash (System Lockout - No Flame)

**Figures & Tables**

**Figure 9**

1. Check for 9-17Ω between these two terminals with multi-meter.

**Figure 10**

1. Check for 115Vac power supply between IGN and IGN-N with multi-meter during preheating sequence. See Appendix A.

**Table 2** Manifold Gas Pressure

<table>
<thead>
<tr>
<th>Input Rating</th>
<th>Manifold Gas Pressure Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>KBTU/H</td>
<td>Natural Gas</td>
</tr>
<tr>
<td>50</td>
<td>4.3-4.7 in. W.C.</td>
</tr>
<tr>
<td>80</td>
<td>3.6-4.0 in. W.C.</td>
</tr>
<tr>
<td>100</td>
<td>4.0-4.4 in. W.C.</td>
</tr>
<tr>
<td>120</td>
<td>4.3-4.7 in. W.C.</td>
</tr>
</tbody>
</table>

**Table 3** Inlet Gas Supply Pressure

<table>
<thead>
<tr>
<th></th>
<th>Natural Gas</th>
<th>Propane Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet Gas Supply Pressure</td>
<td>Minimum: 5.0 in. W.C.</td>
<td>Maximum: 10.5 in. W.C.</td>
</tr>
<tr>
<td>Propane Gas</td>
<td>Minimum: 11.0 in. W.C.</td>
<td>Maximum: 13.0 in. W.C.</td>
</tr>
</tbody>
</table>
3.3 2 Flashes (Pressure Switch Stuck Closed)

Troubleshooting Chart

Start

Are there any loose wires or wrong connections? Yes → Correct wiring according to the wiring diagram

No → Does the resistance of pressure switch show as “∞”? Yes → Replace the pressure switch

See Figure 13 & 14

No → Replace the PCB Board

This error could also be caused by a blocked vent. Check vent for obstructions.
2 Flashes (Pressure Switch Stuck Closed)

Figures

1. Check for \( \infty \) resistance between these two terminals with multi-meter.

---

**Figure 13**

**Figure 14**
3.4 3 Flashes (Pressure Switch Stuck Open)

Troubleshooting Chart
3 Flashes (Pressure Switch Stuck Open)

Figures

1. Check for 0Vac between "HLO" & "PS" terminals with multi-meter during furnace start up sequence. See Appendix A.

Figure 15

Figure 16

Check pressure hose for proper operating condition.
Check for proper hose connections.
Check and remove any blockages in the hose.
3.5 4 Flashes (Open Limit Switch - High Temperature Limit Control)

Troubleshooting Chart

Start

Are there any loose wires or wrong connections?
Yes → Correct wiring according to wiring diagram
No → Turn off the equipment for 10 minutes to ensure sufficient cooling off period.

Are the limit switches working properly? See Figure 17
Yes → Replace the Limit Switch
No → Are the temperatures on the limit switches within normal operating range? See Figure 18
Yes → Is the circulating fan motor turning on after 45s delay?
No → Is there power to the circulating fan motor? See Figure 20
Yes → Is the capacitor functioning properly? See Figure 21
No → Replace the Limit Switch
Yes → Replace the Circulating Fan Motor

Turn it to “On” position
No → Is the SW2 on PCB Board at “On” position? See Figure 19
Yes → Is there blockage on the filter? See Table 5
No → Correct the circulating fan motor speed or replace the motor if necessary.
Yes → Check the airflow duct for blockage

Clean/Replace the filter
4 Flashes (Open Limit Switch - High Temperature Limit Control)

Figures & Tables

**Figure 17**

1. Check for 0 resistance between these two terminals with multi-meter. Make sure to do this check on both limit switches.

**Figure 18**

Use thermodetector to measure the temperature of limit switch when fault is active.
1. Chamber Limit switch acceptable range: 160/130°F
2. Fan mounted Limit switch acceptable range: 120/90°F

**Figure 19**

1. Check to make sure "SW2" dip switch is set to “On”.

**Figure 20**

1. Check for 115Vac power supply between Cir-N and Heat-H with multi-meter
1. Check values and compare to Table 4 to see if the capacitor is working normally.

<table>
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<tr>
<th>Model</th>
<th>Capacitor Value</th>
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</table>

Table 4 Capacitor Values Per Model

### Table 5 Air Delivery - CFM (Without Filter)  
* **

A filter is required for each return-air inlet. Airflow performance included 3/4-inch washable filter media such as contained in field supplied accessory filter rack. To determine airflow performance with this filter, assume an additional 0.1 in. WC available external static pressure.

** Manufacturer default speed tap for heating.
3.6 5 Flashes (Open Rollout Limit Switch)

Troubleshooting Chart

- **Start**
- Are there any loose wires or wrong connections? Yes → Correct wiring according to the wiring diagram
  - No → Is there blockage in the exhaust pipe and check heat exchanger for excess grime?
    - Yes → Remove blockage in the exhaust pipe
    - No → Are both rollout limit switches showing resistance of "0"?
      - Yes → Replace the PCB Board
      - No → After manual reset of the limit switch, is the error still present once the system starts up?
        - Yes → Replace the rollout switch
        - No → Check the inducer for proper function

---

- **Information**: Rollout set point: 250F
- **Information**: Rollout limit switches require manual reset by pressing the button in.
- **Information**: This fault could also be caused by lack of proper NG-LP conversion.
5 Flashes (Open Rollout Limit Switch)

Figures

1. **Power off** and check for 0 resistance between these two terminals with a multi-meter. Ensure that this step is completed for both rollout limit switches.

*Figure 22*

1. Rollout Switch Locations

*Figure 23*
3.7  6 Flashes (Incorrect Polarity of L1/L2)

Troubleshooting Chart

Correct the wire connection (black and white wire) according to wiring diagram

Figures

Figure 24
3.8  7 Flashes (Low Flame)

Troubleshooting Chart

1. Start
2. Is the manifold gas pressure requirement being met? See Table 6
   - No
     - Is the inlet gas pressure requirements being met? See Table 7
       - No
         - Adjust the gas valve to ensure manifold gas pressure meets the required values
       - Yes
         - Replace the gas valve if the pressure cannot be adjusted
     - Yes
       - Adjust the inlet gas pressure
3. Is the flame sensor dirty or broken?
   - Yes
     - Clean with steel wool or replace the Flame Sensor
   - No
4. Is the PCB Board grounded properly? See Figure 25
   - Yes
     - Replace the PCB Board
   - No
     - Properly ground the PCB Board
5. Are orifices blocked or clogged? (check burners)
   - Yes
     - Remove the blockage
   - No

7 Flashes (Low Flame)

Figures & Tables

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<tr>
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<td>4.3-4.7 in. W.C.</td>
<td>9.7-10.3 in. W.C.</td>
<td></td>
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</table>

Table 6  Manifold Gas Pressure

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<tr>
<td>Natural Gas</td>
</tr>
<tr>
<td>Propane Gas</td>
</tr>
</tbody>
</table>

Table 7  Inlet Gas Supply Pressure

1. Check for proper connection (green wire).

Figure 25
3.9  Rapid/Continuous Flashes (Flame Sensor Shorted)

Troubleshooting Chart

![Diagram showing troubleshooting steps for Rapid/Continuous Flashes (Flame Sensor Shorted)]

Figure 26

3.10  Steady On Light (Bad Control Board)

Troubleshooting Chart

![Diagram showing troubleshooting steps for Steady On Light (Bad Control Board)]

Figure 27
Appendix A - Sequence of Operation

Figure 28