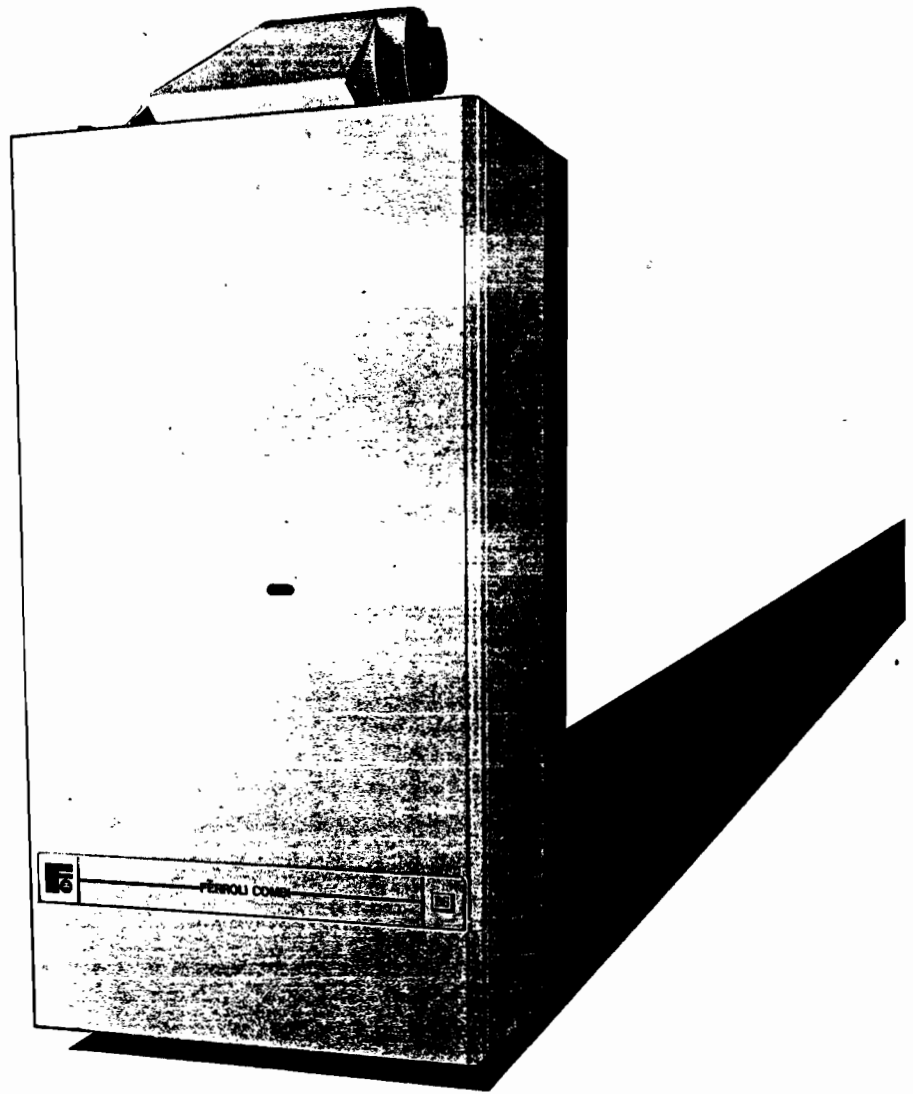




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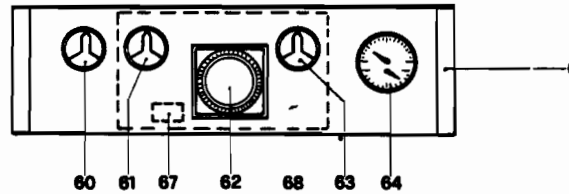
**WALL MOUNTED, ROOM SEALED,
FAN ASSISTED, GAS COMBINATION BOILER**



TECHNICAL INFORMATION



General Explanation on Operation



- 1 Selector Switch 61 in central position (Domestic Hot Water Only).**
 - 1.1 Hot water taps closed (situation after at least 10 minutes)**
 - Fan at low speed to avoid condensation problems and pilot flame failure.
 - Central Heating pump is stopped.
 - The frost thermostat in the boiler can activate the boiler.
 - 1.2 Hot Water tap open (water flow of min. 0,5 Gallon/min. 2,5 Litres/min.).**
 - At opening of a hot water tap the fan will go to full speed and the main burner will light.
 - Boiler is controlled to keep the hot water at a on the P.C.B. factory set temperature of 55°C (if water flow through boiler is not too high see performance curve).
 - Time Clock and Room thermostat (if fitted) will not activate the boiler.
- 2 Selector switch 61 in position Domestic Hot Water and Central Heating continuous.**
 - 2.1 Hot water taps closed**
 - 2.1.1 Room stat demands for heat:**
 - central heating pump will run continuously
 - boiler thermostat 63 controls the boiler temperature in a modulating way
 - Time Clock 62 has no influence on the boiler.
 - 2.1.2 If contact in Room stat breaks (Room temperature too high):**
 - Burner stops immediately
 - Central Heating pump stops after about 6 minutes (pump overrun)
 - 2.2 Hot water tap open (water flow min. 0,5 Gallon/min. 2,5 Litres/min.).**
 - Central heating pump stops immediately (if running).
 - Burner is controlled to keep the hot water at a internally factory set temperature of 55°C (if water flow through boiler is not too high, see performance curve D.H.W.).
- 3 Selector switch 61 in position Domestic Hot Water and Central Heating Timed.**
 - 3.1 Hot water taps closed.**
 - 3.1.1 Central Heating pump starts on command of the Time Clock 62 and Room thermostat (if fitted). Boiler temperature is controlled in a modulating way by boiler thermostat 63.**
 - 3.1.2 If contact in Time Clock 62 or Room thermostat breaks:**
 - burner stops immediately
 - central heating pump stops after about 6 minutes (pump overrun)
 - 3.2 Hot water tap open (water flow min. 0,5 Gallon/min. 2,5 Litres/min.).**
 - Central heating pump stops immediately (priority to domestic hot water).
 - Boiler is controlled to keep hot water at a internally factory set temperature of 55°C (if water flow through boiler is not too high, see performance curve).



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C.H. output adjustment

C.H. output is factory set at min output (8,8 kW)

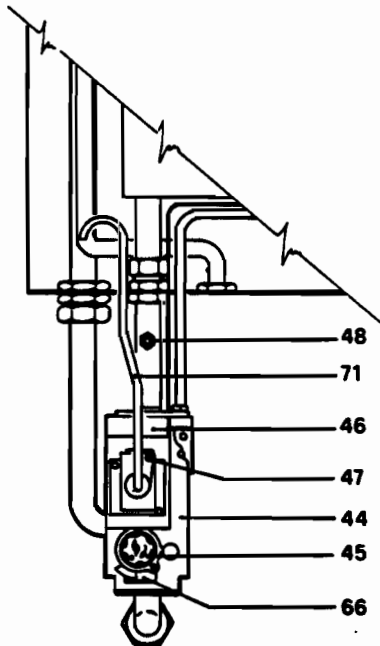


Fig. 1 - Gas valve

- 44 - Combination gas valve
- 45 - Knob gas valve
- 46 - Operator gas valve
- 47 - Modulating regulator (Modureg)
- 48 - Burner pressure test point
- 66 - Microswitch
- 71 - Modulating balance tube

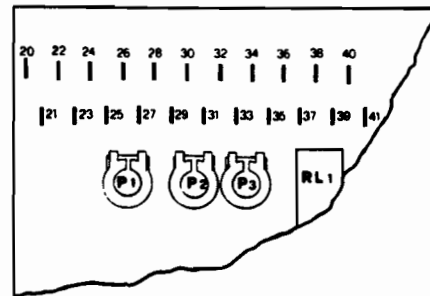


Fig. 2 - Front view P.C.B. in control box.

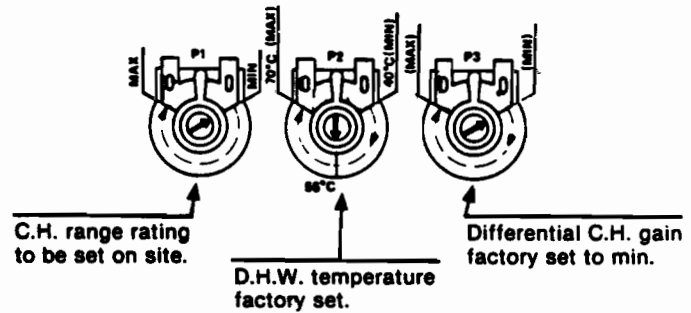


Fig. 3 - Potentiometers settings.

Operations

1. Check if all hot water taps are closed.
2. Disconnect **ONE** electrical connection from operator 46 of gas valve 44

Note - Don't pull the wire, use pliers and pull the faston insulation to the front.

3. Start boiler on C.H., fan will run, cool down C.H. system.
4. Connect a suitable pressure gauge to burner pressure test point 48.
5. **To Note** - Pressure on pressure gauges reference air pressure.
6. Check required burner pressure in fig. 4.
7. Rewire operator 46 of gas valve, burner will light.
8. Set outlet pressure of gas valve 44 with potentiometer P1 on P.C.B. in control box.
Outlet pressure = Burner pressure + reference air pressure (as tested in step 5).
9. Fill in C.H. output on label at inside of control panel. This assist when servicing.

Note - On L.P.G. min. pressure is 7.5 mbar (3.0 inch WG).

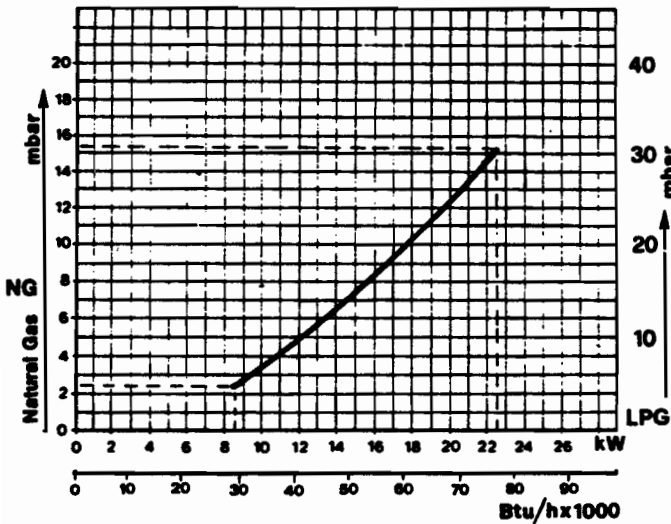


Fig. 4 - Burner pressure VS C.H. load



Commissioning and General Check Out

1 General Check before lighting

- 1.1 Isolating valves in jig bracket open
- 1.2 Central Heating system filled to min. 1,0 bar
- 1.3 Central Heating pump free
- 1.4 Heat exchanger vented
- 1.5 Water flow D.H.W. min. 2,5 Litres/min. (0,5 Gallon/min.)
- 1.6 C.H. radiators vented
- 1.7 Bypass C.H. open
- 1.8 Gas supply purged
- 1.9 Cap automatic air vent unscrewed

2 Lighting

Before lighting, check again if central heating system is pressurised to min. 1 bar

- 2.1 Light boiler following instructions in boiler
- 2.2 Ensure electric mains, gas and water are turned on
- 2.3 Open a hot water tap
- 2.4 Fan in boiler will run at full speed **wait min. 30 seconds then**
- 2.5 Depress gas valve knob fully, electric igniter will light pilot flame
- 2.6 After lighting pilot flame: keep knob of gas valve fully depressed for 20 sec.
- 2.7 Release gas valve knob
Main burner will light

3 General check

- 3.1 Close hot water tap.
Fan runs at min speed
Main burner will extinguish

- 3.2 Selector switch boiler in position:
Hot water and timed central heating
Clock in on position
Room stat at maximum
Boiler stat at higher position
- 3.3 After 2 sec fan runs full speed
Circulating pump will run
Main burner lights
- 3.4 Boiler stat at min. position
Main burner extinguishes
Fan runs at min speed
C.H. pump keeps running
- 3.5 Hot water tap open
Water flow minimum 2,5 Liters/min.
After 2 sec. fan runs at full speed
C.H. pump stops
Main burner lights
- 3.6 Hot water tap closed
Main burner extinguishes
Fan runs at min. speed
C.H. pump starts running again
- 3.7 Room stat at minimum or clock off
C.H. pump stops after 6 minutes

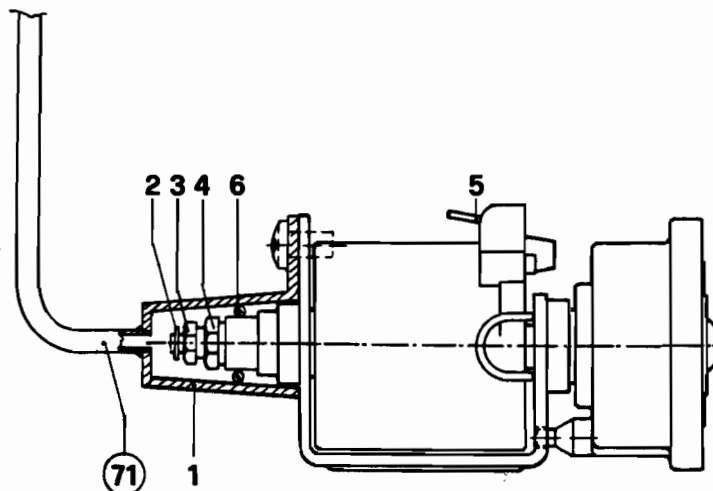
4 Adjustment C.H.

- 4.1 Adjust Central Heating Output of boiler according C.H. Installation requirement see page:
C.H. output adjustment.
Fill in the C.H. installation output on the label at the inside of the control panel. This assist when servicing
- 5 Explain and demonstrate the lighting and shutting down procedure to the user
- 6 It is advisable to flush and refill the Central Heating system 1 day after the complete system has functioned at max. temperature.



Modulating regulator (Modureg) of gas valve

Pressure settings	Minimum		Maximum	
	mbar	inch WG	mbar	inch WG
Natural Gas	2.5	1.0	15.3	6.1
L.P.G.	7.5	3.0	30.0	12.0



- 1. Cap (with tube 71)
- 2. Shaft
- 3. Adjustment screw for maximum pressure setting
- 4. Adjustment screw for minimum pressure setting
- 5. 6,3 mm AMP terminals
- 6. "O" ring
- 71. Modulating balance tube

If necessary replace complete MODUREG

ADJUSTMENTS and CHECKOUT

IMPORTANT

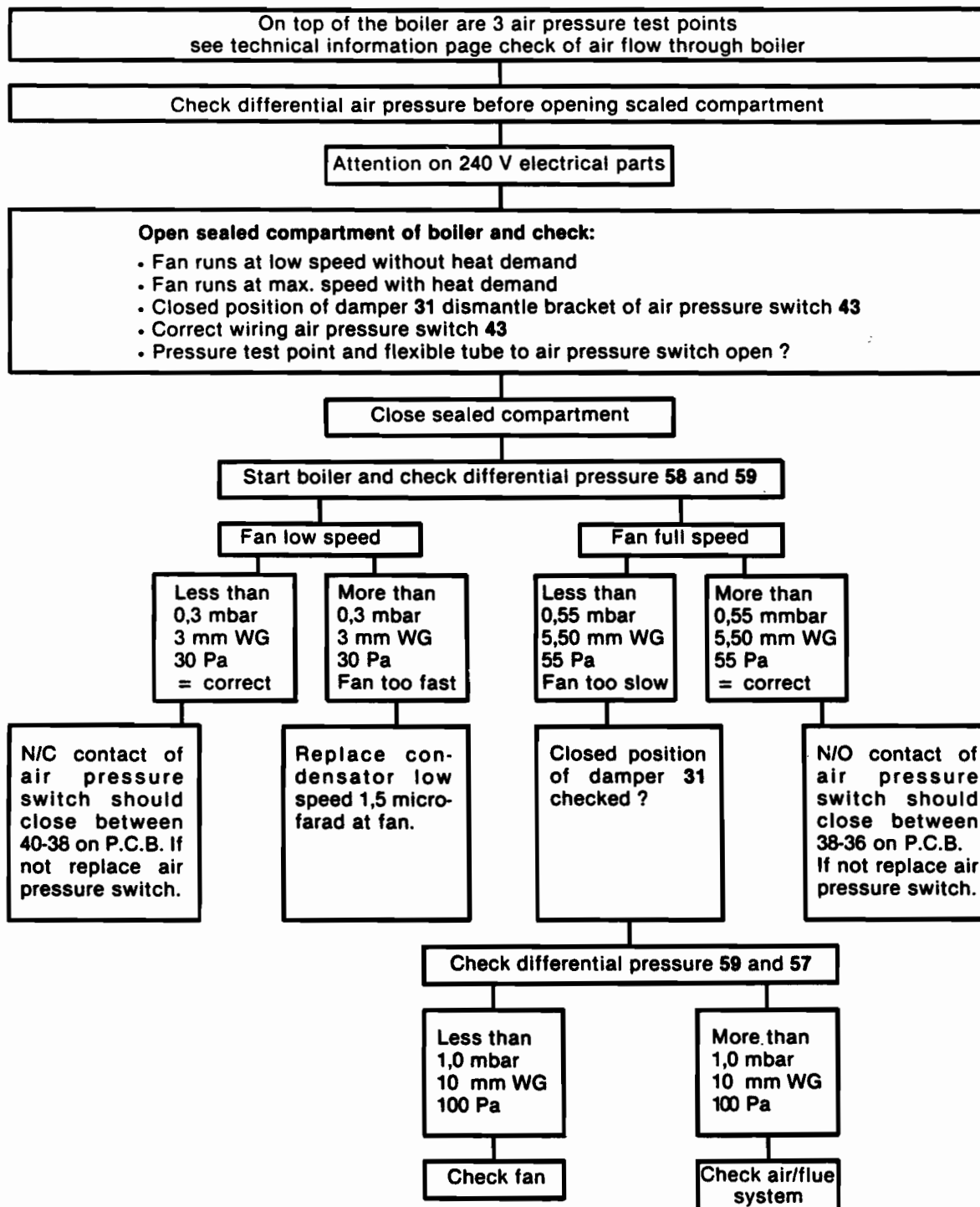
1. Adjustments should be made by qualified personal only.
2. Allow time for pressure to stabilize before making adjustments.
3. It is recommended that the Modureg is operated a few times to ensure correct setting.
4. Cap has to be removed before adjustment can be made.
5. The minimum pressure setting must first be adjusted to ensure that burner will safety light up, then the maximum pressure setting can be adjusted.
6. Any adjustment of minimum pressure setting influences maximum pressure setting.

ADJUSTING MINIMUM and MAXIMUM PRESSURE SETTINGS

1. Connect a suitable pressure gauge to burner pressure test point.
2. Disconnect one electrical connection of Modureg.
3. Wait until minimum pressure is stable.
4. If minimum rate pressure needs adjustment then use a 9 mm wrench to turn the brass nut clockwise to increase or counter-clockwise to decrease pressure, until the desired minimum outlet pressure is obtained.
5. Replace cap.
6. Check several times if main burner lights easily and reliable at minimum pressure (with cap replaced).
7. Remove cap again.
8. Push top of the shaft gently downwards to the red nut and check pressure.
9. If maximum rate pressure needs adjustments then use a 7 mm wrench to turn the red nut clockwise to increase and counter-clockwise to decrease pressure.
10. Check minimum and maximum setting several times by releasing and pushing the top of shaft gently.
11. Replace cap.
12. If minimum and maximum pressures are set, wire Modureg into the circuit.



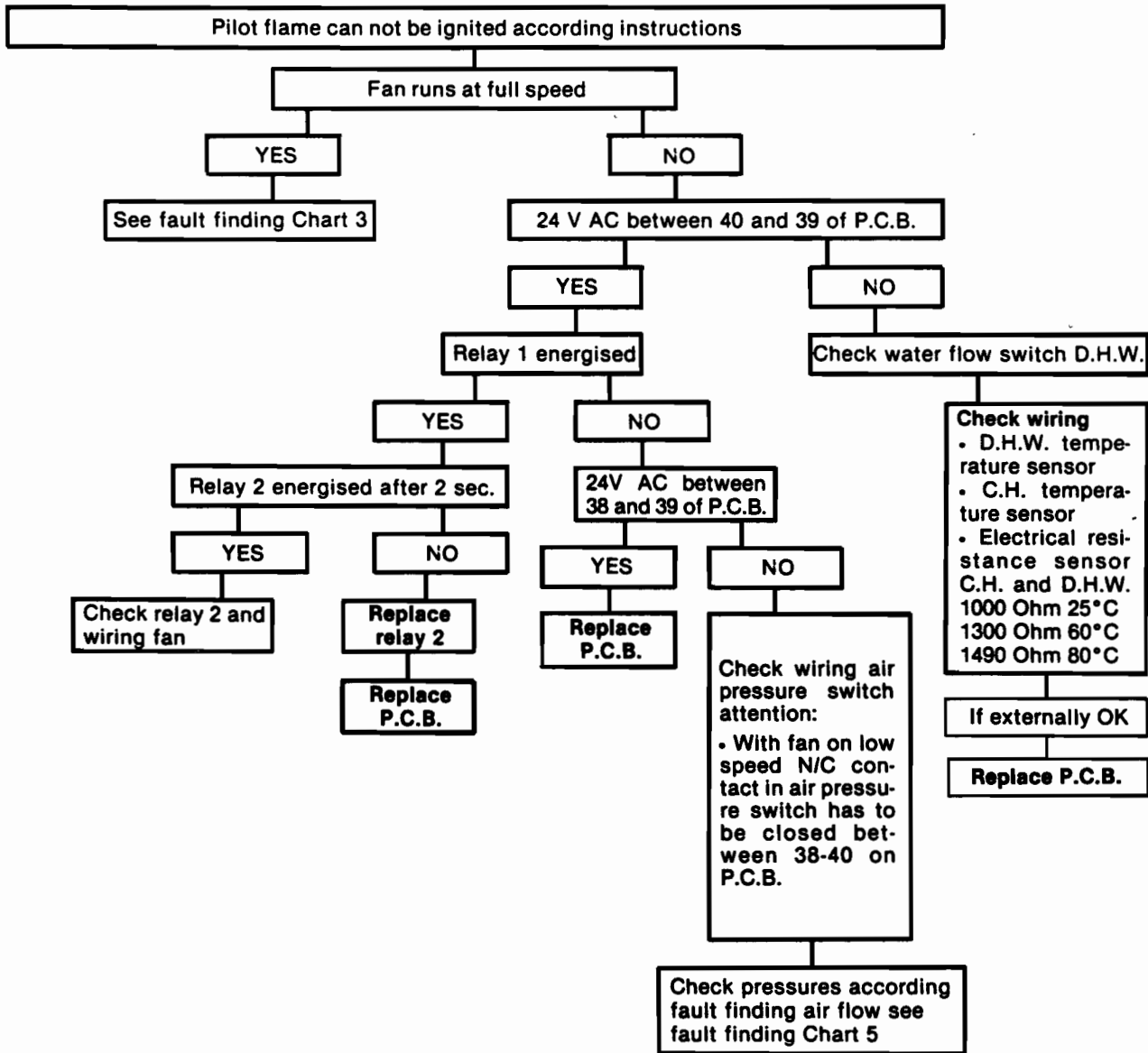
General Test + Fault Finding Air Flow - Chart 5





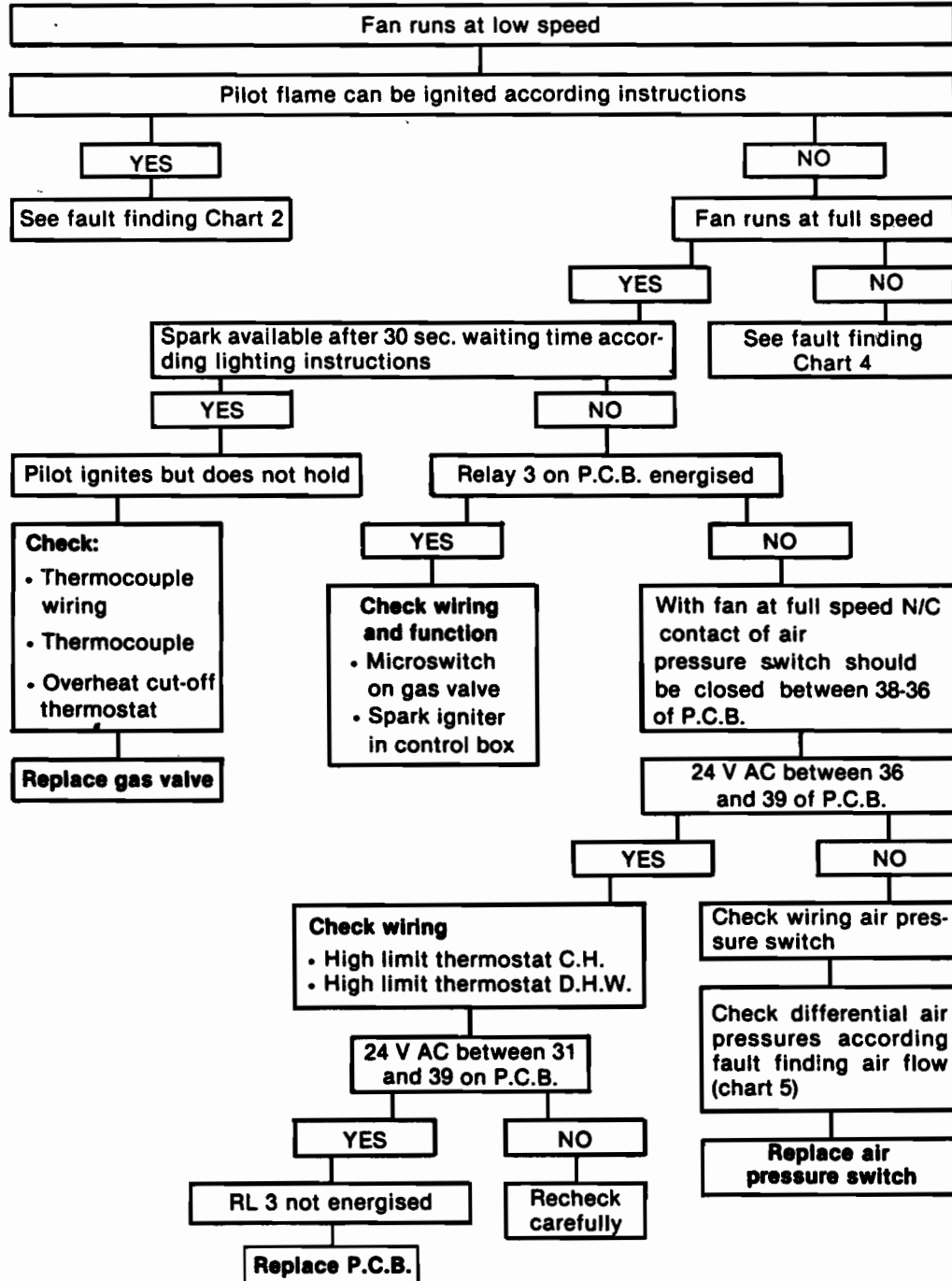
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General test + Fault Finding - Chart 4





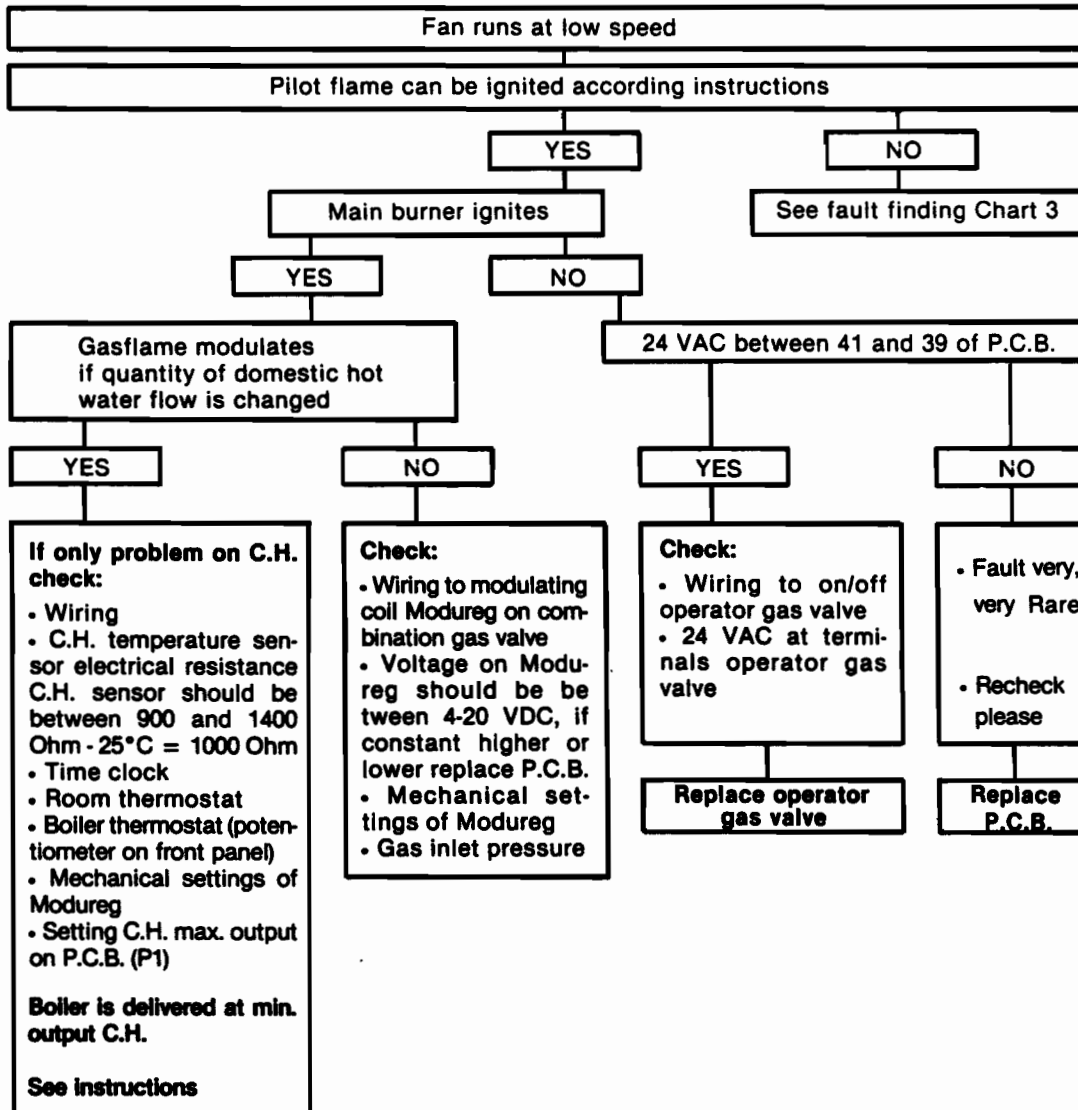
General Test + Fault Finding - Chart 3





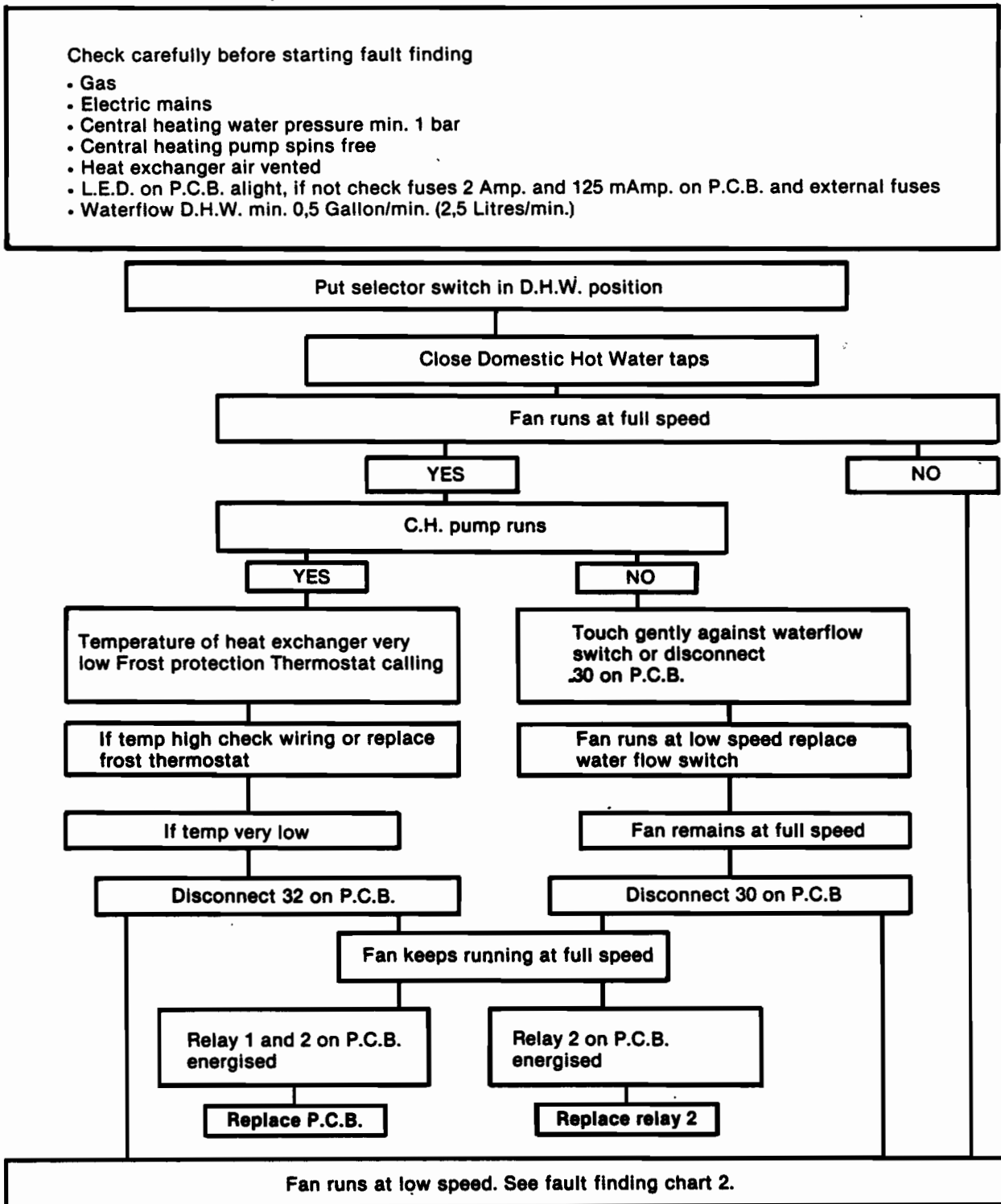
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General Test + Fault Finding - Chart 2





General Test + Fault Finding - Chart 1





General fault finding

To the User/Installer

Check before calling service engineer:

1. Gas available (check kitchen and gascocks)
2. Electrical mains (test with other electrical equipment)
3. Water pressure Central Heating System (min. 1 bar on pressure gauge)
4. Water flow domestic hot water (min. 0,5 Gall./min. - 2,5 L/min.)
(fills a 1 pint milk bottle in max. 15 seconds).
5. Selector switch on boiler in position central heating continuous.
6. Is central heating pump running.
7. Air inlet/flue outlet free from obstacles.
8. Are all service cocks open ?
9. Is at least one radiator valve or bypass in Central Heating system open ?

Important - See also page Filling C.H. - Flushing C.H. - Descaling D.H.W.

To the Service Engineer:

Always follow the complete General test Procedure to make sure that no fault remains unnoticed.

Never disconnect any wire without previous testing. It is possible that a fault disappears after disconnecting and rewiring the fastons.
This fault will come back later.

Never pull on the wires in the Fastons. To disconnect the Fastons pull on the insulation of the Fastons with pliers, keep the terminal pushed back with a screwdriver.



Short explanation on electrical functional drawing. 8 V DC.

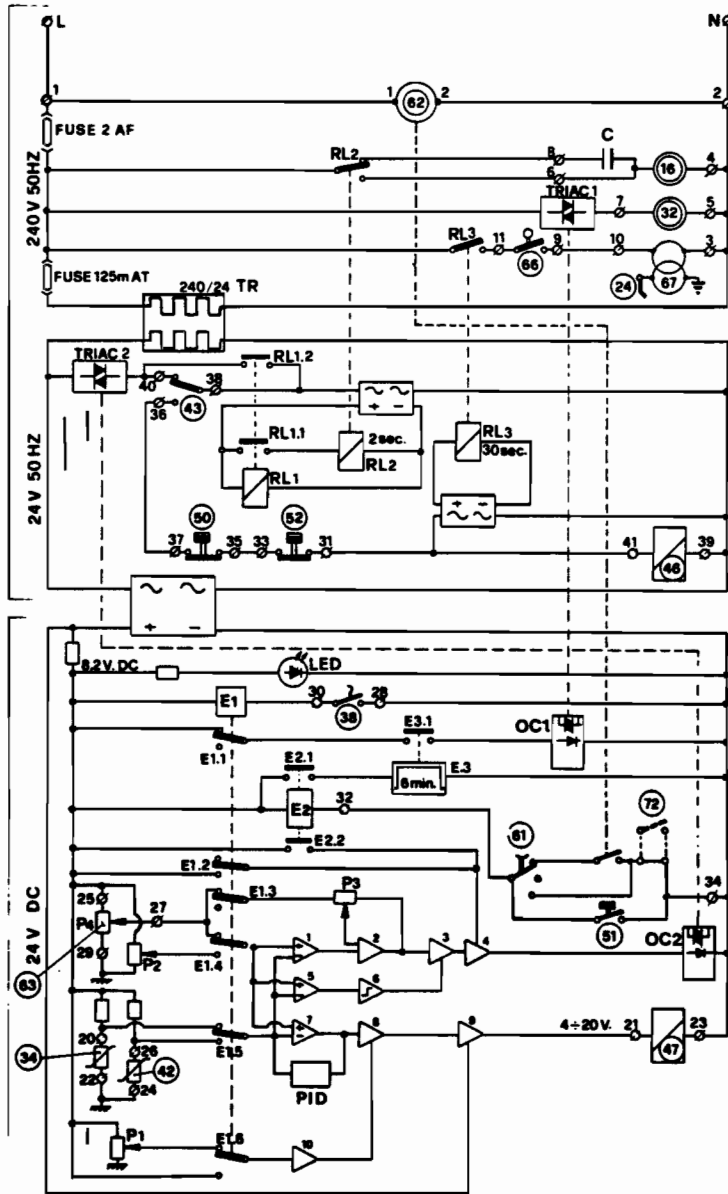
- 5 8V DC electronic control system**
- 5.1 On the 8V DC output is a LED (Light Emitting Diode - Mini Lamp.) to indicate if 8V DC is available, if not replace fuses.
- 5.2 Domestic water flow switch; contact closed if water is running (minimum 2.5 L/min.).
- 5.3 Electronic relay E1 (if activated by the water flow switch) switches the control system from central heating to domestic hot water and gives priority to Domestic Hot Water.
- 5.4 Central Heating Flow temperature sensor and Domestic Hot Water temperature sensor are electrical resistors with a positive temperature coefficient (P.T.C.).
1000 Ohm at 25 degr. C. - 1300 Ohm at 60 degr. C. - 1490 Ohm at 80 degr. C.
(These must not be looped for testing purposes as that will indicate "no heat required").
- 5.5 Function of 8V DC circuit.
- 5.5.1 Domestic Hot Water Taps Closed: Contacts of electronic relay E1 as shown.** Central heating continuous (selector switch turned to the right, Time Clock contact will be linked).
- 5.5.1.1 Electronic relay E2 is activated and E2.1 will switch on the electronic pump-over run-relay E3. Contact E3.1 will switch on the C.H. pump through the optocoupler OC1 + Triac 1. The (electronic) contact E3.1 of the pump overrun relay E3 will remain closed for 6 min., even if the relay E3 is not energised anymore. This gives a 7 min. pump overrun after contact E2.1 breaks.
- 5.5.1.2 **Attention** - The C.H. pump will be switched off immediately if the optocoupler OC1 is not activated anymore (for example on activation of relay E1 through the water flow switch and break of contact E1.1).
- 5.5.1.3 Amplifier 1 compares the Set Point of the central heating boiler thermostat (potentiometer on front panel) with the actual temperature of the C.H. sensor. If set point is higher as actual value, amplifier 2 and 3 will be activated and if relay E2 is switched on, contact E2.2 is closed and the amplifier 4 will activate the optocoupler 2 + Triac 2 to start the fan at full speed through relays RL1 and RL2.
- 5.5.1.4 Amplifier 2 is a differential on/off amplifier set by potentiometer P3 on the P.C.B. This amplifier controls electronically the on/off differential of the flow temperature C.H.
- 5.5.1.5 Amplifiers 5 and 6 are security amplifiers which check if there is not an abnormal situation on the temperature sensors. For example with an abnormal low electrical resistance (sensor linked) the amplifier 5 will switch off amplifiers 6,3 and 4. So the fan will be switched to low speed and the burner will be closed down.
- 5.5.1.6 Amplifier 7 is the real modulating amplifier (PID) which controls the power amplifier 9 and so the voltage on the Modureg modulating coil of the combination gas valve. Amplifier 7 compares continuously the set value of the potentiometer P4 with the actual value of the sensor and will control the voltage on the Modureg coil to keep the flow temperature at the set value. If flow temperature is too high (min output burner higher than C.H. absorption) the burner will be on/off controlled by amplifier 1 (see 5.5.1.3). The Modureg can only control the gas flow to the burner within the preset minimum and maximum settings for safe ignition reasons. Min. and max. pressure of Modureg is mechanically set.
- 5.5.1.7 With potentiometer P1 on the P.C.B. the max. output of the power amplifier 9 can be limited, through amplifier 8. On delivery from factory this potentiometer is set to min., giving min. C.H. output.
- 5.5.2 Domestic Hot Water tap open**
Water flow minimum 0,5 Gallon/min. (2,5 L/min.). The contact in the water flow switch closes and relay E1 will be activated.
- 5.5.2.1 Contact E1.1 breaks and central heating pump switches off immediately as there is no control voltage on the pump switch anymore (Pump start immediately again after closing taps).
- 5.5.2.2 Contact E1.2 bypasses all central heating contacts.
- 5.5.2.3 Contact E1.4 switches from the central heating boiler thermostat P4 to the Hot Water temperature set point potentiometer P2 on the P.C.B.
- 5.5.2.4 Contact E1.5 switches from the central heating temperature sensor to the domestic hot water temperature sensor.
- 5.5.2.5 Contact E1.6 switches from max. output C.H. potentiometer to max. output possible.
- 5.6 Function of selector switch Central Heating.
- 5.6.1 Hot Water and Continuous Central Heating see 5.5.1 and 5.5.2.
- 5.6.2 Hot water.
- 5.6.2.1 Fan and burner will start on "call for Heat" from (domestic) water flow switch.
- 5.6.2.2 Fan and burner and C.H. pump will start on call for Heat from frost thermostat. C.H. pump will stop 6 min. after frost thermostat contact breaks.
- 5.6.3 Hot Water and Timed Central Heating (position as shown in the electrical functional drawing).
- 5.6.3.1 See 5.6.2.1
- 5.6.3.2 See 5.6.2.2
- 5.6.3.3 Fan and burner and C.H. pump will start on call for heat from Time Clock and Room thermostat (if fitted) C.H. pump will stop 6 min. after Time Clock or Room thermostat (if fitted) contacts break.



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Electrical functional drawing - See note

See explanation 1 + 3



See explanation 4 + 5

Key

- 16. Fan
- 24. Spark electrode
- 32. Central heating pump
- 34. C.H. flow temperature sensor
- 38. Cold water flow switch
- 42. D.H.W. temperature sensor
- 43. Air pressure switch
- 46. Operator gas valve
- 47. Modulating regulator (Modureg) gas valve
- 50. Heat exchanger limit thermostat
- 51. Heat exchanger frost thermostat
- 52. D.H.W. limit thermostat
- 61. C.H. selector switch
- 62. Time clock (if fitted)
- 66. Microswitch combination gas valve
- 67. Ignition transformer
- 72. Room thermostat (not fitted)

Fitted on P.C.B.:

- OC Optocoupler
- RL Mechanical relay
- E Electronic relay
- P3 Differential on/off C.H. temperature
- P2 D.H.W. temperature set point
- P1 Max. output C.H.

NOTE - All Contacts shown in following condition

- No electrical mains
- No domestic hot water flow
- Temperature too low (all mechanical thermostats closed)



Short explanation on electrical functional drawing. 240 V AC - 24 V AC - 24 V DC

- 1 All contacts shown in following condition.
- No electrical mains voltage - No domestic hot water flow - Temperature too low (all mechanical thermostats closed)
 - 1.1 The electrical systems can be divided on 4 main areas.
 - 1.2 240 V AC With fan, C.H. pump, sparkigniter Time Clock, and fuses.
 - 1.3 24 V AC With 3 relays, on/off operator of combination gas valve.
24 V AC is available from a 240V/24V transformer.
 - 1.4 24 V DC For power supply to the modulating coil (Modureg) of combination gas valve.
 - 1.5 8 V DC For electronic control system.

- 2 **240 V AC Fuses 2 Amp. F (Fast) and 125 m AMP T. (125 milliamp Timed)**
 - 2.1 RL2 contact of relay 2 controls directly the fan speed between low speed (through the 1,5 microfarad condensator) and full speed if coil of relay 2 is energised.
 - 2.2 Pump controlled by an electronic on/off switch (Triac 1 + optocoupler is comparable to a contact + coil of a mechanical relay).
 - 2.3 Spark igniter generates high voltage as soon as contact RL3 of relay 3 and microswitch on the combination gas valve are closed (microswitch will close with control knob of combination gas control fully depressed).
Attention - Relay 3 has a 30 sec. electronic delay! (pre-purge time!).

- 3 **24 V AC**
 - 3.1 Connection 40 on P.C.B. is electronically switched on/off through Triac 2.
 - 3.2 Connection 40 on P.C.B. will be switched "on" as soon as there is any heat demand for heat from central heating or domestic hot water.
 - 3.3 In stand-by situation the air pressure switch should be in shown position (38-40 closed) and the fan should be at low speed.
 - 3.4 If 38-40 is not closed, relays 1 and 2 will not be activated any more. This is a safety check on the correct function of the air pressure switch (no air pressure with fan at low speed).
 - 3.5 With 24 V AC between 40 and 39 (Triac 2 switched on, on heat demand) and air pressure switch in the shown position, relay 1 will be activated.
 - 3.6 The Relay 1 activates relay 2 and links the N.C. position of the air pressure switch, Relay 2 has a 2 sec. electronic delay and after 2 sec. the fan will be switched to full speed.
 - 3.7 The switch in the air pressure switch will change position if air flow is high enough for safe combustion.
 - 3.8 The on/off operator in the gas valve will be activated if the high limit thermostats (heat exchanger and D.H.W.) demand heat.
 - 3.9 If during a period of at least 30 seconds after starting the fan at full speed, the air pressure switch was switched in the safe position (38-36 closed) the contact RL 3 of relay 3 will close (30 sec. time delay relay 3).
 - 3.10 Depressing fully the knob of the combination gas valve, the microswitch will close and a spark will be generated (for ignition of the pilot).

- 4 **24V DC**
 - 4.1 24V DC is necessary for the power supply of the power amplifier 9, which drives the modulating coil (Modureg) on the combination gas control. Operating voltage on the coil is between 4 Volt and 20 Volt DC.
 - 4.2 **Attention - Never link the modulating coil with a wire or ampere tester. Part of the P.C.B. will be destroyed. Testing can only be done with a voltage tester!.**



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General wiring diagram

- 16. Fan
- 23. Thermocouple
- 24. Spark electrode
- 32. Central heating pump
- 34. C.H. flow temperature sensor
- 38. Cold water flow switch
- 42. D.H.W. temperature sensor
- 43. Air pressure switch
- 46. Operator gas valve
- 47. Modulating regulator (Modureg) gas valve
- 49. Overheat cut-off thermostat
- 50. Heat exchanger limit thermostat
- 51. Heat exchanger frost thermostat
- 52. D.H.W. limit thermostat
- 61. C.H. selector switch
- 62. Time clock (if fitted)
- 63. C.H. boiler thermostat
- 66. Microswitch combination gas valve
- 67. Ignition transformer
- 72. Room thermostat (not fitted)

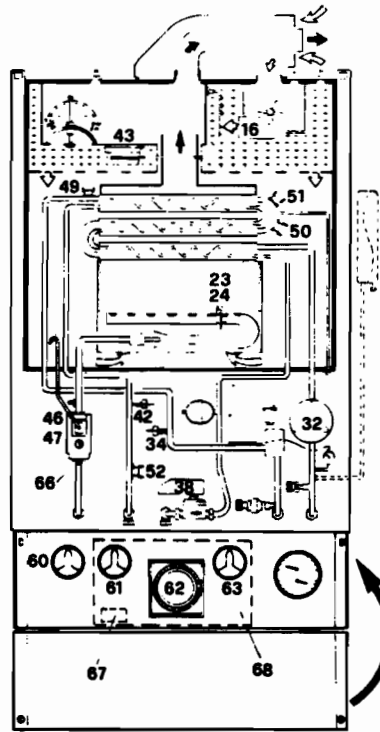


Fig. 1

61. C.H. selector switch



- Heating timed and hot water
- Hot water only
- Heating continuous and hot water

Fig. 2

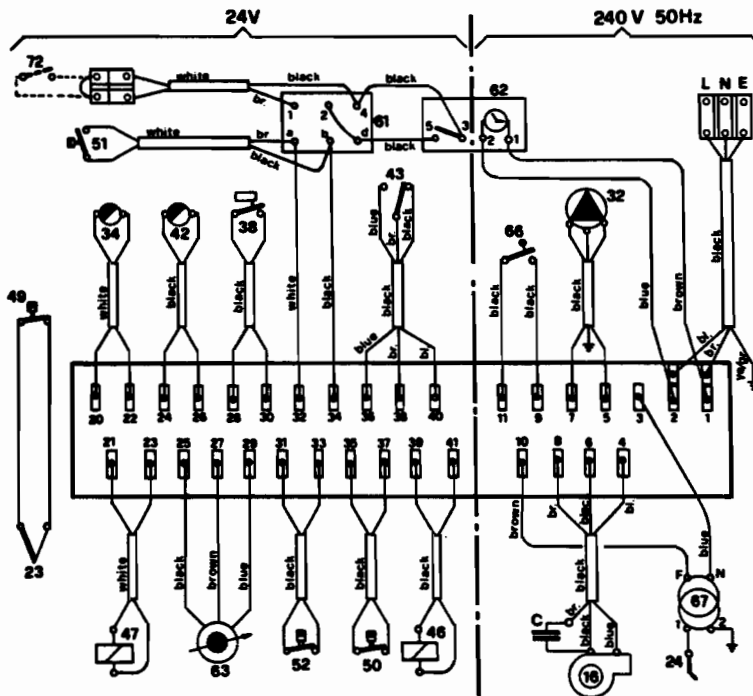


Fig. 3



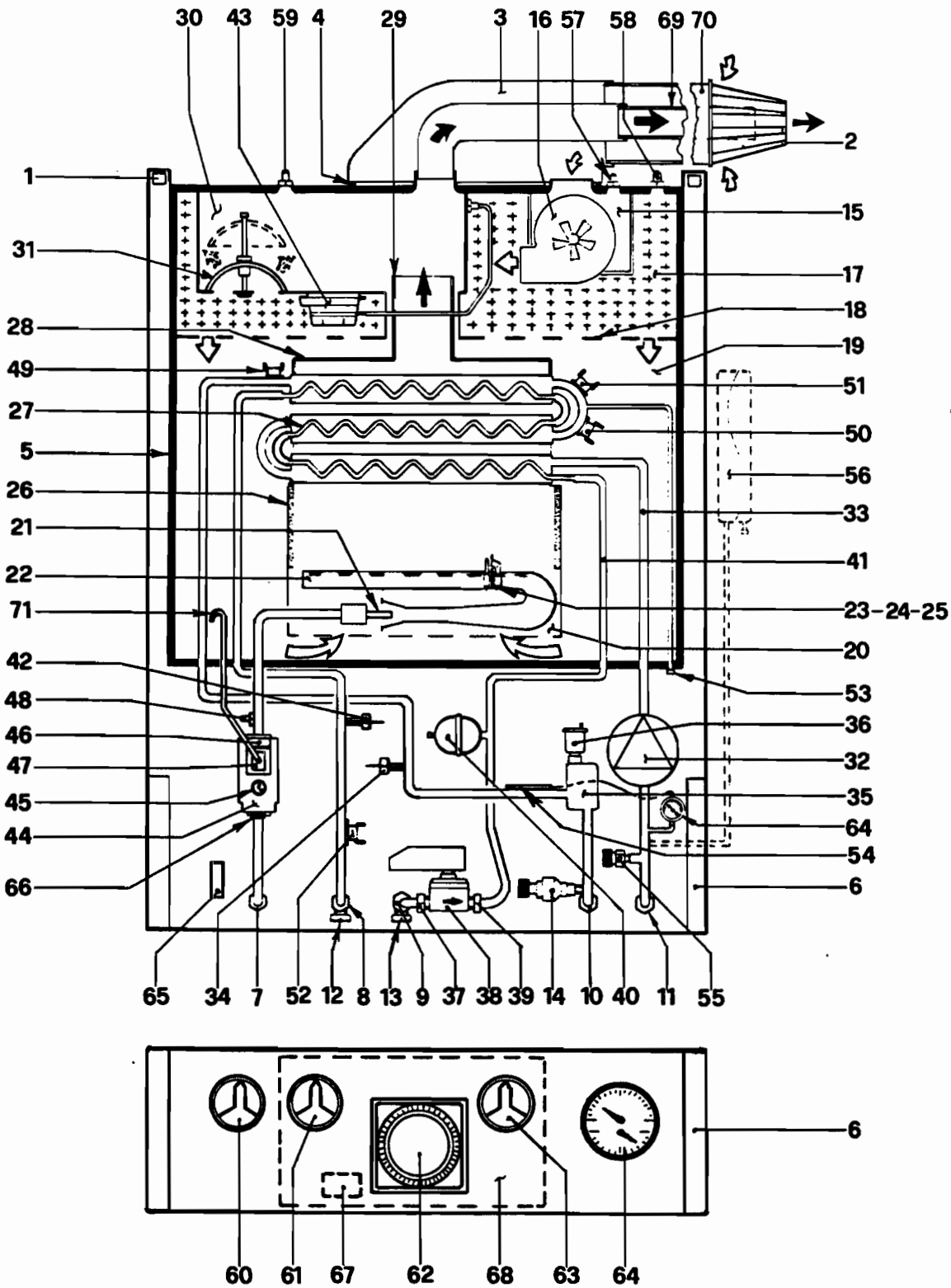
KEY to boiler Flow diagram

1. Fixing point
2. Flue terminal
3. Flue/air intake hood
4. Sealing gasket
5. Room sealed compartment
6. Control panel
7. Gas inlet
8. Domestic hot water outlet
9. Cold water inlet
10. Central heating flow outlet
11. Central heating return inlet
12. D.H.W. draining point
13. Cold water draining point
14. Central heating safety valve
15. Air inlet to fan
16. Fan
17. Air outlet from fan (+ + +)
18. Air distribution screen
19. Combustion - heat exchanging compartment
20. Burner assembly
21. Main injector (4)
22. Burner (4)
23. Thermocouple
24. Spark electrode
25. Pilot
26. Combustion chamber insulation
27. Copper heat exchanger for C.H. + D.H.W.
28. Flue collector from heat exchanger
29. Internal flue exit
30. Flue/surplusair collector
31. Air pressure control damper
32. Central heating pump
33. C.H. waterway of the heat exchanger
34. C.H. flow temperature sensor
35. Air separator
36. Automatic air vent
37. Cold water inlet filter
38. Cold water flow switch
39. Cold water flow limiter
40. Domestic hot water expansion vessel
41. D.H.W. waterway of the heat exchanger
42. D.H.W. temperature sensor
43. Air pressure switch
44. Combination gas valve
45. Knob gas valve
46. Operator gas valve
47. Modulating regulator (Modureg) gas valve
48. Burner pressure test point
49. Overheat cut-off thermostat
50. Heat exchanger limit thermostat
51. Heat exchanger frost thermostat
52. D.H.W. limit thermostat
53. Heat exchanger venting point
54. Temperature sensing bulb
55. C.H. pump drain
56. Expansion vessel
57. Fan air inlet pressure test point
58. Fan air outlet pressure test point
59. Flue outlet pressure test point
60. Extended control knob to gas valve
61. C.H. selector switch
62. Time clock
63. C.H. boiler thermostat
64. C.H. temperature/pressure gauges
65. 240 V + room stat terminal blocks
66. Microswitch combination gas valve
67. Ignition transformer
68. Control box with P.C.B.
69. Inner flue duct
70. Outer air intake duct
71. Modulating balance tube
72. Room thermostat (not fitted)



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Boiler flow diagram





Electricity supply and external controls

Warning - This appliance must be earthed

Inside the boiler are two terminal blocks.

- One 3 pole 240 V
- One 2 pole 24 V

These are accesible after removing white bottom panel of the boiler.

- 240 V AC fuse rating 3 Amp. in permanent live supply (external of boiler).
- 24 V terminal block with plug is linked on delivery.
- Only a two-wire stat should be used. Never connect a Neutral into the stat.
- For two wire room stat remove link and wire roomstat.

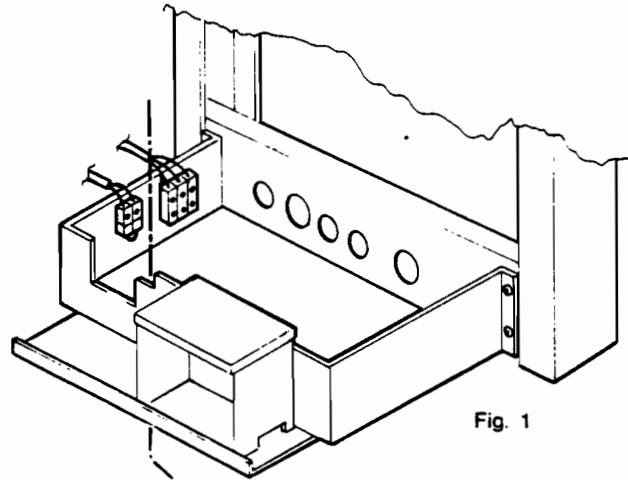


Fig. 1

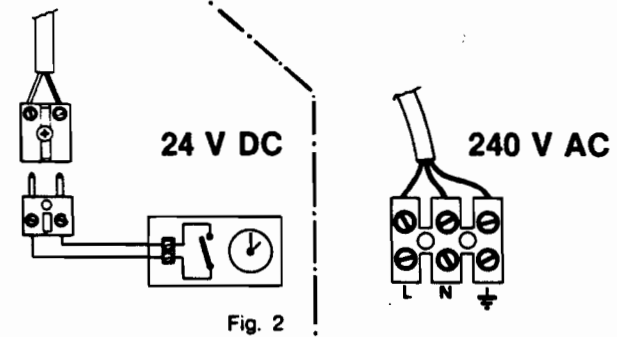


Fig. 2

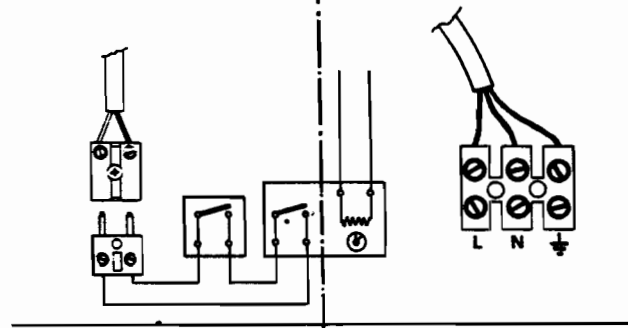


Fig. 3

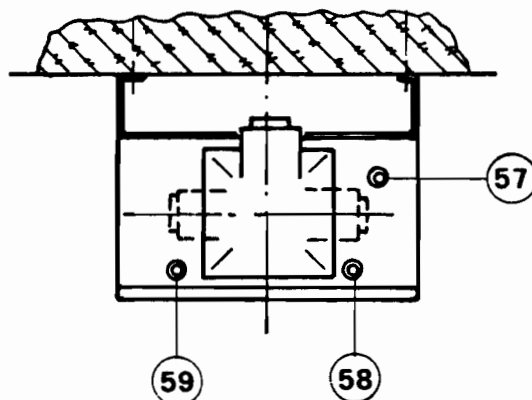
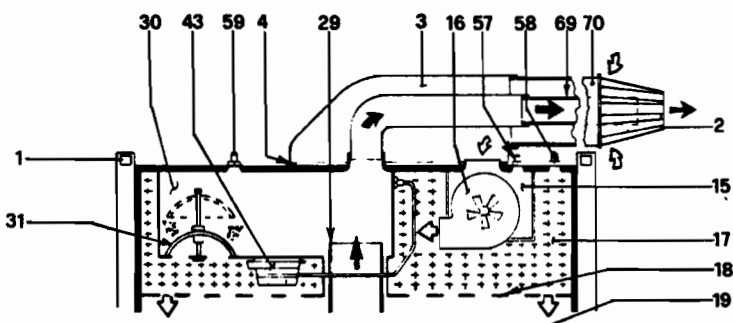
Important Note - The contact of any external control has to be zero voltage.

Warning - Any external voltage (240 V or low voltage) applied to the 24 V terminal block or internal wiring of the boiler, will damage the P.C.B. in the control box.



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Check of AIR Flow through boiler



Top view of boiler

Pressure Test Points

- 57 - Fan air inlet pressure test point
- 58 - Fan air outlet pressure test point
- 59 - Flue outlet pressure test point

Top view boiler

On top of the boiler are three pressure test points with which the correct pressure and air flow of the air can be checked.

Attention - It is always necessary to measure **differential** pressure because the boiler is a room sealed appliance.

58 - 59 Differential pressure on damper **31** and air pressure switch **43**.

59 - 57 Differential pressure on external air/flue duct.

58 - 57 Differential pressure fan **16**.

Checks:

1. On low speed the **differential pressure** between points **58** and **59** should be no more than 0,3 mbar - 3 mm WG-30 Pa.
2. On full speed **differential pressure** between **58** and **59** should be no less than 0,55 mbar - 5,5 mm WG-55 Pa.
3. If less than 0,55 mbar: check differential pressure between **59** and **57** On full speed **differential pressure** between **59** and **57** should be to no more than 1,0 mbar - 10 mm WG-100 Pa. If more check flue ducting.
4. If differential pressure **58** and **59** less than 0,55 mbar and differential pressure **59** and **57** less than 1,0 mbar check air pressure damper **31** and fan **16**.



Wiring diagram components

43. Air pressure switch

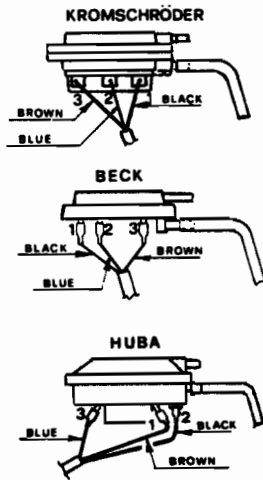


Fig. 1

16. Fan

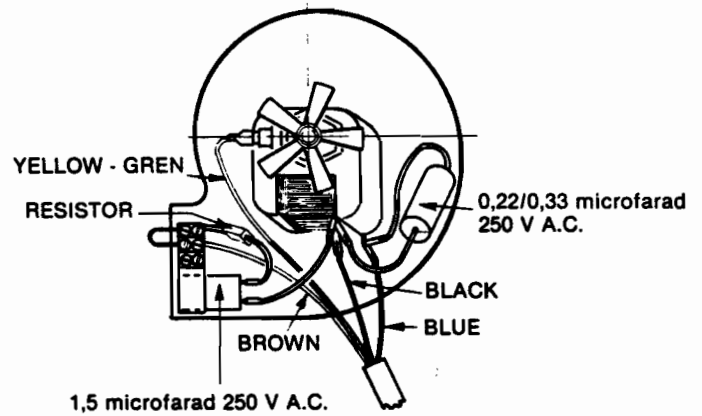


Fig. 2

NOTE 1 - Never pull on the fastons. To disconnect the fastons, pull on the insulation of the fastons with pliers, keep the P.C.B. or the terminal pushed back with a screwdriver.

NOTE 2 - The P.C.B. is fastened with plastic spring fasteners. Use pliers to compress the top of the fastener from the front. Then pull gently the P.C.B. to front. Fasteners remains fixed to the control box!

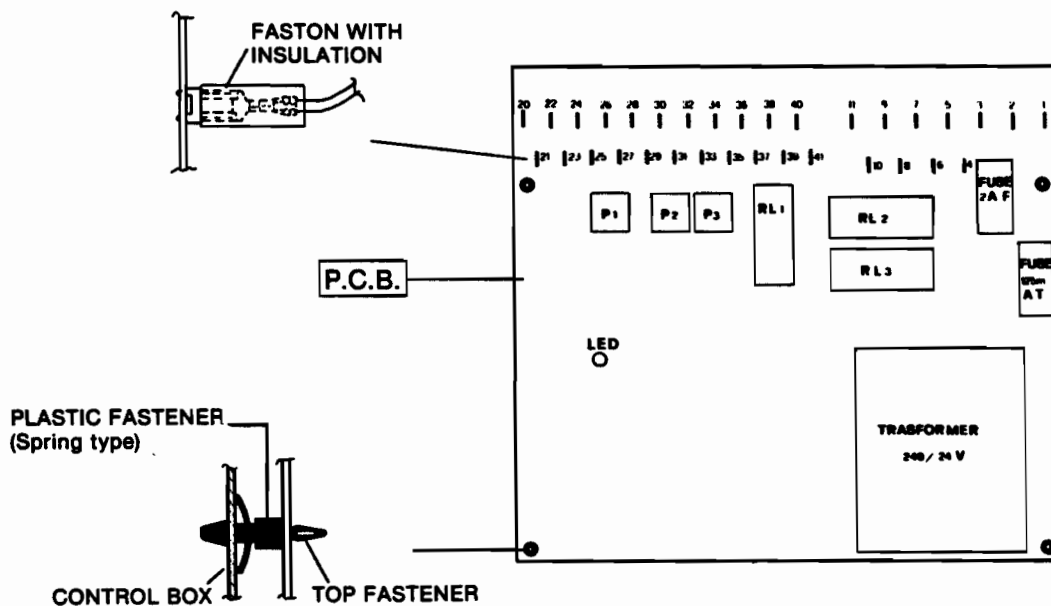


Fig. 3



Mounting Details

Thermostats - pilot - gas valve

Fig. 1

- 50. Heat exchanger limit thermostat (black cable)
- 51. Heat exchanger frost thermostat (white cable)

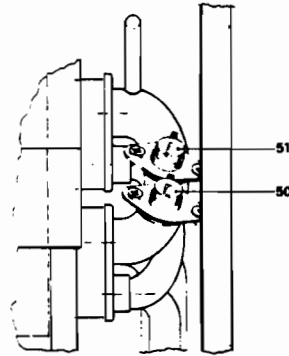


Fig. 1

Fig. 2 - Pilot assembly (for replacement: unscrew central screw and pull pilot assembly to bottom)

- 22. Burner
- 23. Thermocouple
- 24. Spark electrode (for replacement: pull to bottom)
- 25. Pilot

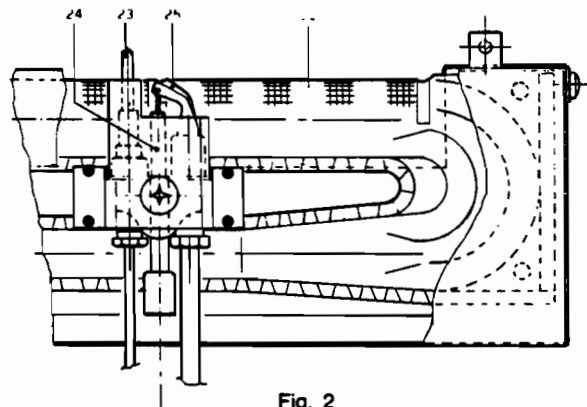


Fig. 2

Fig. 3

- 23. Thermocouple
- 45. Gas valve
- 46. Operator gas valve
- 47. Modulating regulator (Modureg) gas valve
- 49. Eco Connector to overheat cut-off thermostat
- 66. Microswitch combination gas valve for ignition
- 71. Modulating balance tube

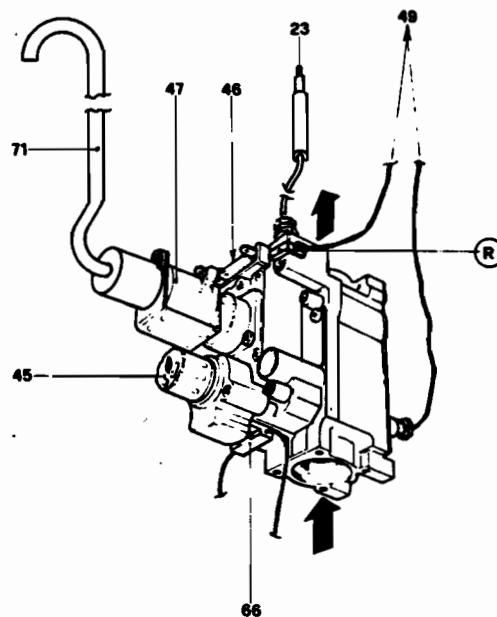
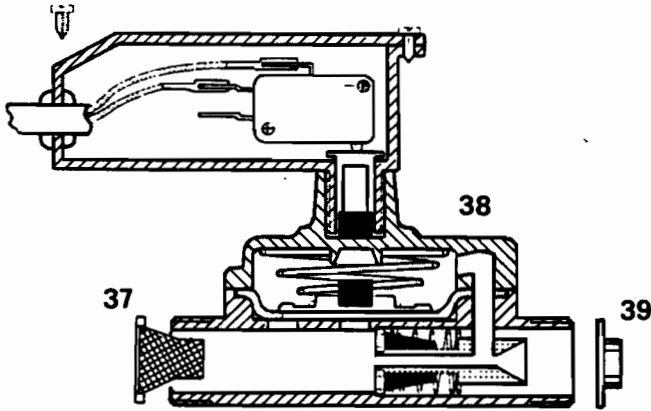


Fig. 3



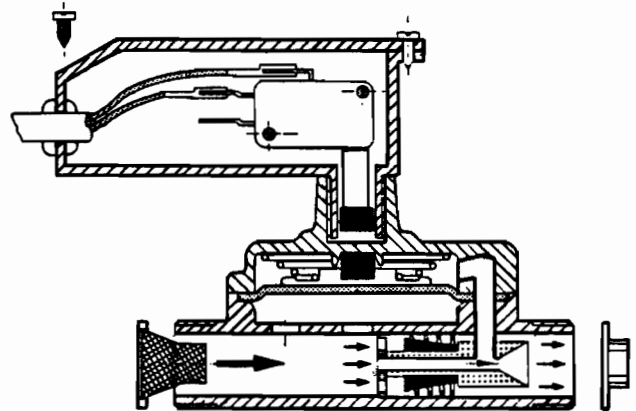
Details Domestic Water Flow Switches (In Cold Water Inlet)

A. Membrane Type + microswitch



without flow

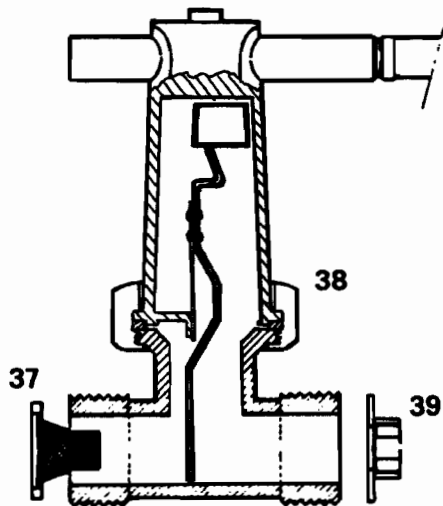
Fig. 1



with flow →

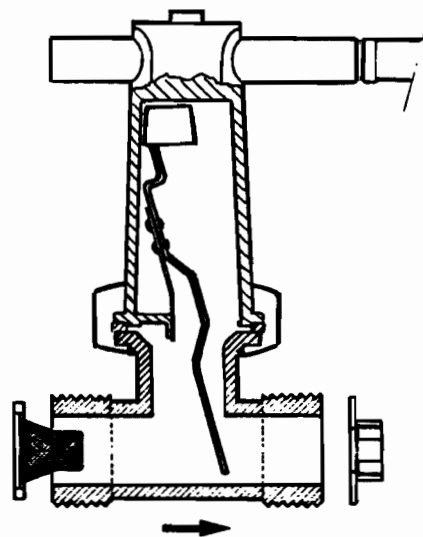
Fig. 2

B. Paddle Type + Reed Contact



without flow

Fig. 3



with flow →

Fig. 4

- 37. Cold water inlet filter
- 38. Cold water flow switch
- 39. Cold water flow restrictor

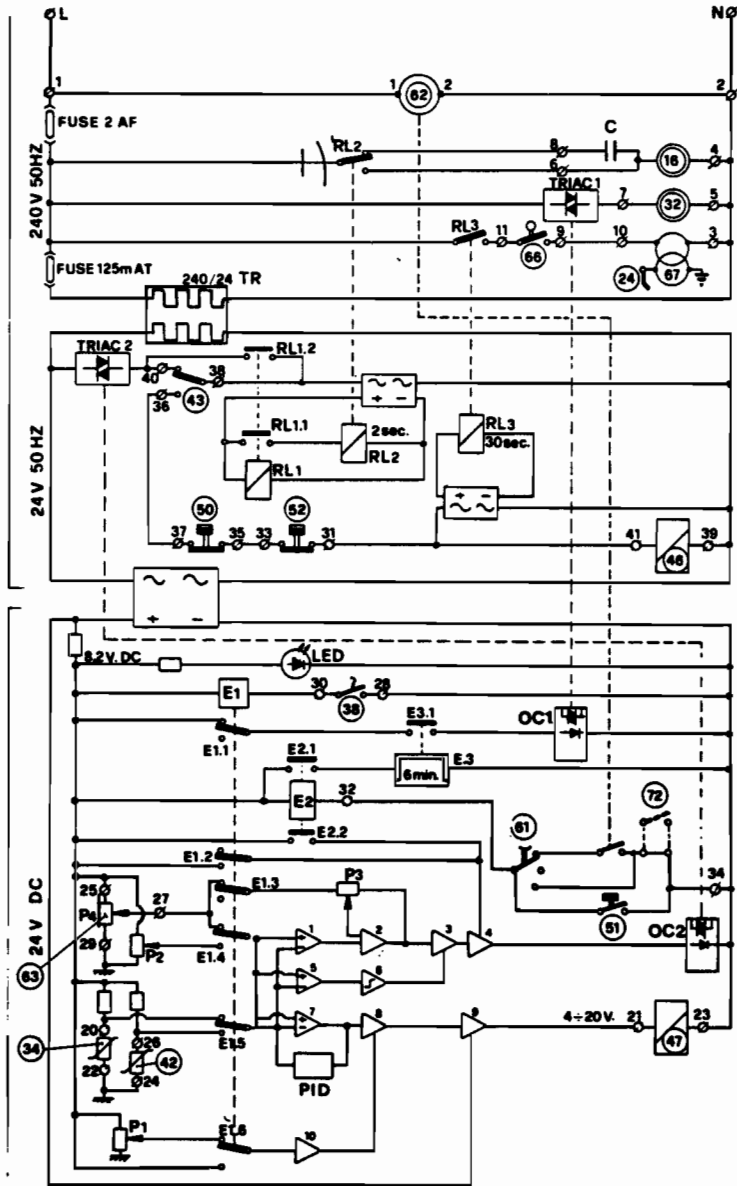


FERROLI COMBI 76 FF

Electrical functional drawing - See note

See explanation 1 + 3

See explanation 4 + 5



Key

- 16. Fan
- 24. Spark electrode
- 32. Central heating pump
- 34. C.H. flow temperature sensor
- 38. Cold water flow switch
- 42. D.H.W. temperature sensor
- 43. Air pressure switch
- 46. Operator gas valve
- 47. Modulating regulator (Modureg) gas valve
- 50. Heat exchanger limit thermostat
- 51. Heat exchanger frost thermostat
- 52. D.H.W. limit thermostat
- 61. C.H. selector switch
- 62. Time clock (if fitted)
- 66. Microswitch combination gas valve
- 67. Ignition transformer
- 72. Room thermostat (not fitted)

Fitted on P.C.B.:

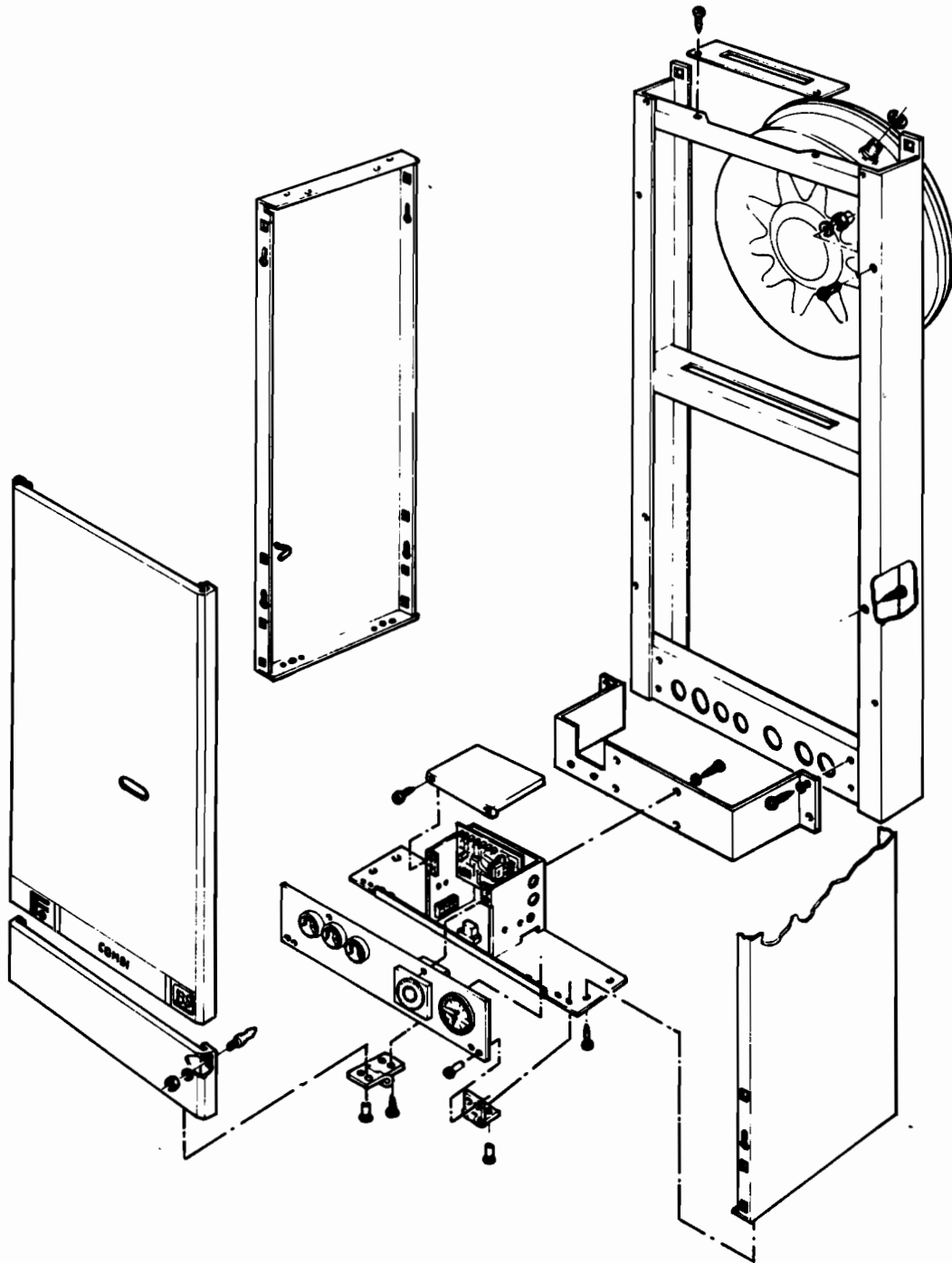
- OC Optocoupler
- RL Mechanical relay
- E Electronic relay
- P3 Differential on/off C.H. temperature
- P2 D.H.W. temperature set point
- P1 Max. output C.H.

NOTE - All Contacts shown in following condition

- No electrical mains
- No domestic hot water flow
- Temperature too low (all mechanical thermostats closed)



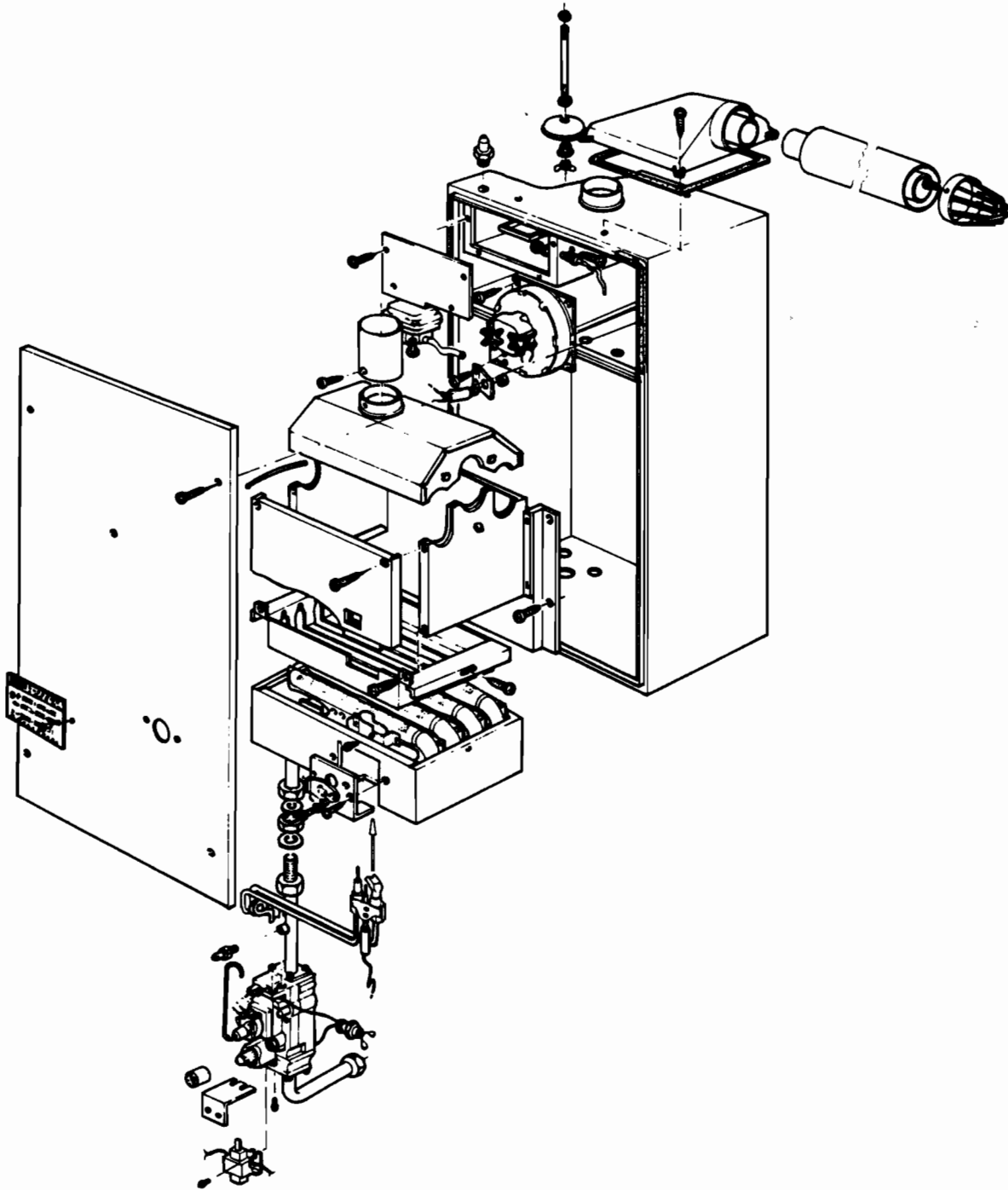
Exploded view jacket





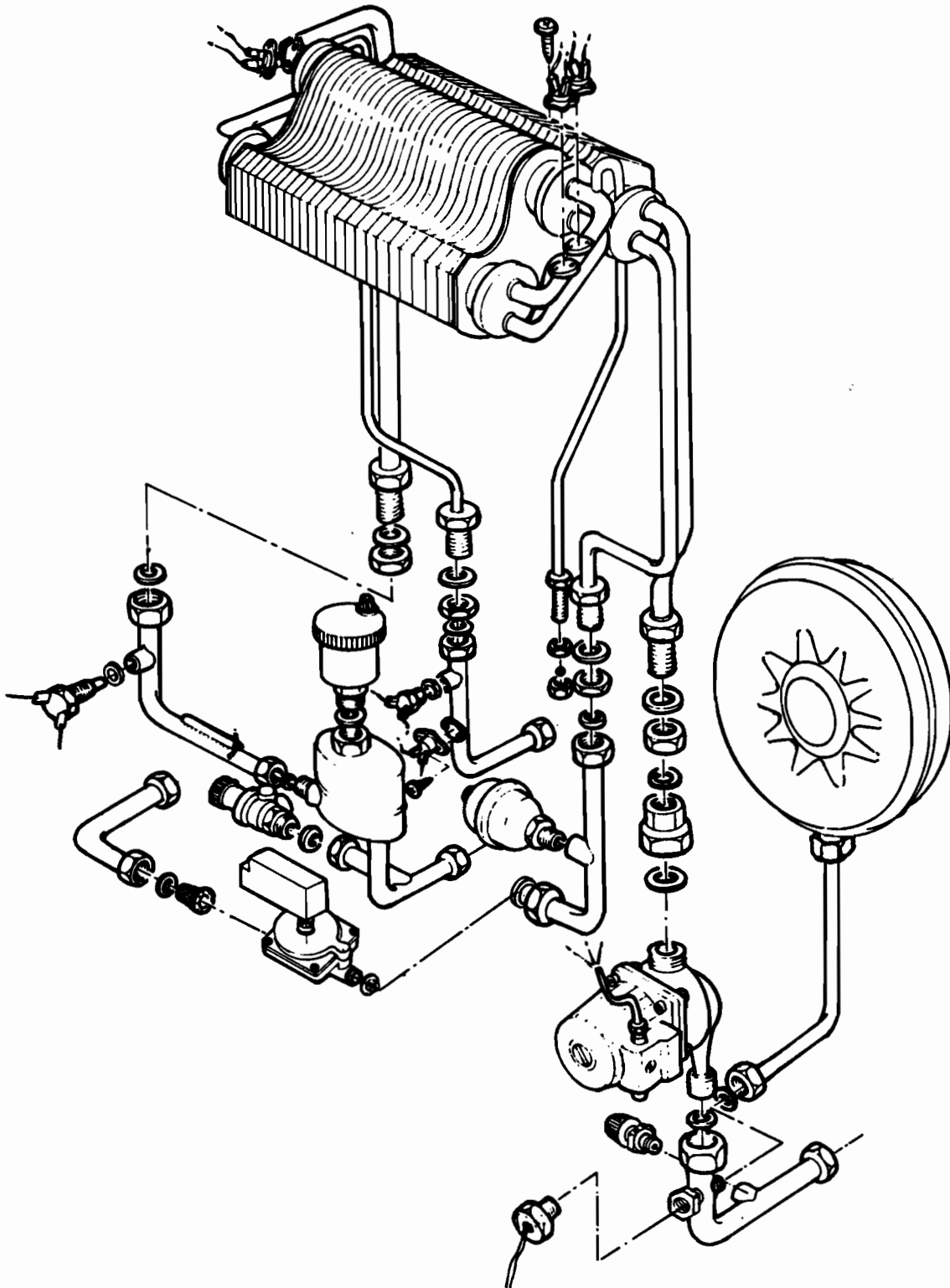
FERROLI COMBI 76 FF

Exploded view gas line and sealed compartment





Exploded view heat exchanger + C.H. and D.H.W. parts

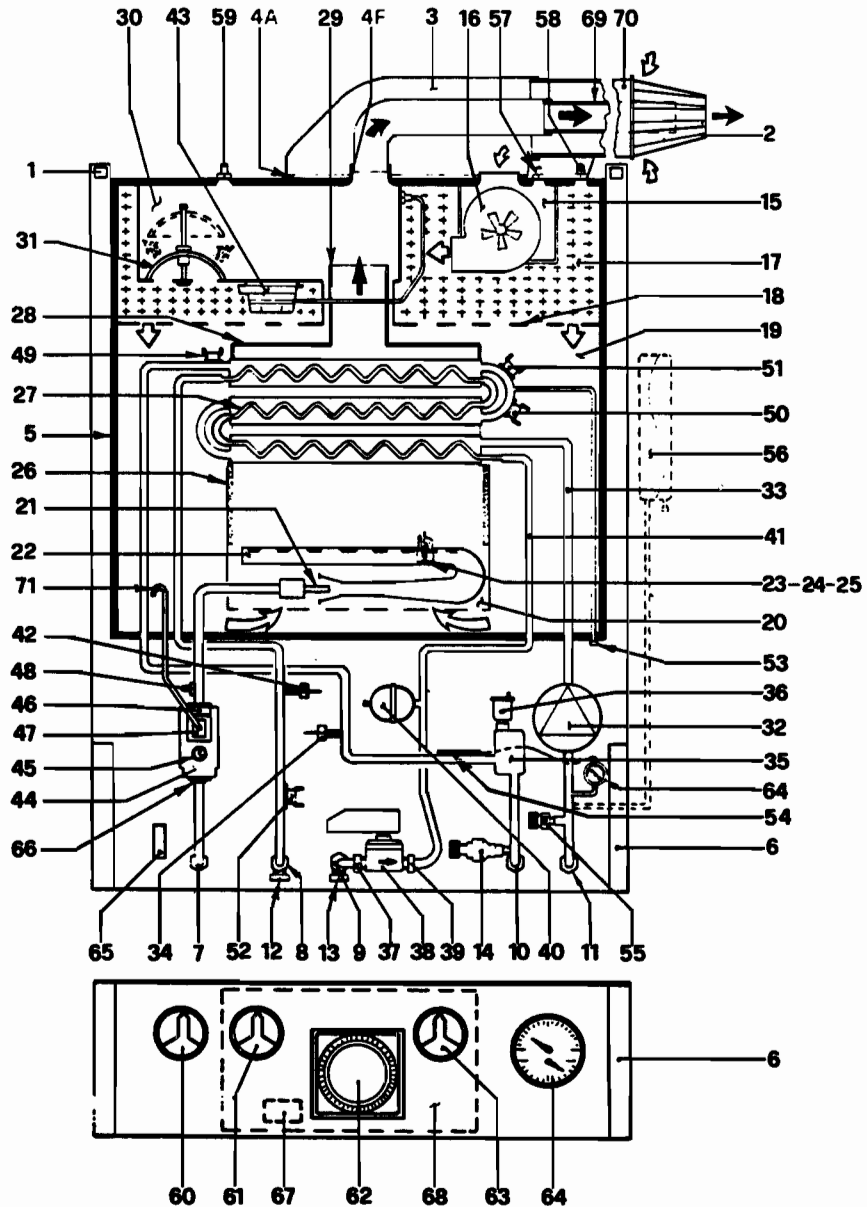




FERROLI COMBI 76 FF

KEY to boiler Flow diagram

1. Fixing point
2. Flue terminal
3. Flue/air intake hood
4. Sealing gasket
5. Room sealed compartment
6. Control panel
7. Gas inlet
8. Domestic hot water outlet
9. Cold water inlet
10. Central heating flow outlet
11. Central heating return inlet
12. D.H.W. draining point
13. Cold water draining point
14. Central heating safety valve
15. Air inlet to fan
16. Fan
17. Air outlet from fan (+ + +)
18. Air distribution screen
19. Combustion - heat exchanging compartment
20. Burner assembly
21. Main injector (4)
22. Burner (4)
23. Thermocouple
24. Spark electrode
25. Pilot
26. Combustion chamber insulation
27. Copper heat exchanger for C.H. + D.H.W.
28. Flue collector from heat exchanger
29. Internal flue exit
30. Flue/surplusair collector
31. Air pressure control damper
32. Central heating pump
33. C.H. waterway of the heat exchanger
34. C.H. flow temperature sensor
35. Air separator
36. Automatic air vent
37. Cold water inlet filter
38. Cold water flow switch
39. Cold water flow limiter
40. Domestic hot water expansion vessel
41. D.H.W. waterway of the heat exchanger
42. D.H.W. temperature sensor
43. Air pressure switch
44. Combination gas valve
45. Knob gas valve
46. Operator gas valve
47. Modulating regulator (Modureg) gas valve
48. Burner pressure test point
49. Overheat cut-off thermostat
50. Heat exchanger limit thermostat
51. Heat exchanger frost thermostat
52. D.H.W. limit thermostat
53. Heat exchanger venting point
54. Temperature sensing bulb
55. C.H. pump drain
56. Expansion vessel
57. Fan air inlet pressure test point
58. Fan air outlet pressure test point
59. Flue outlet pressure test point



60. Extended control knob to gas valve
61. C.H. selector switch
62. Time clock
63. C.H. boiler thermostat
64. C.H. temperature/pressure gauges
65. 240 V + room stat terminal blocks
66. Microswitch combination gas valve
67. Ignition transformer
68. Control box with P.C.B.
69. Inner flue duct
70. Outer air intake duct
71. Modulating balance tube
72. Room thermostat (not fitted)



Short list of spare parts

Boiler flow diagram

KEY N°	FERROLI PART. N°	DESCRIPTION
4A	3510055/0	Air sealing gasket
4F	3510056/0	Flue sealing gasket
14	3690066/0	C.H. safety valve
16	3843911/1	Fan
21	3400585/0	Main injector diam. 2.10 mm Natural Gas
21	3400587/0	Main injector diam. 1.30 mm L.P.G.
23	3670098/0	Thermocouple
24	3670185/0	Spark electrode
25	3670167/0	Pilot Q 385 A
27	3740092/0	Copper heat exchanger for C.H. and D.H.W.
32	3660090/0	Central heating pump
34	3831080/3	Temperature sensor (C.H. + D.H.W.)
36	3690088/0	Automatic air vent
37	3400808/0	Cold water inlet filter
38	3640158/0	Cold water flow switch
39	3690103/0	Cold water flow restrictor 10 L/min.
40	3680179/0	D.H.W. expansion vessel
42	3831080/3	Temperature sensor (C.H. + D.H.W.)
43	3640140/0	Air pressure switch
44	3680164/0	Combination gas valve V 8600 N
49	3640129/0	Overheat cut-off thermostat 96°C
50	3640128/0	Heat exchanger limit thermostat 85°C
51	3640139/0	Heat exchanger frost thermostat 6/14°C
52	3640146/0	D.H.W. limit thermostat 70°C
56	3680177/0	Expansion vessel C.H.
61	3610024/0	C.H. selector switch
62	3940180/0	Time clock
63	3940848/0	C.H. boiler thermostat
64	3640080/0	C.H. temperature pressure gauge
66	3831429/1	Microswitch combination gas valve
67	3670160/0	Ignition transformer
—	3370057/0	Pilot injector 38/33 A (Natural Gas)
—	3370066/0	Pilot injector 020 P (L.P.G.)
—	3650366/0	Condensator 1.5 microfarad on fan
—	3620023/0	Relay on P.C.B.
—	3831406/0	Eco split-wire
—	3831088/0	Ignition cable
—	3980000/0	P.C.B.
—	3751119/0	Two pipe flue adapter
—	3650462/0	Fuse 2 Amp. F (Fast)
—	3650463/0	Fuse 125 m Amp. T (Timed)
—	3370069/0	Sealing gasket Øe 14.5 Øi 8.0 TH.2
—	3370074/0	Sealing gasket Øe 11.0 Øi 6.0 TH.2
—	3370073/0	Sealing gasket Øe 38.0 Øi 27.0 TH.2
—	3370071/0	Sealing gasket Øe 24.0 Øi 17.0 TH.2
—	3370070/0	Sealing gasket Øe 18.5 Øi 12.5 TH.2
—	3510016/0	Sealing gasket Øe 45.0 Øi 33.5 TH.2
—	3510034/0	Sealing gasket Øe 35.0 Øi 24.0 TH.4
—	3510051/0	Sealing gasket Øe 24.5 Øi 16.0 TH.5
—	3370048/0	Sealing gasket Øe 15.0 Øi 10.0 TH.1
—	3510038/0	Sealing gasket Øe 18.5 Øi 12.5 TH.1,5
—	3370055/0	Sealing gasket Øe 24.0 Øi 17.0 TH.2
—	3510044/0	Sealing gasket 25 x 55 TH.8
—	3510050/0	Sealing gasket OR 3087
—	3510053/0	Sealing gasket OR 2037
—	3510052/0	Sealing gasket OR 112
—	3650386/0	Condensator 0,22/0,33 microfarad on fan
—	3650432/0	Resistor on fan