

Boiler Operation Sequence - Fix it with our Plumbers Fault Finder App for Heating Engineers

 boilerfaultfinder.com/sequence-of-boiler-operation/

Sequence of Boiler Operation

General Sequence

1. Boiler in standby mode
2. Demand called for via room [thermostat](#)/timer
3. Pump runs – activating primary flow switch then [micro switch](#) above from NO to NC
4. Diverter valve remains in at “rest” position (central heating port open only)
5. [Printed circuit board](#) sends voltage to fan
6. Fan runs ok
7. [Air pressure switch](#) activates from C and NC position over to C and NO position (Sending signal back to [Printed circuit board](#))
8. [Overheat cut out thermostat](#) is checked for closed circuit (continuous circuit) Primary thermistor is also checked for correct thermal resistance
9. Spark generator and ignition electrode(s) ok
10. Gas valve energised and ignites ok (low rate)
11. Flame detection electrode ok (sparking finishes – ionisation proved)
12. Gas valve ramps up to range rated set pressure (Controlled via the thermistor and potentiometer at p.c.b)
13. Boiler control [thermostat](#) or room [thermostat](#) is satisfied or the timer shuts down boiler
14. Fan and pump over run continue to dissipate residual heat (over run time will vary)
15. Boiler returns to standby mode

Hot Water Mode

1. Boiler in standby mode
2. Demand called for activating [hot water flow switch](#) then [micro switch](#) above from NO to NC (paddle, turbine, wheel or pressure differential type)
3. Pump runs-activating primary flow switch then [micro switch](#) above from No to NC
4. Diverter valves internal hydraulics moves over from “rest” position (central heating port open) to domestic hot water position (port to secondary plate exchanger open only)

Note: not all models incorporate a diverter valve and plate to plate heat exchanger, but instead utilise a twin pass main heat exchanger

5. [Printed circuit board](#) sends voltage to fan
6. Fan runs ok
7. [Air pressure switch](#) activates from C and NC position over to C and NO position (sending signal back to [Printed circuit board](#))
8. C/H and H/W overheat cut out [thermostats](#) are checked for closed circuit (continuous circuit), primary and secondary [thermistors](#) are also checked for correct thermal resistance

9. Spark generator and ignition electrode(s) ok
10. Gas valve energised and ignites ok (ignition rate)
11. Flame detection electrode ok (sparking finishes – ionisation proved)
12. Gas valve modulates according to the water flow rate/ desired temperature setting (controlled via the thermistor and potentiometer at p.c.b)
13. Boiler shuts down when hot water demand is satisfied
14. Fan and pump over run continue to dissipate residual heat (over run time will vary)
15. Boiler returns to standby mode

Please note: The above sequence of operation for both hot water and central heating are not identical for every boiler out there, however, the sequence of events will not progress any further forward, if there are no feedback signals or if they are incorrect. See also our boiler [servicing procedure](#) page.

Main Components

- **Boiler** – Check [boiler manuals](#) for details
- **Programmer**
- **Ignition** – Electronic Pulse, Direct Spark, etc.
- **Heat Exchanger** – Single Pass or Crossflow.
- **Pump** – Speed (single, two speed, three speed), Modulating, Twin Pump, etc.
- **Diverter Valve** – Diaphragm Pass, Wax Capsule, Electric, Venture.
Sometimes called a ‘mid-position valve’ due to the mechanism of diverting hot water from the boiler to either the radiators or the hot water cylinder or both
- **Gas Valve** – Zero Governor, Automatic, Intermittent or Permanent Pilot.
- **Calorifier** – Cylinder and Coil or Plate.
- **Primary Flow Switch** – Pressure differential, Diaphragm, Reed.
- **Secondary Flow Switch** – Paddle Diaphragm, Diaphragm, Reed, Thermistor.

Resources

- [Combination Boilers – Basic Principles of Operation](#)
- [How Heating Boilers Work and are Diagnosed – 39 Steps in the Operation of a Heating System](#)
- [Programmer and Time Switch Compatibility Guides](#)
- [General Fault Finding](#) section
- [System Component Testing](#)