

These instructions contain operating information and should be left with the unit.



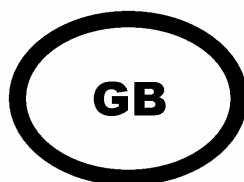
# **Ceiling Void horizontal Fan Electrode Boiler Units**

**LFExx Range**

## **Installation & Operation Manual**

**Edition 1.0.0**

The logo for VapaNet, featuring the word "VapaNet" in a stylized font with a horizontal line above and below the letters.



### **Installation in countries covered by EC Directives:**

This product will meet the requirements of the Low Voltage Safety Directive 73 / 23 EEC and the EMC Directive 89 / 336 EEC when installed in accordance with the instructions contained in this manual.

Failure to comply with these instructions may invalidate the manufacturer's warranty or any certificate/declaration of conformance requested to be supplied with the unit.

**CONTENTS**

1.0	Installation .....	4
1.1	Vapac LFE unit dimensions .....	4
1.1.1	LFExx weights.....	5
1.2	Vent duct connections .....	5
1.2.1	General.....	5
1.2.2	Ventilation duct connections.....	5
1.2.3	Ventilation duty. ....	5
1.3	Plumbing Considerations .....	6
1.4	Electrical Connections.....	7
1.4.1	Important E.M.C. Considerations .....	7
1.4.2	Power Supply Connection.....	8
1.4.3	Electrical Connections.....	8
1.4.4	Cable Entry Provision.....	8
1.5	Cylinder Electrical demand loads .....	8
1.5.1	LFE05 Units.....	8
1.6	Control Circuit Connections.....	9
1.6.1	Control Circuit Wiring .....	9
1.6.2	On/Off Control .....	9
1.6.3	Proportional Control.....	9
1.6.4	Control Signal Selection.....	10
1.6.5	Security Circuit / E.P.O. Shutdown .....	10
1.6.6	Drain operation .....	11
2.0	Start-Up / Operation .....	11
2.0	Start-Up / Operation .....	12
2.0.1	Start-up check list.....	12
2.0.2	Start-Up Instructions .....	12
2.0.3	Commissioning/Start-Up.....	12
2.0.4	Features of VAPANET Electrode Boiler Unit .....	12
2.1	Service Advice.....	12
2.1.1	Procedure for Cylinder Exchange. ....	12
2.2	Service and Maintenance.....	14
2.2.1	Feed Valve with Strainer.....	14
2.2.2	Drain Pump.....	14
3.0	Location of Indicators and Controls.....	15
3.1	Positioning of Indicators and Controls on Vapac ® Vapanet ® LEFC Units.....	15
3.2	Initial Set-up .....	16
3.3	Normal Run / Standby / Start-up – No User Intervention Required .....	17
3.4	Fault / Service Indications – Requiring Operator Intervention. ....	18
3.3	Facia Label symbols .....	19
4.0	Trouble-shooting Check List.....	20
5.0	Wiring diagram.....	21

## Important Installation Points

The unit must be installed to comply with national regulations and/or codes of practice. A qualified electrician must carry this out.

Do not locate the cabinet where the ambient temperature around the unit could exceed 35° C; or fall below 5° C e.g., an unventilated roof mounted enclosure – see minimum space / ventilation requirements pages 4 & 5.

Make sure condensate line(s) have adequate slope (min 8%) for condensate drainage and use.

Provide adequate support to prevent sags developing in flexible steam lines, which can fill with water and create a "trap".

Do not locate vented drain directly within the ventilated void area.

## Important Electrical Connection Items

Before commissioning the unit, check that all electrical (power) connections - including those at the terminals and contactor are tight.

Check that the transformer primary winding connection is correct for the supply voltage at Vapac terminals A1 & A2.

The Vapac transformer must not be used to power other equipment.

To comply with EMC aspects see recommendations on page 8.

Use a high-limit humidistat to ensure positive interruption of unit operation when over-humidification is detected.

It is important to note that the control signal input to terminal 5 is connected to ground at the Vapac control PCB.

**NB:** Care should be taken if the controller output is also referenced to earth, as incorrect connection will lead to damage to the controller and or the Vapac control PCB.

## Important Maintenance Items

Only a competent person should carry out maintenance.

The boiler contains hot water, and must be drained before any maintenance is carried out on the steam section. This should be done prior to isolating the power, and removing the access panel.

**ESD SENSITIVE DEVICES USED ON PCB. ENSURE ANTI-STATIC PRECAUTIONS ARE TAKEN WHEN REMOVING OR REPLACING PCB'S.**

## 1.0 Installation

### Do's

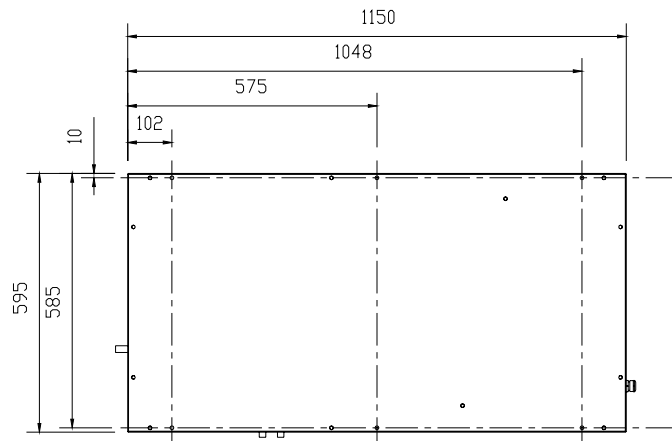
- Do** The top of unit MUST be hang level in both direction as the unit contains a drain tray which must have the correct fall inside.
- Do** The unit must be hang so as a clear access can be gained to the under side access doors of unit. If possible between ceiling tile tee bar or support grid.
- Do** ensure adequate side ventilation (min 80 mm).
- Do** ensure adequate service access below the unit (min 1000 mm).
- Do** use the marking on the side of the carton as a template to mark the mounting hole positions.
- Do** use three M8 stud drop rods or bolts each side of unit (six fixing points) to support the unit level and flat.

### Don'ts

- Don't** mount the unit close to sources of strong electromagnetic emissions e.g. variable speed lift motor drives, kVa transformers etc.
- Don't** mount the unit in an unventilated enclosure.
- Don't** mount in a position where access to the unit will not be possible when all pipe work, vent ducts, and electrical services are installed.
- Don't** mount the unit over light fitting, Fire sensors or other equipment connected onto the ceiling grid or ceiling tiles which would prevent access to the under side.
- Don't** mount the unit in an area which will be hosed down.
- Don't** install the unit where the ambient temperature can exceed 35°C; or fall below 5°C.
- Don't** mount the unit inside a cold-room or other place where temperature and humidity conditions can cause condensation on electrical components.
- Don't** mount the unit where the sound of a contactor opening/closing and water flow in a pipe would be unacceptable or anywhere where the specified unit noise rating is not to be exceeded.

## 1.1 Vapac LFE unit dimensions

Top view: Showing center lines for Mounting hole position on top of unit for M8 fixing stud or bolts to hang unit from ceiling slab. Also unit casing overall size is shown.

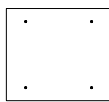
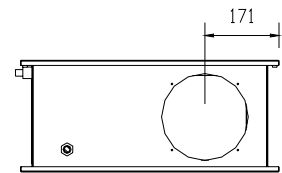
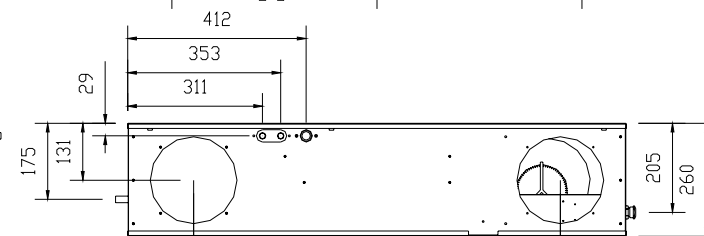
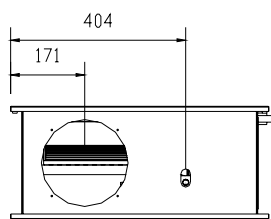


Middle elevations are:

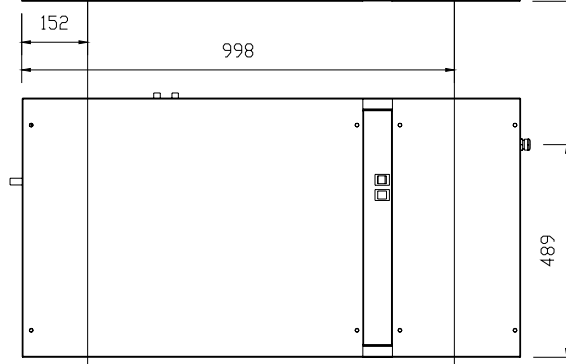
Left view: showing End air discharge position and emergence drain tray overflow connection for visual overflow alarm.

Middle view: showing side air discharge and inlet position these are on both sides of unit two drain connections one for drain tray the other cylinder drain and 3/4" BSP water inlet position.

Right view: Side View showing End air inlet position and electrical cable entry point..



Each unit supplied with  
2 x duct connection spigots  
4 x blanking plates.



Bottom View: Showing Under side of unit ON/OFF switch position and power ON indication light

### 1.1.1 LFExx weights

The unit dry weight is the delivered unit with no water in unit, the wet weight is the operational weight when the unit is running.

Vapanet model	Dry Kg	Wet Kg
LFE05	34	38

## 1.2 Vent duct connections

### 1.2.1 General

The unit is designed to be mounted within a ceiling void with either

The unit is designed to be mounted within a ceiling void with either:

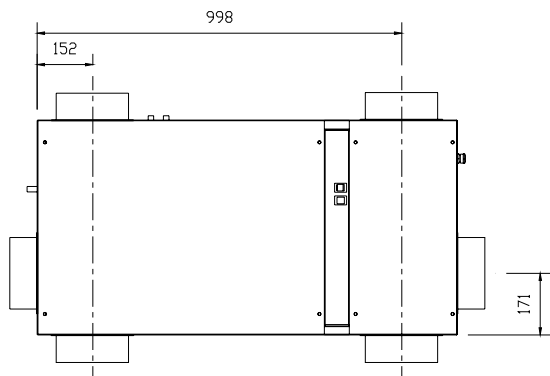
- 1 - a ducted inlet and discharge air for example to ceiling grilles or,
- 2 - a Void inlet and ducted discharge for extract ceilings void or,
- 3 - a Ducted inlet and void discharge for supply air ceiling voids.

The duct connections onto the unit are designed for 200 mm internal diameter flexible ducts. The inlet and discharge for the unit can be on the end, left side, or right side for both inlet and discharge.

### 1.2.2 Ventilation duct connections

The unit is provided with two spigots one for inlet the other for the discharge only one spigot connection is required each end the other two should be blanked off each end of unit, with the four blanking plates provided with unit. The spigot should be placed in one of three positions as shown below the other two outlets should be blanked off.

Duct work connections view from under side of unit.

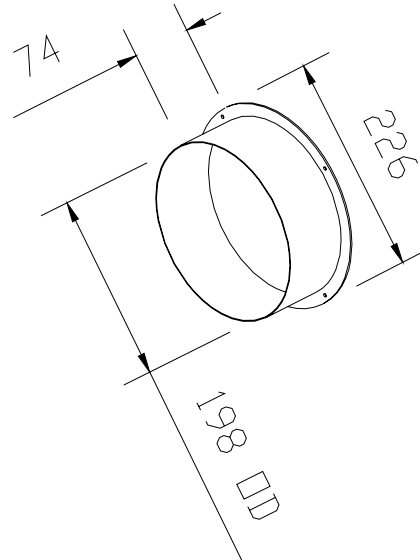


Discharge end

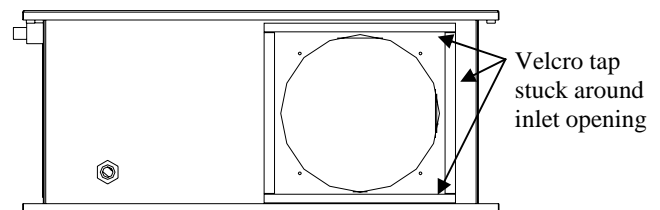
Inlet end

Note only one spigot is required each end the other two ports must be blanked off with blanking plates provided.

The spigot dimensions are



The unit can have free air return inlet or free air discharge into void area if required in this case the spigot need not be connected. If free air return from void area is required a filter screen can be provide part number FVKIT 179 Then the inlet port must have the Velcro strip tapped around the hole as shown and the filter fixed onto the Velcro so air is filtered before entering the unit, note the other two inlets must be blanked off.



### 1.2.3 Ventilation duty.

The unit design airflow is:

FAN SPEED	External pressure Pa	Air Volume m <sup>3</sup> /s
Lo speed	0.	0.1
Lo speed	36	0.09
Hi speed	0	0.16
Hi speed	50	0.12

Note: maximum external resistance at hi speed is 50 Pa which equals 36Pa external at Lo speed.

### 1.3 Plumbing Considerations

#### 1.3.1 Cold water supply

##### General

The Vapanet range of electrode boilers is capable of operating with a range of "raw mains" water quality. The water supply should be within the following limits:-

<b>Hardness</b>	<b>50 – 500 ppm</b>
<b>Conductivity</b>	<b>80 – 1000 <math>\mu</math>S*</b>
<b>PH</b>	<b>7.3 – 8.0</b>
<b>Silica</b>	<b>0</b>
<b>Pressure of between</b>	<b>1.5 - 8 bar.</b>
<b>Chlorine</b>	<b>&lt;170 ppm</b>

Water Supply rates	
0.25 l/min	LFE05

##### Do's

- Do** install a stop-valve/Shut-off valve and a strainer close to the unit.
- Do** provide a water supply with sufficient pressure and pipe size to ensure an adequate flow rate to all units connected to the system.
- Do** use the flexible hose connection with nylon nut provided.

##### Don'ts

**Don't** use a wrench or other tool to tighten the water supply connection - the nylon nut and rubber washer provided, should only require tightening by hand to effect a seal. If water seepage occurs, undo the nut to wipe the washer clean and re-seat it.

#### 1.3.2 Drain connection

##### General

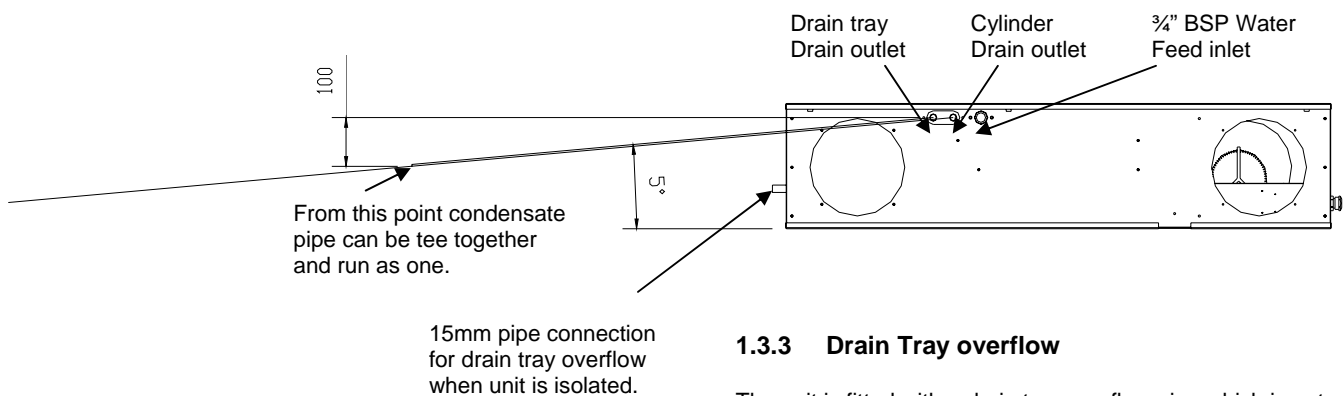
##### Do's

- Do** ensure metal drain and supply water pipework is grounded electrically close to the unit (a ground/earth stud is positioned on the underside of the cabinet).

Drain capacity per cylinder and drain tray pump  
= pump discharge rate of max 11.8 l/min at 50 Hz.  
Power supply 12.2 l/min at 60 Hz.

##### Do's

- Do** use copper or plastic pipe rated for 110 °C.
- Do** arrange to discharge drain water from the unit into a trapped and vented drain at a position where flash steam rising from the drain line vent will not pose a problem for the Vapac or other equipment.
- Do** provide adequate fall for the drain pipe work to allow free flow of water drained from each unit.
- Do** ensure drain line pipe size will accommodate water being drained at the same time from all the Vapac units which are connected to it.
- Do** ensure drain line has a min fall of 5° 1 in 12 pipe (8%) fall and sized adequately to take all units connected into it at full pump flow rate each LFE unit has two pumps one from drain tray the other from cylinder both have the same flow rate as above.
- Do** run both condensate outlets from unit independently until both pipes have dropped 100mm before tee together as shown below.



#### 1.3.3 Drain Tray overflow

The unit is fitted with a drain tray overflow pipe which is not pumped, this is a pipe from the drain tray direct and requires a fall to a visual point to indicate the drain tray is full when the unit is powered off and the drain pump is not working. This is to prevent damage to ceiling void area.

## 1.4 Electrical Connections

Transformer supply 230 volts single phase and natural 50 or 60 Hz supply

### Note:

24 V a.c. Control Circuit - 3.15 A 20 mm (T – Time Lag) fuse (Pt. N<sup>o</sup>. 1080096) mounted on VAPANET Echelon PCB (Pt. N<sup>o</sup>.1150655).

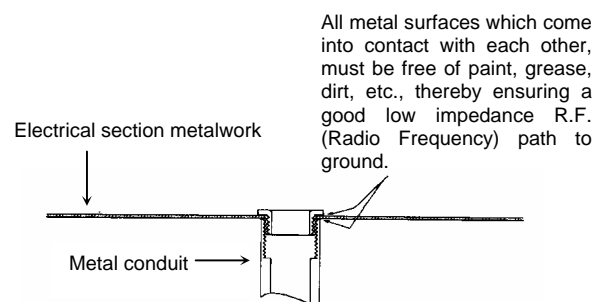
Transformer Primary Circuit - There is one control fuse which protects the transformer primary circuit F1 2.0A (slow blow) (Pt. No. 1080095) mounted in fuse-terminal holder on the main terminal rail; this fuse protects transformer primary supply the transformer secondary feeds the Fan and the 24 volts control to the PCB board. The transformer has the following auto winding tapings for the fan supply. Auto wind voltage are -5v, 160, 170, 180,190,200, 210, 220 and 230 Volts

### 1.4.1 Important E.M.C. Considerations

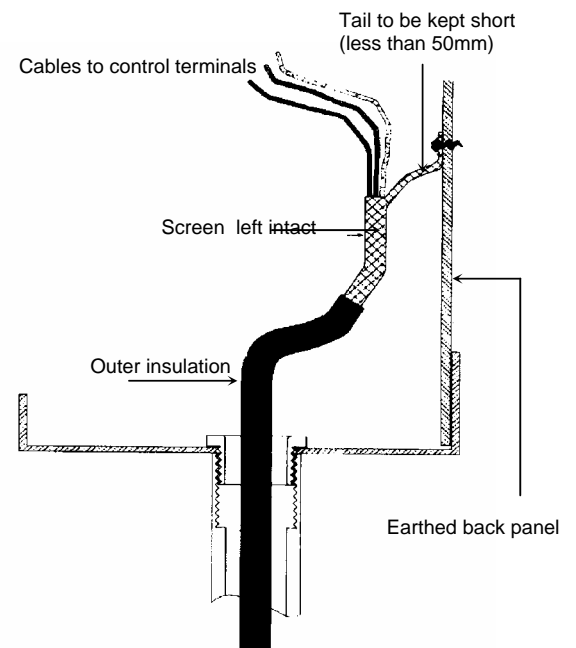
Use a dedicated, earthed metal conduit for both the control signal cable and the security circuit cables along their entire length - they may share the same conduit where practicable. The earth must be made by "metal-to-metal" contact and should be a good RF (Radio Frequency) earth.

The control and security circuit connections should be run in screened cable with the screen grounded at the VAPANET end (onto the electrical section back panel). The screen should be maintained as close as possible to the cable ends and any tail between the screen and the earth point must be kept short (50 mm maximum).

#### Control Cable / Security Circuit Conduit Entry Arrangement



#### Control Cable / Security Circuit Screening Arrangement



Model Ref.		LFE 05		DE-RATED OUTPUT LFE 05 UNIT				
		5	5	2.5	3	3.5	4	4.5
Nominal Output	Kg/hr	11	11	5.5	6.6	7.7	8.8	9.9
Nominal Output	lb/hr	200	230	230	230	230	230	230
Voltage	V	3.71	3.72	1.86	2.3	2.63	3.07	3.4
Power input rating	Kw	Ph+N or 2Ph	Ph+N or 2Ph	Ph+N or 2Ph	Ph+N or 2Ph	Ph+N or 2Ph	Ph+N or 2Ph	Ph+N or 2Ph
Electrical Supply	Ph's	2	2	2	2	2	2	2
No. of electrodes	A	19.5	17	8.5	10.5	12	14	15.5
Full load Current	A	29.25	25.5	12.75	15.75	18	21	23.25
Maximum overcurrent	A	19.5	17	8.5	10.5	12	14	15.5
CSP setting	A	32	32	32	32	32	32	32
Fuse Rating/phase	A	10	10	10	10	10	10	10
Supply cable terminals	mm <sup>2</sup>							
Wiring diagram		A4-LZD-600						

## 1.6 Control Circuit Connections

### 1.6.1 Control Circuit Wiring

Use a dedicated, earthed metal conduit for both the control signal cable and the security circuit cables, sharing the same conduit if practicable.

Use screened cable for all control and security circuit connections to minimise risk of electrical interference. The screen should be grounded at the VAPANET end only. See detail on page 9.

### 1.6.2 On/Off Control

LFE models can be operated by a single step humidistat which has Volt-free contacts.

**Note:** See 1.6.4 Control Signal Selection below.

### 1.6.3 Proportional Control

The VAPANET Electrode Boiler (LFE) models can all be operated by either a potentiometric signal or by one of the following standard proprietary DC analogue signals.

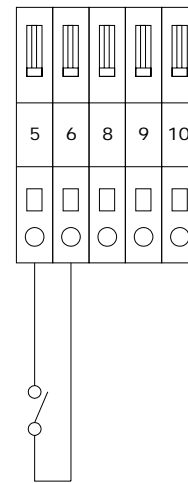
Input signal:

Standard	On/Off
1	0-5 V dc
2	0-10 V dc
3	2-10 V dc
4	1-18 V dc
5	0-20 V dc
6	4-20 mA
7	<i>Pot</i>

Response:

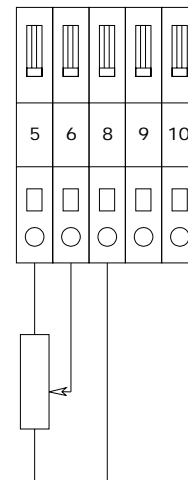
20 -100%

**NB.** The control signal is connected to ground at the PCB – if the controller output is referenced to ground, then the “leg” which is ground must be the one linked to terminal 5.



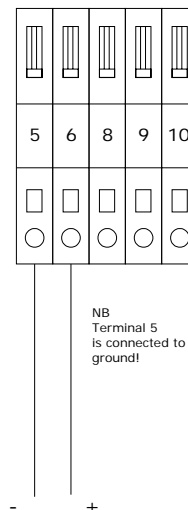
Hygrostat with Volt Free contacts

Max resistance of external connection 100 Ohms.



Potentiometric Control

Min. 135 Ohms  
Max 10k Ohms

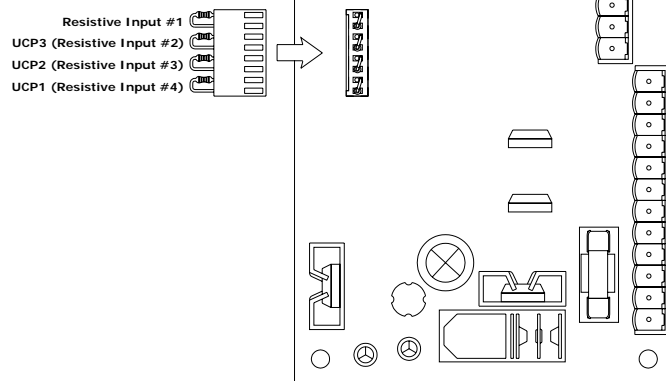


Proprietary DC Analogue Signal.

### 1.6.4 Control Signal Selection

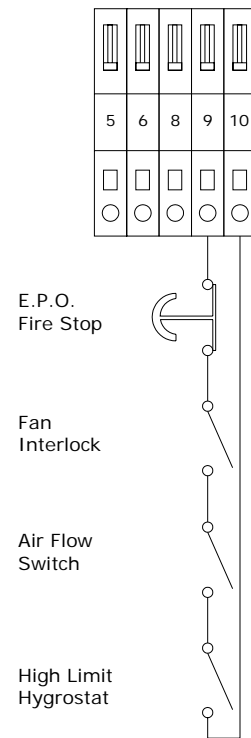
Selection of the control signals is done by resistors fitted to UCP3

**NB** As standard (unless stated at time of order) "On/Off" will be set as standard.



### 1.6.5 Security Circuit / E.P.O. Shutdown

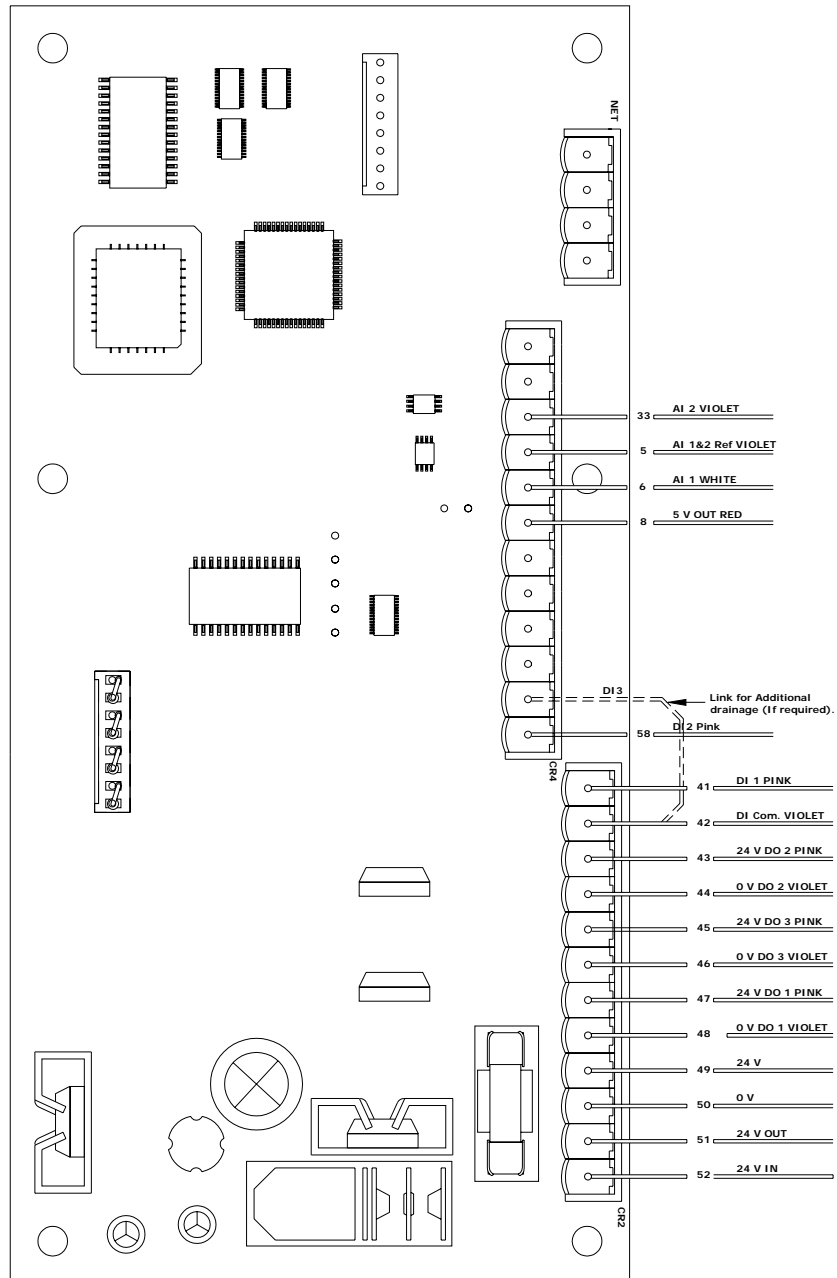
As standard units are shipped such that terminals 9 & 10 are provided for connection of an E.P.O. (Emergency Power Off) switch or fire shutdown facility. Other control interlocks, such as high limit humidistat, airflow switch and/or fan interlock and time switches etc. should also be connected here.



**Use of the 24V supply of the VAPANET unit to power other items of equipment will invalidate the Vapac warranty.**

### 1.6.6 Drain operation

As standard the unit is set for “Economy mode”, which has a reduced automatic drain rate, which will reduce the amount of hot water (and therefore energy) which is expelled to drain. If the supply water is very conductive, or if the unit experiences operational difficulties it may be necessary to introduce additional drain cycles – this can be achieved by adding a link from DI 3 to DI (Com.) as shown.



## 2.0 Start-Up / Operation

### 2.0.1 Start-up check list

- a) **Water supply and Drain Connections:** These should be connected as indicated under Plumbing and in accordance with the relevant local regulations. An isolation valve should be adjacent to the unit. The connecting metal plumbing must be grounded close to the unit.
- b) **Steam Line:** This must be connected according to the installation instructions with adequate slope and support.
- c) **Power supply:** Wiring to the Vapanet unit should be by a qualified electrician and comply with the relevant regulations using appropriately sized cable and cable glands, with disconnect and fuses to suit the maximum fuse rating of the unit at the supply Voltage. The disconnect/fuses should be adjacent to the unit or within easy reach and readily accessible.
- d) **Control Connections:** Ensure the control signal and security circuit are correctly connected according to the relevant instructions/diagrams.
- e) **VAPANET 24v Control Circuit Transformer:** The standard 24V transformer used in the units has primary winding for 200V, 220/240V, 380V, 415V, & 440v 50/60Hz connection derived from the local electrical supply.  
Note: 60Hz connection must be specified with order as 230V 60Hz pump is required.
- f) The maximum output & kW rating of the unit is determined by a Current Set Plug. It is therefore possible to down rate units to any output, down to approximately 50% of the full rated output. (Contact Vapac for further details)
- g) Unit Configuration Plug (U.C.P.) sets the maximum current level for the unit. It is fitted directly onto the control P.C.B.

### 2.0.2 Start-Up Instructions

#### First check:

- a) **That the transformer connection matches supply Voltage.**
- b) **That the security circuit is closed for unit operation.**

Close the electrical access panel.  
Turn on the water supply to the unit.  
Close disconnect/circuit breaker feeding supply to the unit.  
Close the On/Off switch.

### 2.0.3 Commissioning/Start-Up

Once the Set-Up procedure has been completed, the unit is available to operate according to the requirements of the control signal.  
When starting with an empty cylinder, the VAPANET programme switches in the contactor and feeds water in until the water reaches the electrodes, and current starts to flow. Thereafter the VAPANET system will continuously monitor and control the conductivity by adjusting the amount of water drained and fed into the cylinder.

With no demand the LE unit's user LED's will be off. When the demand increases and the unit is switched on the user LED's will flash green/amber at a rate depending on the demand input and the actual current drawn. The actual run current is monitored and until the actual current has two feeds above 95 % the LED will flash green/amber when the current is above 95% for two consecutive feeds the LED's will flash red.

### 2.0.4 Features of VAPANET Electrode Boiler Unit

The VAPANET system of control is designed to adjust the function to keep the unit operating in the face of changing water quality in the cylinder and changing electrode condition even if, in an adverse operational circumstance, this results in some reduction in output while the situation exists.

#### Foaming protection

In particular, the VAPANET is designed to prevent the onset of foaming and to introduce corrective drainage to keep the unit working.

#### Automatic switch-off

The VAPANET PCB will stop operating in response to extreme fault conditions identified as:

Drain Fault STOP (no drain function)

Feed Fault STOP (water not reaching cylinder)

In each case, the display will show the STOP condition and a Help Message, the User LED's on the fascia will indicate the condition see table on page 20. The STOP condition of a VAPANET PCB will be cleared by switching the unit off and on. **THIS ACTION SHOULD ONLY BE TAKEN ONCE THE CAUSE OF THE PROBLEM HAS BEEN ASCERTAINED AND RECTIFIED.**

### 2.1 Service Advice

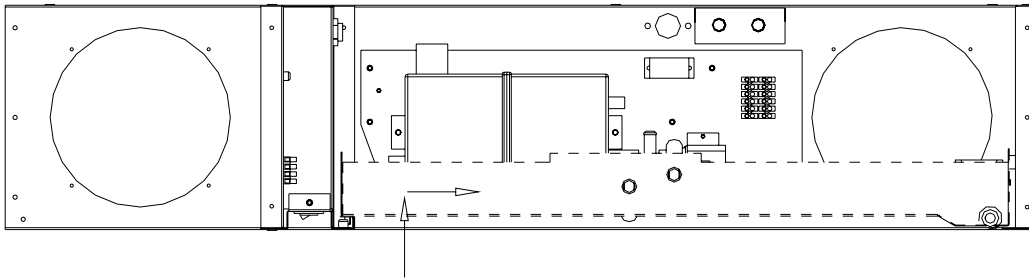
The water hardness and the humidity demand at site will determine the effective life of a steam cylinder. Units located in areas with naturally soft waters will experience the longer cylinder life, possibly upwards of 12 months in calendar terms. With hard waters, a more frequent cylinder exchange must be expected and cylinder exchange 2 or 3 times a year can be the average situation. The normal scaling up of the Vapac steam cylinder is outside the Vapac warranty.

#### 2.1.1 Procedure for Cylinder Exchange.

- A) Remove the drain tray assembly from the unit, as follows:-
  1. With the power connected to the unit, manually drain the unit, by depressing (and holding) the Run/Off/Drain Switch to the momentary drain position.
  2. Disconnect the Vapac from the incoming electrical supply by means of the external isolator (disconnect switch). This should be "locked off" to prevent accidental operation.
  3. Remove the steam section access panel.
  4. Remove the plug connection for the float switches and drain tray condensate pump.
  5. Remove the electrode connections.
  6. Disconnect the drain pump.
  7. Remove the steam distribution assembly by lifting it clear of the cylinder steam outlet boss. Note it may be necessary to rotate it as it is raised to get it high enough to clear the boss.

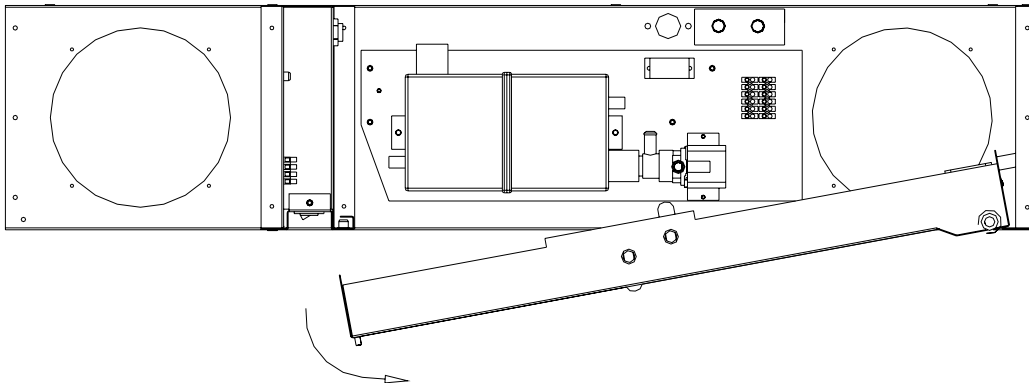
8. Remove drain plug from drain tray catching any water contained in the drain tray into a container as plug is removed To remove the Drain Tray please follow instruction shown in Fig. 1 and Fig. 2
  9. Standing so as to face the drain cylinder, slide the drain tray assembly to the right, until the tray is clear of the mounting support.
  10. Lower the cylinder end of the tray below the lip of the access panel, then slide to the left to clear the right hand mounting support. When it is clear lower the drain tray clear of the unit.
- B) Remove the cylinder as follows:-
- 1) Slide the drain pump and feed adaptor away from the cylinder, until they are clear of the cylinder feed/drain boss, and the pump body is clear of the pump mounting plate. Take care to note the orientation of the pump on the mounting plate, as it will fit on more than one face of the pump body.
  - 2) Remove the cylinder mounting screws and remove the cylinder. Note: There will be residual water in the cylinder and care should be taken not to spill this as it could be hot or discolored and could burn or stain.

FIG. 1



IFT DRAIN (SHOWN IN FIG1 WITH DASHED LINES) TO CLEAR MOUNTING HOLES AS ARROWS INDICATE.  
THEN PUSH PUSH FORWARD UNIT REACHING BACKPLATE.  
TIP THE DRAIN TRAY AT ANGLE (AS SHOWN IN FIG 2) SO THAT THE TOP OF THE DRAIN TRAY CLEARS THE BOTTOM OF THE UNIT AND CLEAR FROM THE UNIT COMPLETELY

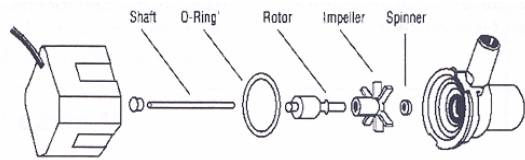
FIG. 2



**Other Maintenance:**

- Should only be carried out by a qualified electrician.
- The steam cylinder should be drained prior to carrying out any maintenance in the steam section – This must be done prior to isolating the electrical supply, i.e. before removing the front access panel.
- The unit should be isolated from the electrical supply before any cover or access panel is removed.

- To dismantle and re-assemble pump refer to the diagram below.

**2.2 Service and Maintenance**

As the operation of the Vapac is entirely automatic, it normally requires no attention on a day-to-day basis. General cleaning and maintenance of the component parts of the Vapac are recommended at intervals of about one year, but this is largely dependent upon the frequency of its use and the quality of the water supply. Where the Vapac is part of an air-conditioning system being serviced regularly, the Vapac should be inspected at the same time.

**2.2.1 Feed Valve with Strainer**

The nylon bodied solenoid valve incorporates a small nylon strainer which is a push fit in the 3/4" inlet of the valve. With a new plumbing installation, residual loose solid material in the pipework could partially block the strainer after start-up. If for this or any other reason a restriction of the water flow is suspected (outside of supply pressure considerations), it would be possible to clean the strainer as follows:-

Turn off the water supply to the Unit.  
Undo the nylon nut connecting the flexible connection to the valve inlet.

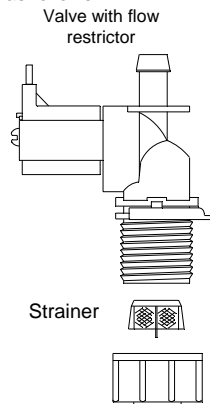
The strainer can be removed using 'long-nosed' pliers to grip the centre flange provided on the strainer for this purpose.

Withdraw the strainer.

Wash and replace it.

Reconnect and turn on water supply.

Reconnect electrical supply to allow unit to operate.



*Note: Always replace the strainer after cleaning as it is required to prevent material lodging in the valve seat or blocking the small 3/4 Nylon nut with washer as flow control restrictor which is fitted part of flexible connector in the valve.*

**2.2.2 Drain Pump**

The pump should be inspected and cleaned regularly. It is recommended that this is done at each cylinder exchange especially in hard water areas. Failure to keep the pump clear and operational will result in reduced cylinder life.

To remove the pump for maintenance purposes proceed as follows:

- Depress and hold the manual drain switch to empty the cylinder. The pump sound changes distinctly when the cylinder is empty. When this occurs release the switch.
- Disconnect unit electrical supply and follow the steam section removal instructions. Once the steam section has been removed, the pump can be removed.
- Ease the pump body away from the cylinder, sliding it fully off its base plate and release the connecting tube.. As the pump inlet is withdrawn from its 'O' ring connection, some hot water may be released, so care should be taken.

- In operation the stainless steel shaft remains stationary while the rotor and impeller rotate on it. Remove all scale build-up on the shaft so that the impeller can rotate freely.
- Ensure that the 'O' ring seal is correctly positioned when fitting the inlet housing to the main pump body. **When re-assembling, make sure the brass spinner is replaced on the shaft in front of the impeller.** A smear of multipurpose grease should be applied to the 'O' ring so that the impeller housing can be rotated into position without distorting the 'O' ring underneath it and so maintain the water seal.

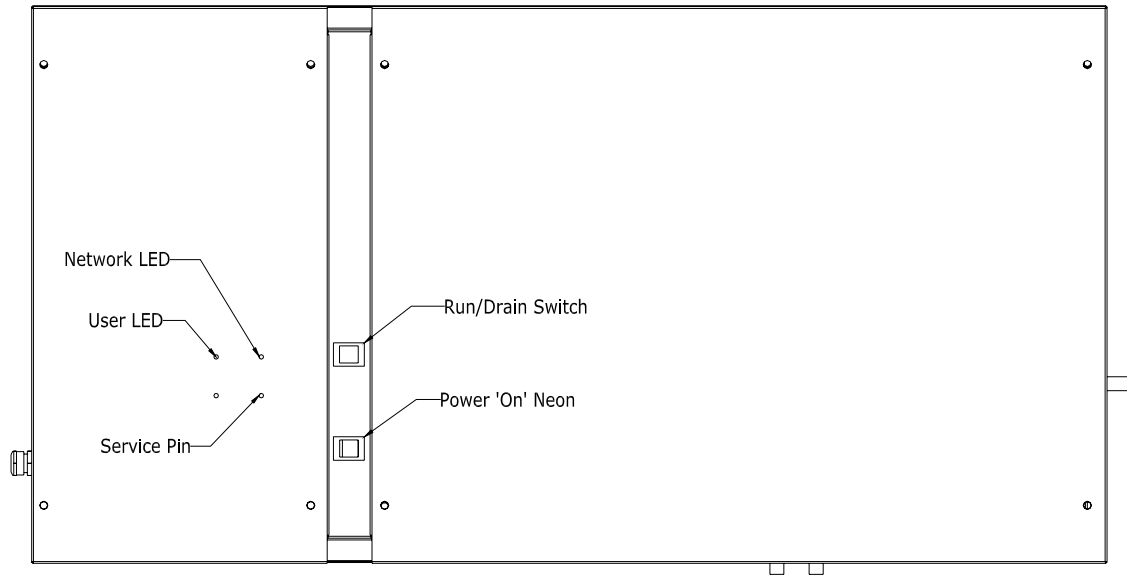
The steam section should be refitted by following the removal instructions in reverse order, reversing all instructions.

**Steam and Condensate Hoses**

The hoses used with and in the Vapac should be inspected at the normal service visits as part of normal maintenance. At the first signs of deterioration, a hose should be removed and replaced.

### 3.0 Location of Indicators and Controls

#### 3.1 Positioning of Indicators and Controls on Vapac® Vapanet® LEFC Units.



### 3.2 Initial Set-up

#### User LEDs

**During the initialisation process the User LEDs can be in one of the following states**

User LED State		Description
1	RED Flashing 2 second period	Unit initialising. If remains in this state, then unit does not a valid UCP1 fitted.

**Prior to the start of the initialisation process, the LEDs will flash Green, Red, Amber repeatedly for 10 seconds to check that the LEDs are operating correctly.**

#### Remedy:

- 1 Check that UCP1 is fitted to plug fitted to CR4 pins 7 & 8 see page 12.

### 3.3 Normal Run / Standby / Start-up – No User Intervention Required

User LEDs being off, RED or RED Flashing refer to following table.

User LEDs		Description																											
1	OFF	Unit in shutdown.																											
2	OFF	Unit in standby																											
3	Green Amber Flashing Variable  RED Flashing Variable Period or ON	Unit in Startup.  Unit Online.  The variable period is determined by the demand signal.  <table> <thead> <tr> <th>Demand</th><th>LED ON RED</th><th>LED OFF</th></tr> </thead> <tbody> <tr> <td>&lt;12.5%</td><td>0.5 seconds</td><td>3.5 seconds</td></tr> <tr> <td>&lt;25%</td><td>1.0 seconds</td><td>3.0 seconds</td></tr> <tr> <td>&lt;37.5%</td><td>1.5 seconds</td><td>2.5 seconds</td></tr> <tr> <td>&lt;50%</td><td>2.0 seconds</td><td>2.0 seconds</td></tr> <tr> <td>&lt;62.5%</td><td>2.5 seconds</td><td>1.5 seconds</td></tr> <tr> <td>&lt;75%</td><td>3.0 seconds</td><td>1.0 seconds</td></tr> <tr> <td>&lt;87.5%</td><td>3.5 seconds</td><td>0.5 seconds</td></tr> <tr> <td>&gt;=87.5%</td><td></td><td>ON RED Continually</td></tr> </tbody> </table>	Demand	LED ON RED	LED OFF	<12.5%	0.5 seconds	3.5 seconds	<25%	1.0 seconds	3.0 seconds	<37.5%	1.5 seconds	2.5 seconds	<50%	2.0 seconds	2.0 seconds	<62.5%	2.5 seconds	1.5 seconds	<75%	3.0 seconds	1.0 seconds	<87.5%	3.5 seconds	0.5 seconds	>=87.5%		ON RED Continually
Demand	LED ON RED	LED OFF																											
<12.5%	0.5 seconds	3.5 seconds																											
<25%	1.0 seconds	3.0 seconds																											
<37.5%	1.5 seconds	2.5 seconds																											
<50%	2.0 seconds	2.0 seconds																											
<62.5%	2.5 seconds	1.5 seconds																											
<75%	3.0 seconds	1.0 seconds																											
<87.5%	3.5 seconds	0.5 seconds																											
>=87.5%		ON RED Continually																											

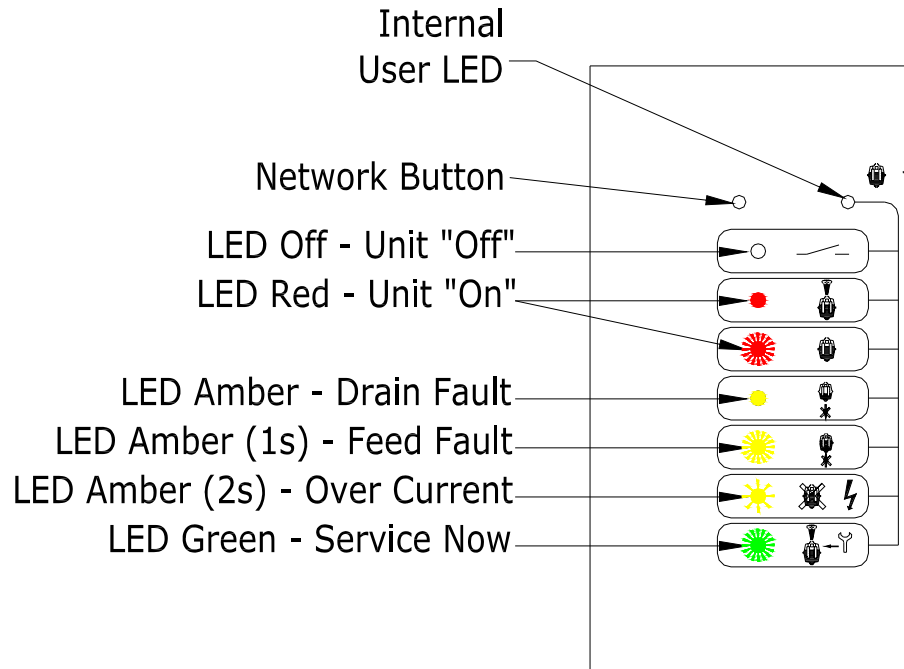
The above are purely indications of the current state of the unit and require no action from the operator. When the state changes, the indication will automatically change.

### 3.4 Fault / Service Indications – Requiring Operator Intervention.

User LED 1 State		Description
1	AMBER	Drain Fault
2	AMBER Flashing 1 second period	Feed Fault
3	AMBER Flashing 2 second period	Over current Fault
4	AMBER/OFF/AMBER/OFF /GREEN/OFF	No Voltage input
5	Green	Service Now

- 1, 2 & 3     **Fault stop:** Once the problem has been cleared the fault can be re-set by the following procedure.  
Power the unit right off, using the local isolator (not the unit on/off switch), waiting ten seconds then re-applying power.
- 4            **No voltage input:** Check the wiring to CR6 and CR7 of the “level sense” daughter board (part number 1150633-3). If the line voltage can be measured here, check the wiring between CR1 pins 5 & 6, of the same daughter board and CR2 pins 1 & 3 of the main control PCB. If this is also correct then either the daughter board or the main control PCB is faulty. Once the fault has been cleared the LED indications will revert back to the cylinders “current state”.
- 5            Service the unit, by following the instructions on pages 15 & 16.

### 3.3 Facia Label symbols



#### 4.0 Troubleshooting Check List

<b>Preliminary</b>	-	<b>Use manual drain option to check pump operation</b>
<b>Symptom</b>		<b>Check/Cause/Remedy</b>
Power-On Neon – Off	-	Check main power is connected and switched on.
Symbol-LED – Off	-	Check power supply fuses.
Display - Blank		
Power-On Neon – On	-	Check if security circuit is open circuit
Symbol-LED – On	-	Check 24V 3.15A fuse mounted on the Vapanet controller PCB 1150655
Display - Blank		

#### **Automatic STOP – Feed Fault indicated.**

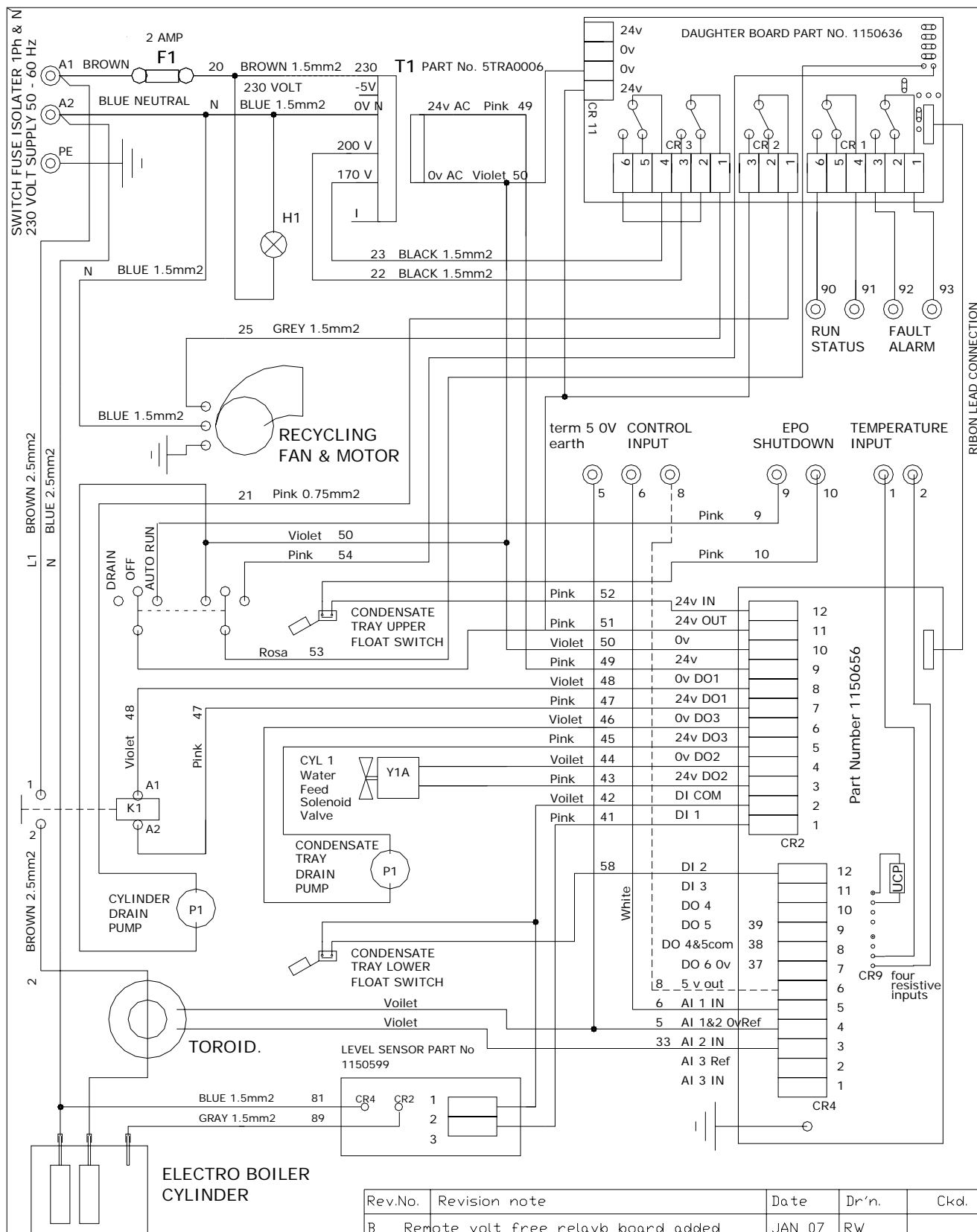
<b>Possibilities</b>		<b>Checks</b>
Water is not connected	-	Check water stop valve is open.
Water connected but not reaching cylinder	-	Check internal Vapac hose connections for a leak.
Water in cylinder and overflowing	-	Check internal hoses for kinks or obstructions.

#### **Automatic Stop – Drain Fault indicated.**

<b>Possibilities</b>		<b>Checks</b>
Drain pump function impaired	-	If pump will not function, empty cylinder by disconnecting the water supply hose between the tundish and the cylinder (at the tundish fill-cup) and lowering it to drain the water into a bucket. Remove, dismantle and clean pump.
Cylinder O/Let Blocked	-	Check & unblock.

#### **Unit On-Line but inadequate or no steam production.**

<b>Possibilities</b>		<b>Checks</b>
Contact not made	-	Contact coil, Control PCB.
Cylinder scaled up.	-	Cylinder Inspection (replace if necessary).



DATE :	
ITEM REF:	LFE
SCALE :	
SHEET No.	
ISSUE :	A

Made in England by:  
Vapac Humidity Control Ltd.

041xxxx  
October 2006

Vapac Humidity Control Ltd. reserve the right to change the design or specification of the equipment described in this manual without prior notice.