

GUARANTEE

C & W Specialist Equipment Limited (hereinafter called C & W) guarantee the cabinet supplied for a period of one year from the date of delivery to the customers place of work subject to the below mentioned conditions and excluding the items listed. If within the said period any part of the cabinet is found to be defective, C & W will (subject to the conditions and excluded items) exchange or repair such parts free of charge. All labour, transport and material costs are covered by this guarantee.

This guarantee is to be additional to and does not take away any of the purchaser's rights under the Sale of Goods Act 1979. Neither does this guarantee supersede any guarantee given by the manufacturers whose services will be employed where appropriate.

Conditions of Guarantee

1. The cabinet has not been tampered with or repaired by anyone other than an employee or agent of C & W, unless under direct instructions from C & W.
2. The cabinet has been installed correctly as per the instructions of C & W.
3. The cabinet has not been subject to misuse, or to willful or accidental damage (including damage caused by fire or lightning).
4. The cabinet has been used solely for the purpose for which it was manufactured and kept in and operated to the conditions specified by C & W.
5. The guarantee excludes parts that have a limited life span and components that are non mechanical or electrical that fail due to third party damage.
 - Indicator Lamps
 - Light Bulbs
 - Fuses
 - Salt Solution Filters
 - Peristaltic Pump Tubing
 - Salt Fog Atomiser (fluid cap only)

On behalf of the company



N D CREMER
Managing Director



Manufacturers of Corrosion and Environmental Chambers

Leintwardine, Craven Arms, Shropshire SY7 0NB, UK.

Tel (01547) 540654 • Fax (01547) 540412

Internet: www.cw-spec.com • E-mail: sales.service@cw-spec.com



DECLARATION OF CONFORMITY

C+W Specialist Equipment Ltd based in Leintwardine, Craven Arms, Shropshire, SY7 0NB, United Kingdom is the manufacturer of Salt Spray Cabinets, Cyclic Salt Spray Cabinets, CCT Cabinets, Humidity Cabinets and Combination Cabinets prefixed with the codes SF, SF/MP, CCT, CCT/VH and AB.

The manufacturer hereby declares under their sole responsibility that the products identified above comply with the protection requirements of the EMC directives with the principle elements of the safety objectives of the low voltage equipment directive and with the essential health and safety requirements of the machinery directive.

Directives Covered:

- 2004/108/EC EMC Directive (89/336/EEC)
- 2006/95/EC Low Voltage Directive (LVD) (72/23 EEC and 93/68 EEC)
- 2006/42/EC Machinery Directive (98/37 EC 2009)
- 89/655/EEC Use of Work Equipment Directive (PUWER 98)

Compliance: By meeting the following standards the equipment is in compliance of the above directives.

- EN 61326-1-2006 Electrical Equipment for Measurement and Control and Laboratory use.
- EN 61010-1-2001 Safety Requirements Electrical Equipment for Measurement, Control and Laboratory use.
- EN 61010-2-010-2003 Particular Requirements for Laboratory Equipment for Heating of Materials.
- EN 61010-1-2003 Safety Requirements for Electrical Equipment for Measurement Control and Laboratory use PART 1 : General Requirements.
- EN 61000-6-2-2005 Electromagnetic Compatibility (EMC) Generic Standards. Immunity for Industrial Environments.

The technical documentation required to demonstrate that the products meet the requirements of the Directives can be made available to the relevant authorities within a reasonable period of time.

The CE mark was first applied in 2007.

Signed : Date :

Name : N D CREMER Position : MANAGING DIRECTOR

NOTES: The attention of the specifier, purchaser, installer or user is drawn to special measures and limitations to use that must be observed when the products are taken into service to maintain compliance with the above directives. Details of special measures and limitations to use are available on request and are contained in product manuals.

CYCLIC CORROSION TEST CHAMBERS

Models SF/2000/CCT, SF/1000/CCT and SF/450/CCT and all VH Models

This range of advanced controlled environment test systems has been developed to enable the corrosion engineer to subject his samples to the following range of conditions quickly, accurately and conveniently.

1. CONTROLLED TEMPERATURE CHANGES.
2. SALT FOG ENVIRONMENT.
3. CONSTANT TEMPERATURE DRYING.
4. FORCED AIR DRYING.
5. CONSTANT TEMPERATURE HIGH HUMIDITY.
6. CYCLIC TEMPERATURE HIGH HUMIDITY.

These facilities have been incorporated into the system with a user configurable programmer/controller interfaced via a solid state decoder to the various relays and actuators required.

CONTROLLED TEMPERATURE CHANGES

Controlled temperature changes are achieved by programming the temperature to be reached against the rate of change of temperature so that temp/time is a straight line function of variable slope. In addition to just changing temperature other functions can be introduced at the same time, these include washing waste products from the humidity generator after a salt fog spray. The Programmer/Controller used for control of the temperature calls for either heating or cooling dependent upon the slope of the time/temp gradient. The cooling can be switched either on or off independent of the computer to increase the slope of the temperature gradient.

SALT FOG ENVIRONMENT

A specially designed Lucite atomiser jet mounted centrally in the lower half of the sample chamber generates a fine salt mist with the atomised product about 100 microns diameter by the introduction of:

- a) **Air:** Dependant upon the standard to which the machine is required to operate the air supply can be either humidified or dry.

Humidified Air: Compressed, oil free and filtered air is introduced via an air regulator and pressure gauge to a humidifier system where it is heated to a preset temperature and moistened prior to its introduction to the atomiser jet.

Dry Air: Is supplied to the atomiser jet via an air regulator and pressure gauge after being filtered etc. It is not treated in any other way to alter its temperature or moisture content.

- b) **Salt Solution:** The specified salt solution is contained in an external reservoir and is introduced to the jet via an inline filter, a variable speed pump and flowmeter. Accurate control of the flow rate and air pressure enable the operator to quickly and repeatedly adjust the fall out per unit area of the test chamber to that required by the various testing standards.

CONSTANT TEMPERATURE DRYING

Can either take place after a salt fog cycle or a humidity cycle is programmed into the sequence of events predetermined by the test conditions. The temperature in the test chamber is raised by an amount that reduces the humidity of the test chamber to acceptable levels and maintained for the period of time required to dry the surface of the samples THOROUGHLY.

FORCED AIR DRYING

More complete drying can be obtained by the introduction of a quantity of circulating air into the test chamber and also keeping the set temperature at an elevated level.

CONSTANT TEMPERATURE HIGH HUMIDITY

This event normally requires temperatures greater than 35°C but not often higher than 48°C. The test chamber can be set anywhere between these temperatures. Water is introduced into humidity generators and heated by the computer and its associated equipment to maintain the test chamber temperature. The generated humidity level is generally between 90 and 98%, adequate for all specifications.

CYCLIC TEMPERATURE HIGH HUMIDITY

In general this test requires temperature changes between 42°C and 48°C at time intervals of 30 minutes. These temperature changes can be programmed into the controller by the use of a sub program for a number of cycles as required by the various testing specifications. At the end of this sequence the system can revert back to any other part of the combined testing cycle.

COMBINED SEQUENCE TESTING

These events can be combined in a large number of ways to make up a complete sequence of tests. Typical testing cycles contain at least three of the above parameters at different temperatures e.g. salt fog at 35°C, drying at 60°C and humidity at 42°C with time intervals of 4 hours, 2 hours and 2 hours. These variations can be modified at will by entering programs into the memory contained in the programmer/controller.

CONTINUOUS TESTING

The system can easily be programmed to carry out:-

1. Salt Fog Spraying (continuous or intermittent)
2. Constant Temperature High Humidity.
3. Cyclic Temperature High Humidity.

Programming these events is quite simple and they can be called up from the controller memory at any time after a program reset has been displayed. Another way of obtaining a continuous test is to HOLD the sequence at the appropriate segment. This involves timing the period of the hold, conversely, when using a program an adequate time period can be programmed into the continuous test.

INTERMITTENT TESTING

Again the system can be programmed to carry out intermittent salt fog and drying tests. The Mebon Prohesion test is one that comes to mind as an example of this type of sequence. It is quite a simple matter to program humidity testing with a drying cycle either at elevated temperature or at ambient temperature over a number of sequences.

*THE COMPLEXITY OF THE TESTING SEQUENCE IS OVERCOME BY THE
SIMPLICITY OF PROGRAMMING THE SYSTEM*

INSTALLATION

Services Required:

- 1) Mains Electricity
- 2) Compressed Air Supply
- 3) Water Supply

Mains Electricity

2000 litre capacity chamber

SF/2000/CCT 3 Phase Power Supply 380-415V 2Kw/16 Amp per Phase
6Kw (max load)

SF/2000/CCT/VH 3 Phase Power Supply 380-415V 2Kw/16 Amp per Phase
8Kw (max load)

1000 litre capacity chamber

SF/1000/CCT 25 Amp Power Supply 220-240V 50/60Hz
5Kw (max load)

SF/1000/CCT/VH 3 Phase Power Supply 380-415V 2Kw/16 Amp per Phase
8Kw (max load)

450 litre capacity chamber

SF/450/CCT 13 Amp Power Supply 220-240V 60/60Hz
3.2Kw (max load)

SF/450/CCT/VH 25 Amp Power Supply 220-240V 50/60Hz
7Kw (max load)

200 litre capacity chamber

SF/200/CCT 13 Amp Power Supply 220-240V 50/60Hz
2.2Kw (max load)

100 litre capacity chamber

SF/100/CCT 13 Amp Power Supply 220-240V 50/60Hz
2.2Kw (max load)

Compressed Air Supply

A clean, oil free and filtered air supply is required.

When using mains air, a wall mounted air regulator should be used to reduce the air pressure entering the test chamber to 2-3 Bar (30 - 40 psi).

Water Supply

A clean water supply should be connected to the test chamber.

In areas known to have a hard water supply, it is recommended to install an inline de-ioniser unit to prevent a build up of calcium deposits on the operative solenoid valve seats and the humidity generator heating elements.

The pressure of the water supply should be regulated to between 2 - 4 Bar (20- 60 psi).

Note: It is important to note that minimum water pressure should be no less than 2.0 Bar (30 psi).

Connection of Condenser Unit to Cabinet

Models: SF/CCT/VH – All Models

The above models are supplied with a Condenser Unit, which should be positioned to the left of the cabinet

AIR FLOW AND RETURN PIPES

There are two flexible plastic pipes which should connect the condenser unit to the cabinet.

Push the flexible pipes over the corresponding outlets on the cabinet and condenser unit and then tighten the circular pipe fasteners so that each pipe is secure.

These pipes take the air into the test chamber, which has been conditioned in the condenser unit and then air from the test chamber back into the condenser unit to be re-conditioned.

WARNING NOTE: Water condensate may build up in these pipes and this can be reduced by making sure that there is a "fall" from the condenser unit to the cabinet, allowing the "condensate build up" to flow into the cabinet and then out through the cabinet drain.

If "condensate" continues to build up then you should periodically raise the pipes by hand so that the water runs into the test chamber.

Electrical

UK MARKET ONLY

All models are manufactured with a mains power connector box at the rear of the cabinet. It will be necessary to connect a suitable cable (20 Amp rated minimum) from the power box at the rear of the cabinet to a wall mounted fused isolator which has the correct supply for the cabinet.

Water

De-ionised or de-mineralised water should always be used in the cabinet. Failure to use de-ionised or de-mineralised water will result in the filter blocking in the humidification box which will result in no humidity production.

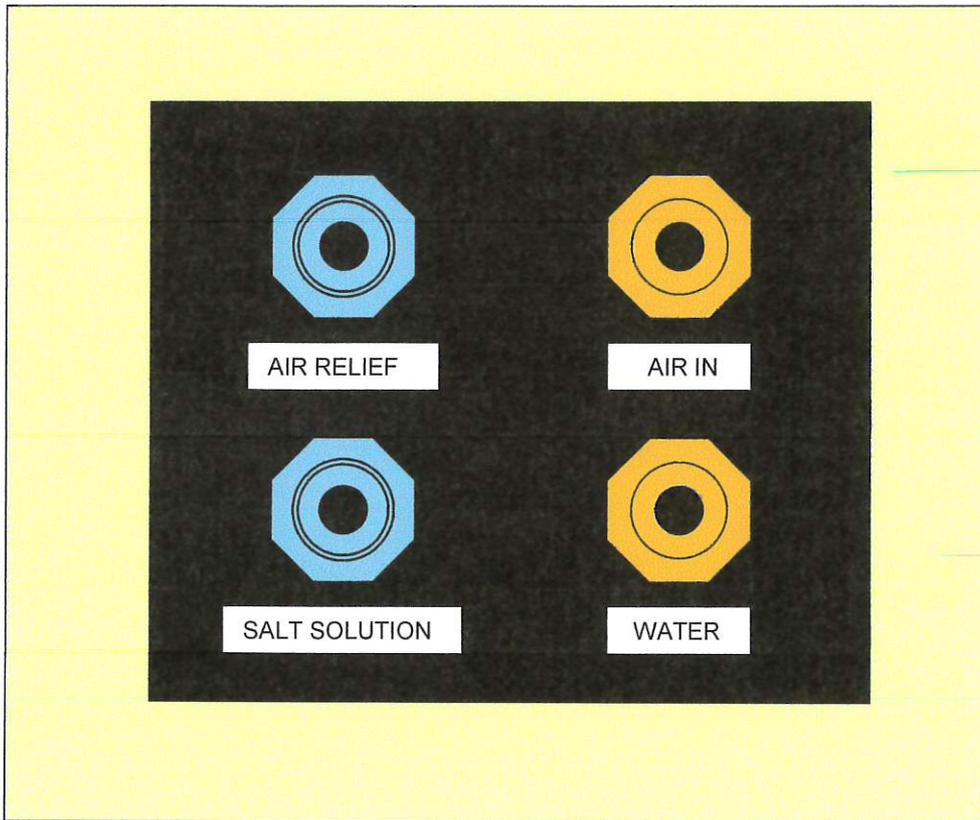
NOTE: The filters should be replaced every eight weeks of use.

Water Supply Options

1. MAINS WATER

If a mains water supply is connected to your water reservoir then there must be a de-ionised system in the line to remove the dissolved solids (calcium carbonate).

SERVICES IN PANEL



2. WATER RESERVOIR ONLY

If the cabinet is supplied with a water reservoir it will be in the form of a plastic container, which has a capacity of 114 litres. The reservoir is supplied on castors and comes complete with a lid. The plastic lid should always be kept in place.

Inside the reservoir there is an in-line filter and this should be replaced every 10 weeks approximately.

The reservoir is linked to the cabinet by a feed pipe and this should be connected using the push on fitting and locking nut.

The reservoir should be filled with de-ionised or de-mineralised water.

Water Consumption

The rate of use of water will vary according to the humidity level set.

Low Consumption

At low humidity set points – Below 50% RH, the rate of water consumption will be low therefore the running time of the cabinet will increase between filling.

High Consumption

At high humidity set points – Above 50% to 98% RH, the rate of water consumption will be high therefore the running time of the cabinet will decrease between filling.

Low Level Reservoir Alarm

Supplied as an optional extra at the time of ordering.

If this has been ordered there will be a low level water sensor in the reservoir. The reservoir will have a power supply from the cabinet so that when a low level situation occurs the low level switch will activate an audible and/or visual alarm to indicate the situation.

Cabinet Cut Off Alarm

Supplied as an optional extra at the time of ordering.

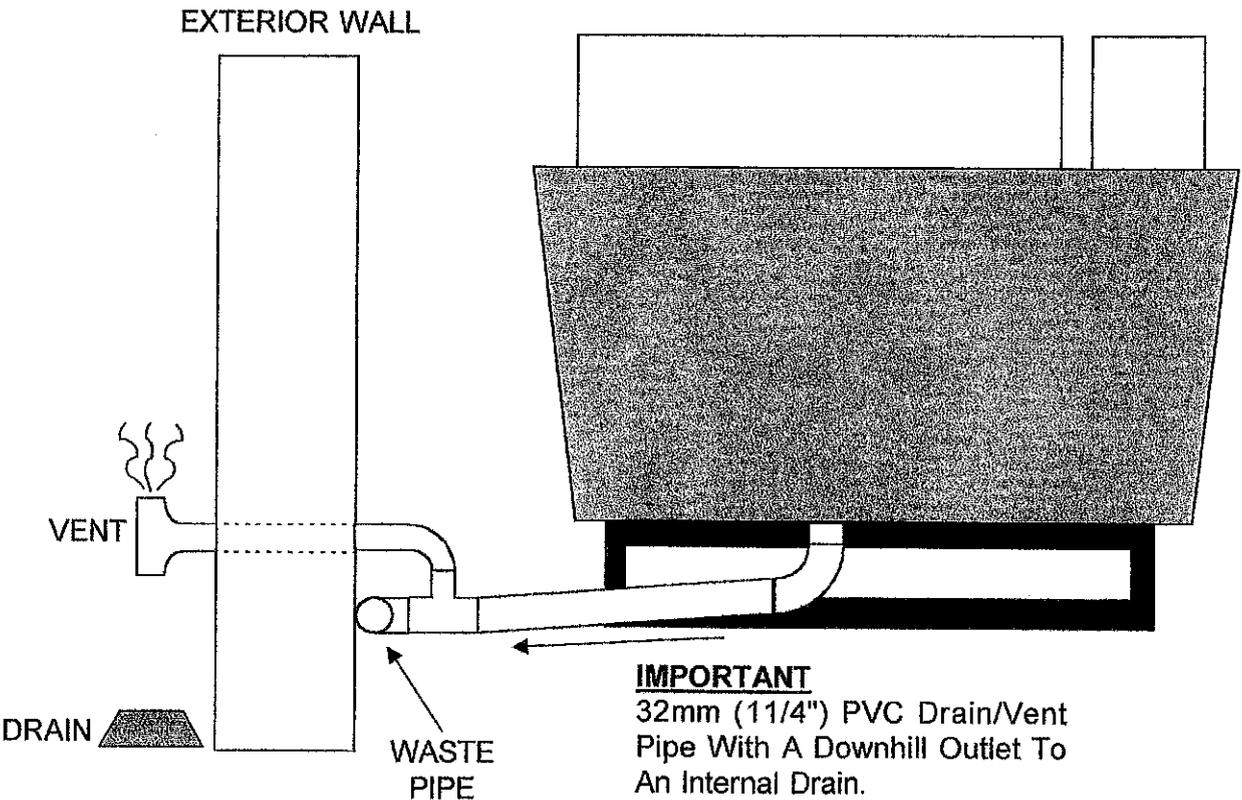
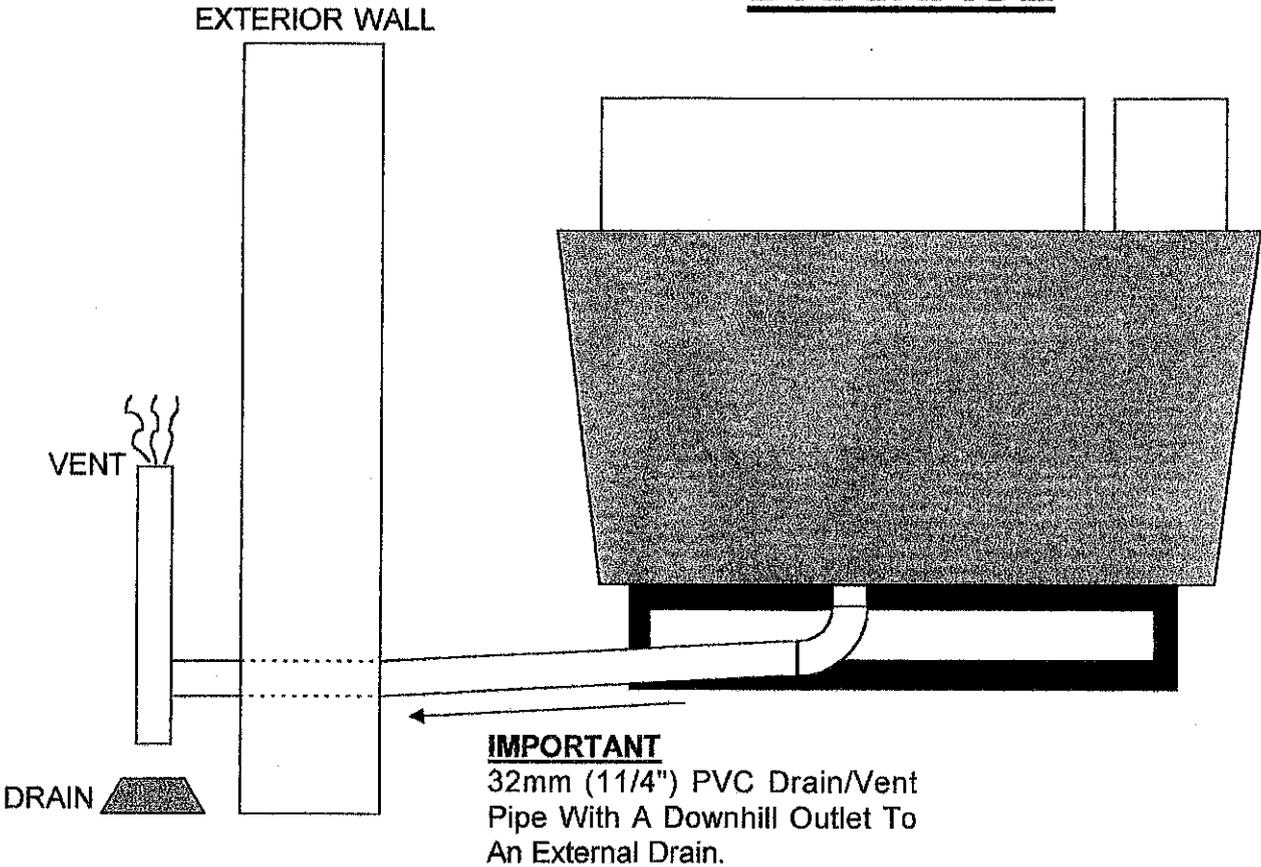
If this has been ordered, there will be a second low level water sensor fitted below the audible low level sensor. Should the operator fail to restore the de-ionised water level then the second low level sensor will be activated and this will switch the cabinet off preventing damage to the cabinet humidification system and cabinet contents.

Drainage

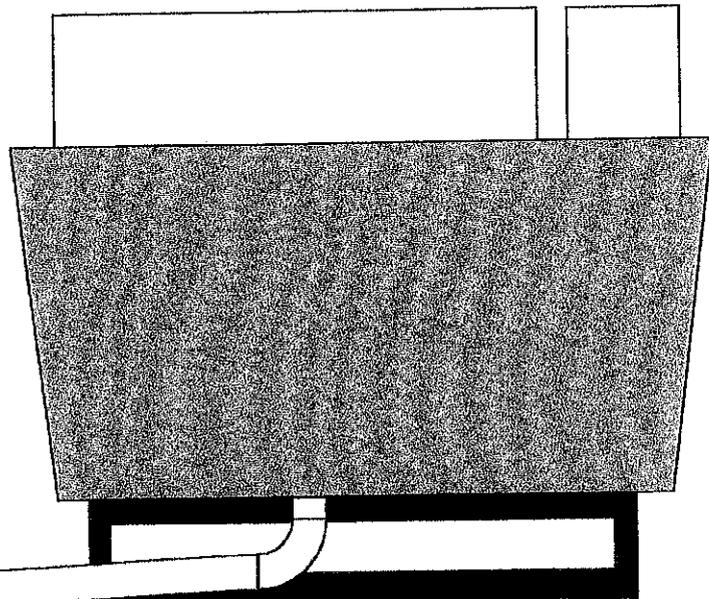
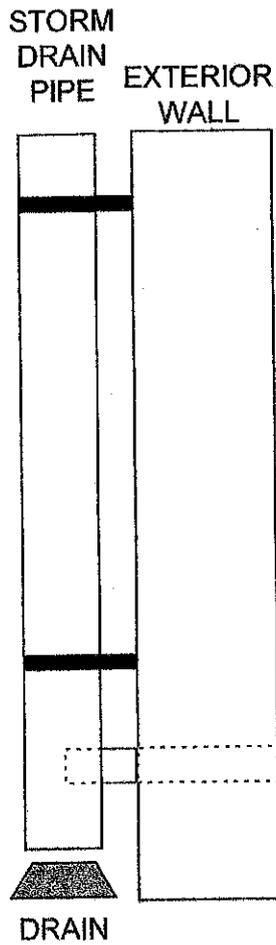
Connect the main drain from the cabinet to a local waste drain close to the cabinet.

1. When the cabinet is operating high humidity levels excess water/condensation will build up in the cabinet and it will drain to waste.

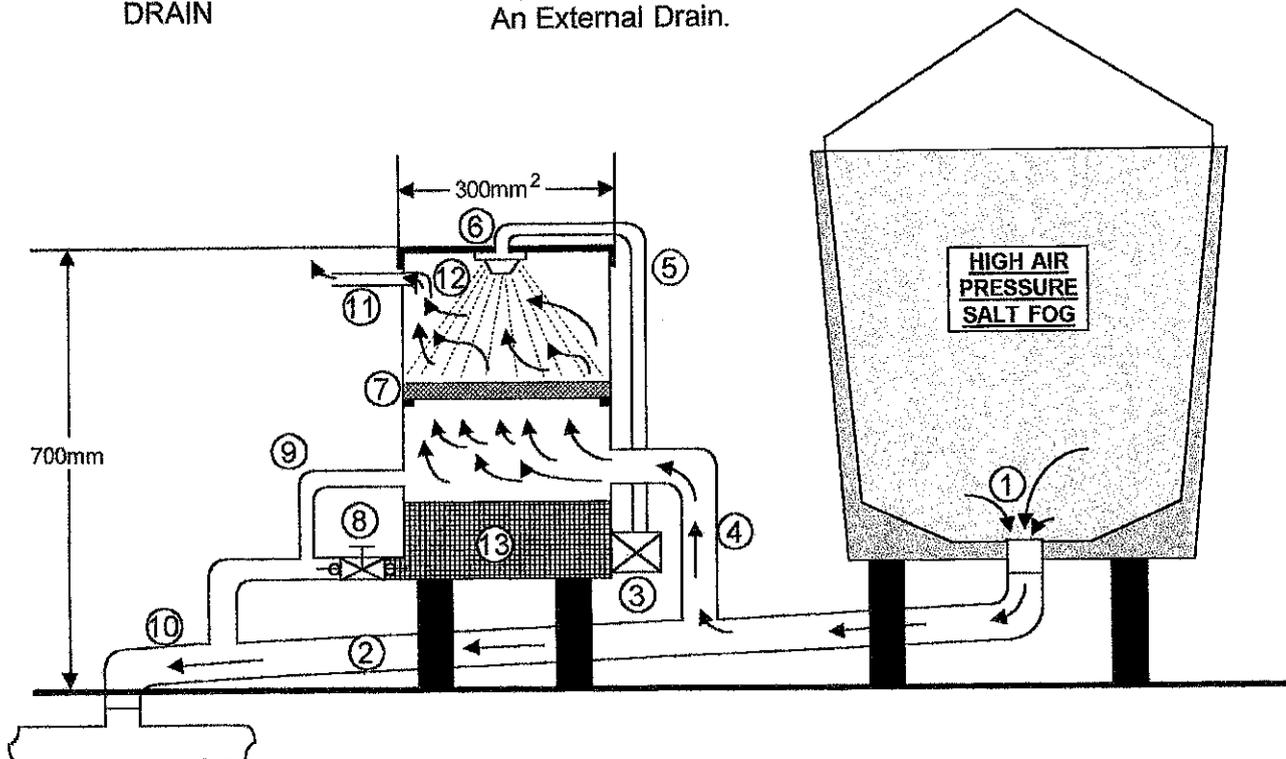
METHODS FOR DRAINAGE



METHODS FOR DRAINAGE



IMPORTANT
32mm (1 1/4") PVC Drain/Vent Pipe With A Downhill Outlet To An External Drain.



- | | | |
|---|-----------------|---------------------|
| 1 Combined Liquid Drain And Air Escape. | 6 Spray Nozzle. | 11 Clean Air Vent. |
| 2 Drain To Waste. | 7 Filter Bed. | 12 Baffle. |
| 3 Electric Pump. | 8 Drain Tap. | 13 Water Reservoir. |
| 4 Vent Breather Pipe. | 9 Overflow. | |
| 5 Water Spray Line. | 10 Drain. | |

2. When the cabinet is operating at low humidity levels excess water is removed from the chamber and condensed on the cooling coil. This water will be removed via the "condenser drain pipe".

Connections: The tube from the fitting marked "condenser drain" should be connected to the main cabinet drain or taken to a waste drain close to the cabinet.

Drainage: For guidance see Method of Drainage diagrams.

Water Reservoir

All models are supplied with as standard a 114 litre de-ionised water reservoir. This should be positioned close to the condenser unit. The reservoir will include an internal water filter.

Connections

The pipe on the reservoir should be connected to the fitting marked "RH Generator Water In".

The tank should then be filled with de-ionised water or de-mineralised water.

DO NOT CONNECT MAINS WATER TO THE CABINET OR RESERVOIR UNLESS INSTRUCTED TO DO SO.

NOTE: If a reservoir is not supplied with the cabinet then a suitable plastic reservoir should be sourced locally.

Fittings for the reservoir will be supplied and these should be added to your reservoir including the internal water filter.

Maintenance

The filter in the reservoir should be changed every 10 weeks. Filter Ref Code C/28.

Drains/Vent

An 1¼" p.v.c. pipe is used to drain away the used Salt Solutions from the test chamber.

It is important that this 1¼" p.v.c. pipe follows a continuous downhill slope to your foul water drain system.

You may wish to insert a U bend in the pipe to eliminate stray odours returning to the test chamber.

Essential

It is essential that a T section is inserted into the 1¼" p.v.c. pipe within 1 metre from the test chamber with a rising pipe "**VENT**" being incorporated and routed to an exterior location. This in turn allows any build up of pressure inside the test chamber to vent to atmosphere.

A second drain from the test chamber drains the water from the humidity generator water baths. This should be connected to your 1¼" p.v.c. pipe and allowed to run to your foul water drain system.

Cabinet Positioning

The test chamber and control module should be placed in a convenient position close to all services (Power, Air, Water and Drain) on a level surface and away from any external heating influence i.e. radiators, heaters, and direct sunlight.

The power input cables should be connected into the "Power In" cable gland on the bottom left hand panel of the control module and connected to terminals 1, 2 and 3 on the Power Chassis (bottom chassis) in the control module.

The connecting leads from the test chamber should be connected into the control module in the same way "Side Wall Heat" "Sink Heat".

The air supply is connected via a hose fitting on the rear right hand side of the test chamber, labeled "AIR INLET".

The water supply is connected via a hose fitting on the rear left hand side of the test chamber, labeled "WATER INLET".

The 1¼" p.v.c. drain/vent pipe exhausts at the rear lower region of the test chamber.

TECHNICAL INFORMATION

TEST CHAMBER	450 LITRE	1000 LITRE	2000 LITRE
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External Dimensions

Length	1370 mm	1960 mm	2400mm
Width	930 mm	1335 mm	1200mm
Height	1030 mm	1410 mm	1645mm

Internal Dimensions

Length	825 mm	1465 mm	2000mm
Width	635 mm	1040 mm	1000mm
Height without lid	620 mm	720 mm	850mm
Height with lid to apex	875 mm	1065 mm	1175mm

Panel Capacity 150mm x 100mm	132	344	516
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CONSTRUCTION

The outer cabinet is molded from glass reinforced plastic using high temperature polyester resin, colour pale blue. This houses the air humidifier, variable flow pump and the rate of flowmeter. The whole being mounted on load bearing supports for floor mounting.

The internal chamber is molded from self coloured glass reinforced plastic with strengthened sides and floor to carry the sample holders or special fixtures. The floor is capable of carrying considerable weight and will support loads of up to 60 Kilo when distributed over the total area.

The transparent apex roof is of welded construction from polycarbonate sheet with an angle of approximately 115 degrees. Gas springs and hinges make for easy opening and closing. When closed the lid sits in a water trap that is self generating when salt fog or humidity cycles are operated. This water seal prevents the leakage of corrosive material from the test chamber and it holds sufficient liquid to maintain the seal on other cycles of the system program.

HEATING SYSTEM

SAMPLE CHAMBER

Panel heaters are mounted onto the outside of the test chamber and insulated from the outer cabinet by low thermal conductive material. This makes for an efficient form of heating with low loss to the outer cabinet wall.

HUMIDITY GENERATOR

In the event of a humidity sequence being called for by the computer then the humidity generator is filled with water. Heaters in the water bath raise the temperature of the sample chamber and keep either a constant or cyclic temperature at humidity levels of between 90% and 98%.

AIR HUMIDIFIER

An immersion heater enclosed in the humidifier tower controlled from a digital temperature controller and on a salt fog cycle holds the humidifier to the preset temperature called for in the testing requirements. This heater can also be controlled from a switch on the main control panel should cool humidified air be called for.

TEMPERATURE CONTROL, SAMPLE CHAMBER

Close control of the sample chamber temperature is obtained from a Eurotherm model 906 programmer/controller. This unit was selected for its versatile programming facilities, its time sequence control and its ability to control the temperature within the sample chamber to close limits. The instruments security level for operator interference with programs is high, the operator having access only to level 1 without the use of the security code number. This protects valuable data from damage and the possibility of total loss by unauthorised interference.

This controller manages the wall heaters and the heaters in the humidity generator, it looks after the rate of change in temperature ramps and the time dwell at each test in the cycle. The logic outputs from the controller are decoded to control the ancillary functions associated with the above main functions. A built in protection system prevents the humidity generator heating from being applied in the event of little or no water in the generator reservoirs but maintains the cabinet temperature by use of the side wall heating.

AIR HUMIDIFIER CONTROL

The temperature of the air humidifier system is derived from a sensor mounted in the immersion heater thermostat pocket and connected to a simple accurate digital readout control system. The system controls the water temperature to within $\pm 1^{\circ}\text{C}$ adequate for the requirements of this part of the system. Protection of the humidifier in the event of low or no water is as follows. Air is diverted from the system and the immersion heater is switched off. When low water is detected, an air relief valve opens and water is let into the container until it is topped up, air and heating are then restored and humidified air is again used to create the salt fog spray.

CABINET PROTECTION

In the event of any electrical parts failing, protection of the cabinet is by a series of fuses or over current cutouts, these protect the heaters, the control equipment, the air humidifier system and the cooling fans. The controllers are open circuit sensor protected, the immersion heaters in the humidifier generators are protected by a low water float switch and by thermal fuses. Over temperature protection of the sample chamber is by an alarm signal releasing a relay in series with the heating conductors and thus switching off the heating until the alarm is released either by the operator or when the fault conditions have cleared.

TABLE OF SALT SPRAY STANDARDS - ALL MODELS

Our cabinets meet the requirements for testing according to the following standards:

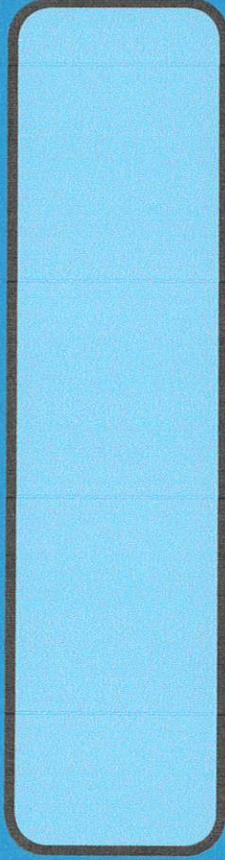
<u>Standard</u>	<u>Spray Cycle</u>	<u>Atomiser Air</u>	<u>Cabinet Temp</u>	<u>Fall out (ml) per 80cm²/hr</u>
BRITISH				
BS 2011:Part 2.1Ka	Continuous	-	35°C	0.5 to 3.0
BS 3900 F4	Continuous	-	20°C	-
BS 3900 F12 (ISO 7253 1984)	Continuous	95 - 98% RH	35°C	0.1 to 2.0
BS 5466 Part 1(ISO 3768 1976) Part 2(ISO 3769 1976) Part 3(ISO 3770 1976)	Continuous	95 - 98% RH	35°C	-
BS AU148 Part 2	Continuous	-	+25°C	1.0 to 2.0
DEF 133	Continuous	-	+35°C	-
DEF 1053 Method 24	Continuous	-	35°C	-
DEF 1053 Method 36	Intermittent 10 mins/hour	-	-	-
AMERICAN				
ASTM B117	Continuous	95 - 98% RH	35°C	1.0 to 2.0
ASTM B287	Continuous	95 - 98% RH	35°C	0.75 to 2.0
ASTM B368 CASS	Continuous	95 - 98% RH	49°C	1.0 to 2.0
MIL STD 202E	Continuous	95 - 98% RH	35°C	0.5 to 3.0
MIL STD 810C	Continuous	-	35°C	0.5 to 3.0
GERMAN				
DIN 50.907	Intermittent 5 mins/hour	-	20°C	-
SS DIN 50.021	Continuous	95 - 98% RH	35°C	-
ESS DIN 50.021	Continuous	95 - 98% RH	35°C	1.5
CASS DIN 50.021	Continuous	95 - 98% RH	50°C	1.5
DIN 40.046	Continuous	-	35°C	0.5 to 3.0
VG 95210	Continuous	-	35°C	0.5 to 3.0
VG 95332	Continuous	-	35°C	2.0
FRENCH				
CCT U01 01A	Continuous	-	35°C	0.5 to 3.0
PN-X 14-002	Continuous	84 - 90% RH	35°C	0.5 to 3.0

Mebon Prohesion® Test - Cabinet Model No. SF/MP4 will carry out all the above standards and the Mebon Prohesion Test.

®Prohesion is the Registered Trade Mark of Mebon Paints Plc

Blå pan 542-lyseblå-lysegrå-sort-hvid-transparent røde

CM SPECIALIST
EQUIPMENT
L I M I T E D



Corrosion System 3000



PROFILE CONTROLLER

The controller can save 7 programs with a maximum of 20 segments per program.

To run a program

Before a program can be run one must be selected between 1 and 7 and loaded into the memory.

- After switching on the machine C+W select function appears in the controller window.
- Press either the left or right arrow keys and you will get '**1 program**' or '**2 maintenance and service**'.

These screens will only appear if no program is running.

- Select **1 program**, and then press the Prog Key. You will then get '**11 run program**'.
- Press the Prog key so that a flashing * appears at the bottom left of the screen.

Note: Parameters on the screen can only be changed when the flashing star appears. To De-activate press program key again.

- Press either of the arrow keys to select between **11 run program** and **12 set up new program**.
- Select **11 run program** and press the Prog key to remove the flashing star.
- Press the arrow keys until **load program at Pos 1** appears.
- Press the Prog key until the flashing * appears.

- Press the arrow keys until the desired program number is reached e.g. Pos 3 etc.
- Press the prog key again; the selected program is now loaded into memory.
- Press the arrow keys until **Stopped prog to run** is showing.
- Press the Prog key to run the program. **Running press reset to stop** will show
- To stop the program press the Reset key.

With the program running you can press either of the arrow keys to view various screens while the program is running. See appendix 1 for full list.

These screens will only appear if no program is running.

- After switching on **Prog interrupt resumes in 10 min** will be displayed.
- If you still wish to run this program, let it time out and it will resume after 10 minutes.
- If you want to run a different program, press the reset key twice and **13 stopped prog to run** will be displayed.
- Press the right arrow key until **11 Run program** is displayed.
- Press right arrow key until **12 load program at Pos 1** is displayed.
- Press the Prog key until the flashing * appears.

- Press the arrow keys until your desired program is selected, 1 to 7.
- Press the Prog key to load.
- Press the right arrow key until **13 stopped prog to run** is displayed.
- Press the prog key to run program. **Running press reset to stop** will be displayed.
- To stop the program press the Reset key.

With the program running you can press either of the arrow keys to view various screens while the program is running.

Air Purge Function

If you need to interrupt the test for a few minutes it is advisable that air purge is selected to disperse the fog etc. so that it does not come into your laboratory. A purge can only be selected if a main program is running.

- Press the arrow keys until **Purge Off program running** appears.
- Press the Prog key until the flashing * appears at the bottom left of the screen.
- Press the arrow keys to switch purge on or off. The Purge will run for a time of 5 minutes.
- To switch off prior to the timed limit press the arrow key until **Off** appears then the Prog key to return to normal running.

If a program is running and there is a power cut. The program is interrupted for 10 minutes, after which the program will continue.

If a long test is running e.g. Honda cyclic test, which includes salt spray, humidity and air purge cycles. Do not touch any of the keys otherwise the program will restart from the beginning again.

However if you are for example just running a continuous program, e.g. salt spray you can override the interrupt to resume the test immediately by pressing the Reset key twice followed by the Prog key once and it will continue on the continuous test you are on.

Programming

New programs cannot be entered while a program is running.

To enter a new program follow the instructions below.

Example: Salt Spray ASTM B117

- Press arrow key until **Running reset to stop** appears.
- Press reset to reset the program.
- Press arrow key until **11 Run program** appears.
- Press the Prog key until the flashing * appears.

- Press arrow key until **set up new program** appears.
- Press the Prog key.
- Press the arrow key until **15 Set up segment** appears.
- Press Prog key **151 Set up segment Main 1** will show.
- Press arrow key until **152 Set function** appears.
- Press Prog key until the flashing * appears

- Press arrow key until function required is reached, e.g. Salt Spray.
- Press Prog key to load.
- Press arrow key until **153 Set sub func temp ramp** appears.
- Press Prog key until the flashing * appears

- Press arrow key until function required is reached, e.g. Fixed temp.
- Press Prog key to load
- Press arrow key until **154 Set temp** appears
- Press Prog key until the flashing * appears

- Press arrow key until temperature required is reached, e.g. 35°C
- Press Prog key to load
- Press arrow key until **154 Set water temp** (Humidifier temperature) appears
- Press Prog key until the flashing * appears

- Press arrow key until temperature required is reached, e.g. 48°C
- Press Prog key to load
- Press arrow key until **156 Prog on time continuous** appears
- Press Prog key until the flashing * appears

- Press arrow key until time in minutes required is reached, e.g. 240 mins.
- Press Prog key to load
- Press arrow key **UV Light off** appears **Ignore** this function, as standard cabinets do not have this facility.
- Press arrow key until **Display fog off time** appears
- Press Prog key until the flashing * appears

- Press arrow key until desired function is reached.
- Press Prog key to load
- Press arrow key until **Number of cycles** appears
- Press arrow key until desired no of cycles is reached
- Press Prog key to load

- Press arrow key until **151 Set up segment main 1** appears

To setup more segments this is a simple repeat of the above sequence remembering to change the segments in **151 Set up segment main 1** to 2, 3, etc.

This is done by the standard way whilst in **151 Set up segment main** by ;

- Press Prog key until the flashing ***** appears
- Press arrow key until **151 Set up segment main 2** appears
- Press Prog key to load
- Then continue the cycle as per above sequence

When you have reached the last segment in your selected program you must end it. This is done from **151 Set up segment main** by:

- Press arrow key until **152 Set function** appears.
- Press Prog key until the flashing ***** appears
- Press arrow key until **End of test** is reached,.
- Press Prog key to load.

You now will need to save the program in a slot 1 to 7.

- Press arrow key until **151 Set up segment main (number of last segment)** appears
- Press the Reset Key **15 Setup seg** will appear
- Press arrow key until **Save program at pos:1** appears
- Press Prog key until the flashing ***** appears
- Press arrow key until desired position is reached. **Note:** Please remember the position of the program as when saved any programs at that position will be overwritten.
- Press Prog key to load **Saving please wait** displayed this will last for 10 seconds
- Press arrow key until **set up new program** appears
- Press Prog key until the flashing ***** appears
- Press arrow key until **11 Run program** appears
- Press Prog key to load
- Press arrow key until **load program** appears
- Press Prog key until the flashing ***** appears
- Press arrow key until **load program at pos:1** appears
- Press Prog key to load
- Press arrow key until **13 stopped Prog to run** appears
- Press Prog key to run program

DISPLAY SCREEN WITH FUNCTIONS DISPLAYED WHEN PROGRAM IS RUNNING
CONTINUOUS SALT SPRAY TEST – EXAMPLE ASTM B117

132 Purge OFF
Program Running,
133 Main Cycles continuous
134 Sub Cycle 1 left (ignore this if a sub program has not been entered)
135 Segment M1 (main program1) Fog
fixed temp 136 Chamber Temp SP (set point) 35°C
Tmp 23°C (or what ever the ambient is when the program is started)
Hum Chamb Temp (Humidifier Tower temperature)
SP (set point) 47°C
TMP 23°C (or whatever the ambient is when the program is started)
138 Current Function Fog on
139 Cycle time continuous (or whatever the fog time that has been set)

CCT Program

Salt Spray @ 35°C 240 Minutes
Dry @ 60°C 120 Minutes
Humidity @ 42°C 20 + 100 Minutes
REPEAT OK

- 1) **Note New programs cannot be entered while a program is running.**
- 2) To enter a new program follows the instructions below.
- 3) Press arrow key until **Running reset to stop** appears.
- 4) Press reset to reset the program.
- 5) Press arrow key until **11 Run program** appears.
- 6) Press the Prog key until the flashing * appears.
- 7) **Salt Spray 35 Deg. C (240 Mins)**
- 8) Press arrow key until **set up new program** appears.
- 9) Press the Prog key.
- 10) Press the arrow key until **15 Set up segment** appears.
- 11) Press Prog key **151 Set up segment Main 1** will show.
- 12) Press arrow key until **152 Set function** appears.
- 13) Press Prog key until the flashing * appears
- 14) Press arrow key until function required is reached, (Salt Spray saturated RH, Temperature Ramp, Temperature Dwell End of Programme)
- 15) Press Prog key to load.
- 16) Press arrow key until **153 Set sub func temp ramp** appears.
- 17) Press Prog key until the flashing * appears
- 18) Press arrow key until function required is reached, Fixed temp.
- 19) Press Prog key to load
- 20) Press arrow key until **154 Set temp** appears
- 21) Press Prog key until the flashing * appears
- 22) Press arrow key until temperature required is reached, 35°C
- 23) Press Prog key to load
- 24) Press arrow key until **154 Set water temp** (Humidifier temperature) appears
- 25) Press Prog key until the flashing * appears
- 26) Press arrow key until temperature required is reached, 45°C
- 27) Press Prog key to load
- 28) Press arrow key until **156 Prog on time continuous** appears
- 29) Press Prog key until the flashing * appears

- 30) Press arrow key until time in minutes required is reached, 240 mins (4 hours).
- 31) Press Prog key to load
- 32) Press arrow key **UV Light off** appears **Ignore** this function, as standard cabinets do not have this facility.
- 33) Press arrow key until **Display fog off time** appears
- 34) Press Prog key until the flashing * appears
- 35) Press arrow key until desired function is reached.
- 36) Press Prog key to load
- 37) Press arrow key until **Number of cycles** appears
- 38) Press arrow key until desired no of cycles is reached
- 39) Press Prog key to load

- 40) **Ramp up to 60 Deg. C (20 Min)**
- 41) Press right arrow key until **151 Set up segment main** appears
- 42) Press Prog key until the flashing * appears
- 43) Press the right arrow key until **Main 2** appears
- 44) Press the Prog key to load
- 45) Press the right arrow key until **152 Set function** appears
- 46) Press Prog key until the flashing * appears
- 47) Press right arrow key until **Temp ramp** appears
- 48) Press Prog key to load
- 49) Press right arrow key until **Set ramp** appear
- 50) Press Prog key until the flashing * appears
- 51) Press right arrow key until **1.0°C/min** appears
- 52) Press Prog key to load
- 53) Press the right arrow key until **154 Set end temp** appears
- 54) Press Prog key until the flashing * appears
- 55) Press right arrow key until desired temp is set, 60°C
- 56) Press Prog key to load

- 57) **DRY Air 60 Deg. C (100 Min)**
- 58) Press right arrow key until **151 Set up segment main 2** appears
- 59) Press Prog key until the flashing * appears
- 60) Press right arrow key until **Main 3** appears
- 61) Press Prog key to load
- 62) Press right arrow key until **152 Set function** appears
- 63) Press Prog key until the flashing * appears
- 64) Press right arrow key until **Temp dwell** appears
- 65) Press Prog key to load
- 66) Press right arrow key until **153 Cycle time** appears

- 67) Press Prog key until the flashing * appears
- 68) Press right arrow key to set desired time, 1 hour 40 minutes (2 hours minus the ramp up time) 100 minutes
- 69) Press Prog key to load
- 70) Press right arrow key until **154 Set temp** appears
- 71) Press Prog key until the flashing * appears
- 72) Press right arrow key until desired temp is set, 60°C
- 73) Press Prog key to load
- 74) **Humidity (Wet) 42 Deg. C (120 Min) 3**
- 75) Press right arrow key until **151 Set up segment main 3** appears
- 76) Press Prog key until the flashing * appears
- 77) Press right arrow key until **Main 4** appears
- 78) Press Prog key to load
- 79) Press the right arrow key until **152 Set function** appears
- 80) Press Prog key until the flashing * appears
- 81) Press right arrow key until **Saturated RH** appears
- 82) Press Prog key to load
- 83) Press right arrow key until **153 Set sub func** appears
- 84) Press Prog key until the flashing * appears
- 85) Press the right arrow key until **Fixed temp** appears
- 86) Press Prog key to load
- 87) Press right arrow key until **154 Set temp** appears
- 88) Press Prog key until the flashing * appears
- 89) Press right arrow key until the desired temp appears 42°C
- 90) Press Prog key to load
- 91) Press right arrow key until **155 Cycle time** appears
- 92) Press Prog key until the flashing * appears
- 93) Press right arrow key to set desired time 120 mins (2 hours)
- 94) Press Prog key to load
- 95) **End of Prog**
- 96) Press arrow key until **151 Set up segment main 4** appears
- 97) Press Prog key until the flashing * appears
- 98) Press right arrow key until **Main 5** appears
- 99) Press Prog key to load
- 100) Press right arrow key until **152 Set function** appears
- 101) Press Prog key until the flashing * appears
- 102) Press right arrow key until **End of prog** appears
- 103) Press Prog key to load
- 104) Press left arrow key until **151 Set up segment main 5** appears

105) SAVING THE PROGRAMME

106) You now will need to save the program in a slot 1 to 7. (Our Choice is Pos 7)

107) Press arrow key until **151 Set up segment main (number of last segment)** appear

108) Press the Reset Key **15 Setup seg** will appear

109) Press arrow key until **Save program at pos:7** appears

110) Press Prog key until the flashing * appears

111) Press arrow key until desired position is reached. **Note:** Please remember the position of the program as when saved any programs at that position will be overwritten.

112) Press Prog key to load **Saving please wait** displayed this will last for 10 seconds

113) Press arrow key until **set up new program** appears

114) Press Prog key until the flashing * appears

115) Press arrow key until **11 Run program** appears

116) Press Prog key to load

117) Press arrow key until **load program** appears

118) Press Prog key until the flashing * appears

119) Press arrow key until **load program at pos:7** appears

120) Press Prog key to load

121) Press arrow key until **13 stopped Prog to run** appears

122) Press Prog key to run program

PROFILE CONTROLLER TROUBLESHOOTING

To override Start - Press the Reset Key twice then press the Prog Key.
The light will stop flashing.

Display Fault - C+W
Select Function (On screen)

1. Press the Right Arrow Key until **1 Program** is displayed.
2. Press the Prog Key until **11 Set Up New Program** is displayed.
3. Press the Prog Key until **a Flashing Star** is displayed.
4. Press the Right Arrow Key until **11 Run Program** is displayed.
5. Press the Prog Key until **the Flashing Star goes off**.
6. Press the Right Arrow Key until **12 Load Program at Pos:1** is displayed.
7. Press the Prog Key until **the Flashing Star** is displayed.
8. Press the Prog Key again until **the Flashing Star goes off**.
9. Press the Right Arrow Key until **13 Stopped Prog to Run** is displayed.
10. Press the Prog Key again to start the Program.
131 Running Reset to Stop is displayed.

NOTE: If you have a program problem then note what is displayed and then find what is displayed on the process above and follow the instructions given above from that point.

Example: **11 Run Program** is displayed – See No. 4 above and follow the rest of the instructions from there to re-set the program.

Data Retrieval

When **131 Running Reset to Stop** is displayed you can keep pressing the Right Arrow Key to display the temperature and functions set.

The functions set are numbered from 133 to 140.

133 = Main Cycle Continuous	134 = Sub Cycles
135 = Segment M1 Fog Fixed Temp	136 = Chamber Temp SP 35°C Temp 14°C
137 = Hum Chamb Temp SP 47°C Temp 14°C	138 = Current Function Fog On
139 = Cycle Time; Continuous	140 = Cycles Left

PROFILE CONTROLLER – AIR PURGE

To put the Air Purge on and off.

1. Press the Left or Right Arrow Key until **Program Running 132 Purge Off** is displayed.
2. Press the Prog Key once to get **a Flashing Star** displayed.
3. Press the Left or Right Arrow Key until **132 Purge On Program Stopped** is displayed.

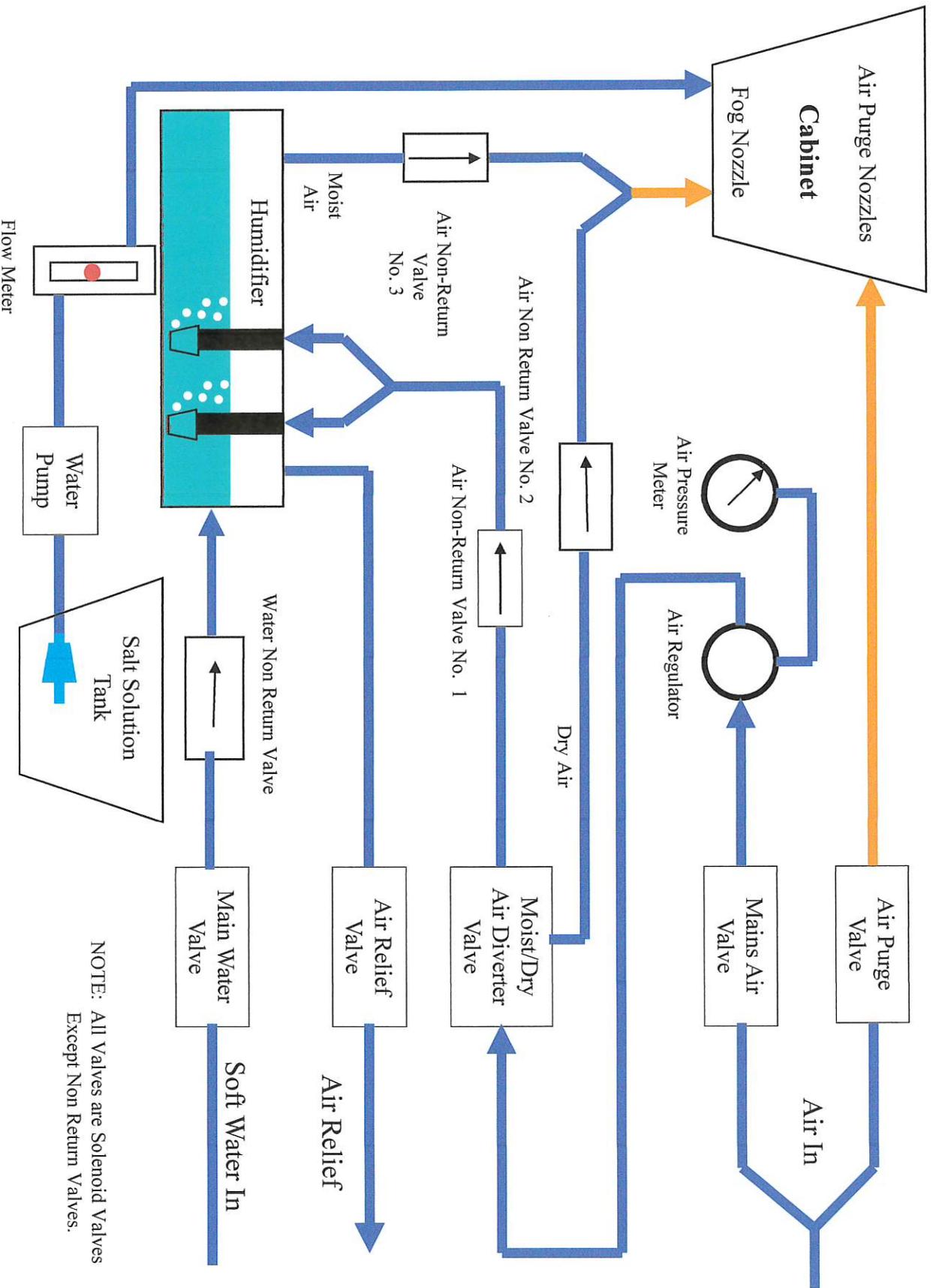
AIR PURGE STARTS.

To turn Air Purge off.

1. Press the Left or Right Arrow Key until **132 Purge Off Program Running** is displayed.
2. Press the Prog Key until **the Flashing Star goes off**.

AIR PURGE STOPPED.

C&W Salt Spray Cabinet (Plumbing)



NOTE: All Valves are Solenoid Valves
Except Non Return Valves.

SUMMARY OF ASTM B117

Solution Preparation & Concentration

Concentration of the salt should be 5+/-1%. Water used for preparation should confirm to type IV in specification D 1193 (limits of chloride and sodium shall be ignored). Table below gives the details of the maximum level of impurities allowed in sodium chloride used to prepare salt spray solution.

Impurity Description	Allowable Limits
Total impurities	≤ 3.0%
Halides (Bromides, fluorides & iodides excluding chlorides)	≤ 0.1%
Copper	< 0.3 ppm
Anti Caking Agents	0.0%

PH

PH of the atomised solution should be between 6.5-7.2, which can be achieved in one of the following ways.

1. Heat the water used to prepare salt solution to 35°C or above, dissolve the required quantity of salt and then check and adjust PH if required.
2. When preparing solution adjust the PH to below 6.5.

The PH of the solution prepared in the above 2 ways does not materially change when atomised at 35°C.

Air Supply

There exists a relationship between humidifier temperature and air pressure which is as given below.

NOTE: If the below mentioned table is followed the required amount of fog is generated. The common practice is to keep the temperature of the humidifier between 46 and 49°C.

Air Pressure (PSI)	Temp (°C)
12	46
14	47
16	48
18	49

Condition in the Salt Spray Chamber

The exposure zone of the chamber shall be maintained at 35 +1.1/-1.7°C. Temperature shall be recorded twice a day at least 7 hours apart.

Atomisation and Quantity of Fog

2 fog collectors per atomiser tower need to be placed within the exposure zone one nearest and another furthest from the nozzle in such a way that no drop of solution will be collected from the test specimen or any other source. Funnel to be used should be Ø 10.

Continuity of Exposure

Unless otherwise specified the test shall be continuous for the duration of the entire test period. Continuous operation implies that the chamber be closed and the spray operating continuously except for short daily interruptions necessary to maintain or check the components.



Manufacturers of Corrosion and Environmental Chambers

Leintwardine, Craven Arms, Shropshire SY7 0NB, UK.

Tel (01547) 540654 • Fax (01547) 540412

Internet: www.cw-spec.com • E-mail: sales.service@cw-spec.com

ASTM B117 pH Range

6.5 7.2

pH to 7.0

pH too low - add Sodium Hydroxide (Na OH)

pH too high - add Hydrochloric Acid (Hc 1)

A. Salt concentration is tested weekly by titration method.

Titration Method

1. Dilute 5ml of the collected salt solution to 100ml distilled water and mix thoroughly.
2. Take 10ml of the solution and put into a glass evaporating dish then add 40ml of distilled water and 1ml of 1% potassium chromate solution (chloride free).
3. Titrate with 0.1 N Silver Nitrate solution until the solution gives an appearance of a permanent red colour.
4. Take reading of amount of 0.1 N Silver Nitrate added to make the colour change to RED.
5. A solution that requires between 3.4ml and 5.1ml of 0.1 N Silver Nitrate solution to be added to make the colour change to red will meet the correct concentration requirements of ASTM B117.

B. Concentration is within range when 3.4 to 5.1ml of 0.1 Normal Silver Nitrate (**0.1 N AgNO₃**) is used during a titration test.

If Salt Concentration is too low - increase salt next mix.

If Salt Concentration is too high - decrease salt next mix.

5% Salt Solution should be 5 grams salt per 95ml H₂O



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ADJUSTING THE pH OF SALT SOLUTION

pH below 6.5

- a) Add approximately 100 grams Sodium Hydroxide to 1 litre of distilled water and stir carefully until dissolved.
- b) Add a little of the solution to the salt solution reservoir and stir thoroughly.
- c) Check pH value, allowing the pH metre 30-40 seconds to settle.
- d) Repeat b) and c) until pH is within specification.

pH above 7.2

- a) Add 5cc Hydrochloric Acid to 1 litre of water and stir carefully.
- b) Add a little of solution to the reservoir and stir thoroughly.
- c) Check pH value allowing pH meter 30-40 seconds to settle.
- d) Repeat b) and c) until pH is within specification.

CARE

Read the instructions on the chemical containers before use as these chemicals are highly corrosive.

Avoid skin contact. If contact is made, wash area thoroughly in water and seek medical advice if required.

CHECK LIST

1. Samples are placed in the test chamber so that they do not obstruct the flow and return air ports.
2. The cabinet lid seals correctly i.e. sufficient water in trap.
3. Humidity level required is set on the program controller.
4. Temperature level required is set on the program controller.
5. Water reservoir is connected and the pipe is not twisted or folded which could restrict the flow.
6. The water reservoir is filled with de-ionised water and the filter is in position.
7. The peristaltic pump head is rotating and there is the required flow showing on the flowmeter.
8. The drains from the cabinet and from the condenser are connected.
9. The flexible flow and return pipes between the condenser unit and the test chamber are connected and sealed.

How to change the tubing on a Peristaltic Pump

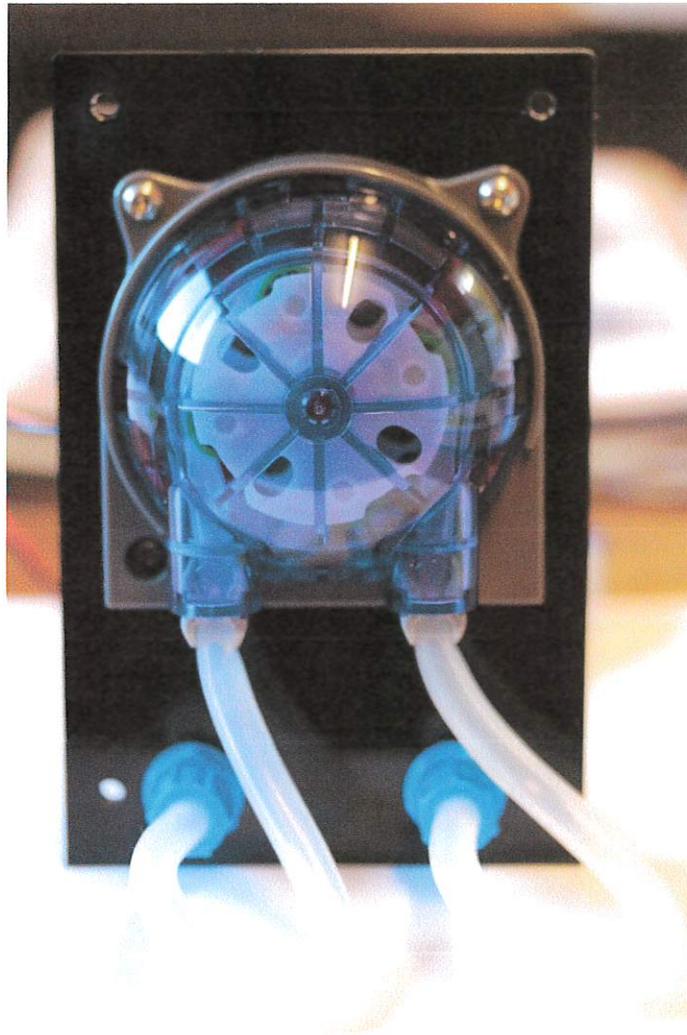


Fig. 1

CW **SPECIALIST
EQUIPMENT
LIMITED**

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Leintwardine, Craven Arms, Shropshire SY7 0NB, UK.
Tel (01547) 540654 • Fax (01547) 540412
Internet: www.cw-spec.com • E-mail: sales.service@cw-spec.com

Instructions

1. Twist the blue pump cover 30° anti-clockwise until it unlocks. See Fig. 2
2. Remove blue pump cover from grey pump housing. See Fig. 3
3. Unclip grey clips from bottom of inside of pump cover. See Fig. 4
4. Remove tube and grey locking clips from pump cover. See Fig. 5
5. Remove grey locking clips from tubing. See Fig. 5
6. Unscrew blue locking caps on pump panel to allow old tube to be pulled off. Remove old tubing and discard. See Fig. 6
7. Cut new length of silicone tube 600mm long. Then place grey locking clip on right hand side of on tube and lock into position on pump cover. See Fig. 7
8. Place flat blade screwdriver in location position in centre white pump rotation drum and turn slowly clockwise to feed the new tube into the channel between the pump rotation drum and the pump cover. See Fig. 7
9. Attach grey locking clip onto tube on left side and push back into position on pump cover. See Fig. 8
10. Put blue locking caps back onto the tube and reconnect the tube onto the blue fittings on the pump panel and tighten. See Fig. 8, 9 & 10
11. Reposition pump cover locating the centre onto the white plastic drive shaft and lock cover by turning clockwise onto the grey housing. See Fig. 11 & 12.
12. Finished! See Fig. 1



Fig. 2

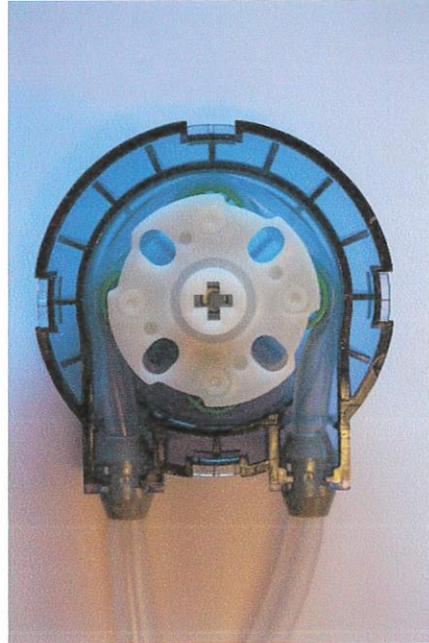


Fig. 3

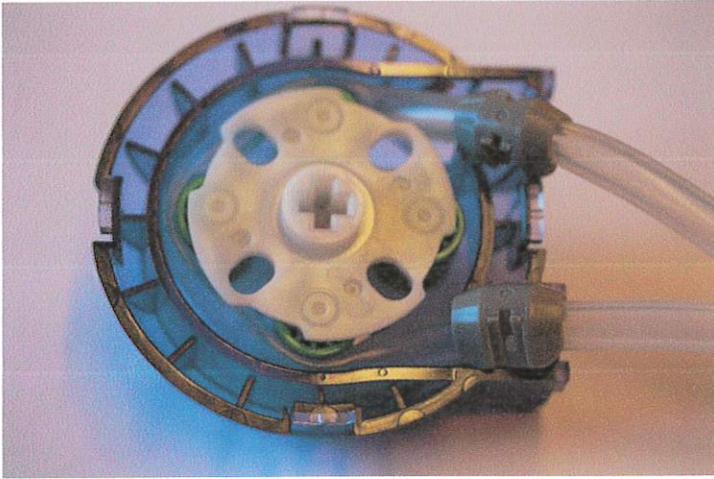


Fig. 4

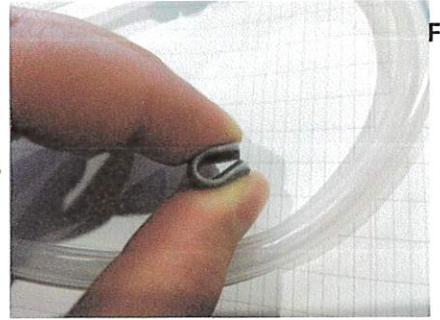
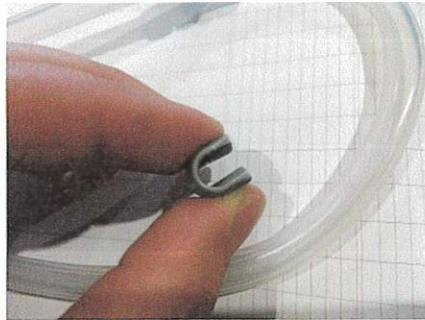


Fig. 5

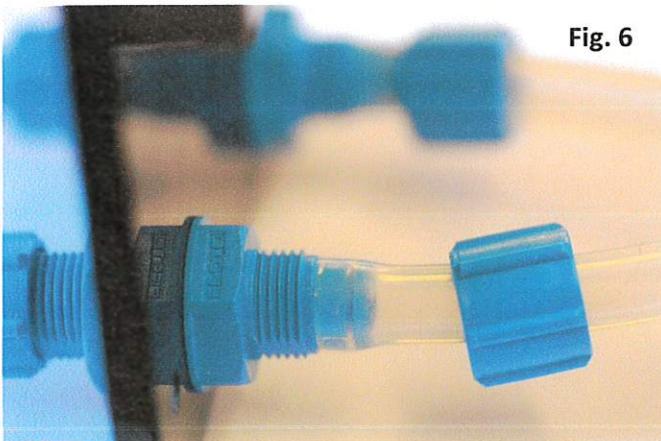
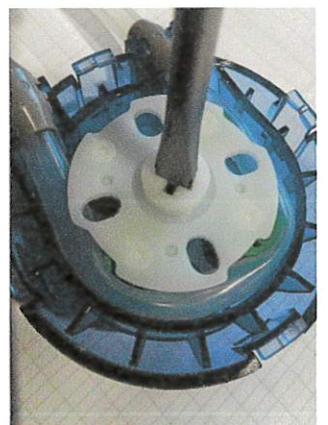


Fig. 6



Fig. 7



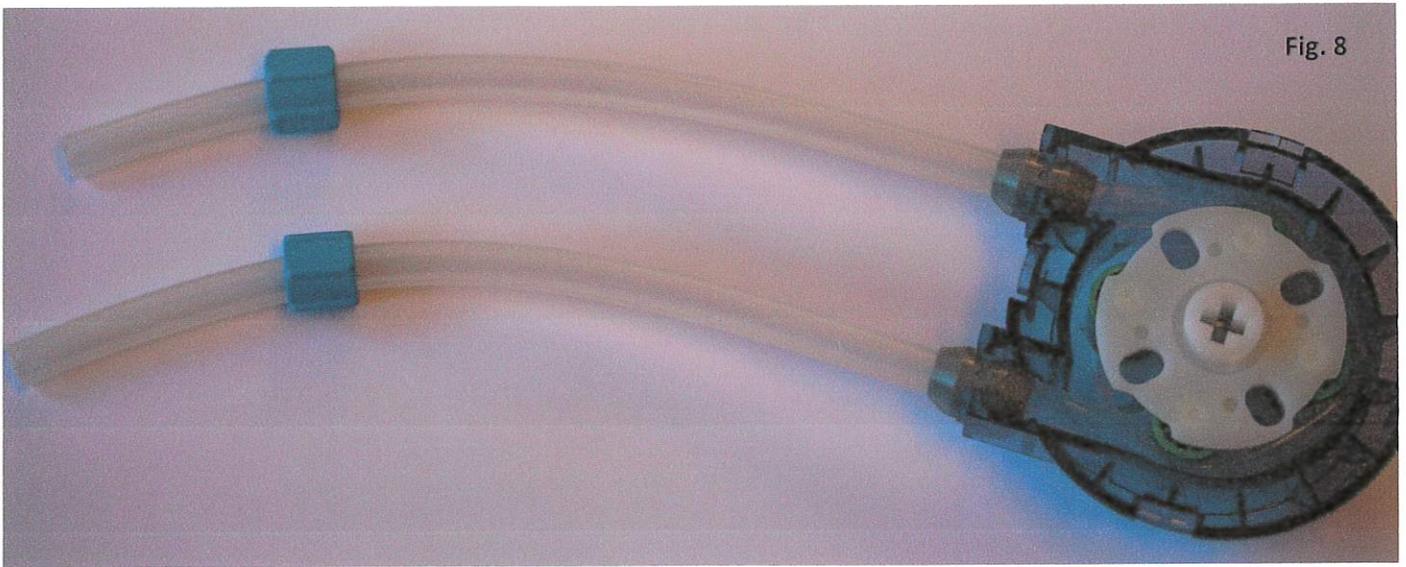


Fig. 8

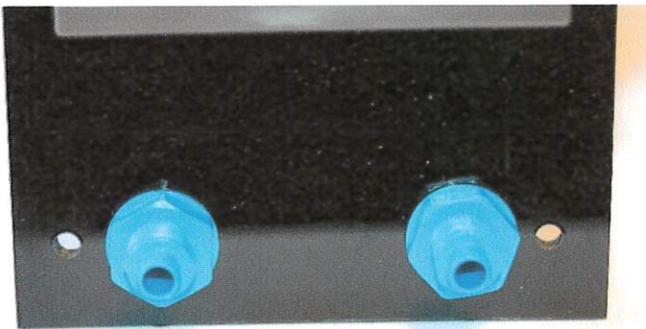


Fig. 9

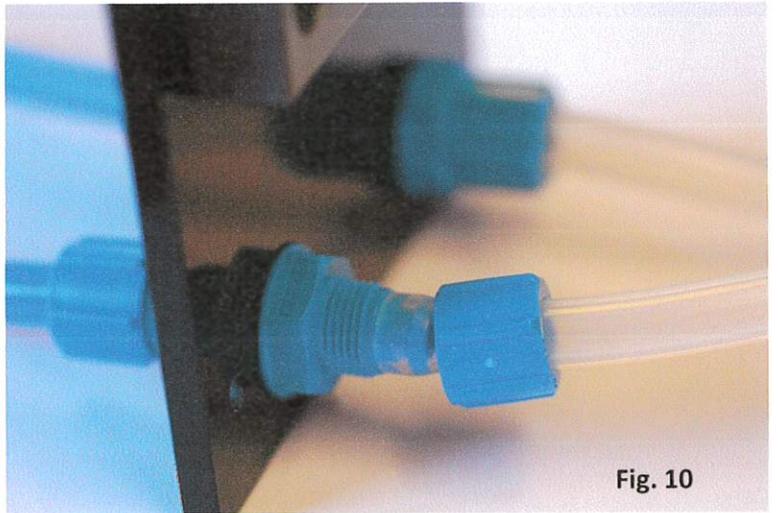


Fig. 10

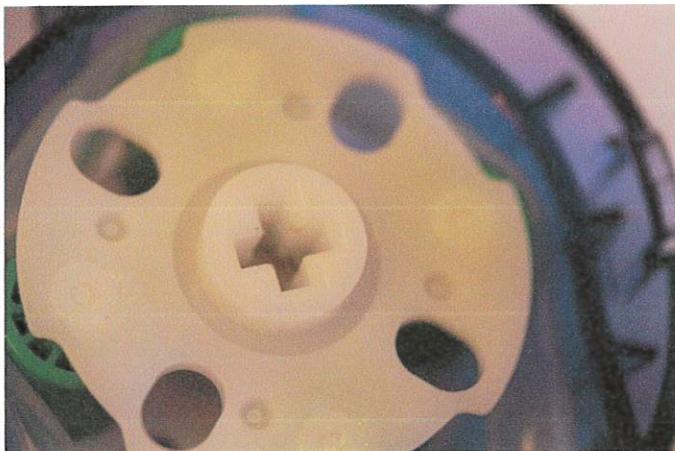


Fig. 11



Fig. 12

SCHEDULED MAINTENANCE

1. During testing the water from the water seal evaporates. It is naturally replaced by droplets running down the apex roof into the water trough.

After prolonged testing it is recommended that the water trough is emptied and replenished with fresh water.

2. After approximately 1000 hours it is recommended that the tubing in the pump head is replaced (see drawing instruction page).

The marprene tubing used is a tough tubing, however, if it is not replaced at the suggested intervals it will eventually wear and split, depositing salt solution onto the pump motor and surrounding area.

3. At least once every 10 weeks the disposable water filter in the water reservoir should be replaced. It may be necessary to replace this filter more frequently depending on the quality of water used.

4. At least every 10 weeks the sintered atomizer filter on the "spinning disc" humidifier should be replaced. It may be necessary to replace this filter more frequently depending on the quality of the water used.

It is policy for our service engineers to exercise the above procedure should you employ our service and calibration contract offered on an annual basis 12 months after delivery of your cabinet.

ESSENTIAL CABINET MAINTENANCE

1. Cabinet Roof Seal

During testing the water from the water seal evaporates. It is naturally replaced by droplets running down the apex roof into the water trough.

After prolonged testing it is recommended that the water trough is emptied and sterilised using a weak solution of household bleach and replenished with fresh water.

2. Peristaltic Pump

The tube on the Peristaltic Pump should be replaced every 10 to 12 weeks of use, as the wall of the tube is eroded due to the action of the pump rollers. This also causes the tube structure to collapse, which restricts the salt solution flow. Additionally the tube could split, which will result in the salt solution being pumped over the pump itself and the also onto the floor of your laboratory.

IMPORTANT NOTE: IT IS VITAL THAT SILICONE TUBE IS REPLACED EVERY 10 TO 12 WEEKS OF USE. THIS WILL PREVENT THE TUBE FROM SPLITTING AND LEAKING.

ADDITIONALLY: THE CORRECT SIZE OF TUBE SHOULD BE USED ON THE PUMP OTHERWISE THE REQUIRED FLOW RATES WILL NOT BE ACHIEVED, AND ALSO DAMAGE TO THE PUMP ROLLERS COULD OCCUR.

USE OF THE INCORRECT TUBE WILL ALSO DAMAGE THE PUMP MOTOR, RESULTING IN MOTOR FAILURE.

USE OF THE WRONG PERISTALTIC PUMP TUBE INVALIDATES THE GUARANTEE ON THE COMPLETE PUMP UNIT.

3. Reservoir Filters

At least once every 3 months the disposable salt solution filter in the salt solution reservoir should be replaced. It may be necessary to replace this filter more frequently depending on the quality of water used on making up the salt solution. If you find Brown Algae in the filters, the reservoir should be cleaned using a weak solution of domestic bleach.

4. Spray Nozzle

It is recommended at six monthly intervals that the spray jet nozzle, "Fluid Cap", is removed from the spray jet nozzle assembly and soaked in a container of clean hot water (50°C max).

It is not considered necessary to replace the spray jet nozzle gasket every time the fluid cap is removed but recommended it is replaced annually.

It is policy for our service engineers to exercise the above procedure should you employ our service and calibration contract offered on an annual basis, 12 months after the delivery of your cabinet.

FAILURE TO FOLLOW THE ABOVE INVALIDATES THE WARRANTY



Manufacturers of Corrosion and Environmental Chambers

Leintwardine, Craven Arms, Shropshire SY7 0NB, UK.
Tel (01547) 540654 + Fax (01547) 540412
Internet: www.cw-spec.com + E-mail: sales.service@cw-spec.com

May 2014

HEALTH AND SAFETY AT WORK ACT – LEGIONELLA
REF: ACoP L8

As you are probably aware there are some 34 different species of the bacteria known to man and they can be found in rivers, lakes, streams, mud and soil.

The bacterium Legionella multiplies only when conditions are at a suitable level and these are:-

1. When water temperatures are between 20°C and 45°C with 37°C being the optimum laboratory temperature.
2. When water is contaminated with sediment, sludge, organic matter and algae. Algae are a good source of nutrients and when a bio film is formed it provides a stable habitat for the multiplication of bacterium Legionella.

(A bio film is a layer of micro organisms contained in a matrix which forms slime on surfaces in contact with water).

Infection is caused by inhaling airborne droplets of particles containing viable Legionella bacteria.

Facts and Conditions Concerning Salt Spray Cabinets and the Growth of Legionella Bacteria

Regarding Salt Spray Cabinets, the conditions within the unit are such that the chances of infection are very low.

1. Legionella bacteria will not grow and multiply in a 5% solution of sodium chloride.
2. Salt Spray Cabinet and Humidification Tower – this should be maintained at 47°C, a temperature outside the range which favours growth of the bacterium.

Facts and Conditions Concerning Humidity Cabinets and the Growth of Legionella Bacteria

Regarding Humidity Cabinets, the conditions within the unit are such that the chances of infection are very low.

1. The water bath in the cabinet is maintained at a level of 65°C and this temperature is considered suitable for sterilisation and one at which Legionella bacteria will not reproduce.
2. The air temperature is maintained by the evaporation of water in the form of humidity and not in a spray of droplet form; consequently the chance of transmission of Legionella bacteria by this condition is very low indeed.

Procedures to Prevent the Growth of Legionella Bacteria

1. We recommend most strongly that the Humidity Cabinet and Salt Spray Cabinet under go regular chlorination with a solution of sodium or calcium hypochlorite 100ml/litre of water.
2. The Salt Spray Cabinet is always opened after a five minute air purge when the salt fog has been removed from the chamber.
3. The Salt Spray Cabinet should never be opened when the spray is being produced.
4. The water trap on both the Humidity Cabinet and Salt Spray Cabinet are kept free of sediment, sludge, scale, organic material and algae by regular chlorination as mentioned in section 1, at intervals of not less than once a month.
5. The salt solution reservoir should be cleaned by chlorination as mentioned in section 1, each time the contents have been used, this is essential to prevent a bio film developing on the walls of the reservoir as algal slime.
6. The salt solution filter should be changed every six to ten weeks to prevent the build up of bacteria and algae colonies.
7. A solution of sodium or calcium hypochlorite (100ml per litre of water) should be pumped through the salt delivery system to prevent the build up of algae and bacteria in areas where stagnation could occur. This should be done at the same time as section 5.

Conclusion

The bacterium Legionella is a commonly occurring organism which is found naturally throughout the world, consequently as an airborne life form it is difficult to eradicate totally and permanently from any environment. With these facts, we as a company can not guarantee that our cabinets will not be susceptible to Legionella bacterium however if our maintenance procedures and operating instructions are followed the chances of infection are greatly reduced.

The company does not accept any liability to third parties using chambers it manufactures in connection to contracting the bacterium Legionella.

On behalf of the company



.....
N D CREMER
Managing Director

TROUBLE SHOOTING

Below are listed several helpful diagnosis hints, should you experience any errors that may interfere with your testing.

No Humidity

1. Check that there is water in the water reservoir tank.
2. Check that the peristaltic pump is rotating.
3. Check that the tube on the peristaltic pump is fitted correctly.
4. Check that there is a "flow reading" on the flowmeter.
5. Check that the flexible pipes connecting the condenser unit to the test chamber are connected and sealed.
6. Check the humidity level (% RH) set in the program controller is set at the required level and compare to the actual reading in the chamber.
7. Check that the sintered atomizer filter is not blocked.

No Heat

1. Check that the power to the cabinet is switched on.
2. Check the temperature setting (degrees centigrade) set in the program controller is set at the required level and compare to the actual reading in the chamber.



Manufacturers of Corrosion and Environmental Chambers

Leintwardine, Craven Arms, Shropshire SY7 0NB, UK.

Tel (01547) 540654 + Fax (01547) 540412

Internet: www.cw-spec.com + E-mail: sales.service@cw-spec.com

TSG 1/2

TROUBLE SHOOTING GUIDE No. 1 – SALT SPRAY/CCT CABINETS (All Models)

PROBLEM : NO AIR AT SPRAY NOZZLE OR LOW AIR PRESSURE AT SPRAY NOZZLE

POSSIBLE FAULT : A) BLOCKED HUMIDIFIER FILTERS
B) BLOCKED AIR NON RETURN VALVE

POSSIBLE CAUSE : HIGH CALCIUM CONTENT OF WATER SUPPLY

A) Blocked Humidifier Filters

1. Switch off mains electricity to the cabinet.
2. Switch off mains air and mains water supply.
3. Remove side inspection panel.
4. Locate drain tap underneath Humidifier Tower which can be found underneath the cabinet in the back right hand corner. Drain off 100ml of water and then close drain tap.
5. Locate two raised bosses on top of the Humidifier Tower (Model 450, 1000 and 2000 litre) or one raised boss (Model 100 and 200 litre), attached to the raised boss is a blue plastic pipe (or red plastic pipe on cabinets from May 2015), which is "Air In" to the humidifier.
6. Remove the pipe from the fitting on top of the raised boss and then with a pair of "Grips" unscrew the plastic boss.
7. Pull out the raised boss which has a long pipe attached and you will locate the filter which is screwed into the end of the pipe. (On 100 litre cabinets unscrew humidifier tower from below to allow tilting to remove the tube).
8. Unscrew the filter and examine for calcium deposits.

If the filter is clear you should be able to blow air through it. (Fault will be Non Return Air Valve).

If you cannot blow through it then the filter is blocked and will need replacing.

9. Replace the filter, reposition the tube into the Humidifier Tower and tighten securely with grips, making sure "O" ring washer is in position.

10. Reconnect the blue (or red) plastic pipe to the fitting in the raised boss.
11. Repeat on second raised boss.
12. Switch on water, air and electricity and start the cabinet and the spray should now be restored.

B) Blocked Air Non Return Valve

1. Switch off mains electricity, water and air to the cabinet.
2. Drain down Humidifier Tower as before in A) 4.
3. Remove side inspection panel.
4. Locate the pipe connected to the top of the Humidifier Tower between the two raised bosses (on 200 litre and 100 litre cabinets it is located close to the inspection panel).

This pipe is the "Moist Air Out" pipe which is connected to an Air Non Return Valve and then the pipe goes to the Spray Nozzle.

5. Locate Air Non Return Valve and disconnect pipe by pressing the valve ends as they are "quick release" fittings.
6. If the valve is blocked then you will see calcium deposits in each end of the valve.

Additionally you should be able to blow air one way through the valve.

If the valve is blocked then it will need replacing.

7. When replacing the original Non Return Valve if it is not blocked or fitting a new valve PLEASE CHECK THAT IT IS THE CORRECT WAY ROUND. The flow is out of the Humidifier so the "Ball/Valve" Symbol should be at the top as the BALL is the OUTLET.
8. Re-connect pipe to spray nozzle at BALL OUTLET END of valve
9. Switch on electricity, water and air.
10. Switch on cabinet, spray should be restored.



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TSG 2/1

TROUBLE SHOOTING GUIDE No. 2 – SALT SPRAY/CCT CABINETS (All Models)

PROBLEM : BUBBLES IN FLOWMETER

POSSIBLE FAULT : 1. THE SALT SOLUTION FILTER IS BLOCKED OR DRY
2. THE RESERVOIR FITTING IS LOOSE OR BROKEN
3. THE RESERVOIR PIPE HAS A HOLE IN IT
4. THE PUMP TUBE IS OLD OR IN THE WRONG POSITION
5. THE FLOWMETER FITTINGS ARE DAMAGED
6. THE SPRAY NOZZLE IS BLOCKED

1. The filter in the salt solution reservoir is blocked or "dry".

Fill the salt solution reservoir with salt solution then remove the pipe from the outside of the reservoir. The salt solution should flow out from the reservoir.

If the salt solution does not flow out of the reservoir then the filter inside the reservoir is either "dry" or blocked. If a new filter it can be "dry" and it will not let salt solution pass. Therefore you must remove it and then suck water through it or force water through it then replace. Then remove the pipe outside the reservoir to see salt solution flowing.

If the inside of the filter is dirty then it will need replacing – it should be replaced every 10 weeks.

If the filter is correct and solution passes through then check the next stage.

2. The fitting on the reservoir could be loose or broken, please check and replace if broken.
3. The tube/pipe from the reservoir to the back of the cabinet could have a hole in it which is allowing air into the system. Check and replace if necessary.
4. The marprene tube on the peristaltic pump could also be a problem as follows:-
 - a) The tube could be old and the walls of the tube have collapsed, which makes it difficult to achieve a good flow.
NOTE: Tube should be replaced every 10 weeks of use.
 - b) The tube could be too short on either side of the pump which means as the pump head rotates it pulls the tube off the fitting enough for air to be pulled into the system.
NOTE: Check there is enough tube each side of the pump head and it is not tight.
 - c) Check the pump head settings have not been changed – see operating manual.

5. The flowmeter inlet and outlet fittings located on the top and bottom of the flowmeter could have been damaged/cracked which will allow air into the system.

Check and replace if damaged.

6. The spray nozzle could be blocked – please unscrew the fluid cap and hold up to a bright light and you should see a small hole 0.75mm diameter.

If blocked blow out with air/water as the entrance hole is 4.0mm diameter.

7. If all the above factors have been checked then the problem could be the carbon dioxide in the water which is used to make up the salt solution. The water will be saturated with carbon dioxide and if the temperature of the laboratory increases then the carbon dioxide will produce bubbles which will be pulled into the system.

The increase in temperature also results in the pH of the collected solution increasing above pH 6.5 as the carbon dioxide releases from the solution.

As per ASTM B117 Page 3 Note 3, Paragraph 3 – Heating the water to 35°C before making the salt solution will expel the carbon dioxide.



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TSG 3/1

TROUBLE SHOOTING GUIDE No. 3 – SALT SPRAY/CCT CABINETS (All Models)

PROBLEM : POOR SPRAY OR NO SPRAY OR LOW COLLECTION RATES OR THE FLOAT IN THE FLOWMETER WILL NOT MOVE

POSSIBLE FAULT : 1. SALT SOLUTION RESERVOIR IS EMPTY
2. THE SALT SOLUTION FILTER IS BLOCKED OR DRY
3. THE PUMP TUBE IS BLOCKED OR IN THE WRONG POSITION
4. THE SPRAY NOZZLE IS BLOCKED

1. Check that the salt solution reservoir tank contains salt solution.
2. The salt solution filter is blocked or dry.
 - a) Locate the pipe on the outside of the reservoir which is connected to the cabinet. Unscrew the locking cap on the pipe and pull off the pipe. The salt solution should drip continuously from the fitting. If the salt solution drips out then the filter in the reservoir is not blocked or dry. Replace pipe to fitting and go to No. 3.
 - b) If the salt solution does not flow out of the reservoir then the filter inside the reservoir is either "Dry" or blocked. If a new filter it can be "Dry" and it will not let salt solution pass. Therefore you must remove it and then suck water through it or force water through it then replace. Then remove the pipe outside the reservoir to see salt solution flowing.
 - c) If the inside of the filter is dirty then it will need replacing – it should be replaced every 10 weeks.

If the filter is correct and solution passes through then go to No. 3.

3. The tube on the pump could be the problem, it could be blocked or the tube walls could have collapsed or the tube could be in the wrong position on the pump rollers.

Disconnect the marprene tube on the outlet of the peristaltic pump. Switch the cabinet on and the pump should rotate and solution appears from the tube.

If this does not happen then check the setting of the pump as per the Operating Manual and also check that the peristaltic tube is in the correct position in the centre of the rollers.

If the tube is old, change the tube – this should be done every 10 weeks.

Close the pump, switch on the cabinet and solution should appear.

If salt solution appears the pump is working – go to No. 4.

4. Blocked Spray Nozzle.

Remove the centre of the spray nozzle, this part is called the Fluid Cap and it has a fine tip. Hold up to a light and you should see a small hole. If no hole then the nozzle is blocked. Try removing the blockage by blowing out from the tip end or use compressed air or water. Small gauge wire can also be used.

When you can see light through the nozzle it is clear and should be replaced.

Before being replaced check that there are no solid substances in the spray body – if so wash out the spray body by pouring water over it. Replace Fluid Cap making sure the Fluid Cap washer is in position.

Turn pump speed up to remove all air from the system, run for three minutes and then check the flowmeter and adjust pump speed to set correct flow rate for cabinet.

100 Litre Cabinet Flow Rate - 0.2 to 0.3 litres per hour Air Pressure – 0.9 - 1 Bar

200 Litre Cabinet Flow Rate - 0.3 to 0.4 litres per hour Air Pressure – 0.9 - 1Bar

450 Litre Cabinet Flow Rate - 0.4 to 0.5 litres per hour Air Pressure – 1.0 - 1.2 Bar

1000 Litre Cabinet Flow Rate - 0.7 to 0.8 litres per hour Air Pressure – 1.3 - 1.4 Bar

All the system is correct and you should have a good spray at the nozzle.



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Internet: www.cw-spec.com • E-mail: sales.service@cw-spec.com

TSG 4/2

TROUBLE SHOOTING GUIDE No. 4 – SALT SPRAY/CCT CABINETS (All Models)

PROBLEM : HEAVY SPRAY FROM SPRAY NOZZLE

POSSIBLE FAULT : A) "WATER IN" SOLENOID VALVE STUCK IN OPEN POSITION.
B) BROKEN FITTING ON SPRAY NOZZLE BODY

A) "Water-In" Solenoid Valve Stuck in Open Position

1. Switch off mains water supply to the cabinet.
2. Switch off mains electricity to the cabinet.
3. Remove side inspection panel.
4. Find drawing in manual "C+W Salt Spray Cabinet (Plumbing)" and "Internal View of Humidifier" drawing.
5. Place container under humidifier and open drain to drain off excess water. Collect at least one litre of water.
6. Remove "Moist Air" pipe (Air Output) from top of humidifier tower to allow more water to drain out of humidifier drain. After 5 minutes close valve and replace pipe to fitting.
7. Locate "Water In" solenoid valve on valve tray which should be marked mains water. It is the bottom valve on the valve tray.
8. Valve tray is fastened to humidifier. Remove two screws at the top of the valve tray and then lift to slide out of bottom slots. This allows access to remove the valve.
9. Unscrew two fasteners holding water valve in position then remove electrical supply plug from valve coil and disconnect black plastic pipe work from valve base connectors.
10. Try and blow air through the valve, if this is possible then the valve is stuck open. If you cannot blow through the valve then the valve is ok. If open, dismantle valve to remove contamination.
11. To dismantle valve:-
 - a) Remove nut on top of valve coil and then remove coil.
 - b) Locate 4 fasteners which hold "coil stem" onto valve body.

- c) Pull off coil stem with care as there is a spring and valve plunger inside the stem.
 - d) Check valve body for small contamination which has prevented the rubber gasket from sealing.
 - e) Re-assemble valve and then check to see if you can blow through the fittings. You should not be able to blow through the valve if it is working correctly.
12. Re-position valve on valve tray and fasten valve tray in position. Re-connect coil and electrical socket and pipe work.
 13. Switch on water supply.
 14. Switch on electricity supply to cabinet.
 15. Run the cabinet for five minutes.
 16. Open cabinet roof and check to see find spray of salt solution.

NOTE: "Mains Water In" solenoid valves can be contaminated with calcium and they can be difficult to clean and so you may have no option other than fit a new complete valve.

PART: 24V WATER SOLENOID VALVE AND COIL – CODE C/302

If the "Water-In" Solenoid valve is now the fault, then please check the spray nozzle body fitting.

B) Broken Fitting on Spray Nozzle Body

High collection rates in the centre of the cabinet can be caused by a broken fitting on the spray nozzle body. The broken fitting allows the compressed air to escape before it reaches the spray nozzle. The loss of air reduces the force to disperse the salt solution, resulting in a high collection rate close to the spray nozzle. The fittings are a White Nylon Fitting ref JA1 on each side of the spray nozzle body.

To Check:-

1. Locate the spray nozzle transparent plastic body in the cabinet. As you look at the spray nozzle body the fitting (Fitting A) towards the back of the cabinet carries compressed air and the fitting closest to you towards the front of the cabinet, carries the salt solution (Fitting B).

THE FITTINGS ARE CONTAINED INSIDE A WHITE PLASTIC PIPE ON THE JET ARM EACH SIDE OF THE SPRAY NOZZLE.

2. Hold the spray nozzle body in one hand and with your other hand grip the white pipe at the back of the spray arm (Fitting A). Hold the spray nozzle body still and then try to force the white pipe to the left and then to the right, and repeat several times and if the fitting is cracked it will break under the force of the movement.

3. With the side to side movement the white nylon fitting (Part JA1) will crack and you will see that the pipe becomes disconnected and needs replacing.

PARTS: 1 X SPRAY NOZZLE BODY – CODE S/204
 2 X JA1 NYLON FITTINGS

4. Try to remove the broken nylon thread of the JA1 from the spray nozzle body and then screw in the JA1 and replace the PU4 Blue Air Line Fitting and connect the air line.

NOTE: If you cannot remove the broken thread of the JA1 from the spray nozzle body then you will need to purchase a new Spray Nozzle Body.



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TSG 4B/1

TROUBLE SHOOTING GUIDE No. 4B – SALT SPRAY/CCT CABINETS (All Models)

PROBLEM : HEAVY SPRAY FROM SPRAY NOZZLE

POSSIBLE FAULT : LIQUID LEVEL SENSOR IN HUMIDIFIER TOWER.

The liquid level sensor or float switch is located in the small vertical pipe in the Humidifier Tower with a 24 volt power supply cable coming out of the top.

The liquid level sensor screws into the top of the unit and you would need to unscrew the sensor to replace it.

1. Switch off mains water supply to the cabinet.
2. Switch off mains electricity to the cabinet.
3. Remove side inspection panel.
4. Place container under humidifier and open drain to drain off excess water. Collect at least 500ml of water.
5. Locate power supply cable D10 and D11 on terminal block on top of valve tray. Follow cable to top of humidifier (small vertical pipe) to find liquid level sensor.
6. Disconnect cable D10 and D11 and unscrew liquid level sensor.
7. Check that the bottom "float" can move up and down and it is free of calcium.
8. To check unit is working put a multi meter set on "Resistance" across the two cables that were in D10 and D11 and move the bottom float up and down to see if the circuit is working.

When the float is down at the base of the float switch then there should be Zero Resistance. When the float is moved up then there should be Resistance.

If the float switch has failed you will get Zero Resistance in both positions and it will need replacing.

NOTE: The humidifier float switch could be contaminated with calcium carbonate from your water supply or by "resin" from a de-ioniser unit if used. Please clean the float before replacing if this is the problem.

PART: HUMIDIFIER FLOAT SWITCH – CODE C/2013



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Leintwardine, Craven Arms, Shropshire SY7 0NB, UK.

Tel (01547) 540654 • Fax (01547) 540412

Internet: www.cw-spec.com • E-mail: sales.service@cw-spec.com

TSG 5/1

TROUBLE SHOOTING GUIDE No. 5 – SALT SPRAY/CCT CABINETS (All Models)

PROBLEM : HUMIDIFIER TEMPERATURE CONTROLLER READING ABOVE SET POINT – OVERHEATING

EXAMPLE: SET POINT TEMPERATURE 49°C
HUMIDIFIER CONTROLLER READING 80°C

POSSIBLE FAULT : A) HUMIDIFIER HEAT SIGNAL FROM CONTROLLER IS ON WHEN IT SHOULD BE OFF
B) SSR2 HAS FAILED IN SHORT CIRCUIT
C) SSR3 HAS FAILED IN SHORT CIRCUIT

A) Humidifier heat signal from the System 3000 Program Controller is on continuously when it should be off – see drawing “Humidifier Heat Circuit” attached.

1. Check output wire connected to output DO2 on the back of the System 3000 Program Controller.

Positive is Yellow Wire marked No. 6.

Negative is Black&White Wire marked No. 5.

2. With volt meter check across these terminals and at 80°C there should be no reading – 0 volts – off.

3. If there is reading at 80°C of 15 volts D.C. then the fault is the Program Controller which will need replacing.

B) If 0 volts at 80°C then the controller is ok and the fault could be SSR2 or SSR3 which are mounted on the humidifier tray – please see attached drawing.

1. One SSR2 check voltage on + and – terminals, the reading should be 0 volts.

2. Check 24 volts output terminals and there should only be 24 volts on one of the output terminals.

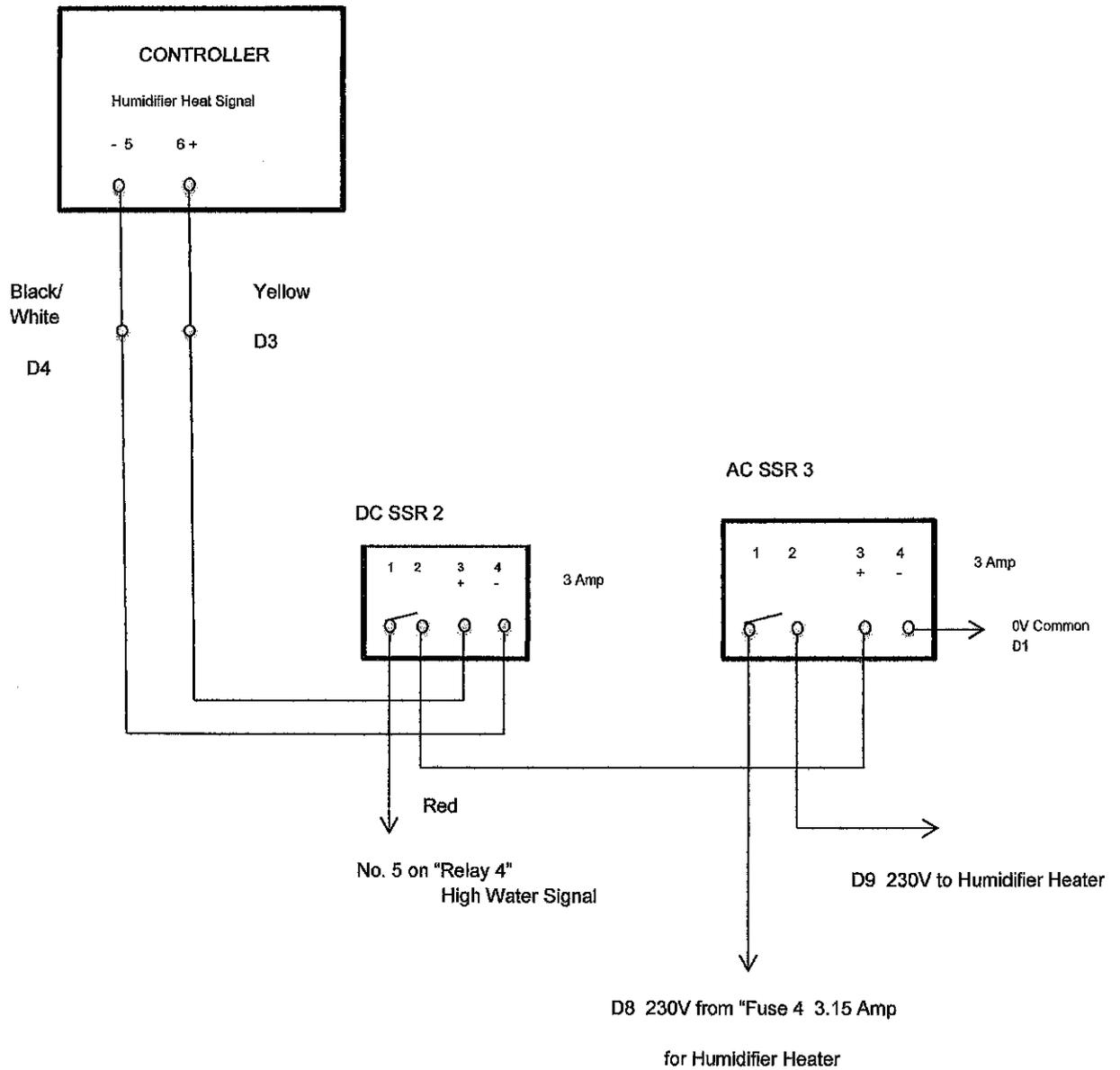
The output should only be made if there is an input signal.

If there is 24 volts on both output terminals and 0 volts on the input terminals then the SSR2 has “failed in short circuit” and needs replacing.

3. If the power supply is correct for SSR2 then check SSR3 in the same way as SSR3 may have failed and needs replacing.

HUMIDIFIER HEAT CIRCUIT

TSG 5/1





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Leintwardine, Craven Arms, Shropshire SY7 0NB, UK.

Tel (01547) 540654 • Fax (01547) 540412

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TSG 5B/1

TROUBLE SHOOTING GUIDE No. 5B – SALT SPRAY/CCT CABINETS (All Models)

PROBLEM : CABINET TEMPERATURE CONTROLLER READING ABOVE SET POINT – OVERHEATING

EXAMPLE:	SET POINT TEMPERATURE	35°C
	CONTROLLER READING	80°C

POSSIBLE FAULT : A) CABINET HEAT SIGNAL FROM CONTROLLER IS ON WHEN IT SHOULD BE OFF

B) SSR1 HAS FAILED IN SHORT CIRCUIT

A) Cabinet heat signal from the System 3000 Program Controller is on continuously when it should be off – see drawing “Humidifier Heat Circuit” attached.

1. Check output wire connected to output DO1 on the back of the System 3000 Program Controller.

Positive is Yellow Wire marked No. 4.

Negative is Black&White Wire marked No. 3.

2. With volt meter check across these terminals and at 80°C there should be no reading – 0 volts – off.

3. If there is reading at 80°C of 15 volts D.C. then the fault is the Program Controller which will need replacing.

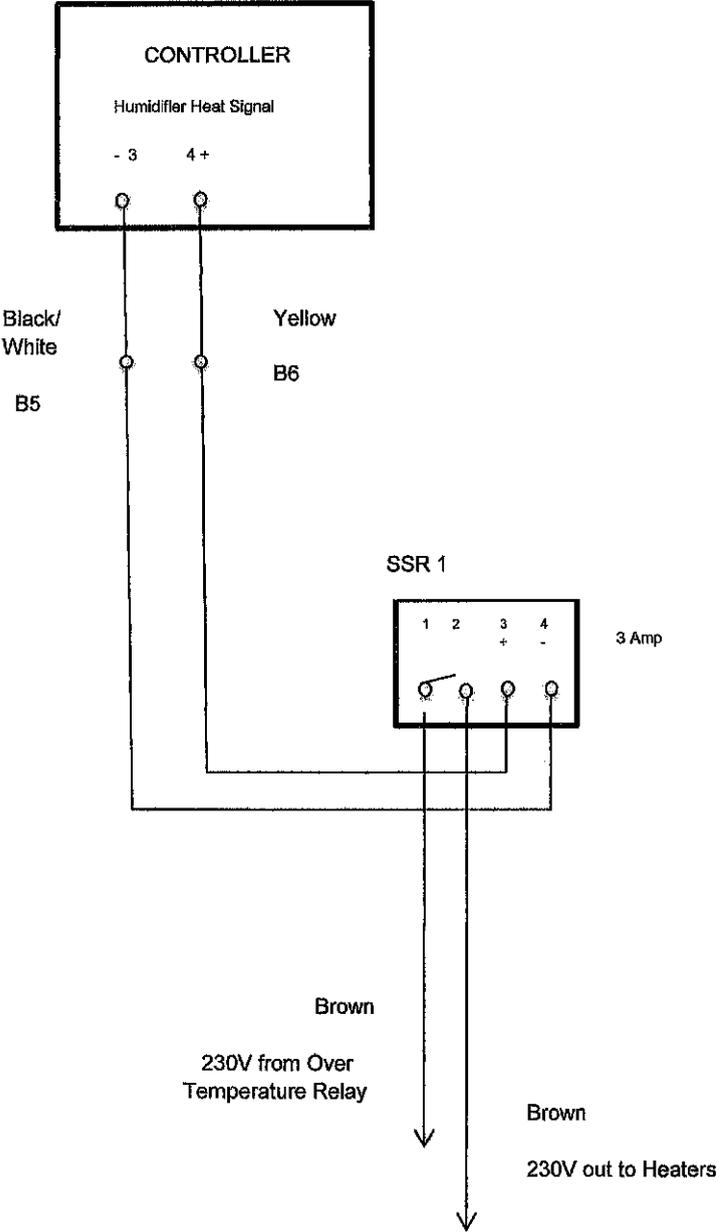
B) If 0 volts at 80°C then the controller is ok and the fault could be SSR1 which is mounted on the Power Chassis and labelled SSR1 – please see attached drawing.

1. On SSR1 the side marked “Input” should measure “0” volts D.C. across the positive and negative terminals if the temperature is above the Set Point on the controller.

2. If there is 230 volts on both “Output” terminals on SSR1 and “0” volts on the “Input” side, then SSR1 has failed and needs replacing as it has short circuited.

CABINET HEAT CIRCUIT

TSG 5B/1





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TSG 6/1

TROUBLE SHOOTING GUIDE No. 6 – SALT SPRAY/CCT CABINETS (All Models)

- PROBLEM : SALT LEAKING FROM THE WATER TRAP ON TOP OF THE CABINET IN WHICH THE APEX ROOF UNIT SITS
- POSSIBLE FAULT : A) BLOCKED DRAIN/FAULTY DRAIN
B) NO EXTERNAL WALL
- POSSIBLE CAUSE : BUILD UP OF COMPRESSED AIR INSIDE THE CABINET

A) Blocked Drain/Faulty Drain

The salt spray is produced by compressed air being mixed with the salt solution at the spray nozzle. The volume of solution is very small but the volume of compressed air is very high and therefore it is very important that the compressed air can leave the salt spray cabinet as fast as it is put into the cabinet.

If there is a problem with the cabinet drain and the air is prevented from escaping then the air pressure inside the cabinet will increase and lift the apex roof unit which results in the compressed air blowing the salt solution out of the water trap and onto the cabinet and laboratory floor, which leaves a large amount of white salt deposits.

PLEASE CHECK THE CABINET DRAIN IS FITTED CORRECTLY.

1. The drain pipe must not be blocked.
2. The drain pipe must always flow downhill and have a fall, it must not flow uphill or rise from the cabinet.
3. The drain pipe should not retain any liquid waste.
4. The drain pipe should be “vented” to an external atmosphere outside the laboratory to allow the air, which is contaminated with salt, to dissipate in the air outside the building.

There is no environmental issue with this as the salt is “pure” and has not been in contact with any of the test samples inside the cabinet.

5. The drain vent to atmosphere should be as close to the cabinet as possible at a maximum of 200cm from the cabinet.
6. After the vent pipe has been taken to the external atmosphere (outside the laboratory) the drain pipe can be continued inside the laboratory by being connected to the internal drain to allow the liquid salt solution waste to escape.

PLEASE SEE DRAIN OPTION DRAWINGS IN THE SALT SPRAY/CCT CABINET OPERATING MANUAL.

NOTE: LIQUID WASTE = LOW VOLUME
 AIR WASTE = HIGH VOLUME

B) No External Wall

If there is no external wall in your laboratory through which you can put a "vent to atmosphere" pipe then you will have to install a "Fog Box".

The C+W "Fog Box" cleans the compressed air as it leaves the cabinet.

The vent pipe from your cabinet is connected to the "Fog Box" and inside the "Fog Box" a high pressure pumped spray system washes the compressed air to remove all the salt, which results in clean air leaving the "Fog Box".

PLEASE REQUEST A DATA SHEET FOR THE FOG BOX AND A QUOTATION IF REQUIRED.

GAS SPRINGS - SAFETY REQUIREMENTS

Gas Springs are filled with Nitrogen at very high pressures, and under no circumstances should they be opened, tampered with, or subjected to excessive heat or tension.

Gas Springs should always be treated with respect in the knowledge of the pressure internally.

As a pressurised item, it is recommended that they be returned to the supplier for safe disposal at the end of their useful life.

As the nature of a Gas Spring is to lose its force over a long period of time, it is advisable to periodically check its ability to operate as initially intended, preferably forming part of planned maintenance structure. Replace if, and when, necessary.

INSTALLATION INSTRUCTIONS

For standard compression Gas Springs, we advise the use of ball joints to alleviate possible side loads.

Generally fit with piston rod down, preferably within 60 degrees to the vertical, and avoid the spring travelling through a large arc. It is advisable to keep the spring in a single plane of movement. Failure to adhere to this advice may result in reduced life of the Gas Spring.

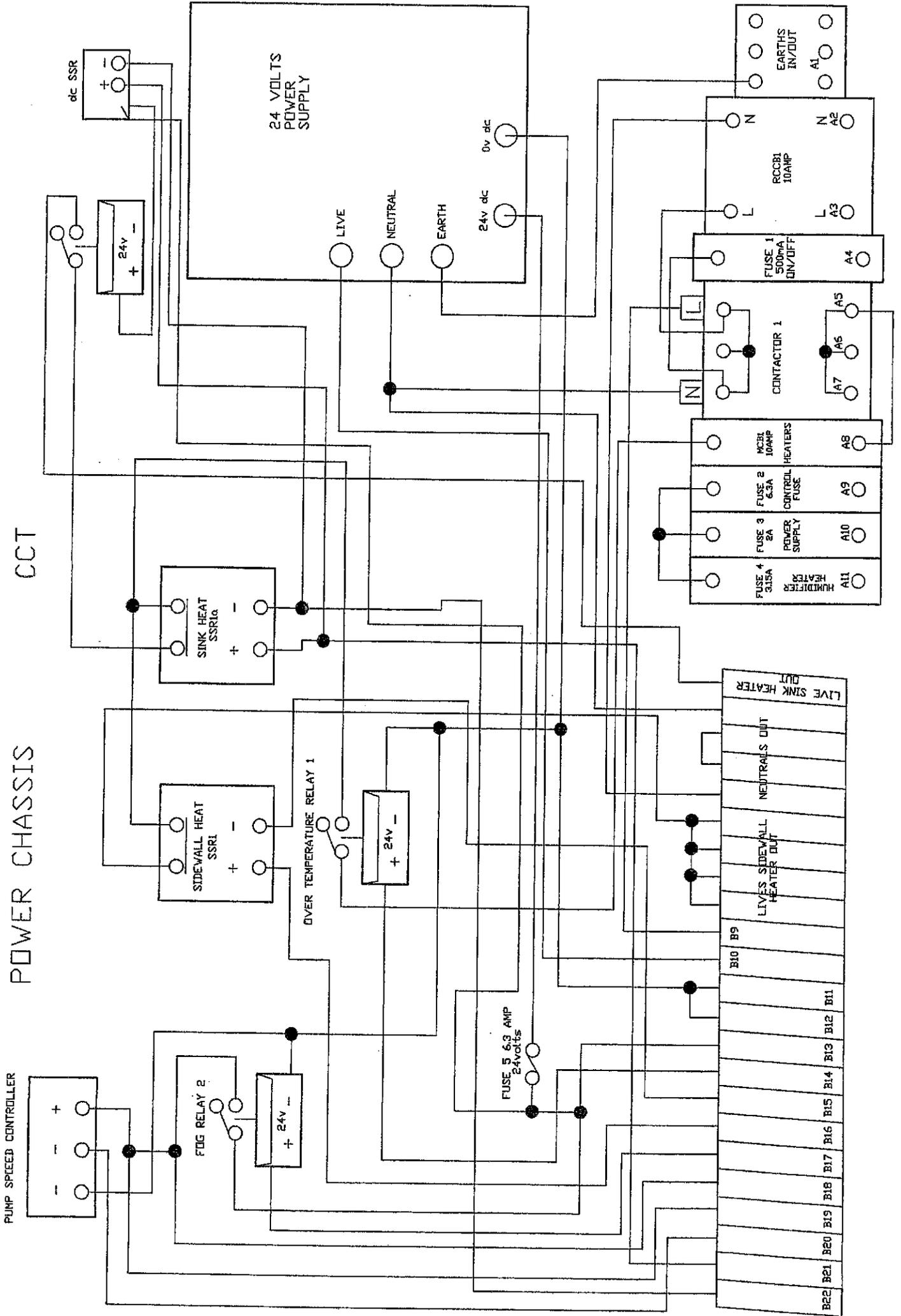
Further information and advice can be obtained from:

C & W SPECIALIST EQUIPMENT LTD
PAYTOE LANE
LEINTWARDINE
CRAVEN ARMS
SHROPSHIRE
SY7 0NB

Tel: (01547) 540654

POWER CHASSIS

CCT



PUMP SPEED CONTROLLER

dc SSR

FOG RELAY 2

OVER TEMPERATURE RELAY 1

SIDEWALL HEAT
SSR1

SINK HEAT
SSR2

24 VOLTS
POWER
SUPPLY

LIVE

NEUTRAL

EARTH

FUSE 5 6.3 AMP
24volts

B10 B9
LIVES SIDEWALL
HEATER OUT
NEUTRALS OUT
LIVE SINK HEATER

FUSE 4
3.15A
HUMIDIFIER
HEATER
A11

FUSE 3
2A
POWER
SUPPLY
A10

FUSE 2
6.3A
CONTROL
FUSE
A9

MCBI
10AMP
HEATERS
A8

CONTACTOR 1

FUSE 1
500mA
IN/OUT
A4

RCCBI
10AMP

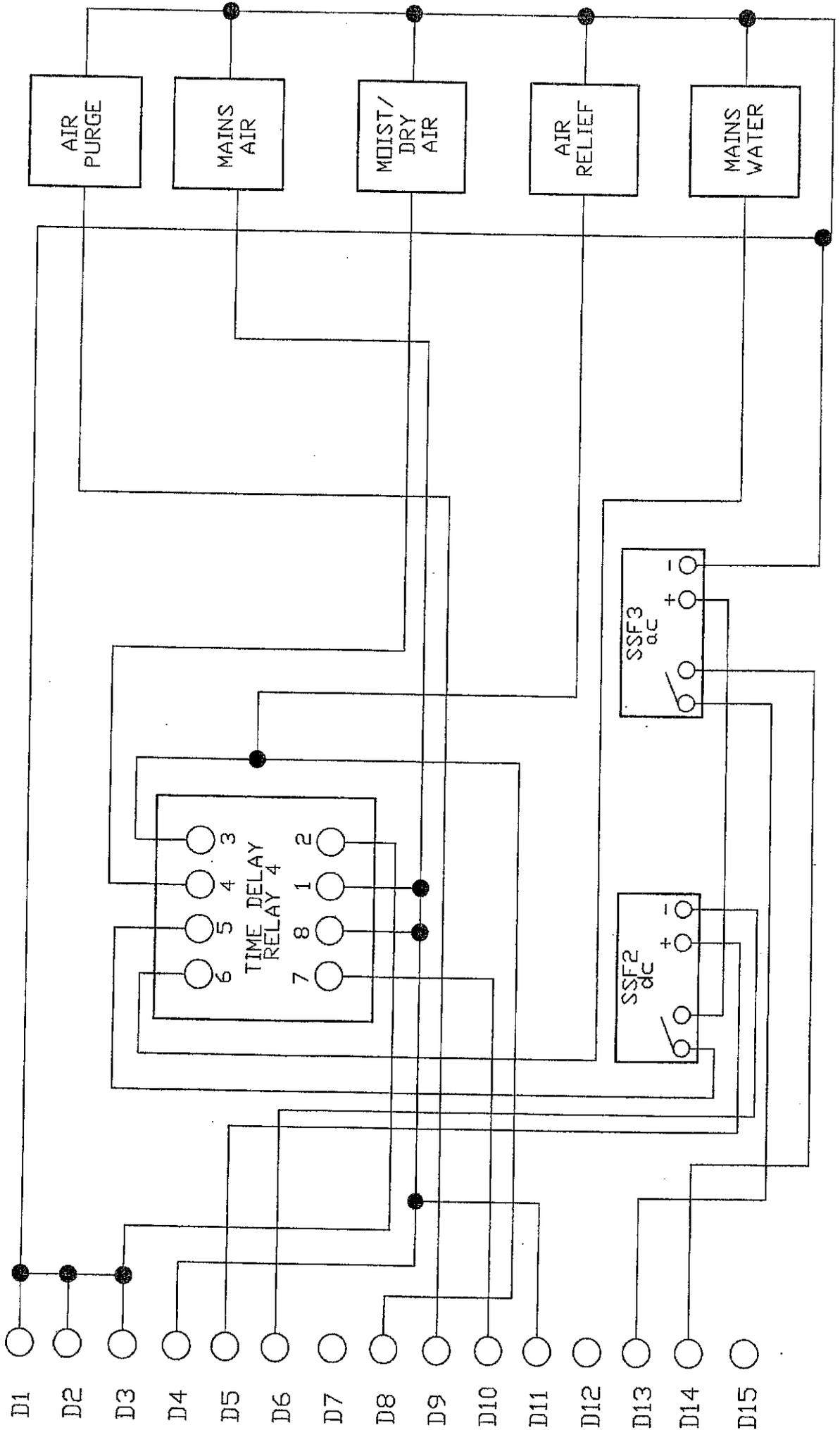
EARTHS
IN/OUT
A1

CCT POWER CHASSIS

- A1 Earths in/out
- A2 Neutral in RCCB
- A3 Live in RCCB
- A4 Live out to on/off Switch Fuse 1 500mA
- A5 Contactor
- A6 Contactor
- A7 Contactor
- A8 Heaters MCB1 10 Amp
- A9 Control Fuse 2 6.3 Amp
- A10 Power Supply Fuse 3 2 Amp Link B10
- A11 Humidifier Heater Fuse 4 3.15 Amp D13

- B9 Live in to Contactor Coil from on/off Switch
- B10 Live in to Power Supply Link A10
- B11 0V D.C. Common out Controller
- B12 0V D.C. Common out D2
- B13 24V D.C. Common out Controller
- B14 24V D.C. in to Overtemperature Relay from Thermostat
- B15 0V D.C. Sidewall Heat Logic in negative, Controller
- B16 15V D.C. Sidewall Heat Logic in positive, Controller
- B17 24V D.C. Fog in from Controller
- B18 24V D.C. Fog out D4
- B19 Variable Voltage out to pump positive
- B20 0V D.C. out to pump negative
- B21 15V D.C. Sink Heat Logic in, Controller positive
- B22 0V D.C. Sink Heat Logic in, Controller negative

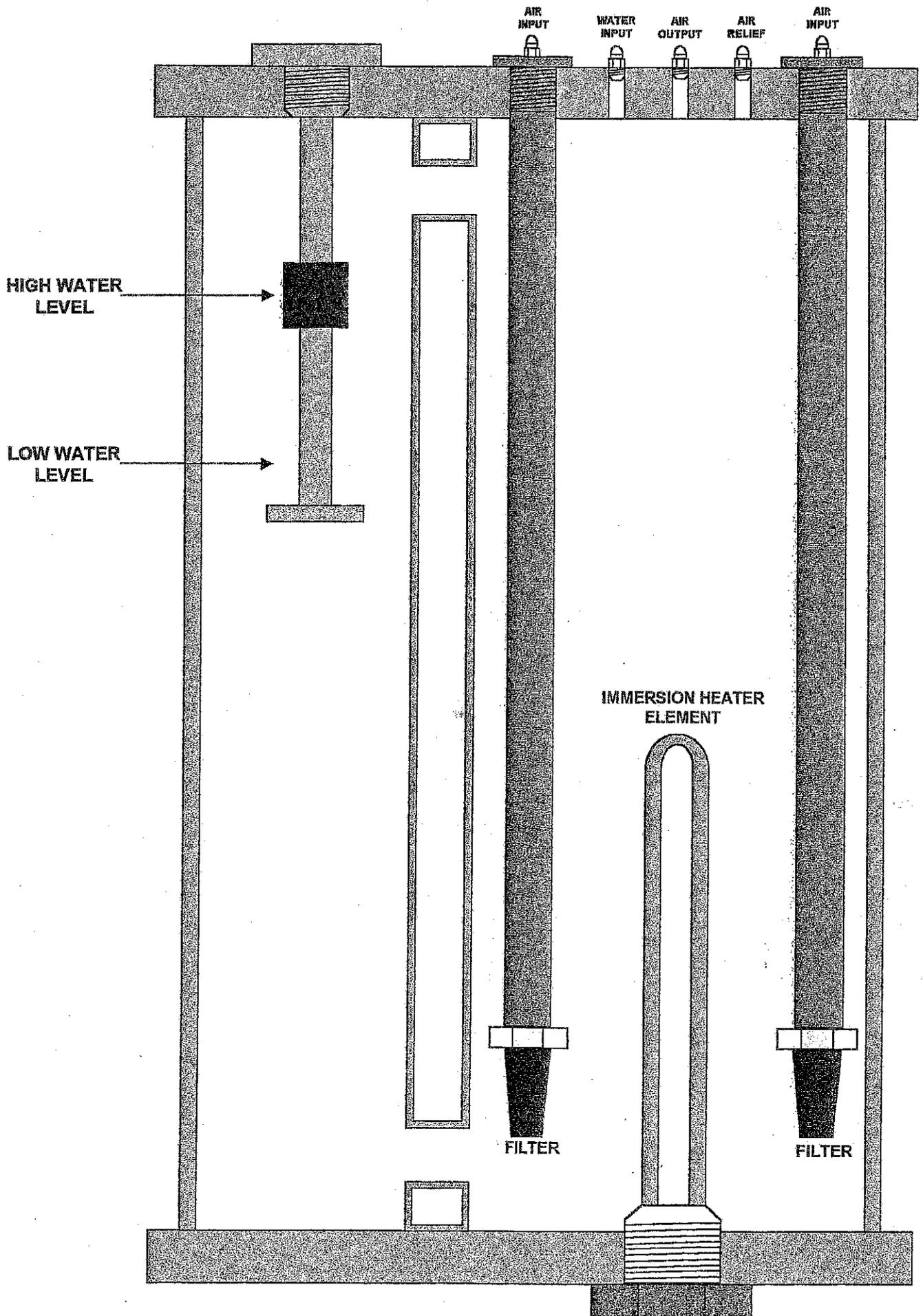
HUMIDIFIER TRAY



HUMIDIFIER TRAY

- D1 0V Common
- D2 0V Common B12
- D3 0V Common
- D4 24V D.C. Fog in B18
- D5 Humidifier Heat Logic in 15V D.C. positive, Controller
- D6 Humidifier Heat Logic in 0V D.C. positive, Controller
- D7 Spare
- D8 24V D.C. out to Low Water Humidifier Indicator
- D9 24V D.C. in to Air Purge Valve, Controller
- D10 Float Switch Return 24V D.C.
- D11 Float Switch 24V D.C. Fog
- D12 Spare
- D13 Live in to Humidifier Heater SSR All
- D14 Live out to Humidifier Heater
- D15 Neutral in/out to Humidifier Heater

INTERNAL VIEW OF THE HUMIDIFIER



CONTROLLER/CONTROL PANEL

