ATAG i Series Boiler Fault Finding 02/10/23.

(All models and generations).

Contents

ATAG i Series 1st generation boiler fault finding.

Fault codes or error:

Fault	Fault	Fault	Other
10	110	130	SE
20	111	133	Spanner symbol
28	113	151	Pump constantly running.
40	117	154	Blank display screen
50	118	164	Boiler heating – no demand & One Connected.
61	119	180	Error code on ONE Controller: Code 002 / 003
78	128	181	Random fault codes on One Controller.
105	129		Sensor resistances
			Error Sub Codes - 7 Day Two Channel Plug-In Digital Programmer

10 Description: Outside sensor error

Cause: Outside sensor not present, short-circuited, broken or values outside specifications.

1. If using ATAG One with internet weather:
    - Check Wi-Fi signal & re-connect if required.
2. If internet weather is not being used, check if outdoor sensor is in use with boiler.
3. If an outside sensor is fitted and code 10 appears on the boiler, check the following:
    - Check the resistance of the outdoor sensor as per the table on page 67 and replace as required.
    - Check whether the cables for the outdoor sensor are connected to the boiler.
    - Check that the cable is not damaged, broken or has any poor contacts. **Use a multimeter to confirm continuity of the cables.** Replace harness as required.
    - Check whether the outdoor sensor is mounted in such a way that it is not affected by weather influences (sunlight, snow, etc.).
4. If error 10 remains after confirming the outdoor sensor and cables are ok, replace the PCB.

20 Description: Flow sensor error

Cause: The flow sensor T1 value out of range.

1. Check full T1 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check if T1 sensor resistances are in line with the flow temperatures.
    - The flow temperature can be identified using the **A menu and A0**.
    - The resistances can be taken at the connector at the PCB **X4 pins 1 & 2**. This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB. Resistances are found on page 67.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault. Replace part as required.

    ***Note thermistors may need cleaned and not always replaced*.**
3. If error 20 remains after the above has been checked, replace PCB.

28 Description: Flue gas sensor fault

Cause: Flue gas sensor not fitted to our boilers so if 28 fault code appears replace PCB.

40 Description: Return sensor error

Cause: The return sensor T2 value out of range.

1. Check full T2 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check T2 sensor resistances are in line with the return temperatures.
    - The return temperature can be identified using the **A menu and A1**.
    - The resistances can be taken at the connector at the PCB **X4 pins 3 & 4**. This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB. Resistances are found on page 67.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault. Replace parts as required.

    ***Note thermistors may need cleaned and not always replaced*.**
3. If error 40 remains after the above has been checked, replace PCB.

50 Description: T3 Hot water sensor error.

Cause: The values of T3 boiler sensor out of specification.

Combi & Economiser boilers.

Cause: The values of the T3 hot water sensor outside specifications.

1. Check full T1 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check if T3 sensor resistances are in line with the return temperatures and per the table on page 67.
    - The DHW temperature can be identified using the **A menu and A2**.
    - The resistances can be taken at the connector at the PCB **X7, pins 8 & 9**. This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault. Replace parts as required.

    ***Note thermistors may need cleaned and not always replaced*.**
4. If error 50 remains after the above has been checked, replace PCB.

Additional checks for iS & iR boilers with Hot Water Priority.

1. Check the Hot water priority DHW NTC sensor is connected to the boiler.
2. Check the boiler sensor wires for loose contacts and breaks.
3. If the cable has been extended, check the wires at the junction box/block connector.
4. Check if the sensor is installed correctly.

61 Description: Bus communication error

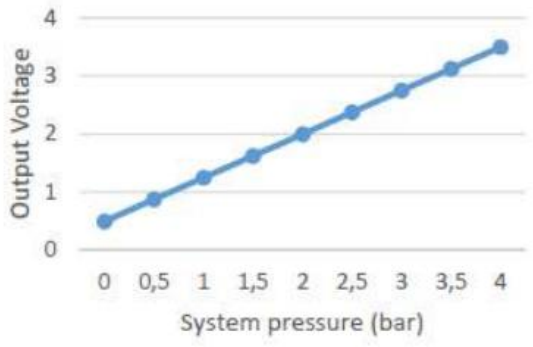
Cause: No signal from One controller (contact open).

1. Turn off the power at fused spur, wait 5 seconds and re-establish power. If connection fails to establish, follow on from point 2.
2. Perform a factory reset on the controller by removing the controller from the wall. Then use a pen or small screwdriver and press the reset button on the rear of the controller.
3. Check connector at rear of One Controller, ensure pins are not bent.
4. Check continuity of wires from controller to the PCB with a multimeter.
5. Check connection on **blue Bus** connector at PCB.
6. Check One Controller for power.
    a. At the Blue Bus connector in the boiler expect **17 VDC**.
    b. At the back plate connector of the One Controller, expect **32 VDC** with the controller removed.
7. If no power to controller, replace PCB.
8. If power to controller, replace One controller.

78 Description: No pump kick detected/Faulty pressure sensor.

Cause: No pressure increase while the pump is running at full load for 5 seconds. This can be caused by air in the boiler, a blocked or faulty pressure sensor or a faulty pump. The pressure increase by the pump must be at least 0.1 bar.

1. Check analogue and digital pressure readouts match.
    - If these do not match add pressure to the system and check digital gauge reads new pressure.
    - Clean sensor if contaminated or replace as required.
2. Use a multimeter to check the wiring harness to the water pressure sensor for continuity from PCB connector **X7 pins 5, 6 & 7**, whilst checking connectors are tight and free from damage or corrosion.
    - Replace as required.
3. Check DC voltage from pressure sensor back to the PCB on connector **X7 pins 5 & 7**. The voltage should be as per the table below. Clean or replace the sensor as required.



4. Check the pump for air and vent the system if required.
    - Use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and then re-establish the power.
5. Check auto air vent is operating correctly and not contaminated with sludge.
6. Check the operation and voltage of the pump with a demand.

- You can force the pump by removing PWM cable at the pump to allow the 230v cable to power the pump at full speed.
- To do this, ensure **safe electrical isolation** and then use a 4mm electrical screwdriver to push down the clip below the PWM connector and gently pull the connector out. Re-establish power to the boiler and the pump should run at full speed.

7. Confirm 230v from the PCB connector **X9 pin 1** & **X10 pin 2**. If no voltage, replace PCB.
8. Check 230v supplied from the PCB to the pump connector. If voltage at pump connector, replace pump.
9. If no voltage at pump connector, use a multimeter to check the wiring harness for continuity from the PCB via connector **X9 pin 1** & **X10 pin 2**, whilst checking connectors are tight and free from damage or corrosion. Replace as required.
10. If 230v side ok, check the pump PWM via the 3-wire cable connection to the pump on PCB connector **X1 pins 1&2**:
    - with the pump off the voltage is +/- 5VDC.
    - 39% load the voltage is +/- 3VDC.
    - 61% load the voltage is +/- 1.9VDC.
    - 100% load the voltage is +/- 0.24VDC.
11. If the above voltages are correct, and the pump does not operate, replace the pump.
12. If the voltages are incorrect, replace the PCB.
13. Check expansion vessel pressure is set correctly as per the manufacturer's instructions.
14. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
15. Check the boiler for any blockages or restrictions.
16. After checking all the above points, switch off the power and back on again, allow the boiler to run automatically through the automatic venting program.
17. If the fault persists, replace the PCB.

105 Description: Venting program active.

Cause: No fault – venting program will run for 7 minutes.

110 Description: Safety temperature exceeded.

Cause: Temperature rise too fast, possible sensor fault or circulation.

1. Check the system for an external heat source such as solar which may affect the return temperature.
2. Confirm flow and return temperatures using the **A menu, A0 &A1.**
3. Check T1 and T2 resistances in line with temperatures from flow and return temperatures found on page 67.
    - Take resistances at the connector **X4** on the PCB **pins 1 & 2**, and **pins 3 & 4**. This checks the wiring harness continuity and connectors at same time.
    - Check wiring connectors are not loose or corroded**.**
    - Disconnect the connector from PCB to ensure no additional resistances are given through the PCB.
    - If readings incorrect, take resistance reading direct from sensor & replace sensor or wiring harness as required.

    ***Note sensors may need cleaning and not always replaced*.**

4. Ensure all air is vented out of the boiler and system.
5. On combi's, the diverter valve operation may be faulty, check as follows:
    - Safely isolate boiler from electrics.
    - Remove the motor from the three-way valve and see if the cartridge moves up and down.
    - If this doesn't move smoothly and seems to be sticking, replace the cartridge.
6. Check system pipework configuration correct.
7. Ensure all valves on the system and boiler are open.
8. Ensure all air is vented out of the boiler and system.
9. Check system pipework and filters for any blockages or restrictions.
10. Check all installation components are functioning correctly (mixing pumps and 2-way valves, etc.).
11. In the case of a combi, check the plate heat exchanger is not blocked.
12. Check for Voltage at the pump. You can force the pump:
    - By removing PWM cable to allow 230v cable to power pump at full speed.
    - If pump does not run via above tests check pins on pump not bent – straighten to fix and check continuity across wiring harness. If all ok and no voltage going to pump, then PCB fault.
    - If voltage to pump and all other checks are ok, replace pump.
13. If all the above checks are ok, PCB may be at fault.

Note If plastic pipes are used, they must be barrier pipes & UFH must comply with DIN4726-4729. If this is not the case, system separation must be provided as these pipes are porous & will allow air into the system.

111 Description: Maximum temperature exceeded.

Cause: Possible sensor fault or circulation.

1. Check the system for an external heat source such as solar which may affect the return temperature.
2. Confirm flow and return temperatures using the **A menu, A0 &A1.**
3. Check T1 and T2 resistances in line with temperatures from flow and return temperatures found on page 67.
    - Take resistances at the connector **X4** on the PCB **pins 1 & 2**, and **pins 3 & 4**. This checks the wiring harness continuity and connectors at same time.
    - Check wiring connectors are not loose or corroded**.**
    - Disconnect the connector from PCB to ensure no additional resistances are given through the PCB.
    - If readings incorrect, take resistance reading direct from sensor & replace sensor or wiring harness as required.

    ***Note sensors may need cleaning and not always replaced*.**
4. Ensure all air is vented out of the boiler and system.
5. On combi's, the diverter valve operation may be faulty, check as follows:
    - Safely isolate boiler from electrics.
    - Remove the motor from the three-way valve and see if the cartridge moves up and down.
    - If this doesn't move smoothly and seems to be sticking, replace the cartridge.
6. Check system pipework configuration correct.
7. Ensure all valves on the system and boiler are open.
8. Ensure all air is vented out of the boiler and system.
9. Check system pipework and filters for any blockages or restrictions.
10. Check all installation components are functioning correctly (mixing pumps and 2-way valves, etc.).

11. In the case of a combi, check the plate heat exchanger is not blocked.
12. Check for Voltage at the pump. You can force the pump:
    - By removing PWM cable to allow 230v cable to power pump at full speed.
    - If pump does not run via above tests check pins on pump not bent – straighten to fix and check continuity across wiring harness. If all ok and no voltage going to pump, then PCB fault.
    - If voltage to pump and all other checks are ok, replace pump.
13. If all the above checks are ok, PCB may be at fault.

***Note *** If plastic pipes are used, they must be barrier pipes & UFH must comply with DIN4726-4729. If this is not the case, system separation must be provided as these pipes are porous & will allow air into the system.

113 Description: Flue gas sensor (T5) fault.

Cause: Flue gas sensor not fitted to our boilers so if 113 fault code appears replace PCB.

117 Description: Water pressure too high (>3 bar).

Cause: Excessive water pressure in system.

1. Check filling loop is turned off and not passing, replace as required.
2. Check for secondary filling loops in the system and check as per point 1.
3. For combi's check main water pressure not passing back through plate heat exchanger by isolating cold main into boiler.
4. Ensure adequate expansion for property.
5. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
6. Check expansion vessel pressure is set correctly as per the manufacturer's instructions, and check Shrader core for leakage.
    - Water in the expansion vessel may only be condensation and can be removed using the expansion vessel service procedure found on page 68.
    - Check expansion vessel not leaking, replace as required.
    - If the expansion vessel is of adequate size for the property, is not leaking and has been fully serviced but not holding pressure, replace the expansion vessel.
7. On rare occasions unvented cylinders may pass back to the central heating via a burst coil. Isolate the mains to confirm.

118 Description: Water pressure too low (<0.8 bar to 0.5 bar) or no pump kick detected.

Cause: Insufficient water pressure in system, blockage in boiler, pump not operating or water pressure sensor faulty.

1. Check analogue and digital pressure readouts match. If these do not match add pressure to the system and check gauges read new pressure. Replace as required.
2. Check pressure loss patterns with the consumer and if any work has been carried out on the system or boiler.
3. Check the heating system for leaks **(system needs to be cold and may need to be over pressured to force leak).**
4. Ensure adequate expansion for property.
5. Check the boiler for leaks including removal of the siphon to check heat exchanger for leaks.
6. Check the pressure relief valve for leakage.
7. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
8. Check expansion vessel pressure is set correctly as per the manufacturer's instructions, and check Shrader core for leakage.
    - Water in the expansion vessel may only be condensation and can be removed using the expansion vessel service procedure found on page 68.
    - Check expansion vessel not leaking, replace as required.
    - If the expansion vessel is of adequate size for the property, is not leaking and has been fully serviced but not holding pressure, replace the expansion vessel.
9. If no obvious leaks are found, isolate boiler from system and leave on test.
    - ***Note*** system must be cold, and pressure set to approx. 1.5 bar before isolating valves from boiler to system.
    - The time required for this test will depend on patterns and amount of pressure loss. (i.e., every 2 days etc.).

119 Description: Link missing on wiring harness.

Cause: Link on PCB connector X2 missing.

1. Check connector connection to PCB.
2. Check link is in pins **4 & 5 on X2**.
3. Check wiring harness.
4. Replace parts as required, if all the above is ok, replace PCB.

128 Description: Ionisation current too low.

Cause: Ionisation level too low at max fan speed/RPM.

1. Check condensate pipe is clear of blockages and is running freely. Clear as required.
2. Check 230v at gas valve, connections **1 & 3**.
    a. If the voltage is correct, move to step 3.
    b. If there is no voltage at the gas valve, check the PCB is sending 230v to the gas valve from connector **X12, pins 1 & 2**. Replace PCB if there is no voltage.
    c. If voltage is supplied from the PCB, check the condition of the wiring harness and connectors. Use a multimeter to confirm continuity throughout the cables. Replace harness if faulty.
3. Check the working pressure at the P1 test point of the gas valve with all gas appliances in the house fully on. The WP must be no less than 4mb under that of the WP at the gas meter for NG or 2.5mb for LPG.
    a. If WP at the meter is under 19mb call National grid or local network to investigate the issue.
    b. If under pressure at the boiler, investigate secondary isolation valves, pipe sizing or shale/debris, etc. in gas pipe.
4. If the working pressure is correct, check the following:
5. Check ionisation current is between 0.8µA & 4µA using the **A menu & A8**.
6. If ionisation current is ok, proceed to step 7.
    a. If ionisation current is too low, check earthing in house with an earth loop impedance tester.
    b. If earthing in the property is ok, move to step 8.
7. Check 230v at the ignition transformer, connections **1 & 2** (black wires).
    a. If the voltage is correct, move to step 8.
    b. If voltage is incorrect at the ignition transformer, check the PCB is sending 230v to the ignition transformer from connector **X12, pins 3 & 4**. Replace PCB if there is no voltage.
    c. If voltage is supplied from the PCB, check the condition of the wiring harness and connectors. Use a multimeter to confirm continuity throughout the cables. Replace harness if faulty.
8. Check voltage from the transformer to the electrodes. Using a multimeter, check for between 60-100 volts AC between both outlet connections of the transformer to an earth connection (the 100 volts should be on initial startup and then settle to approx. 60V). If voltage incorrect replace transformer or if voltage correct, proceed to step 9.
9. Check the spark gap and condition of the electrodes, including the ionisation electrode. The spark electrodes should have a 3 – 4mm spark gap and be clean. Adjust spark gap and clean electrodes with a fine sandpaper if required. If still fails after cleaning and adjustment or is worn out, replace electrodes.
10. Check if the CO/CO2 values are correct.
11. Check the condition of the burner for any debris or cracks, clean or replace as required.
12. Check the non-return valve in the fan is operating correctly, replace as required.
13. Check heat exchanger flue ways are clear of debris. Clean with a soft brush and vacuum cleaner as required.
14. Check boiler for recirculation of products of combustion and repair as required.
15. Check flue length and configuration is correct as per the manufacturer's instructions.
16. Check flue for breaks and carryout O2 checks to confirm no spillage of products of combustion.
17. Check boiler is set to the correct gas type using the **P menu & P5**, whilst ensuring LPG boilers have the correct restrictor fitted at the fan.
18. If all the above have been checked and the fault remains, replace the PCB.

129 Description: Fan error.

Cause: Fan does not start up.

1. Ensure **safe electrical isolation** and remove the PWM cable at the fan (4 wire connector). Re-establish power to the boiler and the fan should run at full speed.
2. If fan does not run, check for 230v from the PCB connector **X11, pins 1 & 2**. If no voltage, replace PCB. If 230v present and fan did not run with PWM removed, replace fan.

Expected fan resistances from PWM connection. All pins on the 230v side normally show OL.

Pins 1 - 2	6 MΩ	Pins 2 - 3	15.97 KΩ	Pins 3 - 4	34.72 KΩ
Pins 1 - 3	8.62 MΩ	Pins 2 - 4	18.78 KΩ	x	x
Pins 1 - 4	5 MΩ	x	x	x	x

130 Description: Maximum flue temperature exceeded.

Cause: Flue gas sensor not fitted to our boilers so if 130 fault code appears replace PCB.

133 Description: No flame detected.

Cause: Ignition error.

1. Check condensate pipe is clear of blockages and is running freely. Clear as required.
2. Check 230v at gas valve, connections 1 & 3.
    a. If the voltage is correct, move to step 3.
    b. If there is no voltage at the gas valve, check the PCB is sending 230v to the gas valve from connector **X12, pins 1 & 2**. Replace PCB if there is no voltage.
    c. If voltage is supplied from the PCB, check the condition of the wiring harness and connectors. Use a multimeter to confirm continuity throughout the cables. Replace harness if faulty.
3. Check the working pressure at the P1 test point of the gas valve with all gas appliances in the house fully on. The WP must be no less than 4mb under that of the WP at the gas meter for NG or 2.5mb for LPG.
    a. If WP at the meter is under 19mb call National grid or local network to investigate the issue.
    b. If under pressure at the boiler, investigate secondary isolation valves, pipe sizing or shale/debris, etc. in gas pipe.
4. If the working pressure is correct, check the following:
5. Check ionisation current is between 0.8µA & 4µA using the **A menu and A8**.
6. If ionisation current is ok, proceed to step 7.
    a. If ionisation current is too low, check earthing in house with an earth loop impedance tester.
    b. If earthing in the property is ok, move to step 8.
7. Check 230v at the ignition transformer, connections 1 & 2 (black wires).

a. If the voltage is correct, move to step 8.
b. If voltage is incorrect at the ignition transformer, check the PCB is sending 230v to the ignition transformer from connector **X12, pins 3 & 4**. Replace PCB if there is no voltage.
c. If voltage is supplied from the PCB, check the condition of the wiring harness and connectors. Use a multimeter to confirm continuity throughout the cables. Replace harness if faulty.

8. Check voltage from the transformer to the electrodes. Using a multimeter, check for between 60-100 volts AC between both outlet connections of the transformer to an earth connection (the 100 volts should be on initial startup and then settle to approx. 60V). If voltage incorrect replace transformer or if voltage correct, proceed to step 9.
9. Check the spark gap and condition of the electrodes, including the ionisation electrode. The spark electrodes should have a 3 – 4mm spark gap and be clean. Adjust spark gap and clean electrodes with a fine sandpaper if required. If still fails after cleaning and adjustment or is worn out, replace electrodes.
10. Check if the CO/CO2 values are correct.
11. Check the condition of the burner for any debris or cracks, clean or replace as required.
12. Check the non-return valve in the fan is operating correctly, replace as required.
13. Check heat exchanger flue ways are clear of debris. Clean with a soft brush and vacuum cleaner as required.
14. Check boiler for recirculation of products of combustion and repair as required.
15. Check flue length and configuration is correct as per the manufacturer's instructions.
16. Check flue for breaks and carryout O2 checks to confirm no spillage of products of combustion.
17. Check boiler is set to the correct gas type using parameter P5, whilst ensuring LPG boilers have the correct restrictor fitted at the fan.
18. If all the above have been checked and the fault remains, replace the PCB.

151 Description: Fan not detected/iR boiler flow error.

Cause: PCB not recognising fan via PWM or fan fault. If for 25 seconds, the RPM is not within tolerance the fault code 151 will be given. (Normally PCB at fault however follow the below to prove).

***If iR boiler flow switch has an open connection during the ignition - for guidance, see below fan speed table after point 5*.**

1. Reset boiler. If fault 151 appears again, replace PCB. If fault clears proceed to step 2.
2. Ensure **safe electrical isolation** and remove the PWM cable at the fan (4 wire connector). Re-establish power to the boiler and the fan should run at full speed.
3. If fan does not run, check for 230v from the PCB connector **X11, pins 1 & 2**. If no voltage, replace PCB.
4. If 230v present and fan did not run with PWM removed check wiring harness for continuity, if ok, replace fan.

Expected fan resistances from PWM connection. All pins on the 230v side normally show OL.

Pins 1 - 2	6 MΩ	Pins 2 - 3	15.97 KΩ	Pins 3 - 4	34.72 KΩ
Pins 1 - 3	8.62 MΩ	Pins 2 - 4	18.78 KΩ	x	x
Pins 1 - 4	5 MΩ	x	x	x	x

5. If the fan runs, check fan speed via the below table and **A menu, A9**. If no speed displayed replace PCB or if speed incorrect replace Fan.

Overview Parameter Settings i Boilers										Fan Speeds (A9 X 100)					
	P1 (P8=1)	P1 (P8=2)	P1 (P8=3)	P2 %	P3 %	P3 (ONE)	P9 setting	Service LMU		Natural Gas			LPG		
										MIN	MAX	CH	MIN	MAX	CH
iS12	100%	100%	100%	61%	61%	40%	0	1		1550	3150	3150	2500	2950	2950
iS15	100%	100%	100%	61%	61%	40%	0	2		1550	3750	3750	2500	3650	3650
iS18	100%	100%	100%	61%	61%	40%	0	3		1550	4450	4450	2500	4250	4250
iS24	100%	100%	100%	62%	61%	40%	0	4		1550	5800	5800	-	-	-
iS32	100%	100%	100%	72%	61%	40%	0	5		1450	5450	5450	3700	5100	5100
iS40	100%	100%	100%	90%	61%	40%	0	6		1450	6650	6650	3700	6300	6300
iR12	100%	100%	100%	61%	61%	-	0	1		1550	3150	3150	2500	2950	2950
iR18	100%	100%	100%	61%	61%	-	0	2		1550	3750	3750	2500	3650	3650
iR18	100%	100%	100%	61%	61%	-	0	3		1550	4450	4450	2500	4250	4250
iR24	100%	100%	100%	62%	61%	-	0	4		1550	5800	5800	-	-	-
iR32	100%	100%	100%	72%	61%	-	0	5		1450	5450	5450	3700	5100	5100
iR40	100%	100%	100%	90%	61%	-	0	6		1450	6650	6650	3700	6300	6300
iC24 (iCon1)	88%	88%	65%	62%	61%	40%	0	1		1550	6400	5800	-	-	-
iC28 (iCon1)	75%	75%	53%	62%	61%	40%	0	2		1550	7200	5800	-	-	-
iC36	78%	78%	55%	72%	61%	40%	0	3		1450	6600	5450	3700	6250	5100
iC40	70%	70%	47%	72%	61%	40%	0	4		1450	7150	5450	3700	6650	5100
iC Economiser 27	76%	76%	73%	62%	61%	40%	0	5		1550	7200	5850	-	-	-
iC Economiser 35	73%	73%	56%	72%	61%	40%	0	6		1500	6900	5450	3700	6400	5200
iC Economiser 39	69%	69%	50%	72%	61%	40%	0	7		1500	7200	5450	3700	6700	5200
iC24 (iCon2)	87%	87%	31%	62%	61%	40%	0	1	LPG	-	-	-	3700	4350	3900
iC28 (iCon2)	73%	73%	17%	62%	61%	40%	0	2	LPG	-	-	-	3700	4900	3900
iS24 (iCon2)	100%	100%	100%	62%	61%	40%	0	3	LPG	-	-	-	3700	3900	3900
iR24 (iCon2)	100%	100%	100%	62%	61%	-	0	4	LPG	-	-	-	3700	3900	3900
iC Economiser 27 (iCon2)	71%	70%	21%	62%	61%	40%	0	5	LPG	-	-	-	3750	5150	4050

P3 One is the bottom modulation range when a One is connected and no outside sensor

Propane iCon2

If iR boiler, pump has started and flow switch has made, then the flow has dropped out causing the flow switch to connection to break. Usually, system related.

1. Check the pump for air and vent the system if required.
    - Use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and then re-establish the power.
2. Check external pump operating properly/strong enough.
3. Check auto air vent is operating correctly and not contaminated with sludge.
4. Check all isolation valves on boiler and system are open.
5. Check system design.
6. Check system for blockages.
7. To check the flow switch, disconnect it from the boiler and using a multimeter across the connections, check for continuity when making the switch and OL when switch breaks. Only replace the flow switch when all the above has been checked and confirmed.

154 Description: Flow temp increases too fast and high ΔT.

Cause: System flow, pump, or sensor fault.

1. Check the system for an external heat source such as solar which may affect the return temperature.
2. Confirm flow and return temperatures using the **A menu, A0 & A1**.
3. Check T1 and T2 resistances in line with temperatures from flow and return temperatures found on page 67.
    - Take resistances at the PCB connector **X4, pins 1&2 (T1) and 3&4 (T2).** This checks the wiring harness continuity and connectors at same time.
    - Check wiring connectors are not loose or corroded**.**
    - Disconnect the connector from PCB to ensure no additional resistances are given through the PCB.
    - If readings incorrect, take resistance reading direct from sensor & replace sensor or wiring harness as required.
    - **Note sensors may need cleaning and not always replaced.**

4. On combi's, the diverter valve operation may be faulty, check as follows:
    - Safely isolate boiler from electrics.
    - Remove the motor from the three-way valve and see if the cartridge moves up and down.
    - If this doesn't move smoothly and seems to be sticking, replace the cartridge.
5. Check system pipework configuration correct.
6. Ensure all valves on the system and boiler are open.
7. Ensure all air is vented out of the boiler and system.
8. Check system pipework and filters for any blockages or restrictions.
9. Check all installation components are functioning correctly (mixing pumps and 2-way valves, etc.).
10. In the case of a combi, check the plate heat exchanger is not blocked.
11. Check for Voltage at the pump:
    - You can force the pump by removing the PWM cable to allow 230v cable to power pump at full speed.
    - If pump does not run via above test check, check 230v across PCB connectors **X9, pin 1, and X10 pin 2**. If no voltage present, replace PCB.
    - If voltage present check pins on pump PWM connector are not bent – straighten to fix if required, and check continuity of wiring harness.
    - Check the pump PWM via the 2-wire cable connection to the pump on PCB connector **X1 pin 1&2**:
        1. with the pump off the voltage is +/- 9VDC.
        2. On pump startup the voltage is +/- 1VDC.
        3. Pump overrun approx. 4.5VDC
        4. Normal running approx. 4.3VDC

    - If above DC voltages are incorrect, replace PCB.
    - If voltage to pump and all other checks are ok, replace pump.

Note If plastic pipes are used, they must be barrier pipes & UFH must comply with DIN4726-4729. If this is not the case, system separation must be provided as these pipes are porous & will allow air into the system.

164 Description: iR boiler Flow error.

Cause: flow switch has an open connection during the operation of the boiler or before starting up. Usually, system related.

1. Check the pump for air and vent the system if required.
    - Use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and then re-establish the power.
2. Check external pump operating properly/strong enough.
3. Check auto air vent is operating correctly and not contaminated with sludge.
4. Check all isolation valves on boiler and system are open.
5. Check system design.
6. Check system for blockages.
7. To check the flow switch, disconnect it from the boiler and using a multimeter across the connections, check for continuity when making the switch and OL when switch breaks. Only replace the flow switch when all the above has been checked and confirmed.

180 Description: Boiler is in chimney sweep (service) mode.

Cause: No fault. Chimney sweep will run for 15 minutes and clear. If doing this constantly, replace PCB.

181 Description: Boiler coming out of chimney sweep (service) mode.

Cause: No fault. This code shows when boiler comes out of chimney sweep mode. If doing this constantly, replace PCB.

SE Description: Time error

Cause: Timer needs reset via boiler display.

1. Push the DHW minus button, the Reset button, and the CH minus button simultaneously.

Spanner symbol Description: Blocking error or service mode.

Cause: The system pressure is low, or the boiler is in service mode. This will clear when the pressure is addressed, or the boiler is out of service mode.

Pump constantly running.

Cause: Frost protection active or pump PWM fault. Sometimes linked with 118 fault codes, if so PWM fault.

1. If a frost symbol is present in the boiler display, follow from point 2. If there is no frost symbol on the display, follow from point 4.
2. Check if boiler has been put into a manual frost protection. This can be turned off by pressing both minus buttons together for 6 seconds. The frost symbol should disappear. If not, proceed to step 3.
3. If the temperature is less than 5 °C, then the internal frost protection is active.
    i. Confirm the resistance of the T1 flow sensor as per the table on page 67 and replace as required.
    ii. Confirm the wiring harness continuity and contacts are ok. Replace if required.
    iii. If the above checks are OK, replace the PCB.
4. Check the PWM signal to the pump is ok by completing the following:
    a. Safely isolate the boiler and remove the PWM cable from the pump. Check the pins are not bent – if bent use a small screwdriver to straighten.
    b. Check pump position in relation to the PCB casing. If this is too close it can put pressure on the PWM connector causing a loose connection. This is usually diagnosed by bring the PCB housing down towards you and the pump may stop – adjust the pump position if required.

5. Check for Voltage at the pump:
    - You can force the pump by removing the PWM cable to allow 230v cable to power pump at full speed.
    - If pump does not run via above test check, check 230v across PCB connectors **X9, pin 1, and X10 pin 2**. If no voltage present, replace PCB.
    - If voltage present check pins on pump PWM connector are not bent – straighten to fix if required, and check continuity of wiring harness.
    - Check the pump PWM via the 2-wire cable connection to the pump on PCB connector **X1 pin 1&2**:
        I. with the pump off the voltage is +/- 9VDC.
        II. On pump startup the voltage is +/- 1VDC.
        III. Pump overrun approx. 4.5VDC
        IV. Normal running approx. 4.3VDC
6. If the voltages are incorrect, replace the PCB.
7. If the voltages are correct, replace the pump.

Blank display screen.

Cause: No power to boiler, internal fuses blown, display fault, PCB fault, fan or pump faults caused PCB to blow.

1. Check fuse at fused spur.
2. Check 230v into boiler.
3. Check continuity of fuses F1 & F2. Replace as required.
    - These fuses protect both the live and neutral circuits only and are not specific to components or internal circuits.
    - Note the boiler is not polarity sensitive however polarity must be correct for safety.
4. Check fan resistances per **151 fault code**. Replace fan as required.
    - PCB will also need changed as fan has taken out board.
5. If fan ok, check pump for smell of burning. Replace pump and PCB.
6. If fan and pump are ok, replace PCB.

Boiler heating – no demand & One Control connected.

Cause: Boiler is still operating with last command from controller, controller now lost signal to boiler.

1. Perform a factory reset on the controller by removing the controller from the wall. Then use a pen or small screwdriver and press the reset button on the rear of the controller.
2. If the reset does not work, replace the One Controller.

Error code on One Controller 002/003.

Cause: No fault **-** These codes show the boiler is in chimney sweep mode (service mode), the same as codes 180 & 181.

Random fault codes on One Controller.

Cause: Faulty battery or controller.

1. Check battery for swelling. If swollen, replace the battery.
2. If battery is OK, perform a factory reset on the controller by removing the controller from the wall. Then use a pen or small screwdriver and press the reset button on the rear of the controller.
3. If the reset does not work, replace the One Controller.

LMU Sub codes.

LMU sub codes that can be displayed on the plug-in digital programmer and description of the codes on the ONE controller and notifications that are shown on the app.

If an error code is still on the display of the boiler e.g., 129, then you can plug in the digital programmer to the blue BUS connection on the back of the board. If the error code has been reset and the display says 'OK' then you will not be able to see the error sub code.

So, when you plug in the digital programmer the boiler display will show e.g., 129 and the digital programmer will power up and display an error sub code e.g., 2, which in this case is 'Fan failure low rpm'. This means the rpm of the fan was too low and you just replace fan.

Therefore, the plug-in digital programmer can be used as a diagnostic tool to help indicate the fault on the boiler with the displayed sub codes.

***Codes on next 2 pages*.**

Errorcode ID115	Sub Code	Main Code	Description
ErrorCode_LMU_C_OT115_1	1	129	(129) Fan failure no signal
ErrorCode_LMU_C_OT115_10	10	119	(119) Flow protection short not mounted
ErrorCode_LMU_C_OT115_100	100	118	(118) Pump pressure increase too low
ErrorCode_LMU_C_OT115_101	101	117	(117) Pump pressure increase too high
ErrorCode_LMU_C_OT115_102	102	95	(95) Internal clock invalid
ErrorCode_LMU_C_OT115_103	103	151	(151) Clip-in pcb failure
ErrorCode_LMU_C_OT115_104	104	151	(151) Clip-in pcb failure
ErrorCode_LMU_C_OT115_105	105	151	(151) Clip-in pcb failure
ErrorCode_LMU_C_OT115_106	106	151	(151) Clip-in pcb failure
ErrorCode_LMU_C_OT115_107	107	151	(151) Eeprom failure, burner control unit error
ErrorCode_LMU_C_OT115_108	108	151	(151) Eeprom failure, burner control unit error
ErrorCode_LMU_C_OT115_109	109	151	(151) Eeprom failure, burner control unit error
ErrorCode_LMU_C_OT115_11	11	119	(119) Flow protection short not mounted
ErrorCode_LMU_C_OT115_110	110	151	(151) Gas valve relay failure
ErrorCode_LMU_C_OT115_111	111	151	(151) Gas valve relay failure
ErrorCode_LMU_C_OT115_112	112	151	(151) Gas valve relay failure
ErrorCode_LMU_C_OT115_113	113	151	(151) Eeprom failure, burner control unit error
ErrorCode_LMU_C_OT115_114	114	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_115	115	151	(151) False flame detection
ErrorCode_LMU_C_OT115_116	116	50	(50) DHW temperature sensor shorted
ErrorCode_LMU_C_OT115_117	117	50	(50) DHW temperature sensor open
ErrorCode_LMU_C_OT115_118	118	52	(52) DHW temperature sensor 2 shorted
ErrorCode_LMU_C_OT115_119	119	52	(52) DHW temperature sensor 2 shorted
ErrorCode_LMU_C_OT115_12	12	111	(111) Boiler water temperature too high.
ErrorCode_LMU_C_OT115_120	120	28	(28) Flue gas temperature sensor shorted
ErrorCode_LMU_C_OT115_121	121	28	(28) Flue gas temperature sensor open
ErrorCode_LMU_C_OT115_122	122	10	(10) Outdoor sensor shorted
ErrorCode_LMU_C_OT115_123	123	10	(10) Outdoor sensor open
ErrorCode_LMU_C_OT115_124	124	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_125	125	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_126	126	105	(105) Deaeration program activated
ErrorCode_LMU_C_OT115_127	127	156	(156) Power supply (voltage) too low
ErrorCode_LMU_C_OT115_13	13	20	(20) Flow temperature sensor shorted
ErrorCode_LMU_C_OT115_14	14	20	(20) Flow temperature sensor interrupted
ErrorCode_LMU_C_OT115_15	15	40	(40) Return temperature sensor shorted
ErrorCode_LMU_C_OT115_16	16	40	(40) Return temperature sensor interrupted
ErrorCode_LMU_C_OT115_17	17	180	(180) Commissioning mode active.
ErrorCode_LMU_C_OT115_18	18	181	(181) Burner off but call for heat.
ErrorCode_LMU_C_OT115_19	19	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_2	2	129	(129) Fan failure low rpm
ErrorCode_LMU_C_OT115_20	20	152	(152) Programming failure burner control unit system selection
ErrorCode_LMU_C_OT115_21	21	152	(152) Programming failure crosscheck max/min values
ErrorCode_LMU_C_OT115_22	22	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_23	23	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_24	24	61	(61) OpenTherm failure
ErrorCode_LMU_C_OT115_25	25	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_26	26	152	(152) Schedule failure
ErrorCode_LMU_C_OT115_27	27	154	(154) dT too high.
ErrorCode_LMU_C_OT115_28	28	154	(154) Return temperature higher than flow temperature
ErrorCode_LMU_C_OT115_29	29	151	(151) Return temperature too high: burner control reset needed
ErrorCode_LMU_C_OT115_3	3	151	(151) Fan failure, speed incorrect: check phase
ErrorCode_LMU_C_OT115_30	30	154	(154) Return temperature too high: burner control reset needed
ErrorCode_LMU_C_OT115_31	31	20	(20) Flow temperature sensor shorted: burner control reset needed
ErrorCode_LMU_C_OT115_32	32	20	(20) Flow temperature sensor open: burner control reset needed
ErrorCode_LMU_C_OT115_33	33	40	(40) Return temperature sensor shorted: burner control reset needed
ErrorCode_LMU_C_OT115_34	34	40	(40) Return temperature sensor open: burner control reset needed
ErrorCode_LMU_C_OT115_35	35	20	(20) Flow temperature sensor shorted
ErrorCode_LMU_C_OT115_36	36	20	(20) Flow temperature sensor open
ErrorCode_LMU_C_OT115_37	37	20	(20) Flow temperature sensor failure.
ErrorCode_LMU_C_OT115_38	38	20	(20) Flow temperature sensor failure.
ErrorCode_LMU_C_OT115_39	39	40	(40) Return temperature sensor shorted
ErrorCode_LMU_C_OT115_4	4	133	(133) No flame after safety time
ErrorCode_LMU_C_OT115_40	40	40	(40) Return temperature sensor open
ErrorCode_LMU_C_OT115_41	41	40	(40) Return temperature sensor failure.
ErrorCode_LMU_C_OT115_42	42	40	(40) Return temperature sensor failure.

Errorcode ID115	Sub Code	Main Code	Description
ErrorCode_LMU_C_OT115_43	43	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_44	44	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_45	45	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_46	46	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_47	47	110	(110) Safety limit temperature exceeded.
ErrorCode_LMU_C_OT115_48	48	0	(0) Burner control unit failure
ErrorCode_LMU_C_OT115_49	49	154	(154) Gradient failure, flow temperature increase exceeds limit
ErrorCode_LMU_C_OT115_5	5	110	(110) Safety limit temperature exceeded.
ErrorCode_LMU_C_OT115_50	50	154	(154) Gradient failure, flow temperature increase exceeds limit: burner control reset needed
ErrorCode_LMU_C_OT115_51	51	154	(154) Gradient failure, flow temperature increase too low: burner control reset needed
ErrorCode_LMU_C_OT115_52	52	0	(0) Burner control unit failure
ErrorCode_LMU_C_OT115_53	53	0	(0) Burner control unit failure
ErrorCode_LMU_C_OT115_54	54	0	(0) Burner control unit failure
ErrorCode_LMU_C_OT115_55	55	0	(0) Burner control unit failure
ErrorCode_LMU_C_OT115_56	56	0	(0) Burner control unit failure
ErrorCode_LMU_C_OT115_57	57	154	(154) dT too high.
ErrorCode_LMU_C_OT115_58	58	154	(154) dT too high.
ErrorCode_LMU_C_OT115_59	59	154	(154) dT too high: burner control reset needed
ErrorCode_LMU_C_OT115_6	6	61	(61) OpenTherm failure
ErrorCode_LMU_C_OT115_60	60	62	(62) OpenTherm failure
ErrorCode_LMU_C_OT115_61	61	152	(152) DHW temperature max setting incorrect
ErrorCode_LMU_C_OT115_62	62	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_63	63	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_64	64	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_65	65	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_66	66	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_67	67	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_68	68	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_69	69	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_7	7	110	(110) STB override interrupted
ErrorCode_LMU_C_OT115_70	70	50	(50) DHW temperature failure.
ErrorCode_LMU_C_OT115_71	71	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_72	72	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_73	73	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_74	74	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_75	75	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_76	76	152	(152) Programming failure.
ErrorCode_LMU_C_OT115_77	77	151	(151) Burner control unit failure
ErrorCode_LMU_C_OT115_78	78	110	(110) Safety limit temperature exceeded.
ErrorCode_LMU_C_OT115_79	79	61	(61) OpenTherm failure
ErrorCode_LMU_C_OT115_8	8	164	(164) Flow protection open
ErrorCode_LMU_C_OT115_80	80	61	(61) OpenTherm failure
ErrorCode_LMU_C_OT115_81	81	152	(152) Clip-in parameter failure
ErrorCode_LMU_C_OT115_82	82	151	(151) Clip-in pcb failure
ErrorCode_LMU_C_OT115_83	83	113	(113) Flue gas protection failure
ErrorCode_LMU_C_OT115_84	84	28	(113) Flue gas protection failure: burner control reset needed
ErrorCode_LMU_C_OT115_85	85	130	(130) Flue gas temperature too high: burner control reset needed
ErrorCode_LMU_C_OT115_86	86	130	(130) Flue gas temperature too high.
ErrorCode_LMU_C_OT115_87	87	78	(78) Water pressure not correct: burner control reset needed
ErrorCode_LMU_C_OT115_88	88	78	(78) Water pressure not correct.
ErrorCode_LMU_C_OT115_89	89	117	(117) Water pressure too high.
ErrorCode_LMU_C_OT115_9	9	164	(164) No water flow detected
ErrorCode_LMU_C_OT115_90	90	118	(118) Water pressure too low: burner control reset needed
ErrorCode_LMU_C_OT115_91	91	118	(118) Water pressure too low.
ErrorCode_LMU_C_OT115_92	92	151	(151) Clip-in pcb failure
ErrorCode_LMU_C_OT115_93	93	151	(151) Clip-in pcb failure
ErrorCode_LMU_C_OT115_94	94	148	(148) Internal failure
ErrorCode_LMU_C_OT115_95	95	81	(81) LPB short circuit or no communication.
ErrorCode_LMU_C_OT115_96	96	82	(82) LPB address collision.
ErrorCode_LMU_C_OT115_97	97	100	(100) Internal failure
ErrorCode_LMU_C_OT115_98	98	140	(140) LPB address not valid.
ErrorCode_LMU_C_OT115_99	99	152	(152) Programming failure.

ATAG i Series 2nd generation boiler fault finding.

Fault codes or error:

1 Fault	1 Fault	2 Fault	3 Fault	4 Fault	5 Fault	6 Fault	7 Fault	Other
1P1	106	201	3P9	411 to 416	5P1	612	701 to 706	Heat Generation Lock
1P2	107	203	303	420	5P2		711 to 716	Blank screen
1P3	108	205	304		5P3		722	Sensor resistances
1P4	109		306		5P6		723	Bus Address Collision
1P9	110		309		501		750	Boiler Stuck on Initializing
101	112				502			Pump always on.
102	114				504			Constant pump overrun (flow faults).
103	118							Zone manager & Zone Manager Light LED's
104	140							
105	141							

1P1, 1P2, 1P3, 101, 102, 103, 104, 105, 106, 107 Fault codes.

The fault code explanations for all the above fault codes are below, with the fault-finding guidance on page 22.

1P1 Description: Flow check 1 error

Cause: Change in the supply temperature between 7°C and 15°C degrees in 1 second. A rapid increase of the supply temperature can mean that the water flow over the boiler is falling sharply and can be an indication of overheating.

1P2 Description: Flow check 3 error

Cause: Flow temperature T1 – Return temperature T2 > 55°C.

1P3 Description: Flow check 4 error

Cause: The return sensor T2 measures a water temperature that is 10°C higher than the supply temperature**.**

101 Description: Over Temperature T1 or T2 Sensor Failure

Cause: The flow sensor T1 or Return sensor T2 > 100°C for 3 seconds.

103 Description: Flow check error 3 times

Cause: 3 times in 15 minutes flow check error ending with a 1P1 (rapid change of supply or return water temperature). A rapid increase in temperature can mean that the flow through the boiler drops sharply, which can result in overheating.

104 Description: Flow check 2 error

Cause: Very fast temperature change between 7°C and 15°C degrees within 1 second on the flow sensor T1 or the return sensor T2.

105 Description: Flow check 3 times wrong

Cause: Three flow check failures within 15 minutes ending with a 1P4 (pressure below 1 bar). Normally a T1 and T2 sensor error, ΔT rise to 37°C within 15 minutes.

106 Description: Flow check 3 times wrong

Cause: Three flow check failures within 15 minutes. The return temperature is more than 35°C higher than the flow temperature with the burner on. T2 temperature is 10°C higher than T1 for more than 20 seconds.

107 Description: Flow check 5 error

Cause: Normally a flow sensor T1 or return sensor T2 malfunction or an external heat source that Cause the return water temperature to rise. The sensor measures T2 – T1 > 35K (with burner on).

1P1, 1P2, 1P3, 101, 103, 104, 105, 106, 107 Fault codes.

1. Check the last 10 faults in the technical area for other pump or flow related faults to aid in diagnosis.
2. Check the system for an external heat source such as solar which may affect the return temperature.
3. Confirm flow and return temperatures, pump PWM rate using the customer info menu.
4. Check T1 and T2 resistances in line with temperatures from flow and return temperatures found on page 67.
    - Take resistances at the connector located on the bottom left of the PCB next to resistor **RL5, pins 1&2**. This checks the wiring harness continuity and connectors at same time.
    - Check wiring connectors are not loose or corroded**.**
    - Disconnect the connector from PCB to ensure no additional resistances are given through the PCB.
    - If readings incorrect, take resistance reading direct from sensor & replace sensor or wiring harness as required.
    - **Note sensors may need cleaning and not always replaced.**
5. Check the pump speed is correct via parameters **2.4.5 & 2.4.6**, adjust if required.
6. On combi's, the diverter valve operation may be faulty, check as follows:
    - Safely isolate boiler from electrics.
    - Remove the motor from the three-way valve and see if the cartridge moves up and down.
    - If this doesn't move smoothly and seems to be sticking, replace the cartridge.
7. Check system pipework configuration correct.
8. Ensure all valves on the system and boiler are open.
9. Ensure all air is vented out of the boiler and system.
10. Check system pipework and filters for any blockages or restrictions.
11. Check all installation components are functioning correctly (mixing pumps and 2-way valves, etc.).
12. In the case of a combi, check the plate heat exchanger is not blocked.
13. Check for Voltage at the pump. You can force the pump 'on' via 2 methods:
    - **Preferred method and safest** by using manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.
      or
    - By removing PWM cable to allow 230v cable to power pump at full speed.
    - If pump does not run via above tests check pins on pump not bent – straighten to fix and check continuity across wiring harness. If all ok and no voltage going to pump, then PCB fault.
    - If voltage to pump and all other checks are ok, replace pump.
14. If all the above checks are ok, PCB may be at fault.

Note If plastic pipes are used, they must be barrier pipes & UFH must comply with DIN4726-4729. If this is not the case, system separation must be provided as these pipes are porous & will allow air into the system.

1P4 Description: System pressure low.

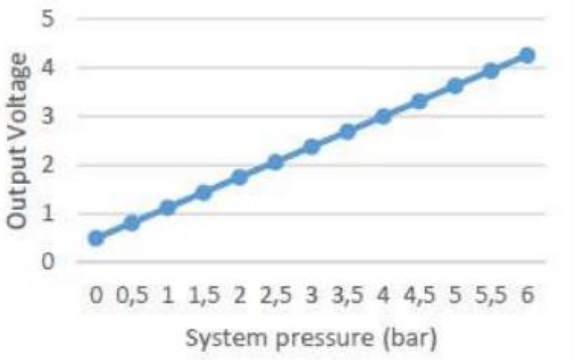
Cause: system pressure is below 1 bar; boiler continues to operate at a system pressure between 0.7 and 1 bar with a warning in the display.

1. Check pressure loss patterns with the consumer and if any work has been carried out on the system or boiler.
2. Check analogue and digital pressure readouts match. If these do not match add pressure to the system and check gauges read new pressure. Replace as required.
3. Check the heating system for leaks **(system needs to be cold and may need to be over pressured to force leak).**
4. Ensure adequate expansion for property.
5. Check the boiler for leaks including removal of the siphon to check heat exchanger for leaks.
6. Check the pressure relief valve for leakage.
7. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
8. Check expansion vessel pressure is set correctly as per the manufacturer's instructions, and check Shrader core for leakage.
    - Water in the expansion vessel may only be condensation and can be removed using the expansion vessel service procedure found on page 68.
    - Check expansion vessel not leaking, replace as required.
    - If the expansion vessel is of adequate size for the property, is not leaking and has been fully serviced but not holding pressure, replace the expansion vessel.
9. If no obvious leaks are found, isolate boiler from system and leave on test.
    - ***Note*** system must be cold, and pressure set to approx. 1.5 bar before isolating valves from boiler to system.
    - The time required for this test will depend on patterns and amount of pressure loss. (i.e., every 2 days etc.).

1P9 Description: No pump kick detected.

Cause: No pressure increase detected while the pump is running at full load for 5 seconds. This can be caused by air in the boiler, a blockage in the boiler, faulty pressure sensor or a faulty pump.

1. Check analogue and digital pressure readouts match.
    - If these do not match add pressure to the system and check digital gauge reads new pressure.
    - Clean sensor if contaminated or replace as required.
2. Use a multimeter to check the wiring harness to the water pressure sensor for continuity from PCB connector **CN12, pins 6, 7 & 8**, whilst checking connectors are tight and free from damage or corrosion.
    - Replace as required.
3. Check DC voltage from pressure sensor back to the PCB on connector **CN12, pins 7&8**. The voltage should be as per the table below. Clean or replace the sensor as required.

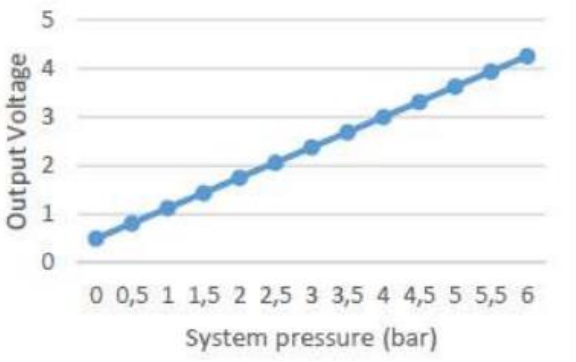


4. Check the pump for air and vent the system if required.
    - Use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and then re-establish the power.
5. Check auto air vent is operating correctly and not contaminated with sludge.
6. Check the operation and voltage of the pump with a demand.
   You can force the pump 'on' via 2 methods:
    - **Preferred and safest method** by using the manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.
      or
    - By removing PWM cable at the pump to allow the 230v cable to power the pump at full speed. To do this, ensure **safe electrical isolation** and then use a 4mm electrical screwdriver to push down the clip below the PWM connector and gently pull the connector out. Re-establish power to the boiler and the pump should run at full speed.
7. Confirm 230v from the PCB connector **CN2, pins 5&6**. If no voltage, replace PCB.
8. Check 230v supplied from the PCB to the pump connector. If voltage at pump connector, replace pump.
9. If no voltage at pump connector, use a multimeter to check the wiring harness for continuity from the PCB via connector **CN2, pins 5&6**, whilst checking connectors are tight and free from damage or corrosion. Replace as required.
10. If 230v side ok, check the pump PWM via the 3-wire cable connection to the pump on PCB connector **CN9 pin 1&2**:
    - with the pump off the voltage is +/- 5VDC.
    - 39% load the voltage is +/- 3VDC.
    - 61% load the voltage is +/- 1.9VDC.
    - 100% load the voltage is +/- 0.24VDC.
11. If the above voltages are correct, and the pump does not operate, replace the pump.
12. If the voltages are incorrect, replace the PCB.
13. Check expansion vessel pressure is set correctly as per the manufacturer's instructions.
14. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
15. Check the boiler for any blockages or restrictions.
16. After checking all the above points, switch off the power and back on again, allow the boiler to run automatically through the automatic venting program.
17. If the fault persists, replace the PCB.

102 Description: Pressure sensor defective

Cause: Pressure sensor outside the expected resistance value, open or short circuit.

1. Use a multimeter to check the wiring harness to the water pressure sensor for continuity from PCB connector **CN12, pins 6, 7 & 8**, whilst checking connectors are tight and free from damage or corrosion.
    - Replace as required.
2. Check DC voltage from pressure sensor back to the PCB on connector **CN12, pins 7&8**. The voltage should be as per the table below.



3. Drain the boiler and clean the pressure sensor or replace as required. **Note** water can still come out of the connection of the pressure sensor so protect underlying parts from this.
4. If the fault still occurs after replacing the sensor and confirming the wiring harness is ok, replace the PCB.

108 Description: Constant filling, water pressure too low, < 0.7 bar

Cause: System water pressure below 0.7 bar.

1. Check pressure loss patterns with the consumer and if any work has been carried out on the system or boiler.
2. Check analogue and digital pressure readouts match. If these do not match add pressure to the system and check gauges read new pressure. Replace as required.
3. Check the heating system for leaks **(system needs to be cold and may need to be over pressured to force leak).**
4. Ensure adequate expansion for property.
5. Check the boiler for leaks including removal of the siphon to check heat exchanger for leaks.
6. Check the pressure relief valve for leakage.
7. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
8. Check expansion vessel pressure is set correctly as per the manufacturer's instructions, and check Shrader core for leakage.
    - Water in the expansion vessel may only be condensation and can be removed using the expansion vessel service procedure found on page 68.
    - Check expansion vessel not leaking, replace as required.
    - If the expansion vessel is of adequate size for the property, is not leaking and has been fully serviced but not holding pressure, replace the expansion vessel.

9. If no obvious leaks are found, isolate boiler from system and leave on test.
    - ***Note*** system must be cold, and pressure set to approx. 1.5 bar before isolating valves from boiler to system.
    - The time required for this test will depend on patterns and amount of pressure loss. (i.e., every 2 days etc.).

109 Description: Constant filling, water pressure too high, > 3.0 bar

Cause: System water pressure higher than 3.0 bar.

1. Check filling loop is turned off and not passing, replace as required.
2. Check for secondary filling loops in the system and check as per point 1.
3. For combi's check main water pressure not passing back through plate heat exchanger by isolating cold main into boiler.
4. Ensure adequate expansion for property.
5. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
6. Check expansion vessel pressure is set correctly as per the manufacturer's instructions, and check Shrader core for leakage.
    - Water in the expansion vessel may only be condensation and can be removed using the expansion vessel service procedure found on page 68.
    - Check expansion vessel not leaking, replace as required.
    - If the expansion vessel is of adequate size for the property, is not leaking and has been fully serviced but not holding pressure, replace the expansion vessel.
7. On rare occasions unvented cylinders may pass back to the central heating via a burst coil. Isolate the mains to confirm.

110 Description: Flow sensor defective

Cause: The flow sensor T1 value out of range.

1. Check full T1 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check if T1 sensor resistances are in line with the flow temperatures.
    - The flow temperature can be identified using the customer information menu.
    - The resistances can be taken at the connector at the PCB (located on the bottom left of the PCB next to resistor **RL5, pins 3&4**). This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB. Resistances are found on page 67.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault.

    Note thermistors may need cleaned and not always replaced.
3. If error 110 remains after the above has been checked, replace PCB.

112 Description: Return sensor defective

Cause: The return sensor T2 value out of range.

1. Check full T2 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check T2 sensor resistances are in line with the return temperatures.
    - The return temperature can be identified using the customer information menu.
    - The resistances can be taken at the connector at the PCB (located on the bottom left of the PCB next to resistor **RL5, pins 1&2**). This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB. Resistances are found on page 67.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault.

    Note thermistors may need cleaned and not always replaced.
3. If error 112 remains after the above has been checked, replace PCB.

114 Description: Outside sensor absent

Cause: Outside sensor not present, short-circuited, broken or values outside specifications.

1. If using ATAG One Zone with internet weather:
    - Check Wi-Fi signal & re-connect if required.
    - If Wi-Fi has failed, change thermoregulation to 2, via parameter **4.2.1**. When the WI-FI is re-established, parameter **2.4.1** can be changed back to 4.
2. If internet weather is not being used, check if outdoor sensor is in use with boiler.
3. If an outside sensor is fitted and code 114 appears on the boiler, check the following:
    - Check the resistance of the outdoor sensor as per the table on page 67 and replace as required.
    - Check whether the cables for the outdoor sensor are connected to the boiler.
    - Check that the cable is not damaged, broken or has any poor contacts. **Use a multimeter to confirm continuity of the cables.** Replace harness as required.
    - Check whether the outdoor sensor is mounted in such a way that it is not affected by weather influences (sunlight, snow, etc.).
4. Check parameter **4.2.1** is set to the desired thermoregulation value. Adjust as required and restart boiler by turning off electricity supply for 5 seconds and then back on again.
5. If code 114 still appears:
    a. Carry out factory reset of the PCB in parameter 2.8 ***Important* The boilers parameters will need reset. If LPG, then the Eprom chip will need to be used to set up the boiler again.**
    b. If error 114 remains after confirming the outdoor sensor and cables are ok, and/or carrying out the factory reset, replace the PCB.

118 Description: Flow and return probe plausibility checks failed.

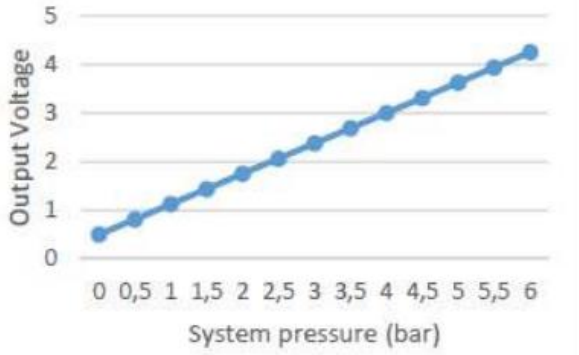
Cause: Incorrect flow and return sensor readings, usually where the flow and returns are reversed.

1. Check system design and alter as required.
2. Use customer information menu or parameter 8.3 to check flow and return temperatures.
3. Check T1 & T2 sensor readings as per the table on page 67. Replace as required.
4. Check harness and connectors are ok, using multimeter to confirm continuity. Replace harness as required.
5. If the above checks are ok, replace the PCB.

140 Description: Working pressure test error 2 times (pump kick)

Cause: No pressure increase while the pump is running at full load for 5 seconds. This can be caused by air in the boiler, a blocked or faulty pressure sensor or a faulty pump. The pressure increase by the pump must be at least 0.1 bar.

1. Check analogue and digital pressure readouts match.
   - If these do not match add pressure to the system and check digital gauge reads new pressure.
   - Clean sensor if contaminated or replace as required.
2. Use a multimeter to check the wiring harness to the water pressure sensor for continuity from PCB connector **CN12, pins 6, 7 & 8**, whilst checking connectors are tight and free from damage or corrosion.
   - Replace as required.
3. Check DC voltage from pressure sensor back to the PCB on connector **CN12, pins 7&8**. The voltage should be as per the table below. Clean or replace the sensor as required.



4. Check the pump for air and vent the system if required.
   - Use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and then re-establish the power.
5. Check auto air vent is operating correctly and not contaminated with sludge.
6. Check the operation and voltage of the pump with a demand.

You can force the pump 'on' via 2 methods:

- **Preferred and safest method** by using the manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.

  or

- By removing PWM cable at the pump to allow the 230v cable to power the pump at full speed. To do this, ensure **safe electrical isolation** and then use a 4mm electrical screwdriver to push down the clip below the PWM connector and gently pull the connector out. Re-establish power to the boiler and the pump should run at full speed.

7. Confirm 230v from the PCB connector **CN2, pins 5&6**. If no voltage, replace PCB.
8. Check 230v supplied from the PCB to the pump connector. If voltage at pump connector, replace pump.
9. If no voltage at pump connector, use a multimeter to check the wiring harness for continuity from the PCB via connector **CN2, pins 5&6**, whilst checking connectors are tight and free from damage or corrosion. Replace as required.
10. If 230v side ok, check the pump PWM via the 3-wire cable connection to the pump on PCB connector **CN9 pin 1&2**:
    - with the pump off the voltage is +/- 5VDC.
    - 39% load the voltage is +/- 3VDC.
    - 61% load the voltage is +/- 1.9VDC.
    - 100% load the voltage is +/- 0.24VDC.
11. If the above voltages are correct, and the pump does not operate, replace the pump.
12. If the voltages are incorrect, replace the PCB.
13. Check expansion vessel pressure is set correctly as per the manufacturer's instructions.
14. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
15. Check the boiler for any blockages or restrictions.
16. After checking all the above points, switch off the power and back on again, allow the boiler to run automatically through the automatic venting program.
17. If the fault persists, replace the PCB.

141 Description: no flow detected (Regular boiler only).

.

Cause: The flow switch has an open circuit after 5 seconds of operation; 7 l/m +/-10% flow is required to make the circuit.

A good flowing system will deliver around 20 L/min.

1. Check if happening on CH or HW, or both, and/or on pump over run to help diagnosis.
2. Check the pump is wired directly into the boiler's green connector.
    - If wired externally to the boiler, the pump overrun will not function. Re-wire as required.
3. Check the pump is of suitable size for the system and boiler resistance (index circuit).
4. Check pump type – i.e., is it a modulating pump. This may affect the operation.
5. Check pump speed.
    - If older pump, it may have weakened. Check the pump by removing the bleed screw and stopping the impeller with a screwdriver.
    - Check the resistance of the pump which should be approximately 150 Ohms.
    - Replace pump as required.
6. Check bypass is of suitable size to function correctly on pump overrun.
7. Check system configuration of open vent and cold feed pipework is correct.
8. Check all isolation valves and TRV's are open, and filters not blocked.
9. Check for air in the system, vent air if required.
10. If system full of air, temporarily link out flow switch and allow pump to help clear air.

11. Check flow and return pipes not reversed.
12. Check system for blockages and remove.
13. Remove flow switch and check continuity when making and breaking the switch manually. Replace flow switch as required.
14. Use a multimeter to check the wiring harness to the flow switch for continuity from PCB connector **CN12, pins 9 & 10,** whilst checking connectors are tight and free from damage or corrosion. Replace harness as required.
15. Loosening the flow switch and turn so arrow on the end points to 11 or 1 o'clock can allow better movement of the paddle to detect the flow.

201 Description: T3 Hot water sensor defective.

Cause: The values of the T3 hot water sensor outside specifications (iC & iCE boilers only).

1. Check full T1 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check if T3 sensor resistances are in line with the return temperatures and per the table on page 67.
    - The return temperature can be identified using the customer information menu.
    - The resistances can be taken at the connector at the PCB **CN12, pins 1&2**. This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault.

    Note thermistors may need cleaned and not always replaced.
3. If 201 appears on a non-combi boiler, check parameter **2.2.8** and change the setting if required. Restart the boiler from the power supply.
4. If changing the parameter does not work, carry out a factory reset on the PCB using parameter **2.8.0**. If this does not work, replace the PCB.

203 Description: T3 Hot water sensor defective.

Cause: The values of T3 boiler sensor out of specification (iS & iR boilers only).

1. Check the Hot water priority DHW NTC sensor is connected to the boiler.
2. Check the boiler sensor wires for loose contacts and breaks.
3. If the cable has been extended, check the wires at the junction box/block connector.
4. Check if the sensor is installed correctly.
5. Check the resistance of the sensor per the table on page 67 from the yellow DHW connector at the boiler and replace if required.
6. If after changing the sensor, the fault does not clear, carry out a factory reset on the PCB using parameter **2.8.0**. If this does not work, replace the PCB.
7. If no sensor is fitted to the boiler, check parameter **2.2.8** and change the setting if required. Restart the boiler from the power supply.

8. If changing the parameter does not work, carry out a factory reset on the PCB using parameter **2.8.0**. If this does not work, replace the PCB.

205 Description: Solar water sensor defective.

Cause: (Very unlikely to see) The values of solar sensor out of specification. (10k OHM sensor is used for solar).

1. Check the Solar NTC sensor is connected to the boiler.
2. Check the boiler sensor wires for loose contacts and breaks.
3. If the cable has been extended, check the wires at the junction box/block connector.
4. Check if the sensor is installed correctly.
5. Check the resistance of the sensor per the table on page 67 from the solar connector at the boiler and replace if required. (10k sensor for solar).
6. If after changing the sensor, the fault does not clear, carry out a factory reset on the PCB using parameter **2.8.0**. If this does not work, replace the PCB.
7. If no sensor is fitted to the boiler replace the PCB.

3P9 Description: Maintenance Alert

Cause: Parameter 8.5.0 Months before next maintenance counter has expired.

The maintenance message can be enabled with parameter 8.5.1 and set from 1 to 60 months in 8.5.0. When the time has elapsed, the maintenance message appears on the display.

1. Check service dates with the customer and ensure the boiler has been serviced in the correct timeframe for warranty.
    - Go to the service area by accessing the technical menu.
    - Select Configuration wizard, Boiler 1, Service Options, Months remaining before service = time remaining on service schedule.
2. Advise customer to call their installer to complete a boiler service.
3. After boiler serviced, the engineer will need to reset the service reminder flag.
4. To reset the service reminder flag:
    - Go to the service area by accessing technical menu (007).
    - Select Configuration wizard, Boiler 1, Service Options, Main warning reset.
    - This will reset the countdown timer for the service reminder to the time stated in the menu 'Months remaining before service, default value = 12 months.
5. If necessary, the maintenance alert can be turned off when in the Service options screen by selecting Enable Service Warnings, then select no.

303 Description: PCB Error

Cause: The PCB has a software or hardware error.

1. Check boiler polarity and voltages are correct.
2. Check boiler is properly earthed using an earth loop impedance tester.
3. Check all connectors on the PCB for loose or broken contacts. Replace as required.
4. If code 303 remains, replace the PCB.

304 Description: Reset too often.

Cause: The reset button has been pressed too many times to clear a fault, more than 5 times in 15 minutes**.**

1. Wait 15 minutes and reset the boiler.
2. Switch off the boiler from the fused spur, wait 5 seconds and re-establish the electricity supply.
3. If this does not help after a couple of attempts, replace the PCB.

306 Description: PCB defective

Cause: PCB defective.

1. Check boiler polarity and voltages are correct.
2. Check boiler is properly earthed using an earth loop impedance tester.
3. Check all connectors on the PCB for loose or broken contacts. Replace as required.
4. If code 306 remains, replace the PCB.

309 Description: Gas valve relay control error

Cause: Flame signal detected after the gas valve has been de-energized.

1. Check whether the boiler is properly earthed using an earth loop impedance tester.
2. Check the ionisation pin condition and the ionisation cable for a short circuit. Replace as required.
3. Check if the flame remains after the demand has ended and if there is still voltage on the gas valve. If so, replace the PCB.
4. If no voltage at the gas valve and the flame remains, replace the gas valve.
5. Check all wiring and connectors to the gas valve and PCB for loose contacts and breaks and check continuity of wires using a multimeter. Replace as required.
6. Check the gas valve and PCB connectors for traces of moisture and corrosion, replace as required. Determine where the moisture comes from and fix the issue. Potential causes: POC recirculation, leaking air vent, etc.
7. If intermittent and all other checks OK, replace the PCB.

411 to 416 Description: Faulty Room Sensor

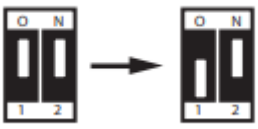
Cause: The ATAG One Zone or Cubes for the specified zone are incorrectly set or faulty. The zones are highlighted via the 3rd number of the fault code i.e., 411 is zone 1, 412 is zone 2 and so on up to zone 6, 416. Room Sensors are either ATAG One Zone controllers or Cubes only. No other 3rd party thermostat will act as a 'room sensor' into the boiler.

1. The Zone assignment must be correct on the ATAG control, so One Zone or Cube zone assignment must correspond to the zone parameter in question. i.e., zone 1 thermostat = zone 1 parameter **4.2.1**, zone 2 thermostat = **5.2.1**. The full 6 zones are shown below.
    - 4.2.1 for zone 1.
    - 5.2.1 for zone 2.
    - 6.2.1 for zone 3.
    - 14.2.1 for zone 4.
    - 15.2.1 for zone 5.
    - 16.2.1 for zone 6
2. Check PCB settings for configuration issue. Where a zone parameter has been configured incorrectly for the heating control equipment used.
3. Check the Thermoregulation is set correctly in the technical area using the above parameters. This parameter can be set to 2 or 4 if One Zone or Cube is fitted.
4. Other 3rd party thermostats must have this parameter set to either 0, on/off fixed flow temp, or 3 for weather comp with on/off. If 3 is selected an outside sensor must be fitted as well.

420 Description: ATAG zone supply overload.

Cause: When using ATAG Zone managers or pump modules, A "BUS supply overload" error may appear when three or more devices supplying power to the BUS are connected to the system.

1. To rectify this error, microswitch 1 on the PCB of one of the Zone Managers, or pump modules must be switched from ON to OFF.



5P1, 5P2, 5P3, 5P6, 501 & 504 Fault codes.

The fault code explanations for all the above fault codes are below, with the fault-finding guidance directly after and on the next page.

5P1 Description: 1st ignition attempt error

Cause: No flame detection on the 1st ignition attempt. No ionisation >0.8 µA detected on first start attempt. 2nd launch is successful. Check ionisation current on ignition via customer information menu or parameter **8.7.5**.

5P2 Description: 2nd ignition attempt error

Cause: No flame detection on 2nd ignition attempt. No ionisation > 1µ detected during the first 2 start attempts. The boiler ignited during the 3rd, 4th or 5th start attempt. Check ionisation current on ignition via parameter **8.7.5**.

5P3 Description: Flame lift

Cause: Flame loss when the boiler is in operation; boiler ignited correctly, and the ionisation current is cut off after the safety time. Check ionisation current during operation is >0.5µA via customer information menu or parameter **8.7.5**.

5P6 Description: No flame

Cause: Boiler has failed to ignite after 5 attempts.

501 Description: No Flame Detected

Cause: No flame or ionisation current > 0.5µA during 5 consecutive start attempts of the same heat demand.

504 Description: Flame lift from burner.

Cause: Flame goes out during burning, burner ignited successfully but ionisation drops out after safety time.

1. Check condensate pipe is clear of blockages and is running freely. Clear as required.
2. Check 240v at gas valve, connections 1 & 3.
    a. If the voltage is correct, move to step 3.
    b. If there is no voltage at the gas valve, check the PCB is sending 240v to the gas valve from connector **CN2, pins 1 & 2**. Replace PCB if there is no voltage.
    c. If voltage is supplied from the PCB, check the condition of the wiring harness and connectors. Use a multimeter to confirm continuity throughout the cables. Replace harness if faulty.
3. Check the working pressure at the P1 test point of the gas valve with all gas appliances in the house fully on. The WP must be no less than 4mb under that of the WP at the gas meter for NG or 2.5mb for LPG.
    a. If WP at the meter is under 19mb call National grid or local network to investigate the issue.

    b. If under pressure at the boiler, investigate secondary isolation valves, pipe sizing or shale/debris, etc. in gas pipe.
4. If the working pressure is correct, check the following:
5. Check ionisation current is between 0.8µA & 4µA using the customer information menu or parameter **8.7.5**.
6. If ionisation current is ok, proceed to step 7.
    a. If ionisation current is too low, check earthing in house with an earth loop impedance tester.
    b. If earthing in the property is ok, move to step 8.
7. Check 240v at the ignition transformer, connections **1 & 2** (black wires).
    a. If the voltage is correct, move to step 8.
    b. If voltage is incorrect at the ignition transformer, check the PCB is sending 240v to the ignition transformer from connector **CN2, pins 3 & 4**. Replace PCB if there is no voltage.
    c. If voltage is supplied from the PCB, check the condition of the wiring harness and connectors. Use a multimeter to confirm continuity throughout the cables. Replace harness if faulty.
8. Check voltage from the transformer to the electrodes. Using a multimeter, check for between 60-100 volts AC between both outlet connections of the transformer to an earth connection (the 100 volts should be on initial startup and then settle to approx. 60V). If voltage incorrect replace transformer or if voltage correct, proceed to step 9.
9. Check the spark gap and condition of the electrodes, including the ionisation electrode. The spark electrodes should have a 3 – 4mm spark gap and be clean. Adjust spark gap and clean electrodes with a fine sandpaper if required. If still fails after cleaning and adjustment or is worn out, replace electrodes.
10. Check if the CO/CO2 values are correct.
11. Check the condition of the burner for any debris or cracks, clean or replace as required.
12. Check the non-return valve in the fan is operating correctly, replace as required.
13. Check heat exchanger flue ways are clear of debris. Clean with a soft brush and vacuum cleaner as required.
14. Check boiler for recirculation of products of combustion and repair as required.
15. Check flue length and configuration is correct as per the manufacturer's instructions.
16. Check flue for breaks and carryout O2 checks to confirm no spillage of products of combustion.
17. Check boiler is set to the correct gas type using parameter **2.0.2**, whilst ensuring LPG boilers have the correct restrictor fitted at the fan.
18. Check whether the height compensation (altitude setting) is set correctly and adjust via parameter **2.0.4** if necessary.
19. If all the above have been checked and the fault remains, replace the PCB.

502 Description: Incorrect Flame Detected

Cause: Flame detected during starting procedure before gas valve was open.

1. Check if there is a flame before the click comes from the gas valve. If a flame is present, the gas valve is passing. Replace the gas valve.
2. If there is no flame, check the ionisation electrode and cable for a short circuit.
3. If there is no short circuit, replace the PCB.

612 Description: Fan Failure

Cause: Fan speed outside the expected range.

1. If the boiler can be reset, check the fan speed via the customer information menu or via parameter **8.2.2**.

   The fan speeds and approximate resistances are below:

	Fan Speeds					
	Natural Gas			LPG		
	MIN	MAX	CH	MIN	MAX	CH
i15S	1550	3600	3600	2400	3500	3500
i18S	1550	4250	4250	2400	4100	4100
i24S	1550	5800	5800	2400	5150	5150
i32S	1500	5500	5500	3700	5100	5100
i40S	1500	6700	6700	3700	6300	6300
i15R	1550	3600	3600	2400	3500	3500
i18R	1550	4250	4250	2400	4100	4100
i24R	1550	5800	5800	2400	5150	5150
i32R	1500	5500	5500	3700	5100	5100
i40R	1500	6700	6700	3700	6300	6300
i24C	1550	6350	5750	2400	5900	5160
i28C	1550	7100	5710	2400	6700	5150
i36C	1500	6650	5500	3700	6250	5100
i40C	1500	7150	5520	3700	6650	5100
iC Economiser 27 Plus	1650	7200	5800	2250	7200	5170
iC Economiser 35 Plus	1650	7100	5750	3850	6650	5480
iC Economiser 39 Plus	1650	7200	5750	3850	6950	5460

2. Check fan resistances and replace fan if not within limits below:

Normal fan resistance readings below.

Pins 1-2	OL	Pins 2-3	14.93kΩ	Pins 3-4	OL	Pins 4-5	OL
Pins 1-3	OL	Pins 2-4	79.9kΩ	Pins 3-5	OL	x	x
Pins 1-4	OL	Pins 2-5	OL	x	x	x	x
Pins 1-5	26 Ω	x	x	x	x	x	x

3. Check all connectors and wiring between the fan and the PCB for loose contacts, damage, moisture, and breakages. Use a multimeter to check continuity across each wire. Replace harness if required.
4. Check the flue installation complies with the manufacturer's installation instructions.
5. Check whether the height compensation (altitude setting) is set correctly and adjust via parameter **2.0.4** if necessary.
6. Remove the fan and check the impeller for free-running and contamination.
7. Check the burner and the heat exchanger condition and for any contamination. Clean or replace as required.
8. If the above is ok, replace the PCB.

701 to 706 Description Zone Flow temperature sensor fault.

Cause: The flow sensor on the specified zone is faulty. The individual zones faults are identified as 701 for zone 1, 702 for zone 2, and so on up to zone 6, 706.

1. Check the continuity of the sensor and replace the sensor if necessary.
2. Check the condition of the connections and wiring from the sensor concerned to the PCB. Use a multimeter to confirm continuity through the cables. Replace cables as required.
3. If the cables and the sensor are ok, replace zone manager.

711 to 716 Description Zone Return temperature sensor fault.

Cause: The return sensor on the specified zone is faulty. The individual zones faults are identified as 711 for zone 1, 712 for zone 2, and so on up to zone 6, 716.

1. Check the continuity of the sensor and replace the sensor if necessary.
2. Check the condition of the connections and wiring from the sensor concerned to the PCB. Use a multimeter to confirm continuity through the cables. Replace cables as required.
3. If the cables and the sensor are ok, replace zone manager.

722 Description Zone 2 overheating.

Cause: The Zone Manager ST2 overheat thermostat has tripped. **Note** if 2 zone managers have been used together, the fault may be in either zone manager and is not individually defined**.**

1. Check the link and its connection to the "ST2" terminal block on the module.
2. Check the maximum heating temperature setting for Zone 2 or 4 via parameter **5.2.5** or **15.2.5**.
3. Check the connection of the safety thermostat to the "ST2" terminal block on the module.
4. Check the wiring harness and connectors if a safety thermostat is in use. Replace as required.
5. Check for continuity over the thermostat and replace as required.
6. If the above is all ok, replace the zone manager.

723 Description Zone 3 overheating.

Cause: The Zone Manager ST3 overheat thermostat has overheated. **Note** if 2 zone managers have been used together, the fault may be in either zone manager and is not individually defined.

1. Check the link and its connection to the "ST3" terminal block on the module.
2. Check the maximum heating temperature setting for Zone 3 or 6 via parameter **6.2.5** or **16.2.5**.
3. Check the connection of the safety thermostat to the "ST3" terminal block on the module.
4. Check the wiring harness and connectors if a safety thermostat is in use. Replace as required.
5. Check for continuity over the thermostat and replace as required.
6. If the above is all ok, replace the zone manager.

750 Description ZM undefined hydraulic scheme

Cause: Issue with the zone manager hydraulic settings**.**

The zone manager(s) need defined. Use parameter **7.2.0** for zone manager 1 and parameter **7.5.0** for zone manager 2. Use the guide below to set correctly.

0 = Not defined - DO NOT USE.
1 = N/A – DO NOT USE.
2 = Mixed heating circuit module II.
3 = Mixed heating circuit module III
4 = N/A
5 = Direct heating circuit module II
6 = Direct heating circuit module III

Heat Generation Lock

Cause: External safety contact open circuit.

1. Check the link wire in the white connector (External safety contact) volt free connection on the side of the PCB. If missing or damaged, replace the connector and link.
2. If a condensate pump safety switch has been wired into the white connector, check the operation of the condensate pump discharge.
3. Check the condensate pump is discharging and the float is moving freely.
4. Check the safety switch of the pump. Free off or replace pump as required.
5. Check the cables and connectors from the condensate pump to the boiler. Use a multimeter to confirm continuity. Replace as required.
6. If the above is all ok, replace the boiler PCB.

Blank display screen.

Cause: Screen set to off, or no power to boiler, internal fuses blown, display fault, PCB fault, fan or pump faults caused PCB to blow.

1. Press ok button. If screen lights up continue with the below, if not, go to point 2.
    - Press OK again to enter the customer menu.
    - Select Summer/Winter/Off.
    - Change the setting to Summer/Winter or Heating only as required.
2. Check fuse at fused spur.
3. Check 230v into boiler.
4. Check continuity of fuses F1 & F2. Replace as required.
    - These fuses protect both the live and neutral circuits only and are not specific to components or internal circuits.
    - Note the boiler is not polarity sensitive however polarity must be correct for safety.
5. Check fan resistances per **612 fault code**. Replace fan as required.
    - PCB will also need changed as fan has taken out board.
6. If fan ok, check pump for smell of burning. Replace pump and PCB.
7. If fan and pump are ok, replace PCB.

Bus address collision.

Cause: ATAG controls incorrectly wired or wrong zone assigned.

1. Ensure wires from the ATAG Zone Managers and Cube controls match the boiler B & T BUS connectors. (The One Zone is not polarity sensitive).
2. Ensure the ATAG controls are set to the correct zone.

Boiler stuck on Initializing.

Cause: Communication error with controls.

1. Check OpenTherm controller not fitted to orange BUS connector. If so, fit to blue OT bus connector and restart boiler.
2. Remove all low volt/volt free controls and after powering up reconnect the controls.

Pump constantly running.

Cause: Frost protection active or pump PWM fault. Sometimes linked with **109 & 140** fault codes, if so PWM fault.

1. If a frost symbol is present in the boiler display, follow from point 2. If there is no frost symbol on the display, follow from point 3.
2. Press OK to access the user menu.
    a. Select Complete menu and then CH settings.
    b. Scroll to Pump continuous running.
    c. If Enabled is highlighted, frost protection can be turned off by selecting Disabled.
    d. If this function is already Disabled, or the frost symbol still appears after selecting Disabled, check the flow temperature of the boiler via parameter **8.3.1**. If the temperature is less than 8 °C, then the internal frost protection is active.
        i. Confirm the resistance of the T1 flow sensor as per the table on page 67 and replace as required.
        ii. Confirm the wiring harness continuity and contacts are ok. Replace if required.
        iii. If the above checks are OK, replace the PCB.
3. Check the PWM signal to the pump is ok by completing the following:
    a. Safely isolate the boiler and remove the PWM cable from the pump. Check the 3 pins are not bent – if bent use a small screwdriver to straighten.
    b. Check pump position in relation to the PCB casing. If this is too close it can put pressure on the PWM connector causing a loose connection. This is usually diagnosed by bring the PCB housing down towards you and the pump may stop. – adjust the pump position if required.
    c. Check the pump PWM via the 3-wire cable connection to the pump on PCB connector **CN9 pin 1&2**:
        1. with the pump off the voltage is +/- 5VDC.
        2. 39% load the voltage is +/- 3VDC.
        3. 61% load the voltage is +/- 1.9VDC.
        4. 100% load the voltage is +/- 0.24VDC.
    d. If the voltages are incorrect, replace the PCB.
    e. If the voltages are correct, replace the pump.

ATAG i Series 3rd generation boiler fault finding.

Fault codes or error:

1 Fault	1 Fault	2 Fault	3 Fault	4 Fault	5 Fault	6 Fault	7 Fault	Other
1P1	110	201	3P9	411 to 416	5P1	612	7P1	Heat Generation
1P2	112	203	303	420	5P2		701 to 706	Lock
1P3	114	205	304		5P3		711 to 716	Blank screen
1P4	118		306		5P6		722	Pump Lights
1P9	140		309		501		723	Sensor resistances
101	141				502		750	Bus Address Collision
102	142				504			Boiler stuck on Initializing
103	143							Pump always on.
104	144							Constant Pump Active (usually with 7P1).
105	145							Zone manager & Zone Manager Light LED's.
106								
107								
108								
109								

1P1, 1P2, 1P3, 101, 102, 103, 104, 105, 106, 107 Fault codes.

The fault code explanations for all the above fault codes are below, with the fault-finding guidance on page 43.

1P1 Description: Flow check 1 error

Cause: Change in the supply temperature between 7°C and 15°C degrees in 1 second. A rapid increase of the supply temperature can mean that the water flow over the boiler is falling sharply and can be an indication of overheating.

1P2 Description: Flow check 3 error

Cause: Flow temperature T1 – Return temperature T2 > 55°C.

1P3 Description: Flow check 4 error

Cause: The return sensor T2 measures a water temperature that is 10°C higher than the supply temperature**.**

101 Description: Over Temperature T1 or T2 Sensor Failure

Cause: The flow sensor T1 or Return sensor T2 > 100°C for 3 seconds.

103 Description: Flow check error 3 times

Cause: 3 times in 15 minutes flow check error ending with a 1P1 (rapid change of supply or return water temperature). A rapid increase in temperature can mean that the flow through the boiler drops sharply, which can result in overheating.

104 Description: Flow check 2 error

Cause: Very fast temperature change between 7°C and 15°C degrees within 1 second on the flow sensor T1 or the return sensor T2.

105 Description: Flow check 3 times wrong

Cause: Three flow check failures within 15 minutes ending with a 1P4 (pressure below 1 bar). Normally a T1 and T2 sensor error, ΔT rise to 37°C within 15 minutes.

106 Description: Flow check 3 times wrong

Cause: Three flow check failures within 15 minutes. The return temperature is more than 35°C higher than the flow temperature with the burner on. T2 temperature is 10°C higher than T1 for more than 20 seconds.

107 Description: Flow check 5 error

Cause: Normally a flow sensor T1 or return sensor T2 malfunction or an external heat source that

Cause the return water temperature to rise. The sensor measures T2 – T1 > 35K (with burner on).

1P1, 1P2, 1P3, 101, 103, 104, 105, 106, 107 Fault codes.

1. Check the last 10 faults in the technical area for other pump or flow related faults to aid in diagnosis.
2. Check the system for an external heat source such as solar which may affect the return temperature.
3. Confirm flow and return temperatures, pump PWM and pump flow rate using the customer info menu.
4. Check T1 and T2 resistances in line with temperatures from flow and return temperatures found on page 67.
    - Take resistances at the connector located on the bottom left of the PCB next to resistor **RL5, pins 1&2**. This checks the wiring harness continuity and connectors at same time.
    - Check wiring connectors are not loose or corroded**.**
    - Disconnect the connector from PCB to ensure no additional resistances are given through the PCB.
    - If readings incorrect, take resistance reading direct from sensor & replace sensor or wiring harness as required.
    - **Note sensors may need cleaning and not always replaced.**
5. Check the pump speed is correct via parameters **2.4.5** & **2.4.6**, adjust if required.
6. Ensure all air is vented out of the boiler and system.
7. On combi's, the diverter valve operation may be faulty, check as follows:
    - Safely isolate boiler from electrics.
    - Remove the motor from the three-way valve and see if the cartridge moves up and down.
    - If this doesn't move smoothly and seems to be sticking, replace the cartridge.

If the pump Flow Control is switched off (this can be checked in parameter 2.9.2) follow the following additional checks.

Turn on flow control and use the customer information menu to give you data on the flow rate and PWM signals to assist in fault finding. Using flow control may also give different fault codes which may be useful. If the flow control does not aid fault finding, set the parameter back to as found & use the guidance below.

1. Check system pipework configuration correct.
2. Ensure all valves on the system and boiler are open.
3. Ensure all air is vented out of the boiler and system.
4. Check system pipework and filters for any blockages or restrictions.
5. Check all installation components are functioning correctly (mixing pumps and 2-way valves, etc.).
6. In the case of a combi, check the plate heat exchanger is not blocked.
7. Check for Voltage at the pump. You can force the pump 'on' via 2 methods:
    - **Preferred method and safest** by using manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.
      or
    - By removing PWM cable to allow 230v cable to power pump at full speed.
    - If pump does not run via above tests check pins on pump not bent – straighten to fix and check continuity across wiring harness. If all ok and no voltage going to pump, then PCB fault.
    - If voltage to pump and all other checks are ok, replace pump.
8. If all the above checks are ok, PCB may be at fault.

Note If plastic pipes are used, they must be barrier pipes & UFH must comply with DIN4726-4729. If this is not the case, system separation must be provided as these pipes are porous & will allow air into the system.

1P4 Description: System pressure low.

Cause: system pressure is below 1 bar; boiler continues to operate at a system pressure between 0.7 and 1 bar with a warning in the display.

1. Check pressure loss patterns with the consumer and if any work has been carried out on the system or boiler.
2. Check analogue and digital pressure readouts match. If these do not match add pressure to the system and check gauges read new pressure. Replace as required.
3. Check the heating system for leaks **(system needs to be cold and may need to be over pressured to force leak).**
4. Ensure adequate expansion for property.
5. Check the boiler for leaks including removal of the siphon to check heat exchanger for leaks.
6. Check the pressure relief valve for leakage.
7. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
8. Check expansion vessel pressure is set correctly as per the manufacturer's instructions, and check Shrader core for leakage.
    - Water in the expansion vessel may only be condensation and can be removed using the expansion vessel service procedure found on page 68.
    - Check expansion vessel not leaking, replace as required.
    - If the expansion vessel is of adequate size for the property, is not leaking and has been fully serviced but not holding pressure, replace the expansion vessel.
9. If no obvious leaks are found, isolate boiler from system and leave on test.
    - ***Note*** system must be cold, and pressure set to approx. 1.5 bar before isolating valves from boiler to system.
    - The time required for this test will depend on patterns and amount of pressure loss. (i.e., every 2 days etc.).

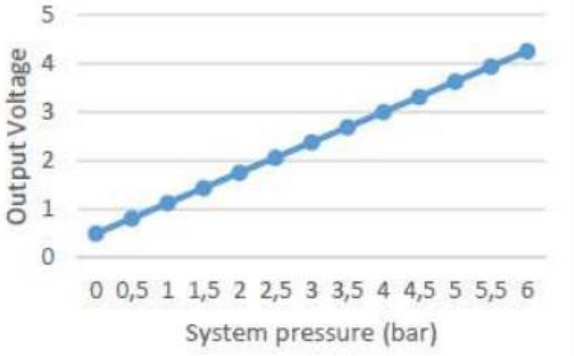
1P9 Description: No pump kick detected.

Cause: No pressure increase detected while the pump is running at full load for 5 seconds. This can be caused by air in the boiler, a blockage in the boiler, faulty pressure sensor or a faulty pump.

This will only happen if the pump flow control is turned off via parameter 2.9.2. The pressure increase by the pump must be at least 0.1 bar. Turning the flow control back on can aid fault finding or use the guide below.

1. Check analogue and digital pressure readouts match.
    - If these do not match add pressure to the system and check digital gauge reads new pressure.
    - Clean sensor if contaminated or replace as required.
2. Use a multimeter to check the wiring harness to the water pressure sensor for continuity from PCB connector **CN12, pins 6, 7 & 8**, whilst checking connectors are tight and free from damage or corrosion.
    - Replace as required.

3. Check DC voltage from pressure sensor back to the PCB on connector **CN12, pins 7&8**. The voltage should be as per the table below. Clean or replace the sensor as required.

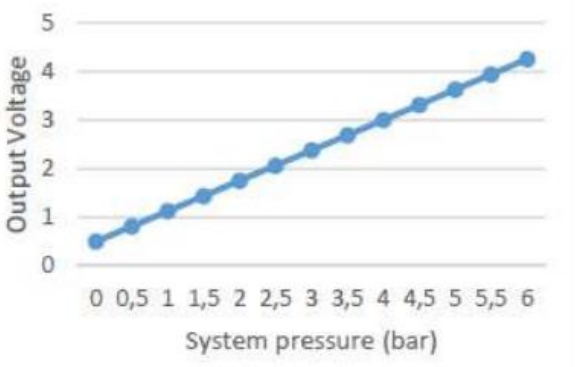


4. Check the pump for air and vent the system if required.
    - Use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and then re-establish the power.
5. Check auto air vent is operating correctly and not contaminated with sludge.
6. Use pump LEDs for indication of issue on page 66 and action as required.
7. Check the pump is running. Diagnosis can be aided by turning flow control back on & using the customer information menu to check the pump PWM % and the pump flow rate.
    - If this does not help, follow the next steps.
8. Check the operation and voltage of the pump with a demand.
   You can force the pump 'on' via 2 methods:
    - **Preferred and safest method** by using the manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.
      or
    - By removing PWM cable at the pump to allow the 230v cable to power the pump at full speed. To do this, ensure **safe electrical isolation** and then use a 4mm electrical screwdriver to push down the clip below the PWM connector and gently pull the connector out. Re-establish power to the boiler and the pump should run at full speed.
9. Confirm 230v from the PCB connector **CN2, pins 5&6**. If no voltage, replace PCB.
10. Check 230v supplied from the PCB to the pump connector. If voltage at pump connector, replace pump.
11. If no voltage at pump connector, use a multimeter to check the wiring harness for continuity from the PCB via connector **CN2, pins 5&6**, whilst checking connectors are tight and free from damage or corrosion. Replace as required.
12. If 230v side ok, check the pump PWM via the 3-wire cable connection to the pump on PCB connector **CN9 pin 1&2**:
    - with the pump off the voltage is +/- 5VDC.
    - 39% load the voltage is +/- 3VDC.
    - 61% load the voltage is +/- 1.9VDC.
    - 100% load the voltage is +/- 0.24VDC.
13. If the above voltages are correct, and the pump does not operate, replace the pump.
14. If the voltages are incorrect, replace the PCB.
15. Check expansion vessel pressure is set correctly as per the manufacturer's instructions.
16. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
17. Check the boiler for any blockages or restrictions.
18. After checking all the above points, switch off the power and back on again, allow the boiler to run automatically through the automatic venting program.
19. If the fault persists, replace the PCB.

102 Description: Pressure sensor defective

Cause: Pressure sensor outside the expected resistance value, open or short circuit.

1. Use a multimeter to check the wiring harness to the water pressure sensor for continuity from PCB connector **CN12, pins 6, 7 & 8**, whilst checking connectors are tight and free from damage or corrosion.
    - Replace as required.
2. Check DC voltage from pressure sensor back to the PCB on connector **CN12, pins 7&8**. The voltage should be as per the table below.



3. Drain the boiler and clean the pressure sensor or replace as required. **Note** water can still come out of the connection of the pressure sensor so protect underlying parts from this.
4. If the fault still occurs after replacing the sensor and confirming the wiring harness is ok, replace the PCB.

108 Description: Constant filling, water pressure too low, < 0.7 bar

Cause: System water pressure below 0.7 bar.

1. Check pressure loss patterns with the consumer and if any work has been carried out on the system or boiler.
2. Check analogue and digital pressure readouts match. If these do not match add pressure to the system and check gauges read new pressure. Replace as required.
3. Check the heating system for leaks **(system needs to be cold and may need to be over pressured to force leak).**
4. Ensure adequate expansion for property.
5. Check the boiler for leaks including removal of the siphon to check heat exchanger for leaks.
6. Check the pressure relief valve for leakage.
7. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
8. Check expansion vessel pressure is set correctly as per the manufacturer's instructions, and check Shrader core for leakage.
    - Water in the expansion vessel may only be condensation and can be removed using the expansion vessel service procedure found on page 68.

- Check expansion vessel not leaking, replace as required.
- If the expansion vessel is of adequate size for the property, is not leaking and has been fully serviced but not holding pressure, replace the expansion vessel.

9. If no obvious leaks are found, isolate boiler from system and leave on test.
    - ***Note*** system must be cold, and pressure set to approx. 1.5 bar before isolating valves from boiler to system.
    - The time required for this test will depend on patterns and amount of pressure loss. (i.e., every 2 days etc.).

109 Description: Constant filling, water pressure too high, > 3.0 bar

Cause: System water pressure higher than 3.0 bar.

1. Check filling loop is turned off and not passing, replace as required.
2. Check for secondary filling loops in the system and check as per point 1.
3. For combi's check main water pressure not passing back through plate heat exchanger by isolating cold main into boiler.
4. Ensure adequate expansion for property.
5. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
6. Check expansion vessel pressure is set correctly as per the manufacturer's instructions, and check Shrader core for leakage.
    - Water in the expansion vessel may only be condensation and can be removed using the expansion vessel service procedure found on page 68.
    - Check expansion vessel not leaking, replace as required.
    - If the expansion vessel is of adequate size for the property, is not leaking and has been fully serviced but not holding pressure, replace the expansion vessel.
7. On rare occasions unvented cylinders may pass back to the central heating via a burst coil. Isolate the mains to confirm.

110 Description: Flow sensor defective

Cause: The flow sensor T1 value out of range.

1. Check full T1 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check T1 sensor resistances are in line with the return temperatures.
    - The return temperature can be identified using the customer information menu.
    - The resistances can be taken at the connector at the PCB (located on the bottom left of the PCB next to resistor **RL5, pins 3&4**). This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault.

    Note thermistors may need cleaned and not always replaced.
3. If error 110 remains after the above has been checked, replace PCB.

112 Description: Return sensor defective

Cause: The return sensor T2 value out of range.

1. Check full T2 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check T2 sensor resistances are in line with the return temperatures.
    - The return temperature can be identified using the customer information menu.
    - The resistances can be taken at the connector at the PCB (located on the bottom left of the PCB next to resistor **RL5, pins 1&2**). This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault.

    Note thermistors may need cleaned and not always replaced.
3. If error 112 remains after the above has been checked, replace PCB.

114 Description: Outside sensor absent

Cause: Outside sensor not present, short-circuited, broken or values outside specifications.

1. If using ATAG One Zone with internet weather:
    - Check Wi-Fi signal & re-connect if required.
    - If Wi-Fi has failed, change thermoregulation to 2, via parameter **4.2.1**. When the WI-FI is re-established, parameter **2.4.1** can be changed back to 4.
2. If internet weather is not being used, check if outdoor sensor is in use with boiler.
3. If an outside sensor is fitted and code 114 appears on the boiler, check the following:
    - Check the resistance of the outdoor sensor as per the table on page 67 and replace as required.
    - Check whether the cables for the outdoor sensor are connected to the boiler.
    - Check that the cable is not damaged, broken or has any poor contacts. **Use a multimeter to confirm continuity of the cables.** Replace harness as required.
    - Check whether the outdoor sensor is mounted in such a way that it is not affected by weather influences (sunlight, snow, etc.).
4. Check parameter **4.2.1** is set to the desired thermoregulation value. Adjust as required and restart boiler by turning off electricity supply for 5 seconds and then back on again.
5. If code 114 still appears:
    c. Carry out factory reset of the PCB in parameter 2.8 ***Important* The boilers parameters will need reset such as LPG etc.**
    d. If error 114 remains after confirming the outdoor sensor and cables are ok, and/or carrying out the factory reset, replace the PCB.

118 Description: Flow and return probe plausibility checks failed.

Cause: Incorrect flow and return sensor readings, usually where the flow and returns are reversed.

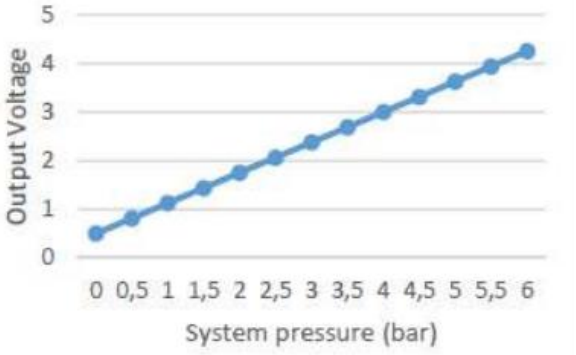
1. Check system design and alter as required.
2. Use customer information menu or parameter **8.3** to check flow and return temperatures.
3. Check T1 & T2 sensor readings as per the table on page 67. Replace as required.
4. Check harness and connectors are ok, using multimeter to confirm continuity. Replace harness as required.
5. If the above checks are ok, replace the PCB.

140 Description: Working pressure test error 2 times (pump kick)

Cause: No pressure increase while the pump is running at full load for 5 seconds. This can be caused by air in the boiler, a blocked or faulty pressure sensor or a faulty pump. The pressure increase by the pump must be at least 0.1 bar.

This will only happen if the pump flow control is turned off via parameter 2.9.2. The pressure increase by the pump must be at least 0.1 bar. Turning the flow control back on can aid fault finding or use the guide below.

1. Check analogue and digital pressure readouts match.
    - If these do not match add pressure to the system and check digital gauge reads new pressure.
    - Clean sensor if contaminated or replace as required.
2. Use a multimeter to check the wiring harness to the water pressure sensor for continuity from PCB connector **CN12, pins 6, 7 & 8**, whilst checking connectors are tight and free from damage or corrosion.
    - Replace as required.
3. Check DC voltage from pressure sensor back to the PCB on connector **CN12, pins 7&8**. The voltage should be as per the table below. Clean or replace the sensor as required.



4. Check the pump for air and vent the system if required.
    - Use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and then re-establish the power.
5. Check auto air vent is operating correctly and not contaminated with sludge.
6. Use pump LEDs for indication of issue on page 66 and action as required.
7. Check the pump is running. Diagnosis can be aided by turning flow control back on & using the customer information menu to check the pump PWM % and the pump flow rate.

- If this does not help, follow the next steps.

8. Check the operation and voltage of the pump with a demand.
   You can force the pump 'on' via 2 methods:
   - **Preferred and safest method** by using the manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.
     or
   - By removing PWM cable at the pump to allow the 230v cable to power the pump at full speed. To do this, ensure **safe electrical isolation** and then use a 4mm electrical screwdriver to push down the clip below the PWM connector and gently pull the connector out. Re-establish power to the boiler and the pump should run at full speed.
9. Confirm 230v from the PCB connector **CN2, pins 5&6**. If no voltage, replace PCB.
10. Check 230v supplied from the PCB to the pump connector. If voltage at pump connector, replace pump.
11. If no voltage at pump connector, use a multimeter to check the wiring harness for continuity from the PCB via connector **CN2, pins 5&6**, whilst checking connectors are tight and free from damage or corrosion. Replace as required.
12. If 230v side ok, check the pump PWM via the 3-wire cable connection to the pump on PCB connector **CN9 pin 1&2**:
    - with the pump off the voltage is +/- 5VDC.
    - 39% load the voltage is +/- 3VDC.
    - 61% load the voltage is +/- 1.9VDC.
    - 100% load the voltage is +/- 0.24VDC.
13. If the above voltages are correct, and the pump does not operate, replace the pump.
14. If the voltages are incorrect, replace the PCB.
15. Check expansion vessel pressure is set correctly as per the manufacturer's instructions.
16. Check expansion vessel flexi hose is correctly connected with no kinks or blockages.
17. Check the boiler for any blockages or restrictions.
18. After checking all the above points, switch off the power and back on again, allow the boiler to run automatically through the automatic venting program.
19. If the fault persists, replace the PCB.

141 Description: no flow detected (Regular boiler only).

.

Cause: The flow switch has an open circuit after 5 seconds of operation; 7 l/m +/-10% flow is required to make the circuit.

A good flowing system will deliver around 20 L/min.

1. Check if happening on CH or HW, or both, and/or on pump over run to help diagnosis.
2. Check the pump is wired directly into the boiler's green connector.
   - If wired externally to the boiler, the pump overrun will not function. Re-wire as required.
3. Check the pump is of suitable size for the system and boiler resistance (index circuit).
4. Check pump type – i.e., is it a modulating pump. This may affect the operation.
5. Check pump speed.
   - If older pump, it may have weakened. Check the pump by removing the bleed screw and stopping the impeller with a screwdriver.

- Check the resistance of the pump which should be approximately 150 Ohms.
- Replace pump as required.

6. Check bypass is of suitable size to function correctly on pump overrun.
7. Check system configuration of open vent and cold feed pipework is correct.
8. Check all isolation valves and TRV's are open, and filters not blocked.
9. Check for air in the system, vent air if required.
10. If system full of air, temporarily link out flow switch and allow pump to help clear air.
11. Check flow and return pipes not reversed.
12. Check system for blockages and remove.
13. Remove flow switch and check continuity when making and breaking the switch manually. Replace flow switch as required.
14. Use a multimeter to check the wiring harness to the flow switch for continuity from PCB connector **CN12, pins 9 & 10**, whilst checking connectors are tight and free from damage or corrosion. Replace harness as required.
15. Loosening the flow switch and turn so arrow on the end points to 11 or 1 o'clock can allow better movement of the paddle to detect the flow.

142 Description: Pump feedback open short circuit.

Cause: The pump PWM signal has been interrupted.

1. Where possible, use the customer information menu to check the pump PWM % and the pump flow rate.
2. Use the pump LEDs on page 66 to assist with diagnosis.
3. Check the operation and voltage of the pump with a demand.
   You can force the pump 'on' via 2 methods:
   - **Preferred and safest method** by using manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.

     or
   - By removing PWM cable at the pump to allow the 230v cable to power the pump at full speed. To do this, ensure **safe electrical isolation** and then use a 4mm electrical screwdriver to push down the clip below the PWM connector and gently pull the connector out. Re-establish power to the boiler and the pump should run at full speed.
4. If the pump does not run, check 230v supplied from the PCB to the pump connector.
5. If voltage at pump connector, replace pump.
6. If no voltage at pump connector, check wiring harness and connectors for damage, corrosion, and loose connections.
   - Confirm continuity with a multimeter and replace harness if required.
7. Confirm 230v from the PCB via connector **CN2, pins 5&6**. If no voltage, replace PCB.
8. If 230v side ok, check the pump PWM via the 3-wire cable connection on the pump and pins **1 & 2** on the PCB connector **CN9**:
   - with the pump off the voltage is +/- 5VDC.
   - 39% load the voltage is +/- 3VDC.
   - 61% load the voltage is +/- 1.9VDC.
   - 100% load the voltage is +/- 0.24VDC.

9. If the above DC voltages are correct are correct, replace the pump.
10. If the voltages are incorrect, replace the PCB.

143 Description: Pump feedback abnormal running.

Cause: High power consumption on the pump leading to pump overheating. PWM > 77.5% and < 82.5% and the pump led flashes green/red.

1. Where possible, use the customer information menu to check the pump PWM % and the pump flow rate.
2. Use the pump LEDs on page 66 to assist with diagnosis.
3. Check the pump for air and vent the system if required – use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and the re-establish the power.
4. Check auto air vent is operating correctly and not contaminated with sludge.
5. Check pump/system for contamination/sludge.
6. The pump voltage may be too high or too low, check the following:
7. Check the operation and voltage of the pump with a demand.
   You can force the pump 'on' via 2 methods:
   - **Preferred and safest method** by using the manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.
     or
   - By removing PWM cable at the pump to allow the 230v cable to power the pump at full speed. To do this, ensure **safe electrical isolation** and then use a 4mm electrical screwdriver to push down the clip below the PWM connector and gently pull the connector out. Re-establish power to the boiler and the pump should run at full speed.
8. If the pump does not run, check 230v supplied from the PCB to the pump connector.
7. If voltage at pump connector, replace pump.
8. If no voltage at pump connector, check wiring harness and connectors for damage, corrosion, and loose connections.
   - Confirm continuity with a multimeter and replace harness if required.
9. Confirm 230v from the PCB via connector **CN2, pins 5&6**. If no voltage, replace PCB.
10. If 230v side ok, check the pump PWM via the 3-wire cable connection on the pump and pins **1 & 2** on the PCB connector **CN9**:
    - with the pump off the voltage is +/- 5VDC.
    - 39% load the voltage is +/- 3VDC.
    - 61% load the voltage is +/- 1.9VDC.
    - 100% load the voltage is +/- 0.24VDC.
11. If the above DC voltages are correct are correct, replace the pump.
12. If the voltages are incorrect, replace the PCB.

144 Description: Pump feedback abnormal stop.

Cause: High power consumption on the pump leading to pump overheating. PWM > 82.5% and < 92.5% and the pump led flashes red.

1. Where possible, use the customer information menu to check the pump PWM % and the pump flow rate.
2. Use the pump LEDs on page 66 to assist with diagnosis.
3. Check the pump for air and vent the system if required – use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and the re-establish the power.
4. Check auto air vent is operating correctly and not contaminated with sludge.
5. Check pump/system for contamination/sludge.
6. The pump voltage may be too high or too low, check the following:
7. Check the operation and voltage of the pump with a demand.
   You can force the pump 'on' via 2 methods:
   - **Preferred and safest method** by using the manual settings in parameter menu 2. Set parameter **2.6.0** to 1 = Manual mode On, and **2.6.1** to 1 pump control 'On'. Please note change **2.6.0** to 0 manual mode 'off' after this test.
     or
   - By removing PWM cable at the pump to allow the 230v cable to power the pump at full speed. To do this, ensure **safe electrical isolation** and then use a 4mm electrical screwdriver to push down the clip below the PWM connector and gently pull the connector out. Re-establish power to the boiler and the pump should run at full speed.
8. If the pump does not run, check 230v supplied from the PCB to the pump connector.
9. If voltage at pump connector, replace pump.
10. If no voltage at pump connector, check wiring harness and connectors for damage, corrosion, and loose connections. Confirm continuity with a multimeter and replace harness if required.
11. Confirm 230v from the PCB via connector **CN2, pins 5&6**. If no voltage, replace PCB.
12. If 230v side ok, check the pump PWM via the 3-wire cable connection on the pump and pins **1 & 2** on the PCB connector **CN9**:
    - with the pump off the voltage is +/- 5VDC.
    - 39% load the voltage is +/- 3VDC.
    - 61% load the voltage is +/- 1.9VDC.
    - 100% load the voltage is +/- 0.24VDC.
13. If the above DC voltages are correct are correct, replace the pump.
14. If the voltages are incorrect, replace the PCB.

145 Description: Pump feedback failure.

Cause: No circulation/the pump impeller is stuck or full of debris/sludge. Because of this the power consumption is high, leading to the pump overheating. PWM > 92.5% and < 97.5% and the pump led is constant red.

1. Use the pump LEDs on page 66 to assist with diagnosis.
2. Check the pump for air and vent the system if required – use the boiler air purge to assist by turning off the power at the fused spur for 5 seconds and the re-establish the power.
3. Check auto air vent is operating correctly and not contaminated with sludge.
4. Check pump/system for contamination/sludge.
5. If the above checks are ok, replace the pump.

201 Description: T3 Hot water sensor defective.

Cause: The values of the T3 hot water sensor outside specifications (iC & iCE boilers only).

1. Check full T1 wiring harness and connectors for signs of damage, corrosion, or loose contact.
2. Use a multimeter to check if T3 sensor resistances are in line with the return temperatures and per the table on page 67.
    - The return temperature can be identified using the customer information menu.
    - The resistances can be taken at the connector at the **PCB CN12, pins 1&2**. This checks the wiring harness continuity at same time. Disconnect the connector from PCB 1st to ensure no additional resistances are given through the PCB.
    - If the readings are incorrect, disconnect the wiring harness from the sensor and check the sensor readings without the harness to prove if the sensor or harness is the fault.

    Note thermistors may need cleaned and not always replaced.
3. If 201 appears on a non-combi boiler, check parameter **2.2.8** and change the setting if required. Restart the boiler from the power supply.
4. If changing the parameter does not work, carry out a factory reset on the PCB using parameter **2.8.0**. If this does not work, replace the PCB.

203 Description: T3 Hot water sensor defective.

Cause: The values of T3 boiler sensor out of specification (iS & iR boilers only).

1. Check the Hot water priority DHW NTC sensor is connected to the boiler.
2. Check the boiler sensor wires for loose contacts and breaks.
3. If the cable has been extended, check the wires at the junction box/block connector.
4. Check if the sensor is installed correctly.
5. Check the resistance of the sensor per the table on page 67 from the yellow DHW connector at the boiler and replace if required.

6. If after changing the sensor, the fault does not clear, carry out a factory reset on the PCB using parameter 2.8. If this does not work, replace the PCB.
7. If no sensor is fitted to the boiler, check parameter **2.2.8** and change the setting if required. Restart the boiler from the power supply.
8. If changing the parameter does not work, carry out a factory reset on the PCB using parameter **2.8.0**. If this does not work, replace the PCB.

205 Description: Solar water sensor defective.

Cause: (Very unlikely to see) The values of solar sensor out of specification. (10k OHM sensor is used for solar).

1. Check the Solar NTC sensor is connected to the boiler.
2. Check the boiler sensor wires for loose contacts and breaks.
3. If the cable has been extended, check the wires at the junction box/block connector.
4. Check if the sensor is installed correctly.
5. Check the resistance of the sensor per the table on page 67 from the solar connector at the boiler and replace if required.
6. If after changing the sensor, the fault does not clear, carry out a factory reset on the PCB using parameter **2.8.0**. If this does not work, replace the PCB.
7. If no sensor is fitted to the boiler replace the PCB.

3P9 Description: Maintenance Alert

Cause: Parameter 8.5.0 Months before next maintenance counter has expired.

The maintenance message can be enabled with parameter 8.5.1 and set from 1 to 60 months in 8.5.0. When the time has elapsed, the maintenance message appears on the display.

1. Check service dates with the customer and ensure the boiler has been serviced in the correct timeframe for warranty.
    - Go to the service area by accessing the technical menu.
    - Select Configuration wizard, Boiler 1, Service Options, Months remaining before service = time remaining on service schedule.
2. Advise customer to call their installer to complete a boiler service.
3. After boiler serviced, the engineer will need to reset the service reminder flag.
4. To reset the service reminder flag:
    - Go to the service area by accessing technical menu (007).
    - Select Configuration wizard, Boiler 1, Service Options, Main warning reset.
    - This will reset the countdown timer for the service reminder to the time stated in the menu 'Months remaining before service, default value = 12 months.
5. If necessary, the maintenance alert can be turned off when in the Service options screen by selecting Enable Service Warnings, then select no.

303 Description: PCB Error

Cause: The PCB has a software or hardware error.

1. Check boiler polarity and voltages are correct.
2. Check boiler is properly earthed using an earth loop impedance tester.
3. Check all connectors on the PCB for loose or broken contacts. Replace as required.
4. If code 303 remains, replace the PCB.

304 Description: Reset too often.

Cause: The reset button has been pressed too many times to clear a fault, more than 5 times in 15 minutes**.**

1. Wait 15 minutes and reset the boiler.
2. Switch off the boiler from the fused spur, wait 5 seconds and re-establish the electricity supply.
3. If this does not help after a couple of attempts, replace the PCB.

306 Description: PCB defective

Cause: PCB defective.

1. Check boiler polarity and voltages are correct.
2. Check boiler is properly earthed using an earth loop impedance tester.
3. Check all connectors on the PCB for loose or broken contacts. Replace as required.
4. If code 306 remains, replace the PCB.

309 Description: Gas valve relay control error

Cause: Flame signal detected after the gas valve has been de-energized.

1. Check whether the boiler is properly earthed using an earth loop impedance tester.
2. Check the ionization pin condition and the ionization cable for a short circuit. Replace as required.
3. Check if the flame remains after the demand has ended and if there is still voltage on the gas valve. If so, replace the PCB.
4. If no voltage at the gas valve and the flame remains, replace the gas valve.
5. Check all wiring and connectors to the gas valve and PCB for loose contacts and breaks and check continuity of wires using a multimeter. Replace as required.

6. Check the gas valve and PCB connectors for traces of moisture and corrosion, replace as required. Determine where the moisture comes from and fix the issue. Potential causes: POC recirculation, leaking air vent, etc.
7. If intermittent and all other checks OK, replace the PCB.

411 to 416 Description: Faulty Room Sensor

Cause: The ATAG One Zone or Cubes for the specified zone are incorrectly set or faulty. The zones are highlighted via the 3rd number of the fault code i.e., 411 is zone 1, 412 is zone 2 and so on up to zone 6, 416. Room Sensors are either ATAG One Zone controllers or Cubes only. No other 3rd party thermostat will act as a 'room sensor' into the boiler.

1. The Zone assignment must be correct on the ATAG control, so One Zone or Cube zone assignment must correspond to the zone parameter in question. i.e., zone 1 thermostat = zone 1 parameter **4.2.1**, zone 2 thermostat = **5.2.1**. The full 6 zones are shown below.
    - 4.2.1 for zone 1.
    - 5.2.1 for zone 2.
    - 6.2.1 for zone 3.
    - 14.2.1 for zone 4.
    - 15.2.1 for zone 5.
    - 16.2.1 for zone 6
2. Check PCB settings for configuration issue. Where a zone parameter has been configured incorrectly for the heating control equipment used.
3. Check the Thermoregulation is set correctly in the technical area using the above parameters. This parameter can be set to 2 or 4 if One Zone or Cube is fitted.
4. Other 3rd party thermostats must have this parameter set to either 0, on/off fixed flow temp, or 3 for weather comp with on/off. If 3 is selected an outside sensor must be fitted as well.

420 Description: ATAG zone supply overload.

Cause: When using ATAG Zone managers or pump modules, A "BUS supply overload" error may appear when three or more devices supplying power to the BUS are connected to the system.

To rectify this error, microswitch 1 on the PCB of one of the Zone Managers, or pump modules must be switched from ON to OFF.

5P1, 5P2, 5P3, 5P6, 501 & 504 Fault codes.

The fault code explanations for all the above fault codes are below, with the fault-finding guidance directly after.

5P1 Description: 1st ignition attempt error

Cause: No flame detection on the 1st ignition attempt. No ionisation >0.8 µA detected on first start attempt. 2nd launch is successful. Check ionisation current on ignition via customer information menu or parameter **8.7.5**.

5P2 Description: 2nd ignition attempt error

Cause: No flame detection on 2nd ignition attempt. No ionization > 1µ detected during the first 2 start attempts. The boiler ignited during the 3rd, 4th or 5th start attempt. Check ionisation current on ignition via parameter **8.7.5**.

5P3 Description: Flame lift

Cause: Flame loss when the boiler is in operation; boiler ignited correctly, and the ionization current is cut off after the safety time. Check ionisation current during operation is >0.5µA via customer information menu or parameter **8.7.5**.

5P6 Description: No flame

Cause: Flame loss when the boiler is in operation; boiler ignited correctly, and the ionization current is cut off after the safety time. Check ionisation current during operation is >0.5µA via customer information menu or parameter **8.7.5**.

501 Description: No Flame Detected

Cause: No flame or ionization current > 0.5µA during 5 consecutive start attempts of the same heat demand.

504 Description: Flame lift from burner.

Cause: Flame goes out during burning, burner ignited successfully but ionization drops out after safety time.

1. Check condensate pipe is clear of blockages and is running freely. Clear as required.
2. Check 240v at gas valve, connections 1 & 3.
    a. If the voltage is correct, move to step 3.
    b. If there is no voltage at the gas valve, check the PCB is sending 240v to the gas valve from connector **CN2, pins 1 & 2**. Replace PCB if there is no voltage.
    c. If voltage is supplied from the PCB, check the condition of the wiring harness and connectors. Use a multimeter to confirm continuity throughout the cables. Replace harness if faulty.

3. Check the working pressure at the P1 test point of the gas valve with all gas appliances in the house fully on. The WP must be no less than 4mb under that of the WP at the gas meter for NG or 2.5mb for LPG.
    a. If WP at the meter is under 19mb call National grid or local network to investigate the issue.
    b. If under pressure at the boiler, investigate secondary isolation valves, pipe sizing or shale/debris, etc. in gas pipe.
4. If the working pressure is correct, check the following:
5. Check ionization current is between 0.8µA & 4µA using the customer information menu or parameter **8.7.5**.
6. If ionization current is ok, proceed to step 7.
    a. If ionization current is too low, check earthing in house with an earth loop impedance tester.
    b. If earthing in the property is ok, move to step 8.
7. Check 240v at the ignition transformer, connections **1 & 2** (black wires).
    a. If the voltage is correct, move to step 8.
    b. If voltage is incorrect at the ignition transformer, check the PCB is sending 240v to the ignition transformer from connector **CN2, pins 3 & 4**. Replace PCB if there is no voltage.
    c. If voltage is supplied from the PCB, check the condition of the wiring harness and connectors. Use a multimeter to confirm continuity throughout the cables. Replace harness if faulty.
8. Check voltage from the transformer to the electrodes. Using a multimeter, check for between 60-100 volts AC between both outlet connections of the transformer to an earth connection (the 100 volts should be on initial startup and then settle to approx. 60V). If voltage incorrect replace transformer or if voltage correct, proceed to step 9.
9. Check the spark gap and condition of the electrodes, including the ionization electrode. The spark electrodes should have a 3 – 4mm spark gap and be clean. Adjust spark gap and clean electrodes with a fine sandpaper if required. If still fails after cleaning and adjustment or is worn out, replace electrodes.
10. Check if the CO/CO2 values are correct **or O2 values if using a natural gas and hydrogen blend**.
11. Check the condition of the burner for any debris or cracks, clean or replace as required.
12. Check the non-return valve in the fan is operating correctly, replace as required.
13. Check heat exchanger flue ways are clear of debris. Clean with a soft brush and vacuum cleaner as required.
14. Check boiler for recirculation of products of combustion and repair as required.
15. Check flue length and configuration is correct as per the manufacturer's instructions.
16. Check flue for breaks and carryout O2 checks to confirm no spillage of products of combustion.
17. Check boiler is set to the correct gas type using parameter **2.0.2**, whilst ensuring LPG boilers have the correct restrictor fitted at the fan. **If using natural gas & hydrogen blend, ensure conversion kit is fitted**.
18. Check whether the height compensation (altitude setting) is set correctly and adjust via parameter **2.0.4** if necessary.
19. If all the above has been checked and the fault remains, replace the PCB.

502 Description: Incorrect Flame Detected

Cause: Flame detected during starting procedure before gas valve was open.

1. Check if there is a flame before the click comes from the gas valve. If a flame is present, the gas valve is passing. Replace the gas valve.
2. If there is no flame, check the ionization electrode and cable for a short circuit.
3. If there is no short circuit, replace the PCB.

612 Description: Fan Failure

Cause: Fan speed outside the expected range.

1. If the boiler can be reset, check the fan speed via the customer information menu or via parameter **8.2.2**.

   The fan speeds and approximate resistances are below:

	Fan Speeds					
	Natural Gas			LPG		
	MIN	MAX	CH	MIN	MAX	CH
i15S	1550	3600	3600	2400	3500	3500
i18S	1550	4250	4250	2400	4100	4100
i24S	1550	5800	5800	2400	5150	5150
i32S	1500	5500	5500	3700	5100	5100
i40S	1500	6700	6700	3700	6300	6300
i15R	1550	3600	3600	2400	3500	3500
i18R	1550	4250	4250	2400	4100	4100
i24R	1550	5800	5800	2400	5150	5150
i32R	1500	5500	5500	3700	5100	5100
i40R	1500	6700	6700	3700	6300	6300
i24C	1550	6350	5750	2400	5900	5160
i28C	1550	7100	5710	2400	6700	5150
i36C	1500	6650	5500	3700	6250	5100
i40C	1500	7150	5520	3700	6650	5100
iC Economiser 27 Plus	1650	7200	5800	2250	7200	5170
iC Economiser 35 Plus	1650	7100	5750	3850	6650	5480
iC Economiser 39 Plus	1650	7200	5750	3850	6950	5460

2. Check fan resistances and replace fan if not within limits below:

Normal fan resistance readings below.

Pins 1-2	OL	Pins 2-3	14.93kΩ	Pins 3-4	OL	Pins 4-5	OL
Pins 1-3	OL	Pins 2-4	79.9kΩ	Pins 3-5	OL	x	x
Pins 1-4	OL	Pins 2-5	OL	x	x	x	x
Pins 1-5	26 Ω	x	x	x	x	x	x

3. Check all connectors and wiring between the fan and the PCB for loose contacts, damage, moisture, and breakages. Use a multimeter to check continuity across each wire. Replace harness if required.
4. Check the flue installation complies with the manufacturer's installation instructions.
5. Check whether the height compensation (altitude setting) is set correctly and adjust via parameter **2.0.4** if necessary.
6. Remove the fan and check the impeller for free-running and contamination.
7. Check the burner and the heat exchanger condition and for any contamination. Clean or replace as required.
8. If the above is ok, replace the PCB.

7P1 Description Pump error: low flow rate.

Cause: This is not visible on the display screen and is only shown in the Faults section of the technical area with **Pump Active** is normally displayed on the screen. The flow control technology and pump feedback has detected insufficient flow around the system.

1. Check pipe system resistance allows minimum flow rates of 370l/h for boilers with the iCon1 heat exchangers and 400l/ for boilers with the iCon2 heat exchangers. This can be checked via the customer information menu.
2. Check system pipework configuration is correct.
3. Ensure all valves on the system and boiler are open.
4. Ensure all air is vented out of the boiler and system.
5. Check system pipework and filters for any blockages or restrictions.
6. Check the pump speed is correct via parameters **2.4.5** & **2.4.6**, adjust if required.
7. Diverter valve operation may be faulty, check as follows:
    a. Safely isolate boiler from electrics.
    b. Drain the boiler.
    c. Remove the motor from the three-way valve and see if the cartridge moves up and down.
    d. If this doesn't move smoothly and seems to be sticking, replace the cartridge.

***Note *** If plastic pipes are used, they must be barrier pipes & UFH must comply with DIN4726-4729. If this is not the case, system separation must be provided as these pipes are porous & will allow air into the system.

701 to 706 Description Zone Flow temperature sensor fault.

Cause: The flow sensor on the specified zone is faulty. The individual zones faults are identified as 701 for zone 1, 702 for zone 2, and so on up to zone 6, 706.

1. Check the continuity of the sensor and replace the sensor if necessary.
2. Check the condition of the connections and wiring from the sensor concerned to the PCB. Use a multimeter to confirm continuity through the cables. Replace cables as required.
3. If the cables and the sensor are ok, replace zone manager.

711 to 716 Description Zone Return temperature sensor fault.

Cause: The return sensor on the specified zone is faulty. The individual zones faults are identified as 711 for zone 1, 712 for zone 2, and so on up to zone 6, 716.

1. Check the continuity of the sensor and replace the sensor if necessary.
2. Check the condition of the connections and wiring from the sensor concerned to the PCB. Use a multimeter to confirm continuity through the cables. Replace cables as required.
3. If the cables and the sensor are ok, replace zone manager.

722 Description Zone 2 overheating.

Cause: The Zone Manager ST2 overheat thermostat has tripped. **Note** if 2 zone managers have been used together, the fault may be in either zone manager and is not individually defined**.**

1. Check the link and its connection to the "ST2" terminal block on the module.
2. Check the maximum heating temperature setting for Zone 2 or 4 via parameter **5.2.5** or **15.2.5**.
3. Check the connection of the safety thermostat to the "ST2" terminal block on the module.
4. Check the wiring harness and connectors if a safety thermostat is in use. Replace as required.
5. Check for continuity over the thermostat and replace as required.
6. If the above is all ok, replace the zone manager.

723 Description Zone 3 overheating.

Cause: The Zone Manager ST3 overheat thermostat has overheated. **Note** if 2 zone managers have been used together, the fault may be in either zone manager and is not individually defined.

1. Check the link and its connection to the "ST3" terminal block on the module.
2. Check the maximum heating temperature setting for Zone 3 or 6 via parameter **6.2.5** or **16.2.5**.
3. Check the connection of the safety thermostat to the "ST3" terminal block on the module.
4. Check the wiring harness and connectors if a safety thermostat is in use. Replace as required.
5. Check for continuity over the thermostat and replace as required.
6. If the above is all ok, replace the zone manager.

750 Description ZM undefined hydraulic scheme

Cause: Issue with the zone manager hydraulic settings**.**

The zone manager(s) need defined. Use parameter **7.2.0** for zone manager 1 and parameter **7.5.0** for zone manager 2. Use the guide below to set correctly.

0 = Not defined - DO NOT USE.
1 = N/A – DO NOT USE.
2 = Mixed heating circuit module II.
3 = Mixed heating circuit module III
4 = N/A
5 = Direct heating circuit module II
6 = Direct heating circuit module III

Heat Generation Lock

Cause: External safety contact open circuit.

1. Check the link wire in the white connector (External safety contact) volt free connection on the side of the PCB. If missing or damaged, replace the connector and link.
2. If a condensate pump safety switch has been wired into the white connector, check the operation of the condensate pump discharge.
3. Check the condensate pump is discharging and the float is moving freely.
4. Check the safety switch of the pump. Free off or replace pump as required.
5. Check the cables and connectors from the condensate pump to the boiler. Use a multimeter to confirm continuity. Replace as required.
6. If the above is all ok, replace the boiler PCB.

Blank display screen.

Cause: No power to boiler, internal fuses blown, display fault, PCB fault, fan or pump faults caused PCB to blow.

1. Check fuse at fused spur.
2. Check 230v into boiler.
3. Check continuity of fuses F1 & F2. Replace as required.
    - These fuses protect both the live and neutral circuits only and are not specific to components or internal circuits.
    - Note the boiler is not polarity sensitive however polarity must be correct for safety.
4. Check fan resistances per **612 fault code**. Replace fan as required.
    - PCB will also need changed as fan has taken out board.
5. If fan ok, check pump for smell of burning. Replace pump and PCB.
6. If fan and pump are ok, replace PCB.

Bus address collision.

Cause: ATAG controls incorrectly wired or wrong zone assigned.

1. Ensure wires from the ATAG Zone Managers and Cube controls match the boiler B & T BUS connectors. (The One Zone is not polarity sensitive).
2. Ensure the ATAG controls are set to the correct zone.

Boiler stuck on Initializing.

Cause: Communication error with controls.

1. Check OpenTherm controller not fitted to orange BUS connector. If so, fit to blue OT bus connector and restart boiler.
2. Remove all low volt/volt free controls and after powering up reconnect the controls.

Pump constantly running.

Cause: Frost protection active or pump PWM fault. Sometimes linked with **109 & 140** fault codes, if so PWM fault.

1. If a frost symbol is present in the boiler display, follow from point 2. If there is no frost symbol on the display, follow from point 3.
2. Press OK to access the user menu.
    a. Select Complete menu and then CH settings.
    b. Scroll to Pump continuous running.
    c. If Enabled is highlighted, frost protection can be turned off by selecting Disabled.
    d. If this function is already Disabled, or the frost symbol still appears after selecting Disabled, check the flow temperature of the boiler via parameter 8.3.1. If the temperature is less than 8 °C, then the internal frost protection is active.
        i. Confirm the resistance of the T1 flow sensor as per the table on page 67 and replace as required.
        ii. Confirm the wiring harness continuity and contacts are ok. Replace if required.
        iii. If the above checks are OK, replace the PCB.
3. Check the PWM signal to the pump is ok by completing the following:
    a. Safely isolate the boiler and remove the PWM cable from the pump. Check the 3 pins are not bent – if bent use a small screwdriver to straighten.
    b. Check pump position in relation to the PCB casing. If this is too close it can put pressure on the PWNM connector causing a loose connection. This is usually diagnosed by bring the PCB housing down towards you and the pump may stop. – adjust the pump position if required.
    c. Check the pump PWM via the 3-wire cable connection to the pump on PCB connector **CN9 pin 1&2**:
        1. with the pump off the voltage is +/- 5VDC.
        2. 39% load the voltage is +/- 3VDC.

3. 61% load the voltage is +/- 1.9VDC.
4. 100% load the voltage is +/- 0.24VDC.

d. If the voltages are incorrect, replace the PCB.
e. If the voltages are correct, replace the pump.

Pump LED's

Description of WILO Para 15/7-60/IPWM1 pump operational LED's.

LED is green, pump in normal function, PWM between 5% and 85%.

The green LED is flashing, pump in standby mode, PWM between 93% and 100%.

LED is Green/Red flashing, warning pump has a failure. If not solved, then it will start flashing RED.

LED is Red, pump has a failure.

Red LED is flashing, pump sensing a problem such as low water pressure, an overload of the motor/impeller blocked or poor system flow.

RESISTANCE TABLE SENSORS

Outside Sensor		Flow Sensor, Return Sensor, DHW Sensor	
NTC 1k (25°C)		NTC 10k (25°C)	
Temperature (°C)	Resistance (KΩ)	Temperature (°C)	Resistance (KΩ)
-10	4.574	-10	55.047
-9	4.358	0	32.555
-8	4.152	10	19.873
-7	3.958	12	18.069
-6	3.774	14	16.447
-5	3.600	16	14.988
-4	3.435	18	13.674
-3	3.279	20	12.488
-2	3.131	22	11.417
-1	2.990	24	10.449
0	2.857	26	9.573
1	2.730	28	8.779
2	2.610	30	8.059
3	2.496	32	7.406
4	2.387	34	6.811
5	2.284	36	6.271
6	2.186	38	5.779
7	2.093	40	5.330
8	2.004	42	4.921
9	1.920	44	4.547
10	1.840	46	4.205
11	1.763	48	3.892
12	1.690	50	3.605
13	1.621	52	3.343
14	1.555	54	3.102
15	1.492	56	2.880
16	1.433	58	2.677
17	1.375	60	2.490
18	1.320	62	2.318
19	1.268	64	2.159
20	1.218	66	2.013
21	1.170	68	1.878
22	1.125	70	1.753
23	1.081	72	1.638
24	1.040	74	1.531
25	1.000	76	1.433
26	0.962	78	1.341
27	0.926	80	1.256
28	0.892	82	1.178
29	0.858	84	1.105
30	0.827	86	1.037
35	0.687	88	0.974

Servicing the expansion vessel.

The expansion vessel charge should be checked on every service and set as per table 9.2.a of the Manufacturer's Instructions.

Expansion vessels themselves may need to be fully serviced if the vessel is losing pressure or has water coming out of the Schrader valve. Over time expansion vessels can gather up to half a litre of condensation water in the air chamber from repeated re-pressurisations and that water that can sit in the charge hose.

The water can easily be removed to avoid unnecessary replacements and return the vessel to factory condition thus improving performance.

To correctly service the ATAG expansion vessel, follow the below instructions:

1. Remove the system pressure via a drain point (not PRV). Remove the diverter valve actuator on a combi before doing this to ensure boiler is fully drained.

2. Depressurise expansion vessel and remove Schrader core.

3. Attach a tube to the Schrader valve to a bucket.

4. Repressurise boiler to 1 bar via filling loop to remove the condense water (around 0.5Ltr) from the vessel *

5. When condense has stopped flowing, drain boiler via a drain point. Leave drain point open and remove tube.

6. Fit new Schrader core and recharge the restored vessel as per the manufacturer's instructions and above guidance (normally 0.5 bar for most installations).

7. Close the drain point and re-attach the Schrader valve cap. This cap has an additional O-ring inside to provide a double seal effect. **Ensure this cap is as tight as possible to give the expansion vessel extra protection from Schrader core leaks.**

8. Set the system pressure and allow boiler to go through its air purge function for 7 minutes.

** If water continues to flow out through Schrader valve after the condense has been removed, the membrane is split, and vessel requires replacement**.

LED signals

GREEN LED (left)	
off	power supply OFF
steady	power supply ON
flashing	powered ON, board in manual mode
GREEN LED (central)	
Light off	BUS communication absent or not-OK
Steady light	BUS communication present
Flashing light	scanning or initialisation of BUS communication
RED LED (right)	
Light off	no operation error
Steady light	presence of one or more operation errors