eco hometec

DUOTANK
Un-vented Hot Water Cylinders

INSTALLATION MANUAL

eco hometec
Unit 11E
Carcroft Enterprise Park
Carcroft
Doncaster
DN6 8DD

Tel. 01302 722266
Fax. 01302 728634

e.mail:sales@eco-hometec.couk
http://www.eco-hometec.co.uk

D:\October_2001_Manuals\Duotank_Installation_Manual.doc\01 July 2002

eco hometec is committed to design, develop and produce environmentally friendly appliances for both domestic and commercial applications.

Contents

1. The Duotank Range

The Duotank range of high performance stainless steel hot water tanks from eco hometec comprises of six models with outputs between 291 and 1474 litres an hour continuous secondary delivery at 50^{o} Δt.

The domestic hot water is heated and stored in a stainless steel vessel, which is immersed within a primary tank – a principal known as a tank within a tank. This method provides not only exceptional efficiency, but ensures thorough and even heating of domestic hot water. The eco hometec Duotank range of high performance hot water tanks are ideally suited for providing volume hot water for a variety of domestic, and commercial applications.

The principal of design and the quality and type of material used, creates a product, which offers not only exceptional performance, but also with the important advantage of long-term reliability, internal hygiene and virtually maintenance free operation.

The Duotank range of hot water tanks are listed in the Water By-laws Scheme's Water Fittings and Materials Directory and are approved for installation.

2. Duotank Range Key Points

2.1 Corrosion Resistance

The domestic hot water storage vessel is constructed from AISI 316 Ti stainless steel, which provides excellent resistance to corrosion and high temperatures. All welding is carried out in an inert atmosphere, followed by through cleaning and sand blasting to remove all oxide residues. No additional anodes are required.

2.2 High Performance

The domestic hot water vessel provides a large surface area further increased by corrugated walls and this, combined with a high interference to primary water flow between the outer and inner tank walls, creates a large and efficient heat exchanger, producing fast recovery and excellent performance.

2.3 No Stratification or Cool Zones

The principal of domestic hot water being heated and contained in a vessel which is immersed concentrically with a primary heated vessel (tank in tank), ensures that heat is transfers into the domestic hot water leaving no cool areas,
The corrugated wall of the stainless domestic inner vessel create gentle eddy curves during heat up, causing stirring of the domestic hot water, preventing stratification, thus ensuring a through and even heating.

2.4 Self Cleaning

The corrugated walls of the domestic inner vessel allow significant flexing movement to take place which prevents the adherence of performance reducing scale deposits.

2.5 Hygienic

The thorough and even heat working principal of the Duo range will assist with the prevention of bacteria such as legionella within domestic hot water systems, making the product ideally suited for all applications.

2.6 Inspection Access

Each Duotank has a removable, top mounted, inspection cover providing generous access for inspection and cleaning. In addition, the inspection cover carries the secondary connections which when removed, allow inspection of and if desired, the cleaning of all the domestic water carrying tubes.

2.7 Low Maintenance

The self- cleaning nature of the product plus the absence of sacrificial anodes, significantly reduces the maintenance to just a periodic check.

2.8 Guarantee

The Duotank carries a five-year guarantee on the vessel against materials or manufacturing defect.

3. Specification

3.1 Vessel

The Duotank is constructed from two concentric cylindrical tanks. The primary outer is manufactures from boiler quality ST-37 carbon steel. The domestic hot water vessel is constructed from AISI 316 Ti stainless steel and is formed with corrugated walls and welded using inert Argon atmosphere followed by sand blast oxide removal.

3.2 Connections

The secondary connections are formed in stainless steel and are mounted onto a removable inspection plate, which also carries the thermostat phial.

3.3 Immersion Heater (optional)

The optional immersion heater is located in the primary water space below the secondary tank, ensuring complete heating and avoids being secondary water fouled.

3.4 Insulation

A high standard of insulation is afforded using
high density injected polyurethane foam.

3.5 Control Panel

Each Duotank is equipped with an injection moulded control panel which houses a dial type thermometer, combination control and manual reset high limit thermostats, immersion heater switch and electric connection terminal rail.

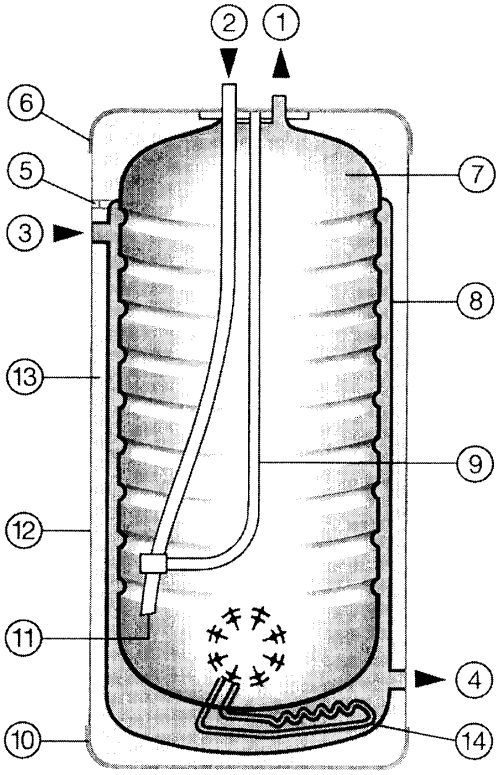
3.6 Outer Jacket

The Duotank is finished using injection moulded rigid top and base covers, plus a removable vinyl jacket.

3.7 Wall mounting bracket

Duotank 60, 100 and 150litre capacity are supplied complete with wall mounting brackets to allow vertical fixing only.

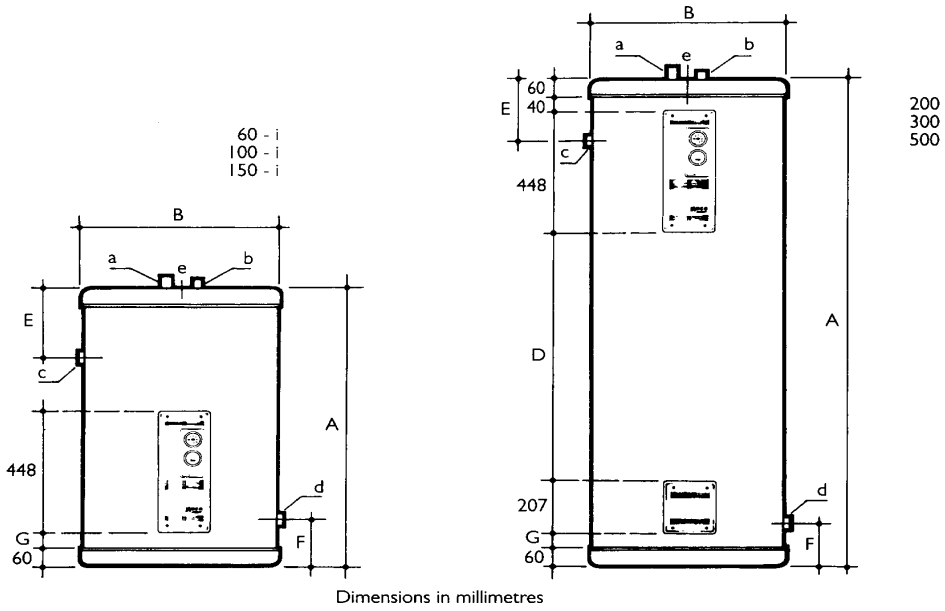
Figure 1 General overview



1 Hot drawoff (vertical installation)
2 Cold feed (vertical installation)
3 Primary flow
4 Primary return
5 Primary air vent
6 Top moulding
7 Stainless steel domestic water vessel
8 Primary vessel
9 Thermostat pocket & dip tube stay
10 Base moulding
11 Dip tube
12 Padded vinyl jacket
13 Rigid polyurethane foam insulation
14 Immersion heater (optional)
Secondary return connection not shown for clarity

4. Duotank Dimensions

Figure 2 Dimensions



Dimensions in millimetres

Figure 3 Plan view

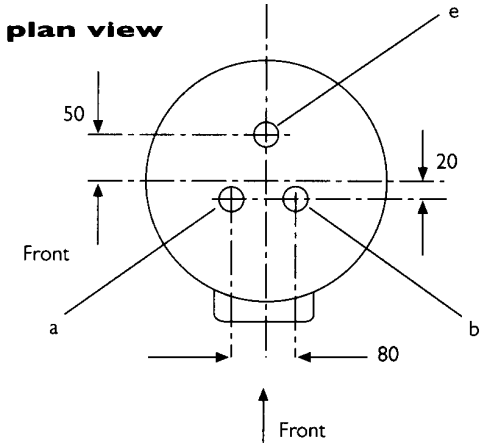


Table 1 Duotank Dimensions (mm)

Model	A	B	D	E	F	G
60	749	480	-	175	170	31
100	1154	480	-	175	170	31
150	983	620	-	206	182	42
200	1239	620	-	206	182	42
300	1724	620	865	212	182	42
500	1730	770	853	237	192	52

Table 2 Connection details

Model	Primary Flow & Return C & d	Domestic hot water feed A	Dometsic hot water draw off B	Secondary return E
60	1" BSP - F	¾" BSP – M	¾" BSP – M	N/A
100	1" BSP – F	1" BSP – M	1" BSP – M	1" BSP – M
150	1" BSP – F	1" BSP – M	1" BSP – M	1" BSP – M
200	1" BSP – F	1" BSP – M	*1" BSP – M	1" BSP – M
300	1" BSP – F	1" BSP – M	*1" BSP – M	1" BSP – M
500	1 ½" BSP - F	1" BSP – M	*1" BSP – M	1" BSP – M

- Supplied with 1 ½" x 1" reducing socket to increase connection size for open vented installations. (Not required and not supplied with Unvented connection kits)

5. Duotank Technical Data

Table 3 Technical Data

MODEL	DUOTANK	60	100	150	200	300	500
DHW Capacity	Litres	55	100	150	200	300	500
Primary Capacity	Litres	22	32	44	56	72	98
Heating Surface	m2	0.6	1.0	1.2	1.6	2.4	3.1
Boiler Power Req.	kW	17	35	33	44	67	86
Primary Circuit Pressure Drop	mm, wg	15	237	79	173	545	851
10 min peak output @ 45° Flow	Litres	124	242	284	379	573	851
10 min peak output @ 60° Flow	Litres	103	200	244	325	491	745
1st Hour Continuous Output @ 45° Flow	Litres	465	957	973	1298	1945	2625
1st Hour Continuous Output @ 60° Flow	Litres	291	599	565	754	1148	1474
Heat-Up Time 10- 45°	Min.	12	10	15	15	14	18
Heat-Up Time 10- 60°	Min.	16	14	21	21	20	25
Maximum Operating Temperature	O C	90	90	90	90	90	90
Maximum Operating Pressure Primary	Bar	3	3	3	3	3	3
Maximum Operating Pressure Secondary	Bar	8	8	8	8	8	8
Weight empty	Kg	32	48	64	78	109	151
Weight filled	Kg	109	180	258	334	481	749

Note: The above data is based on the following: - Primary inlet water (from the boiler) 80 ^{O}C. Cold water inlet temperature 10 ^{0}C. Primary circuit pressure drop is based on volume flow equivalent to a 10K differential across the primaries. Performance of the unit may vary with other operating conditions.

6. System schematics

Figure 4 Typical un-vented direct on mains application

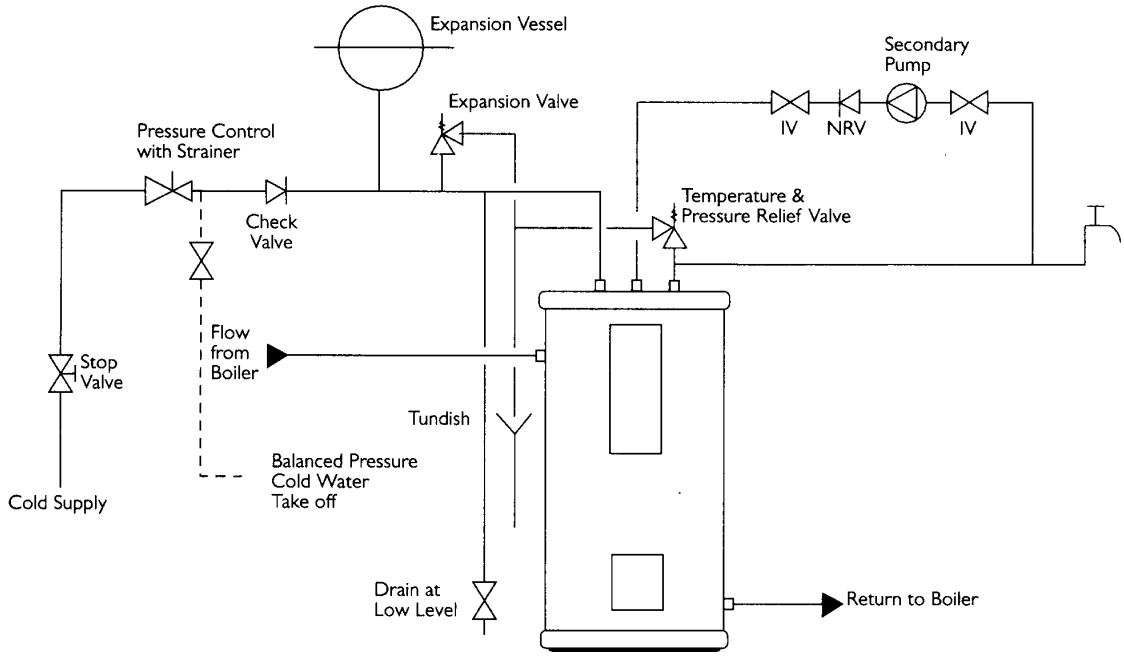
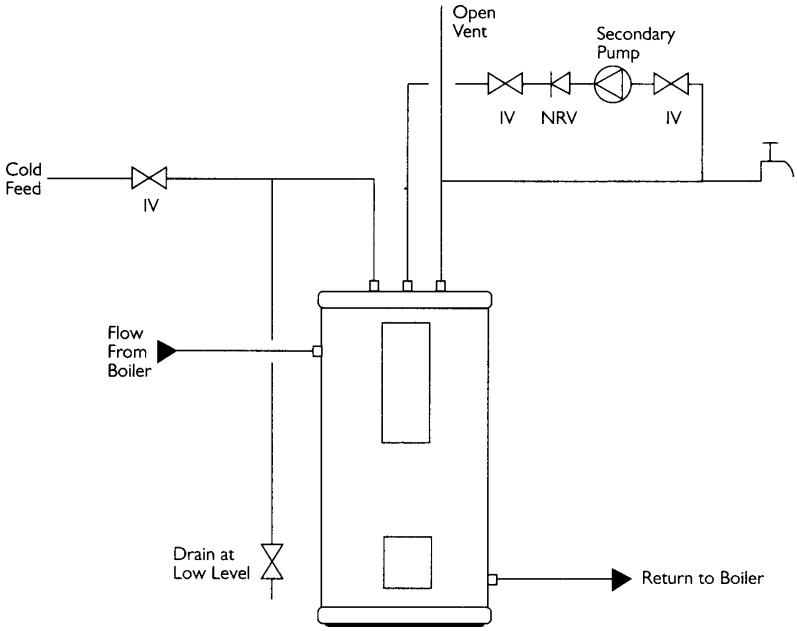


Figure 5 Typical open vented application



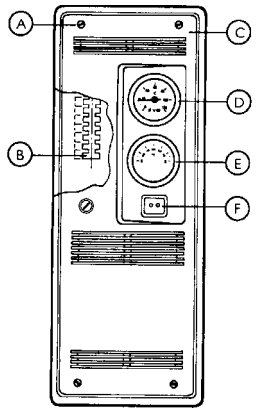
Where Duotank hot water tanks are installed on an unvented system, an unvented connection control pack supplied by eco hometec must be used. The control packs are supplied as a kit of components for on-site assembly and comprise of the following items:-

1. Pressure limiting valve with strainer
2. Check valve
3. Expansion valve
4. Expansion vessel
5. Temperature & pressure relief valve
6. Two port primary motorised valve for safety shut off primary flow in event of high temperature limit (to comply with Building Regulations G3)

7. Installation requirements

The calorifier must be installed to comply with the Water Bye-laws, Building Regulations, I.E.E. regulations and the Bye-Laws of the local Water Company. The installation should also be in accordance with any Local Authority requirements and the recommendations of CP342 Centralised hot water supply, or Be6700 as appropriate. The Duotank calorifier should be positioned on a level plinth, which must be capable of supporting the weight of the calorifier and its contents when filled with water. Allowance should be made for access to the flow, return and electrical connection.

Figure 6 Control panel



A Control Panel Fixing Point

B Electrical Connection Terminal Rail

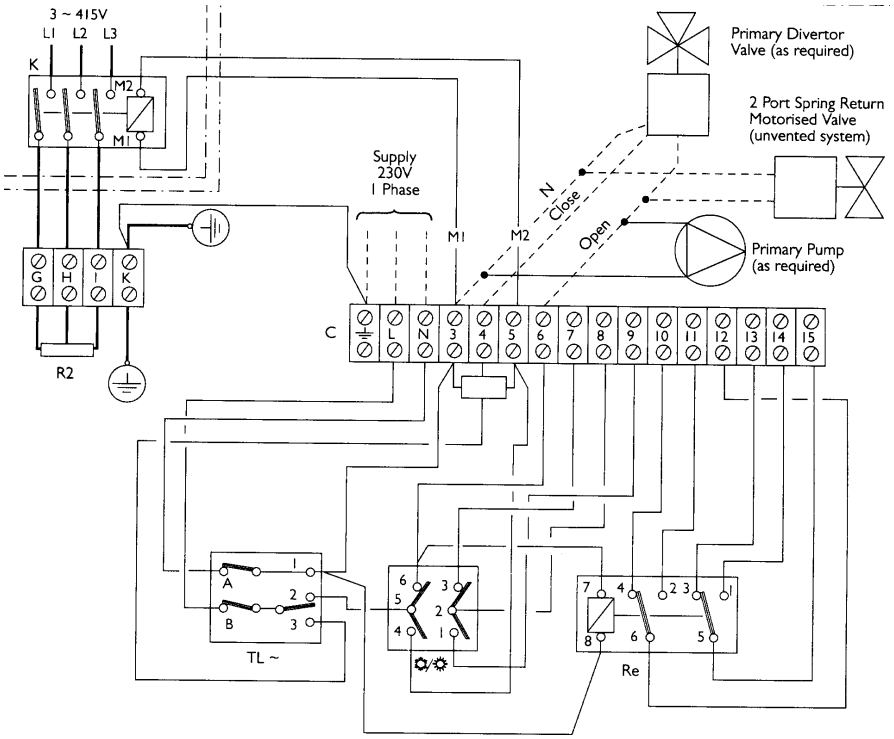
C Control Panel Moulding

D Thermometer

E Combined Control & Limit Thermostat

F Summer/Winter Switch
Summer setting gives operation via immersion heater (optional extra) if fitted.

Figure 7 Wiring detail



TL ~ - Combined Control & Limit thermostat

☼/☼ - Summer/Winter (Immersion Htr/Boiler) Switch

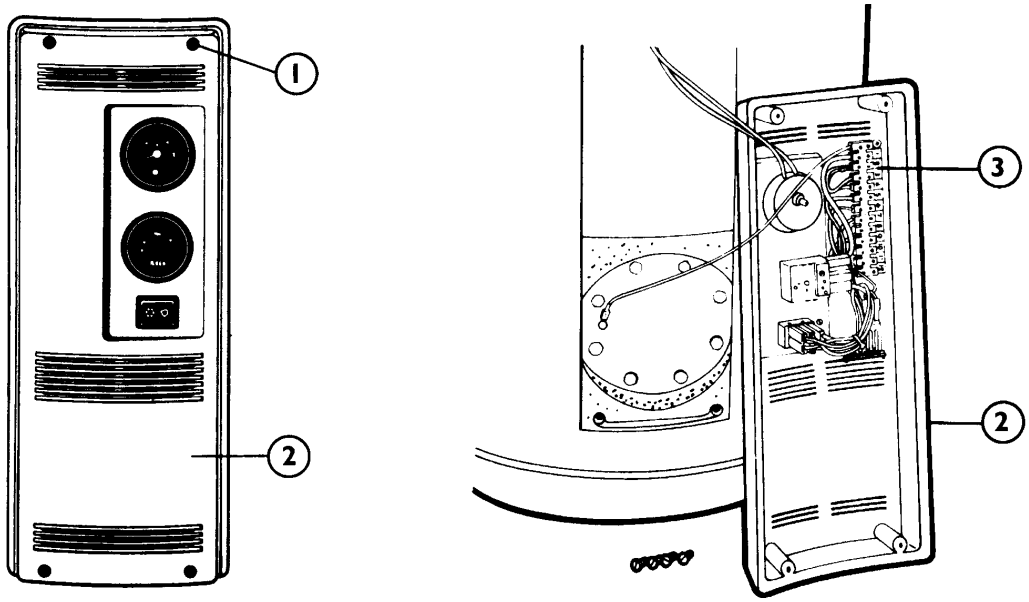
Re - Relay

R - Immersion Heater

C - Terminal Rail

K - 3phase Contactor - By others.

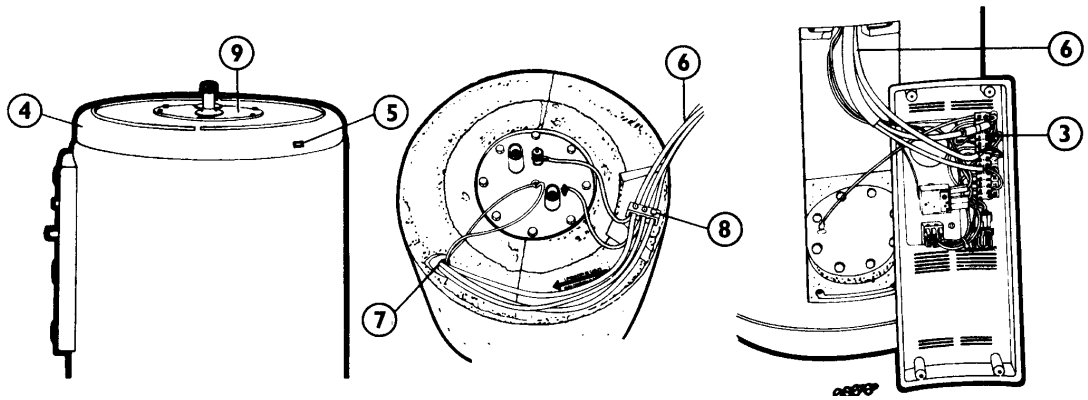
Figure 8 Electrical connections



8. Wiring

To make electrical connections remove 4 no. fixing screws (1) retaining control panel (2). Carefully rotate control panel (2) to expose electrical terminal (3) See Figure 9.

Figure 9 Electrical connections



Carefully cut out cable entry aperture (5) on calorifier top cover (4).

Lift up top cover (4), removing first the cleaning access cover panel (9).

Route cables (multi strand flex only) (6) through the aperture (5), through cable clamp (8) and guide cables carefully down through cable tube (7) to terminate at the control panel rear.

Make necessary electrical connections to terminal rail (3) See Figure 7 and 8.

Refit control panel (2) to calorifier using screws (1).

Ensure cables (6) are routed correctly with sufficient slack to, allow future easy access to rear of control panel (2) and securely retain cables under clamp (8).

Refit top cover (4) and cleaning access cover panel.

9. Water connections

9.1 Primary water connections

Primary flow and return connections to the calorifier should be made using appropriate sized fittings with a male BSP component that allows for disconnection of the unit. Care must be taken to ensure that connections are watertight to avoid unseen leakage and external corrosion damage to the exterior of the tank.

9.2 Secondary water connections

All of the secondary connections are located on the top of the unit and are male BSP threaded stainless steel.* Connections should be made via fittings that do not allow galvanic corrosion between the calorifier and the system pipework.

Connections to the unit must allow for complete disconnection and removal of local pipework in order that the removal of the inspection access port is not impeded.

* Models 222, 300 and 500 when being installed on a vented system are supplied with 2no. 1 ½" x1" BSP FF reducing sockets which then creates a 1 ½" BSP female cold feed and hot draw off connections.

9.3 Filling the calorifier

1. Ensure the calorifier is correctly connected to the primary and secondary circuits.

2. The secondary (domestic) inner tank **must** be filled first. Turn on the domestic cold feed and fill the inner tank ensuring complete filling and purging of air through the draw off pipework.

3. Fill the primary side (outer tank) and ensure correct and proper venting via the primary air (manual) air vent located adjacent to the primary flow in connection.

Note: Failure to properly vent the primary side of the calorifier will result in circulation noise and poor performance of the unit.

IMPORTANT
Failure to observe the correct sequence of filling (i.e. domestic first) may lead to irrepairable damage to the calorifier.

10. Use of immersion heaters

1. Ensure that the electrical connections have been made and that the supply is of adequate rating and adequate fuse protection.

2. Ensure that the secondary and primary systems have been filled correctly.

NOTE: Failure to fill the primary side (outer tank) will result in "burn out" of the immersion heater element, as it is located in the primary water space.

3. Set the control stat to the required setting.

4. Set the summer/winter switch to the summer position.

5. Turn on the electricity supply.

10.1 Optional Immersion Heaters

The Duotank can be fitted with an optional immersion heater. The heater element is installed into the primary tank underneath the domestic stainless steel vessel. This ensures through heat up of the domestic hot water and avoids scale build up on the element.

The immersion heater will provide an emergency back up in the event of primary heat source failure, or summer shutdown of boiler/s.

Table 4 Immersion heater details

Model	Immersion Heater Heating kW	Recover Time (hrs) Δt 50^{o} C
60	1.5 (1ph 230v)	3.0
100	2.2 (1ph 230v)	3.5
150	2.2 (1ph 230v)	5.2
200	2.5 (1ph 230v)	6.0
300	2.5 (1ph 230v)	8.7
500	2.5 (1ph 230v) 7.5 (3ph 415v)	14.0 4.7

11. Draining the calorifier

If it is required to drain the secondary (domestic) water from the calorifier then the following procedure must be followed to avid damage to the unit.

1. Isolate and drain the primary side ensuring the manual primary air vent (located adjacent to the primary flow in connection) is open whilst draining.

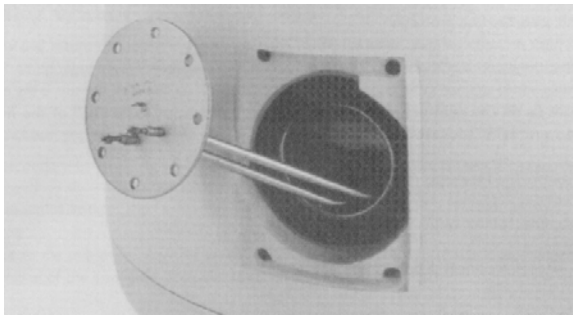
2. Isolate the domestic cold feed and open the hot draw off to atmosphere.

3. Open the low-level drain leg drain cock (by installer) and the inner tank will siphon drain.

4. For refilling, close drain cocks and vents etc. and follow filling procedure.

12. Immersion replacement

Figure 10 Immersion heater replacement



In order to replace the immersion heater it is necessary to drain the primary side only (see previous section)

1. Isolate the electricity supply to the calorifier.

2. Remove immersion heater cover panel models 200, 300, and 500 or control panel models 60 100 and 150.

3. Disconnect electrical connections from immersion heater (note: some models have additional manual reset high limit stat – not shown).

4. Remove fixing bolts from circumference of immersion heater carrier plate and retain bolts for re-use.

5. Remove immersion heater by withdrawing to the front and then to the side.

6. Remove and discard gasket.

7. Insert new heater complete with new gasket

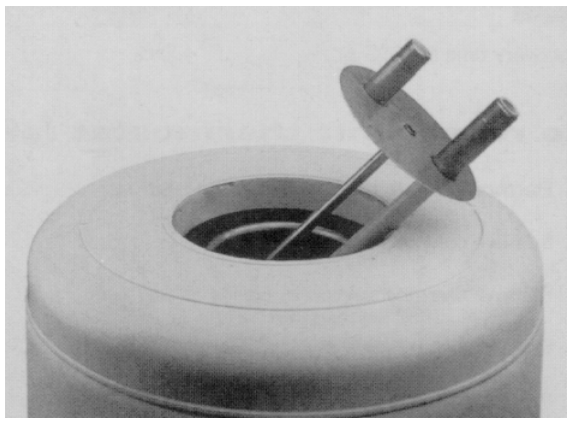
8. Secure heater by tightening bolts evenly using opposite – opposite sequence.

9. Refill and vent primary side – see previous section and ensure water tightness.

10. Reconnect electrical connections and refit cover/control panel.

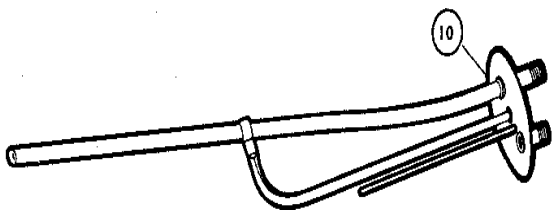
13. Internal inspection

Figure 11 Internal inspection



The Duotank range of calorifiers are designed to allow internal inspection/access.

Figure 12 Dip tube assembly



To gain access for internal inspection:

1. Isolate and drain calorifier as described in previous section.

2. Disconnect all secondary pipework, stripping away sections of pipework as necessary to allow full access for removal of tube plate and dip tube assembly (10) figure 11.

3. Carefully withdraw instrument capillaries and bulbs (11) from pocket in tube plate.

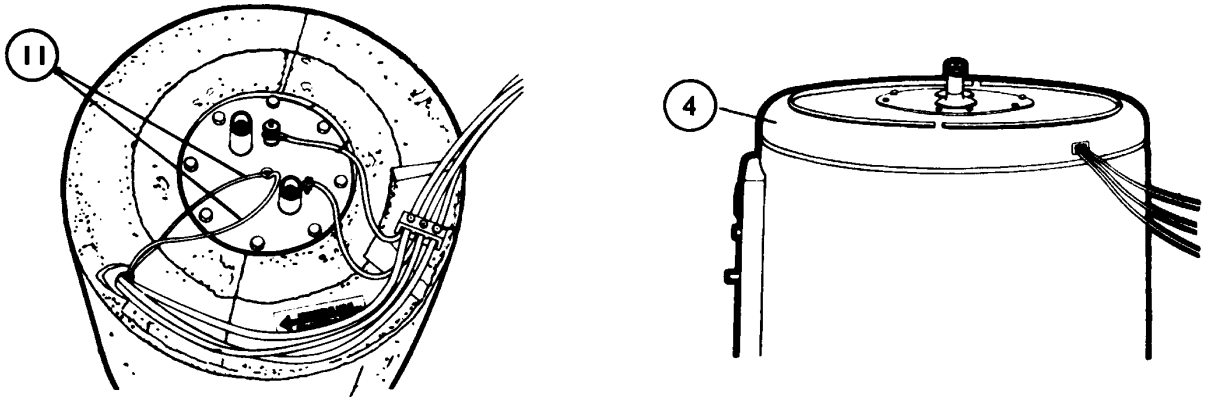
4. Remove bolts from circumference of inspection cover flange plate and lift away flange plate.

5. Carefully lift away tube plate and dip tube assembly.

6. Reassembly is reverse order of above process.

7. Refill the calorifier observing procedure described on page 11.

Figure 13 Internal access



14. High limit thermostat.

To reset high limit thermostat:

1. Isolate the electricity supply to the calorifier.

2. Remove control panel (see page 10 figure 9.)

3. Remove thermostat knob by pulling off from control thermostat spindle.
4. Remove thermostat fixing screws and allow thermostat to move away from inside face of control panel.

5. Press reset pin marked “S” on thermostat body (adjacent to control spindle).

6. Reassemble control panel using reverse of the above procedure.

eco hometec
Unit 11E
Carcroft Enterprise Park
Carcroft
Doncaster
DN6 8DD

Tel. 01302 722266
Fax. 01302 728634

e.mail:sales@ecohometec.com
http://www.eco-hometec.co.uk