OZONE & UV SYSTEMS

UVASPA SS15 – SS75

MEDIUM PRESSURE UV SYSTEMS FOR SPA POOL WATER TREATMENT

OPERATION & MAINTENANCE INSTRUCTIONS

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Captions

The following is a description of the symbols and pictograms which are used in these operating instructions:

ATTENTION:

Prohibited actions and procedures.

WARNING/INSTRUCTION:

Warning of danger. General warning that special attention should be paid. Important instruction, that must be followed.

WARNING:

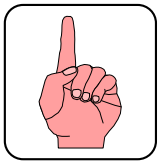
Voltage or high voltage: Dangerous for persons or household pets. The valid regulations and accident prevention measures must be strictly adhered to.

WARNING:

Dangerous situation. Serious injury or death can result. The product or its surrounding can be damaged.

INFORMATION:

Information and instructions that must also be followed.



IMPORTANT:

Measures recommended by Triogen.

Contents

1.0 Introduction

This manual is for the following models of Medium Pressure UV systems manufactured by Triogen in Glasgow, Scotland

UVASPA SS15

UVASPA SS25

UVASPA SS50

UVASPA SS75

These operating instructions contain important information for the operation and maintenance of the equipment.

Please ensure that these operating instructions are carefully read by all relevant persons before putting into operation, to ensure the safe use of the UV system. The operating instructions are an integral part of the equipment supply.

Before putting into operation, all the conditions necessary for safe operation of the equipment must be fulfilled. Please refer to Section 3 “Safety measures and regulations”.

The installation, commissioning and maintenance of the equipment should only be carried out by qualified personnel.

The equipment should only be operated by authorized personnel who have been trained accordingly.

No modifications should be made to the equipment without consulting Triogen, as this could effect the safe operation of the unit. Triogen shall not be held responsible for damage resulting from unapproved modifications.

INSTRUCTION:

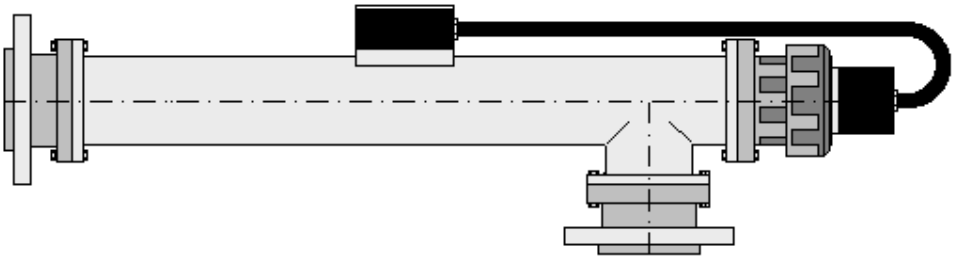
The operating instructions are to be kept where they will be accessible for operating and maintenance personnel.

2.0 Equipment Description

2.1 General

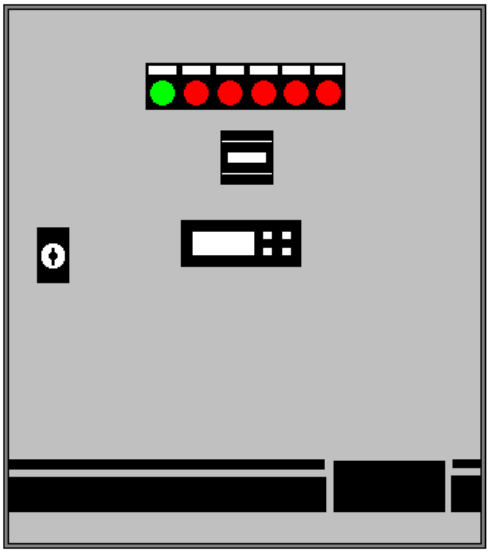
The UVASPA range of UV systems have been specifically designed for use in Spa and Small Pool water treatment plants.

Each system comprises of a UV reactor and electrical control panel with interconnecting cabling.



The reactor vessel is manufactured from 316L Stainless Steel materials and incorporates uPVC end plates with integral stub flanges fitted with galvanised mild steel backing rings.

The reactor design allows for the easy removal of the lamp and protective thimble as one unit for periodic cleaning of the external surface of the thimble.



Each reactor is supplied with a wall or frame mountable electrical control panel with front panel mounted controls and indications with internal magnetic ballast, control system and fan cooling.

2.2 Electrical & environmental data

Environmental conditions:

Ambient temperature for operation	5...40	°C
Ambient temperature for transport and storage	-25...+55	°C
Annual average air humidity - for 60 continuous days a year - occasionally	≤65 85 95	% % %
Condensation/aggressive environment	to be avoided	
Protection class for installation	IP 54	
Vibration/Shock	Install in a vibration-free environment	
Sound intensity level	≤85	dB(A)

Electrical data:

Supply circuit breaker Type 'B' or 'C' (for standard voltage)	UVASPA 15 = 13 (FUSE) UVASPA 25 = 20 UVASPA 50 = 20 UVASPA 75 = 20	A
Line supply	UVASPA 15 = 230V 1ph 50Hz UVASPA 25/50/75 = 400V 3ph 50Hz + N	V_{AC}
Line current	UVASPA 15 = 7 UVASPA 25/50/75 = 8	A_{AC}
Line power consumption	UVASPA 15 = 1.6 UVASPA 25/50/75 = 3.1	kW
Line power factor	~0.98 lagging	$\cos\varphi$

Voltages in the equipment:

- UVASPA 15, 25, 50 & 75 - 5kV lamp pulse ignition voltage, 260V lamp operating voltage, 400V ballast supply voltage and mains supply voltage.

3.0 Safety measures and regulations

The equipment must be installed, put into operation and maintained by trained specialists. The owner and/or user must ensure that the operating personnel have been suitable instructed.

The equipment has been subjected to a hazard analysis, corresponding precautionary measures regarding the safety of persons and domestic animals have been made. Nevertheless, it is still possible that **danger could arise** as a result of incorrect use, bad maintenance, material changes, etc. These dangers are associated with:

- Electricity
- Mechanical dangers
- Exposure to high intensity UV light

3.1 Electricity

The lightning flash and arrowhead symbol is to alert the user to the presence of un-insulated **"DANGEROUS VOLTAGE" within** the enclosure.

The equipment may **only** be opened if the mains supply is isolated **and** has been isolated for a period of at least 1 hour. This is in order to allow the power factor correction capacitors time to discharge.The mains supply must **not** be restored as long as the equipment is open. This applies to both the electrical control panel and the reactor vessel.

ATTENTION:

Working on live equipment is forbidden.

3.2 Mechanical dangers

The equipment contains glass which must be handled with care.

3.3 Exposure to high intensity UV light

The reactor contains UV emitting lamps and if exposed while energised can cause serious eye and skin damage. Ensure that the mains supply is isolated before opening any of the covers of the reactor.

WARNING:

Exposure to ultraviolet (UV) light can cause damage to eyes and skin. Always switch off the UV lamp before removing the end cap.

4.0 Installation guidance

4.1 Installing the UV System

The UV system control panel is designed to be bulkhead mounted either on a suitable wall surface or a floor mounted frame.

The reactor vessel is designed to be mounted and supported by the pipepine in which it is fitted.

IMPORTANT:

The reactor control panel utilises air cooling. The following guidelines must be adhered to when locating the unit.

- The reactor and control panel must not be located in a position where the ambient air temperature exceeds 40ºC.
- The reactor and control panel must not be located adjacent to other equipment that directly emit heat
- The reactor and control panel must not be located adjacent any chemical equipment that is likely to emit fumes.
- The reactor should be located within the pool circulation piping system in such a manner as to ensure that sufficient clearance is available in a horizontal direction to allow for lamp replacement .
- The reactor must be positioned with the tee-piece branch pointing downwards.

INFORMATION:

Do not install the reactor vertically or rotate it around its horizontal axis.

It is recommended that the reactor is mounted in a valved bypass loop fitted with a flow switch to detect low water flow which should be interlocked with the control panel to switch off the UV lamp.

A valve should also be installed in the main line between the two take-off points. This allows the reactor to be isolated for maintenance.

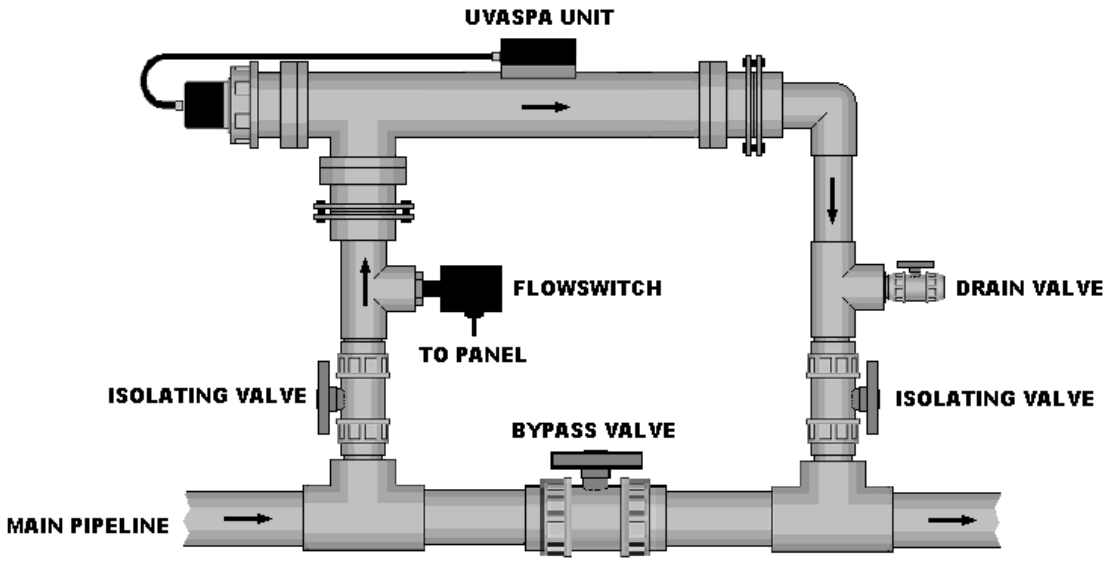
INFORMATION:

Never install the reactor in a position directly adjacent to chemical dosing points.

Failure to comply with any of the above criteria could effect the operation and warranty of the unit and have an adverse effect on the long term reliability and lifespan of the system.

4.2 Mechanical Connection

The reactor vessel is supplied with uPVC inlet and outlet stub flanges fitted with galvanised mild steel backing rings.



4.3 Electrical Connection

Main Supply

The mains power connection is made to the marked terminals fitted in the control panel.

INFORMATION:

The cable size and supply circuit breaker must be sufficient to meet the local regulations and the specified requirements in section 2.3.

INFORMATION:

The electrical installation must only be carried out by a suitably qualified electrical engineer. The electrical supply to the unit must be earthed.

INFORMATION:

The electrical panel MUST be interlocked with a flowswitch and also the main circulation pump starter circuit to ensure that the UV lamp is never energised during no-flow conditions.

Panel Controls & Indications

The following controls & indications are mounted on the control panel door:

UV Lamp On-Off Switch & Indicator (Green)
Lamp Low Current Fault(Red)
Lamp Trip Fault (Red)
Panel High Temperature Fault (Red)
Reactor High Temperature Fault (Red)
Remote Trip Fault (Red)
Reactor Temperature Display
Hours Run Meter

The remote start stop terminals within the control panel must be utilised to interlock both a flowswitch and the main ciculating pump starter circuit.

5.0 Commissioning

5.1 Commissioning Preparation

Preparation:

- The commissioning personnel authorised by the owner and/or user, must read and understand the operating instructions.
- The commissioning personnel must be familiar with the safety measures and regulations applicable to the country/area in which the system is installed.

5.2 Checking the installation

Before the electrical feed can be connected, the following must be checked:

- Is the control panel secured against moving?
- Is the power supply line feed to the panel protected?
- Is the reactor installed with sufficient access?
- Are the pipework connections tight?
- Are the reactor isolating valves closed?
- Is there adequate ventilation for normal operation?
- Has the flowswitch been interlocked with the panel?
- Has the system been electrically interlocked with the main circulating pumps?

ATTENTION:

The UV lamp must not be energised in no flow conditions. Failure to comply with this instruction will have a detremental effect on the life of the reactor body, lamp and seals.

5.3 Commissioning the System

- Check that the main electrical power supply is isolated to the control panel.
- Loosen the two fixing screws on the reactor lamp socket connector (Power Head) and remove.
- Loosen the 3” union nut and carefully withdraw the one-piece thimble/lamp assembly.
- As the UV lamp is shipped as a separate item, the thimble only will be installed in the end support plate assembly.
- Inspect the thimble for any signs of cracking or damage that may have occurred during installation.

- If the thimble appears sound, refit the assembly back into the reactor vessel.
- Open the water isolating valves to allow the reactor to be flooded.
- Check that there are no water leaks around the thimble O-ring seal, through the thimble itself or through any of the other reactor flange seals.
- Ensure the internal of the lamp thimble is completely dry.
- Remove the UV lamp from its protective shipping box.
- Remove the lamp carefully from its polythene sleeve taking care not yo touch the glass surfaces of the lamp.
- Insert the lamp slowly into the reactor thimble and position the lamp plate fixing holes in line with the fixing holes in the thimble clamp plate.
- Re-fit the lamp securing pins turning until hand tight.
- Re-fit the lamp socket (Powerhead) and ensure that the M4 x 40 fixing screws are re-fitted as they form the Earth connection for the unit.

INFORMATION:

The UV lamp glass and quartz thimble must never be handled with a bare hand. When handling the glass, clean white cotton gloves must always be worn.

INSTRUCTION:

Both the thimble internal surface and the UV lamp must be completely dry. Failure to ensure this will lead to reduced lamp life.

WARNING:

DANGEROUS VOLTAGES CAN EXIST ON THE POWER FACTOR CORRECTING CAPACITORS WITHIN THE CONTROL PANEL. ENSURE THAT AFTER SWITCHING OFF POWER TO THE PANEL, DO NOT OPEN THE PANEL FORAT LEAST 1 HOUR TO ALLOW THE CAPACITORS TO DISCHARGE. AFTER THIS TIME DO NOT ATTEMPT TO WORK WITHIN THE PANEL BEFORE CHECKING THE DC VOLTAGE PRESENT ON THE CAPACITORS. IF THE VOLTAGE PRESENT IS SIGNIFICANT, THEN EITHER ALLOW MORE TIME FOR THE CAPACITOR TO DISCHARGE OR USE APPROPRIATE EQUIPMENT TO MANUALLY DISCHARGE THE CAPACITORS.

Never switch on the power to the control panel unless the two M4 x 40 screws are fitted.

- Open the front door of the control panel and visually check for any obvious signs of damage that may have occurred during installation or fitting of the mains power supply cabling.
- Carry out a manual pull test on all internal cable terminations to ensure that none have slackened during transportation or mounting.
- Re-set circuit breaker MCB2, and make sure MCB1 is in the off position.

INFORMATION:

Before re-storing the power to the control panel, ensure that the UV lamp wires are fitted to the correct terminals in the panel and also the reactor thermostat wires. Ensure that the remote wiring interlock with the main circulating pump controls and flowswitch are correctly wired.

- Re-store the main electrical supply to the control panel.
- Measure the supply voltage at the input terminals of the control panel isolator and check that this matches the voltage shown on the rating plate.

INFORMATION:

The left hand Power On indicator should illuminate green.

- Re-set circuit breaker MCB1.
- Close the control panel door and secure the locks with the supplied key.

INFORMATION:

Ensure that the control panel door is properly closed and sealed.

- With water flowing through the reactor,switch the UV LAMP ON and OFF by pressing the START – STOP switch. The green switch will illuminate to indicate the lamp is energised.
- Close the bypass valves on the reactor inlet and outlet pipes and check that the LAMP ON light goes out as this is a no-flow situation and should have been detected by the flowswitch.
- With the LAMP ON, stop the main circulating pumps to check that the interlock system is functioning and that the lamp switches off as this again represents a no-flow condition.

6.0 Operation

The equipment may only be operated by persons authorised by the owner and/or user. It is up to the owner and/or user how many persons he authorises to operate the equipment, and whether he will instruct further persons with partial functions, e.g. “EMERGENCY STOP”.

The owner and/or user must ensure that the persons authorised by him have familiarised themselves with the safety measures and regulations, and that they also comply with them, in addition to having read and **understood** the operating instructions.

6.1 Starting-Stopping the UV Lamp

The preconditions for starting are: -

- Water is flowing through the vessel.
- The electrical supply to the control panel is ON and the Power On indicator is illuminated.
- No fault lights are illuminated
- The UV lamp has been OFF for at least 5 minutes.

INFORMATION:

Upon switching OFF the UV lamp, no attempt should be made to restart the UV system for 5 minutes. This is to allow the lamp to cool as it will not re-start when at its operating temperature.

Starting the UV Lamp.

IMPORTANT:

The system should not be stopped and re-started more than eight times in a twenty-four hour period. Excessive switching will cause lamp life to be reduced.

6.2 Hours Run

The control system incorporates an hours run meter which logs the amount of time the UV lamp circuit has been energised.

The Hours Run figure shown is used to calculate when the system requires a lamp replacement which is normally after 4,000 hours of operation at full power.

INFORMATION:

It is not possible to reset the Hours Run meter.

IMPORTANT:

It is important that the lamp is replaced at the correct time interval if the pool or spa are to be correctly dosed.

The UV lamp being lit is not an indication that the lamp is still useable as its ability to produce UV light at the correct spectrum deteriates over time.

6.3 Reactor Temperature Display

The control system incorporates an electronic thermocontroller mounted on the electrical panel door.

The UV reactor body is fitted with a temperature sensor which constantly monitors the outside body temperature.

The controller is factory set at an alarm point of 45oC at which temperature the UV lamp power circuit is de-energised to protect the reactor from overheating.

IMPORTANT:

The reactor thermostat system is a safety back-up system for both the water flowswitch and the main circulation pump interlock and therefore it is essential that these safety interlocks are used to detect no-flow conditions.

Utilising the reactor thermostat as the sole detection device for no-flow conditions is unacceptable and failure to incorporate the other safety interlocks will negate the warranty on the system.

6.4 Technical Support

In the first instance technical support should be requested from the supplier of the equipment. However, if for some reason this is not possible then technical support can be requested direct from Triogen.

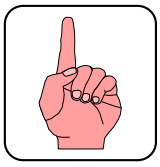
7.0 Maintenance

Maintenance work may only be carried out by personnel who have been trained and authorised for this work by the owner and/or user. The owner and/or user must ensure that the maintenance personnel are familiar with the safety measures and regulations, and that they also comply with them, in addition to having read and understood the operating instructions.

Only original replacement parts from Triogen must be used.

The following are the recommended service intervals for replacement parts:

- UV lamp change - as indicated on the control panel (minimum 4000 hours).
- UV lamp thimble change - once per two years
- Control Panel filter mat - clean or change at same time as UV lamp change.



IMPORTANT:

The service intervals detailed above are on a time basis however, it is recommended that the work is carried out at the same time as the lamp change which is nearest to the specified time.

7.1 Replacing the UV lamp.

To replace the lamp.

- Check that the main power supply is isolated to the control panel.

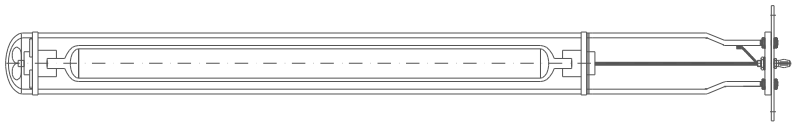
WARNING/INSTRUCTION:

Make sure that the power has been isolated or that the UV lamp has been OFF for at least 15 minutes before carrying out the following procedure. This is to insure that any residual heat on the lamp has been dissipated.

WARNING:

WITH POWER ISOLATED DANGEROUS VOLTAGES CAN STILL EXIST ON THE ELECTRICAL CONNECTIONS TO THE LAMP. DO NOT ATTEMPT TO TOUCH THE LAMP WITH THE POWER HEAD (LAMP CONNECTOR) STILL CONNECTED TO THE LAMP. ALSO, DO NOT ATTEMPT TO TOUCH THE ELECTRICAL CONNECTIONS WITHIN THE POWER HEAD (LAMP CONNECTOR).

- Loosen the two fixing screws on the reactor lamp socket connector (Power head) and disconnect.
- Remove the two fixing pins that secure the lamp terminal plate to the reactor gland nut.
- Grip the edges of the lamp plate and slide out the lamp assembly ensuring that bare fingers do not touch the lamp glass surface.
- As the lamp assembly is withdrawn, the opposite end of the lamp should become visible and the ceramic end of the lamp can be held to allow total removal.



UV Lamp Layout

- Visually check the internals of the vessel thimble for any signs of cracking or water leakage that could have occurred during operation.
- Ensure the internal of the lamp thimble is completely dry.

INFORMATION:

The UV lamp glass and quartz thimble must never be handled with a bare hand. When handling the glass, clean white cotton gloves must always be worn.

- Insert the new lamp, securing with the fixing pins.

INSTRUCTION:

Both the thimble internal surface and the UV lamp must be completely dry. Failure to ensure this will lead to reduced lamp life.

- Re-fit the lamp socket connector (Power head) and ensure that the fixing screws are re-fitted as they form the Earth connection for the cover.

INFORMATION:

Never switch on the power to the control panel unless the two M4 x 40 screws are fitted.

- Before restarting the system, take a note of the hours run figure and use this as strting figure to calculate the next lamp change.

7.2 Replacing the UV lamp thimble

The reactor thimble which houses the UV lamp will require to be replaced after two years of operation (or at the nearest lamp change procedure to this time).

- Check that the main power supply is isolated to the control panel.

WARNING/INSTRUCTION:

Make sure that the power has been isolated or that the UV lamp has been OFF for at least 15 minutes before carrying out the following procedure. This is to insure that any residual heat on the lamp has been dissipated.

WARNING:

WITH POWER ISOLATED DANGEROUS VOLTAGES CAN STILL EXIST ON THE ELECTRICAL CONNECTIONS TO THE LAMP. DO NOT ATTEMPT TO TOUCH THE LAMP WITH THE POWER HEAD (LAMP CONNECTOR) STILL CONNECTED TO THE LAMP. ALSO, DO NOT ATTEMPT TO TOUCH THE ELECTRICAL CONNECTIONS WITHIN THE POWER HEAD (LAMP CONNECTOR).

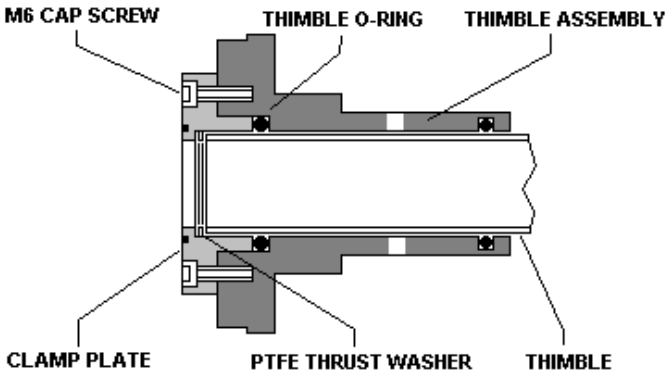
- Stop the flow of water through the reactor by operating the by-pass valves and stop the main circulation pump if flow can be interupted breifly to allow for this maintenance.

INFORMATION:

If the main circulation pump(s) are stopped the water in the spa or swimming pool will not be filtered or chemically treated during this time.

- Close the isolating valves fitted on the inlet and outlet lines of the reactor vessel.
- Loosen the fixing screws on the reactor lamp socket connector (Power head) and disconnect.
- Remove the lamp as described previously and store carefully if being re-used.
- Slowly loosen the 3” union nut and use a bucket or similar vessel to catch the water that will escape as the reactor vessel drains down.

- After draining, fully remove the thimble assembly from the reactor vessel and take to a suitable workbench or similar.
- Unscrew the two M6 gland nut fixing screws and remove the gland nut.
- Withdraw the thimble, o-ring and thrust washer.



Section of Thimble seal Assy

INFORMATION:

The new quartz thimble must not be handled with bare hands. When handling the glass, clean white cotton gloves must always be worn.

- Fit a new o-ring seal by placing over the end of the thimble against the front plate and then push the end of the thimble which will drag the o-ring into the o-ring seat (if necessary, use a small blunt instrument to push the o-ring down to the bottom of the seat).
- Position the PTFE thrust washer inside the gland nut and position over the thimble end.
- Gently push the gland nut into location which will slide the thimble into its correct position.
- Refit the two M6 fixing screws holding the gland nut.
- Visually check that the thimble shows no signs of cracking around the o-ring position and that the o-ring is compressed on to the thimble.
- Re-insert the thimble assembly into the reactor vessel and tighten the 3” union nut.
- Slowly open the water isolating valves and slowly flood the reactor with the pool water.

- Check the o-ring seal and thimble for signs of leakage. If any leakage is observed isolate the water inspect and re-seal, change thimble or o-ring as necessary. Start the flow of water through the reactor by operating the by-pass valve or by starting the main circulation pump(s).

INFORMATION:

Depending on the position of the reactor in the system small amounts of air may pass to the pool during the first few minutes after re-starting the water flow through the reactor.

- Check the o-ring seal of the thimble for any signs of water leakage and leave for a period of fifteen minutes. If any leakage is observed isolate the water as previously described, inspect and re-seal, change thimble or o-ring as necessary.
- Once the thimble is sealed, the inside of the thimble should be inspected to ensure that it is clean and dry. If required cleaned and dried using a lint free cloth.

INSTRUCTION:

Both the thimble internal surface and the UV lamp must be completely dry. Failure to ensure this will lead to reduced lamp life.

- Re-insert the lamp, securing hand tight with the fixing pins.
- Re-fit the lamp socket connector (Power head) and ensure that the fixing screws are re-fitted.

INFORMATION:

Never switch on the power to the control panel unless the two M4 x 40 screws are fitted.

The system can now be re-started as previously described.

7.3 Replacing the Control Panel filter mat.

Depending on the environment where the control panel is installed, the filter mat fitted to the inlet fan grill must be cleaned or changed on a regular basis.

It is recommend that after installation and commissioning that the filter mat is checked on a monthly basis as it is normal on new installations for there to be high levels of dust particles.
There after, depending on the results of these checks, this could be reduced to between 3 to 6 months.

8.0 Fault finding

Fault finding work may only be carried out by maintenance personnel who have been trained and authorised for this work by the owner and/or user. The owner and/or user must ensure that the maintenance personnel authorised to carry out this work are familiar with the safety measures and regulations, and that they also comply with them, in addition to having read and understood the operating instructions.

WARNING:

During the following procedures it will be required to carry out tests on live circuits. These checks should only be carried out by suitably qualified engineers who fully understand the electrical circuits and the voltages present. Checks may also be required with the power isolated. In these instances, be aware that the power factor correction capacitors may still be holding a significant charge. Ensure that the capacitors are discharged before attempting any work within the control panel.

8.1 Loss of all indications

This fault is evident when the green power ON and status indicators fail to illuminate. This can be caused by the following:

- Failure of the power supply.
- Failure of the control MCB2

For these check.

- The supply circuit breaker / fuses.
- Check the voltage at the mains power inlet terminals.
- Check that the control MCB2 is in the ON position.

8.2 Fault indication – Lamp Low Current Fault (Red Indicator)

It indicates that.

- The UV lamp has failed to ignite
- The current sensing relay CSR has failed

For these check.

- The lamp has been allowed to cool down for five (5) minutes since being switched off and then attempting to re-start
- The lamp has not failed but has reached the end of its operational life.

Additional checks

- Using the electrical drawings visually inspect all the components and cabling from MCB 1 to the UV lamp for any signs of an open circuit.
- Use a resistance meter to check the continuity of the lamp supply cable.
- Visually inspect the ballast(s) for any signs of damage. Use a resistance meter to measure the resistance of the windings (The readings should be low, open circuit reading will indicate a fault)
- Check the operation of the lamp ignition module. A high frequency buzzing sound should be heard when the lamp ON circuit is energised indicating the ignition module is not faulty.
- Check the setting on the current sensing relay (CSR) is at minimum. Use a clamp ammeter to check that current is present in the line when the fault is indicated. If the correct current is present the CSR is faulty.
- Check the mains supply voltage at the internal control panel terminals. If a problem is found check the supply fuses and cables.

IMPORTANT:

Use a suitable resistance meter to measure continuity as required.

8.3 Fault indication – Lamp Tripped (Red Indicator)

It indicates that.

- RCD/MCB1 has tripped

For this check

- Visually inspect RCD/MCB1 which has three block levers.
- If the two levers to the left are in the down position, this indicates a high current trip.
- If all three of the levers are in the down position, this indicates an earth fault trip.

High Current Trip

- Utilising the electrical drawings, visually inspect all the component wiring from MCB1 to the UV lamp terminals for any signs of electrical arcing or damage.
- Check the capacitors using a suitable meter which should give a reading of 29 uF + or – 10%.
- Check the ballasts by measuring the resistance between one of the terminals on the left hand side and one of the terminals on the righthand side. The normal reading is 0.8 ohms approximately.
- If the ballast is faulty, it will measure as a short circuit at figures of 0.1 to 0.3 ohms depending on the resistance in the meter leads.
- If it is not possible to take resistance readings, then each ballast can be disconnected in turn and the system re-started until one of the ballasts is identified as faulty.

Earth Fault Trip

- Inspect the thimble inside the reactor body for any signs of water leakage or dampness
- Inspect all cabling between MCB1 and the reactor lamp power head connector for any signs of external damage that may caused an earthe leakage
- If neither of the above is identified as the cause, then it is necessary to isolate components from the circuit to identify the cause.

- Firstly, remove the power head connector from the reactor and remove the lamp and check the internals of the reactor glass thimble for any signs of water or dampness. If this is found, then check the thimble for any signs of cracking or leakage and replace if necessary.
- Replace the lamp and powerhead and re-start the system. If the system re-starts, then the problem has been identified.
- If MCB1 continues to trip, isolate the supply cables to the powerhead from terminal strip TB1, terminals 1 & 2 and re-start the system. If MCB1 does not trip, then this indicated an earth leakage fault with the lamp power supply cables and integral powerhead. Parts should be replaced.
- If MCB1 continues to trip, isolate the ignition module and check if the system re-starts. If it re-starts, then there is an earth leakage fault within the ignition module. Part should be replaced.
- If MCB1 continues to trip, isolate each of the ballasts in turn and try to re-start the system. If the system re-starts after one of the ballasts has been isolated, then the ballast has an earth leakage fault. Part should be replaced.
- If MCB1 continues to trip, isolate the PF capacitors and try and re-start the system. If the system starts, then there is an earth leakage fault within one of the capacitors. Part should be replaced.
- If MCB1 continues to trip, disconnect Contactor C1 and if the system re-starts, then there is a fault within the contactor. Part should be replaced.
- If MCB1 continues to trip, then the fault is within the RCD/MCB1 unit. Part should be replaced.

8.4 Fault indication- Remote Trip Fault (Red)

This indicates that one of the panel interlocks has signaled the lamp to stop either due a low waterflow condition being detected by the flowswitch or the main circulating pumps being stopped.

For this check.

- Check if the main circulating pumps have been stopped.
- Check that the isolating valves around the reactor piping have not been closed.
- Check if a filter backwash is being carried out as this could result in the water flow to the reactor being starved which should be detected by the flowswitch.

8.5 Fault indication- Reactor High Temperature Fault (Red)

This indicates that a high temperature level has been reached on the outside surface of the UV reactor. The fault circuit is latching and therefore the fault symptoms may not be apparent at the time of investigation, due to the passage of time.
If this is the case, the following possible causes of the fault should be checked prior to re-starting the system.

For this check.

- The temperature controller is indicating a reactor temperature above the alarm point of 45oC.
- Check that the system isolating valves have not been closed by mistake.
- Check that the main circulating pump is operating

IMPORTANT:

The reactor temperature thermostat is to protect the system against overheating in the event of low flow conditions. It is not a control device and must not be used to replace the required interlock between the system and the main circulating pump and the water flowswitch.

As this fault is latching, in order to reset, switch the UV LAMP circuit OFF which will reset the fault which is indicated by the RED indicator light being de-energised.

If the RED fault light stays illuminated after swiching of the UV LAMP circuit, then a high temperature level still exists within the reactor.

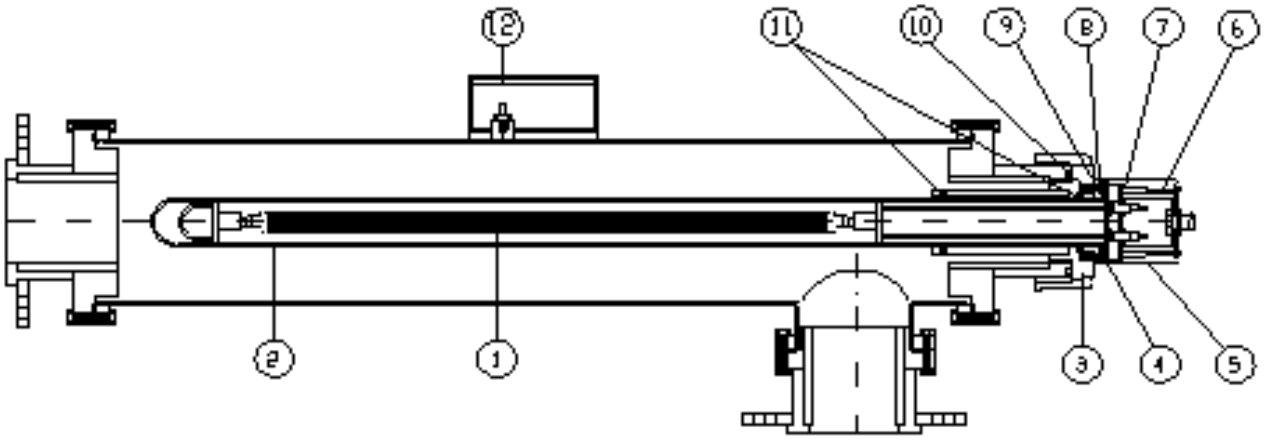
8.6 Fault indication- Panel High Temperature Fault (Red)

This indicates that a high temperature level has been reached inside the control panel.

- The internal panel thermostat is factory set at 50oC and check that this has not been altered.
- By turning the thermostat setting dial, it should be possible to hear the thermostat contacts opening and closing.
- Check that the internal cooling fan is operational.
- Check the fan inlet filter is clean. This is the most common cause of a panel high temperature fault.

9.0 Spare parts

9.1 Reactor spare parts



UVASPA 15				UVASPA 25-75		
No.	BIN Ref.	DESCRIPTION		No.	BIN Ref.	DESCRIPTION
1	VGPL025	UV Lamp 1.5kW		1	VGPL021	UV Lamp 3.0kW
2	VANC001	Quartz Thimble		2	VANC722	Quartz Thimble
3	VSPR001	Thimble Plate Assembly		3	VSPR001	Thimble Plate Assembly
4	VMMP1014	Gland Nut		4	VMMP1014	Gland Nut
5	VASS001	Powerhead Assembly		5	VASS001	Powerhead Assembly
6	NBW0100	Panhead Screw M4 x 40		6	NBW0100	Panhead Screw M4 x 40
7	VMMP1120	Lamp Plate Fixing Screw		7	VMMP1120	Lamp Plate Fixing Screw
8	NBW0004	Cap Screw M6 x 10		8	NBW0004	Cap Screw M6 x 10
9	VVOR734	Gland Nut O Ring		9	VVOR734	Gland Nut O Ring
10	VMPP019	Thimble Thrust Washer		10	VMPP019	Thimble Thrust Washer
11	VVOR708	Thimble O Ring		11	VVOR708	Thimble O Ring
12	VEPM777	Temperature Sensor		12	VEPM777	Temperature Sensor

9.2 Control Panel spare parts

Details of all the relevant electrical control panel components are contained in the electrical drawings.

10.0 Warranty

The UV systems (UV reactor and electrical control panel) are covered by a twelve month limited warranty period starting at the date of purchase, during which time any failure of the equipment due to defective workmanship or parts, will be rectified provided that:

1. Notice of the claimed defect is given to Triogen within twelve (12) months from the documented date of purchase.

2. Following notification, the parts or accessories are properly packaged and returned to the address so designated by Triogen, and that associated transportation and any other charges are prepaid.

3. Upon inspection, Triogen is satisfied that the claimed defects are traceable to the original parts or workmanship.

The warranty will be deemed void, if the equipment is serviced by other than a trained service engineer acknowledged by, or employed by, the supplier, or if the equipment has not been properly installed or operated according to the instructions in this manual.

In no event shall Triogen be liable for any consequential loss, damage or expense arising from the supply and use of the equipment , either separately or in combination with other equipment.

Triogen medium pressure UV lamps are guaranteed for up to 1500 service hours full replacement. Lamps must be operated as specified, in a manner for which they were designed and must be returned, as noted above, for replacement lamp credit determination.

11.0 Disposal

For disposal of the following materials which form sub-components of the UV system, such as:

- Capacitors
- Plastics such as PTFE, PVDF, PE, PVC, Plexiglas (pipelines, conduits, cable channels, electrical components)
- Non-ferrous metals such as nickel, brass, copper (fittings, rails, cables)
- Stainless materials etc.
- UV lamps containing glass and small amounts of mercury.

These should be disposed of by the specialists in the owners company or by special disposal companies.

12.0 Certificate of conformity

CE CERTIFICATION OF CONFORMITY

in accordance with CE guidelines

Machines 89/392/EWG, appendix II A, Electromagnetic compatibility 2004/108/EC

TYPE OF APPARATUS

Article : Medium Pressure UV Type : UVASPA Range UV Systems

The above has been developed, designed and manufactured in accordance with referred EU guidelines by: Company: Triogen Ltd, Triogen House, Craigton, Glasgow, Scotland, G52 1BD

THE FOLLOWING HARMONISED STANDARDS WERE APPLIED:

EN 292-1, 2/91 Safety of machinery; Part 1 and part 2

EN 60204-1/94 Safety of machinery - Electrical equipment of machinery; Part 1

EN 50081-1/92 Electromagnetic compatibility (EMC), Generic emission standard; Part 1; Residential, commercial and light industry

EN 55022B/87 Limits and methods of measurements of radio interference characteristics of Information Technology Equipment

EN 50082-2/95 Electromagnetic compatibility (EMC), Generic immunity standard; Part 2: Industrial environment

EN 61000-4-2/95 EMC; Part 4: Testing and measurement techniques / Section 2: Electrostatic discharge immunity test

EN 61000-4-4/95 EMC; Part 4: Testing and measurement techniques / Section 4: Electrical fast transient/burst immunity test

ENV 50140/93 EMC - Basic immunity standard - Electromagnetic fields, radiation, tests, severity

ENV 50141/93 EMC - Basic immunity standard - Conducted disturbances induced by radio-frequency fields

Place and date: Glasgow, 16th January 2004

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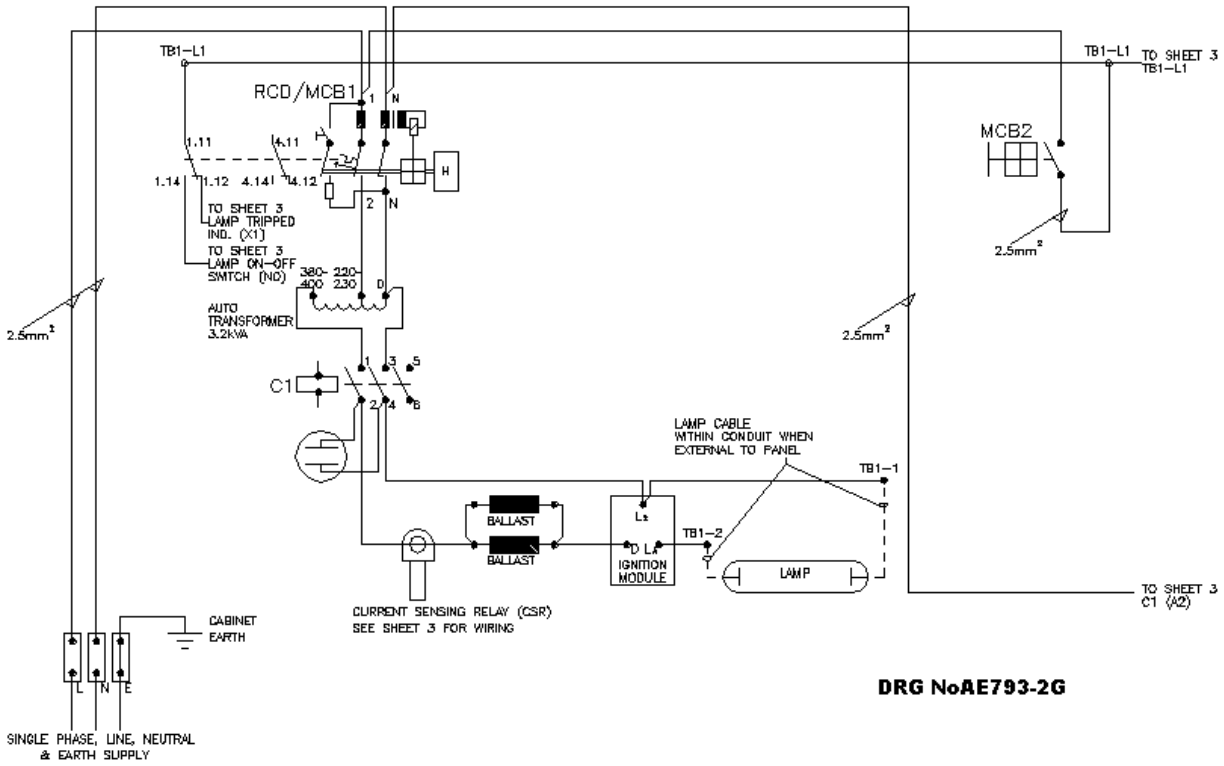
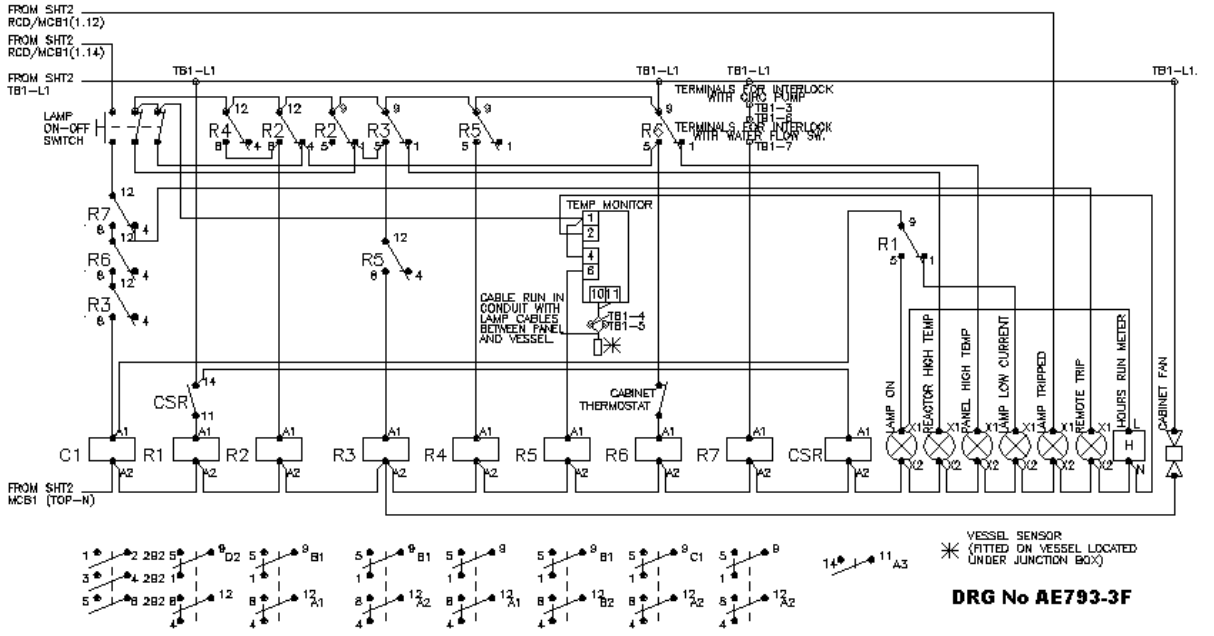
Triogen Ltd:	Engineering Manager	Managing Director

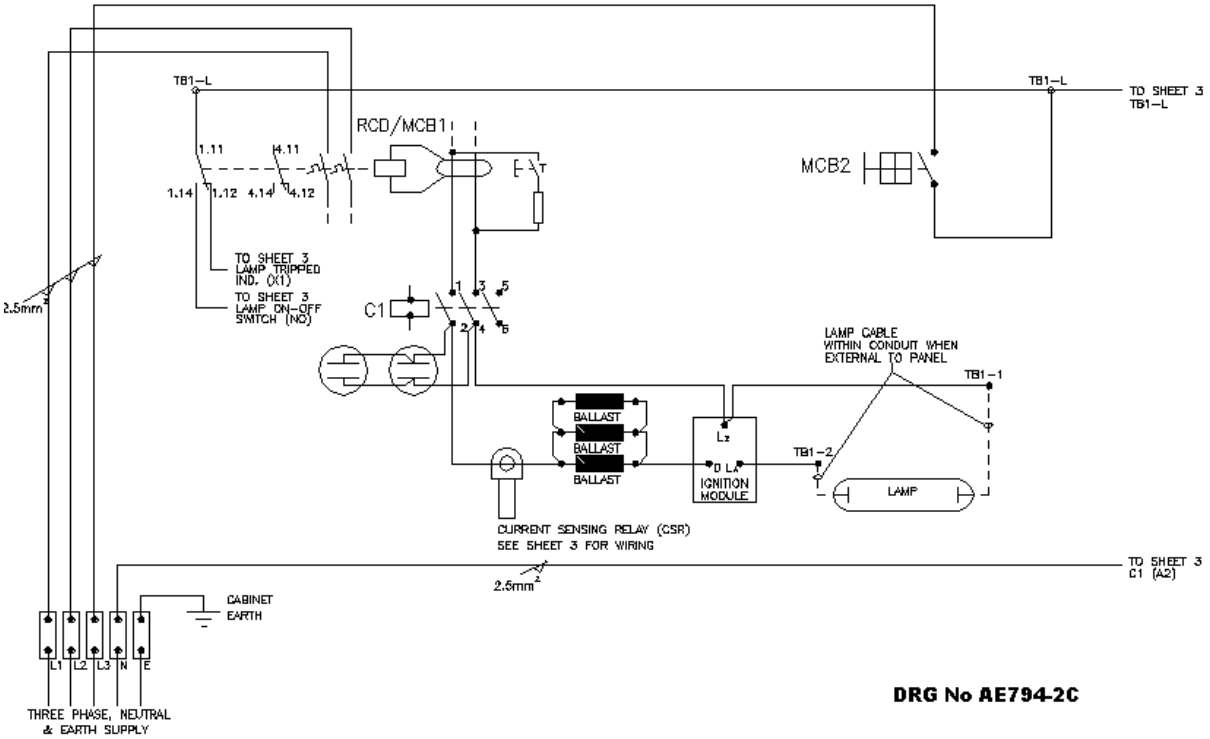
13.0 Electrical Drawing

Uvaspa SS15 Control Panel electrical drawings

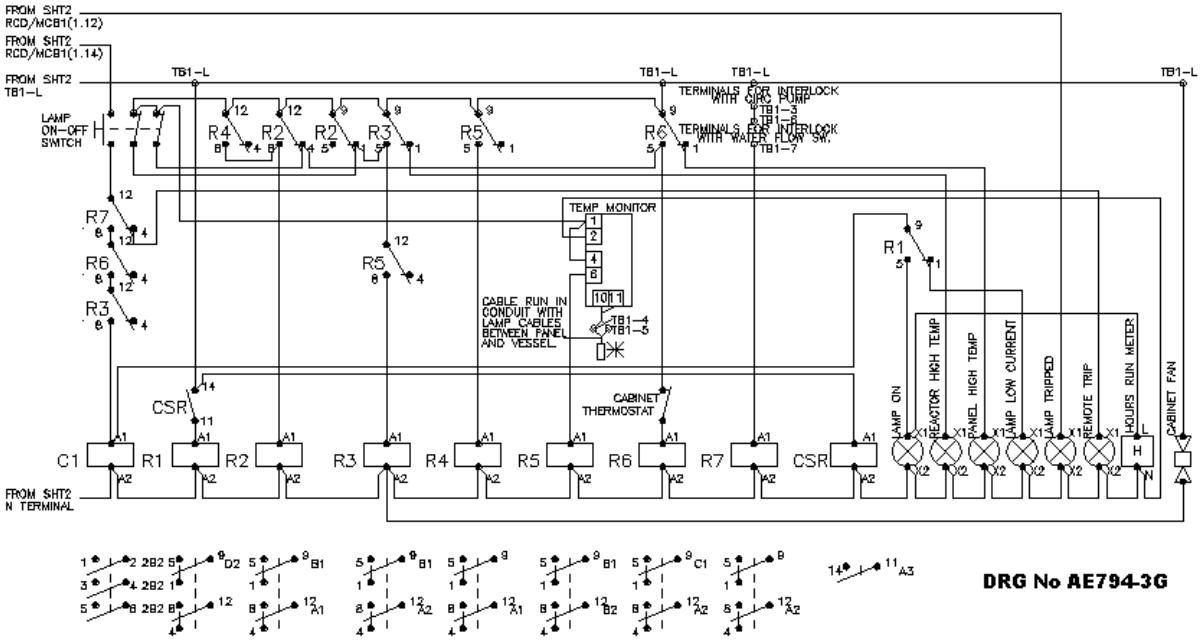




Uvaspa SS25/50/75 Control Panel electrical drawings



DRG No AE794-2C



DRG No AE794-3G

Uvaspa SS25/50/75 Control Panel electrical drawings

North American Version