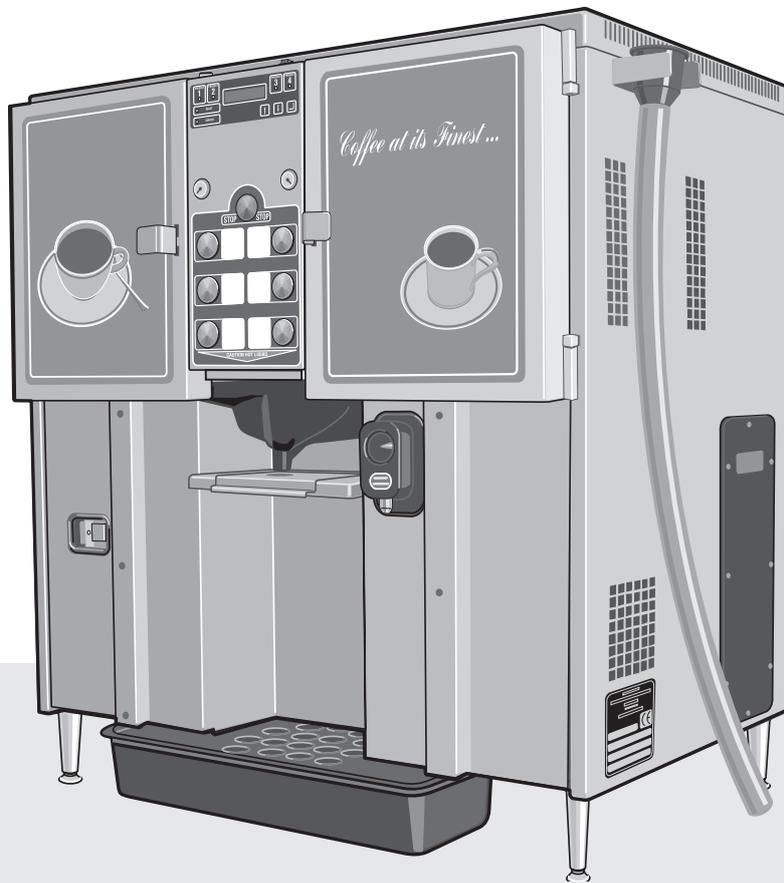


D420 Coffee Dispenser



Service Manual

Notice

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Conventions Used in this Document

All instructions are given as viewed from the front of the machine.

Descriptions of the components referred to mostly match those used in the Illustrated Parts Catalogue.

There are no bolts used in the construction of the machine. Hexagon headed screws are referred to as Set Screws.

DASS Manufacturing Ltd.

SBC House, Restmor Way, Wallington, Surrey, SM6 7AH, United Kingdom.

Tel: +44 (0)20 8669 8012 Fax: +44 (0)20 8669 9529

Email: support@aromat-uk.com Web: www.aromat-uk.com

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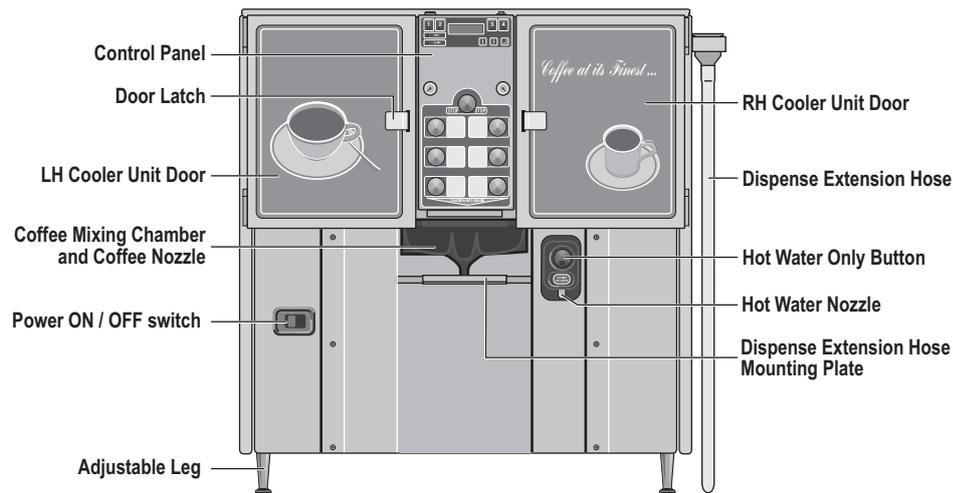
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1 Introduction



The D420 Coffee Dispenser requires minimal maintenance. The selection of procedures listed in this document is based on the service requirement history of other machines produced by DML.

To attain the highest levels of quality and reliability, the D420 will undergo continuous design development during its life cycle. This document will therefore be updated regularly to reflect any changes.

WARNING: Before replacing any major component, it is essential that the machine is isolated from both the power and water supply.

1.1 Using this Manual

This manual describes the processes for the machine's operation, how to obtain replacement parts and instructions for carrying out the most probable maintenance procedures.

In order to avoid the repetition of basic tasks, the document has been carefully sectioned to enable the service engineer to extract the relevant sub sections for reference when on site.

It is designed to be updated on a regular basis and will not be published in hard copy, although a pdf version will be available for downloading from the DASS Technical Web Site. Before carrying out any maintenance on the machine, the service engineer should consult the web site and either download the latest pdf version of the entire document or print off the relevant individual (html) web pages.

To identify the parts referred to in this manual, you may find it useful to view the D420 Illustrated Parts Catalogue, available from the web site.

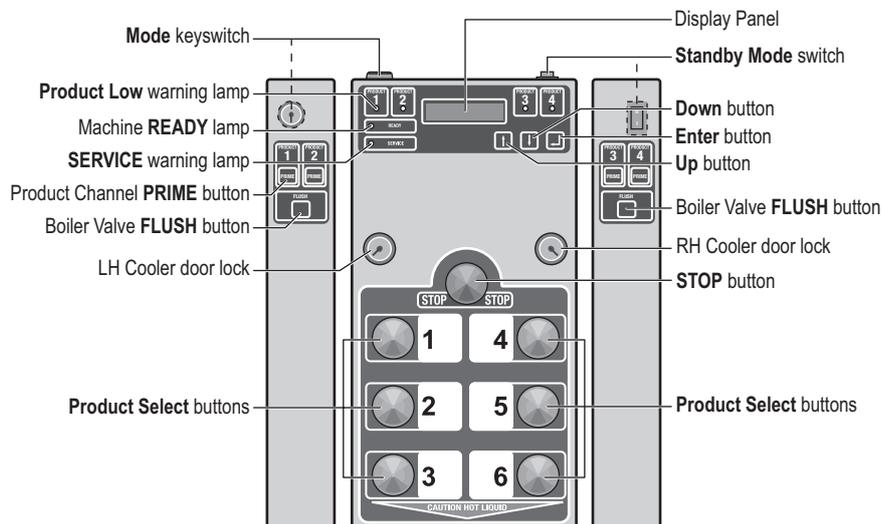
As this manual is under constant review and development, any comments or advice from service engineers that would improve the document would be welcomed. Please email any comments to technical@aromat-uk.com.

1.2 Understanding Fault Codes

The table below describes the D420's Fault Codes:

Fault	Description / Cause
Overflow	Too much water in tank
Float Fault	Logical fault. Overflow detected but insufficient water in tank. Possible stuck float or faulty switch.
Thermostat Trip	Thermostat has detected boiler overheated. Possible faulty thermostat.
Possible Leak	Actual leak or there has been no dispenses over 15 boiler refills. This can occur due to evaporation in the tank.
Lack of Water	During normal operation after machine has filled for the first time, the inlet valve has been open for more than 15 minutes. Possible main water valve closed, low water pressure or faulty inlet valve.
Lack of Water #1	The initial water fill from empty has taken longer than 25 minutes. Possible inadequate water flow or pressure.
Water overheat	Thermister has detected water is too hot. Tank water temperature is higher than top temperature setting. Possible faulty thermister.

1.3 The Control Panel



Note: On some earlier models, the **Mode** keyswitch is located on the top left side of the control panel and the **Standby** rocker switch is located on the top right side of the control panel. It may be necessary to open the cooler unit doors to access these switches.

1.4 Setup Mode

To view the user settings, put the machine into **SETUP MODE** by turning the **Mode** keyswitch.



The menu options are:

- Selection
- Speed
- Strength
- Set Channel?

Scroll through the options by pressing the **Enter** button.

1.5 Machine Supplied User Settings

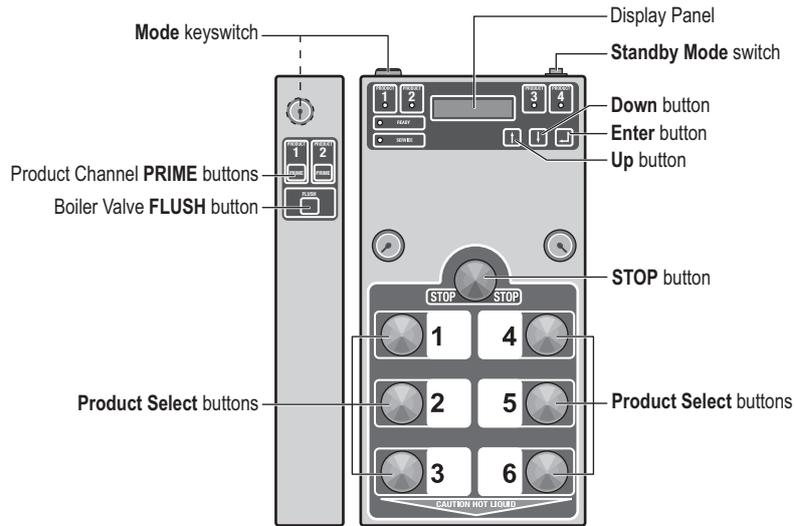
The machine was configured in the factory with the following user settings:

Button No.	Speed	Volume	Strength	Channels
1	3	10 gal	40:1	1&2
2	3	5 gal	40:1	1&2
3	2	Airpot	40:1	1&2
4	3	10 gal	40:1	3&4
5	3	5 gal	40:1	3&4
6	2	Airpot	40:1	3&4

The strength ratio means that 1 part of coffee concentrate is added to 40 parts of water.

Note: These settings may have been changed by the Installation Engineer to suit the customer's requirements.

2 Engineer Configurable Settings



Note: On some models, the **Mode** keyswitch is located on the top left side of the control panel and the **Standby Mode** Switch is located on the top right hand side of the control panel. It may be necessary to open the cooler unit doors to access these switches.

2.1 Making Changes

DASS Manufacturing Ltd. will not accept liability for any damage or losses caused as a direct result of any changes made to the machine by the service engineer when carrying out any of the procedures described in this manual. All replacement parts used in the D420 dispenser should be approved by DASS Manufacturing Ltd.

2.2 Putting the D420 into Engineer Setup mode

- 1 Turn the **Mode** keyswitch to put the machine into **SETUP MODE**.
- 2 Press **PRIME 1** and then **PRIME 2**; the following will display:



- 3 Press the **Enter** button. The display will change to:



Scroll through the menu by pressing the **Enter** button.

2.3 The Engineer Menu Structure

In **ENGINEER SETUP** mode, the following settings may be changed:

- Temperature Display
- Maximum Temperature
- Enable / Disable Coffee
- Enable / Disable Water
- Product Choices
- Peris Speed Offset
- Enable / Disable product Sensors
- Enable / Disable Leak Detect

The *D420 Installation Guide* provides basic instructions for changing these settings.

2.4 Machine Supplied Settings

The machine was configured in the factory with the following user settings:

Temp Display Fahrenheit (USA) or Celsius (EU)

Set Max Temperature=194F or 95C

Coffee Enabled

Water Enabled

Product Choices 2 + 2

Product Sensors Enabled

Leak Detect Enabled

Note: Peris Speed Offsets will differ between machine and pumps.

Note: These settings may have been changed by the Installation Engineer to suit the customer's requirements.

3 Obtaining Replacement Parts

3.1 Illustrated Parts Catalogue

A printable illustrated parts catalogue can be downloaded from the **PDF Bank** on the Aromat Technical Website.

3.2 Using Web Site

To access the technical website go to: www.aromat-info.com and click on **Technical Documents**. This will take you to the Technical Centre which is in both English and German. A Username and Password is required to enter the site.

3.3 Obtaining User name and Password

Complete and send the on-line **Registration Form** or send an email to: technical@aromat-uk.com

3.4 Locating Part Illustration, Description and Number

Select **Parts Lists** from the left menu and then **D420** at the top of the Navigation page. Select the version to reach the Parts Lists overview page. Clicking on an assembly image will open a new window with an annotated exploded view of that assembly. Clicking on the assembly menu will take you to the relevant section in the parts list.



Parts Lists Overview Page

3.5 On-line Parts Enquiry Form

Having located the part, selecting **Parts Enquiry** from the left hand menu will open a new window with an on-line form. Complete the form and press **SEND**. A representative of DASS Manufacturing Ltd. will get back to you with prices and availability of parts as soon as possible.

3.6 Exploded View Assembly Drawing

A printable composite exploded view of the D420 assembly can be downloaded from the PDF Bank on the Aromat Technical Website.

4 Preparing the D420 for Servicing

WARNING: To avoid electric shock, when the casing panels are being removed, the D420 MUST be isolated from the mains power supply.

Note: Unless essential for any work being carried out, we recommend that the valve for the mains water service to the machine also be closed before servicing the D420.

4.1 Preparing a Suitable Work Area

Many components of the D420 Coffee Dispenser can be serviced or replaced in-situ but where main assemblies need to be removed from the machine, we recommend that a work area or temporary mobile work bench be set up adjacent to the machine. Ideally, this work area should not be less than 10 square feet (1 square metre).

For most service procedures, only the lower front panel or top panel needs to be removed. Space is required for temporary storage of these panels.

All tools required should be to hand before undertaking any major disassembling.

4.2 Noting Machine Settings

Before undertaking any maintenance on the D420, noting down all of the current user and engineering mode settings will enable you to return the machine to service exactly as the original settings.

Note: It will be necessary to change the dispense volume settings for one or more of the product selection buttons when undertaking some maintenance procedures. These may need to be reset with the customer present on completion of the work.

The User Settings to note for each Product Select Button are:

- Selection (Enabled or Disabled).
- Selection size (Speed = 1, 2 or 3).
- Dispense Volume (This will need to be measured if the information cannot be supplied by the customer - see note below)
- Selection strength (water:coffee ratio).
- Set channel (1, 2, 3, 4 ; 1, 2 & 3 ; 1 & 2 or 3 & 4 depending on the option selected in Engineering Mode).

Note: To determine the dispense volumes, set the machine to **Coffee Disabled** and undertake a dispense for each Product Select Button into the largest typical container used by the customer and then measure.

The Engineering Mode settings to note are:

- Temperature Display (Celsius, Fahrenheit, None).
- Maximum Temperature Set.
- Product Choices (4 Identical, 3+1, 2+2 or 4 Different).
- Peris Speed Offset for each pump.
- Leak Detect (Enabled or Disabled)

A Machine Settings Form is included in Appendix C of this manual; also available as a printable pdf document from the DASS technical web site ([d420_machine_settings.pdf](#)).

4.3 Removing the Casing Panels

WARNING: Before removing any of the Casing Panels the machine MUST be isolated from the mains power supply.

Note: The machine should only be powered ON with the panels removed if the engineer can satisfy himself that it is safe to do so.

Tools required:

- No. 2 Pozidrive Screwdriver
- No. 2 Pozidrive Screwdriver – Stubby

To remove the casing panels:

- 1 Power OFF and isolate the machine from the mains power supply.
- 2 Open both Cooler Unit doors and remove the four M4 x 8mm screws securing the casing Front Panel.
- 3 Remove the Front Panel by tilting toward you to clear the On/Off switch and Hot Water button and lifting slightly to clear the support lugs at the front of the Chassis Base Plate.
- 4 With both Cooler Unit doors still open, remove the four M4 x 8mm screws securing the Casing Top Cover.
- 5 Remove the Casing Top Cover by lifting up and toward the front.
- 6 Remove the two screws securing the Cooler Units to the Cooler and Nozzle Platform and slide the Cooler units forward about one inch (25mm).
- 7 Undo the twelve M4 x 8mm screws securing the RH Side Panel, first at the top, then at the base and then at the back.
- 8 Ease the RH side panel out at the back and bottom.
- 9 Remove the bottom three and loosen the top M4 x 8mm screws securing the LH side panel to the Back Panel.
- 10 Remove the five screws securing the Back Panel to the chassis Base Plate, supporting the panel at the bottom.
- 11 Still supporting the Back Panel at the bottom, remove the remaining Side Panel fixing screw and slide the back panel out.
- 12 Undo the eight remaining screws securing the top and bottom of the LH side panel.
- 13 Ease the LH side panel out at the back and bottom.

4.4 Refitting the Casing Panels

WARNING: Before refitting any of the Casing Panels the machine MUST be isolated from the mains power supply.

Tools required:

- No. 2 Pozidrive Screwdriver
- No. 2 Pozidrive Screwdriver – Stubby

To refit the casing panels:

- 1 Power OFF and isolate the machine from the mains power supply.
- 2 First refit the Back Panel by loose fitting the five screws securing it to the chassis Base Plate.

- 3 Slide both Cooler Units forward about one inch (25mm).
- 4 Refit both Side Panels by easing the lip on the top and bottom of the panels around the chassis Side Frames and fits on the outside of the Back Panel.
- 5 Loose fit the screws securing the Side Panels to the Back Panel.
- 6 Loose fit the screws securing the Side Panels to the top of the chassis Side Frame and Tank.
- 7 Tight fit the screws securing the Side Panels to the chassis Base Plate.
- 8 Tighten all loosely fitted screws.

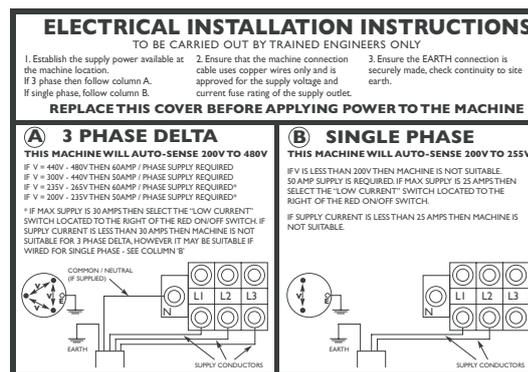
The Cooler Units may now be slid back into place and secured.

The Top Panel and Front Panel are reinstalled by reversing the instructions given in Section 4.3.

4.5 Disconnecting / Reconnecting Power Supply

WARNING: Before removing the PSU Front Panel, the Mains Power Supply **MUST** be switched **OFF** and the cable unplugged or disconnected from the supply.

Note: This procedure **MUST** be carried out by a qualified Electrician. Refer to the instructions on the PSU Front Panel. See copy in Appendix E of this document.



Tools required:

- No. 2 Pozidrive Screwdriver
- 8mm AF socket
- 10mm AF socket
- Socket holder
- Gland Spanners

To disconnect the D420 from the Mains Power Supply:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Front Panel as described in Section 4.3.
- 3 Undo the four M4 x 12mm screws and remove the PSU Connection Cover.
- 4 Disconnect the Mains power and earth cables from the Terminal Blocks.
- 5 Undo the cable gland-securing nut and pull the cable and cable gland down through the Conduit Plate and Base Plate.

Reconnect the Power Supply by reversing the above instructions.

Note: Ensure PSU Front Panel is refitted before re-connecting to mains power supply.

4.6 Disconnecting / Reconnecting Water Supply

Note: When machine is powered OFF, water will not flow through the inlet valve.

Tools required:

1 1/8" AF Spanner

To disconnect the dispenser from the Mains Water Supply:

- 1 Ensure that the mains valve is closed.
- 2 Place a bucket or suitable container beneath the mains valve.
- 3 Disconnect the flexible inlet connector pipe from the mains valve and allow the water in the hose to run into the container. Retain the sealing washer.
- 4 If necessary, disconnect the flexible inlet connector pipe from the inlet valve under the Base Plate, retaining the sealing washer.

The water supply is reconnected by reversing the instructions above.

4.7 Draining the Tank

WARNING: Water in the tank may scold.

Note: When the D420 Dispenser is powered OFF, water will not flow through the Water Inlet Valve. DO NOT shut off the water at the supply valve and leave the machine powered ON, as this could damage the Water Inlet Valve.

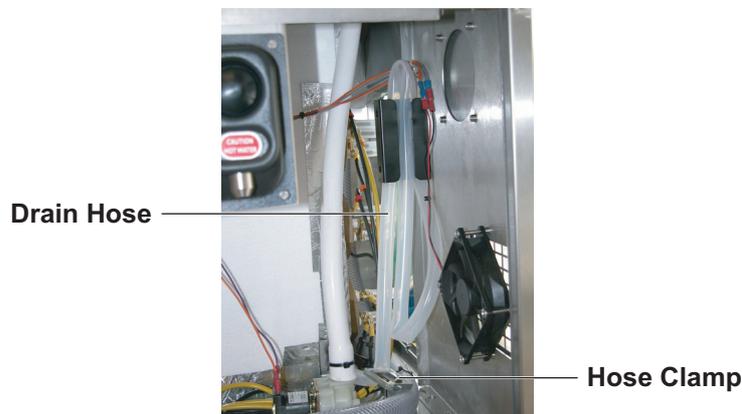
Note: The tank capacity is 21 gallons (80 litres).

Tools required:

No. 2 Pozidrive Screwdriver
Large bucket

To drain the tank:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Front Panel as described in Section 4.3.



- 3 Locate the drain hose and clamp, which is connected to the bottom right hand of the tank, and remove the hose from its bracket on the chassis side panel.
- 4 Place the end of the drain hose over the bucket (or drain if available).
- 5 Open the hose clamp to allow water to pass. Close and reopen the clamp as necessary until the tank is empty.

4.8 Draining Water Inlet Hose Pipe

Even though the tank may be drained, water will still remain in the water inlet hose pipe.

Tools required:

- Metal hose clamp (supplied with the machine)
- One litre container
- Towel or absorbent cloth
- Side cutting pliers
- Cable tie

To drain the water inlet hose pipe:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Front Panel as described in Section 4.3.
- 3 Place the metal hose clamp over the inlet hose near to the inlet valve.
- 4 Place the container near to the inlet valve.
- 5 Place a towel or absorbent cloth around the inlet valve.
- 6 Cut the black cable tie securing the hose to the inlet valve and disconnect the tube.
- 7 Place the end of the pipe over the container and open the metal hose clamp to expel the water.
- 8 After completing the service work, refit the Water Inlet Hose Pipe by reversing the above procedure.

Note: A new cable tie will be required to secure the hose.

5 Servicing Tank and Water Supply

5.1 Replacing the Water Inlet valve

Note: It is not necessary to drain the water tank to replace the Water Inlet Valve.

Tools required:

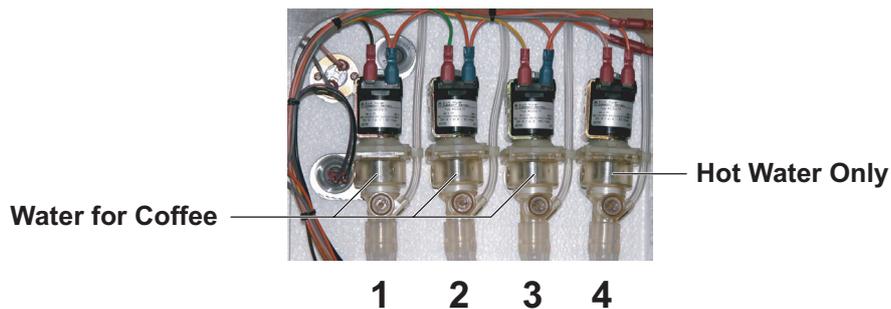
- Metal hose clamp (supplied with the machine)
- 1 1/8" AF Spanner
- No. 2 Pozidrive Screwdriver – Stubby

To replace the water inlet valve:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the lower Front Panel as described in Section 4.3.
- 3 Close the mains water valve.
- 4 Disconnect from the mains water supply as described in Section 4.6.
- 5 Drain the Water Inlet Pipe as described in Section 4.8.
- 6 Place a towel or absorbent cloth on the bench underneath the Water Inlet Valve.
- 7 From underneath the chassis Base Plate, disconnect the Inlet Connector Pipe from the Water Inlet Valve, being careful not to lose the fibre washer
- 8 From underneath the chassis Base Plate undo the two screws securing the Water Inlet Valve.
- 9 Fit the new valve by reversing the above procedure.

5.2 Replacing Water Outlet Valves

There are four Water Outlet Valves. Numbering them from the left, 1, 2, 3 and 4, the first three dispense water for coffee and the fourth dispenses hot water only.



Note: The tank does not need to be fully drained but the water level must be below the valve tube before removing the valve. One or both Cooler units should be removed.

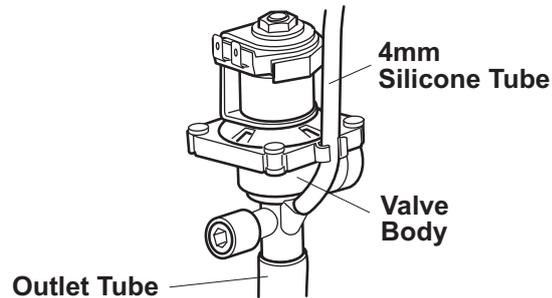
Tools required:

- No. 2 Pozidrive Screwdriver

To replace a Water Outlet Valve:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the lower Front Panel as described in Section 4.3.
- 3 Remove either or both Cooler units as described in Section 7.1.

- 4 Follow the procedure in Section 4.7 to lower the water level to below the valve tube. As the water drains out, you should be able to see the top of the water in the valve body as the level drops. Once this level appears to stop dropping, run off another bucket of water to ensure that the level is below the valve.



- 5 Disconnect the 4mm silicone tube on the RH side of the valve.
- 6 Mark cables and disconnect the wiring to the valve solenoid.
- 7 Slightly rotate and carefully slide the valve out of the Boiler Seal.
- 8 Remove the valve complete with the outlet tube and elbow.
- 9 Carefully push the new valve into the Boiler Seal.
- 10 Fit the outlet tube and elbow from the old valve and reconnect the 4mm silicone tube to the RH side of the valve.

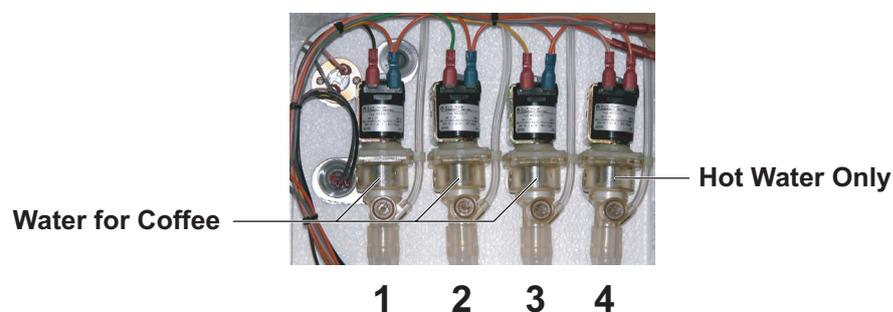
Note: The flow rate for the new valve now has to be set. To do this, the machine must be powered ON, the tank refilled and the water brought up to the maximum operating temperature.

5.3 Setting Water Outlet Valve Flow Rate

The flow rate for each of the Water Outlet Valves will have been set to 5 litres per minute in the factory. This setting is important to establishing comparable concentrate ratios for each of the channels.

Note: The machine must be powered ON, the tank filled and brought up to maximum operating temperature.

Note: This procedure may require changing the speed and channel settings. We recommend that the customer's settings are noted down as described in Section 4.2.



There are four Water Outlet Valves. Numbering them from the left, 1, 2, 3 and 4, the first three dispense water for coffee and the fourth dispenses hot water only.

Which of the valves employed for dispensing water for coffee depends on the selection speed and product channel, for the product selection button used.

Note: If all valves are being replaced, first adjust and set Outlet Valve 2, then Outlet Valves 1 and 3.

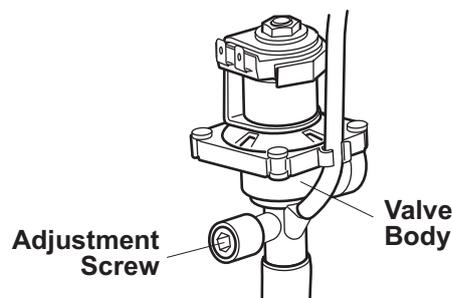
Outlet Valve 4 uses the Hot Water Only button and for maximum flow, should be adjusted so that the screw is flush with the cylinder face.

Tools required:

- Calibrated 2 gallon (10 litre) container or bucket (see Appendix A)
- Timer with second hand
- 6mm hexagonal key (or 6mm flat end screwdriver)

First prepare the machine:

- 1 Turn the mode keyswitch to put the machine into **SETUP MODE**.
- 2 Press **PRIME1** and then **PRIME2** to put the machine into **ENGINEER SETUP**.
- 3 Press the **Enter** button to scroll down until **Coffee Enabled** is displayed and press the **Down** button to disable coffee.
- 4 Press the **Enter** button to scroll down until **Product Choices** is displayed and select **2+2**.
- 5 Place the calibrated container under the nozzle.
- 6 Press the **Enter** button to scroll down until **SETUP MODE** is displayed.
- 7 Press Product Select Button 1.
- 8 Press the **Enter** button to scroll down until **Set Volume** is displayed.
- 9 Press Product Select button 1, time the dispense for 60 seconds and press the **STOP** button.
- 10 Press the **Enter** button to scroll until **SETUP MODE** is displayed again.
- 11 Remove either or both Cooler Units as described in section 7.1.



To adjust the flow rate for **Water Outlet Valve 1**:

Note: If also replacing Outlet Valve 2, first adjust and set valve 2, then valve 1.

- 1 With the machine in **SETUP MODE**, press Product Select Button 1 and then the **Enter** button to scroll down until **Speed** is displayed and set to **Speed=2**.
- 2 Press the **Enter** button to scroll down until **Set Channel?** is displayed and using the **Up** and **Down** buttons, set to **Ch 1&2**.
- 3 Press the **Enter** button to scroll down until **SETUP MODE** is displayed again.
- 4 Turn the **Mode** keyswitch back to normal dispense.
- 5 Press Product Select Button 1. 10 litres should be dispensed.
- 6 If not, adjust the Water Outlet Valve by turning the screw one quarter of a turn each time. Turn anticlockwise to increase the flow and clockwise to decrease the flow.

- 7 Repeat the operations 5 and 6 until the correct amount (10 litres) is dispensed.

To adjust the flow rate for **Water Outlet Valve 2**:

- 1 With the machine in **SETUP MODE**, press Product Select Button 1 and then the **Enter** button to scroll down until **Speed** is displayed and set to **Speed=1**.
- 2 Press the **Enter** button to scroll down until **Set Channel?** is displayed and using the **Up** and **Down** buttons, set to **Ch 1&2**.
- 3 Press the **Enter** button to scroll down until **SETUP MODE** is displayed again.
- 4 Turn the **Mode** keyswitch back to normal dispense.
- 5 Press Product Select Button 1. 5 litres should be dispensed.
- 6 If not, adjust the Water Outlet Valve by turning the screw one quarter of a turn each time. Turn anticlockwise to increase the flow and clockwise to decrease the flow.
- 7 Repeat the operations 5 and 6 until the correct amount (5 litres) is dispensed.

To adjust the flow rate for **Water Outlet Valve 3**:

Note: If also replacing Outlet Valve 2, first adjust and set valve 2, then valve 3.

- 1 With the machine in **SETUP MODE**, press Product Select Button 1 and then the **Enter** button to scroll down until **Speed** is displayed and set to **Speed=2**.
- 2 Press the **Enter** button to scroll down until **Set Channel?** is displayed and using the **Up** and **Down** buttons, set to **Ch 3&4**.
- 3 Press the **Enter** button to scroll down until **SETUP MODE** is displayed again.
- 4 Turn the **Mode** keyswitch back to normal dispense.
- 5 Press Product Select Button 1. 10 litres should be dispensed.
- 6 If not, adjust the Water Outlet Valve by turning the screw one quarter of a turn each time. Turn anticlockwise to increase the flow and clockwise to decrease the flow.
- 7 Repeat the operations 5 and 6 until the correct amount (10 litres) is dispensed.

To put the machine back into service,

- 1 Reinstall the Cooler Unit and Front Panel.
- 2 Reset the machine to the customer's settings as noted.

5.4 Replacing Heating Elements

An access panel has been provided on the RH side casing panel.

WARNING: The machine must be completely isolated from the Mains Power supply when changing any electrical component.

Note: This procedure MUST be carried out by a qualified electrician.

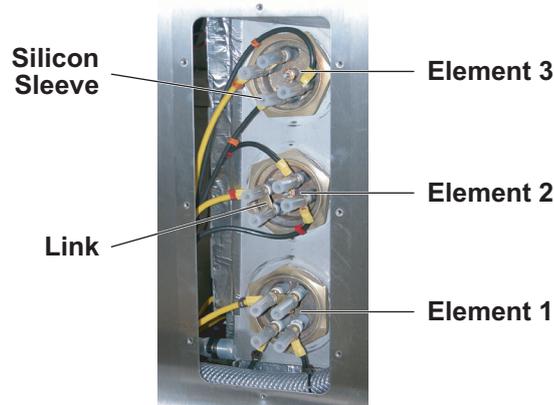
Tools required:

No. 2 Pozidrive Screwdriver
8mm AF deep socket
75mm Element box spanner

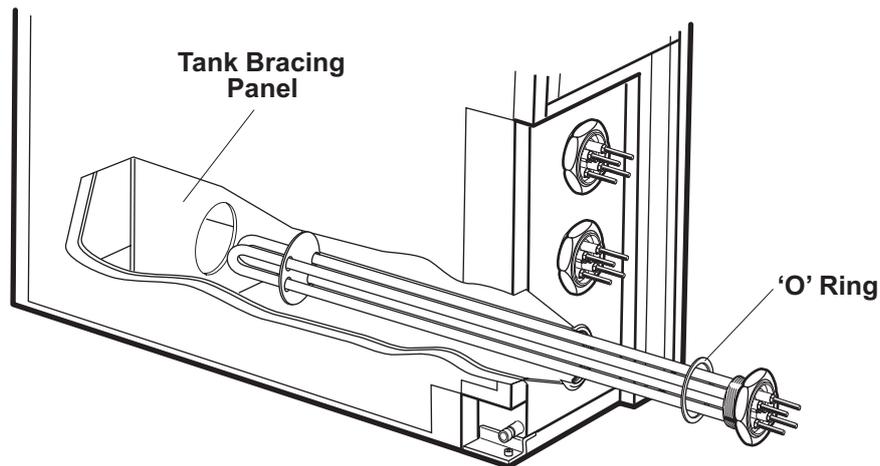
To replace the heating element/s:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the lower Front Panel as described in Section 4.3.

- 3 Drain the tank as described in Section 4.7.
- 4 Undo the eight M4 x 10mm countersunk screws and remove the Element Access Cover fitted to the RH side casing panel.

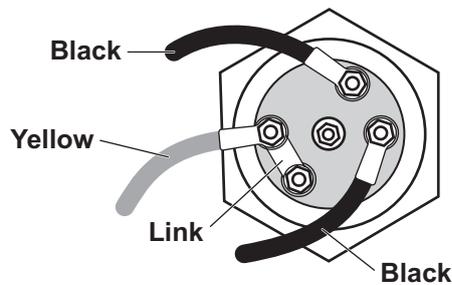


- 5 Tab and mark the cabling connected to the heater element to ensure they are reconnected to the new element/s correctly.
- 6 Disconnect the cabling to the element/s, retaining the nuts, links and washers.
- 7 Unscrew the element/s and carefully extract.



- 8 Fit the new element/s by reversing the above procedure, taking care to pass the element through the tank bracing panel.

Note: Discard the element washer and replace with a new element washer or 'O' ring, or reuse the 'O' ring if one was originally supplied.



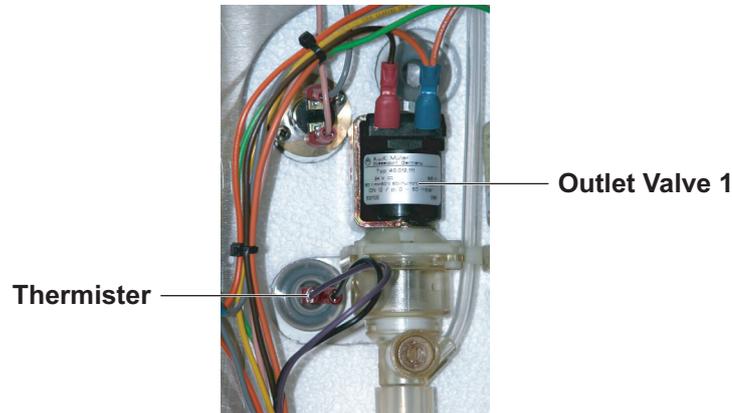
WARNING: Connect the links and cables as shown above. Incorrect wiring will damage the element.

- 9 Connect to the Mains Power Supply and power ON the machine.

- 10 Allow the machine to refill with water and check for any leaks.
- 11 Power OFF and isolate the machine from the Mains Power Supply.
- 12 Refit the Element Access Cover and Front Panel.

5.5 Replacing Boiler Temperature Control Thermister

The boiler temperature control thermister is accessible from behind the LH Cooler Unit.



It is situated to the left of the water outlet valves.

Tools required:

No. 2 Pozidrive screwdriver

To replace the boiler temperature control thermister:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the lower Front Panel as described in Section 4.3.
- 3 Remove the LH Cooler Unit as described in Section 7.1.
- 4 Follow the procedure in Section 4.7 to lower the water level to below the outlet valve tubes. As the water drains out, you should be able to see the top of the water in the valve body as the level drops. Once this level appears to stop dropping, run off another bucket of water to ensure that the level is below the valve.
- 5 Extract the Thermister and silicon sleeve.
- 6 Disconnect the thermister loom.
- 7 Remove the silicon sleeve and fit to the replacement thermister.
- 8 Fit the new thermister by reversing the above procedure.
- 9 Calibrate the Thermister as described in Section 5.6.

5.6 Calibrating the Thermister

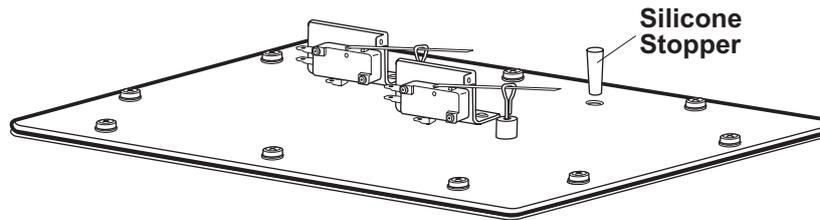
The water temperature displayed is determined by the Thermister setting. The Thermister resistance must be calibrated to accurately show the temperature of the tank water on the display panel. The Thermister setting is adjusted using the Trim Pot on the Control PCB.

Tools required:

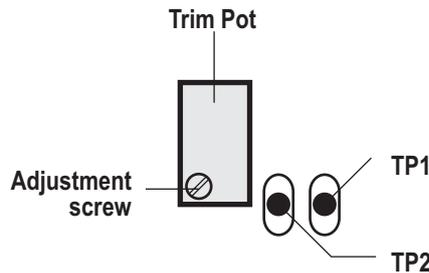
- Submersible Thermometer (min 12" probe)
- Ohm meter with long probes
- Terminal Screwdriver
- No. 2 Pozidrive Screwdriver

To calibrate the Thermister:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Top Panel as described in Section 4.3.
- 3 Remove the Silicone Stopper in the tank lid.



- 4 Insert the thermometer probe approximately 10" (25 cm) into the tank to the level of the thermister and check the reading.
- 5 Before making any adjustment, set the probes of the Ohm meter on the points TP1 and TP2 and set the Trim Pot resistance to 265K Ohms.

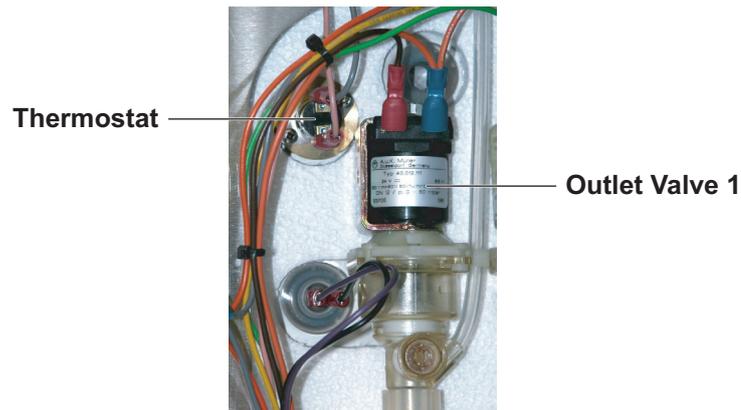


- 6 Reconnect to the Mains Power Supply and power ON the machine.
- 7 Turn the Mode keyswitch to put the machine into **SETUP MODE**.
- 8 Press **PRIME1** and **PRIME2** to put the machine into **ENGINEER SETUP** mode.
- 9 Press the **Enter** button to scroll through the menu and **Set Max Temperature=203F**.
- 10 Press the **Enter** button to scroll through the menu and set to **Coffee Disabled**.
- 11 Press the **Enter** button to scroll through the menu until **SETUP MODE** is displayed and turn the Mode keyswitch back to normal dispense mode.
- 12 Wait until tank has heated to maximum temperature and elements switch off (the Contactor will 'clunk').
- 13 Press a Product Select button (set to dispense highest volume) to rapidly draw off 10 litres at a time until the water temperature drops below 194°F. The heating elements will switch back on.
- 14 Let the boiler reheat until it switches itself off again.
Note: As the water reheats, the temperature will fluctuate considerably until it reaches around 192° Fahrenheit due to the mixing of the cold water with the hot water in the tank.
- 15 Compare the reading on the display panel with the thermometer.

- 16 Match the temperature shown on the display panel to the thermometer reading by turning the screw on the Trim Pot (anticlockwise to raise temperature displayed and clockwise to lower temperature displayed) by approx. 1°F (.5°C) per full turn.
- 17 If necessary repeat instructions 13 to 16 until the readings are the same.
- 18 Replace the Silicone Stopper and refit the Top Panel as described in Section 4.4.
- 19 In **ENGINEER SETUP** mode, **Set Max Temperature=194F**, and **Coffee Enabled**.

5.7 Replacing Boiler Over Temperature Thermostat

The boiler over temperature thermostat is accessible by removing the LH Cooler Unit.



It is situated above the thermister.

Tools required:

No. 1 Pozidrive screwdriver – 10”

To replace the boiler over temperature thermostat:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the lower Front Panel as described in Section 4.3.
- 3 Remove the LH Cooler Unit as described in Section 7.1.
- 4 Mark the cables connected to the thermostat.
- 5 Gently ease off the connectors.
- 6 Undo the two screws securing the thermostat assembly to the probe and retain the screws.
- 7 Wipe the probe clean and fit the new thermostat by reversing the above procedure.

Note: It is not necessary to replace the heat sink compound.

5.8 Replacing a Float Microswitch

The float microswitches are located on the Tank Lid Assembly.

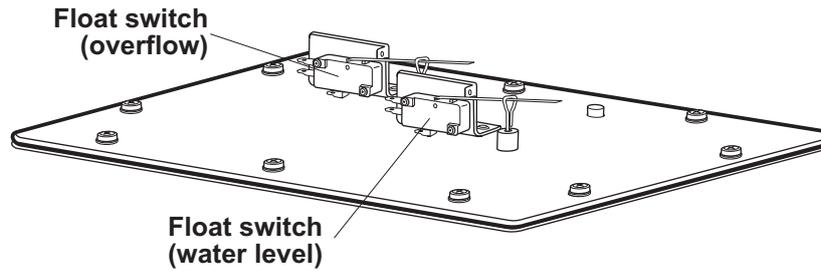
Tools required:

No. 1 Pozidrive screwdriver
5.5mm spanner

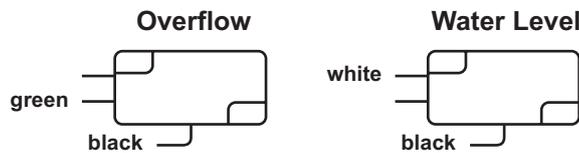
To replace a float microswitch:

- 1 Power OFF and isolate the machine from the Mains Power Supply.

- Remove the Top Panel as described in Section 4.3.



- Carefully label and disconnect the cables to the microswitch.
- Undo the two screws securing the microswitch to the bracket, being careful not to lose the securing nuts. Retain the screws and nuts.
- Slide the switch arm out of the float rod eye.



- Fit the new microswitch by reversing the above procedure, taking care to fit the correct cables and not to overtighten the screws or damage the connector tabs.

WARNING: If the switches are wired incorrectly, the elements could overheat without water in the tank or the tank could overflow, both of which may cause serious damage to the machine.

5.9 De-scaling the Tank

The tank can be descaled in situ by adding a proprietary descaling agent to the water in the tank.

The manufacturer's instructions relating to mixture ratios and the time to descale should be strictly observed.

WARNING: Rubber gloves and eye protection must be worn, and any spills cleaned up immediately.

Note: The boiler tank capacity is 21.13 US gallons (80 litres)

Tools required:

- No. 2 Pozidrive Screwdriver
- Descaling agent.

To descale the boiler tank using a descaling agent:

- If required in the descaling agent instructions, heat the water in the tank to the maximum temperature set.
- Power OFF and isolate the machine from the Mains Power Supply.
- Remove the Casing Top Cover as described in Section 4.3.
- Disconnect the cables to the microswitches or preferably the Tank Lid Loom from the Control PCB (see Section 9.3).
Note: Removing the cables to the microswitches could damage the connector tabs.

- 5 Undo the ten M4 x 8mm screws and carefully remove the Tank Lid Cover.
- 6 Slowly pour the descaling agent into the tank. It will immediately begin to effervesce.
- 7 Wait for the minimum required time recommended by the scaling agent manufacturer before draining the tank as described in Section 4.7.
- 8 If any scale remains, repeat the procedure above.
- 9 Flush the tank by refilling with cold water using a hose placed into the top of the tank and draining.
- 10 Reflush the tank.
- 11 Replace the Tank Lid ensuring that the Tank Lid Gasket is properly seated and reconnect the loom.
- 12 Reconnect the machine to the Mains Power Supply and Power ON the machine.
- 13 When the water has reached maximum temperature, place a container (at least one gallon) beneath the mixer nozzle and press the **FLUSH** button on either side of the Control Panel to clear the valves.

The machine is now ready for normal dispensing.

5.10 Cleaning Water Outlet Valves

If the **FLUSH** button is used to descale the valves on a regular basis, the valves should not need to be removed and descaled.

However, if they have not been descaled regularly, when the tank is descaled, it is possible that the valves do not seat correctly, which could cause a slight leak.

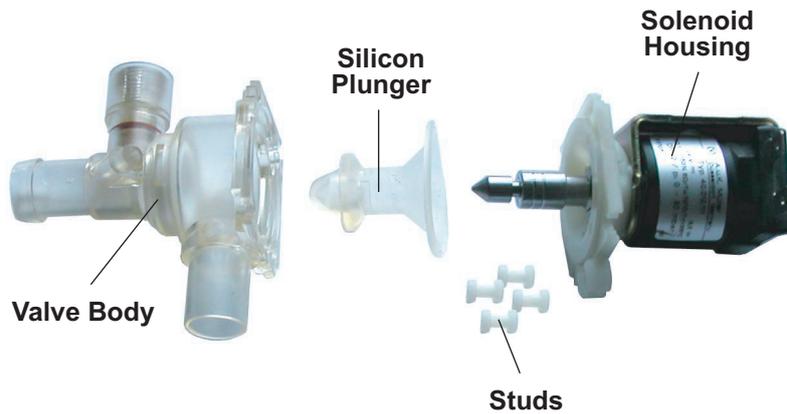
The body of the valve is secured by the four round studs at each corner.

Tools required:

Container or bowl
Descaling agent

To clean the Water Outlet Valves:

- 1 Follow the procedure for removing the valves as described in Section 5.2.
- 2 Prepare a solution of a suitable descaling agent in accordance with the manufacturer's recommendations.
- 3 Carefully prize out the studs in each corner of the valve. Using a small screwdriver behind the top of the stud and turning the screwdriver may help to ease it out.



- 4 Taking care not to pull the shaft out of the solenoid body, prize off the silicone plunger.
Note: There is a small spring inside the shaft which may be lost if the shaft is allowed to come out of the solenoid body.
- 5 Undo and remove the adjustment screw.
- 6 Immerse the plunger, adjustment screw and valve body in the descaling agent for no more than a few minutes and then wipe all components clean with a dry cloth.
- 7 Reassemble by first sliding the silicone plunger back onto the solenoid shaft, making sure that it seats correctly into the groove around the shaft.
- 8 Insert the plunger into the valve body and align the breather outlet on the valve body with the tube holder on the solenoid top plate.
- 9 Refit the studs to each corner.
- 10 Refit the Water Outlet Valve as described in Section 5.2.
- 11 Reset the flow rate as described in Section 5.3.

6 Servicing Control Panel

6.1 Removing / Refitting Control Unit Assembly

The Control Unit Assembly is secured by a thumbscrew connecting it to the retaining bracket fitted to the chassis cross tie plate and a chrome handle fitted to the Cooler platform, on which the Control Unit pivots

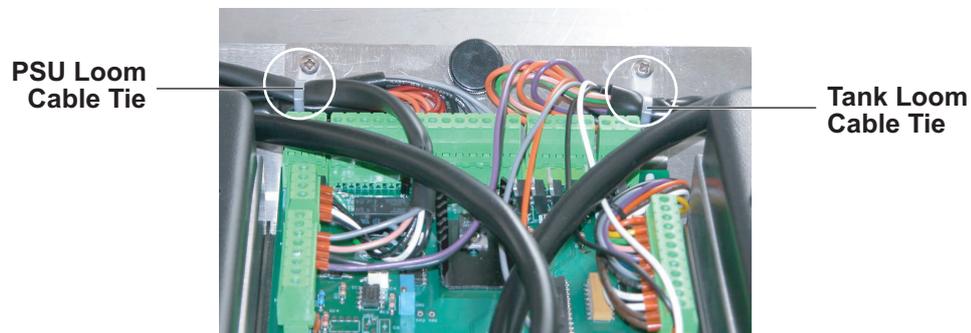
Refer to the Control PCB layout diagram in Section 9.3 before disconnecting the looms.

Tools required:

No. 2 Pozidrive Screwdriver

To remove the Control Unit assembly:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Casing Top Cover as described in Section 4.3.



- 3 Undo and retain the two screws securing the cable ties to the back of the Selection Box PCB Plate.
- 4 Disconnect the Cooler Unit looms (one block for each).
- 5 Disconnect the Tank Lid loom (two blocks).
- 6 Disconnect the looms from the water outlet valves, water inlet valve and fans (three blocks).
- 7 Disconnect the Power Supply Unit loom (two blocks).
- 8 Open both Cooler Unit doors to avoid damaging the Prime/Flush Membranes on each side of the Selection Box.
- 9 Undo the Thumbscrew situated behind the Control PCB and tilt the Control Unit assembly towards you.
- 10 Carefully lift the complete Control Unit Assembly up and away from the chassis.
- 11 Refit the Control Unit Assembly by reversing the above procedure.

6.2 Updating the PCB Processor Chip

This can be undertaken in situ without removing Control Unit Assembly or Control PCB.

Refer to Control PCB layout diagram in Section 9.3 before replacing the Processor Chip.

Note: An earthing wristband should be worn when there is a risk of touching any of the components on a printed circuit board.

Note: After replacing the Control Board Processor Chip, it will be necessary to reset the peris speed offset for each channel (see section 7.5), recalibrate the thermister (see

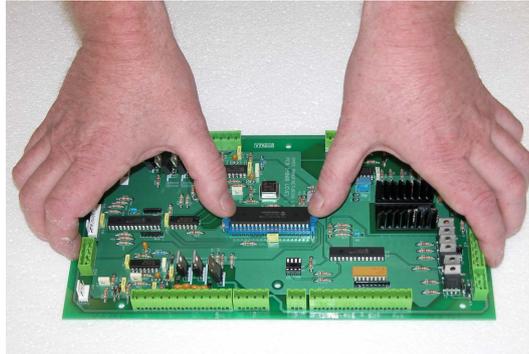
section 5.6) and reset the top temperature setting.

Tools required:

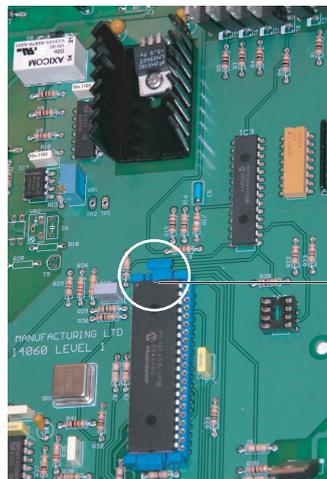
- No. 2 Pozidrive Screwdriver
- Stepladder

To replace the Control PCB Processor Chip:

- 1 Ensure that all settings are noted as described in Section 4.2.
- 2 Power OFF and isolate the machine from the Mains Power Supply.
- 3 Remove the Casing Top Cover as described in Section 4.3.



- 4 Using both hands, with fingers at each end of the PCB use thumbs to open the clasps securing the Processor Chip. As the clasps open, the chip will be lifted out of its sockets.
- 5 Gently place the new Processor Chip on the clasp shelves, with the dimple towards the back of the PCB, ensuring it is central and the pins align with the sockets. With a light touch you should feel that the pins are located correctly.



Dimple on Chip

- 6 When you are sure the Processor Chip is properly located, gently push down on the chip until both clasps click into the locked position.
- 7 Reconnect the machine to the Mains Power Supply and Power ON the machine to check the display is functioning correctly.
- 8 Power OFF the machine and refit the top panel as described in Section 4.4.
- 9 Power the machine ON, reset peris pump offset section 7.5), recalibrate thermister (section 5.6) and reset top temperature to 198F.
- 10 Reset the machine to the customer's settings.

6.3 Replacing the Control PCB

This can be undertaken without removing the Control Unit Assembly.

Refer to the Control PCB layout diagram in Section 9.3 before replacing the Control PCB.

Note: An earthing wristband should be worn when there is a risk of touching any of the components on a printed circuit board.

Note: If also replacing the Control Board Processor Chip, it will be necessary to reset the peris speed offset for each channel (see section 7.5), recalibrate the thermister (see section 5.6) and reset the top temperature setting.

Tools required:

No. 2 Pozidrive Screwdriver
Long nose pliers

To replace the Control PCB:

- 1 Ensure that all settings are noted as described in Section 4.2.
- 2 Power OFF and isolate the machine from the Mains Power Supply.
- 3 Remove the Casing Top Cover as described in Section 4.3.
- 4 If required, label the connector blocks and looms.
- 5 Gently remove all green connector blocks.
- 6 Very carefully disconnect the Set-up and Prime/Flush membranes.
- 7 Using long nose pliers, starting from one end of the board, gently squeeze the nylon PCB supports and lift the board free of the catch one at a time until the board is free of all six supports.
- 8 Lift the board clear of the supports.
- 9 Place the new board loosely onto the PCB supports.
- 10 Gently press down from one end until all six supports click and secure the panel.
- 11 Reconnect looms.
- 12 Reconnect the machine to the Mains Power Supply, Power ON the machine and check the display is functioning properly.
- 13 Power OFF the machine and refit the top panel as described in Section 4.4.
- 14 Power the machine ON. If a new Chip is being used, reset peris pump offset (section 7.5), recalibrate thermister (section 5.6) and reset top temperature to 198F. If the original Chip is being used on the new board, check that the customer's settings have not changed; reset if necessary.

6.4 Replacing Set Up or Prime/Flush Membranes

These are the panels around the display and on each side of the Control Unit Box used to adjust machine settings, prime the concentrate tubes and flush the boiler valves.

The function keys and indicators are integrated into the panel and in the event of failure, the entire panel must be replaced.

Tools required:

No. 2 Pozidrive Screwdriver
Blunt Stanley Knife blade

To remove and replace a membrane panel:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Top Cover panel as described in Section 4.3.
- 3 Undo the Cooler Unit door if replacing a Prime/Flush membrane
- 4 Very carefully disconnect the Set-up or Prime/Flush membranes.
- 5 Using a blunt Stanley knife blade, carefully ease up the corner of membrane panel, pull off with fingers and discard.
- 6 Remove the protective sheet from the back of the new membrane panel, pass the connector through the slot in the Selection Box, and affix the panel to Selection Box.
- 7 Carefully reconnect the membrane panel connector.
- 8 Power ON the machine to test the new membrane panel.
- 9 Power OFF and isolate the machine from the Mains Power Supply.
- 10 Refit the Top Cover panel as described in Section 4.4.

6.5 Replacing the Display Unit

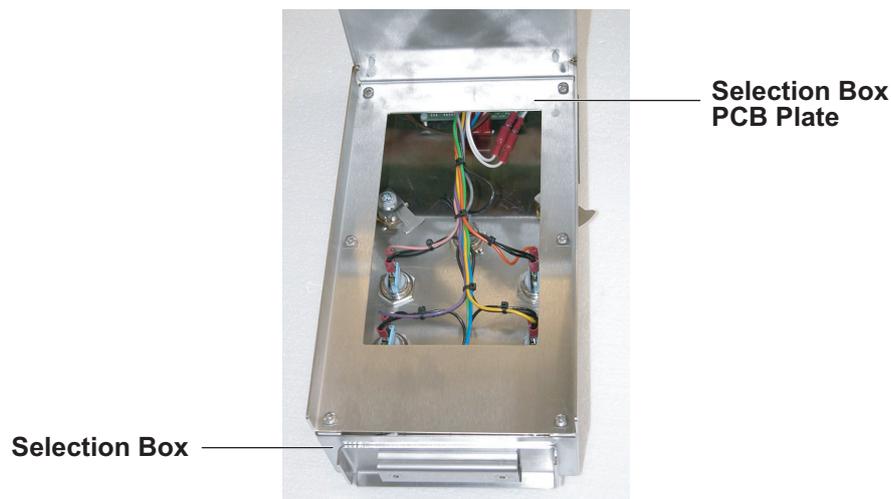
To avoid possible damage to the membrane tapes and PCB, this should be carried out with the Control Unit Assembly on a bench.

Tools required:

- No. 2 Pozidrive screwdriver
- No.1 Pozidrive screwdriver
- Foam pad or folded towel

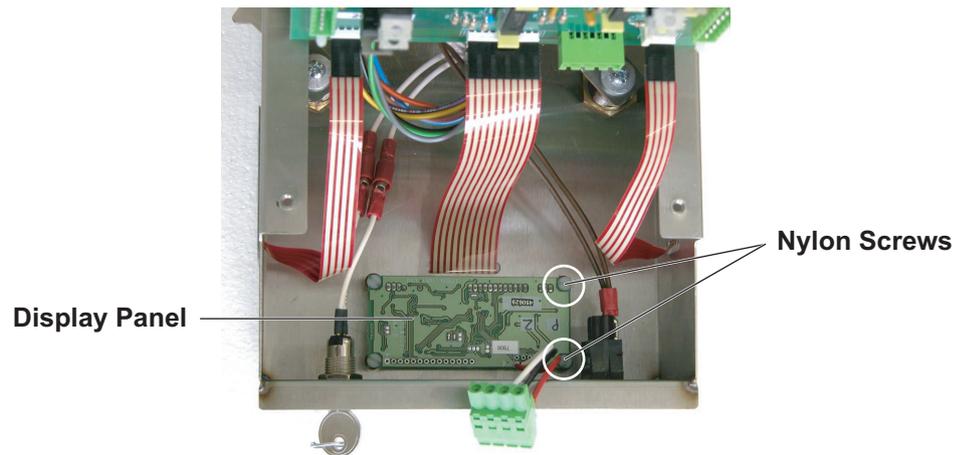
To remove and replace the Display Unit:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Control Unit Assembly as described in Section 6.1.
- 3 With the Control Unit Assembly on a bench, very carefully disconnect the green connector block for the Display panel from the PCB.



- 4 Undo the six M4 x 8mm screws securing the Selection Box PCB Plate to the Selection Box.
- 5 Place the Control Box with the Product Selection buttons face down on a foam pad

or folded towel on the bench.



- 6 Undo the four nylon screws securing the Display Panel to the raised studs on the Selection Box and carefully lift the Display Panel away.
Note: there are fibre washers between the Display Panel and studs, which must be retained with the nylon screws.
- 7 Remove the protective film from the new Display Unit face.
- 8 Ensuring the fibre washers are in position, with the nylon screws inserted in the new Display Panel, place the new panel over the studs and carefully locate the screws through the washers.
- 9 Lightly tighten the nylon screws.
- 10 Refit the PCB Plate to the Selection Box.
- 11 Refit the Display Panel and Membrane ribbon connectors.
- 12 Refit the Control Unit Assembly as described in Section 6.1
- 13 Power ON the machine to test the display.
- 14 Power OFF and isolate the machine from the Mains Power Supply.
- 15 Refit the Top Cover panel as described in Section 4.4.

7 Servicing the Cooler Unit

The D420 Cooler Units are handed but comprise identical components save for the door panel Label.

You may find it useful to view the D420 Illustrated Parts Catalogue to identify the parts referred to in this procedure. A pdf version is available from the DASS Technical web site.

7.1 Removing / Refitting Cooler Unit

Note: Before removing the Cooler Unit, ensure that coffee concentrate cans have been removed and the concentrate delivery system has been flushed through.

Tools required:

No. 2 Pozidrive Screwdriver – 6”

To remove a Cooler Unit:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Open both Cooler Unit doors and remove the four M4 x 8mm screws securing the Casing Top Cover.
- 3 Remove the Casing Top Cover by lifting up and toward the front.
- 4 Remove the four M4 x 8mm screws securing the Casing Lower Front Panel.
- 5 Remove the Front Panel by tilting toward you to clear the On/Off switch and Hot Water Button and lifting slightly to clear the support lugs at the front of the Chassis Base Plate.
- 6 Remove the M4 x 8mm screw securing the Cooler Unit Support Plate to the Chassis Cooler and Nozzle Platform.
- 7 Carefully disconnect the Cooler Unit Wiring Loom from the Control Panel PCB.
- 8 Gently slide the Cooler Unit toward you, away from the chassis and place on a bench.
- 9 Refit the Cooler Unit by reversing the above procedure; making sure that when sliding the unit back into place, the duckbill valves are seated correctly in the holes on the Chassis Base Plate.

7.2 Checking Product Detect System

The Product Detect System must be functioning correctly to indicate when a can of concentrate needs replacing and also for the machine to automatically switch to another concentrate channel.

Tools required:

Can of coffee concentrate at 41°F (5° C)
4 plastic or glass containers
1 litre measuring beaker or jug

To check the Product Detect System:

- 1 Open both Cooler Unit doors and remove any concentrate cans.
- 2 Press **PRIME** for each channel to clear the concentrate from the tubes.
- 3 Flush the channels thoroughly with hot water as described in the User Handbook.

- 4 Turn the **Mode** keyswitch to put the machine into **SETUP MODE**.
- 5 Press **PRIME1** and then **PRIME2** to put the machine into **ENGINEER SETUP** mode.
- 6 Change the settings to:
Coffee Enabled
Water Disabled
Product Choices / 4 Identical
Product Sensor Enabled
 The four LEDs for each of the Product Channels should be lit.
- 7 Turn the **Mode** keyswitch back to normal dispense mode.
- 8 Pour a half cup of concentrate from the can into each of the containers and place one container under the suction tube for each channel.
- 9 Place the beaker or jug beneath the dispense nozzle.
- 10 Press **PRIME 1** for channel 1. The Product 1 LED will extinguish.
- 11 Not to waste concentrate, as soon as the LED extinguishes, lower the container for channel 1 below the suction pipe and press **PRIME 1** again to clear the system. The Product 1 LED should light up again showing that the sensor for this channel is functioning correctly.
- 12 Replace the container under the suction tube.
- 13 Repeat the process for the remaining 3 channels.
- 14 If not checking for channel changeover, clean the inside of the Cooler Unit and sanitise the suction tubes as described in Appendix D.
- 15 If not checking for channel changeover, replace containers with concentrate cans and reset the machine to the customer's settings.

7.3 Checking for Channel Changeover

When the concentrate can is empty in one channel, if configured to do so, the D420 will automatically select another channel from which to dispense. There are four options, which need to be checked:

- **4 Identical**, which should automatically select the channels in order of the channels primed.
- **3+1**, which should automatically select channels in order as primed from channels 1 to 3 only and channel 4 independently.
- **2+2**, which for channel 1 should only automatically select channel 2 and, for channel 3 should only automatically select channel 4.
- **4 Different**, which should not automatically select another channel.

This procedure would normally follow on from checking the product detect system.

Note: The instructions given below are for on-site checking and Product Selection button 1 is used for all dispenses to minimise disruption to customer's settings.

Tools required:

- Can of coffee concentrate at 41°F (5° C)
- 4 plastic or glass containers
- 1 litre measuring beaker or jug
- Timer with second hand

To check Channel Changeover for option **4 Identical**:

- 1 Follow instructions 1 to 6 in Section 7.2.
- 2 Press the **Enter** button until the machine is in **SETUP MODE**.
- 3 Press Selection button 1, scroll down to **Set Volume** and using the timer, set to dispense for 60 seconds.
- 4 Turn the **Mode** keyswitch to put the machine back into normal dispense mode.
- 5 Pour a half cup of concentrate into each of the containers and place one container under the suction tube for each channel.
- 6 Place the beaker or jug beneath the dispense nozzle.
- 7 **PRIME** the channels in order 1, 2, 3, 4.
- 8 Press Product Select button 1. When the channel 1 is empty. **PRODUCT 1** LED should light and concentrate should be taken from the next channel. Each product LED should light in turn as the container empties.
- 9 **PRIME** channels 4 and 1 in that order, refill the containers and place under the suction tubes and press Product Selection button 1 to confirm that when channel 4 empties, concentrate is then taken from channel 1.

To check Channel Changeover for option **3+1**:

- 1 Turn the Mode keyswitch to put the machine into **SETUP MODE**.
- 2 Press **PRIME 1** and then **PRIME 2** to put the machine into **ENGINEER SETUP** mode.
- 3 Set **Product Choices** to **3+1** and press the **Enter** button until **SETUP MODE** displays.
- 4 Press Selection button 1, scroll through the menu to **Set Channel?** and set to **Ch 1, 2 & 3**.
- 5 Press **Enter** until **SETUP MODE** displays and turn the **Mode** keyswitch back to normal dispense mode.
- 6 Pour a half cup of concentrate into each of the containers and place one container under the suction tube for each channel.
- 7 Place the beaker or jug beneath the dispense nozzle.
- 8 **PRIME** the channels in order 1, 2, 3, 4.
- 9 Press Product Select button 1. When the cup under channel 1 is empty. **PRODUCT 1** LED should light and concentrate should be taken from the next channel. Product LEDs 1, 2 and 3 should light in turn as the containers empty. It should not dispense from channel 4.
- 10 From the jug under the nozzle, pour a half cup of concentrate into each of the containers and again place one container under the suction tube for each channel.
- 11 Replace the beaker or jug beneath the dispense nozzle.
- 12 **PRIME** channel 3 and 1 in that order and press Product Selection button 1 to confirm that when channel 3 empties, concentrate is then taken from channel 1.
- 13 In **SETUP MODE**, press Selection button 1, scroll through the menu to **Set Channel?** and set to **Ch 4**.
- 14 Press **Enter** until **SETUP MODE** displays again and turn the **Mode** keyswitch back to normal dispense mode.
- 15 Press Selection button 1 to confirm that when the container under channel 4 is empty, the machine stops dispensing.

To check Channel Changeover for option **2+2 (Ch 1 & 2)**:

- 1 Turn the **Mode** keyswitch to put the machine into **SETUP MODE**.
- 2 Press **PRIME 1** and then **PRIME 2** to put the machine into **ENGINEER SETUP** mode.
- 3 Set **Product Choices** to **2+2** and press the **Enter** button until **SETUP MODE** displays.
- 4 Press Selection button 1, scroll through the menu to **Set Channel?** and set to **Ch 1 & 2**.
- 5 Press **Enter** until **SETUP MODE** displays and turn the **Mode** keyswitch back to normal dispense mode.
- 6 Pour a half cup of concentrate into each of the containers and place one container under the suction tube for each channel.
- 7 Place the beaker or jug beneath the dispense nozzle.
- 8 **PRIME** channels 1, 2, 3 and 4, in that order.
- 9 Press Product Select button 1. When the cup under channel 1 is empty. **PRODUCT 1** LED should light and concentrate should be taken from channel 2. Product LEDs 1 and 2 should light in turn as the containers empty. It should not dispense from channels 3 and 4.
- 10 From the jug under the nozzle, pour a half cup of concentrate into each of the empty containers and replace under the suction tubes for channels 1 and 2.
- 11 Replace the beaker or jug beneath the dispense nozzle.
- 12 **PRIME** channels 2 and 1 in that order.
- 13 Press Product Select button 1. When the cup under channel 2 is empty. **PRODUCT 2** LED should light and concentrate should be taken from channel 1. Product LEDs 2 and 1 should light in turn as the containers empty. It should not dispense from channels 3 and 4.

To check Channel Changeover for option **2+2 (Ch 3 & 4)**:

- 1 In **SETUP MODE**, press Selection button 1, scroll through the menu to **Set Channel?** and set to **Ch 3 & 4**.
- 2 Press **Enter** until **SETUP MODE** is displayed and turn the **Mode** keyswitch back to normal dispense mode.
- 3 From the jug under the nozzle, pour a half cup of concentrate into each of the empty containers and replace under the suction tubes for channels 1 and 2.
- 4 Replace the beaker or jug beneath the dispense nozzle.
- 5 **PRIME** channels 3, 4, 1 and 2 in that order.
- 6 Press Product Select button 1. When the cup under channel 3 is empty. **PRODUCT 3** LED should light and concentrate should be taken from channel 4. Product LEDs 3 and 4 should light in turn as the containers empty. It should not dispense from channels 1 and 2.
- 7 From the beaker or jug under the nozzle, pour a half cup of concentrate into each of the empty containers and replace under the suction tubes for channels 3 and 4.
- 8 Replace the beaker or jug beneath the dispense nozzle.
- 9 **PRIME** channels 4 and 3 in that order.

- 10 Press Product Select button 1. When the cup under channel 4 is empty. **PRODUCT 4** LED should light and concentrate should be taken from channel 3. Product LEDs 4 and 3 should light in turn as the containers empty. It should not dispense from channels 1 and 2.

To check Channel Changeover for option **4 Different**:

- 1 Turn the **Mode** keyswitch to put the machine into **SETUP MODE**.
- 2 Press **PRIME 1** and then **PRIME 2** to put the machine into **ENGINEER SETUP** mode.
- 3 Set **Product Choices** to **4 Different** and press the **Enter** button until **SETUP MODE** displays.
- 4 Press Selection button 1, scroll through the menu to **Set Channel?** and set to **Ch 1**.
- 5 Press **Enter** until **SETUP MODE** displays and turn the **Mode** keyswitch back to normal dispense mode.
- 6 From the beaker or jug under the nozzle, pour a half cup of concentrate into each of the empty containers, replace under the suction tubes and replace the beaker or jug beneath the dispense nozzle.
- 7 **PRIME** channels 1, 2, 3 and 4.
- 8 Press Selection Button 1. When the cup under channel 1 is empty, the machine should stop.
- 9 From the beaker or jug under the nozzle, pour a half cup of concentrate into the empty container, replace under the suction tube and replace the beaker or jug beneath the dispense nozzle.
- 10 **PRIME** channels 1, 2, 3 and 4.
- 11 In **SETUP MODE**, press Selection button 1, scroll through the menu to **Set Channel?** and set to **Ch 2**.
- 12 Press **Enter** until **SETUP MODE** displays and turn the **Mode** keyswitch back to normal dispense mode.
- 13 Press Selection Button 1. When the cup under channel 2 is empty, the machine should stop.
- 14 Repeat steps 9 to 13 changing the channel settings as appropriate to test **Ch 3** and **Ch 4**.
- 15 In **ENGINEER SETUP** mode, change to **Enable Water** and reset the machine to the customer's settings.

7.4 Replacing Peristaltic Pumps

Peristaltic pumps are an integral part of the concentrate delivery system inside each of the cooler units. For each cooler unit, the LH and RH pumps differ slightly but the procedure for changing them is the same.

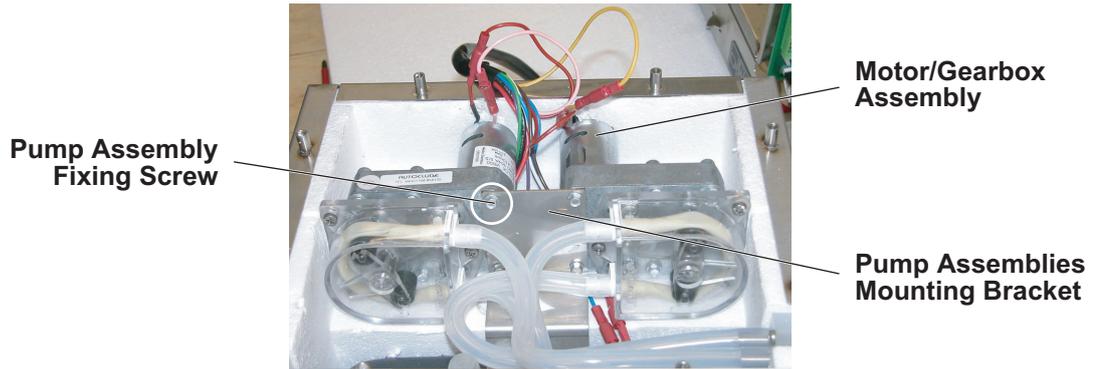
The procedure will be facilitated by removing the Cooler Unit from the dispenser and working on a bench.

Tools required:

- No. 2 Pozidrive Screwdriver
- 6mm AF ring spanner or 6mm socket and driver

To replace a Peristaltic Pump:

- 1 With the D420 powered ON and in dispense mode, flush the product channel with clean water, as described in the User Handbook, but do not reinsert the suction tube into any can or container.
- 2 Clean the suction tubes and inside the cooler unit.
- 3 Remove the Cooler Unit assembly as described in Section 7.1 and place on a bench.
- 4 Undo the eight M4 x 25mm screws and remove the cooler unit Top Cover.
- 5 Disconnect the wiring to the Motor and Gearbox assembly.



- 6 Note how the silicone tubes connect to the pump being replaced and disconnect the tubes.
- 7 Using the spanner or socket, undo the two set screws securing the pump assembly to the bracket and carefully lift the assembly away.
- 8 Install the new pump assembly by reversing the above procedure.
- 9 Adjust the replacement pump as described in Section 7.5.
- 10 Before putting the new pump into service, with the D420 powered ON and in dispense mode, thoroughly flush the product channel with a sanitizing agent, as described in Appendix D.

7.5 Adjusting a Peristaltic Pump

There is one pump for each concentrate channel. The speed of the pump determines the ratio of coffee to water dispensed. When **Product Choices** is set to **4 Identical**, all four pumps should be matched equally for speed to maintain the same strength.

The pumps are numbered 1 to 4 reading from the left.

This procedure is carried out with the D420 powered ON.

Note: The machine was originally set up in the factory using metric measurements. Therefore for accuracy, this procedure uses metric measurements.

Tools required:

- Two 1 quart containers
- One 1 pint container
- 1/2 Litre calibrated measuring cylinder

To adjust a Peristaltic Pump:

- 1 Open both Cooler Unit doors and remove any coffee concentrate.
- 2 Press **PRIME** for the product channel of the pump to be adjusted and clear the concentrate from the tubes.
- 3 Flush the product channel by using a 1 pint (50cl) container of hot water and pressing **PRIME** until the container is empty.
- 4 Turn the **Mode** keyswitch to put the machine into **SETUP MODE**.
- 5 Set Selection Button 1 to:
Speed = 3
Set Volume to dispense for 1 minute
Strength Sel 1 = 35:1
Set Channel? Ch *n* (*n* = pump being adjusted)
- 6 Press **Enter** until **SETUP MODE** is displayed, then press **PRIME1** and then **PRIME2** to put the machine into **ENGINEER SETUP** mode.
- 7 Adjust machine settings to:
Coffee Enabled
Water Disabled
Product Choices - 4 Different
Peris *n* Speed Offset = 0 (*n* = pump being adjusted)
Product Sensors Disabled.
- 8 Press **Enter** until **SETUP MODE** is displayed and turn the **Mode** keyswitch back to normal dispense mode.
- 9 Place one of the containers with 1 litre of cold water in the Cooler and insert the suction tube for channel *n* (*n* = pump being adjusted).
- 10 Place the other container beneath the nozzle.
- 11 **PRIME** Channel *n* (*n* = pump being adjusted)
- 12 Press Selection button 1. When the flow stops, pour the water dispensed into the measuring cylinder, which should be 428 ml.
- 13 If the reading is not exact, put the machine back into **ENGINEER SETUP** mode and scroll through to **Peris *n* Speed**.
- 14 Initially adjust the offset to +10 to increase the dispense volume or –10 to decrease the dispense volume and repeat instructions 9 to 13.
- 15 If necessary, repeat instructions 13 to 14 (adjusting the offset adjustment as required) until the amount dispensed is correct.
- 16 To confirm the adjustment: In **SETUP MODE**, press Selection button 1 and set **Strength Sel 1 = 40:1**.
- 17 Press **Enter** until **SETUP MODE** is displayed and turn the **Mode** keyswitch back to normal dispense mode.
- 18 Press Selection button 1. The water dispensed should be 375 ml.
- 19 Reset the machine to the Customer's settings.

7.6 Replacing Heat Pump

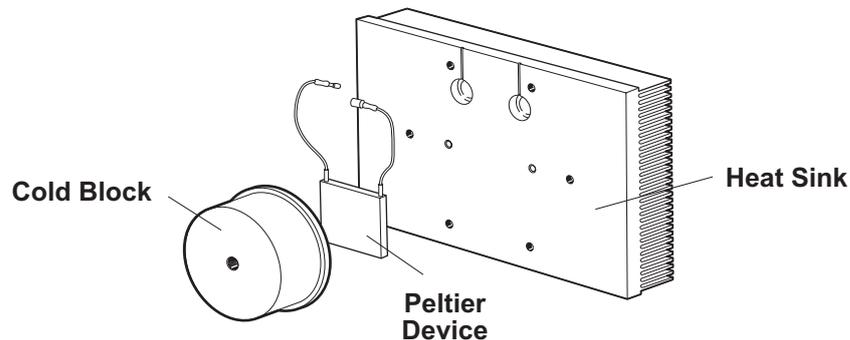
There is a heat pump assembly in each of the Cooler Units. To replace any of the heat pump components, the Cooler Unit must be removed from the dispenser.

Tools required:

- 8mm AF socket and driver
- No. 2 Pozidrive Screwdriver – 6"

To replace the Heat Pump:

- 1 Remove the Cooler Unit as described in Section 7.1 and place on a bench.
- 2 Disconnect the two cables from the Peltier Device to the Cooler Unit Loom.
- 3 Open the door and with the socket, undo and remove the M6 x12mm Hex Set screw.
- 4 Close the cooler unit door and place the cooler unit with the door face down on the bench.
- 5 Undo and remove the eight M4 x 8mm screws securing the Sealing Ring to the Cooling Chamber Back Plate.
- 6 Lift off the Heat Pump Assembly and Sealing Ring and place on the bench with the Heatsink face down.
- 7 Undo the six M6 x 6mm screws securing the Sealing Ring to the Heatsink.
- 8 The Cold Block, Peltier Device and Heat Sink may now be separated.



- 9 Wipe the components clean and reapply a thin layer of heat sink compound to both sides of the peltier device, taking care not to bridge across the surfaces.
- 10 Reinstall the Heat Pump components by reversing the above procedure.

8 Servicing the Power Supply Unit

In order to access the D420 PSU components, the top and front panels will need to be removed. To gain easy access to these components, it may be preferable to remove the complete unit in order to work on a bench.

You may find it useful to view the D420 Illustrated Parts Catalogue to identify the parts referred to in this procedure. A pdf version is available from the DASS Technical web site.

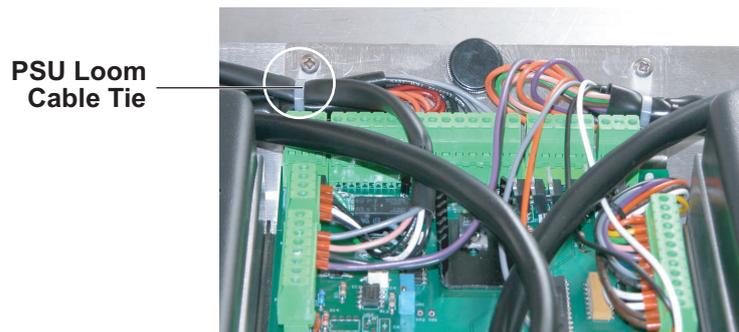
8.1 Removing / Refitting PSU

Tools required:

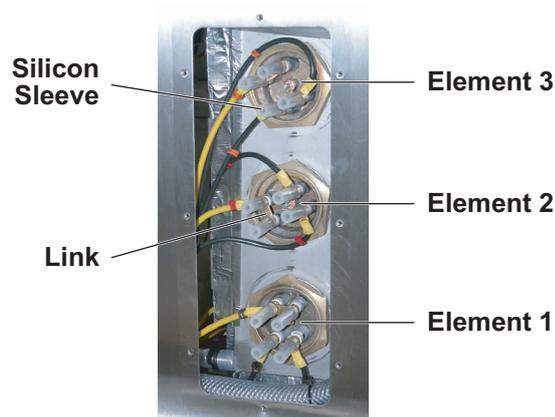
- No. 2 Pozidrive Screwdriver
- Wire cutters
- 8mm AF Spanner or extended socket and ratchet handle
- 7mm socket and driver

To remove the PSU Assembly:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Front and Top Casing Panels as described in section 4.3.
- 3 Remove the cable tie fixing the PSU Loom Assembly to the Selection Box retaining bracket, behind the Control PCB (located behind the display panel).



- 4 Disconnect the PSU Loom Assembly from the Control PCB (refer to the diagram in Section 9.3 of this manual).
- 5 Undo the four M4 x 12mm screws and remove the PSU Connection Cover.
- 6 Disconnect the power supply cables from the Mains Terminal Block and pull the cable out through the Conduit Plate and Chassis Base Plate as described in section 4.5.
- 7 Label and mark the cables connected to the heating elements.
- 8 Disconnect cables connected to the heating elements, retaining the sleeves, link, nuts and washers.



- 9 With the 7mm socket, disconnect the Earth cable at the tank and retain nut and washers.
- 10 From beneath the Chassis Base Plate, undo the six M5 x 8mm hex set screws securing the PSU assembly to the Chassis Base Plate.
- 11 Carefully feeding the Power Loom behind the LH Cooler unit, lift out the entire D420 PSU Assembly and place on a bench.
- 12 Refit the D420 PSU Assembly by reversing the above procedure.

8.2 Removing / Refitting PSU Cover Panels

Tools required:

No. 2 Pozidrive Screwdriver

Note: The PSU should already have been disconnected from the Mains Power as described in Section 4.5 of this manual.

To remove the PSU cover panels:

- 1 The PSU Connection Cover will already have been removed to disconnect the Power connection to the PSU.
- 2 Undo the five M4 x 6mm screws and remove the RH End Cover.
- 3 Undo the two M4 x 6mm screws securing the LH End Cover.
Note: If not being disassembled on a bench, the six M5 x 8mm hex set screws securing the PSU Assy. to the Chassis Base Plate will need to be unscrewed and the PSU assembly rotated anticlockwise to provide access to the side panel screws.
- 4 Undo the two M4 x 6mm screws inside at the back of the PSU Tray securing the PSU (top) Cover panel.
- 5 Undo the seven M4 x 6mm screws securing the top Cover panel to the PSU Tray and On/Off Switch Bracket.
- 6 Remove top Cover and LH End Cover panels.

To refit the PSU cover panels:

- 1 Insert the two screws securing to top Cover to the back of the PSU Tray and tighten.

- 2 Ease the LH End Cover into place and secure with two screws to the top Cover panel.
- 3 Loose fit the remaining seven screws securing the Top Cover panel to the PSU Tray and On/Off Switch Bracket.
- 4 Tighten the LH End Cover screws.
- 5 If necessary, rotate the PSU assembly clockwise and refit the six M5 x 8mm hex set screws securing the PSU Assy. to the Chassis Base Plate.
- 6 Loose fit the five screws securing the RH End Cover.
- 7 Loose fit the PSU Connection Cover to ensure alignment.
- 8 Tighten all screws securing the top Cover and RH End Cover.

8.3 Replacing a Relay or the Contactor

The Relays and Contactor can be replaced in situ.

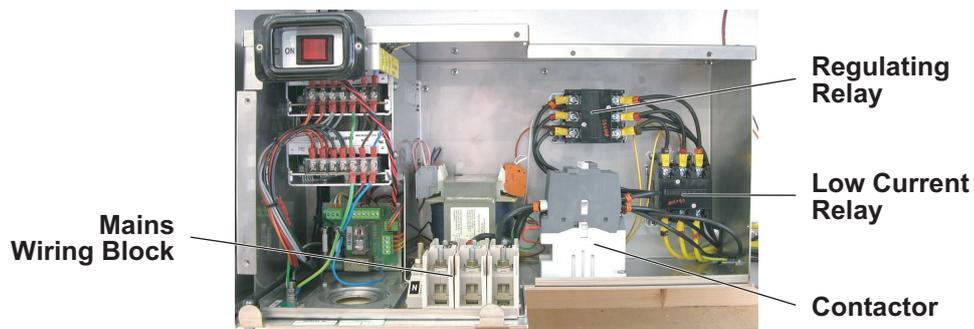
Tools required:

- No. 2 Pozidrive Screwdriver – 6"
- No. 2 Pozidrive Screwdriver – 10"
- 3mm Terminal Screwdriver

Note: Individual cables connected to each relay are of a fixed length.

To replace the relay or the Contactor:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the Connection Cover.
- 3 Remove the RH End Cover.
- 4 If not already marked, mark each cable to ensure they are reconnected correctly.



- 5 Disconnect the cables between Mains Terminal blocks, Contactor, Relays and the Heater Elements as necessary.
- 6 Undo the four M5 x 6mm screws securing the Relay to the PSU Tray and noting the orientation, remove the Relay,
or
Undo the two M4 x 16mm screws securing the Contactor to the PSU Tray and noting the orientation, remove the Contactor.
- 7 Install the replacement Relay or Contactor by reversing the above procedure.

8.4 Replacing the Switched Mode PSUs

The Switched Mode PSUs are fitted to the On/Off Switch Bracket and can be replaced without removing the PSU Assembly from the machine.

Note: The new 12v PSU will need to be adjusted after installing.

Tools required:

- No.2 Pozidrive Screwdriver
- 8mm A/F Spanner or 8mm extended socket and ratchet handle
- 3mm Terminal Screwdriver

To replace either of the Switched Mode PSUs:

- 1 Power OFF and isolate the machine from the Mains Power Supply.
- 2 Remove the PSU Connection Cover.
- 3 Disconnect the power supply cables from the Mains Terminal Block and pull the cable out through the Conduit Plate and Chassis Base Plate as described in section 4.5.
- 4 Undo the five M4 x 6mm screws and remove the RH End Cover.
- 5 From beneath the Chassis Base Plate, undo the seven M5 x 8mm hex set screws securing the PSU Assembly to the Chassis Base Plate.



- 6 Rotate the PSU assembly anticlockwise to provide access to the LH End Panel screws and remove the LH End Panel.
- 7 Note each cable connected to the Switched Mode PSU you are replacing.



- 8 Remove the plastic terminal cover on the front of the Switched Mode PSU being replaced and disconnect all cables.
- 9 Undo the three M4 x 6mm screws fixing the Switched Mode PSU to the On/Off Switch Bracket.
- 10 Carefully slide the Switched Mode PSU towards the front to remove.
- 11 Install the replacement Switched Mode PSU by reversing the above procedure.

To calibrate the 12v PSU:

- 1 Disconnect both Cooler Unit looms at the Control PCB (see section 9.3).
- 2 With the PSU plastic terminal cover removed, power ON the machine.
- 3 Using a volt meter, measure across any red and any black terminal connection.



- 4 Adjust the POT to set the PSU as near to 12v as possible, but not lower than 12v.
- 5 Power OFF and isolate the machine from the Mains Power supply.
- 6 Refit the plastic terminal cover and PSU assembly front cover.
- 7 Reconnect the Cooler Unit looms to the Control PCB.
- 8 Power ON the machine.

8.5 Replacing the PSU PCB

The PSU Assembly does not need to be removed from the machine to replace the PSU PCB. Isolate and disconnect the PSU Assembly from the Mains Power supply.

Refer to the PSU wiring diagram in Section 9.4.

Tools required:

- 3mm Terminal screwdriver
- No.2 Pozidrive screwdriver
- Long nose pliers.

To replace the PSU PCB:

- 1 Power OFF and isolate the machine from the mains power supply.
- 2 Disconnect the power supply cables from the Mains Terminal Block and pull the cable out through the Conduit Plate and Chassis Base Plate as described in section 4.5.
- 3 Undo the five M4 x 6mm screws and remove the RH End Cover.
- 4 From beneath the Chassis Base Plate, undo the seven M5 x 8mm hex set screws securing the PSU Assy. to the Chassis Base Plate.



- 5 Rotate the PSU assembly anticlockwise to provide access to the LH End Panel screws and remove the LH End Panel.
- 6 Disconnect Earth loom from PCB to the 12v Switched Mode PSU and PSU Tray.



- 7 Disconnect the cables from the PCB to the Transformer (at the Transformer) and from the PCB to the Mains Wiring Block (at the Mains Wiring Block).
- 8 Unplug the connectors to the Low Current Switch and LEDs.
- 9 Squeeze the Self Locking PCB supports and gently pull the board forward.
- 10 Install the replacement PSU PCB by reversing the above procedure.

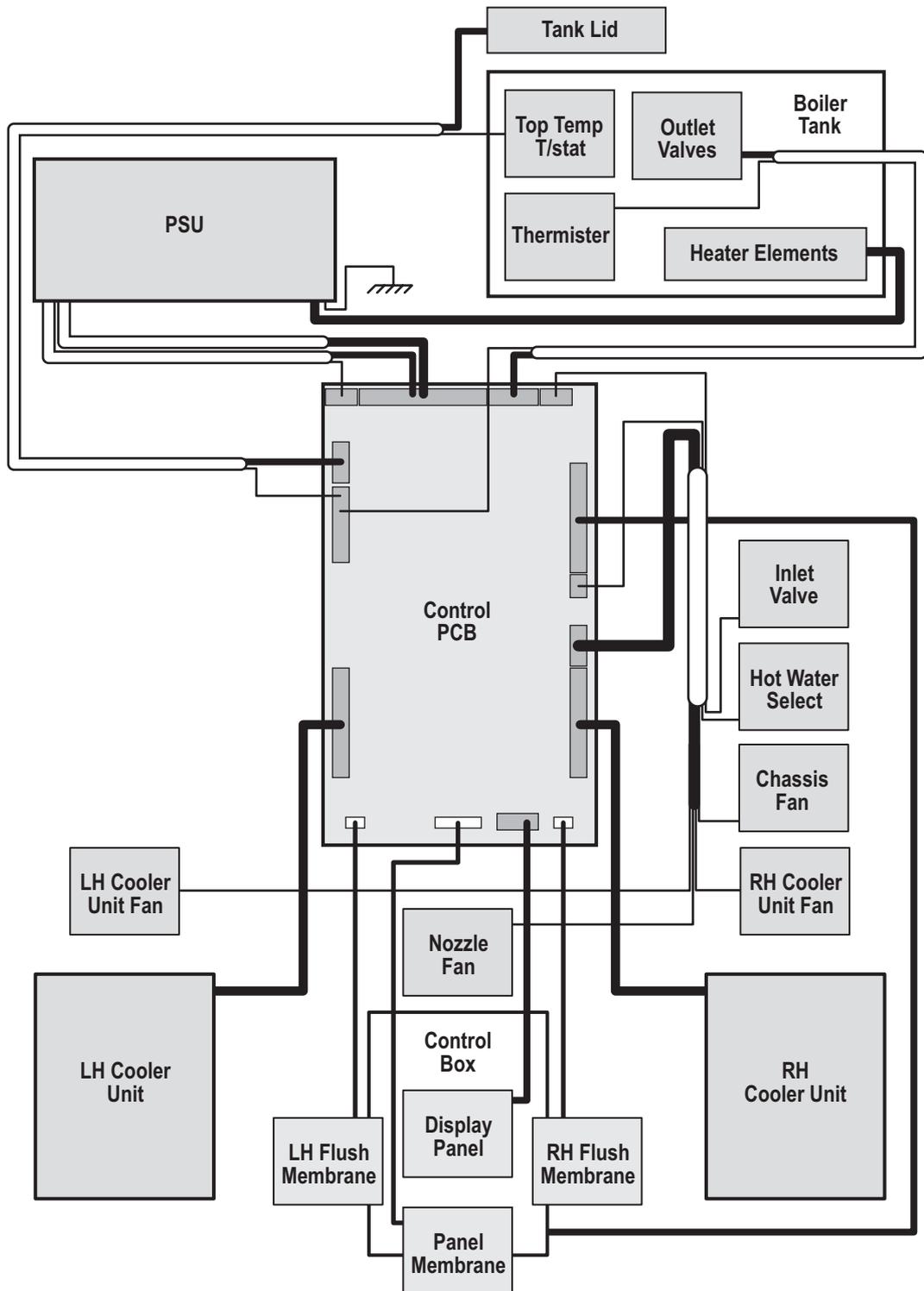
9 Technical Specifications

9.1 General Specifications

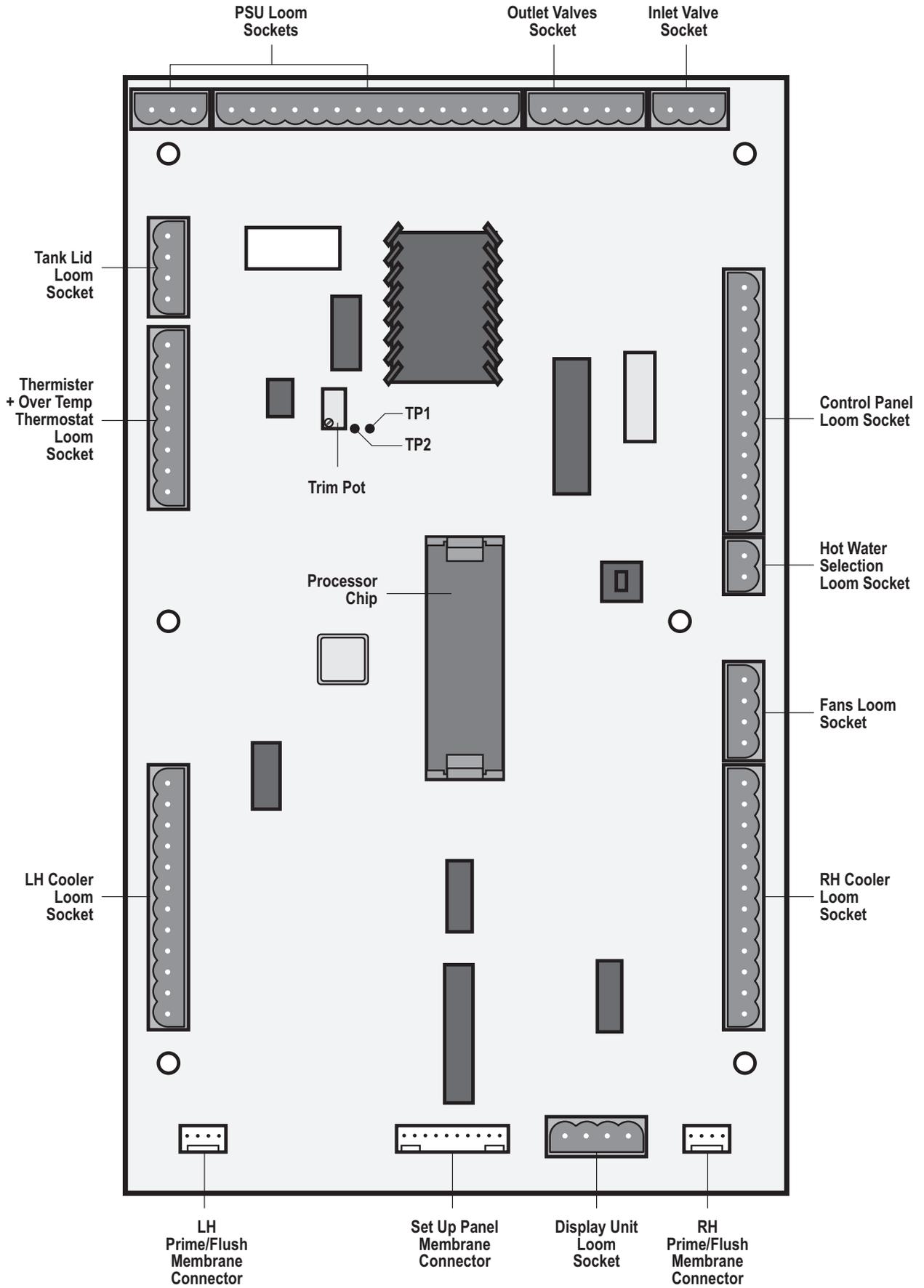
Height:	35.04 ins (89 cm)
Depth:	23.23 ins (59 cm)
Width:	31.10 ins (79 cm)
Net weight:	278 lbs (126 Kg)
Operating weight:	463 lbs (210 Kg)
Power: 3 Phase Delta	min. 30Amps (Low Current circuit) 440v - 480v – 60Amp 300v - 440v – 50Amp 235v - 265v – 60Amp 200v - 235v – 50Amp
Power: Single Phase	Min 200v - 25Amps (Low Current circuit) Min 200v - 50Amps
Min. Water pressure:	29 psi (2bar)
Min. Water Flow Rate:	5.28 US gallons (18 litres) per minute.
Tank Capacity:	21.13 US gallons (80 litres)
Pot Clearance:	Without Drip Tray – 16.5 ins (42 cm) With Drip Tray – 13 ins (33 cm)

9.2 Main Looms Diagram

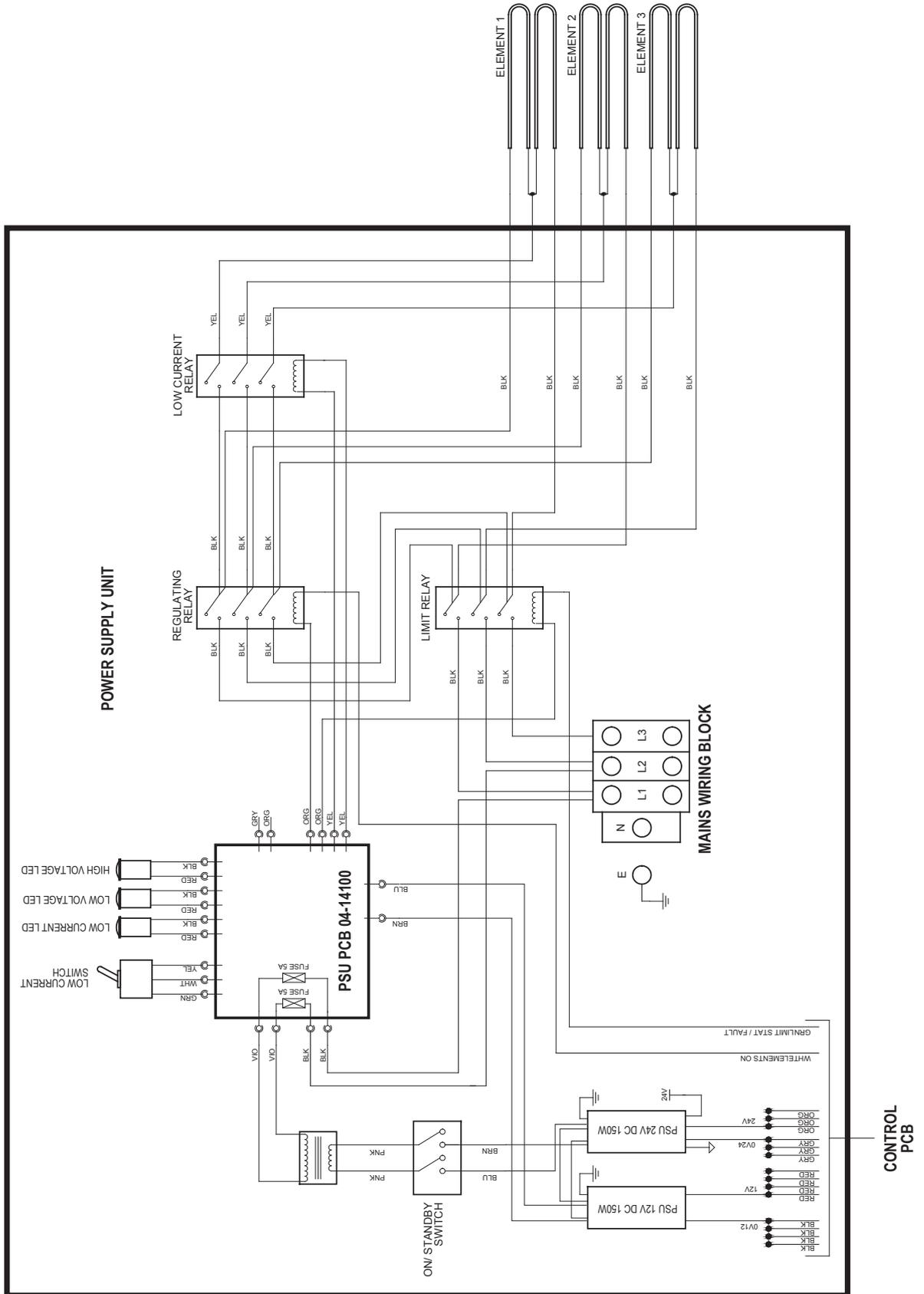
D420 Main Looms



9.3 The Control PCB



9.4 PSU wiring diagram



Appendix A **Calibrating a Suitable Container**

Before adjusting the flow rate for a new outlet valve if a suitable container is not already calibrated, it will be necessary to mark the inside of a bucket with volume levels.

Note: Because under normal conditions, the machine will be dispensing water at the maximum temperature, it is necessary that water from the boiler be used when calibrating the container or bucket.

Tools required:

A calibrated one Litre Jug.
Suitable container, at least 2 gallons (10 litres)
Waterproof marker or stylus

To calibrate the container:

- 1 Use the Hot Water Only button to measure out 2.5 litres and pour into the container or bucket.
- 2 On the inside of the container, carefully, clearly and accurately mark the level of the top of the water with the marker or stylus as the 2.5 litre level.
- 3 Measure out another 2.5 litres of hot water and pour into the container.
- 4 Accurately mark the level of the top of the water with the marker or stylus as the 5 litre level.
- 5 Measure out another 2.5 litres of hot water and pour into the container.
- 6 Again, accurately mark the level of the top of the water with the marker or stylus as the 7.5 litre level.
- 7 Measure out another 2.5 litres of hot water and pour into the container.
- 8 Again, accurately mark the level of the top of the water with the marker or stylus as the 10 litre level.
- 9 Carefully dispose of the hot water in the container.

Appendix B Recommended List of Tools

Below are listed the tools referred to in this manual:

- 3mm terminal screwdriver
- 6mm flat end screwdriver
- No.1 Pozidrive screwdriver
- No. 2 Pozidrive screwdriver – 6”
- No. 2 Pozidrive screwdriver – 10”
- No. 2 Pozidrive screwdriver – Stubby
- 6mm AF socket
- 7mm AF socket
- 8mm AF socket
- 10mm AF socket
- 8mm extended socket
- Socket driver
- Socket ratchet
- 6mm hexagonal key
- 6mm AF ring spanner
- 8mm AF Spanner
- 1 1/8” AF Spanner
- Gland spanners
- 75mm Element box spanner
- Side cutting pliers
- Long nose pliers
- Wire cutters
- Ohm meter with long probes
- Submersible thermometer (min 12” probe)
- Timer with second hand
- Blunt (Stanley) knife blade
- One 2 Gallon (10 litre) Bucket (calibrated)
- Two 1 qt (1 litre) containers
- One 1 pt (500ml) container
- One 16 fl oz (500ml) calibrated measuring cylinder
- Four 8 fl oz (250ml) plastic or glass containers
- One 1 qt (1 litre) measuring beaker or jug
- Stepladder

Appendix C Machine Settings Form

D420 Customer Machine Settings

Engineer Name:
Service Date:

Mach Ref. No:

User Configured Settings:

Product Select Button:	1	2	3	4	5	6
Selection (Enabled/Disabled):						
Selection Speed (1,2 or 3):						
Dispense Volume (measure):						
Selection Strength (Ratio):	:	:	:	:	:	:
Channel:						

Engineer Configured Settings:

Temperature Display: Celcius Fahrenheit None
Tick appropriate Box

Max. Temperature Set:

Product Choices: 4 Identical
Tick appropriate Box

2 + 2
 3 + 1
 4 Different

Peris Speed Offset:

Pump 1	<input type="text"/>	Pump 2	<input type="text"/>
Pump 3	<input type="text"/>	Pump 4	<input type="text"/>

Leak Detect: Enabled Disabled
Tick appropriate Box

Settings Reset (Eng. sig.)

Keep completed form with machine.
Complete a new form if changes are made.

Appendix D Cleaning and Sanitising Instructions

IN PLACE CLEANING SCHEME FOR D420 DISPENSER.

Cleaning the dispenser and sanitising the concentrate systems should be undertaken on a daily basis.

To avoid Injury, exercise caution when handling hot liquids. When handling chemicals exercise precautions as defined by the chemical manufacturer.

- 1 Open both cooler doors and pull the nozzle from its housing.
- 2 Wash the nozzle in a sink of hot water with detergent added (such as Ivory liquid' or 'Fairy liquid') in the ratio of 1oz to two gallons until clean.
- 3 Wash out the inside of the cooler units with the same solution using a clean cloth and rinse with a clean cloth soaked in clean water, polish dry with a clean dry cloth.
- 4 Rinse the nozzle thoroughly in clean running water and replace the nozzle in its housing on the dispenser.
- 5 Wipe down the outer casing of the dispenser with a clean soft cloth soaked in hot detergent solution and then dry thoroughly. Do not use any abrasive cleaners.

Repeat the following procedure for each individual dosing system.

- 1 Remove the can of concentrate and wipe the suction tube clean with a disposable paper towel that has been soaked with clean hot water. To maintain a good level of hygiene, avoid touching the suction tube with your hands after wiping it.
- 2 Fill a suitable, clean, one-litre (1 quart) container with hot water, (not less than 160°F (70°C)) and place it in the cooler unit with the suction tube inserted into the water.
- 3 Operate the PRIME switch until the container of hot water is empty; repeat this until at least one litre of water has been flushed through the system.
- 4 Fill the same container as used above with one litre (1 quart) of a food safe, chlorine based sanitizing agent, such as 'Clorox' or 'Kay-5', mixed in accordance with the concentration levels found in U.S. FDA 21 CFR, 178-1010. Place the concentrate suction tube into the sanitising fluid. Operate the PRIME switch until fluid is seen to run from the dispense nozzle. Leave the fluid in the system for not less than 10 minutes.
- 5 After this time has elapsed, dispense the remainder of the sanitising fluid through the system by operating the PRIME switch continuously until the container is empty.
- 6 Refill the container with clean hot water and place it in the cooler unit with the suction tube inserted into the water.
- 7 Operate the PRIME switch continuously to purge the system, until the container of hot water is empty; repeat this until at least a litre (1 quart) of water has been flushed through the system.
- 8 Replace the can of concentrate and prime the system.
- 9 Repeat the above procedure for all 4 concentrate channels.

Appendix E PSU Front Cover Label

ELECTRICAL INSTALLATION INSTRUCTIONS

TO BE CARRIED OUT BY TRAINED ENGINEERS ONLY

1. Establish the supply power available at the machine location.
2. Ensure that the machine connection cable uses copper wires only and is approved for the supply voltage and current fuse rating of the supply outlet.
3. Ensure the EARTH connection is securely made, check continuity to site earth.

REPLACE THIS COVER BEFORE APPLYING POWER TO THE MACHINE

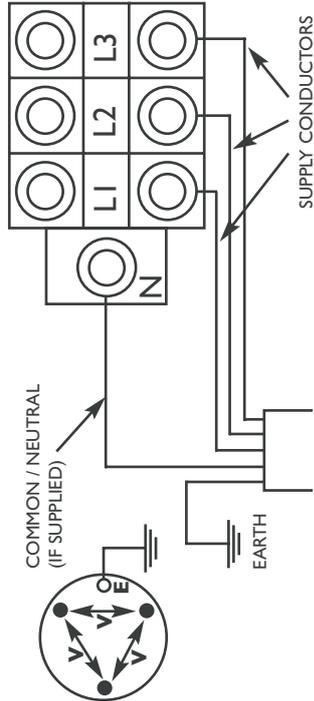
A

3 PHASE DELTA

THIS MACHINE WILL AUTO-SENSE 200V TO 480V

- IF V = 440V - 480V THEN 60AMP / PHASE SUPPLY REQUIRED
- IF V = 300V - 440V THEN 50AMP / PHASE SUPPLY REQUIRED
- IF V = 235V - 265V THEN 60AMP / PHASE SUPPLY REQUIRED*
- IF V = 200V - 235V THEN 50AMP / PHASE SUPPLY REQUIRED*

* IF MAX SUPPLY IS 30 AMPS THEN SELECT THE "LOW CURRENT" SWITCH LOCATED TO THE RIGHT OF THE RED ON/OFF SWITCH. IF SUPPLY CURRENT IS LESS THAN 30 AMPS THEN MACHINE IS NOT SUITABLE FOR 3 PHASE DELTA, HOWEVER IT MAY BE SUITABLE IF WIRED FOR SINGLE PHASE - SEE COLUMN 'B'



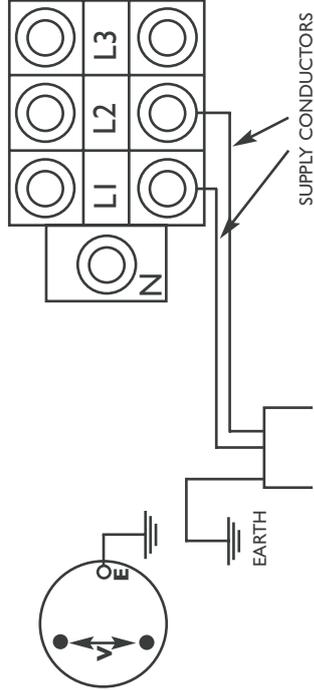
B

SINGLE PHASE

THIS MACHINE WILL AUTO-SENSE 200V TO 255V

IF V IS LESS THAN 200V THEN MACHINE IS NOT SUITABLE. 50 AMP SUPPLY IS REQUIRED. IF MAX SUPPLY IS 25 AMPS THEN SELECT THE "LOW CURRENT" SWITCH LOCATED TO THE RIGHT OF THE RED ON/OFF SWITCH.

IF SUPPLY CURRENT IS LESS THAN 25 AMPS THEN MACHINE IS NOT SUITABLE.





Contact Information

DASS Manufacturing Ltd.

SBC House,
Restmor Way,
Wallington,
Surrey, SM6 7AH,
United Kingdom.

Tel: +44 (0)20 8669 8012
Fax: +44 (0)20 8669 9529

Email: sales@aromat-uk.com
Web: www.aromat-uk.com
www.aromat.de

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