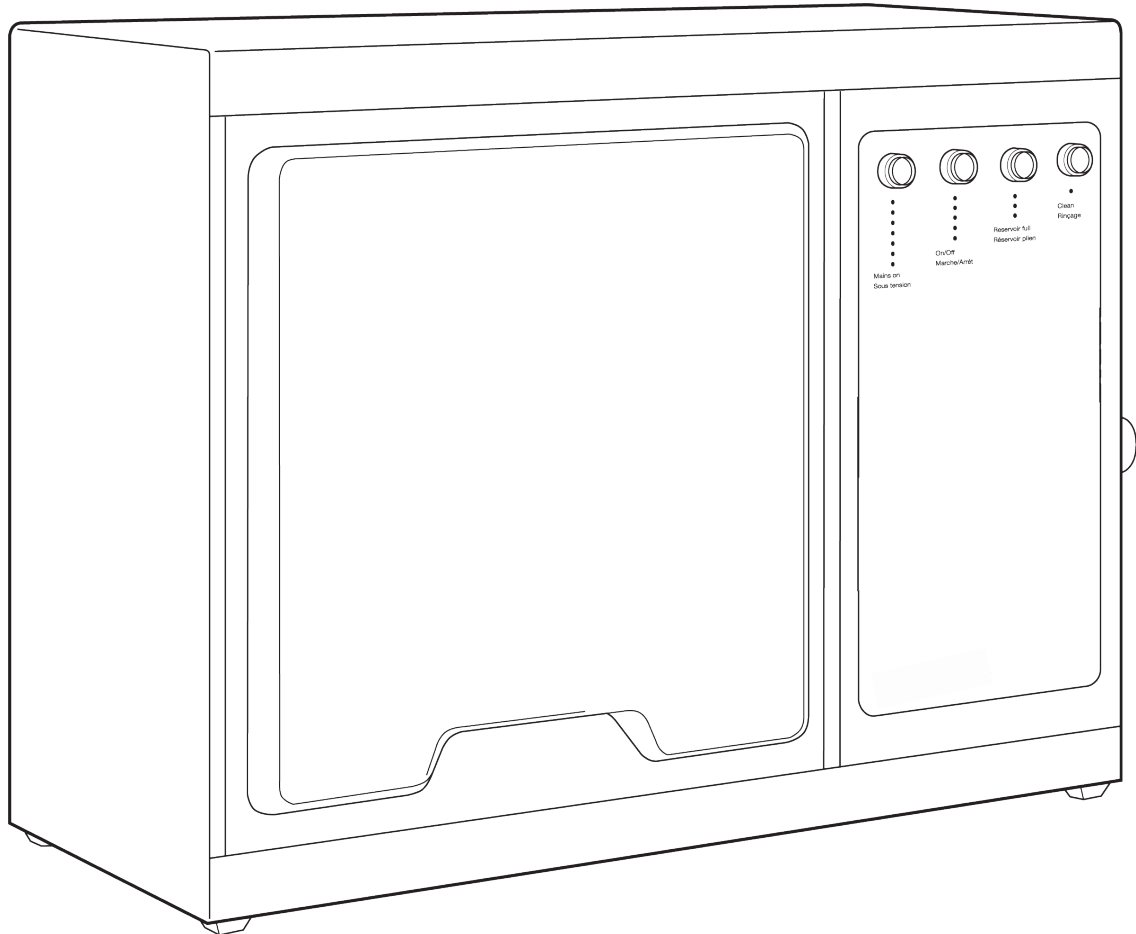


Cole-Parmer®

WS-200 Series

Water Stills



Instruction Manual
700668(ES)-CPB ISSUE 2.7

Cole-Parmer®
essentials

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Location & Services

In order to obtain the optimum performance from your new Cole-Parmer Water Still careful consideration should be given to the intended location and the availability of services such as water, electricity and drain.

Please study the following notes before commencing installation.

Before Use

If the equipment is not used in the manner described in this manual then its performance and operation will be impaired.

Cole-Parmer Water Stills are designed to operate under the following conditions:

- ❖ For indoor use only.
- ❖ Ambient temperature +5°C to +40°C.
- ❖ Altitude up to 2000m.
- ❖ Relative humidity not exceeding 80%.
- ❖ Mains supply voltage fluctuates not greater than $\pm 10\%$ of normal.
- ❖ Over voltage Category II IEC60364-4-443.
- ❖ Polluting degree 2 IEC664.

1. Bench Wall Mounting

Cole-Parmer Water Still models WS-200A-4 and WS-200A-8 can be either bench or wall mounted and a bracket is provided for the latter purpose. A gap of at least 50cm should be left at the right hand end of the unit to allow access to the heating elements.

For reasons of weight, models WS-200AD-4 and WS-200A-8 are best bench mounted, but if it is desired to elevate the unit then a stout shelf should be used.

2. Electricity Supply

N.B. The Cole-Parmer Water Still is classified as "Permanently Connected Equipment" and should be connected to the electricity supply by a qualified electrician in the manner described in the electrical installation section of this manual.

The Cole-Parmer Water Stills are available in three models, WS-200A-4, WS-200AD-4 & WS-200A-8.

A suitable supply for the WS-200A-4 is rated at 3kW, 220-240v, 50/60Hz~ single phase. A suitable supply for the WS-200AD-4 & WS-200A-8 is rated at 6kW, 220-240v, 50/60Hz~ single phase.

WS-200A-4 units should be connected to the mains supply via a double pole 30mA Residual Current Breaker with over current protection (RCBO) isolating circuit breaker rated at 15A.

WS-200AD-4 and WS-200A-8 units should be connected to the mains supply via a double pole 30mA Residual Current Breaker with over current protection (RCBO) isolating circuit breaker rated at 32A.

If you have any doubts about the suitability of your supply, consult a qualified electrician before installing your Cole-Parmer Water Still.

3. Water Supply

A cold water supply is required for coolant and feed purposes. This may be from the mains supply or a header tank having a flow capacity of at least 1 litre/min. for the WS-200A-4 and 2 litres/min. for the WS-200A-8 and WS-200AD-4. The pressure range should be within 3-100 p.s.i. ($0.2-7 \times 10^5 \text{Nm}^{-2}$).

If the feed water quality is poor and likely to contain particulate matter, such as rust or silt, it is advisable to fit a pre-filter unit before the still.

4. Drain

A waste water drain is required. It is important that the distance between the drain and the Water Still is kept as short as possible to reduce the possibility of pressure build-up. Similarly, the drain pipe from the still should fall straight, without any kinks or bends, to allow an unimpeded flow. It is also recommended that the unit is connected to properly earth bonded water supplies and drainage systems.

5. Storage Tank

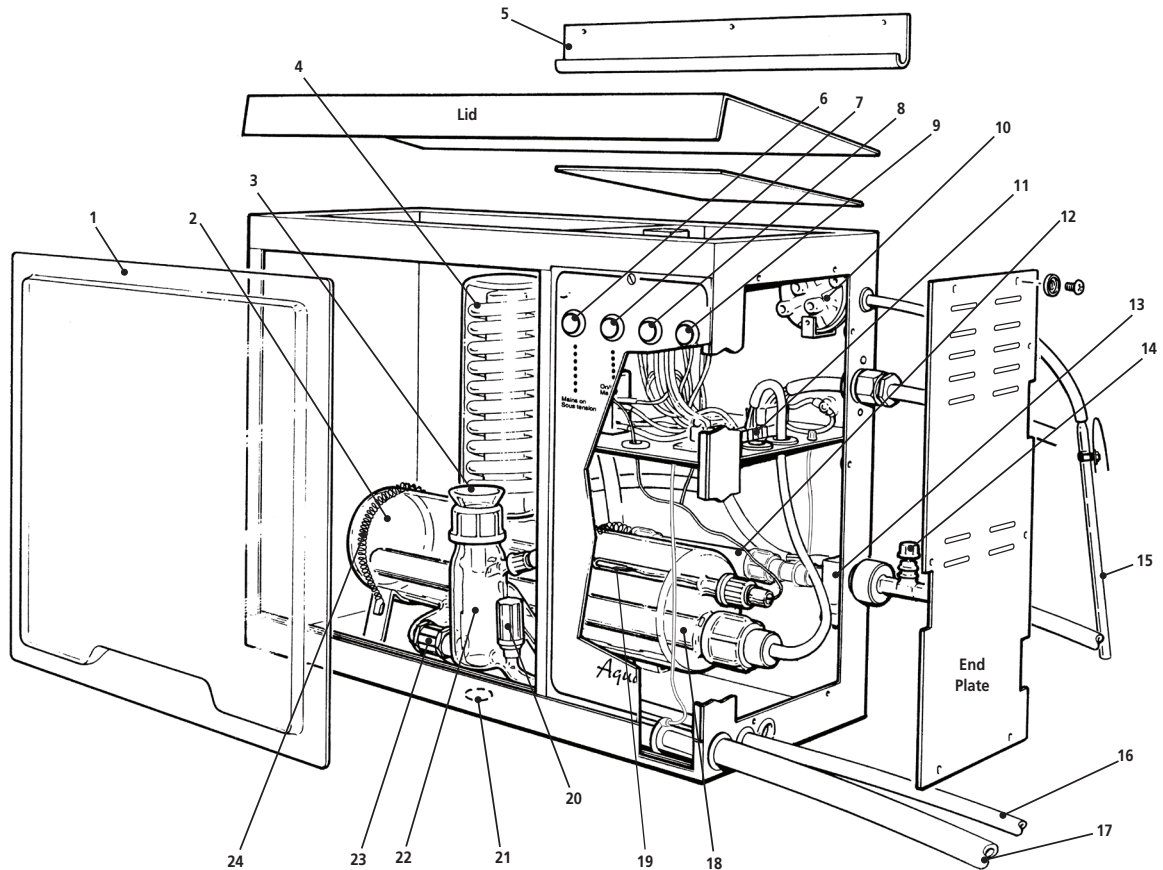
A suitable reservoir, the WR20 for instance, is required for the collection of the distillate. This should be positioned beneath the still ensuring that the distillate can flow into the reservoir without hindrance.

6. Maintenance

The location of the still should facilitate easy access for routine cleaning and maintenance. With regards to the latter, it is recommended that a space of at least 50cm be provided on the right hand side of the Water Still cabinet. This is to allow the removal of the side cover and replacement of the heating element.

WS-200A-4

Fig. 1



List of Major Components – WS-200A-4

Item no.	Description	Part number	Item no.	Description	Part number
1	Perspex Screen	M484	13	Solenoid Assembly	A4000/SA
2	Boiler	WBA	14	Mains Water Mini Valve Assembly	7001059 (S)
3	Funnel	WF48	15	Reservoir Water Level Sensor	WLS
4	Condenser	WC48/M2	16	Distillate Outlet Pipe (Bench Mounted)	–
5	Wall Mounting Bracket	M510G	17	Cooling Water Pipe to Drain (16mm)	–
6	Green 'Mains On' Indicator	700691 (S)	18	Heater Assembly	A4000/HA
7	White 'On/Off' Switch	700988 (S)	19	Thermostat	WT4
8	Amber 'Reservoir Full' Indicator	700987	20	stopcock	A4000/RCOCK
9	White 'Clean' Switch	700988 (S)	21	Distillate Outlet (Wall Mounted)	–
10	Reservoir Pressure Switch	WPS	22	Boiler Level Control	WL48
11	Heaters Connector Terminal	A4000/HTB	23	Boiler Plastic Coupling	WBC1
12	Water Flow Sensor Assembly	I/A4000HK/1	24	Boiler Retaining Spring	700007

WS-200A-4 Assembly

Your Cole-Parmer Water Still WS-200A-4 has been designed with ease of assembly specifically in mind. Please study the installation diagram and the enclosed DVD before commencing the installation. Follow the sequence of instructions and do not connect the mains electricity supply until directed.

1. From the outer packaging remove all the components including the metal cabinet containing the glass boiler.
2. Before unpacking the individual components, identify them on the check list below:
 WS-200A-4 Unit containing boiler.
 Condenser – WC48/M2
 Heater – W48H
 Boiler Level Control – WL48
 Funnel – WF48
 Reservoir Water Level Sensor – WLS
 Output Hose Assembly – I/A4000HK/2
 Hose Kit – I/WH48/1/B
 Wall Mounting Bracket – M510G
3. Remove the perspex viewing screen (Fig. 1, item 1) from the unit by lifting it up using the finger recess. Remove the internal packaging carefully. Snip the temporary ties holding the boiler retaining springs (Item 24).
4. Remove the end plate and lid by removing the retaining screws.
5. Ensure that the sealing O ring and the stabilising O ring are correctly positioned on the vapour tube of the boiler. Fit the condenser (Fig. 1, item 4) to the vapour tube ensuring that the distillate outlet faces the front and the two water connections are parallel to the unit Fig 1a. When slight resistance is felt when fitting the condenser, press down slightly on the top of the condenser until a gap of approximately 19mm exists between the condenser and the boiler.

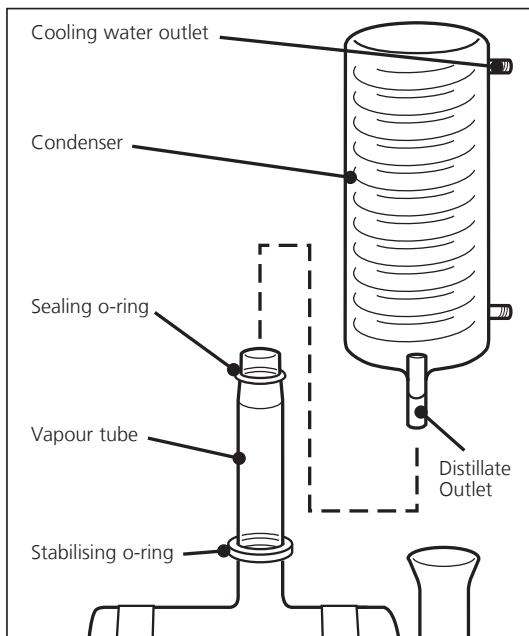


Fig. 1a

6. Take the 1m length of 8mm hose from hose kit I/WH48/1/B and connect one end to the distillate outlet of the condenser (Fig. 1a). Secure with a tie wrap. Pass the other end of the tube through the cabinet hole, Fig. 1, item 21 if to be wall mounted, or hole, Item 16 if bench mounted.

7. Take the boiler level control WL48 (Fig. 1, item 22). Remove the end split nut and central part of the boiler plastic coupling (Item 23) leaving the other split nut in place, and the internal seal in the boiler level control. Ensure the stopcock is fully closed (screwed down).
8. Take the 16mm earth spigot located inside the WS-200A-4 and place the 16mm tubing part of it into a beaker of hot water for approximately 20 – 30 seconds; this will make the tubing more supple. Connect the 16mm tubing to the boiler level control (Item 22) drain connection (below the stopcock). Secure with a tie wrap.
9. Take the 1m length of 16mm hose from hose kit I/WH48/1/B. Place one end into a beaker of hot water for approximately 20 – 30 seconds. Thread the tube through hole (Fig. 1, item 17) until approximately 300mm of tubing is inside the cabinet. Connect to the 16mm earth spigot and secure with a tie wrap.
10. Pull the 16mm hose back out of the cabinet until a gap of approximately 5mm exists between the boiler level control and the boiler connection.
11. Place the boiler plastic coupling split nut and central part onto the boiler connection. Connect the boiler level control to the boiler, ensuring that the internal seal of the boiler plastic coupling is fitted inside the boiler connection and the boiler level control connection. Tighten the boiler plastic coupling.
12. Loosen the black cap on top of the boiler level control. Fit the funnel into the top of the boiler level control and tighten the black cap.
13. Take the hose assembly I/A4000HK/2 and connect the end marked '2' to the top connection of the condenser. Connect the other end marked '3' to the boiler level control.
14. Identify the water flow sensor assembly (Fig. 1, item 12) inside the cabinet. Connect the red connector marked '1' to the bottom connection of the condenser. It may be necessary to slightly twist the condenser to release any kinks in the water sensor assembly.
15. Remove the heater black cap and rubber ring from the boiler. Place the black cap onto the heater until it is approximately 25mm from the electrical connectors end. Push the rubber ring onto the heater and into the black cap.
16. Fit the heater into the boiler and screw on the black cap. When the black cap is tight push the heater through the black cap until the end of the heater sits in the nodule at the end of the boiler.

Do not overtighten the screw cap as this may cause the boiler to break, or push the heater in too far as this may break the nodule.

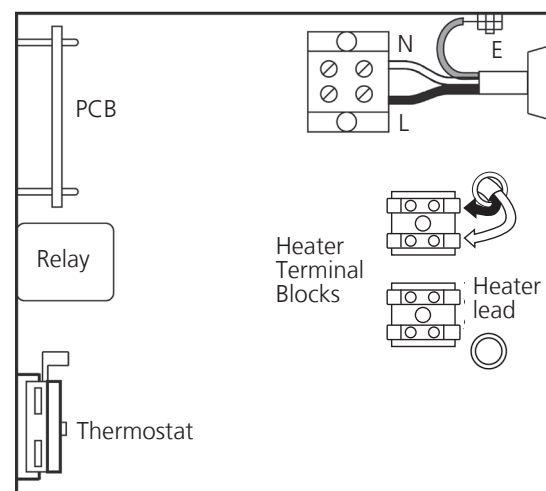


Fig. 1b

17. Thread the two heater connectors through the hole into the electrical control compartment and connect to the heater terminal block. Brown to Brown, Blue to Blue, (Fig. 1b).

SAFETY: It could be possible to mis-locate the heater crimps on to the heater terminal block tags. Ensure that the heater crimps are properly located onto the heater terminal block tags and fully locked on. Attempt to pull the crimp off the tag to ensure full attachment.

18. Refit the end plate and lid.

19. Move the unit to its working location. If it is to be wall mounted use the mounting bracket (Fig. 1, item 5). Ensure a space of at least 50cm to the right of the unit to allow access.

20. Connect the cold water supply to the mains water inlet. The tubing selected should have a safe working pressure of at least equal to the pressure of the water supply and should be adequately secured with hose clips.

DO NOT TURN ON WATER SUPPLY

21. THIS EQUIPMENT MUST BE EARTHED! 

Carry out the electrical installation. This should only be carried out by a suitably qualified electrician.

The WS-200A-4 is classed as permanently connected equipment. The earth spigots should pass a high current (ie. >200mA).

The equipment is supplied with 1.5m of flexible, triple core, circular cable to the following specification: 1.5mm², to BS 6500 or equivalent and <HAR> or BASEC approved.

Connection to the mains electrical supply should be via a double pole 30mA Residual Current Breaker with Overcurrent protection (RCBO) isolating circuit breaker switch with a continuous current carrying capacity of 15A at 250V and overcurrent of 15A.

DO NOT SWITCH ON ELECTRICAL SUPPLY.

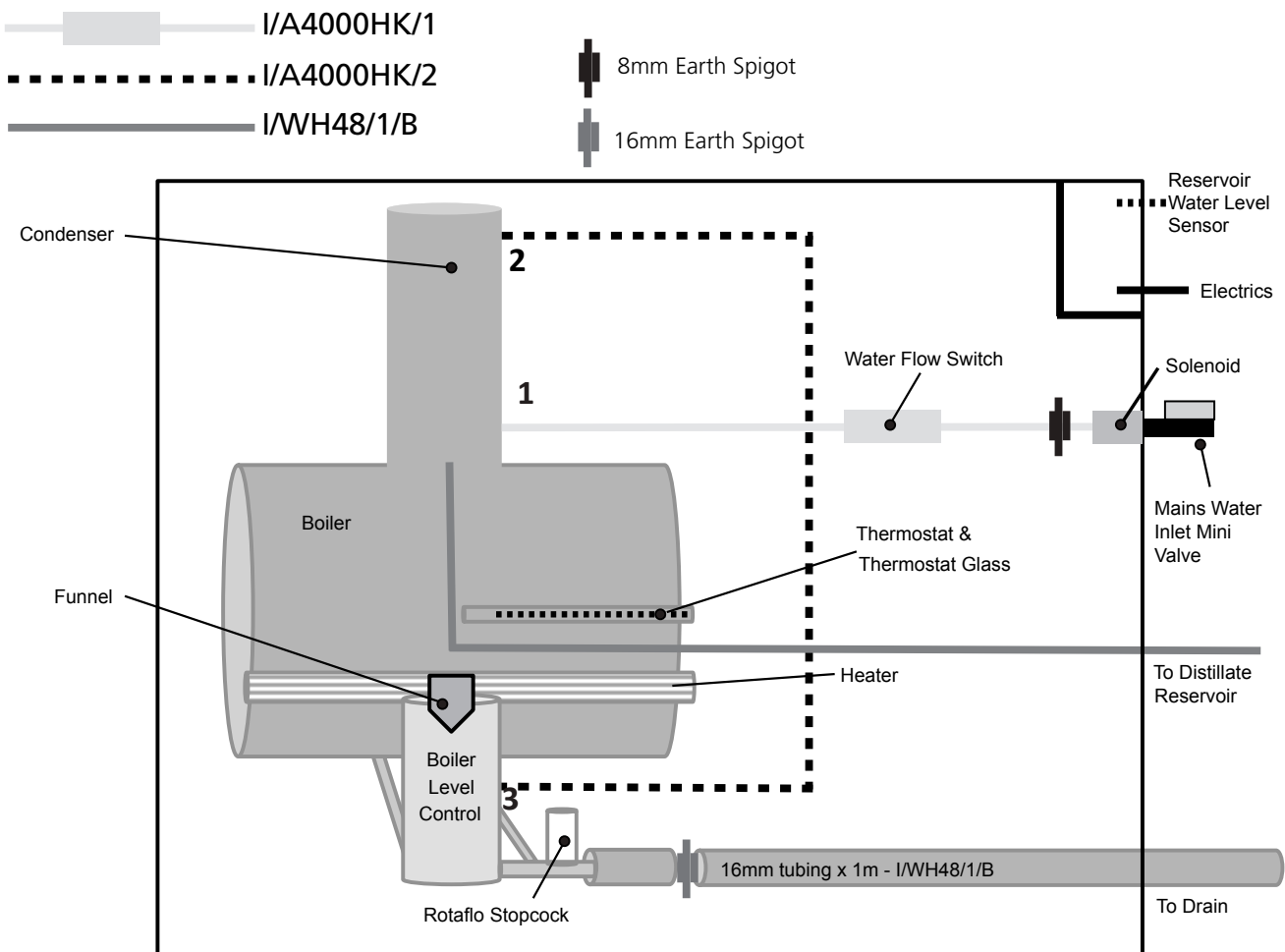
22. Connect the reservoir water level sensor WLS (Fig. 1, item 15) to the WS-200A-4 and secure with a tie wrap.

Place the glass pressure bell in the collection reservoir, following the instructions given on page 19.

23. Operate the WS-200A-4 Waterstill as per Operating Instructions and check for leaks.

24. Fit the Perspex viewing screen

WS-200A-4 Installation Diagram



WS-200A-4 Operation

The following instructions apply to the WS-200A-4 Water Still where the water feed to the boiler is via the mains supply or a header tank.

1. Before switching on either the mains electricity or water supply, identify the control switches and indicator lights on the front of the cabinet.

Green Light – When illuminated this shows that there is mains supply voltage to the unit. Under no circumstances should the cabinet end-panel be removed when this light is illuminated.

White 'On/Off' Switch – This is the primary switch for controlling water and electricity inside the still. The switch illuminates when pressed in the ON position.

Amber Light – When illuminated, this indicates that the distillate collection reservoir is full as detected by the level control.

White 'Clean' Light – This shuts off the heating element but allows water to flow into the boiler when the still is being commissioned or cleaned. When pressed in the CLEAN position the switch illuminates.

2. Carefully check the following:

The appropriate electricity, water and drain services have been provided. If in doubt, consult the LOCATION & SERVICES SECTION of this manual.

The ON/OFF switch on the control panel is in the OFF position.

The CLEAN switch is pressed in the CLEAN position.

The stopcock on the boiler level control is closed.

The reservoir water level sensor is fitted to the distillate collection vessel.

The dummy shorting plug is fitted to the boiler level control DIN socket on the cabinet.

3. Ensure all earth leads are connected to the earth point.
4. Check all glassware for any damage.
5. Switch on the electricity supply – the green light illuminates.
6. Press the ON/OFF switch to the ON position – the switch will illuminate.
7. Recheck that the CLEAN switch is in the CLEAN position and illuminated.
8. Turn on the mains water supply and using the mini valve assembly, adjust the flow rate to approximately 1 litre/min. This can be achieved by observing the drain water from the boiler level control and adjusting the mini valve assembly accordingly.
9. Check for water leaks.
10. Observe the boiler now filling with water to cover the heating element. When water has reached the pre-set limit, the excess will discharge to drain. Check the water drains freely and does not back up into the boiler level control.
11. Switch the CLEAN button off by pressing it a second time. The switch light goes out.
12. The heater will now warm up and eventually run at a red glow. If the flow rate is insufficient, the heater will not switch on. This will require adjustment of the mini valve assembly to be opened further. After about 2 – 3 minutes of operation distilled water will emerge from the outlet pipe falling into the collection reservoir.

13. To avoid excess wastage of coolant water, make further adjustments to the mini valve assembly. Slowly reduce the flow rate until the flow control switch switches off the heater, then increase the flow until the power is restored.

14. Refit the Perspex screen.

15. **Safety Cut-Outs** – All Cole-Parmer Water Stills are protected by the following safety devices.

Flow Control Switch – Monitors the flow of coolant water into the still and shuts off the heating element if the flow is insufficient.

Thermostat Cut-Out – In normal operation the water within the glass will be at 100°C. In single fault conditions, i.e. in the event of water supply failure, the content will increase to 112°C where upon a resettable thermostat will operate. Once switched, the thermostat has to be manually reset. This is achieved by unscrewing the black knob located inside the cabinet and pressing the reset button.

Reservoir Control – Is positioned in the collection reservoir and switches off both the electricity and water supplies when the reservoir is full of distillate water. The water supply is shut off after around 7 minutes after the reservoir is full to allow the heating element to cool.

It is recommended that the operation of the flow switch and reservoir control is checked on a regular basis.

- a. **Simulation of Mains Water Supply Failure**

Turn off the mains water supply at the tap. This should switch off the heating element. Turning the tap on again will switch the heater on.

- b. **Simulation of Reservoir Full Condition**

Lower the glass pressure bell of the reservoir water level sensor into the distillate to a depth of 150mm. This will switch off the heating element immediately and the cooling water after 7 minutes. Raising the bell will cause both to be switched back on.

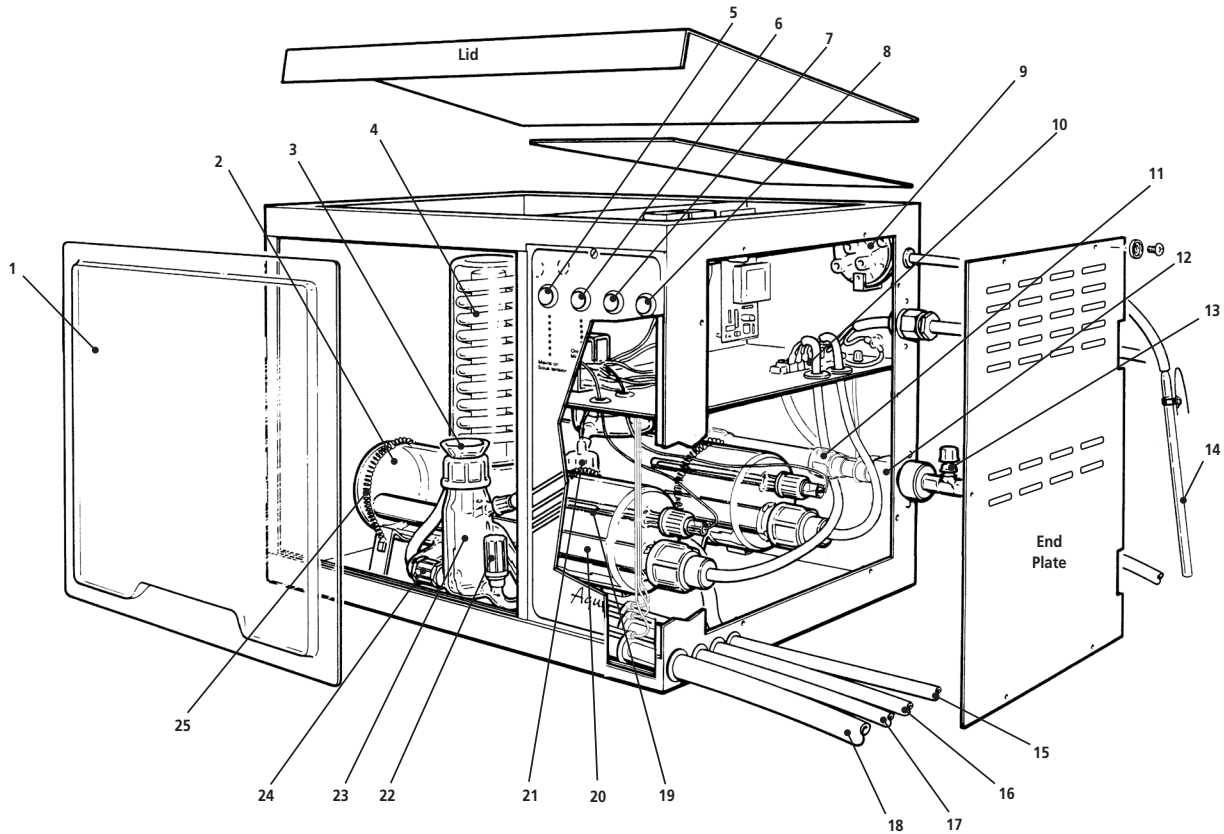
16. **Switching Off** – Push the CLEAN switch to the ON position. Wait until the residual heat contained in the heating element has dispersed and no boiling is evident. Turn off water supply. Push ON/OFF switch to OFF position. Isolate from mains electricity supply.

WS-200A-4 Spares

Boiler	WB4
Funnel	WF48
Condenser	WC48/M2
'Mains On' Green Indicator	700691(S)
'On/Off' White Switch	700988(S)
'Reservoir Full' Amber Indicator	700987
'Clean' White Switch	700988(S)
Reservoir Pressure Switch	WPS
Heater Terminal Block	A4000/HTB
Solenoid Assembly	A4000/SA
Water Flow Sensor Assembly and Hoses	I/A4000HK/1
Condenser to Boiler level control Hose (Output Hose Assembly)	I/A4000HK/2
Reservoir Water Level Sensor	WLS
Mains Water Mini Valve Assembly	7001059(S)
Thermostat Glass Tube	WTT48
Thermostat	WT4
Boiler Level Control	WL48
Boiler Plastic Coupling	WBC1
Heater Assembly	A4000/HA
Heater Assembly 220V	A4000/HA220
Boiler Retaining Spring	700007
w Stopcock Assembly	A4000/RCOCK
6 Way Electrical Terminal Block	A4000/ETB
Ceramic Terminal Block	A4000/CTB
5 DIN Socket Assembly	A4000/DIN
Boiler Vapour Tube Sealing O Ring	I/M502
Boiler Vapour Tube Stabilising O Ring	I/QR38/24
Relay Assembly	A4000/RA
PCB	700804(ES)
Distillate Output and Boiler Level Control Drain Hose Kit	I/WH48/1/B
Wall Mounting Bracket	M510G
Black Phenolic Screw Cap	I/QC38/25

WS-200AD-4

Fig. 2



List of Major Components – WS-200AD-4

Item no.	Description	Catalogue number	Item no.	Description	Catalogue number
1	Perspex Screen	M484	14	Reservoir Water Level Sensor	WLS
2	Boiler (2 off)	WB4	15	Distillate Outlet Pipe	–
3	Funnel	WF48	16	Drain Pipe from W4L2A	–
4	Condenser (2 off)	WC48/M2	17	Cooling Water Pipe to Drain (8mm)	–
5	Green 'Mains On' Indicator	700691(S)	18	Cooling Water Pipe to Drain (16mm)	–
6	White 'On/Off' Switch	700988(S)	19	Thermostat (2 required)	WT4
7	Amber 'Reservoir Full' Indicator	700987	20	Heater Assembly (2 required)	A4000/HA
8	White 'Clean' Switch	700988(S)	21	Boiler Level Control (rear)	W4L2A
9	Reservoir Pressure Switch	WPS	22	stopcock	A4000/RCOCK
10	Terminal Strip for Heaters	A4000/HTB	23	Boiler Level Control (front)	WL48
11	Water Flow Sensor Assembly	I/A4000DHK/1	24	Boiler Plastic Coupling	WBC1
12	Solenoid Assembly	A4000/SA	25	Retaining Springs	7000007
13	Mains Water Inlet Valve Assembly	7001059(S)			

WS-200AD-4 Assembly

Your Cole-Parmer Water Still WS-200AD-4 has been designed with ease of assembly specifically in mind. Please study the installation diagram and the enclosed DVD before commencing the installation. Follow the sequence of instructions and do not connect the mains electricity supply until directed.

1. From the outer packaging remove all the components including the metal cabinet containing the glass boiler.

2. Before unpacking the individual components, identify them on the check list below:

WS-200AD-4 Unit containing 2 boilers.

Condenser – WC48/M2 x2

Heater – W48H x2

Boiler Level Control (Front) – WL48

Boiler Level Control (Rear) – W4L2A

Funnel – WF48

Reservoir Water Level Sensor – WLS

Hose Kit – I/WH48/3/B

3. Remove the perspex viewing screen (Fig. 2, item 1) from the unit by lifting it up using the finger recess. Remove the internal packaging carefully. Snip the temporary ties holding the boiler retaining springs (Item 25).
4. Remove the cabinet end plate and lid by removing the retaining screws.
5. Withdraw the metal thermostat probe (Fig. 2, item 19) from the glass tube inside the front boiler.
6. Remove the front boiler by releasing the retaining springs.
7. Ensure that the sealing O ring and the stabilising O ring are correctly positioned on the vapour tube of the rear boiler (Fig 2a).

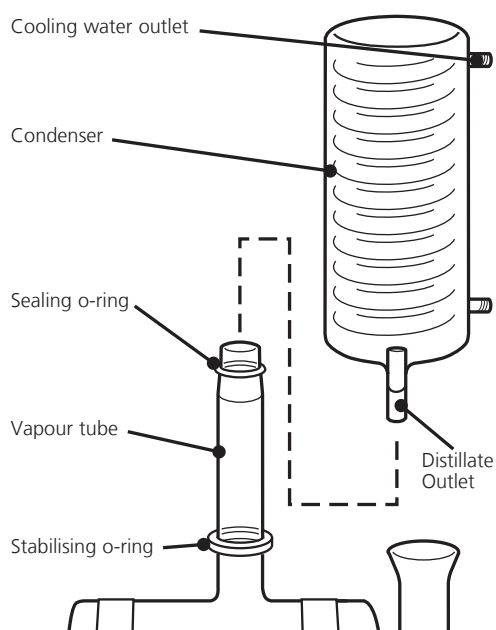


Fig. 2a

8. Select 8mm tubing x 1m from hose kit I/WH48/3/B and connect one end to the distillate outlet connection (Bottom) of one of the condensers (Fig. 2a). Secure with a tie wrap.

9. Fit the condenser to the vapour tube of the rear boiler ensuring that the distillate outlet faces the front and the two water connections are parallel to the unit. When slight resistance is felt when fitting the condenser, press down slightly on the top of the condenser until a gap of approximately 19mm exists between the condenser and the boiler.

10. Pass the free end of the 8mm tubing through the hole (Fig. 2, item 15).

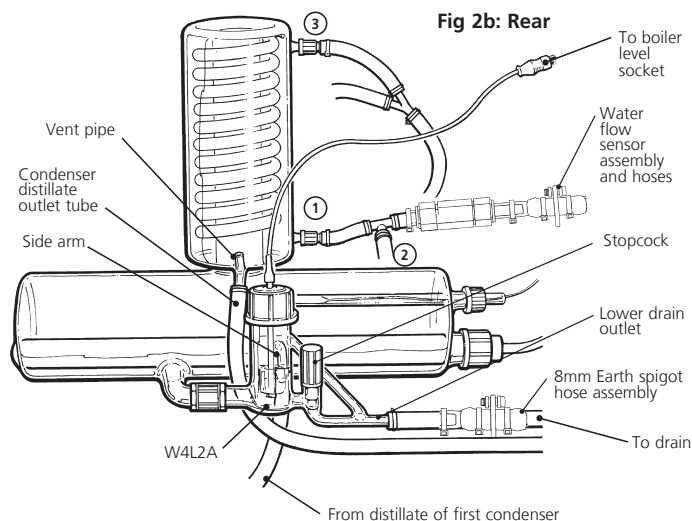
11. Take the rear Boiler Level Control W4L2A and connect the 8mm x 300mm vinyl tubing from hose kit I/WH48/3/B to the side arm and tie wrap (Fig. 2b). Remove the end split nut and central part of the boiler plastic coupling leaving the other split nut on, and the internal seal in the boiler level control. Ensure the stopcock is fully closed (screwed down).

12. Connect the tubing of the 8mm earth spigot hose assembly to the drain of the rear boiler level control W4L2A and tie wrap.

13. Take the 8mm x 1m vinyl tubing from hose kit I/WH48/3/B and connect to the 8mm earth spigot hose assembly in step 12 and tie wrap. Pass the free end of the 8mm tubing through the hole (Fig. 2, item 16).

14. Place the boiler plastic coupling split nut and central part onto the rear boiler connection. Connect the boiler level control to the boiler, ensuring that the internal seal of the boiler plastic coupling is fitted inside the boiler connection and the boiler level control connection. Tighten the boiler plastic coupling.

15. Connect the plug of the rear boiler level control to the DIN socket connector.



16. Refit the front boiler. Refit the thermostat probe removed in step 5.

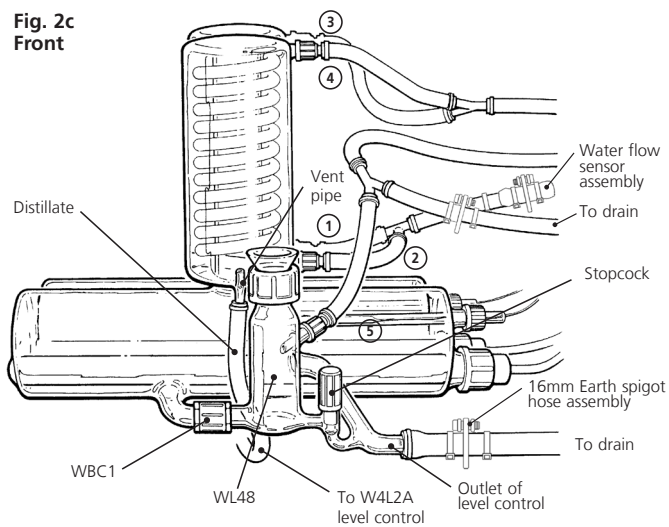
17. Fit the condenser to the front boiler vapour tube ensuring that the distillate outlet faces the front and the two water connections are parallel to the unit. When slight resistance is felt when fitting the condenser, press down slightly on the top of the condenser until a gap of approximately 19mm exists between the condenser and the boiler.

18. Connect the free end of the 8mm x 300mm tubing connected to the rear boiler level control side arm, to the distillate outlet of the front condenser (Fig. 2c).

19. Take the front Boiler Level Control WL48, remove the end split nut and central part of the boiler plastic coupling leaving the other split nut on, and the internal seal in the boiler level control. Ensure the stopcock is fully closed (screwed down).

20. Take the 16mm earth spigot and place the 16mm tubing part

Fig. 2c
Front



of it into a beaker of hot water for approximately 20 – 30 seconds; this will make the tubing more supple. Connect the 16mm tubing to the front boiler level control drain connection (below the stopcock). Secure with a tie wrap.

21. Take the 1m length of 16mm hose from hose kit I/WH48/3/B. Place one end into a beaker of hot water for approximately 20 – 30 seconds. Thread the tube through the hole (Fig. 2, item 18) until approximately 300mm of tubing is inside the cabinet. Connect to the 16mm earth spigot and secure with a tie wrap.
 22. Pull the 16mm hose back out of the cabinet until a gap of approximately 5mm exists between the boiler level control and the boiler connection.
 23. Place the boiler plastic coupling split nut and central part onto the boiler connection. Connect the boiler level control to the boiler, ensuring that the internal seal of the boiler plastic coupling is fitted inside the boiler connection and the boiler level control connection. Tighten the boiler plastic coupling.
 24. Locate the tube assemblies inside the cabinet and connect the numbered connectors as follows:
 - 1 – Bottom connection of rear condenser.
 - 2 – Bottom connection of front condenser.
 - 3 – Top connection of rear condenser.
 - 4 – Top connection of front condenser.
 - 5 – Front Boiler Level Control.
 25. Pass the remaining length of 8mm tubing through hole (Fig. 2, item 17).
 26. Loosen the black cap on the boiler level control. Fit the funnel into the top of the boiler level control and tighten the black cap.
 27. Remove the heater black cap and rubber ring from the rear boiler. Place the black cap onto one of the heaters until it is approximately 25mm from the electrical connectors end. Push the rubber ring onto the heater and into the black cap.
 28. Fit the heater into the boiler and screw on the black cap. When the black cap is tight push the heater through the black cap until the end of the heater sits in the nodule at the end of the boiler.
- Do not overtighten the screw caps as this may cause the boiler to break, or push the heaters in too far as this may break the nodule.**
29. Repeat steps 27 & 28 for front heater.
 30. Pass the electrical cables of the heaters up into the electrical control compartment via the two orifices. Push the spade connections onto the heater terminal block. Brown to Brown, Blue to Blue (Fig. 2d).

SAFETY: It could be possible to mis-locate the heater crimps on to the heater terminal block tags. Ensure that the heater crimps are properly located onto the heater terminal block tags and fully locked on. Attempt to pull the crimps off the tags to ensure full attachment.

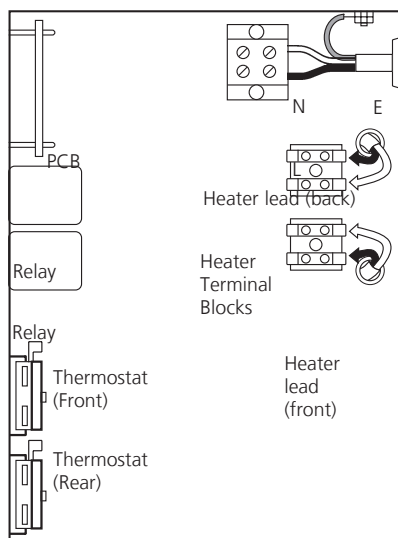



Fig. 2d

31. Refit the end plate and lid.
 32. Move the unit to its working location. Ensure a space of at least 50cm to the right of the unit to allow access.
 33. Connect the cold water supply to the mains water inlet. The tubing selected should have a safe working pressure of at least equal to the pressure of the water supply and should be adequately secured with hose clips.
- DO NOT TURN ON WATER SUPPLY**
34. **THIS EQUIPMENT MUST BE EARTHED!** 

Carry out the electrical installation. This should only be carried out by a suitably qualified electrician.

The WS-200AD-4 is classed as permanently connected equipment. The earth spigots should pass a high current (ie. >200mA).

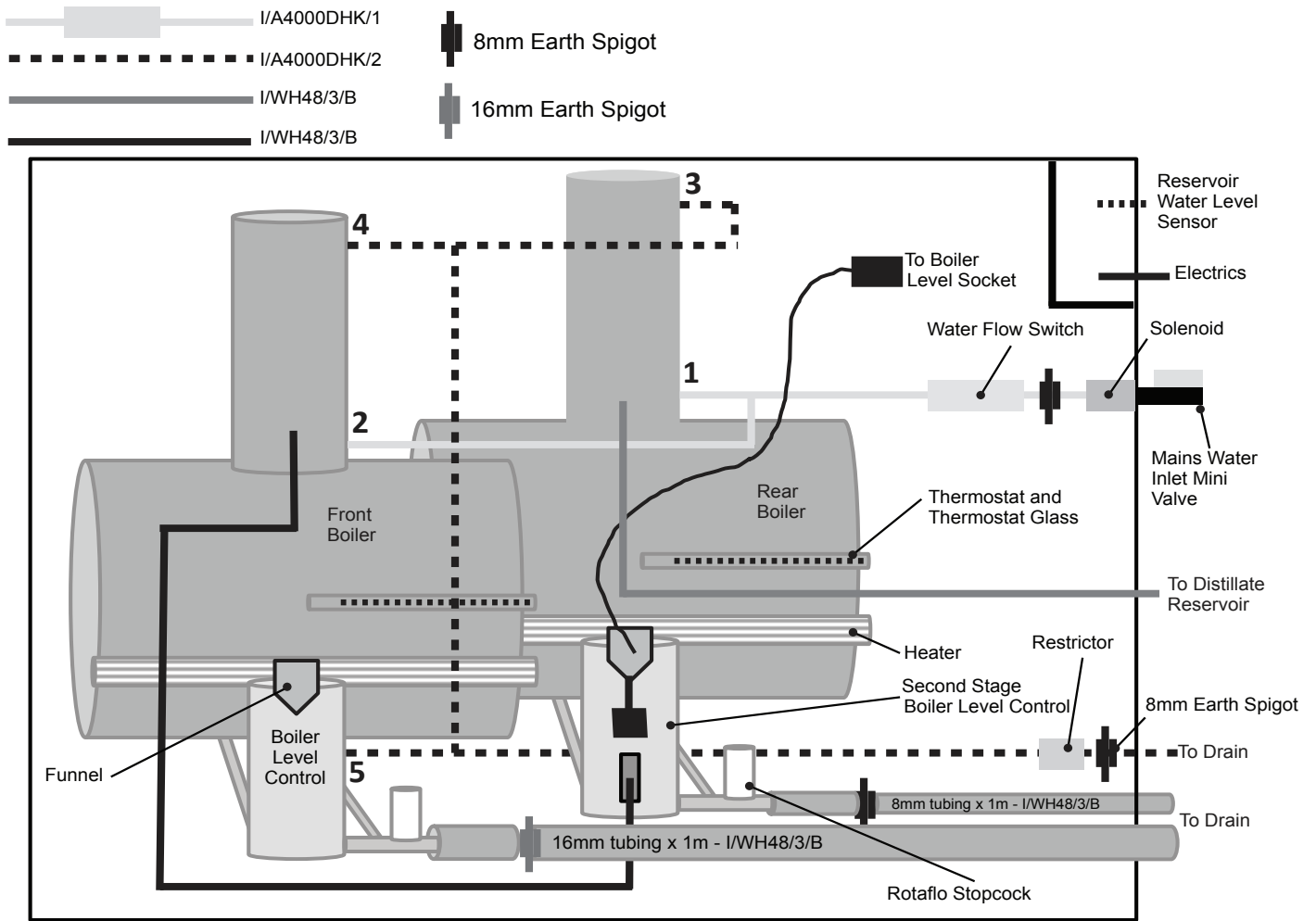
The equipment is supplied with 1.5m of flexible, triple core, circular cable to the following specification: 4.0mm², to BS 6500 or equivalent and <HAR> or BASEC approved.

Connection to the mains electrical supply should be via a double pole 30mA Residual Current Breaker with Overcurrent protection (RCBO) isolating circuit breaker switch with a continuous current carrying capacity of 30A at 250V and overcurrent of 30A.

These devices should be sited near to the equipment and clearly marked 'Disconnect device for Cole-Parmer Water Still'

DO NOT SWITCH ON ELECTRICAL SUPPLY.
 35. Connect the reservoir water level sensor WLS (Fig. 2, item 14) to the WS-200AD-4 and secure with a tie wrap. Place the glass pressure bell in the collection reservoir, following the instructions given on page 19.
 36. Operate the WS-200AD-4 Waterstill as per Operating Instructions and check for leaks.
 37. Fit the Perspex viewing screen.

WS-200AD-4 Installation Diagram



WS-200AD-4 Operation

The following instructions apply to the WS-200AD-4 Water Still where the water feed to the boiler is via the mains supply or a header tank.

1. Before switching on either the mains electricity or water supply, identify the control switches and indicator lights on the front of the cabinet.

Green Light – When illuminated this shows that there is mains supply voltage to the unit. Under no circumstances should the cabinet end-panel be removed when this light is illuminated.

White 'On/Off' Switch – This is the primary switch for controlling water and electricity inside the still. The switch illuminates when pressed in the ON position.

Amber Light – When illuminated, this indicates that the distillate collection reservoir is full as detected by the level control.

White 'Clean' Light – This shuts off the heating element but allows water to flow into the boiler when the still is being commissioned or cleaned. When pressed in the CLEAN position the switch illuminates.

2. Carefully check the following:

The appropriate electricity, water and drain services have been provided. If in doubt, consult the LOCATION & SERVICES SECTION of this manual.

The ON/OFF switch on the control panel is in the OFF position.

The CLEAN switch is pressed in the ON position.

The stopcocks on the front and rear boiler level controls are closed.

The float switch on the rear boiler level control W4L2A is set at the factory. However, check that this has not been disturbed during transit. A rough check is that the distance from the top of the large screw cap of the W4L2A to the top of the glass guide tube should be approximately 15-20mm (Fig 2e).

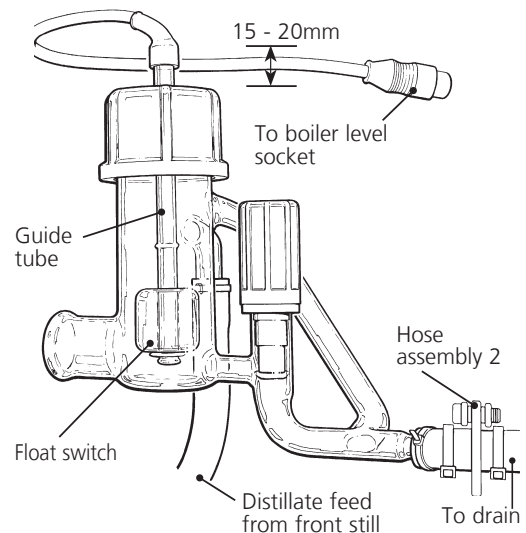


Fig 2e

The reservoir water level sensor is fitted to the distillate collection vessel.

The dummy shorting plug is fitted to the boiler level control DIN socket on the cabinet.

3. Ensure all earth leads are connected to the earth point.
4. Check all glassware for any damage.
5. Switch on the electricity supply – the green light illuminates.
6. Press the ON/OFF switch to the ON position – the switch will illuminate.
7. Recheck that the CLEAN switch is in the ON position and illuminated.
8. Turn on the mains water supply and using the mini valve assembly, adjust the flow rate to approximately 2 litre/min. This can be achieved by observing the drain water from the boiler level control and adjusting the mini valve assembly accordingly.
9. Check for water leaks.
10. Observe that the front boiler is now filling with water to cover the heating elements. When the water has reached the pre-set limit, the excess will discharge to drain. Check the water drains freely and does not back up into the boiler level control.
11. Switch the CLEAN button off by pressing it a second time. The switch light goes out.

The heater on the front boiler will now warm up and eventually run at a red glow. After a short time distilled water will emerge from the outlet pipe. This should feed into the empty rear boiler via the rear boiler level control WL42A.

12. Allow the rear boiler to fill with single distilled water (for approximately 20 – 30 minutes), keeping an eye on the level. Note that the heater of the second stage only comes on when the level of single distilled water in the rear boiler is at about the equator. It may be necessary to adjust the level of the float switch of the rear boiler level control (WL42A) to achieve this condition.

Lifting the guide tube increases the level at which the heating element will switch on.

Lowering the guide tube decreases the level at which the element will switch on.

Double distilled water ultimately flows from outlet pipe (Fig. 2, item 15). This should fall away from the still with no kinks, restrictions or U bends.

13. To avoid excess wastage of coolant water, make further adjustments to the mini valve assembly. Slowly reduce the flow rate until the flow control switch switches off the heater, then increase the flow until the power is restored.
14. **Safety Cut-Outs** – All Cole-Parmer Water Stills are protected by the following safety devices.

Flow Control Switch – Monitors the flow of coolant water into the still and shuts off the heating element if the flow is insufficient.

Thermostat Cut-Out – In normal operation the water within the glass will be at 100°C. In single fault conditions, i.e. in the event of water supply failure, the content will increase to 112°C where upon a resettable thermostat will operate. Once switched, the thermostat has to be manually reset. This is achieved by unscrewing the black knob located inside the cabinet and pressing the reset button.

Reservoir Control – Is positioned on the collection reservoir and switches off both the electricity and water supplies when the reservoir is full of distillate water. The water supply is shut

off around 7 minutes after the reservoir is full to allow the heating element to cool.

It is recommended that the operation of the flow switch and reservoir control is checked on a regular basis.

a. Simulation of Mains Water Supply Failure

Turn off the mains water supply at the tap. This should switch off the heating element. Turning the tap on again will switch the heater on.

b. Simulation of Reservoir Full Condition

Lower the glass pressure bell of the reservoir water level sensor into the distillate to a depth of 150mm. This will switch off the heating element immediately and the cooling water after 7 minutes. Raising the bell will cause both to be re-supplied.

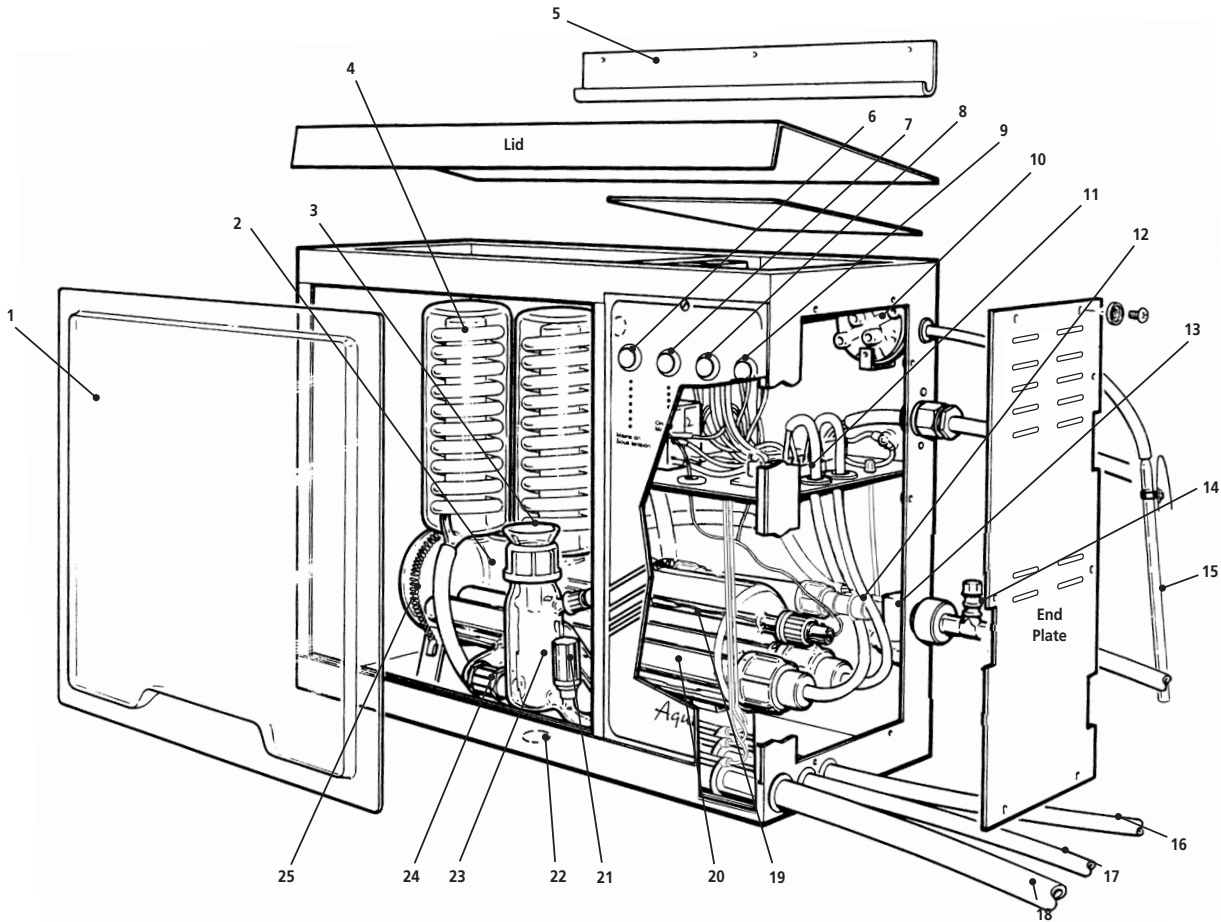
16. **Switching Off** – Push the CLEAN switch to the ON position. Wait until the residual heat contained in the heating element has dispersed and no boiling is evident. Turn off water supply. Push ON/OFF switch to OFF position. Isolate from mains electricity supply.

WS-200AD-4 Spares

Boiler	WB4
Funnel	WF48
Condenser	WC48/M2
'Mains On' Green Indicator	700691(S)
'On/Off' White Switch	700988(S)
'Reservoir Full' Amber Indicator	700987
'Clean' White Switch	700988(S)
Reservoir Pressure Switch	WPS
Heater Terminal Block	A4000/HTB
Solenoid Assembly	A4000/SA
Water Flow Sensor Assembly and Hoses	I/A4000DHK/1
Reservoir Water Level Sensor	WLS
Mains Water Mini Valve Assembly	7001059(S)
Thermostat Glass Tube	WTT48
Thermostat	WT4
Boiler Level Control (Front)	WL48
Boiler Level Control (Rear)	W4L2A
Boiler Plastic Coupling	WBC1
Heater Assembly	A4000/HA
Heater Assembly 220V	A4000/HA220
Boiler Retaining Spring	700007
Condenser to Boiler Level Control Assembly	I/A4000DHK/2
w stopcock Assembly	A4000/RCOCK
Relay Assembly	A4000/RA
PCB	700804(ES)
6 Way Electrical Terminal Block	A4000/ETB
Ceramic Terminal Block	A4000/CTB
5 DIN Socket Assembly	A4000/DIN
Boiler Vapour Tube Sealing O Ring	I/M502
Boiler Vapour Tube Stabilising O Ring	I/QR38/24
4 DIN Socket Assembly	A4000D/DIN
Distillate Output and Boiler Level Control Drain Hose Kit	I/WH48/3/B
Black Phenolic Screw Cap	I/QC38/25

WS-200A-8

Fig. 3



List of Major Components – WS-200A-8

Item no.	Description	Catalogue number	Item no.	Description	Catalogue number
1	Perspex Screen	M484	14	Mains Water Inlet Valve Assembly	7001059(S)
2	Boiler	WB8	15	Reservoir Water Level Sensor	WLS
3	Funnel	WF48	16	Distillate Outlet Pipe (Bench Mounted)	–
4	Condenser (2 off)	WC48/M2	17	Cooling Water Pipe to Drain (8mm)	–
5	Wall Bracket	M510G	18	Cooling Water Pipe to Drain (16mm)	–
6	Green 'Mains On' Indicator	700691(S)	19	Thermostat	WT8
7	White 'On/Off' Switch	700988(S)	20	Heater Assembly (2 Required)	A4000/HA
8	Amber 'Reservoir Full' Indicator	700987	21	stopcock	A4000/RCOCK
9	White 'Clean' Switch	700988(S)	22	Distillate Outlet Pipe (Wall Mounted)	–
10	Reservoir Pressure Switch	WPS	23	Boiler Level Control	WL48
11	Terminal Strip for Heaters	A4000/HTB	24	Boiler Plastic Coupling	WBC1
12	Water Flow Sensor Assembly	I/A8000HK/1	25	Retaining Springs	7000007
13	Solenoid Assembly	A4000/SA			

WS-200A-8 Assembly

Your Cole-Parmer Water Still WS-200A-8 has been designed with ease of assembly specifically in mind. Please study the installation diagram and the enclosed DVD before commencing the installation. Follow the sequence of instructions and do not connect the mains electricity supply until directed.

- From the outer packaging remove all the components including the metal cabinet containing the glass boiler.
- Before unpacking the individual components, identify them on the check list below:
 WS-200A-8 Unit containing boiler.
 Condenser – WC48/M2 x2
 Heater – W48H x2
 Boiler Level Control – WL48
 Funnel – WF48
 Reservoir Water Level Sensor – WLS
 Hose Kit – IWH48/2/B
 Wall Mounting Bracket – M510G
- Remove the perspex viewing screen (Fig. 3, item 1) from the unit by lifting it up using the finger recess. Remove the internal packaging carefully. Snip the temporary ties holding the boiler retaining springs (Item 25).
- Remove the cabinet end plate and lid by removing the retaining screws.
- Ensure that the sealing O rings and the stabilising O rings are correctly positioned on the vapour tubes of the boiler.

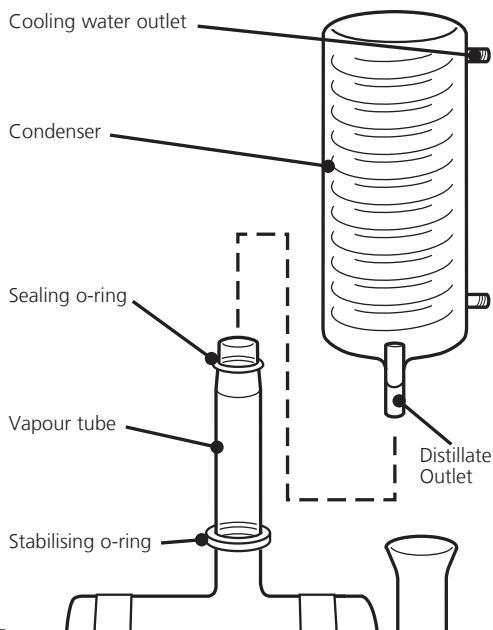


Fig. 3a

- Fit one of the condensers (Fig. 3, item 4) to the left hand vapour tube ensuring that the distillate outlet faces the front and the two water connections are parallel to the unit. When slight resistance is felt when fitting the condenser, press down slightly on the top of the condenser until a gap of approximately 19mm exists between the condenser and the boiler (Fig. 3a).
- Looking inside the cabinet, identify the vinyl tubing assemblies fitted with numbered screw thread connectors. Make the following connections:

Connect number 2 to the lower water inlet of the condenser.

Connect number 4 to the upper water outlet of the condenser (Fig. 3b).

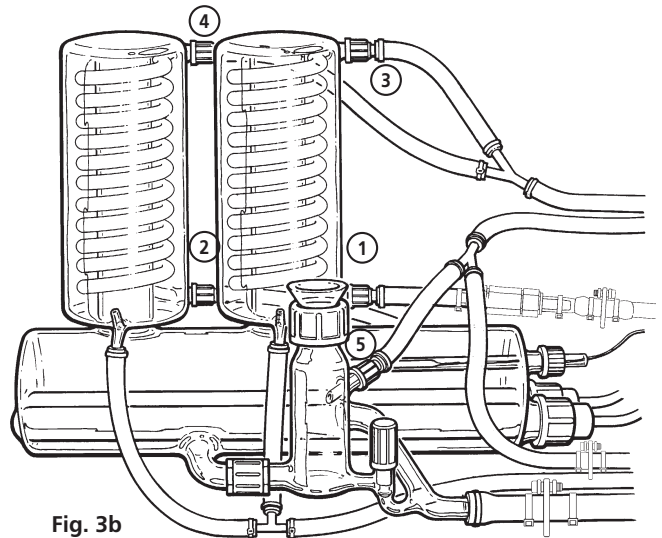


Fig. 3b

- Fit the second condenser (Fig. 3, item 4) to the right hand vapour tube ensuring that the distillate outlet faces the front and the two water connections are parallel to the unit. When slight resistance is felt when fitting the condenser, press down slightly on the top of the condenser until a gap of approximately 19mm exists between the condenser and the boiler.
- Looking inside the cabinet, identify the vinyl tubing assemblies fitted with numbered screw thread connectors. Make the following connections:
 Connect number 1 to the lower water inlet of the condenser.
 Connect number 3 to the upper water outlet of the condenser (Fig. 3b).
- From the hose kit IWH48/2/B take the 1m length of 8mm tubing fitted with the T piece.
- Connect the 180mm length of tubing from the T piece to the distillate outlet of the condenser on the left hand side. Secure with a tie wrap.
- Connect the 100mm length of tubing from the T piece to the distillate outlet of the condenser on the right hand side. Secure with a tie wrap.
- Pass the free end of the tubing through:
 The cabinet base (Fig. 3, item 22) if wall mounted.
 The cabinet side (Fig. 3, item 16) if bench mounted.
- Take the boiler level control WL48 (Fig. 3, item 23). Remove the end split nut and central part of the boiler plastic coupling (Item 24) leaving the other split nut on, and the internal seal in the boiler level control. Ensure the stopcock is fully closed (screwed down).
- Take the 16mm earth spigot and place the 16mm tubing part of it into a beaker of hot water for approximately 20 – 30 seconds; this will make the tubing more supple. Connect the 16mm tubing to the boiler level control (Item 23) drain connection (below the stopcock). Secure with a tie wrap.
- Take the 1m length of 16mm hose from hose kit IWH48/2/B. Place one end into a beaker of hot water for approximately 20 – 30 seconds. Thread the tube through hole (Fig. 3, item 18) until approximately 300mm of tubing is inside the cabinet. Connect to the 16mm earth spigot and secure with a tie wrap.
- Pull the 16mm hose back out of the cabinet until a gap of

approximately 5mm exists between the boiler level control and the boiler connection.

18. Place the boiler plastic coupling split nut and central part onto the boiler connection. Connect the boiler level control to the boiler, ensuring that the internal seal of the boiler plastic coupling is fitted inside the boiler connection and the boiler level control connection. Tighten the boiler plastic coupling.
 19. Loosen the black cap on the boiler level control. Fit the funnel into the top of the boiler level control and tighten the black cap.
 20. Connect the tubing connector number 5 to the boiler level control (Fig 3b).
 21. Take the remaining length of 8mm tubing from the 8mm earth spigot and feed through the hole (Fig. 3, item 17).
 22. Unscrew the two black plastic screw caps and rubber rings from the boiler. Place the black caps onto the heaters until they are approximately 25mm from the electrical connectors end. Push the rubber ring onto the heaters and into the black cap.
 23. Fit the heaters into the boiler and screw on the black caps. When the black caps are tight push the heaters through the black caps until the end of the heaters sit in the nodules at the end of the boiler.
- Do not overtighten the screw caps as this may cause the boiler to break, or push the heaters in too far as this may break the nodule.**
24. Thread the four heater connectors through the holes into the electrical control compartment and connect to the heater terminal blocks. Brown to Brown, Blue to Blue (Fig. 3c).

SAFETY: It could be possible to mis-locate the heater crimps on to the heater terminal block tags. Ensure that the heater crimps are properly located onto the heater terminal block tags and fully locked on. Attempt to pull the crimps off the tags to ensure full attachment.

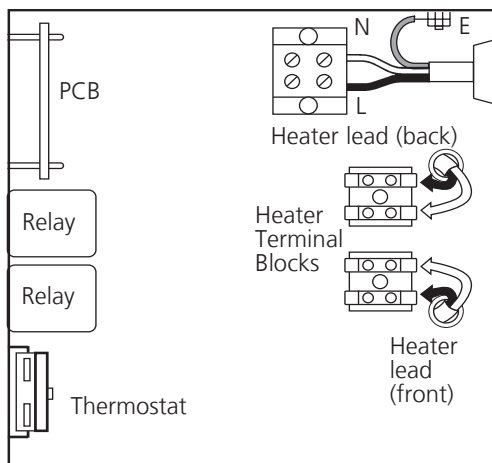


Fig. 3c

25. Refit the end plate and lid.
26. Move the unit to its working location. If it is to be wall mounted use the mounting bracket Fig. 3 (Item 5). Ensure a space of at least 50cm to the right of the unit to allow access.
27. Connect the cold water supply to the mains water inlet. The tubing selected should have a safe working pressure of at least equal to the pressure of the water supply and should be adequately secured with hose clips.

DO NOT TURN ON WATER SUPPLY

28. THIS EQUIPMENT MUST BE EARTHED! 

Carry out the electrical installation. This should only be carried out by a suitably qualified electrician.

The WS-200A-8 is classed as permanently connected equipment. The earth spigots should pass a high current (ie. >200mA).

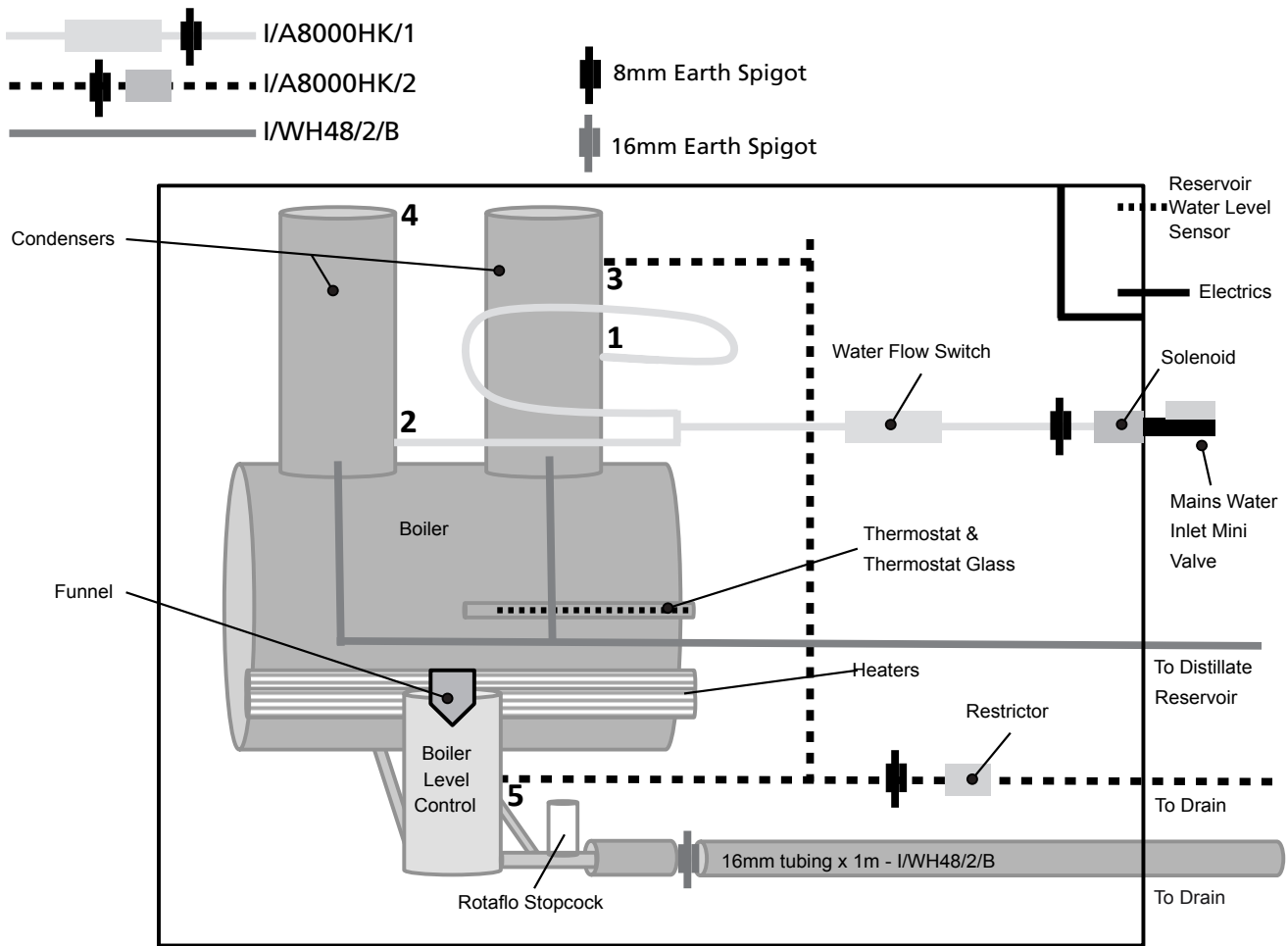
The equipment is supplied with 1.5m of flexible, triple core, circular cable to the following specification: 4.0mm², to BS 6500 or equivalent and <HAR> or BASEC approved.

Connection to the mains electrical supply should be via a double pole 30mA Residual Current Breaker with Overcurrent protection (RCBO) isolating circuit breaker switch with a continuous current carrying capacity of 30A at 250V and overcurrent of 30A.

These devices should be sited near to the equipment and clearly marked 'Disconnect device for Cole-Parmer Water Still'
DO NOT SWITCH ON ELECTRICAL SUPPLY.

29. Connect the reservoir water level sensor WLS (Fig. 3, item 15) to the WS-200A-8 and secure with a tie wrap. Place the glass pressure bell in the collection reservoir, following the instructions given on page 19.
30. Operate the WS-200A-8 Waterstill as per Operating Instructions and check for leaks.
31. Fit the Perspex viewing screen.

WS-200A-8 Installation Diagram



WS-200A-8 Operation

The following instructions apply to the WS-200A-8 Water Still where the water feed to the boiler is via the mains supply, or a header tank.

1. Before switching on either the mains electricity or water supply, identify the control switches and indicator lights on the front of the cabinet.

Green Light – When illuminated this shows that there is mains supply voltage to the unit. Under no circumstances should the cabinet end-panel be removed when this light is illuminated.

White 'On/Off' Switch – This is the primary switch for controlling water and electricity inside the still. The switch illuminates when pressed in the ON position.

Amber Light – When illuminated, this indicates that the distillate collection reservoir is full as detected by the level control.

White 'Clean' Light – This shuts off the heating element but allows water to flow into the boiler when the still is being commissioned or cleaned. When pressed in the CLEAN position the switch illuminates.

2. **Carefully check the following:**

The appropriate electricity, water and drain services have been provided. If in doubt, consult the LOCATION & SERVICES SECTION of this manual.

The ON/OFF switch on the control panel is in the OFF position.

The CLEAN switch is pressed in the CLEAN position.

The stopcock on the front boiler level control is closed.

The reservoir water level sensor is fitted to the distillate collection vessel.

The dummy shorting plug is fitted to the boiler level control DIN socket on the cabinet.

3. Ensure all earth leads are connected to the earth point.
4. Check all glassware for any damage.
5. Switch on the electricity supply – the green light illuminates.
6. Press the ON/OFF switch to the ON position – the switch will illuminate.
7. Recheck that the CLEAN switch is in the CLEAN position and illuminated.
8. Turn on the mains water supply and using the mini valve assembly, adjust the flow rate to approximately 2 litres/min. This can be achieved by observing the drain water from the boiler level control and adjusting the mini valve assembly accordingly.
9. Check for water leaks.

10. Observe the boiler now filling with water to cover the heating elements. When water has reached the pre-set limit, the excess will discharge to drain. Check the water drains freely and does not back up into the boiler level control.
11. Switch the CLEAN button off by pressing it a second time. The switch light goes out.
12. The heaters will now warm up and eventually run at a red glow. If the flow rate is insufficient, the heaters will not switch on. This will require adjustment of the mini valve assembly to be opened further. After about 2 – 3 minutes of operation distilled water will emerge from the outlet pipe falling into the collection reservoir.
13. To avoid excess wastage of coolant water, make further adjustments to the mini valve assembly. Slowly reduce the flow rate until the flow control switch switches off the heaters, then increase the flow until the power is restored.
14. Refit the Perspex screen.
15. **Safety Cut-Outs** – All Cole-Parmer Water Stills are protected by the following safety devices.

Flow Control Switch – Monitors the flow of coolant water into the still and shuts off the heating element if the flow is insufficient.

Thermostat Cut-Out – In normal operation the water within the glass will be at 100°C. In single fault conditions, i.e. in the event of water supply failure, the content will increase to 112°C where upon a resettable thermostat will operate. Once switched, the thermostat has to be manually reset. This is achieved by unscrewing the black knob located inside the cabinet and pressing the reset button.

Reservoir Control – Is positioned on the collection reservoir and switches off both the electricity and water supplies when the reservoir is full of distillate water. The water supply is shut off around 7 minutes after the reservoir is full to allow the heating element to cool.

It is recommended that the operation of the flow switch and reservoir control is checked on a regular basis.

a. Simulation of Mains Water Supply Failure

Turn off the mains water supply at the tap. This should switch off the heating element. Turning the tap on again will switch the heater on.

b. Simulation of Reservoir Full Condition

Lower the glass pressure bell of the reservoir water level sensor into the distillate to a depth of 150mm. This will switch off the heating element immediately and the cooling water after 7 minutes. Raising the bell will cause both to be re-supplied.

16. **Switching Off** – Push the CLEAN switch to the ON position. Wait until the residual heat contained in the heating element has dispersed and no boiling is evident. Turn off water supply. Push ON/OFF switch to OFF position. Isolate from mains electricity supply.

WS-200A-8 Spares

Boiler	WB8
Funnel	WF48
Condenser	WC48/M2
'Mains On' Green Indicator	700691(S)
'On/Off' White Switch	700988(S)
'Reservoir Full' Amber Indicator	700987
'Clean' White Switch	700988(S)
Reservoir Pressure Switch	WPS
Heater Terminal Block	A4000/HTB
Solenoid Assembly	A4000/SA
Water Flow Sensor Assembly and Hoses	I/A8000HK/1
Condenser to Boiler Level Control Hose Assembly	I/A8000HK/2
Reservoir Water Level Sensor	WLS
Mains Water Mini Valve Assembly	7001059(S)
Thermostat Glass Tube	WTT48
Thermostat	WT8
Boiler Level Control	WL48
Boiler Plastic Coupling	WBC1
Heater Assembly	A4000/HA
Heater Assembly 220V	A4000/HA220
Boiler Retaining Spring	700007
Distillate Output and Boiler Level Control Drain Hose Kit	I/WH48/2/B
w Stopcock Assembly	A4000/RCOCK
Relay Assembly	A4000/RA
PCB	700804(ES)
6 Way Electrical Terminal Block	A4000/ETB
Ceramic Terminal Block	A4000/CTB
5 DIN Socket Assembly	A4000/DIN
Boiler Vapour Tube Sealing O Ring	I/M502
Boiler Vapour Tube Stabilising O Ring	I/QR38/24
Black Phenolic Screw Cap	I/QC38/25
Wall Mounting Bracket	M510G

Distillate Collection & Reservoir System

Each Cole-Parmer Water Still is supplied with a Reservoir Water Level Sensor (WLS).

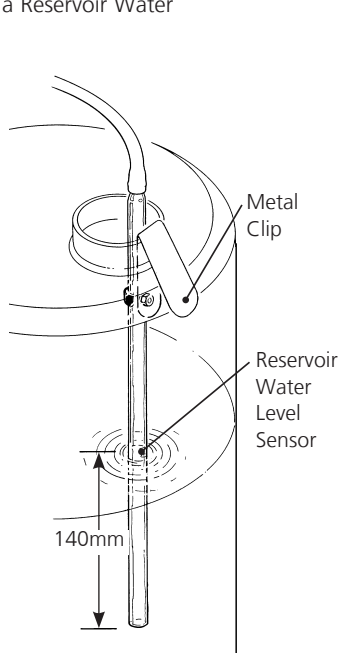
This automatically switches off the heating elements and coolant water supply when the distillate collection reservoir is filled with distilled water.

Note that the control is fitted with a 'delay timer' which switches off the coolant water supply approximately 7 minutes after the heating elements. This is to allow time for the heaters to cool and for boiling to cease.

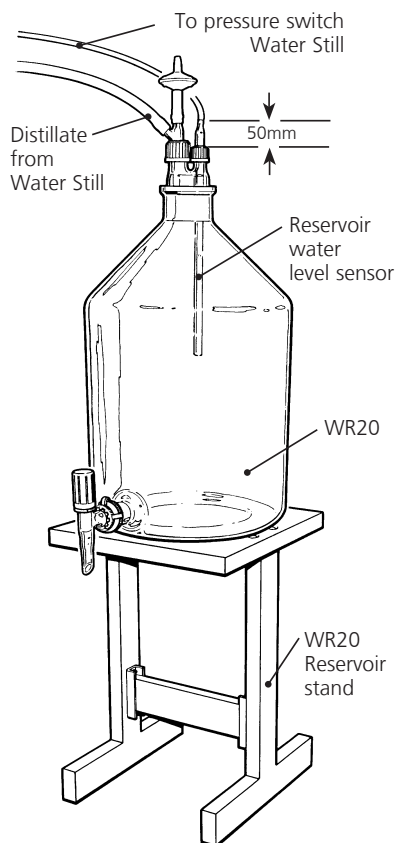
The control also automatically switches on the heating elements and coolant water supply when the level of distillate in the collection reservoir falls.

It is possible to fit the glass pressure bell of the control to most types of reservoir and container by means of a metal clip WFC/1 which is provided with the Reservoir Water Level Sensor Assembly (WLS).

Alternatively, Antylia Scientific offer a purpose designed reservoir collection system WR20 fitted with a special adapter to hold the bell.

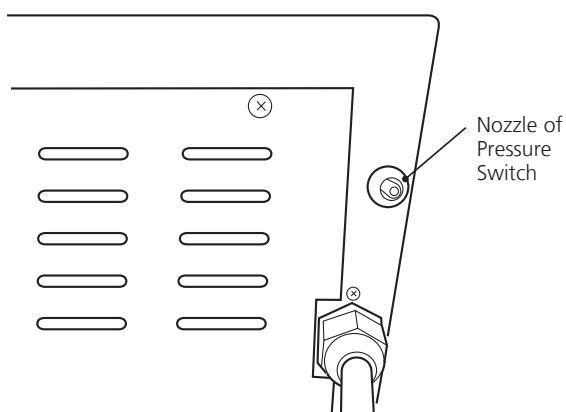


WR20 & WS20 Reservoir System



Fitting the Reservoir Control WLS to Collection Vessels

1. Position the distillate collection reservoir in a suitable location. This should be below the Water Still so that the vinyl rubber tubing transporting the distilled water from the still can fall down to the reservoir without restrictions, kinks or U bends.
2. Take the Reservoir Water Level Sensor WLS and connect the free end of the rubber tubing to the nozzle of the pressure switch located on the side of the Cole-Parmer Water Still cabinet. Secure with a tie wrap.



3. Use the metal clip to fit the glass pressure bell inside the distillate collection reservoir.
4. Position the bell so that the open end is 140mm below the desired distillate level.

Antylia Scientific offer a purpose designed reservoir system for the collection of distilled water from your Cole-Parmer Water Still.

WR20 – A 20 litre glass reservoir complete with stopcock and special lid.

WS20 – Reservoir stand, 43cm high for use with WR20.

The lid of the reservoir has a side arm for connection to the distillate feed from the Cole-Parmer Water Still and a vent fitted with a bacteriological filter to maintain the purity of the water. A screw thread fitting is also provided to support the Reservoir Water Level Sensor (WLS).

Location & Assembly

1. Locate the reservoir in a position which is below the level of the Water Still.
2. Fit the drain cock to the lower ground glass socket of the reservoir and secure with the plastic joint clip.
3. Take the bacteriological filter and connect this to the top of the glass feed-pipe using the vinyl tubing provided. Fit the feed pipe and filter into the reservoir lid via the large screw cap fitting.
4. Fit the Reservoir Water Level Sensor (WLS) to the lid via the small screw cap fitting. Note that the system of the glass pressure bell should extend approximately 50mm above the screw cap.
5. Place the assembled lid into the socket of the reservoir.
6. Take the rubber tubing from the Reservoir Water Level Sensor (WLS) and connect to the small plastic nozzle on the side of the Cole-Parmer Water Still cabinet.
7. Take the vinyl plastic tubing from the distillate outlet of the Water Still and connect to the side arm of the feed pipe on the reservoir lid. Ensure that the tubing falls down to the reservoir without any restrictions, kinks or U bends.

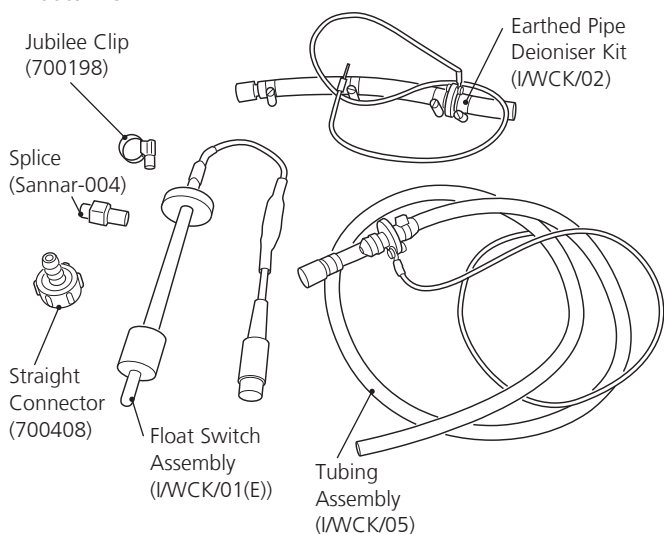
Connection of stills to deionised and pre-treated water supplies

Many laboratories prefer to feed their Water Stills with deionised or pre-treated water to obviate the need for boiler cleaning and descaling.

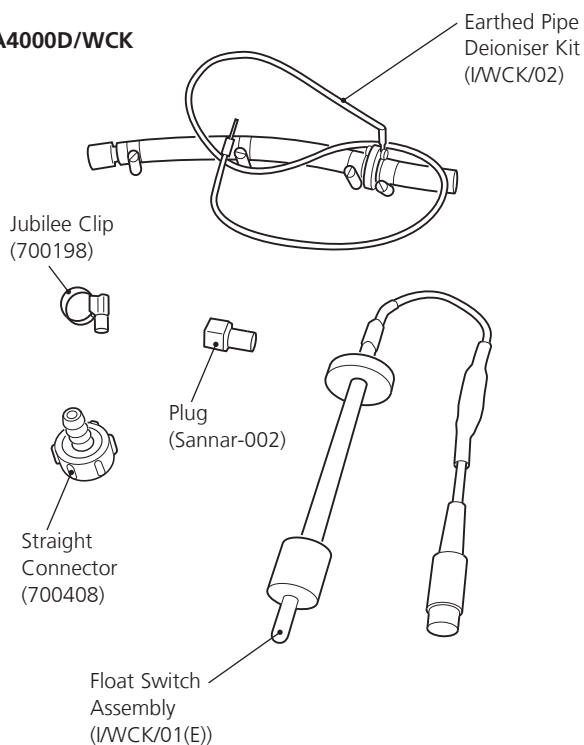
Your new Cole-Parmer Water Still can be easily converted to a deionised water feed by use of a simple accessory – the Water Feed Conversion Kit, Part No A4000/WCK (WS-200A-4) or A4000D/WCK (WS-200AD-4 & WS-200A-8). This kit permits the still to operate with most types of deioniser and also piped supplies of pre-treated water.

The sequence of operations to fit the kit is detailed below and should be used in conjunction with the instructional video which accompanies the kit. The video is also accessible on You Tube (www.youtube.com/c/ColeParmerEssentials) or www.coleparmer.com.

A4000/WCK



A4000D/WCK



WS-200A-4

1. Ensure the unit is isolated from the mains.
2. Remove the perspex viewing screen, cabinet roof and cabinet end panel.
3. Lift out the front switch panel from the cabinet groove by unscrewing the countersunk screw at the top of the panel. This will allow better access to the plumbing system.
4. Unscrew the tubing connector marked '3' from the boiler level control as shown in the WS-200A-4 Installation Diagram on page 6.
5. Connect the splice (Sannar-004) to the tubing connector marked '3' disconnected in step 4.
6. Connect tubing assembly (IWCK/05) to the other end of the splice in step 5.
7. Thread the earth cable from tubing assembly (IWCK/05) through the access hole in bottom of the electrical compartment and connect to the main earth point.
8. Thread the tubing from tubing assembly (IWCK/05) through the last hole on the side of the cabinet to the drain.
9. Take tubing assembly (IWCK/02) and connect to the deionised / pre-treated water solenoid, and secure with a jubilee clip.
10. Connect the other end of the tubing assembly (IWCK/02) to the boiler level control.
11. Thread the earth cable from tubing assembly (IWCK/02) through the access hole in bottom of the electrical compartment and connect to the main earth point.
12. Unscrew the black cap from the boiler level control and remove the funnel and seal.
13. Fit the boiler level control black cap over the float switch assembly (IWCK/01(E)) and fit to the boiler level control ensuring that the end of the guide tube locates in the well at the base.
14. Remove the dummy plug from the DIN connector and connect the float switch assembly connector.
15. Remove the dummy cap from the deionised / pre-treated water inlet and fit the straight hose connector (700408).
16. Connect the straight hose connector (700408) to the outlet of the deionised / pre-treated water supply. Note the tubing selected should have a safe working pressure of at least equal to the pressure of the water supply and should be adequately secured with hose clips.
17. Refit the front switch panel.
18. Refit the perspex viewing screen, cabinet side panel and cabinet roof.

WS-200AD-4

1. Ensure the unit is isolated from the mains.
2. Remove the perspex viewing screen, cabinet roof and cabinet end panel.
3. Lift out the front switch panel from the cabinet groove by unscrewing the countersunk screw at the top of the panel. This will allow better access to the plumbing system.
4. Unscrew the tubing connector marked '5' from the boiler level control as shown in the WS-200AD-4 Installation Diagram on page 12.
5. Connect the plug (Sannar-002) to the tubing connector marked '5' disconnected in step 4.
6. Take tubing assembly (IWCK/02) and connect to the deionised / pre-treated water solenoid, and secure with a jubilee clip.

7. Connect the other end of the tubing assembly (IWCK/02) to the boiler level control.
8. Thread the earth cable from tubing assembly (IWCK/02) through the access hole in bottom of the electrical compartment and connect to the main earth point.
9. Unscrew the black cap from the front boiler level control and remove the funnel and seal.
10. Fit the front boiler level control black cap over the float switch assembly (IWCK/01(E)) and fit to the front boiler level control ensuring that the end of the guide tube locates in the well at the base.
11. Remove the dummy plug from the DIN connector and connect the float switch assembly connector.
12. Remove the dummy cap from the deionised / pre-treated water inlet and fit the straight hose connector (700408).
13. Connect the straight hose connector (700408) to the outlet of the deionised / pre-treated water supply. Note the tubing selected should have a safe working pressure of at least equal to the pressure of the water supply and should be adequately secured with hose clips.
14. Refit the front switch panel.
15. Refit the perspex viewing screen, cabinet side panel and cabinet roof.

WS-200A-8

1. Ensure the unit is isolated from the mains.
2. Remove the perspex viewing screen, cabinet roof and cabinet end panel.
3. Lift out the front switch panel from the cabinet groove by unscrewing the countersunk screw at the top of the panel. This will allow better access to the plumbing system.
4. Unscrew the tubing connector marked '5' from the boiler level control as shown in the WS-200A-8 Installation Diagram on page 17.
5. Connect the plug (Sannar-002) to the tubing connector marked '5' disconnected in step 4.
6. Take tubing assembly (IWCK/02) and connect to the deionised / pre-treated water solenoid, and secure with a jubilee clip.
7. Connect the other end of the tubing assembly (IWCK/02) to the boiler level control.
8. Thread the earth cable from tubing assembly (IWCK/02) through the access hole in bottom of the electrical compartment and connect to the main earth point.
9. Unscrew the black cap from the boiler level control and remove the funnel and seal.
10. Fit the boiler level control black cap over the float switch assembly (IWCK/01(E)) and fit to the boiler level control ensuring that the end of the guide tube locates in the well at the base.
11. Remove the dummy plug from the DIN connector and connect the float switch assembly connector.
12. Remove the dummy cap from the deionised / pre-treated water inlet and fit the straight hose connector (700408).
13. Connect the straight hose connector (700408) to the outlet of the deionised / pre-treated water supply. Note the tubing selected should have a safe working pressure of at least equal to the pressure of the water supply and should be adequately secured with hose clips.
14. Refit the front switch panel.
15. Refit the perspex viewing screen, cabinet side panel and cabinet roof.

Operation

1. Before switching on either the mains electricity or water supply, identify the control switches and indicator lights on the front of the cabinet.

Green Light – When illuminated this shows that there is mains supply voltage to the unit. Under no circumstances should the cabinet end panel be removed if this light is illuminated.

White 'on/off' Switch – This is the primary switch for controlling water and electricity inside the still. The switch illuminates when pressed in the 'on' position.

Amber Light – When illuminated this indicates that the distillate collection reservoir is full as detected by the level control.

White 'Clean' Switch – This shuts off the heating element but allows water to flow into the boiler when the still is being commissioned or cleaned. When pressed in the 'Clean' position the switch illuminates.

2. Carefully check:
 - i. the appropriate electricity, water and drain services have been provided. If in doubt, consult the Location and Services section on page 3.
 - ii. the on/off switch on the control panel is in the off position.
 - iii. the clean switch is pressed in the clean position.
 - iv. the stopcock on the boiler level control is closed.
 - v. the reservoir pressure switch is fitted to the distillate collection vessel.
 - vi. the dummy shorting plug has been removed from its socket and replaced with the lead from the float switch assembly (IWCK/01(E)).
3. Switch on the electricity supply – the green indicator light will illuminate.
4. Press the on/off switch to the on position – the switch will illuminate.
5. Recheck that the clean switch is in the clean position and illuminated.
6. Turn on the mains water supply and using the mini valve assembly, adjust the flow rate to approximately 1 litre/min for WS-200A-4 and 2 litres/min for WS-200AD-4 and WS-200A-8. This can be achieved by observing the drain water from the boiler level control and adjusting the mini valve assembly accordingly. Check the mains water flows to drain without restriction.
7. Turn on the supply of deionised or pre-treated water. Observe that deionised water enters the boiler via the float switch assembly in the boiler level control.
8. Allow deionised water to flow into the boiler until the heating element(s) is covered by approximately 10mm of water. At this level the flow of deionised water into the boiler should be automatically cut off by the float switch assembly in the boiler level control.
9. Switch off the clean button by pressing it for a second time – the switch light extinguishes. The heater(s) will start to warm up and eventually run at a red glow. (If heater(s) fails to glow, check that the flow of mains water is adequate).
10. Allow distillation to commence and observe that the float switch assembly allows fresh deionised water to enter the boiler and maintain a satisfactory operating level. If the deionised supply fails then the WCK kit fitted will switch off the heater until it is restored.

Cleaning

When any of the Cole-Parmer Water Stills have been used to produce distilled water directly from a mains water supply, there will inevitably be a build up of scale in the boiler and on the heating element(s). To obtain optimum performance from the still, the scale should be removed on a regular basis. The time span between cleaning depends entirely upon the hardness of the water supply. In very hard water areas it may be necessary to clean the still once a week, whereas in soft water areas several weeks may elapse before cleaning is necessary.

It should not of course be necessary to de-scale the second stage boiler on the WS-200AD-4 or when the stills have been operated from a deioniser.

Cleaning the still involves the use of 10% formic acid or kettle descaler. As a safety precaution, protective clothing, gloves, mask and goggles should be worn during cleaning.

Note – The cabinet and perspex screen should be cleaned using a dilute detergent solution only.

It is possible to descale the Cole-Parmer Water Still without dismantling the glassware by following these instructions in conjunction with Control of Substances Hazardous to Health (COSHH) Regulations 2002.

Method

1. Push the CLEAN switch to the CLEAN position – the switch illuminates.
2. Observe that the heating element(s) has switched off. Allow boiling to stop and water to cool.
3. Push ON/OFF switch to OFF position.
4. Remove the perspex screen.
5. Open the stopcock on the boiler level control WL48, allow the boiler to empty to $\frac{3}{4}$ of its full capacity, and close the stopcock.
6. Carefully add about 100ml of 10% formic acid solution or kettle descaler into the glass funnel of the WL48.
7. Push the ON/OFF switch to the ON position, the boiler will refill to its operating level.
8. Push the ON/OFF switch to the OFF position.
9. Allow the chemical reaction within the boiler to continue until all the deposits have been removed.

Note – If scale has built up above the operating level, the boiler may be completely filled by either lifting the drain pipe or restricting the flow of water to drain. This operation must be carefully controlled so that the boiler does not over fill and cause water to be forced over the funnel top.

10. Open the stopcock and allow contents of the boiler to drain completely.

Note – If the acid added to the boiler has not been completely neutralised, the liquid flowing to drain may be strongly acid. Necessary safety precautions should be observed around the drain position and any effluent control procedures followed.

11. Close stopcock.
12. Push ON/OFF switch to ON position and allow boiler to fill with water. Again the boiler may be completely filled by following procedure detailed in step 8.
13. Push ON/OFF switch to OFF position.
14. Drain the boiler by opening the stopcock.

15. Repeat steps 11-14 two or three times until the boiler has been thoroughly flushed through.
16. The still is re-started by finishing the cleaning cycle at step 12., then pushing the CLEAN switch to the OFF position (switch is not illuminated).

Before collecting the distillate the still should be allowed to run for about 10 minutes with the distillate running to drain. This will ensure that any residual acid is removed.

Note – The amount of acid required will depend upon the degree of scaling. If after performing the cleaning cycle deposits are left in the boiler, it may be necessary to repeat the cleaning cycle using a fresh quantity of acid.

The benefits gained from regular cleaning cannot be over emphasised.

Fault Finding

In the event of operating difficulties with your Cole-Parmer Water Still, it is suggested that the following basic checks are made. (Please note that these checks should only be carried out by suitably qualified personnel).

If these checks fail to identify and remedy the problem then you are advised to seek the help of your supplier or the Service Department of Antylia Scientific Ltd.

1. Unit completely inoperative – No mains green indicator on.
Check the electricity supply to the Cole-Parmer Water Still and ensure that a fuse has not blown at the supply fuse board. (This check should be conducted by a qualified electrician).
2. Heater(s) not on – Mains green indicator light on, water flowing.
 - a. Check the Cole-Parmer Water Still switches are in the correct mode, i.e:
 - ON/OFF switch is in the ON position.
 - CLEAN switch is in the OFF position.
 - Check that the reservoir indicator light is NOT illuminated and indicating a full collection reservoir.
 - b. Check that the fuse, located on the PCB inside the electrical chamber of the cabinet, has not blown. (This check should be conducted by a qualified electrician).
 - c. Check that the flow of cooling water is sufficient.
 - WS-200A-4 requires a flow rate of at least 1 litre/min.
 - WS-200AD-4 & WS-200A-8 require a flow rate of at least 2 litres/min.
 - If the flow rate is NOT sufficient then:
 - Check the mains water supply is turned on.
 - Check the mains water mini valve assembly is open.
 - Check the water inlet filter is not blocked (See note 8).
 - Check the flow of water is not impeded by blockages or restrictions.
3. Heater(s) not on – Water not flowing, mains green indicator light on.
Check that the thermostat has not operated. Confirm this by pressing the thermostat reset button located inside the main chamber of the cabinet.
If the thermostat has cut out then the cause should be identified at once.
Check that the boiler contains sufficient water.
Check that the plumbing connections are not leaking.
Check that the stopcock on the boiler level control WL48 is closed.
4. Heater in second stage boiler of WS-200AD-4 not on.
Check the setting of the boiler level control W4L2A. See the WS-200AD-4 Assembly section of this manual.
Check thermostat has not operated. See notes under step 3.
5. Water level in boiler too high – Choking of condenser.
Check that the flow of water into the boiler is not excessive. Control flow by adjusting the mains water mini valve assembly.
Check that the coolant water drain pipe falls away from the Cole-Parmer Water Still without restrictions or U bends.
If level of water in the second stage boiler of model WS-200AD-4 is too high, then:

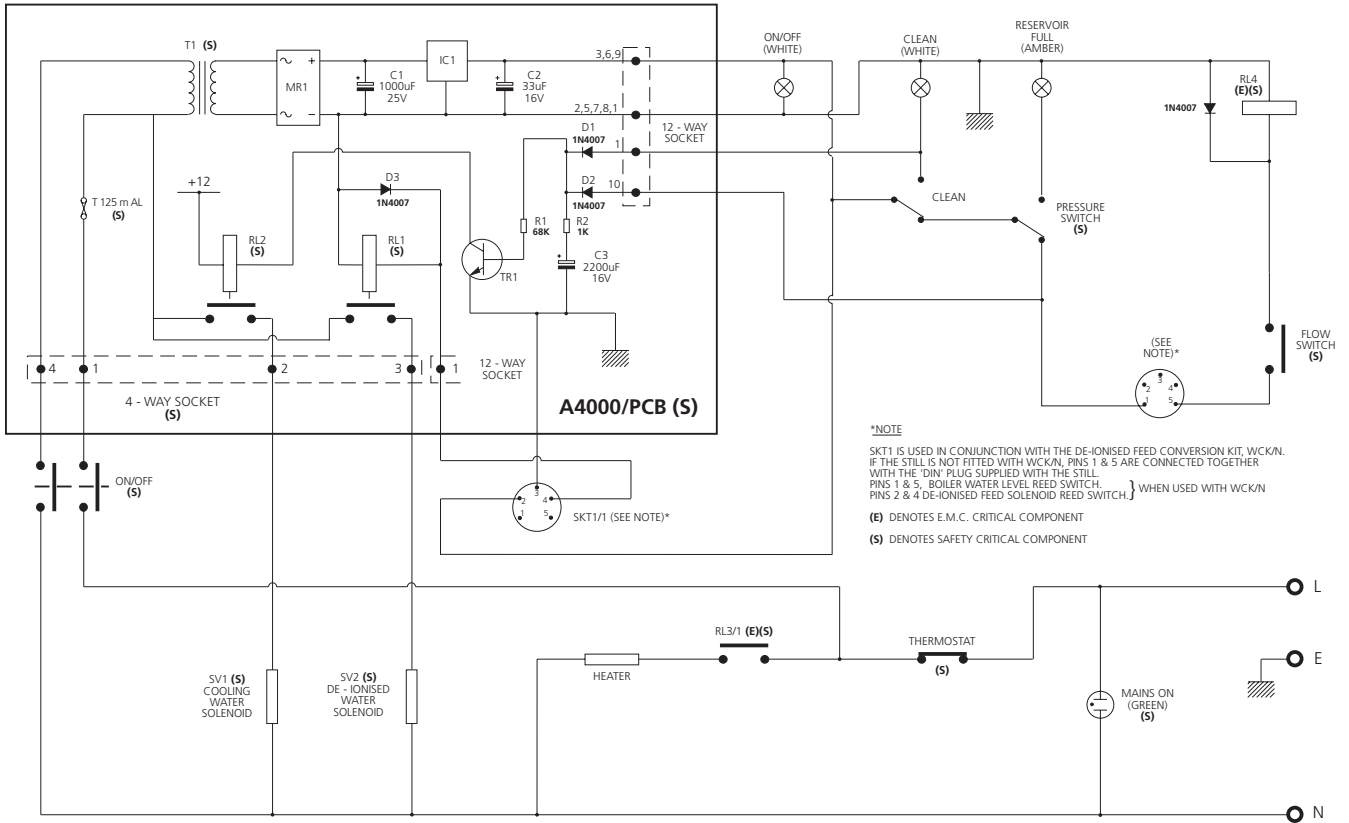
Check setting of the float switch in boiler level control W4L2A. See WS-200AD-4 Assembly section of this manual.

6. Distillate quality low.
Check the condition of the boiler and clean if heavily scaled.
7. Distillate collection reservoir floods.
Check the location of the reservoir water level sensor WLS inside the reservoir. See the Distillate Collection section of this manual.
Check that the WLS pipe connections between the glass bell and Cole-Parmer Water Still are secure and air tight.
8. Cleaning blocked water filters.
Your Cole-Parmer Water Still is fitted with a built in water filter to prevent the ingress of particulate matter into the plumbing system.
The filter can be examined and cleaned if necessary by unscrewing the black plastic screw cap which secures the mains water mini valve assembly.
A similar filter is also incorporated on the same side of the cabinet for use with pre-treated water supplies. Access is via the black screw cap which secures the hose nozzle.
9. Persistent tripping of the RCBO.
This is likely to be due to the integrity of the heater which should therefore be replaced.

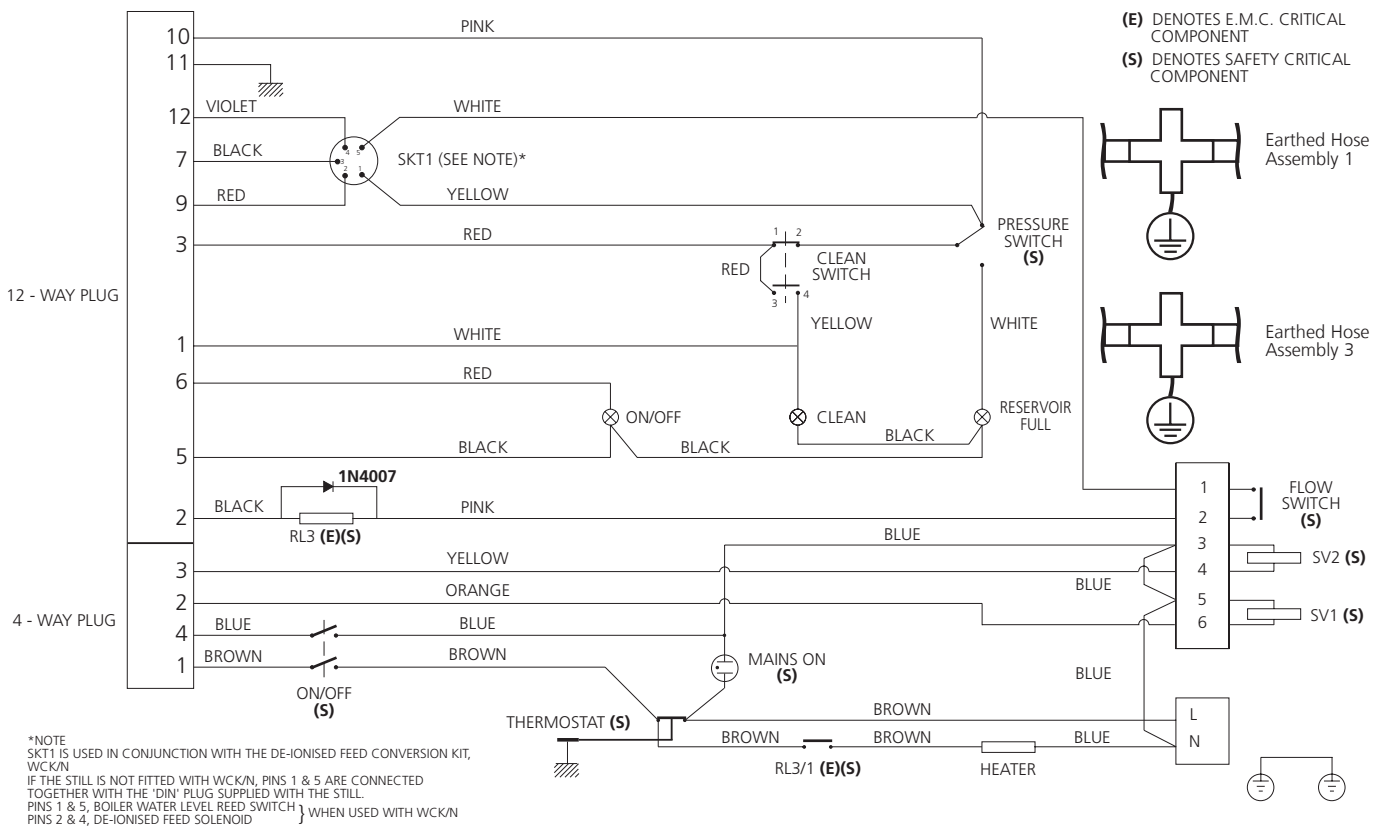
Additional Checks for Cole-Parmer Water Stills fed with deionised or pre-treated water.

- a. Boiler does not fill.
Check that supply of pre-treated water is switched on.
Check input water filter on side of cabinet is not blocked (See step 8).
Check water feed conversion kit A4000/WCK or A4000D/WCK is correctly fitted and adjusted. See the Connection of Stills to Deionised / Pre-Treated Water Supplies section of this manual.
- b. Heater(s) not on.
Check water level in boiler is above the heating element.
Check water feed conversion kit A4000/WCK or A4000D/WCK is correctly fitted and adjusted. See the Connection of Stills to Deionised / Pre-Treated Water Supplies section of this manual.

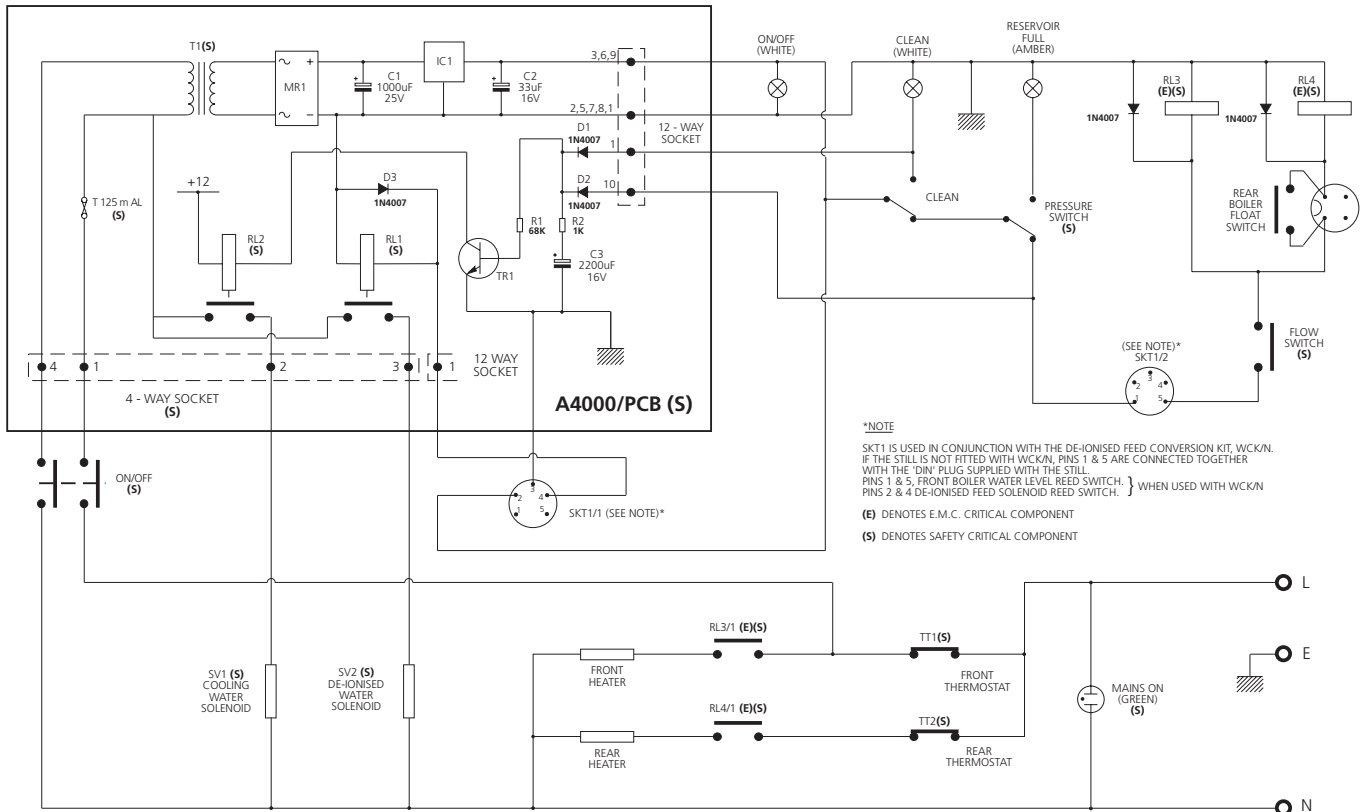
Circuit diagram for WS-200A-4



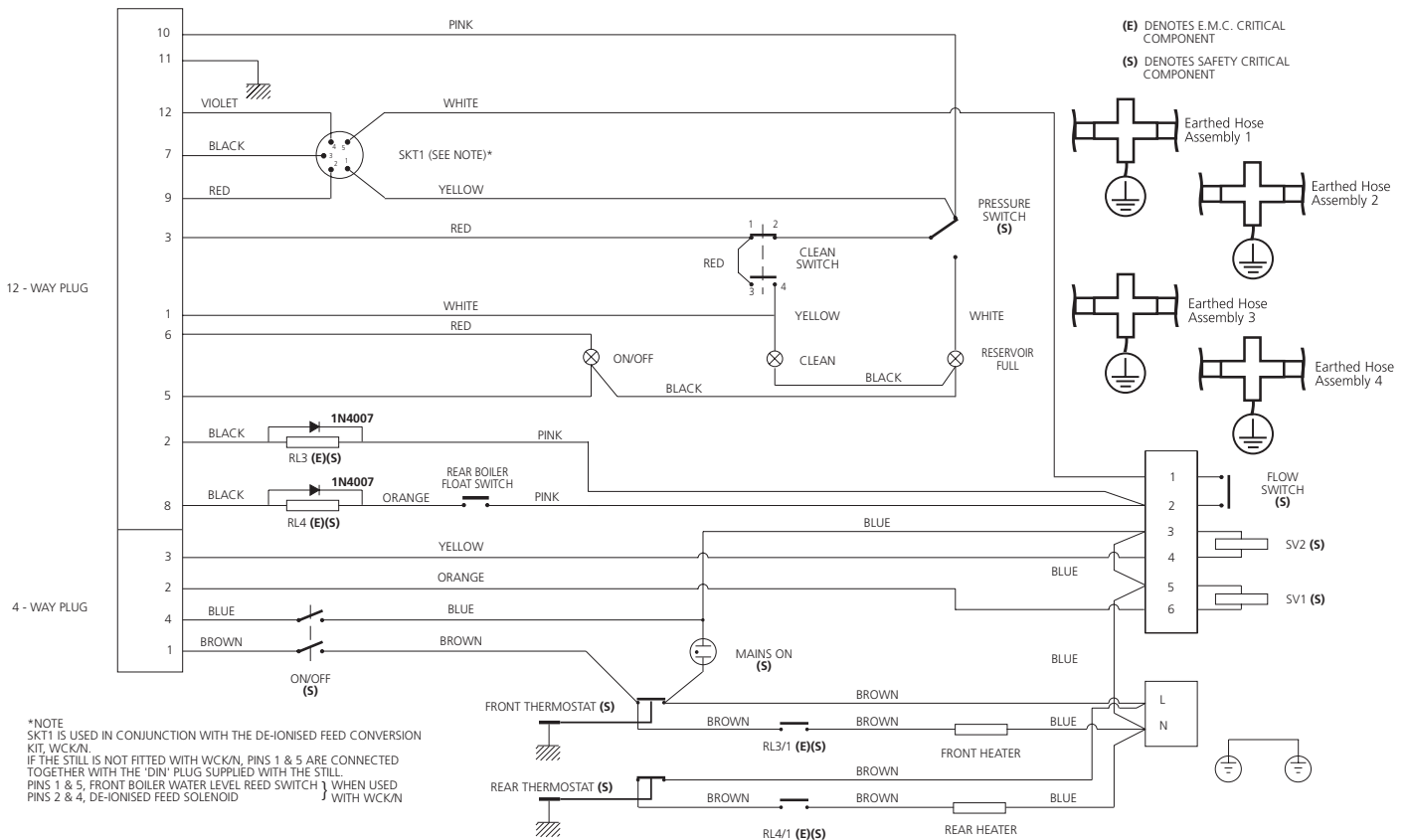
Wiring diagram for WS-200A-4



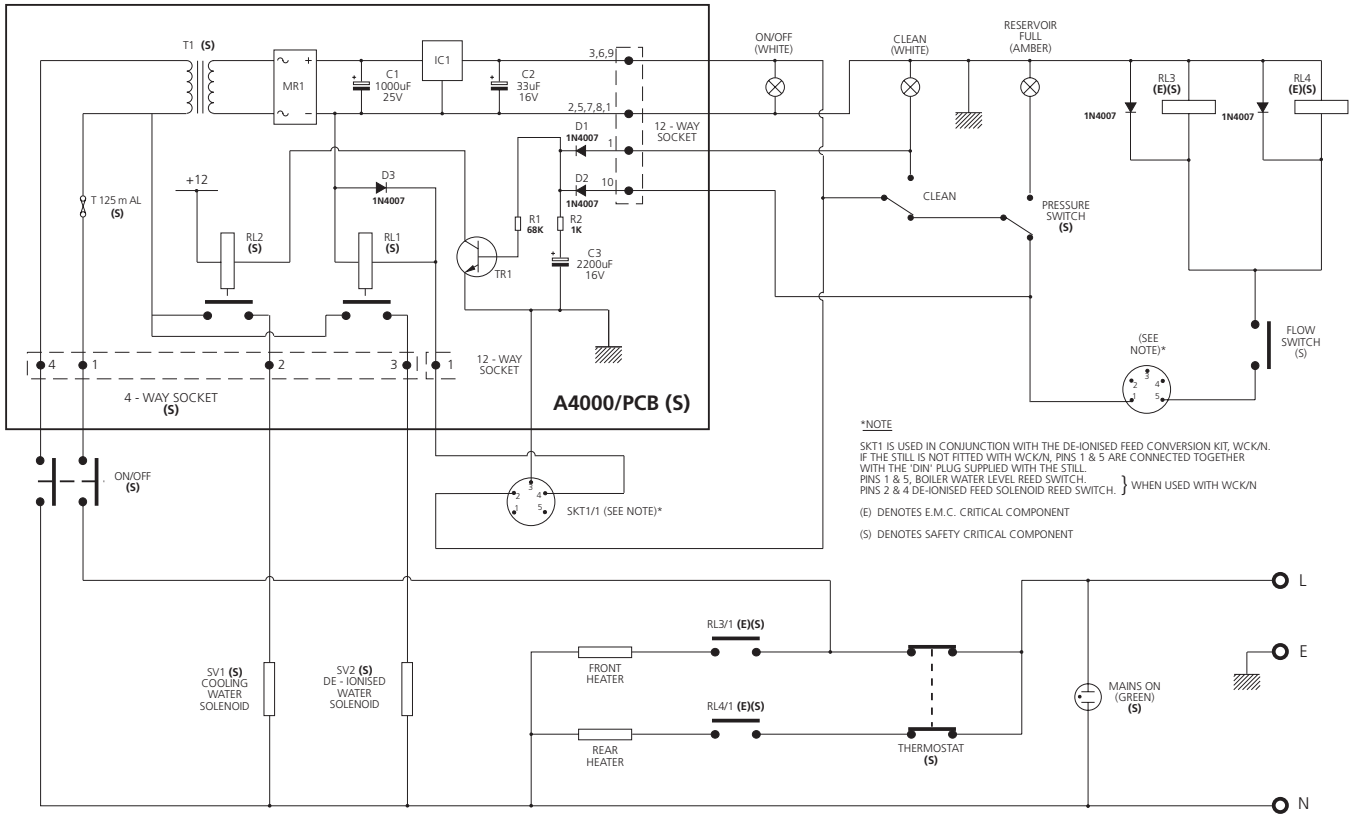
Circuit diagram for WS-200AD-4



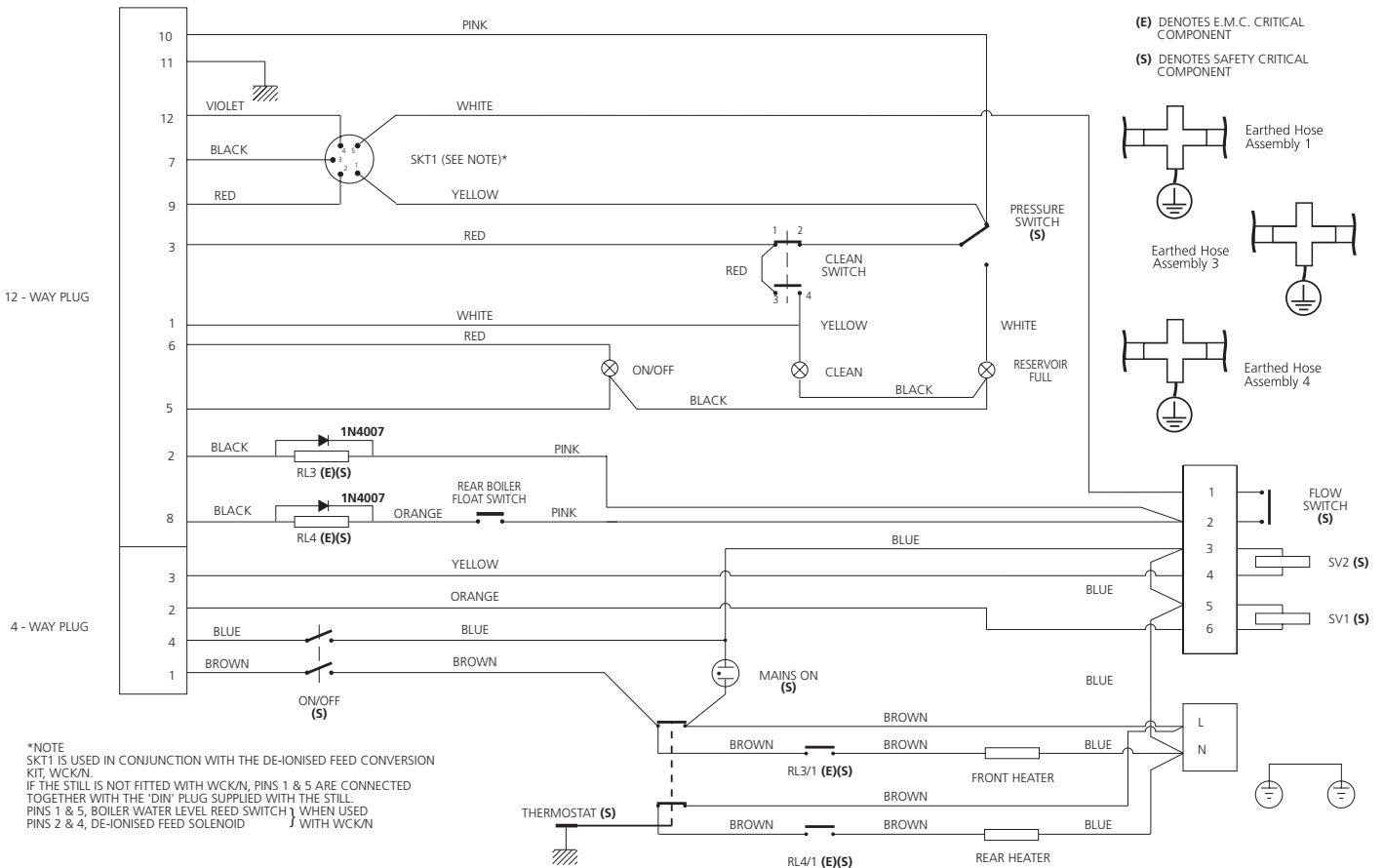
Wiring diagram for WS-200AD-4




Circuit diagram for WS-200A-8



Wiring diagram for WS-200A-8



 This product meets the applicable CE Directives and UKCA Legislation for radio frequency interference and may be expected not to interfere with, or be affected by, other equipment with similar qualifications. We cannot be sure that other equipment used in its vicinity will meet these standards and so we cannot guarantee

that interference will not occur in practise. Where there is a possibility that injury, damage or loss might occur if equipment malfunctions due to radio frequency interference, or for general advise before use, contact the manufacturer.

Declaration of Conformity is available to view online at www.coleparmer.com

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Order No.	Series	Model	Legacy SKU
99294-00	WS-200	WS-200A-4-220	A4000/220V/60
99294-05	WS-200	WS-200A-4	A4000
61010-10	WS-200	WS-200AD-4-220	A4000D/220V/60
99294-15	WS-200	WS-200AD-4	A4000D
99294-20	WS-200	WS-200A-8-220	A8000/220V/60
99294-25	WS-200	WS-200A-8	A8000

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