

Dorchester DR-PF Range of Hot Water Storage Heaters

**Direct Gas Fired Hot Water Storage Heaters
with Forced Draught Burner
for Domestic Hot Water Installations**

Installation, Commissioning and Servicing Instructions

DORCHESTER DR-PF 55, 65, 75, 95, 115, 145 Models

NATURAL GAS I_{2H} LPG I₃₊

**NOTE: THESE INSTRUCTIONS MUST BE READ AND UNDERSTOOD BEFORE
INSTALLING, COMMISSIONING, OPERATING OR SERVICING EQUIPMENT.**

**THIS WATER HEATER IS FOR USE ON GROUP H NATURAL GAS (2ND FAMILY) I_{2H} OR
LPG (3RD FAMILY) I₃₊. PLEASE ENSURE RELEVANT INFORMATION REQUIRED WITHIN
DOCUMENT IS FOUND RELATING TO SPECIFIC GAS TO BE FIRED BEFORE FIRING
HEATER.**

THIS WATER HEATER COMPLIES WITH ALL RELEVANT EUROPEAN DIRECTIVES.

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1. GENERAL

1.1 Description of the heater

Construction of the heater is in accordance with the European standards for gas-fired water heaters for sanitary use (EN 89). The heaters therefore comply with the European Guidelines for Gas Heaters and are permitted to carry the CE mark.

They are atmospheric heaters suitable for both gas-fired and oil-fired ventilator burners (heater category B₂₃). The heaters are suitable for use with a working pressure of up to 8 bar. The cylindrical tank is made from sheet steel containing a number of vertically placed flue tubes. For protection against corrosion, the inside of the tank is glass lined. The tank is also fitted with a number of magnesium anodes for extra protection against corrosion. A thick PU insulating layer between the tank and the steel jacket helps to reduce heat loss. When the heater is completely filled with water, it is under continuous mains water pressure. When hot water is drained from the heater, cold water immediately enters the heater. For effective heat transfer, flue baffles have been included in the flue tubes. Heat from the flue gases is transferred to the water by means of radiation and convection.

1.2 Technical safety equipment

1.2.1 Control panel

The control panel is fitted to the heater casing and contains the temperature control for the water heater (see figure 1).

The water heater has three thermostats:

- control thermostat,
- high limit thermostat,
- safety thermostat.

The control thermostat controls the set temperature of the water.

The high limit thermostat acts as a safeguard against excessive water temperatures at the top of the heater, if as a result of a draining (frequently draining of small quantities), stratification of the water temperatures occur. If both the control thermostat and the high limit thermostat fail, the safety thermostat shuts down the water heater automatically.

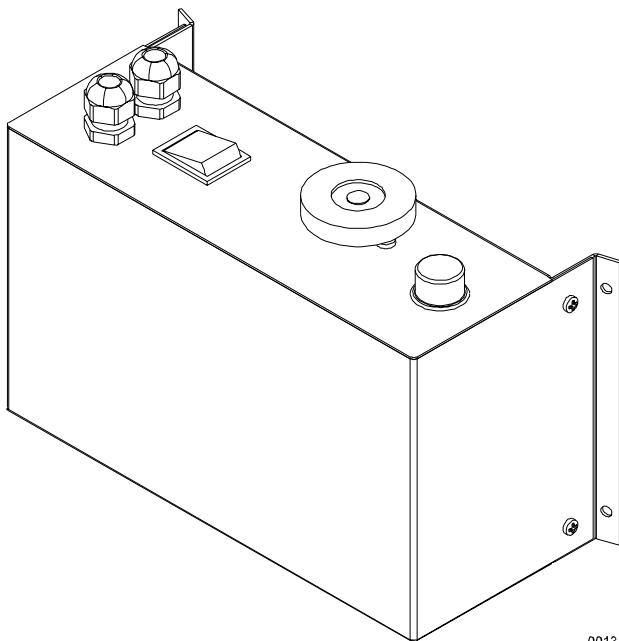
The safety thermostat stops the electrical supply to the burner and the control valve of the burner closes.

The control thermostat can be set between 40°C and 80°C with the temperature control knob.

The high limit thermostat operates at 84°C, the safety thermostat operates at 95°C.

The sensor for the control thermostat is located in the lower immersion well of the control panel. The sensors for the high limit thermostat and safety thermostat are located in the immersion well at the top of the heater. If the safety thermostat is made active, it must be manually reset. Do this when the temperature at the top of the heater falls below 89°C.

The control panel is fitted with an 'ON/OFF' switch ('I/O'). In position 'I' the forced draught burner is controlled on the basis of the heat demand from the control thermostat. In position 'O' the heater is switched off.



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Figure 1 - Control panel DR-PF

1.3 Technical information

1.3.1 Dimensions

(See figure 2).

Size	DR-PF 55	DR-PF 65	DR-PF 75	DR-PF 95	DR-PF 115	DR-PF 145
A	1900	1900	1900	1900	1900	2025
B	685	685	685	640	640	765
C	585	585	585	605	605	745
D	705	705	705	705	705	705
E	150*	200	200	200	200	250*
F	1700	1700	1700	1630	1630	1770
G	1720	1720	1720	1650	1650	1785
1	Hot water outlet					
2	Cold water inlet					
3	Drain valve					
4	Burner fixing flange					
5	T & P connection (temperature and pressure valves)					
6	Inspection opening					
7	Cleaning opening					

(All dimensions are in millimeters $\pm 2,5$ mm)

* after installing the flue reducer

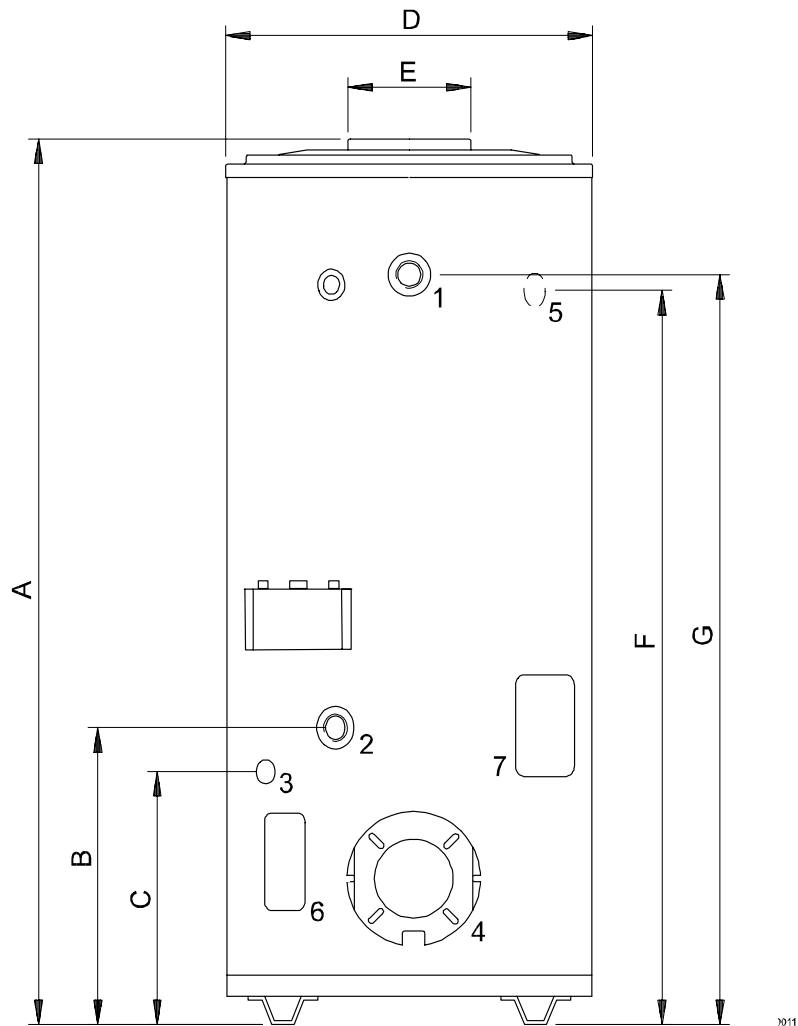


Figure 2 - Dimensions

- | | |
|---------------------------|--|
| 1) Hot water outlet | 5) T&P connection (Temperature and Pressure Valve) |
| 2) Cold water inlet | 6) Combustion chamber inspection opening |
| 3) Drain valve | 7) Cleaning opening |
| 4) Burner mounting flange | |

1.3.2 Burners

The water heaters are suitable for both gas fired and oil fired burners.

The water heaters have been examined and tested with the following front mounted burners from Riello:

Model	Gas fired burner		Oil fired burner	
	Model	Type	Model	Type
DR-PF 55	BS 2	912 T1	RG 2	377 T1
DR-PF 65	BS 2	912 T1	RG 2	377 T1
DR-PF 75	BS 3	913 T1	RG 3	393 T1
DR-PF 95	BS 3	913 T1	RG 3	393 T1
DR-PF 115	BS 3	913 T1	RG 3	393 T1
DR-PF 145	BS 3	913 T1	RG 4S	396 T

The burners for the DR-PF 145 heaters must be fitted with a special flame tube, as there are the high temperatures in the combustion chamber of the heater. The burners that are supplied with the water heater are complete with the special flame tubes.

1.3.3 Technical data

The data below applies to front mounted burner room

Riello Oil: fuel oil, max. viscosity at 20°C: 6 mm² /s

(35 second oil).

DESCRIPTION	UNIT	DR-PF 55	DR-PF 65	DR-PF 75	DR-PF 95	DR-PF 115	DR-PF 145
GAS DATA: G20 - 20 mbar							
Burner model		BS 2	BS 2	BS 3	BS 3	BS 3	BS 3
Burner type		912 T1	912 T1	913 T1	913 T1	913 T1	913 T1
Nominal load (max)	kW	65.4	81.7	98.1	125.3	147.0	190.6
Nominal output	kW	49.5	61.8	74.2	94.8	111.2	144.1
Supply pressure	mbar	20	20	20	20	20	20
Burner pressure	mbar	3.3	5.0	3.0	4.2	4.6	9.1
Gas consumption*	m ³ /h	6.4	7.9	9.5	12.2	14.3	18.5
Heating time ΔT = 45K	min	20	16	13	9	8	6
GAS DATA: G30 – 28/30 mbar							
Burner model		BS 2	BS 2	BS 3	BS 3	BS 3	BS 3
Burner type		912 T1	912 T1	913 T1	913 T1	913 T1	913 T1
Nominal load (max)	kW	63.8	79.8	95.7	122.2	143.5	186.0
Nominal output	kW	49.5	61.8	74.2	94.8	111.2	144.1
Supply pressure	mbar	30	30	30	30	30	30
Burner pressure	mbar	4.3	6.4	2.4	3.5	5.3	9.5
Gas consumption*	kg/h	4.7	5.9	7.1	9.1	10.7	13.8
GAS DATA: G31 – 37 mbar							
Burner model		BS 2	BS 2	BS 3	BS 3	BS 3	BS 3
Burner type		912 T1	912 T1	913 T1	913 T1	913 T1	913 T1
Nominal load (max)	kW	64.0	80.0	96.0	122.6	143.9	186.5
Nominal output	kW	49.5	61.8	74.2	94.8	111.2	144.1
Supply pressure	mbar	37	37	37	37	37	37
Burner pressure	mbar	6.0	8.5	3.2	4.7	6.9	12
Gas consumption*	kg/h	4.7	5.8	7	8.9	10.5	13.6

* Gas consumption at 1013.25 mbar and 15°C.

DESCRIPTION	UNIT	DR-PF 55	DR-PF 65	DR-PF 75	DR-PF 95	DR-PF 115	DR-PF 145
OIL DATA							
Burner model		RG 2	RG 2	RG 3	RG 3	RG 3	RG 4S
Burner type		377 T1	377 T1	393 T1	393 T1	393 T1	396 T1
Nozzle (Delavan)		1.25 x 80W	1.5 x 80B	1.75 x 80B	2.25 x 80B	2.75 x 80B	4.0 x 80B
Nominal load (max)	kW	65.6	78.7	91.8	118.1	144.0	209.8
Nominal output	kW	51.7	62.1	72.4	93.2	113.7	165.6
Oil flow rate	kg/h	5.3	6.3	7.4	9.5	11.6	16.9
Pump pressure	bar	12	12	12	12	12	12
GENERAL							
Storage capacity	litre	338	338	333	296	296	271
Number anodes		2	2	2	3	3	4
Number of flue tubes		6	6	7	12	12	16
Cold water inlet		Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½
Hot water outlet		Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½
Drain valve		¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT
Anode		¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT
T&P connection		1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT
Maximum operating pressure	bar	8	8	8	8	8	8
Maximum operating pressure un-vented	bar	5.5	5.5	5.5	5.5	5.5	5.5
Nominal operating pressure unvented	bar	3.5	3.5	3.5	3.5	3.5	3.5
Weight (empty)	kg	260	260	260	290	290	335

1.3.4 Air proving switch

This section applies for heaters with gas-fired burners. The air-proving switch monitors the airflow to the burner during the pre-purge cycle and operating cycle of the water heater. If the airflow falls below a threshold value, the air-proving switch measures an insufficient difference in pressure and closes. The gas supply to the burner stops immediately. The switching point for the air-proving switch is:

UNIT	Pressure difference for switching off [mbar]		
	G20	G30	G31
DR-PF 55	3.4	3.4	3.2
DR-PF 65	5	5	5.3
DR-PF 75	4.1	3.6	4.1
DR-PF 95	5.5	5	5
DR-PF 115	5.8	5.7	5.9
DR-PF 145	6.2	6.3	6.5

These values are recommended and have been determined under laboratory conditions.

The switching point for the air-proving switch must be set during the commissioning of the water heater. Make sure that the air proving switch closes before the CO contents of the flue gas reaches 2000 ppm.

To do this, close the air supply off and make sure that the burner controller closes before the CO contents of the flue gas reach 2000 ppm.

1.3.5 Gas pressure switch

This section applies for heaters with gas-fired burners.

The gas pressure switch monitors the gas supply pressure to the gas burner. If the gas supply pressure falls below a threshold value, the gas control valve closes; the gas supply to the burner stops.

The switching point for the gas pressure switch on the burner is:

UNIT	Switching point gas pressure switch [mbar]		
	G20	G30	G31
DR-PF 55	6	6	6
DR-PF 65	6	6	6
DR-PF 75	7	7	7
DR-PF 95	7	6	6
DR-PF 115	8	5	6
DR-PF 145	10	7	7

The values are recommended and have been determined under laboratory conditions.

The switching point for the gas pressure switch must be set during the commissioning of the water heater. Make sure that the burner safely extinguishes before the CO contents of the flue gas reaches 2000 ppm.

To do this, slowly close the gas supply and make sure that the burner controller safely locks out before the CO contents of the flue gas reaches 2000 ppm.

1.3.6 Setting the burner head

This section applies for heaters with either gas or oil fired burners.

The required flow rate of the water heater determines the setting of the burner head. During the commissioning of the water heater, the position of the burner head must be set to the value stated in the table below. Refer to the burner instruction manual.

The setting of the burner head is as follows:

UNIT	Notch number in burner head			
	Gas fired burner			Oil fired burner
	G20	G30	G31	
DR-PF 55	2	2	2	2
DR-PF 65	3	3	3	3
DR-PF 75	2.3	1.5	1.5	3
DR-PF 95	3	3	3	3
DR-PF 115	4.3	4.3	4.3	4
DR-PF 145	7	7	7	4

1.3.7 Setting the air valve

This section applies for heaters with either gas or oil fired burners.

The required flow rate of the water heater determines the setting of the air valve. During the commissioning of the water heater, the position of the air valve must be set to the value stated in the table below. Refer to the burner instruction manual.

The setting of the air valve is as follows:

UNIT	Notch number in air valve			
	Gas fired burner			Oil fired burner
	G20	G30	G31	
DR-PF 55	1.6	1.7	1.6	2.4
DR-PF 65	2.1	2.5	2.1	3.5
DR-PF 75	1.9	1.8	1.5	1.7
DR-PF 95	2.9	2.9	2.5	2.7
DR-PF 115	3.1	3.1	3	3
DR-PF 145	5.2	5	4.2	3.5

The values are recommended and have been determined under laboratory conditions.

Make sure that the CO₂ level is <10% for G20, and <12% for G30 and G31. A 12.5% maximum CO₂ level applies to oil.

If the CO₂ level is still not in limits after the air valve has been set, the air-valve must be readjusted.

2. FOR THE INSTALLER

We recommend using a pallet or forklift truck to transport the heater. The heater must be vertical at all times during transport. Make sure that the required combustion air intake is not located in areas where chemical substances are stored or used. Some propellants, bleaches, degreasing substances and similar substances, give off vapours that cause corrosion. If the heater is used in areas where such substances are present, the guarantee will be null and void.

2.1 Installation procedure

The water heater must be fitted in a location that has provision for an approved flue system and adequate ventilation. The water heater must stand on a level, heat resistant surface that is able to support the weight of the unit when full of water. The water heater must not be installed in a bathroom, bedroom or in a cupboard opening on to these rooms. This water heater must not be installed in any area where flammable materials are used or stored. Insufficient ventilation may give rise to a risk of fire, explosion or suffocation. If in doubt consult the national and local regulations governing the installation of gas appliances or the local British gas service department.

2.1.1 Installation

Regulations and Related Documents.

Gas Safety Installations and Use Regulations 1998, (As amended).

It is law that competent persons, in accordance with the above regulations, install all gas appliances. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to make sure that this law is complied with. The installation of the boiler **MUST** be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, IEE Regulations and the Water Supply (water fittings) Regulations.

The installation must also be in accordance with any relevant requirements of the HSE, local gas region and local authority and the relevant recommendations of the following documents: -

British Standards

BS 6891: Specification for installation of low-pressure gas pipe work of up to 28 mm (R1) in domestic premises (2nd family gas). For larger installations see **IGE/UP/2** below.

BS 6798: Specification for installation of gas-fired boilers of rated input not exceeding 70 kW net.

BS 6644: Specification for installation of gas-fired hot water boilers of rated inputs between 60 kW and 2 MW (2nd and 3rd family gases).

BS 6700: Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

BS EN 806-2: Specification for installations inside buildings conveying water for human consumption. Part 2: Design.

BS 5546: Specification for installation of hot water supplies for domestic purposes, using gas-fired appliances of rated input not exceeding 70 kW.

BS 5440: Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases). Part 1: Flues. Part 2: Ventilation.

Institute of Gas Engineers and Managers Publications

IGE/UP/1 Soundness testing and purging of industrial and commercial gas installations.

IGE/UP/1A Soundness testing and direct purging of small low-pressure industrial and commercial natural gas installations.

IGE/UP/2 Gas installation pipe work, boosters and compressors on industrial and commercial premises.

IGE/UP/10 Installation of gas appliances in industrial and commercial premises. **Part 1:** flued appliances.

CIBSE Publications:- "CIBSE Guide"

Section B4 : Water Service Systems.

Some chemicals produce vapours that can cause rapid failure of thermocouples, burners and storage tanks if they are drawn into the combustion air supply.

Therefore if this water heater will be used to supply hot water to:

- Hairdressers;
- Dry cleaners;
- Industrial degreasing processes;
- Any other area where compounds containing halogens are used and stored. Care must be taken that all primary and secondary air is drawn from outside atmosphere free of such contaminants.

For further advice contact Hamworthy Heating Limited.

2.1.2 Water connections

Hamworthy Heating Ltd. water heaters are suitable for connection to vented, un-vented and pump pressurised systems. In all cases appropriate valves and fittings must be used to make sure that the system complies with the requirements of the water fittings and appropriate building regulations.

When fitting it is essential the rules of 'good practice' are applied at all stages of installation.

Dependant on the length and insulation of the water piping and the water demand frequency, it can be necessary to install a circulation system on the drain valve. The return pipe of the circulation piping can be fitted on top of the drain valve after the sealing plug has been removed (see figure 5).

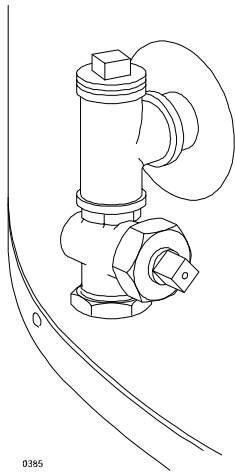


Figure 3 - Connection point for the return piping

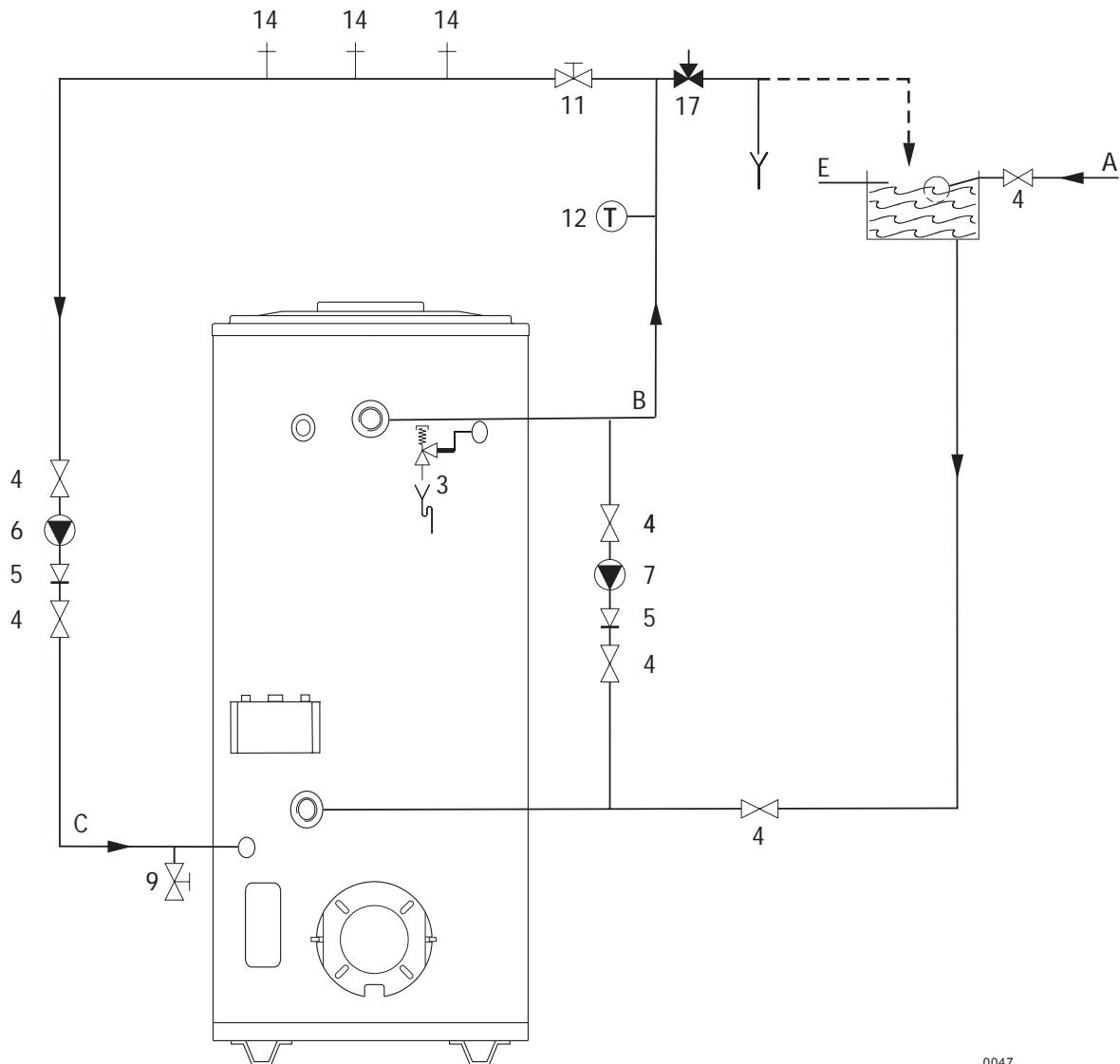
Dependant on the water demand pattern (e.g., small amounts frequently), it can be necessary to circulate the water in the heater to prevent temperature stratification. Therefore, we recommend that a top to bottom circulation system be installed in the event of such demand patterns (see figure 4 or 5).

2.1.2.1 Vented systems

If the water heater is to be connected to a cold feed tank or cistern the hot water supply pipe must include an open vent. Ideally the vent pipe must link to a separate tundish/drain or else to the cold water feed tank.

The cold feed cistern must have an actual capacity of greater volume than the hourly recovery rate of the water heater(s) that it supplies.

The minimum actual capacity is 50 gallons or 227 litres (see figure 4).



0047

Figure 4 - Typical vented system

- | | |
|-------------------------------------|-------------------------------------|
| 3) Safety valve | 14) Hot water taps |
| 4) Stop valve | 17) Three way vent valve (optional) |
| 5) Non-return valve | |
| 6) Circulation pump | |
| 7) Top to bottom recirculation pump | A) Cold water supply |
| 9) Drain valve | B) Hot water delivery |
| 11) Service valve | C) Return circulation |
| 12) Temperature gauge | E) Overflow |

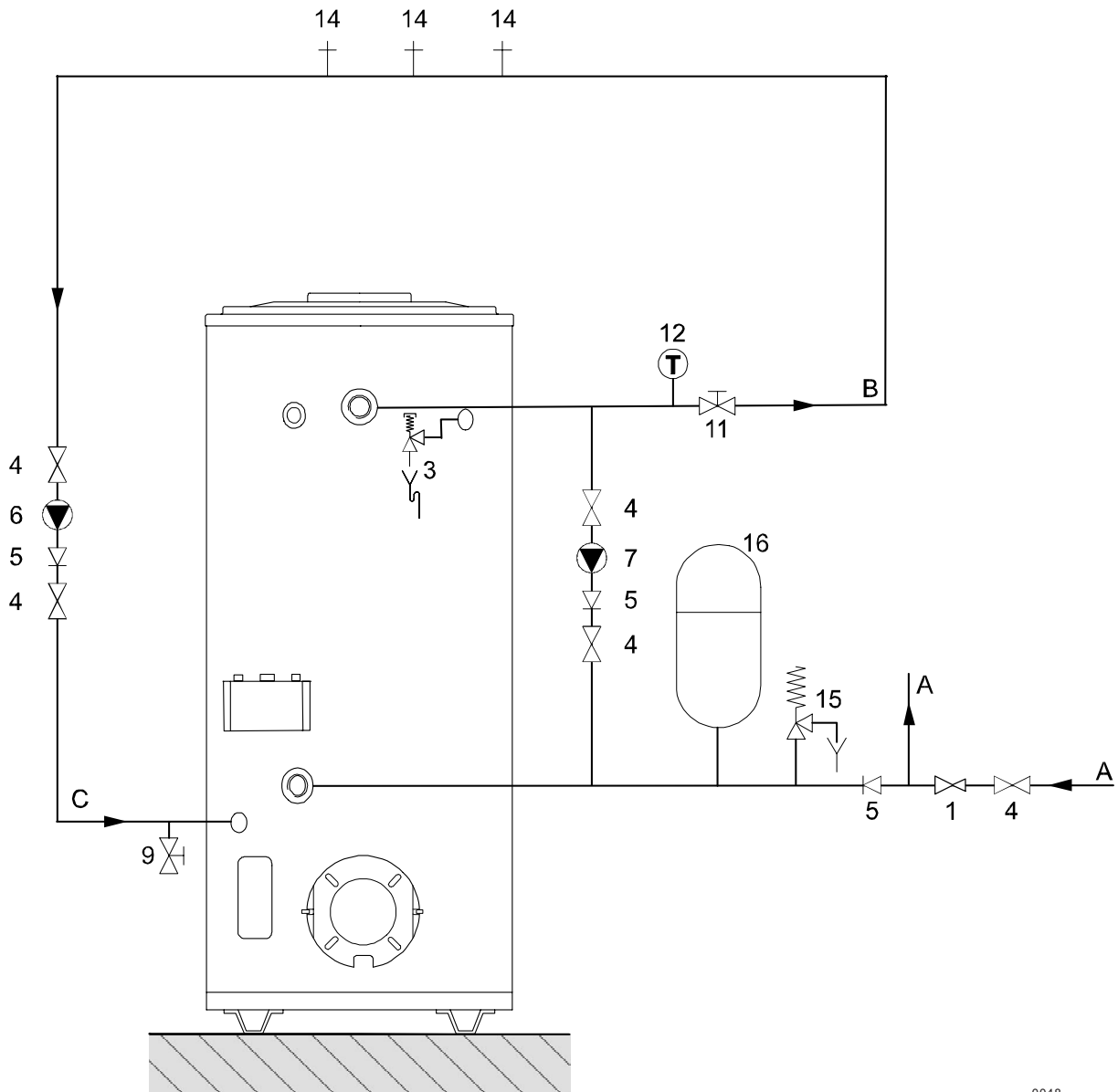
2.1.2.2 Unvented systems

To install a Hamworthy water heater on an un-vented cold water supply system a kit of valves and fittings (WRAS approved) must be used. Installation must be carried out generally as shown on figure 5.

Hamworthy water heaters are tested to a maximum pressure of 12 bar and a maximum working pressure of 8 bar. However, on un-vented systems the maximum working pressure is limited to 5,5 bar. The pressure reducing valve regulates the water supply pressure to a normal operating pressure of 3,5 bar.

Dead legs on a hot water installation are undesirable. Where possible they must be avoided. Where the inclusion on the system of a dead leg is unavoidable the following restrictions must be applied:

- For pipes not exceeding 19 mm inside diameter; maximum length of dead leg permitted 12.0 meters;
- For pipes exceeding 19 mm but not exceeding 25 mm inside diameter; maximum length of dead leg 7.5 meters;
- For pipes with an inside diameter exceeding 25 mm. maximum dead leg 3.0 meters.



0048

Figure 5 - Typical un-vented system.

- | | |
|-----------------------------------|-----------------------|
| 1) Pressure reducing valve | 12) Temperature gauge |
| 3) T&P valve | 14) Hot water taps |
| 4) Stop valve | 15) Expansion valve |
| 5) Non-return valve | 16) Expansion vessel |
| 6) Circulation pump | A) Cold water supply |
| 7) Top to bottom circulation pump | B) Hot water delivery |
| 9) Drain valve | C) Return circulation |
| 11) Service valve | |

2.1.3 Gas connection

The gas supply to this appliance must be installed in accordance with BS 6891 and IGE/ UP/1,1A and 2. No heat or soldered joints must be applied in the vicinity of the gas control valve, as this could cause damage to the control. All connections and joints must be tested for gas soundness. When operating this unit on LPG a suitable gas supply cock must be used.

2.1.4 Flue system

For the DR-PF 55 and 145 the adapter ring supplied must be fitted prior to connecting the flue system. For the models DR-PF 65, 75, 95, 115 the flue system can be connected direct to the water heater. The flue pipe must be of suitable materials and must have at least the same diameter as the spigot on the water heater [see table 1.3.1]. For units with an oil-fired burner, a stainless steel flue pipe must be installed. The flue system must be self-supporting and a maintenance joint must be incorporated local to the heater.

2.1.5 Burner mounting

For mounting the forced draught burner, please refer to the instructions supplied with the burner. Read these instructions carefully before attempting to install and connect the burner.

2.1.6 Electrical connection

An accredited electrical installation company must carry out all electrical connections in accordance with IEE regulations. The control panel must be connected to the mains by means of a permanent electrical connection. A double pole isolator with a contact opening of at least 3 mm must be fitted between this permanent connection and the heater. The supply cable must have cores of at least 3 x 1.0 mm². The terminals for the supply cable are located on the terminal block in the control panel. Always check with a voltage tester if the live and the neutral have been connected correctly in the control panel. This is essential for the functioning of the forced draught burner's flame detection system.

The electricity supply must comply with the requirements below:

Electrical supply	Frequency	Fuse
230 V AC	50 Hz (+/- 2%)	6 A
(-15% / + 10%)		

The electrical diagrams of all connections in the control panel are shown in the appendix, (see figure 9: Electrical diagram).

2.2 Commissioning

2.2.1 Filling the heater

1. Fit drain valve and check that it is closed.
2. Open the cold-water valve to the heater and all hot water taps to remove all air from the system. The heater has been filled when cold water runs out at all taps.
3. Close all hot water taps. The heater is now under system pressure. At this pressure the any expansion or safety valve must not release any water.

2.2.2 Turning on the burner

The burner must be turned on in accordance with the installation manual supplied with the front mounted burner.

2.3 Shutting down

For brief periods:

1. Turn the temperature control knob down to the lowest setting and set the 'I/O' switch to '0'.

For longer periods:

1. Switch off the supply voltage at the local isolator;
2. Close the manual gas valve;
3. Close the water inlet valve;
4. Empty the heater to prevent frost damage.

2.4 Usage / temperature control

The control thermostat on the panel regulates the water temperature. If the temperature in the water heater drops below the set value, the control thermostat will switch on the burner. The automatic burner control will ignite the burner, which remains firing until the control thermostat is satisfied.

The water temperature can be set between 40°C and 80°C. High water temperatures cause more calcium precipitation in the water heater. Moreover, the stand-by heat losses are greater with higher temperatures.

Therefore, it is recommended to set the control thermostat at approx. 60°C. For reasons of safety, the water heater is equipped with a high limit thermostat and a safety thermostat. If the high limit thermostat is activated, the heater does not lock out and the control thermostat will take over the temperature control again as soon as the high limit thermostat automatically resets.

If the safety thermostat is activated, it must be reset manually after the water has cooled down. The cause of the problem must be investigated before resetting. Upon reset, the water heater resumes normal operation.

2.5 Setting the nominal input

This section only applies if the heater has a gas-fired burner. Setting the nominal input is always necessary. It is not preset by the manufacturer.

Setting the nominal input and checking the correct gas/air ratio must be carried out in accordance with the instruction manual for the burner. The burner pressures to be set are shown in table 1.3.2

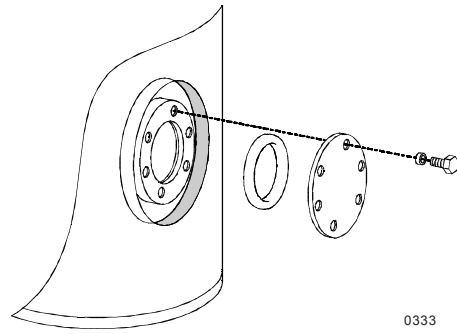


Figure 6 - Inspection opening

2.6 Conversion to another gas type

This section only applies if the heater has a gas-fired burner and conversion of the burner is permissible. If the heater has to function on a gas category (LP-gas or natural gas) other than the gas set as standard (ex works), the burner must be converted to the applicable gas category. A conversion kit must be ordered. Only an authorised installer may convert the heater.

2.7 Maintenance

The heater must be checked and cleaned regularly at least once a year by an accredited installer to keep correct operation. The burner, control and safety valves and anodes must also be checked.

2.8 Anode

The life of the anode is determined by the quality and quantity of the water flowing through the heater. It is recommended that the anode be checked regularly - preferably simultaneously with an internal inspection of the glass-lined tank. In order to determine the frequency with which the anodes must be replaced, the water side of the heater must be checked three months after installation. The anodes must be replaced if more than 60% has dissolved at any point on their length.

To inspect the tank:

1. Close the cold-water inlet valve;
2. Empty the heater completely by opening the drain valve;
3. Remove the covering plate on the heater's casing;
4. Remove the access cover plate from the tank by unscrewing and removing the bolts and washers, (see figure 6);
5. To make sure water tightness of the access cover the rubber O-ring must be replaced when the access cover is refitted, (see figure 6).

To inspect the anodes:

1. Disconnect the flue at the maintenance joint;
2. Unscrew the fastening screws on the edge of the top casing;
3. Remove the top casing. The hexagonal heads of the anodes are now visible, (see figure 7);
4. Unscrew the anodes with the appropriate spanner (27 mm A/F) and replace with new anodes if required.

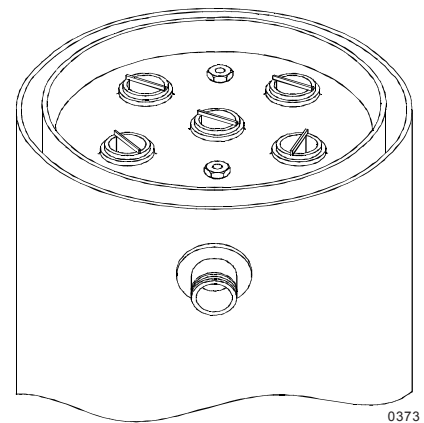


Figure 7 - Anodes

Important note:

The anodes must make contact with the tank (metal on metal). If the tank and the anodes are separated electrically (as a result of the sealing material used), the anode cannot function. This could have a negative effect on the operating life of the tank. Therefore check electrical continuity after fitting;

5. Assemble everything in reverse order including a new U-seal on top of the tank.
6. Fill the heater and test.

2.9 De-scaling

Calcium deposition depends on the type of water and the demand and increases at high water temperatures. A temperature setting of 60°C is recommended, which will keep calcium deposition to a minimum. An access opening is located on the side for inspecting and de-scaling the tank. The access cover can be reached via the covering plate on the outer casing.

Empty the heater before opening the access cover. An appropriately qualified person must carry out de-scaling with a suitable chemical.

2.10 Condensate

When the heater is filled with cold water or the hot water consumption is very high, the flue gases will condense on the cold surfaces of the combustion chamber and the flue tubes. The drops of water will fall on the burner and cause a hissing sound. This is normal and will stop as soon as the operating temperature has been reached.

2.11 Spare parts

It is important to mention the heater, type, model and full serial number when ordering spare parts. The spare parts can be determined according to these numbers.

3. FOR THE USER

3.1 Instructions for use

WARNING:

An accredited installer must install the heater and commission it.

3.1.1 Filling the heater

1. Check the drain valve is closed.
2. Open the cold water valve to the heater and all hot water taps in order to remove all air from the system. The heater has been filled when cold water runs out of all taps.
3. Close all the hot water taps. The heater is now under system pressure.

3.1.2 Lighting the heater

1. Check that the heater is filled with water and that the gas supply to the heater is on;
2. Turn the temperature knob to lowest setting;
3. Switch the local isolator on.
4. Set the 'I/O' switch on the control panel to 'I'.
5. The burner will now start.
6. Turn the temperature control knob to the desired position, preferably to approx. 60°C.

3.2 Operation

The control thermostat in the control panel controls the water temperature. If the temperature in the water heater drops below the set value, the control will send a signal to the burner.

The automatic burner control ignites the burner that remains until the temperature of the control thermostat is reached.

High water temperatures cause calcium precipitation in the water heater also, the stand-by heat losses of the water heater are greater with higher water temperatures. It is recommended to set the control thermostat to approx. 60°C.

For safety reasons, the water heater is equipped with a high limit thermostat and a safety thermostat. If the high limit thermostat is activated, the heater does not lock out and the control thermostat will take over the temperature control again as soon as the high limit thermostat automatically resets.

If the safety thermostat is activated, it must be reset manually after the water has cooled down. The cause of the problem must be investigated before resetting. Upon resetting, the water heater will resume its normal operation.

3.3 Shutting down

For brief periods:

1. Turn the temperature control knob down to the lowest setting and set the 'I/O' switch to 'O'.

For longer periods:

1. Switch off the supply voltage at the local isolator;
2. Close the manual gas valve;
3. Close the water inlet valve;
4. Empty the heater to prevent frost damage.
5. Empty the heater to prevent frost damage.

3.4 Maintenance

Maintenance must be carried out at least once a year in accordance with the recommendations of Hamworthy Heating Ltd. Failure to carry out adequate maintenance may render the warranty null and void. It is recommended that a maintenance contract be taken out with your installer.

4. WHAT TO DO IN CASE OF FAILURE

4.1 General

If faults occur, check the following points:

Safety thermostat:

The water heaters are equipped with a safety thermostat which, in the case of a too high water temperature, interrupts the electrical supply to the burner, as a result of which the control valve of the burner will close.

If the safety thermostat is activated, it must be reset manually after the water has cooled down. The cause of the problem must be investigated before resetting.

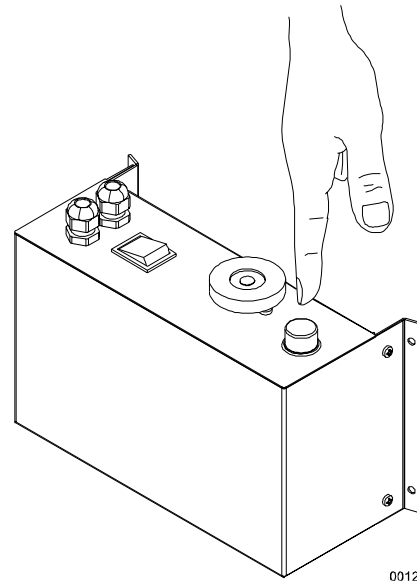
Upon resetting, the water heater will resume its normal operation. (See figure 8).

Water temperature too high:

Check if the control thermostat has been set too high.

Wrong hot water temperature:

1. Check the control thermostat setting;
2. Check that there are no leaks or if any taps are open.



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Figure 8 - Resetting the safety thermostat

4.2 Fault overview

Fault	Possible cause	Measure
Heater is off or does not ignite	Chimney is blocked	Trace cause and rectify it
	Safety thermostat is activated	Let water in heater cool down and set the water temperature to a lower value. Reset the safety thermostat. Let heater ignite
	Gas or oil supply shut off	Open manual gas or oil valve
Insufficient hot water or none at all	Temperature set too low	Set water temperature to higher value
	Safety thermostat is activated	Reset safety thermostat after the water has cooled down and set the water temperature to a lower value.
	Supply of hot water exhausted	Reduce hot water use. Give the heater time to heat up the water
	Cause cannot be traced	Electrically isolate. Close gas / oil supply valve and contact your installer
Water leakage	Insufficient sealing of the water connections (screw thread)	Tighten the screw thread connections
	Leakage from another water appliance or pipes in neighbourhood.	Trace the cause.

In the event of faults occurring with the burner, consult the Riello instruction manual.

5. APPENDIX

5.1 Electrical diagram DR-PF

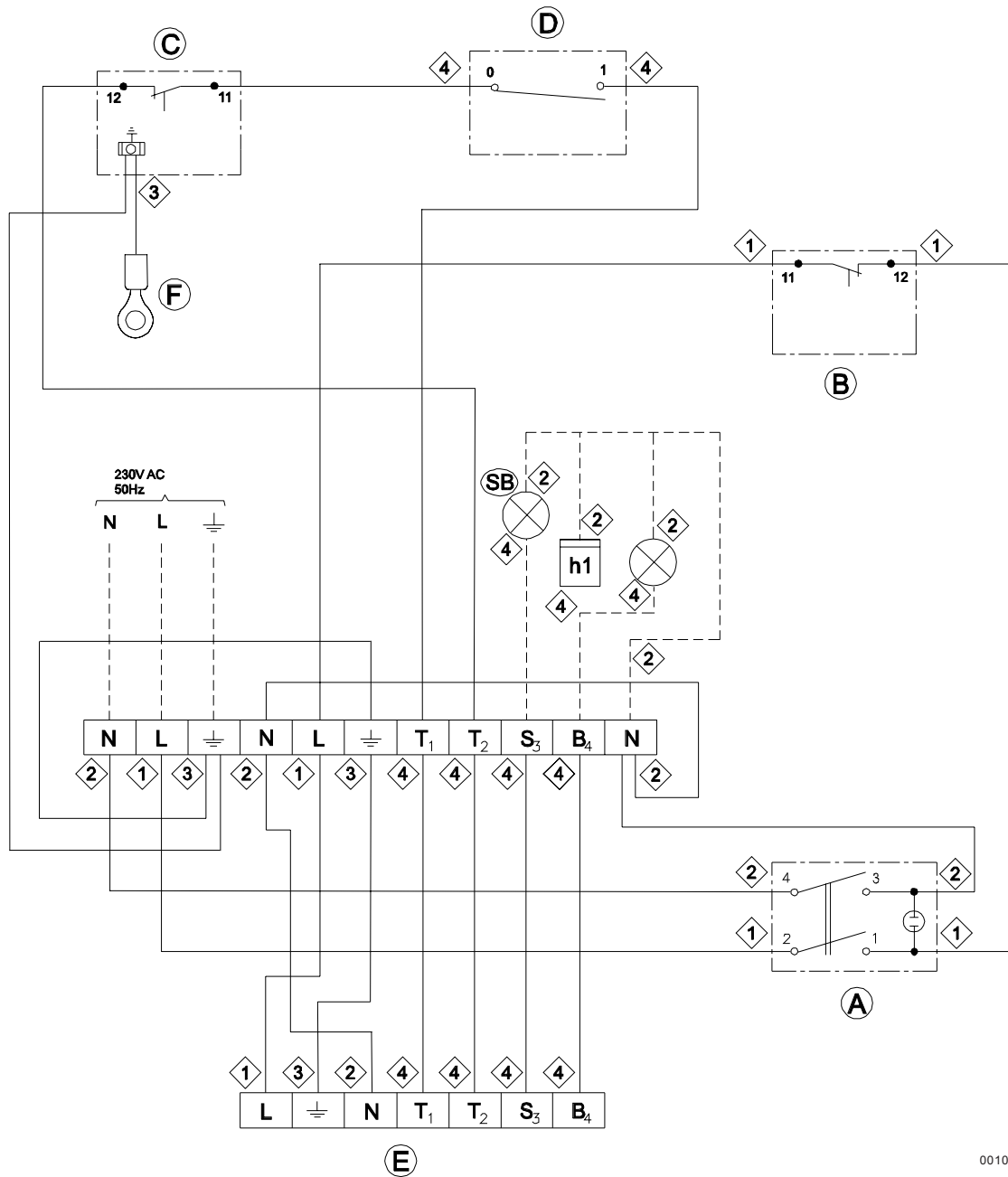


Figure 9 - Electrical diagram DR-PF

- 1 = brown
- 2 = blue
- 3 = yellow/green
- 4 = black
- ⊥ = Earth
- N = Neutral
- L = Live
- A = 'I/O'-switch
- B = Safety thermostat
- C = High limit thermostat
- D = Control thermostat
- E = Male 7-pole connector

H1 = Hours run meter (Not HHL supply)
 SB = Fault alarm (Not HHL supply)

————— Not HHL supply

Note:

When a hours run meter (H1) is connected to the burner by means of a cable longer than 3 m, a 47 μ F capacitor must be fitted between B4 and earth to prevent Electro Magnetic Compatibility (EMC) issues.

The same applies to the installation of a fault alarm (SB); in this case a 100 μ F capacitor must be fitted between S3 and earth, if the cable length exceeds 3 m.

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