



AF3

OPERATION AND MAINTENANCE MANUAL



Models Covered

AF3-0002
AF3-0003
AF3-0008
AF3-0014
AF3-0027
AF3-0051
AF3-0116

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Please note that drawings relating to the complete range of AF3 models are included in this manual. The user may decide to remove drawings from the manual which are not relevant for the model(s) installed.

1. Introduction

This manual is supplied with the AF3 UV system and is intended to provide guidance on installation, operation and fault finding.

Further hard copies or electronic versions may be obtained from:




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Please keep this manual available for reference by any persons working with the system.

A section has been provided (Appendix C) to note updates, modifications and operating data. Ensuring this section is used and kept up to date is the responsibility of the equipment owner and will assist in ensuring the system is maintained in a good operating condition.

Comments or suggestions about this document may be made to the Technical Director at the above address:

The following symbols are used in this manual

	This symbol indicates a requirement or warning
	This symbol indicates a recommendation
	This symbol indicates an electrical hazard

1.1. Glossary of Abbreviations/Terms

316L	=	A grade of 316 Stainless Steel with reduced carbon content.
A/T	=	Arc Tube (also known as UV lamp).
CFD	=	Computational Fluid Dynamics.
COSHH	=	Control of Substances Hazardous to Health.
Dose	=	Also known as fluence.
Drg	=	Drawing.
DVM	=	Digital Volt Meter (Multi-meter)
GMP	=	Good Manufacturing Process.
H/F	=	High Frequency.
ID	=	Internal Diameter.
I/P	=	Input
IPA	=	Iso propyl alcohol.
LCD	=	Liquid Crystal Display.
LED	=	Light Emitting Diode
OD	=	Outer Diameter.
O/P	=	Output.
PSU	=	Power Supply Unit. (Also known as Electron Control panel)
Qualification	=	Certification package used to attain qualification of the system.
Thimble	=	A quartz 'sleeve' which is sealed at one end.
UV	=	Ultra Violet.
VFC	=	Volt Free Contact.

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1.3. Disinfection by UV light

The UV light produced by the AF3 Series systems (UV-C band, see Section 2.2) will reduce the level of viruses and bacteria in a process stream. It works by disrupting the DNA (or RNA in the case of a virus), preventing replication of the organism.

The disinfection effect is dependant on the amount of UV energy received by the organism, and this in turn is the product of the intensity of the light and the exposure time. This is termed the dose (fluence) and has the unit of $W.s/m^2$, more commonly expressed as mJ/cm^2 .

1.3.1. UV Light

The UV light is generated by a mercury vapour discharge lamp. Except for the AF-0002 unit all the AF3 Series systems use the new Hanovia amalgam type UV lamp. These lamps are amongst the most power efficient available achieving up to three times the UV output efficiency of standard mercury medium pressure lamps. The systems are typically designed to provide an average dose of $30 mJ/cm^2$ at the end of the lamp life, Hanovia sales or your local sales agent will have the information to advise different dose rate and flow combinations if required.

The dose required to achieve a 90% reduction in the number of bacteria which replicate varies with the species of bacteria. For example, *Pseudomonas aeruginosa* requires a dose of 5.5 mJ/ cm² while *Bacillus subtilis* (a spore) requires 12.0 mJ/ cm².

1.3.2. Intensity

The intensity of the UV light reaching each bacteria depends on the initial rating of the lamp, the age of the lamp (the intensity decreases as the lamp is used), and the transmittance of UV light through the process stream. The transmittance is reduced as the turbidity of the stream increases and also as the concentration of any contaminants which can absorb UV radiation increases. So the transmittance of UV light through a process stream like sewage effluent is significantly less than through borehole water.

The lamp will have been sized for the required duty. However, if the properties of the process stream change or the quartz thimble in the UV chamber gets coated with contamination the performance of the lamp may decline.

AF3 systems can be supplied with a manual or automatic cleaning mechanism for the quartz thimble where deposition is likely to occur.

There is an option to include a % intensity monitor with the AF3 series of UV systems when the RCM version of the Electron control panel is selected. This monitor provides a reading of the transmittance of UV light through the process stream as a percentage of the intensity of the new lamp and clean thimble and can be used, for example, to determine when the UV lamp may require to be changed, the thimble cleaned or when the process stream changes.

1.3.3. UV Exposure

The exposure of the process stream to the UV radiation is a function of the time it takes for the process stream to pass through the treatment chamber and the design of the chamber. The innovative L-shaped design of the chamber in the AF3 series has been optimised using CFD to produce a more uniform UV dose and an enhanced chamber performance. The UV system used in the process has been selected based on the flow rate, the level and type of bacteria that may be present and the nature of the process stream to ensure the appropriate exposure to UV light is achieved.

1.3.4. Qualification Information

Where systems are for pharmaceutical use, additional parts and information are available, including certified lamps and seals made from FDA approved materials. Optional higher finishes of the chamber and tri-clamp fittings are also available.

2. Safety

2.1. Risks Associated with the System

Incorrect operation or use for other than the intended purpose may:

- Endanger the health of the operator.
- Damage the unit and other equipment.
- Prevent efficient operation of the unit.

All persons concerned with the installation, commissioning, operation, maintenance and repair of the unit must:

- Be suitably qualified
- Observe these Operating Instructions.

Take the time to read and understand the operating manual before attempting to use the system in order to ensure correct and safe operation

IF IN DOUBT – ASK

2.2. Ultra Violet Light


Ultraviolet is electromagnetic radiation of wavelength 100 to 400nm. It lies beyond the violet end of the visible spectrum and precedes the X-ray Band.

The UV spectrum is further divided into 4 sub bands:


UV-A	320nm to 400nm
UV-B	280nm to 320nm
UV-C	200nm to 280 nm
Vacuum UV	100nm to 200nm

Hanovia UV treatment systems operate principally in the UV-C band; typically 250 – 260nm. The emissions in this band are invisible and highly damaging to eyes and exposed skin.

For this reason;

	DO NOT ATTEMPT TO OPERATE THE ARC TUBE OUTSIDE THE CHAMBER DO NOT ATTEMPT TO LOOK AT AN OPERATING ARC TUBE
---	---

2.3. Earthing

	The equipment must be earthed correctly by using a conductor of adequate cross section and the supplied leads. See Section 4 for installation details.
---	---

2.4. High Voltages



ENSURE INSTALLATION HAS BEEN CARRIED OUT IN ACCORDANCE WITH THIS MANUAL BEFORE OPERATING EQUIPMENT.

There may be voltages in excess of 300 Volts in the cabinet and arc-tube connections.

Wait approximately two minutes after the isolator has turned off before gaining access to the cabinet or UV chamber connections.

Before attempting to service a treatment chamber, ensure that the power supply is completely disconnected by means of the door isolator. The isolator should be padlocked in the OFF position, and local lock-off procedures followed.

See section 7, Figure 7-1.



ALL INSTALLATION AND MAINTENANCE WORK SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL.

2.5. High Temperatures

The arc-tube wall reaches high temperatures during normal operation and the arc-tube retains heat for a considerable time after it has been switched off.



TAKE EXTREME CARE WHEN HANDLING HOT ARC-TUBES.

2.6. Mercury

Arc-tubes have an amalgam which contains a small quantity of mercury (<100mg).

Powder free gloves should be worn at all times when handling arc tubes and care should be taken to avoid breakage.

Old arc tubes must be disposed of safely. On request, your local customer services agent can supply details of suitable disposal companies. New arc tubes should be stored in their original packing until required for use.

2.6.1. Mercury Spillage

In the event of an Arc-tube breakage, carry out the following procedure.

Check List
Items needed to clean up a small mercury spill
1. Zip Lock type plastic bags
2. Rubber or Latex gloves
3. Paper Towels
4. Cardboard or squeegee
5. Eyedropper, syringe or pipette
6. Duct tape, or shaving cream and small paint brush
7. Mercury Spillage Cleaning kit (optional)

1. Put on rubber or latex gloves.
2. If there are any small broken pieces of glass or sharp objects, pick them up with care. Place all broken objects on a paper towel. Fold the paper towel and place in a zip lock bag, secure and label broken glass.
3. Locate visible mercury beads or amalgam spots (see illustration in Section 7.3.2 step 4) depending on type of lamp fitted (see Section 7.9). Use a squeegee or cardboard to gather mercury beads/amalgam spots. Use slow sweeping motions to keep mercury from becoming uncontrollable.
Note: Mercury can move surprising distances on hard-flat surfaces, so be sure to inspect the entire room when "searching."
4. Use the eyedropper to collect or draw up the mercury beads. Slowly and carefully squeeze mercury onto a damp paper towel. Place the paper towel in a zip lock bag, secure and label spilt mercury.
5. After you have removed the larger beads, put shaving cream on top of small paint brush and gently "dot" the affected area to pick up smaller hard-to-see beads. Alternatively, use duct tape to collect smaller hard-to-see beads. Place the paint brush or duct tape in a zip lock bag and secure.
6. OPTIONAL STEP: It is OPTIONAL to use commercially available mercury cleaning kits that contain powdered sulphur to absorb the beads that are too small to see. The sulphur does two things: (1) it makes the mercury easier to see since there may be a colour change from yellow to brown and (2) it binds the mercury so that it can be easily removed and suppresses the vapour of any missing mercury. Mercury spill kits can normally be purchased from laboratory, chemical supply and hazardous materials supply manufacturers.
7. Mercury waste should be properly disposed of in accordance with local laws for hazardous waste.

2.7. Pneumatic Air (Auto wiper option)

Before carrying out any maintenance, ensure that the air supply is isolated, and the system is vented of air.

2.8. Manual Wiper (Option)

Ensure that the wiper retaining pin is located in the wiper shaft when the wiper is not in use; see 7.7.2, item 12, page 73

2.9. Risk Assessment

OPERATION OR PROCEDURE:- Commissioning, Servicing, Maintaining and Operating Low Pressure and Amalgam UV Disinfection Systems		
HAZARDS	PERSONS AT RISK	CONTROLS AND PRECAUTIONS
High Voltages (Cabinet and Arc tube).	Service Engineer Operator Installer	<ol style="list-style-type: none"> 1. Control Cabinet to prevent access to live terminals. 2. Door switch safety interlock 3. 'High voltage' warning signs. 4. Circuit breakers in OFF position. 5. Statement in Operating manual referring to High Voltages 6. Training, part of Hanovia's Service Engineer training schedule. 7. Part of commissioning procedure for customer (operator). 8. Keyhole plate to prevent access to arc tube.
Ultraviolet light (Arc tube).	Service Engineer Operator Installer	<ol style="list-style-type: none"> 1. Hazard WARNING label on UV chamber. 2. Instruction to turn off, isolate system and padlock isolator off prior to replacing arc tube. 3. Statement in Operating manual referring to exposure to eyes and skin. 4. Training as 7 above.
High temperatures (Arc tube).	Service Engineer Operator Installer	<ol style="list-style-type: none"> 1. Instruction in operating manual to allow lamp to cool before removal. 2. Statement in operating manual referring to High Temperatures. 3. Training as 7 above.
Mercury (Arc tube).	Service Engineer Operator Installer	<ol style="list-style-type: none"> 1. This is a COSHH listed substance.

Continued.

OPERATION OR PROCEDURE:- Commissioning, Servicing, Maintaining and Operating Low Pressure and Amalgam UV Disinfection Systems		
HAZARDS	PERSONS AT RISK	CONTROLS AND PRECAUTIONS
Water (Pressure).	Service Engineer. Operator. Installer.	<ol style="list-style-type: none">1. Local inlet / outlet valves with isolation warning tags(Operator responsibility)2. Training as 7 above.3. Manual wiper option – instruction to secure wiper shaft
Pneumatic Air. (Auto wiper option)	Service Engineer Operator Installer	<ol style="list-style-type: none">1. Instruction to isolate and vent system of air.2. Training as 7 above.

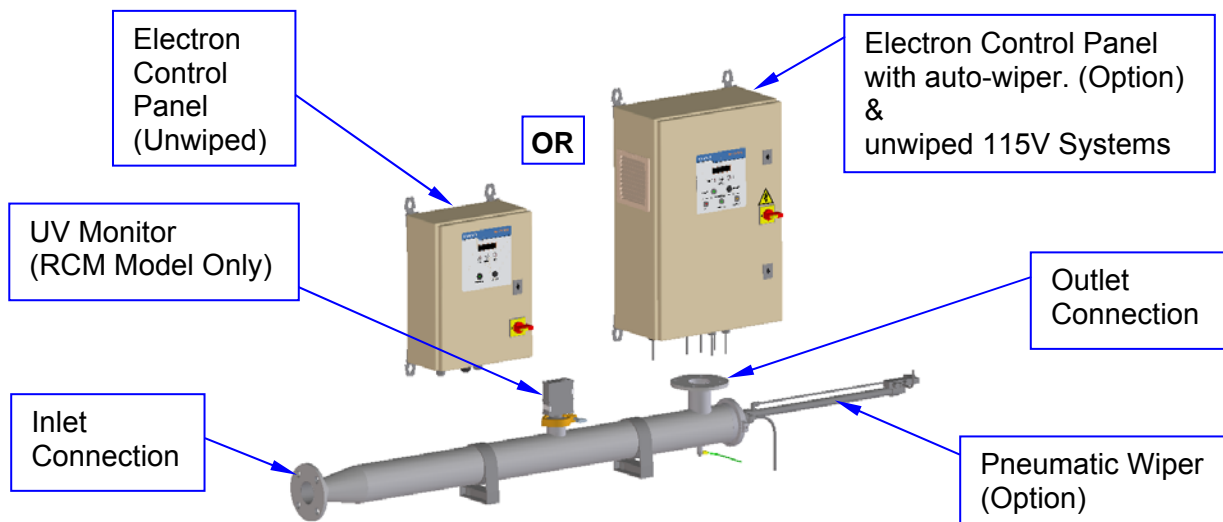
3. Description of System

The AF3 UV treatment system consists of a UV Chamber, Electron control panel or an Electron control panel with wiper (Option) and connecting cables. A UV Monitor and pneumatic wiper are also available as options.

The system uses high intensity UV emissions to treat a fluid stream (i.e. disinfect constituents).

A typical system is shown below:

Figure 3-1 AF3 UV System



3.1. UV Chamber

The treatment chamber has been designed using Hanovia's proven CFD modelling tools. It is based on an innovative L-shaped design which optimises the UV dose and delivers an optimal combination of low power, low hydraulic pressure drop and prevention of micro-organism replication.

The chamber is manufactured out of 316L stainless steel and is electropolished and passivated. It is available with either threaded / flanged connections (depending on size) or tri-clamp connections in the GMP Version.

The lamp is housed within a quartz thimble to prevent direct contact with the fluid. The quartz thimble and the lamp can only be installed from one end of the chamber, adjacent to the outlet connection.

When installed, the quartz thimble extends from approximately the end of the 'tapered' inlet section of chamber to the sealed connection at the other end of the chamber. However, the UV lamp is shorter than the chamber and the quartz thimble and when fully installed one end fits into the sealed end of the quartz thimble while the other end stops before the outlet connection for the process flow. The treatment length of the UV is based on the length of the lamp and not that of the chamber or the quartz thimble.

The chamber may also be fitted with a UV monitor and either a pneumatically operated or manually operated wiper (see section 3.4.2).

3.2. Electron Control Panel

The main functions of the control panel are:

- Supply power to the UV chamber.
- Provide customer control interface.
- Provide fault indication.

The AF3 UV system is available in several modes of construction and control. Some options and operation modes are not valid for each system. This will be mentioned where it is relevant.

The cabinet sizes for the various models are shown below.

Table 1 Cabinet Sizes

Models	Voltage	Auto Wiper Option	Manual Wiper Option	Cabinet Size H x W x D (mm)
'B' & 'RC' & 'RCM	230V	No	Yes *	400 x 300 x 155
'B' & 'RC' & 'RCM	115V/230V	Yes *	Yes *	600 x 400 x 210

* Not on AF3-0002 and -0003 Models

All control systems are described in this manual, the following basic configurations are possible:

3.2.1. Electron B

The Electron B panel is fitted with:-

- A Door isolator switch – for isolating the UV system during maintenance and service. Also used to start / stop the lamp
- Front panel “lamp on” and “fault” indicator.
- Electronic Ballast - for supplying H/F voltage to the UV lamp.
- Customer Interface Terminals – for the customer to use for monitoring the lamp status.

OR

3.2.2. Electron B with auto-wiper control (Option not on AF3-0002 & -0003 Models)

- Configuration as above in 3.2.1
- Front panel Indication – “Wiper ON”, “Wiping” and “Fault”.
- Customer interface terminals – for customer to monitor wiper fault condition.

3.2.3. Electron RC & RCM

The Electron RC & RCM panel is fitted with:-

- A Door isolator switch – for isolating the UV system during maintenance and service.
- Front panel “power on” indicator and reset button.
- Electronic Ballast - for supplying H/F voltage to the UV lamp.
- Customer Interface Terminals – for the customer to use for monitoring, alarm warnings, remote start and reset of system.
- Local start/stop and status indication.
- Display of % UV intensity (Only on Electron RCM model).
- LCD – two line display giving indication of operation of system.
- Push buttons – start / stop of system and menu access.

OR

3.2.4. Electron RC & RCM with auto-wiper control (Option not on AF3-0002 & -0003 Models)

- Configuration as above in 3.2.3
- Front panel Indication – “Wiper ON”, “Wiping” and “Fault”.
- Customer interface terminals – for customer to monitor wiper fault condition

3.3. System Identification

- Electron Panel – the rating plate on the side of the cabinet lists;
Part Number
Serial Number
Model Number
Input Rating
Lamp Rating

Also the software version can be seen on the display at startup.

- Chamber – the rating plate lists;
Working Pressure and Temperature
Lamp and Quartz Part Numbers
Part Number
Serial Number
Model Number
Maximum Flow Rate
- UV Monitor– Serial Number, Model Number & Revision are included on the label.
(Only on Electron RCM Model)

3.4. Options

3.4.1. UV Monitor

A sealed UV monitor, fitted to the chamber, detects the intensity of UV light being emitted from the arc-tube measured after passage through the process stream. The UV intensity is displayed on the screen of the Electron controller as a percentage of the intensity of the new lamp with a clean thimble. The output is also available as a 4 – 20 mA passive output. Customer supplies +24V DC (Limit +18V DC to +32V DC). See drawing 210073-XXXX-iss in Appendix A and Section 4.6

The UV monitor is fitted as standard to the AF3 Models using the Electron RCM. Where AF3 Models are supplied using the Electron RC, these models can, if required, be upgraded at a later date to the Electron RCM version using the optional UV monitor.

3.4.2. Wiper

An automatic or manual cleaning for the quartz thimble is available for customers where quartz fouling is likely to occur.

This device causes 2 elastomeric rings (Fixed to a stainless steel shaft), operated either by hand (manual cleaning, see section 7.7) or a pneumatic cylinder (automatic cleaning, see section 7.6) to be drawn over the outer surfaces of the quartz thimble to remove deposits.

3.5. Specifications

Model:	AF3-0002	AF3-0003	AF3-0008	AF3-0014	AF3-0027	AF3-0051	AF3-0116
Treatment capacity m ³ /hr*	1.5	3.3	7.9	13.5	26.5	51.0	116.0
Number of lamps	1	1	1	1	1	1	1
Power (W)	40	80	80	140	270	270	500
Expected Lamp life (hours)	9,000	16,000	16,000	16,000	12,000	12,000	12,000
Warranted Lamp life (hours)	5000	9,000	9,000	9,000	9,000	9,000	9,000

* 30 mJ/ cm² average dose at 98% T10, end of lamp life

UV Chamber:

Material of construction	316L Stainless Steel, electropolished and passivated						
Connections	DN25 BSPT/ 1" NPT / JIS / TRI	DN25 BSPT/ 1" NPT / JIS / TRI	DN40 BSPT/ 1.5" NPT / JIS / TRI	DN50 BSPT/ 2" NPT / JIS / TRI	DN50 BSPT/ 2" NPT / JIS / TRI	DN80 PN16/JIS/ ANSI/ TRI	DN150 PN16/JIS/ ANSI
Maximum operating pressure	7 Bar (10 Bar optional)						
Maximum fluid temperature	+ 30 °C	+ 40 °C					
Rating	IP65 (NEMA 4)						
Dimensions Length x body Dia (mm)*	1150 x 63	1150 x 63	1388 x 102	1388 x 102	1388 x 102	1437 x 168	1980 x 204

* Allow chamber length clearance for lamp and quartz thimble replacement

GMP Version	AF3S-0002	AF3S-0003	AF3S-0008	AF3S-0014	AF3S-0027	AF3S-0051	AF3S-0116
Connections	DN25 Tri-clamp	DN25 Tri-clamp	DN40 Tri-clamp	DN50 Tri-clamp	DN50 Tri-clamp	DN80 Tri-clamp	DN150 Tri-clamp

Electron Control:

Material of construction	Carbon Steel, painted (Optional 304 St. St.)						
Rating	IP65 (NEMA 4)						IP55 (NEMA 12)
Dimensions height x width x depth (mm)	See Table 1, Page 14						
Supply voltage	115V 50 / 60 Hz or 230V 50 / 60 Hz Factory set, must be specified at time of ordering.						230V 50 / 60 Hz
Temperature Range	+5 °C to +40 °C						
Maximum cable length to chamber (m)	5						

Features:

Electron Models:	Indicators			VFC Outputs				Options
	Lamp on	Lamp fail	Power on	Lamp on	Low UV	Reset Button	Remote start/Stop	4 – 20 mA % Intensity
B	✓	✓		✓				
RC	✓	✓	✓	✓		✓	✓	
RCM	✓	✓	✓	✓	✓	✓	✓	✓

Features - Automatic Wiper Option:

Electron Models: (only AF3-0008 to 0116)	Indicators		VFC Outputs	
	Wiper on	Wiper fail	Wiper running	Wiper Fail
B (Not 0116)	✓	✓	✓	✓
RC	✓	✓	✓	✓
RCM	✓	✓	✓	✓

4. Installation and Commissioning

4.1. What is supplied:

The AF3 UV system components are:-

- 1 x UV Electron Panel
- 1 x UV Chamber
- 1 x Quartz thimble with 'O'-ring, (Pre assembled in the chamber)
- 1 x Arc tube
- 1 x Arc tube lead assembly (Pre-wired to the cabinet)
- 1 x Earth Lead (Pre-wired to the cabinet)
- 1 x Operating and Maintenance Manual
- 1 x Certification pack (only with the GMP Version)
- 1 x 3 mm Hex Head driver (Tool required to change arc tube)
- 1 x Panel locking key.

Also required, but not supplied with the AF3 UV system are:-

- An adjustable wrench with jaw opening at least 46mm will be required for the quartz nipple removal. (special tool available see 7.9)
- A section of plastic pipe, 1.5 - 2 metre long x 25mm dia; to assist with quartz thimble removal.



Tools required for the auto-wiper or manual wiper (Optional fitment)

- 2.5mm Hex head driver.
- 7, 8, 13mm spanners.
- Adjustable spanner with 25mm min. jaw width. (special tool available see 7.9)
- Seal replacement tool (see 7.9)

4.2. Options

- UV monitor with lead assembly (Pre-wired to the cabinet if provided).
- 1 x UV chamber auto-wiper parts (see 4.7 for wiper installation and set-up) with lead assembly (Pre-wired to the cabinet if provided).
- 1 x UV chamber manual wiper parts.
- 2 x UV chamber mounting brackets

4.3. Handling Instructions:

	This equipment is delivered in protective packaging but it should be protected from shocks and heavy weights and it should be stored in a clean dry area at between -10°C and 50°C prior to installation. (14°F to 122°F)
	When unpacking the equipment, check that all components are present and are undamaged. DO NOT touch the Quartz thimble or Arc tube with bare hands, use powder free Gloves. On chambers fitted with pneumatic wipers DO NOT lift the UV Chamber by the pneumatic cylinder.

4.4. Installation Recommendations

The UV chamber may be installed either horizontally or vertically to suit local installation requirements. However, Hanovia's recommendation is to mount the unit horizontally to facilitate replacement of the lamp and/or quartz thimble. It should be installed in a readily accessible location to facilitate maintenance.

If the unit is to be mounted vertically then you must contact Hanovia to request a vertical mounting adaptor kit and installation recommendations. Fitting and removal of arc tubes is described in section 7.3.3.

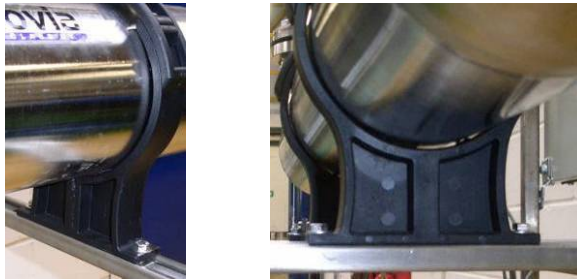
NOTE that access space equal to or greater than the chamber length MUST be allowed at the opposite end to the flow inlet to the chamber for arc tube and quartz thimble replacement.

1. Install equipment in an indoors environment.
2. The ambient temperature in the installation area should be between 5°C and 40°C (41 to 122°F) with the relative humidity less than 90%.
3. Insulate the unit from extreme temperatures.
4. Install the chamber horizontally (If mounting vertically contact Hanovia)
5. If the installation uses plastic pipework it is recommended to use stainless steel pipework for the first metre at the inlet and outlet to minimise the exposure of the plastic pipework to UV light. Any bends put in as light traps should be at least 2 diameters from the connection point
6. Allow maintenance space around the system, including the chamber length for lamp removal. (See Figure 4-3 & Figure 4-4)
7. Ensure that the displays on the Electron control panel are at eye level or otherwise easily viewable. Mount the Electron control panel clear of the floor as a precaution against water ingress.
8. The maximum cable run between the Electron control panel and the chamber is 5m. The cables provided are the standard length. If these are longer than required Hanovia recommend that the excess cable is coiled and neatly fixed but the cables may be shortened by a competent electrician.
9. Ensure that the earth lead (green / yellow) from the cabinet is fitted to the UV chamber earth terminal.
10. Adjust the arc tube connector from the keyhole plate as shown in Figure 4-5 and to the lengths in Table 3 to ensure the arc tube is mounted the correct distance into the UV chamber.
11. Ensure the Arc tube amalgam spot is towards the bottom of the chamber. See section 7.3.2
12. The mains supply cable to the Electron control panel must be wired on site. This is connected to the control panel through one of the available inlet ports on the bottom of the panel and is wired to the connections on the isolator in the panel as shown in Figure 4-2. See Table 2 for supply information.
13. Ensure that the panel locking key is kept in a convenient location for future access to the electrical panel.

14. If the optional mounting fittings are provided with the unit as shown in Figure 4-1. These two fittings supporting the chamber can be mounted as appropriate but ideally they will be a minimum of 0.5 meters apart. See Appendix A, Drg Ref. 120186-XXXX & 120195-XXXX for installation details.
15. UV Chamber units with Auto-wiper Option –. The wiper system assembly is split from the UV chamber and will need to be fitted once the UV chamber is mounted and connected to the customers pipework (see section 4.7 for wiper installation and set-up)
16. The auto-wiper (Option) air supply must be clean dry air, 3-5 bar gauge, filtered to 50µm MAX.
17. Brass drain plugs are fitted as standard to some versions of the AF3 chambers. Hanovia recommends that during commissioning, it is replaced by a stainless steel drain valve or plug as brass may have an effect on some processes.

Figure 4-1 Installation fittings.

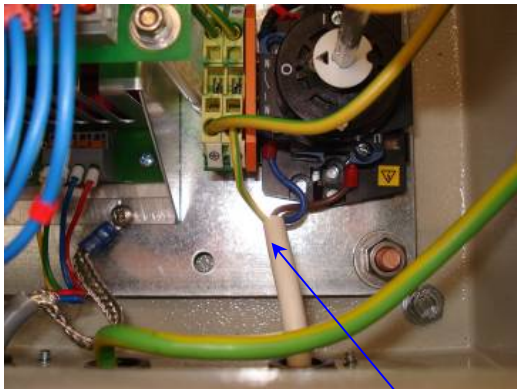
Note: the UV chamber mounting clips are not normally supplied with the system and are available as an optional supply.



The mains supply must only be connected to the correct supply: as indicated on the rating plate on the side of the panel

If the correct voltage is not available do not connect the supply to the cabinet, contact the agent who supplied the equipment.

Figure 4-2 Incoming Supply Cable



Electron UV
Control Panel
(Small Panel)

Incoming
power supply
cable

Electron UV
Control Panel
(Large Panel)


Figures shown are typical for RC / RCM panel

4.5. Electrical Notes

Wiring sizes given below are for guidance only; local regulations should be referred to for cable type and installation method and derating factors such as cable type, temperature and bunching etc. Circuit breakers are to be of the 'D' or 'K' curve type (Suitable for high current inrush).

Table 2 Electrical Supply Requirements

Model	Nominal Lamp Power (W)	Supply Voltage Range * At 50-60Hz	Circuit Breaker	Recommended Circuit Breaker (Supply)	Recommended Wiring mm ² (Supply)
AF3-0002	40	115V or 230V (103.5 to 126.50) (207.0 to 253.00)	6 Amp	10 Amp Type D	1.5mm ² 16 AWG
AF3-0003 AF3-0008	80	115V or 230V (103.5 to 126.50) (207.0 to 253.00)	6 Amp	10 Amp Type D	1.5mm ² 16 AWG
AF3-0014	140	115V or 230V (103.5 to 126.50) (207.0 to 253.00)	6 Amp	10 Amp Type D	1.5mm ² 16 AWG
AF3-0027 AF3-0051	270	115V or 230V (103.5 to 126.50) (207.0 to 253.00)	6 Amp	10 Amp Type D	1.5mm ² 16 AWG
AF3-0116	500	230V ONLY (207.0 to 253.00)	6 Amp	10 Amp Type D	1.5mm ² 16 AWG

	<p>ALL INSTALLATION WORK MUST BE CARRIED OUT BY QUALIFIED PERSONAL.</p> <p>READ SAFETY SECTION BEFORE COMMENCING INSTALLATION</p>
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*Operation outside these specified ranges may result in inadequate performance or damage to the equipment.

Figure 4-3 Single line connection diagram (RCM Model)

Refer to drawings in Appendix A.

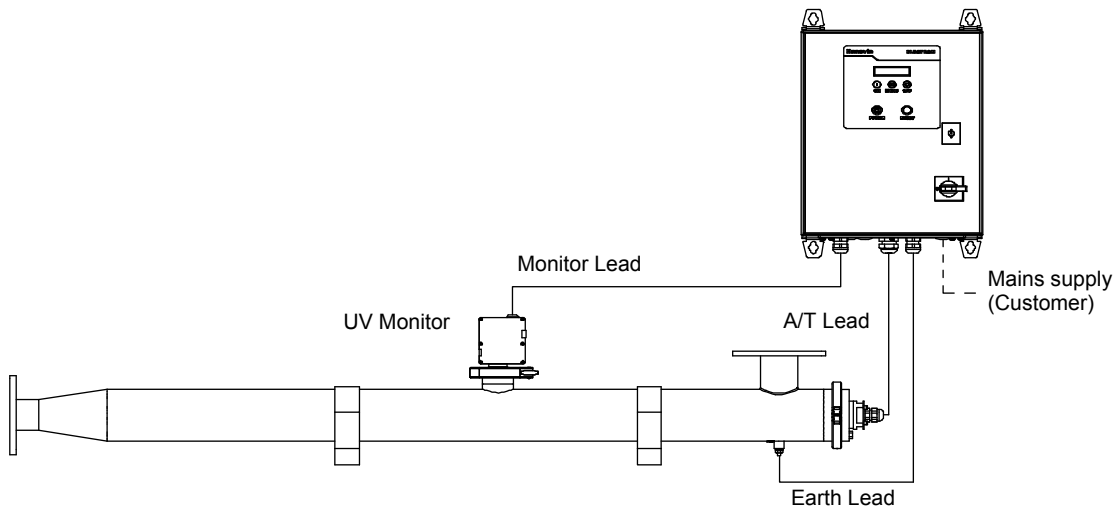


Figure 4-4 Single line connection diagram (RCM Model with wiper)

Refer to drawings in Appendix A.

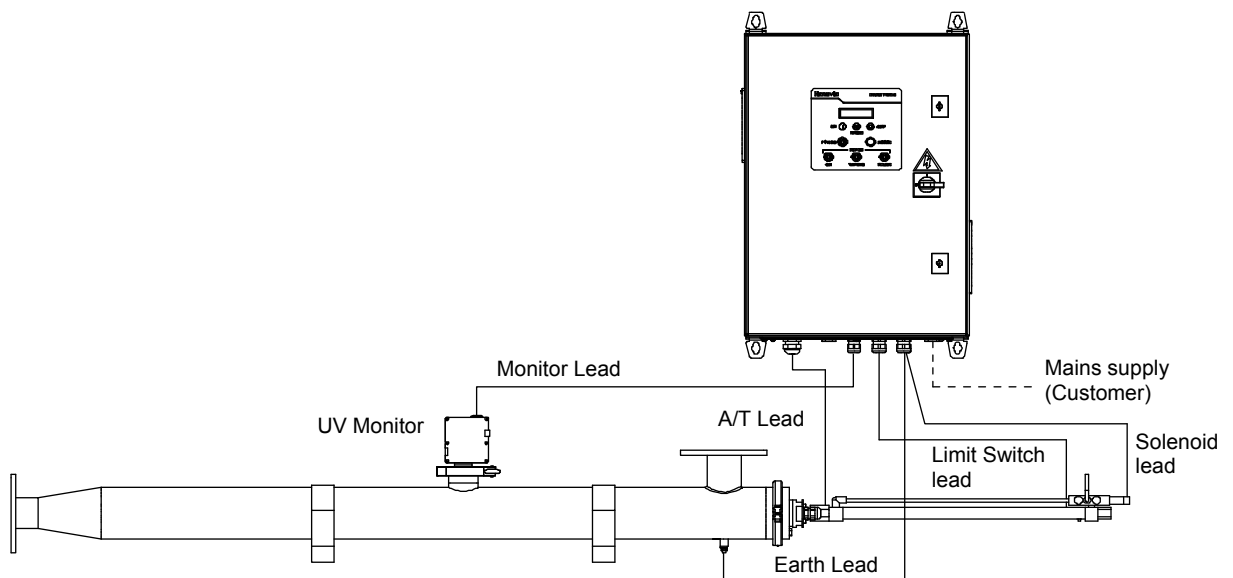
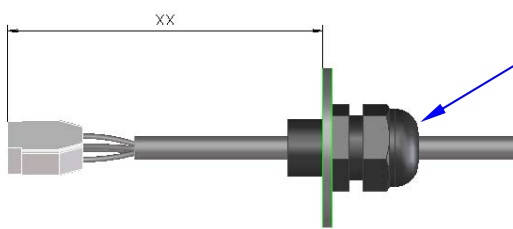


Table 3 Arc tube connector distance

	AF3-0002 and 0003	AF3-0008, -0014, and -0027	AF3-0051	AF3-0116
	Dim xx (See Figure 4-5)			
40W LP	125mm			
80W Amalgam	300mm	400mm		
140W Amalgam		270mm		
270W Amalgam		170mm	185mm	
500W Amalgam				200mm

Figure 4-5 Arc tube cable connector adjustment.

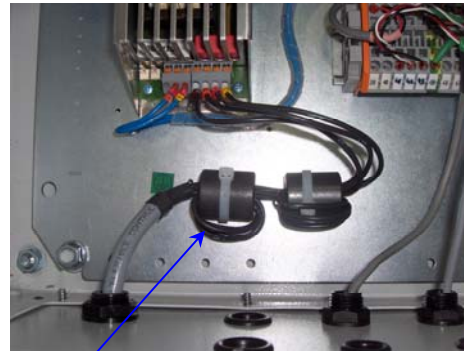
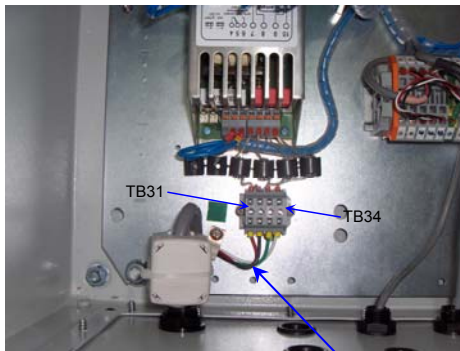


Loosen this nut to adjust cable length. When the length has been adjusted, retighten the nut.

Figure 4-6 Arc tube cable terminations

AF3-0002 to AF3-0051
230V supply

AF3-0002 to AF3-0051
115V supply and AF3-0116



Arc tube cable

Figures showing both versions of arc tube lead termination in control cabinet

4.6. Interface Wiring

All the interface wiring between the Electron control panel and UV Chamber is pre-wired into the cabinet. The only wiring necessary is to connect to the mains supply (See Figure 4-2) and to the customer interface terminals if necessary.

Figure 4-7 Customer Interface Terminals

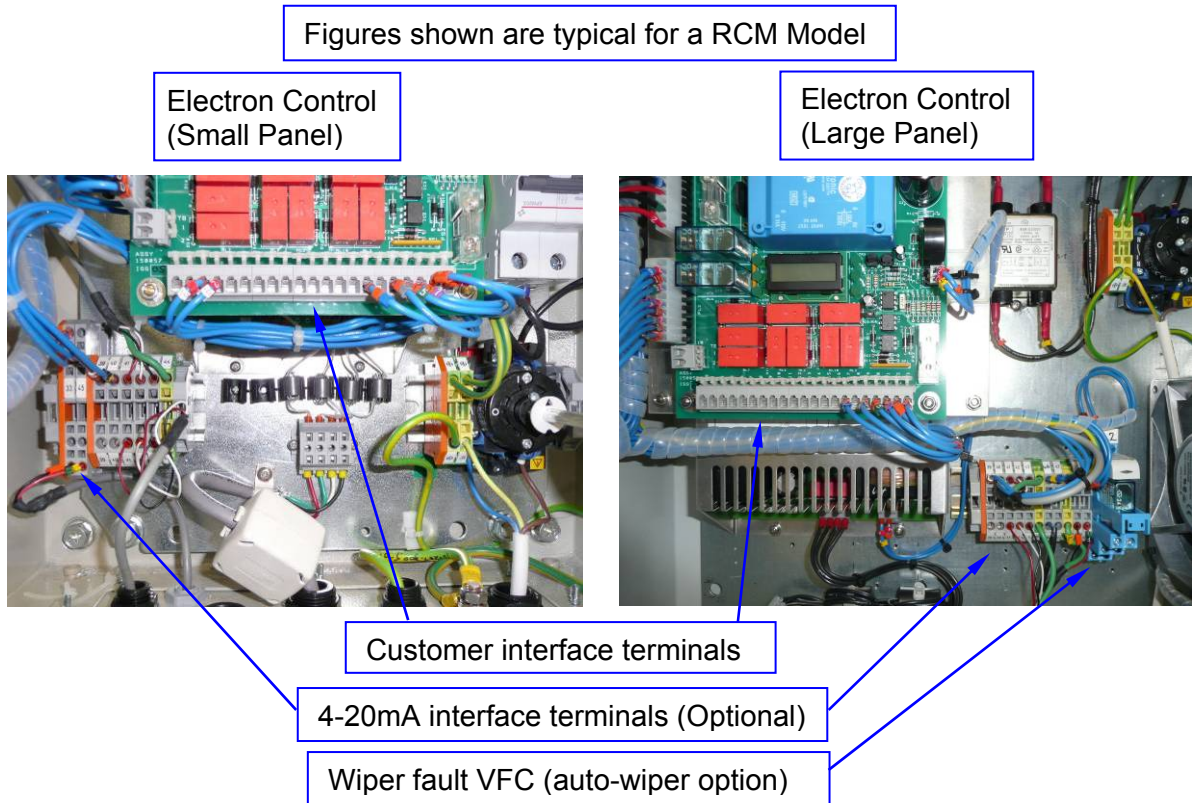
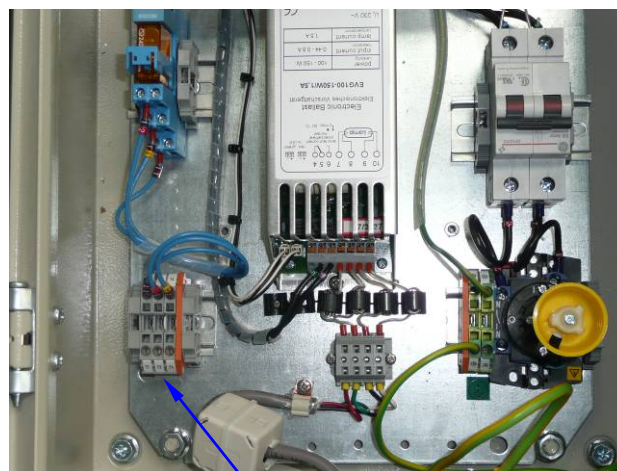





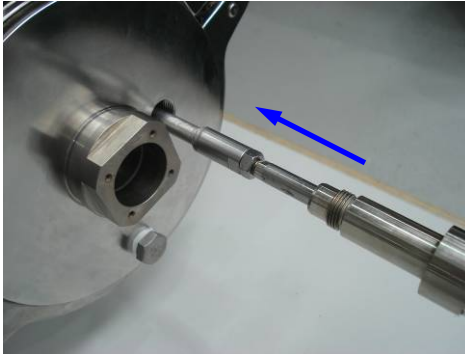
Figure shown is typical for a 'B' Model


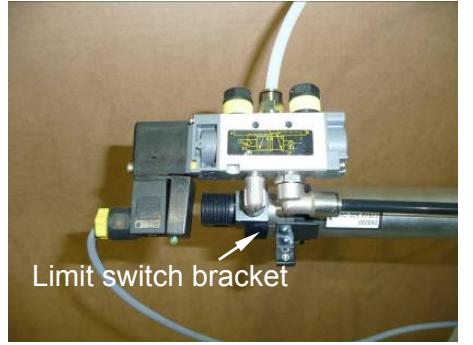





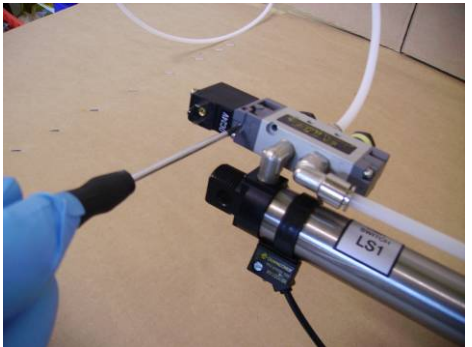
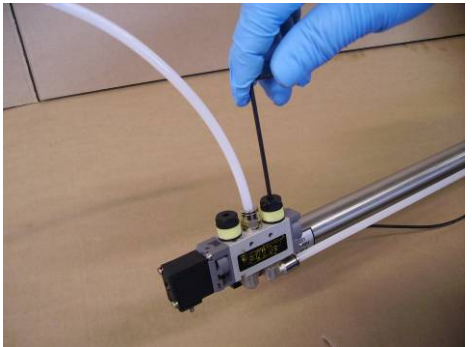
Lamp Fail VFC

4.7. Auto- wiper installation and setup (Option)

Refer to Appendix A. Drg 120195-XXXX for the auto wiper specifications and electrical connections.

1.	The Chamber and pneumatic cylinder will be delivered as two parts, the wiper shaft protruding through the chamber end plate.	
2.	Attach the pneumatic cylinder assy to exposed wiper shaft, turn cylinder shaft until fully engaged with the wiper shaft. Tighten the locknut onto the wiper shaft.	 
3.	Push the pneumatic cylinder & wiper shaft carefully into the chamber until the thread at the end of the cylinder engages with the thread in the chamber. Note: to help to ease the wiper into the chamber remove the UV monitor (see section 7.5.1) and wet the quartz thimble through the monitor port. Then replace monitor after (see section 7.5.3).	

4.	Tighten cylinder bearing housing to chamber using a suitable spanner (special tool available see section 7.9)	
5.	Locate the Limit switch mounting bracket.....	 <p>Limit switch bracket</p>
6.	Place the Limit switch onto the Mounting bracket.	
7.	Then insert and tighten up the screw to keep the Limit switch firmly in place.	

8.	<p>Insert a 6mm air line into the pneumatic valve. (See section 4.4 item 16 for air supply requirements) Ensure there is water flowing in the UV Chamber. Then turn on the air supply.</p>	
9.	<p>Set the Air pressure to between 3 & 5 Bar. Manually push the plastic screw head in on the pneumatic valve as indicated and the auto wiper should operate. A “clunk” should be heard when the wiper reaches the other end of the chamber. If not increase the pressure slightly until the auto wiper operates correctly.</p>	
10.	<p>The speed of the outward and return stroke of the auto wiper has been pre-set at the Factory. However, should this need to be changed, the exhaust valves can be adjusted with the use of a 2.5mm Hexagon key, turn the hexagon key clockwise or anti clockwise to adjust the speed of the outward or return stroke. The speed should be adjusted so that the wiper takes between 1 and 2 seconds to travel a full stroke. The air pressure may need to be adjusted too as there is some interaction between the two.</p>	

4.8. Commissioning Procedure

Commissioning of the AF3 unit should be carried out in accordance with the recommendations of this manual with particular attention to Safety. (See Section 2.)
See Table 4 for the commissioning checklist.

In order to check system parameters and settings see the ACCEPTANCE TEST RECORD in Appendix D

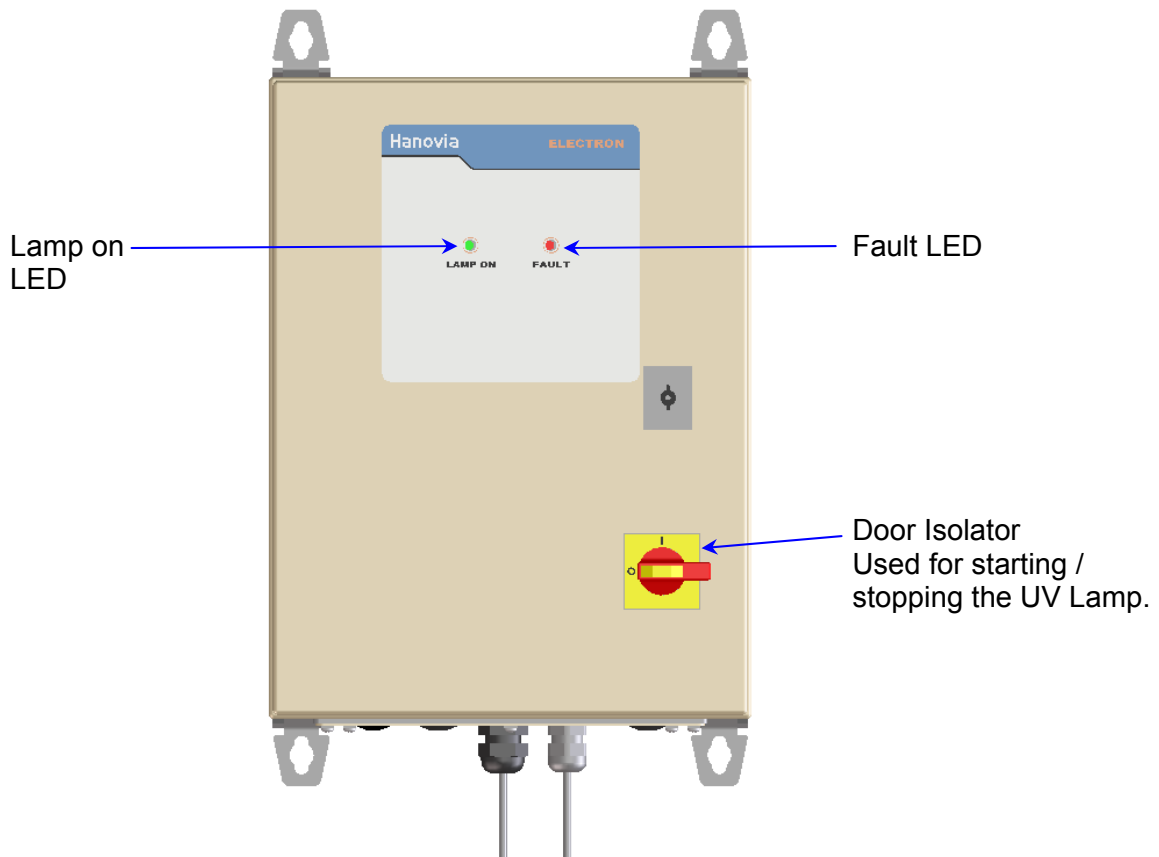
Table 4 Commissioning Checklist

CHECK LIST		
PROCEDURE	Tick if OK	
Ensure the chamber is free from damage, has been correctly mounted and inlet and outlet pipework is correctly fitted.		
Check that the power supply and all interconnecting wiring is connected correctly.		
Check that the electrical supply voltage and frequency is correct and that the power isolator is 'locked off'. (See procedure in section 7 and Figure 7-1). (The rating plate on the side of the cabinet will have the voltage / frequency details.)		
Check that the lamp is not fitted. Turn on the process stream and ensure that the flow passes through the chamber.		
Check for leaks.		
If there are no leaks and the process stream is flowing correctly then install the UV lamp (See procedure in section 7) and turn on the power to the Electron control panel and the chamber.		
Check that system settings are correct.		
Carry out functional check on system and ensure it performs satisfactorily.		
Check that the customer outputs, if connected, are delivering the correct data.		
If applicable, test the unit in the remote mode.		
Check system is correctly configured for local/remote, monitored or unmonitored operation. (RC/RCM Models)		
Confirm that the operator is trained and is competent to take over operation of the system.		
Confirm that the operator is competent to replace an arc tube and quartz thimble.		
Ensure that the operator is aware of all Health and Safety considerations.		
If it is a AUTO WIPED SYSTEM then carry out the following.		
Set wiper cycle to minimum time and observe outward and return stroke operates correctly.		
Unplug monitor and observe wiper operation on low UV signal, wiper should be heard when running and "Wiper wiping" LED illuminates.		
Reset wiper cycle to the required time interval		
Remarks:-		
SIGNATURE (Hanovia): Commissioning and Training Completed	NAME(Print)	DATE
SIGNATURE (Client): Training Completed	NAME (Print)	DATE

5. Electron B Operation



Figure 5-1 Electron B Control Panel Display



5.1. Running Instructions.

5.1.1. Starting the unit

To start the UV lamp, rotate the 'Door Isolator' switch to the 'On' position. When the UV lamp has struck the 'Lamp on' green LED will illuminate.

5.1.2. Stopping the unit

To switch the UV lamp off, rotate the 'Door Isolator' to the 'Off' position.

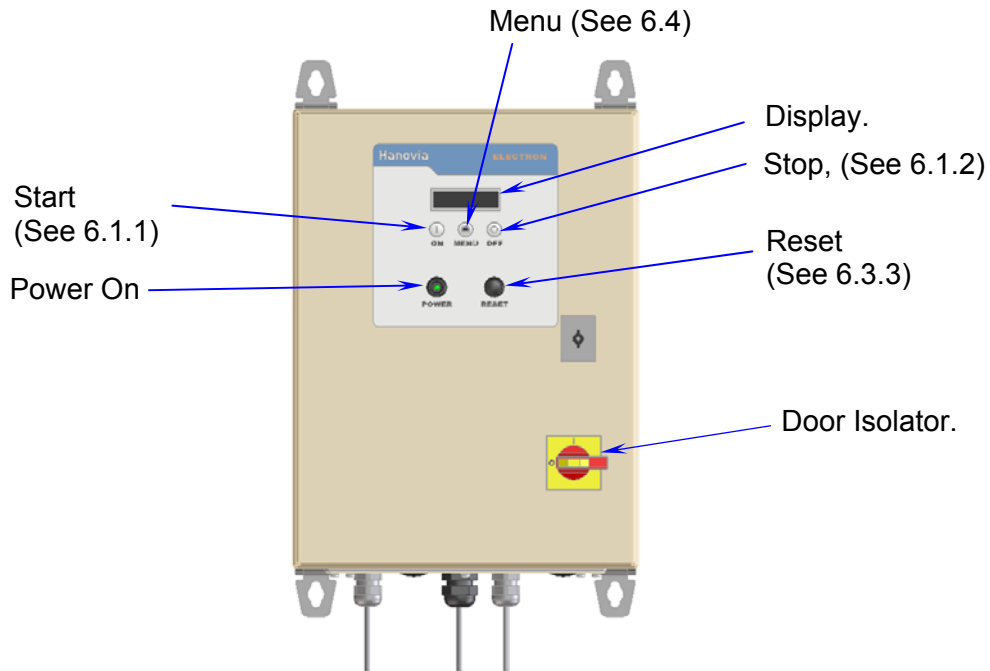
5.1.3. Warnings and Trips

In the event of a UV lamp failure, the 'Fault' red LED will illuminate. See Section 8 for possible causes.

6. Electron RC and RCM Operation



Figure 6-1 Electron RC and RCM Control Panel Display



6.1. Local Operation

6.1.1. Running Instructions – Starting the unit.

On the Electron control panel make sure the 'Door Isolator' is switched on and the 'Power On' LED illuminates.

The display on the panel will illuminate and show

then

Press and hold the Ⓛ ('Start') button for a few seconds and release.

The UV lamp has struck and is warming up to full power. (The Lamp on VFC will close, TB9 & TB10)

SOFTWARE
VERSION NO __. __

LAMP OFF
START MENU STOP

STARTING
START MENU STOP

Followed by:




The UV has gone above the LOW UV set point and the LOW UV VFC has closed, TB15 & 16)



(If there is no UV Monitor fitted to the chamber then '%' will not be shown)

6.1.2. Stopping the unit

Press and hold the  ('Stop') button for a few seconds and release. The following screen will show.



Followed by:
The UV lamp is now switched off.



6.2. Remote Operation

6.2.1. Starting / Stopping the Unit

Closing a Volt Free Contact (VFC) across TB11 and TB12 within the Electron control panel will start the UV Lamp; opening the VFC contact will stop the UV lamp. The LCD screens will appear similar to those shown above, but 'START' will not be displayed and the start button will be inoperative. 'STOP' will be replaced by 'REMOTE'.



If you want to set the Electron control panel from Local to Remote operation then the DIP switch No.2 needs to be set to 'ON' (See DIP Switch settings. Figure 6-2). The wiring will also need to be amended between the control PCB and the display PCB. See drawing 210073-0003 & 0004-iss in Appendix A for wiring details.

6.3. Warning and Trips

The following messages may appear on the display in the event of a warning or trip occurring on the unit.

6.3.1. Low UV Warning (Only RCM Model)

This screen indicates that the UV monitor is reading a low UV output from the UV lamp. The Low UV VFC, TB15 & 16 in the panel also goes open).

See Section 8 for possible causes.

The warning will clear automatically if the measured UV output rises above the low UV set point. (Fixed during test setup according to the system type as a %.)

If no UV monitor is fitted this screen is not displayed.



6.3.2. Lamp Failure

This screen indicates that the lamp has failed. The Lamp on VFC (TB9 & 10) and Low UV VFC (TB15 & 16) will open.

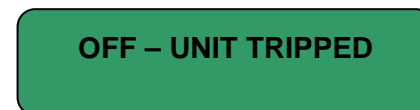
See Section 8 for possible causes.



6.3.3. Off – Unit Tripped

This screen indicates that there has been a power failure or interrupt on the mains supply.

To clear the fault, press the 'RESET' button.



6.3.4. Power Interrupt

This screen indicates that the system has just been powered up or there has been a power failure or interrupt on the mains supply.




6.4. Menu Button

6.4.1. Monitored Units (Only RCM Model)


The following screen appears when the arc tube is running with units fitted with a UV monitor.

**ON XXX%
START MENU STOP**

Pressing the ('Menu')  button will display the following screen.

**HOURS = XXXX
MENU**

This is an incremental timer that shows the number of hours the UV lamp has run. Record dates of lamp replacement in Table 8, Appendix C.

Pressing the  button again within 5 seconds will display the next screen, otherwise the screen will revert to the normal display.

**RESET UV TO 100%
YES MENU YES**

Pressing both "yes" buttons simultaneously ('Start' and 'Stop' buttons) while this screen is displayed will set the UV intensity to display 100%.


This should only be done when the lamp has reached full intensity. It is important to carry this out after a new UV lamp has been fitted or the quartz thimble/monitor is cleaned or replaced. After the lamp has run for 100 hours, the UV intensity will need to be reset to 100% again.

The following screen will be displayed for a few seconds.

100% SET

Display will revert to normal after 5 seconds

6.4.2. Unmonitored Units (Only RC Model)

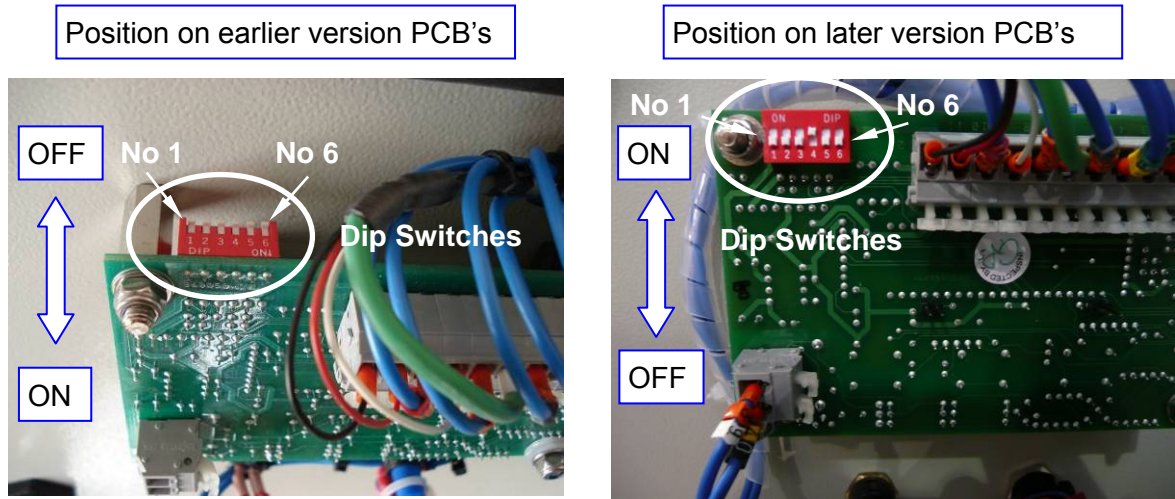
Pressing the  button will display the following hours run screen. Display will revert to normal after 5 seconds.

**HOURS = XXXX
MENU**

6.5. DIP Switch settings.

The dipswitch is located on the side of the Display PCB within the Electron control panel. These are normally factory preset for customer's individual requirements.

Figure 6-2 DIP Switch position



The dip switch setting will allow the following options to be set:

SWITCH 1	OFF	MONITOR FITTED
	ON	NO MONITOR
SWITCH 2	OFF	LOCAL OPERATION (see 6.2.1)
	ON	REMOTE OPERATION (see 6.2.1)
SWITCH 3	OFF	
	ON	
SWITCH 4	OFF	
	ON	
SWITCH 5	OFF	
	ON	
SWITCH 6	OFF	
	ON	

} Hanovia Use Only

6.6. 4-20mA Output Calibration (Option)

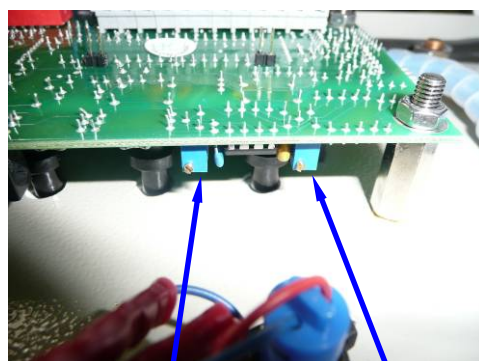
The 4-20mA output is factory calibrated, should the 4-20mA output require re-calibrating then follow the procedure below.

6.6.1. Test Equipment Required.

4-20mA Loop calibrator
0 - 5 VDC Power supply.

6.6.2. Calibration Procedure.

1. The 4-20mA output is scaled so that 4mA corresponds to 0% intensity, and 20mA corresponds to 100% intensity.
2. Turn off the unit
3. Disconnect the UV monitor wires from terminals TB42 and TB43. Connect the DC power supply into terminals TB42 and TB43, terminal TB42 is positive
4. Connect the 4-20mA loop calibrator into terminals TB39 and TB40, terminal TB39 being positive. Set the loop calibrator for internal power and to read loop current.
5. Turn power on to the UV Electron control panel. The loop current should be 4mA. If this requires adjustment trim potentiometer RV1 on the PCB mounted on the front panel (see below).
6. Set the DC power supply to 4 ± 0.5 volts, and then start the UV Lamp.
7. Reset the display to 100% See section 6.4. Since this is a stabilised voltage in place of the monitor the reading should remain constant during setting.
8. The 4-20mA should now output approximately 20mA. If this requires adjustment trim potentiometer RV2 on the PCB mounted on the front panel.
9. It may be necessary to repeat setting of the 4mA and 20 mA as the two settings interact slightly.
10. When calibration is complete the monitor should be reconnected, and the system reset to 100% as in section 6.4.



RV1 and RV2 potentiometers are located on the bottom of the PCB on the door.

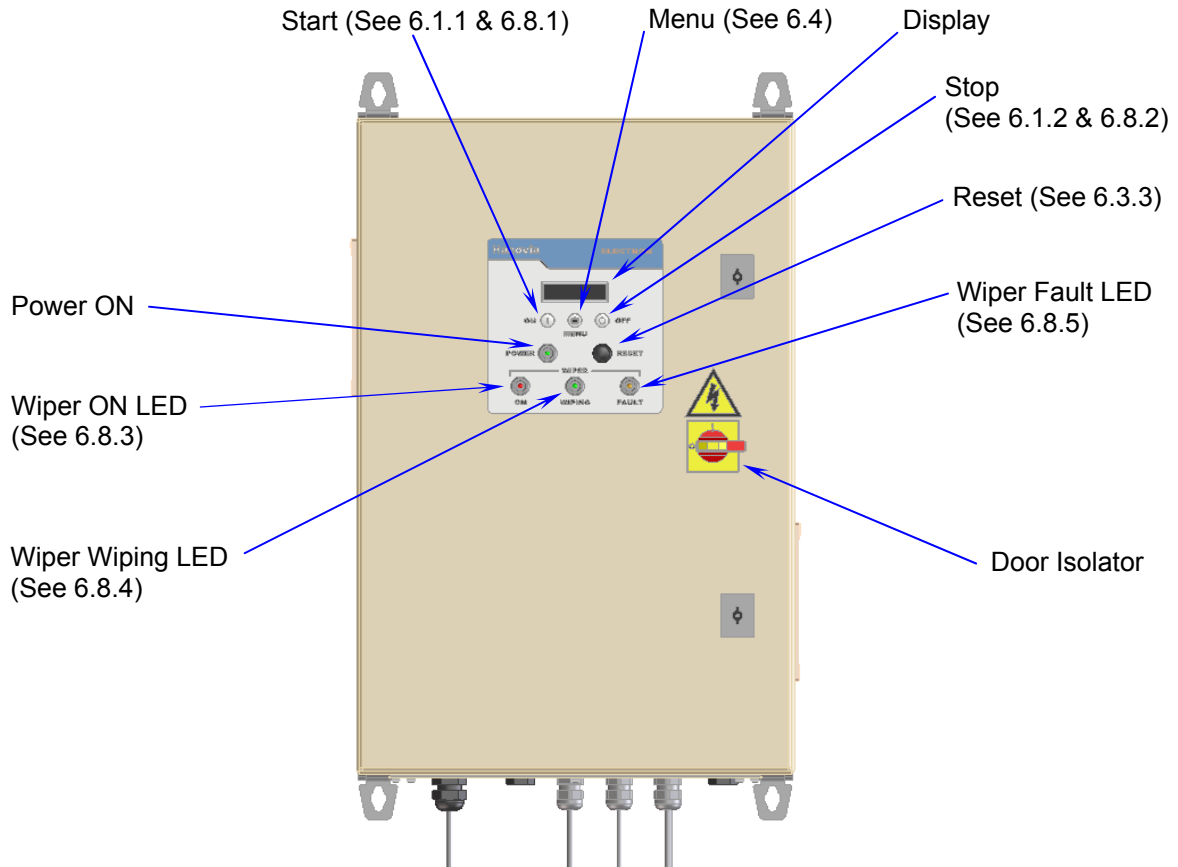
RV2

RV1

6.7. Electron control Panel with Wiper Operation

Figure 6-3 Electron Control Panel with Wiper Display
(Label shown is for an RC/RCM Model.)

Wiper operation is not available on AF3-0002 & 0003 Models.



6.8. Running instructions

6.8.1. Starting the Unit

To turn the unit on, rotate the 'Door Isolator' switch to the 'ON' Position. The 'Wiper ON' LED will illuminate. The wiper will then be run automatically by the control panel.

6.8.2. Stopping the Unit

To disable the pneumatic wiper, or to disconnect the supply in order to service the pneumatic wiper, rotate the 'Door Isolator' to the OFF position.

Note: This will also turn the UV Lamp off.

6.8.3. Wiper ON LED

Power is available to the wiper control circuitry and the wiper is ready for operation.

6.8.4. Wiper Wiping LED

The pneumatic wiper is enabled and is performing a wiping operation in the UV chamber.

6.8.5. Wiper Fault LED

The wiper has failed to return back within a 30 second time period, the 'Wiper fault' LED will illuminate.

See section 8 for possible causes.

6.9. Operation

A wiper carriage with 2 or 3 wiper rings is propelled along the quartz thimble by the pneumatic cylinder, when the solenoid valve is energised. The stroke is slightly more than the distance between the wiper rings so that all active areas where the UV light passes through the thimble are kept clean.

A magnetic switch is mounted at the home (retracted) position of the cylinder to detect the return of the cylinder at the end of the wipe cycle. Failure to detect the end of the wipe cycle will cause a wiper alarm, see 6.8.5.

6.9.1. B + RC Models

When the Door Isolator is turned on the wiper will immediately operate, the next wiper cycle will then be initiated to the wiper interval settings set in 6.10.

6.9.2. RCM Models

When the Door Isolator is turned on the wiper will immediately operate, the next wiper cycle will then be initiated to the wiper interval settings set in 6.10 or from a LOW UV signal. If there is still a LOW UV signal within 15 minutes then the wiper will perform another wipe after this 15 minute period and repeat until the LOW UV signal is resolved. See section 8 for possible causes if LOW UV signal remains for longer than 30 minutes..

6.10. Wiper Time interval settings

The wiper time interval between wipe cycles is factory set at 3Hrs. However this can be changed from within the control panel by terminating one or all of the wire(s) numbered 46/0, 46/1, 46/2 to terminal TB46. The pre-made wires can be found under the trunking cover at the top of the Electron control Panel. See Figure 6-4.

The wiper time intervals that can be set are:

15min; 30min; 1 Hr; 3hr; 6Hr; 12Hr; 24Hr.

See Figure 6-5 and Drg 210072-0005 to 0006-iss to set the wiper time interval settings.

Figure 6-4 Wiring Location for Wiper time interval

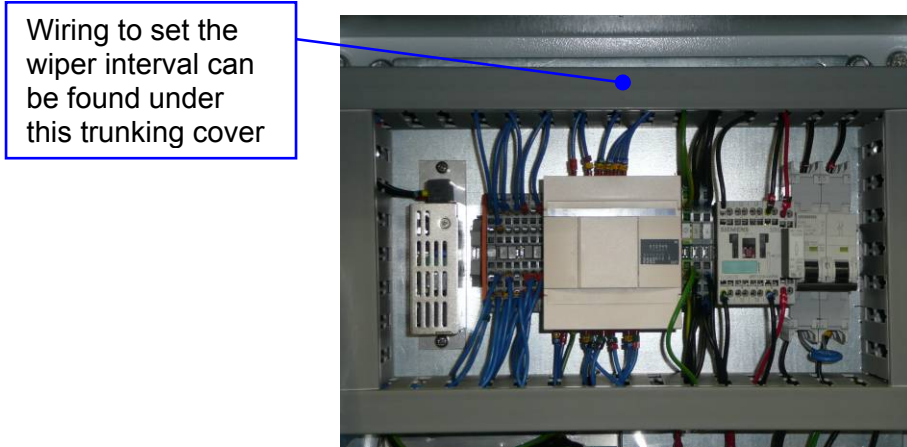
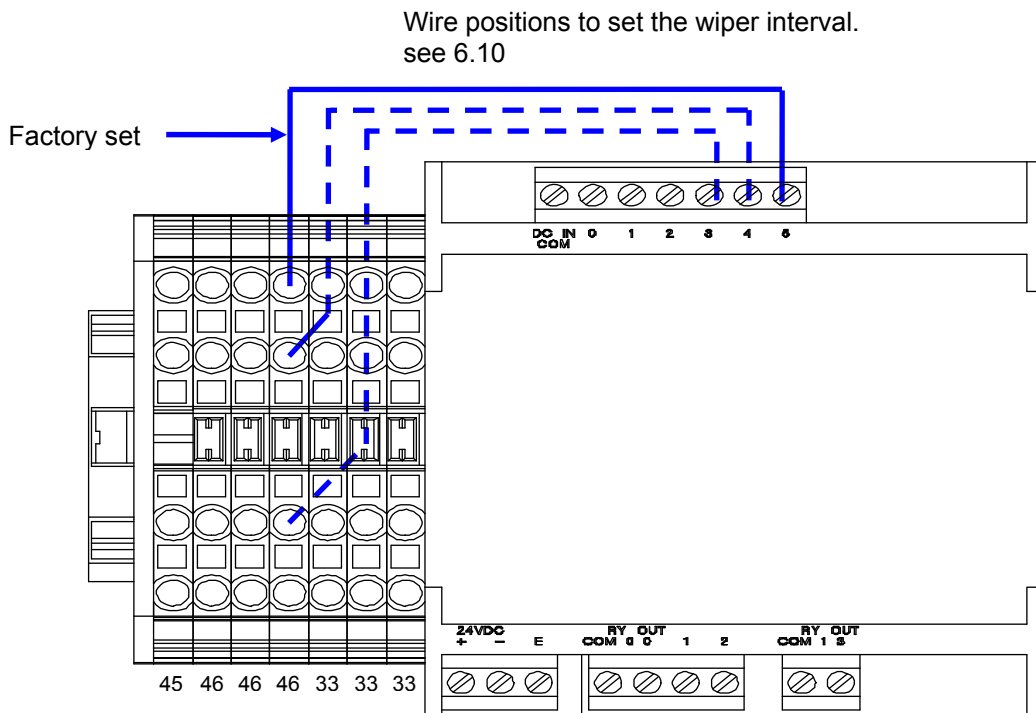


Figure 6-5 Wire positions for Wiper time interval



7. Service

7.1. Service Schedule

Period	Model	Maintenance Procedure
9000 hrs or Low UV *	AF3-0002	Lamp Replacement
16000 hrs or Low UV *	AF3-0003, AF3-0008 AF3-0014	Lamp Replacement
12000 hrs or Low UV *	AF3-0027, AF3-0051, AF3-0116	Lamp Replacement
12 Months	All models	Replace Wiper Parts
		Clean Thimble
		Clean Monitor Probe
24 months		Thimble replacement

* Whichever is sooner

Record the maintenance procedure tasks carried out and date in Table 8 provided in Appendix C.


	<p>PRIOR to carrying out ALL maintenance tasks on the AF3 UV chamber or control panel ensure that the isolator on the front of the Electron control panel is switched to OFF and LOCKED OFF. See. Figure 7-1 (Also Safety Section 2.)</p>
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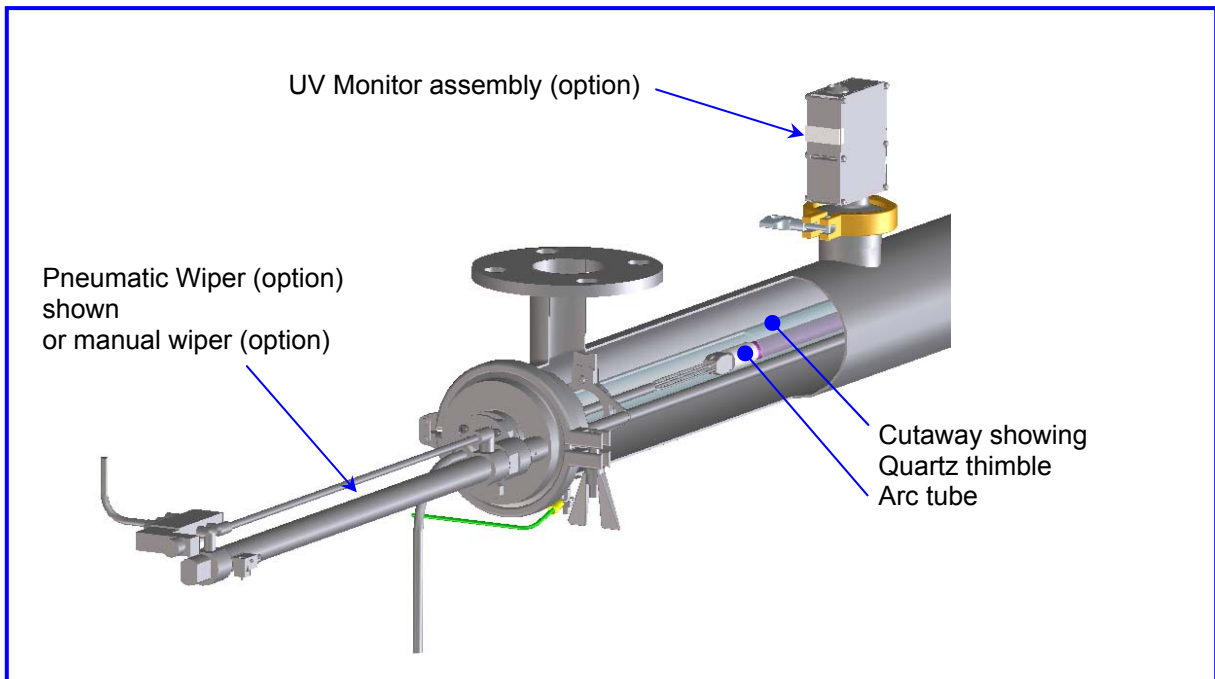
Figure 7-1 Panel with power 'locked off'



7.2. UV chamber

	Wear suitable powder free gloves, e.g. neoprene rubber, to protect the optical components from being contaminated with finger prints.
	Ensure that there is a clean, dry and safe working space to set down components, carry out cleaning operations with Iso propyl alcohol; and water


Figure 7-2 UV Chamber

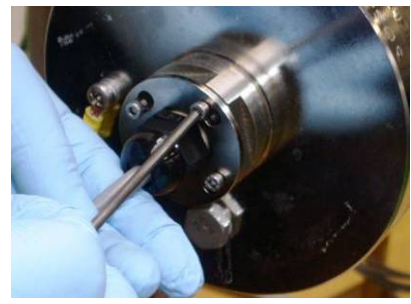
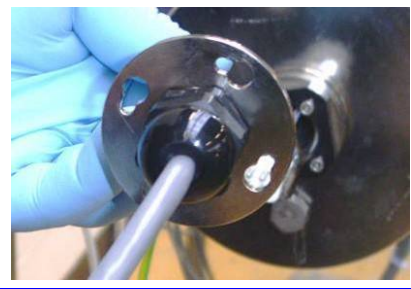

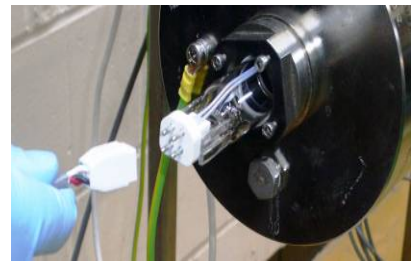



The thimble cleanliness should be checked each time that the arc-tube is replaced. Sufficient spare quartz thimbles and arc-tubes should be kept available in order to service the system with the minimum downtime.

7.3. Arc Lamp:



7.3.1. Removing the Arc Tube

	<p>CAUTION! WHEN REMOVING THE ARC TUBE IT MAY BE HOT.</p> <p>NEVER TOUCH AN ARC TUBE WITH BARE FINGERS. HOLD WITH ACID FREE TISSUE OR POWDER FREE GLOVES</p>
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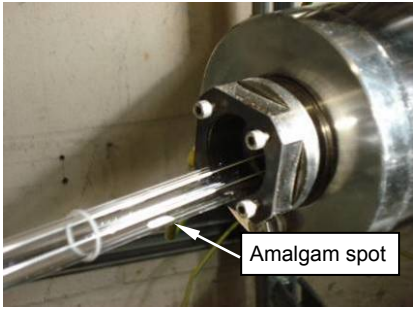

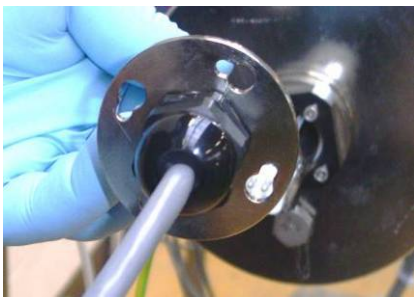
1.	Using tool provided loosen the 4 socket cap head screws on the end plate of the chamber.	
2.	Rotate the end plate anticlockwise and pull forward.	
3.	Gently pull the length of cable out of the unit until the white electrical connection can be accessed. Note that the end of the lamp will be pulled out of the chamber by this action.	
4.	Disconnect the white electrical connection.	
5.	Pull the UV lamp out of the quartz thimble and either dispose of safely (see Risk Assessment Section 2) or set in a clean dry location if the lamp is to be refitted.	

7.3.2. Fitting the Arc Tube:

These instructions apply to installing a new lamp or reinstalling a used lamp. It is recommended that the quartz thimble is cleaned before fitting a new arc tube. See section 7.4

1.	Ensure that the quartz thimble is installed and the nipple has been fully tightened.	
2.	Ensure that the drain plug is installed or the drain valve is closed.	
3.	Ensure that the system has been checked for leaks if the quartz thimble has been removed and refitted. (The unit should also be checked for leaks when it is first commissioned.)	


	NEVER TOUCH AN ARC TUBE WITH BARE FINGERS. HOLD WITH ACID FREE TISSUE OR POWDER FREE GLOVES
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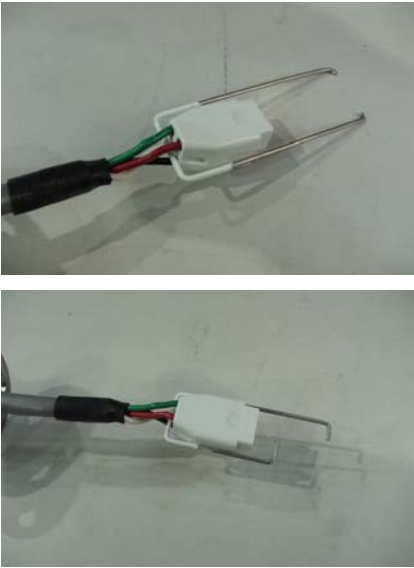


4.	<p>Present the end of the UV lamp without the white electrical connection to the quartz thimble and gently slide the lamp into place. NOTE – ensure the lamp is installed so that the amalgam spot on the side of the lamp is towards the bottom of the UV chamber. (Only applies to 80W to 500W lamps)</p>	
5.	<p>Prior to pushing the lamp fully into the quartz thimble connect the white electrical power supply fitting to the white connection on the UV lamp. NOTE – the connector is rectangular so can only be connected in two ways. (Either way is acceptable).</p>	
6.	<p>Push the excess electrical wire into the unit then fit the end plate onto the 4 set screws and turn clockwise to lock in place. Once the plate is fitted tighten the 4 set screws using the tool provided. Ensure the connector is spaced away from the endplate correctly, see Figure 4-5 and Table 3.</p>	

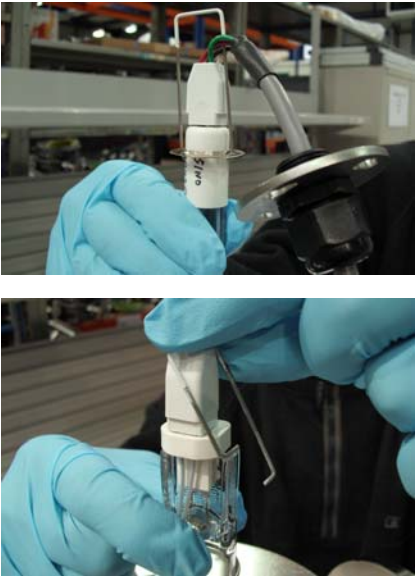

If a UV monitor is fitted then after fitting a new arc tube ensure liquid is flowing through the UV chamber and let the system run for at least an hour. The UV monitor then needs to be reset to 100% intensity. The system should then be run for 100 hours and the Intensity checked / reset to 100%. See section 6.4.1

7.3.3. Fitting and Removal of the Arc Tube – Vertical Mounted Chambers

Refer to sections 7.3.1 and 7.3.2 for instructions to gain access to the arc tube and section 7.4 for removing and installing the quartz thimble.

1	<p>Slide spring into quartz thimble (Do not drop in). If the chamber is mounted vertically already remove the thimble from the chamber for this operation. The spring may vary from the one illustrated.</p>	
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	<p>2 Assemble spring clip onto the arc tube connector, the two types are shown, the bottom version being for the larger arc tubes (270W).</p>	
<p>3</p>	<p>The illustrations shown are for reference of both types of spring clip and arc tubes as they should be when the arc tube lead is connected to the arc tube. The middle illustration is the larger arc tube (270W) and the bottom one shows the other end of both types of arc tube.</p>	
<p>4</p>	<p>Lower the arc tube into the chamber.</p>	

5	Connect the white electrical connector with the arc tube as shown.	
6	Slide the spring clip down until it secures the arc tube and the white electrical connector together.	
7	Slide the arc tube into the chamber and complete the assembly with reference to section 7.3.2. Removal of the arc tube is the reversal of these instructions refer to section 7.3.1.	

7.3.4. Cleaning the Arc Tube




The arc tube should be handled with powder free gloves. To remove accidental finger marks clean the arc tube with iso propyl alcohol. When the tube is cold, mercury may condense in patches on the inner surfaces to look like a finger mark; this is normal and does not indicate a fault.




7.4. Quartz Thimble.



ISOLATE AND DRAIN THE CHAMBER BEFORE CHANGING THE QUARTZ THIMBLE

7.4.1. Removing the Quartz Thimble

1.	If a UV lamp is installed it must first be removed following the procedure for 'Removing the Arc tube' (Section 7.3.1.)	
2.	Close inlet and outlet valves on pipework connected to the unit, if available, to avoid draining down a large section of pipework.	
3.	Remove the drain plug or open the drain valve if one is fitted. NOTE – depending on the plant room it may be necessary to have a suitable container available to catch the water released from the drain point. See drawing 120186-XXXX-iss in Appendix A for the volume of the chamber.	
4.	Loosen and remove the nipple using an adjustable spanner or the correct size spanner. (available as an optional extra see 7.9) DO NOT use a pipe grip as this can damage the nickel plated brass fitting. Take care not to lose the backing rings.	
5.	Remove the Backing Ring (Quartz) from the nipple, the Backing Ring (O-ring) and the O-ring (Quartz) and inspect for damage. NOTE – it may be necessary to remove the quartz thimble before the O-ring can be removed. If it is difficult to remove the "O" ring from the thimble apply a small amount of water to the "O" ring and quartz for lubrication. Hanovia recommend replacing these items each time a new quartz thimble is installed. (see also Figure 7-3) Do not pull the quartz thimble out at this stage.	

6.	Check the quartz thimble is free to move. If it is not then 'free' the thimble by gently moving it manually. Do not pull the quartz thimble out at this stage.	
7.	The quartz thimble is supported at both ends but not in the middle. To assist in removing the thimble a length of plastic piping can be used. Prepare a length of plastic pipe with an OD similar to, but less than, the ID of the quartz thimble (25 mm OD) and approximately 0.5m longer than the chamber length. Clean the outside of the plastic pipe by wiping with IPA. Insert the plastic pipe into the thimble. Note: If a wiper is fitted refer to section 7.6 autowipe or section 7.7 handwipe.	
8.	Hold the end of the quartz thimble with one hand while applying a slight downward pressure on the plastic pipe to support the thimble with the other hand and gently withdraw the quartz thimble.	
9.	Fully remove the quartz thimble and dispose of in an appropriate manner or place somewhere clean and dry if it is to be reused.	

7.4.2. Cleaning the Quartz Thimble

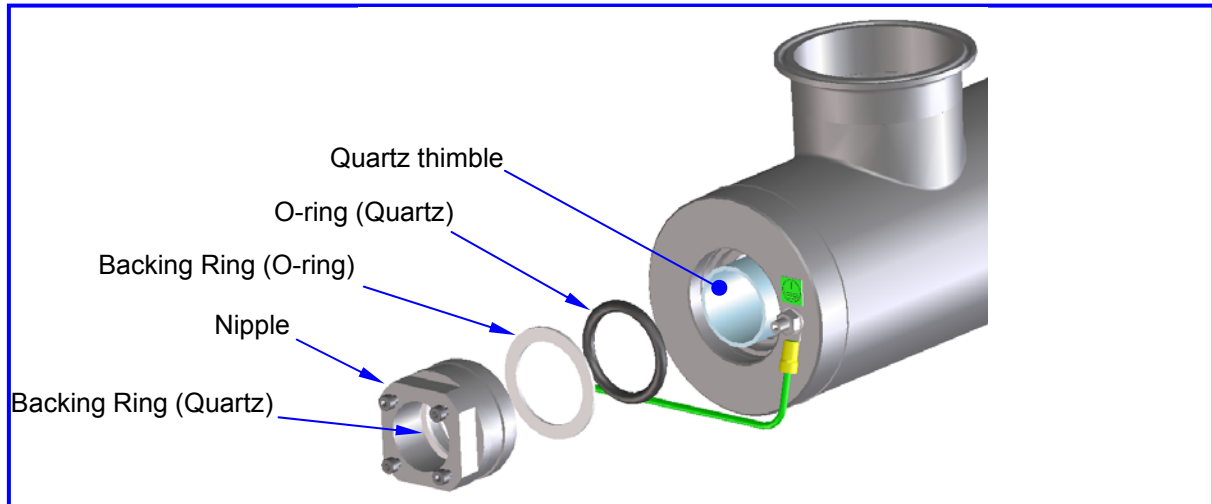
The quartz thimble forms the hydraulic barrier between the arc-tube and the liquid under treatment. It is essential that the thimble is kept clean otherwise there will be a reduction of the UV light which will reduce the effectiveness of treatment.

1. If the quartz thimble is to be refitted then it should be cleaned prior to being reinstalled.
NOTE - Only handle with powder free gloves.
2. If it is lightly soiled then the outside of the quartz thimble may be wiped with IPA. A soft paper tissue may be used for the initial cleaning but the final clean should use a lint free cloth or acid free tissue. If available, a final rinse and clean with clean water can also be carried out.
3. If it is highly soiled then the outside of the quartz thimble may be initially cleaned using a plastic Scotch Bright type material followed by an IPA clean using a lint free cloth or acid free tissue. If available, a final rinse and clean with clean water can also be carried out.

4. If there is iron or carbonate deposits from hard water 5% citric acid may be used to remove these deposits. The thimble can then be rinsed with water, cleaned with IPA then, if available, a clean water wash can also be carried out.
5. If the thimble cannot be cleaned a replacement will be necessary.

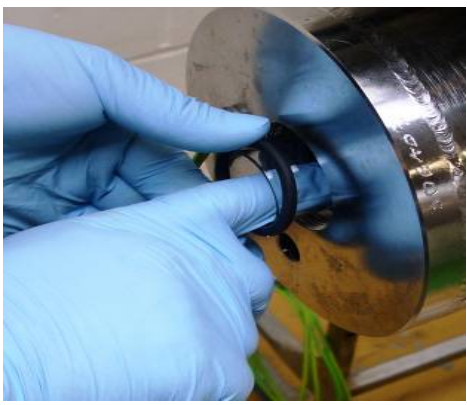


7.4.3. Installing the Quartz Thimble:



Figure 7-3 Quartz thimble sealing parts.



The Figure above shows an exploded view of the seals and fittings holding the quartz thimble in place.

1.	The quartz thimble is supported at both ends but not in the middle. To assist in fitting the thimble a length of plastic piping can be used. Prepare a length of plastic pipe with an OD similar to, but less than, the ID of the quartz thimble (25 mm OD) and approximately 0.5 m longer than the chamber length. Clean the outside of the thimble by wiping with IPA. Insert the tube into the thimble.	
2.	Hold the quartz thimble with one hand while applying a supporting downward pressure on the plastic pipe with the other hand and gently feed the quartz thimble into the chamber. NOTE – there is a supporting ‘cup’ fitted in the opposite end of the chamber to support the sealed end of the thimble. The thimble should be fitted into this cup until it is supported but not fully pushed into place. Remove the plastic pipe. Note: If a wiper is fitted refer to section 7.6 autowipe or section 7.7 handwipe.	

3.	<p>Fit a new O-ring or refit the old O-ring onto the end of the quartz thimble. This can be most easily done by holding the thimble with one hand and fitting the O-ring with the other hand. (NOTE – Hanovia recommend new O-rings should be used each time a thimble is refitted.)</p>	
4.	<p>Fit either a new Backing Ring (O-ring) or refit the old one and push it into place.</p>	
5.	<p>Fit either a new Backing Ring (Quartz) or refit the old one into the nipple. NOTE – this Backing Ring is slightly larger than the ID of the fitting so should be fitted as shown then pushed into place. Since it is a 'positive' fit it is self-retaining.</p>	


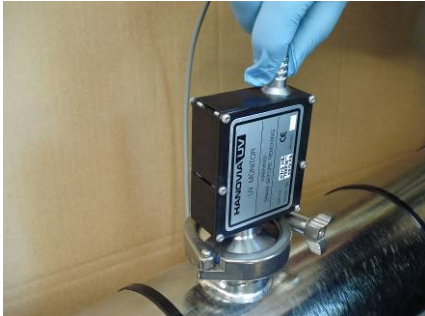

6.	<p>Fit and tighten the nipple using an adjustable spanner or the correct size spanner (available as an optional extra see 7.9) DO NOT use a pipe grip as this can damage the nickel plated brass fitting. There is no torque setting for tightening this nipple but it should be gently tightened until a definite stop is felt. (This will be approximately ½ turn after tightening the nipple when the “O” ring seal comes under pressure.) The Backing Ring will protect the end of the quartz thimble from damage.</p>	
7.	<p>Refit the drain plug or close the drain valve if one is fitted.</p>	
8.	<p>Open the inlet and outlet valves on the pipework supplying the unit if they have been closed and re-pressurise the hydraulic system. Check the “O” ring seal for leakage.</p>	
9.	<p>If leakage occurs, repeat thimble removal procedure and recheck the “O” ring seals and quartz thimble sealing surfaces for damage. Replace the seals or thimble if necessary.</p>	

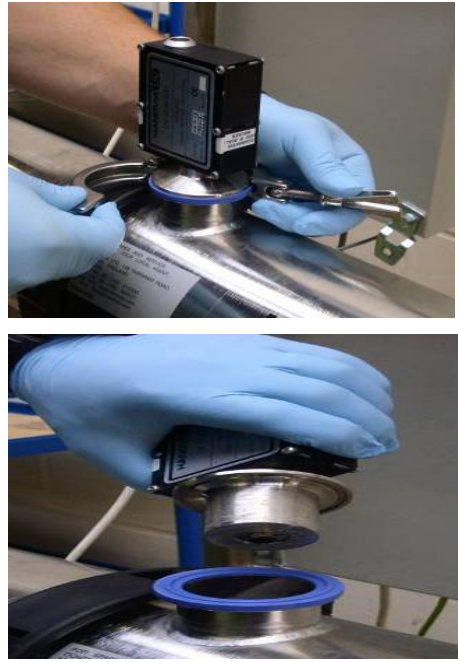
7.5. UV Monitor (RCM Version Only)



ISOLATE AND DRAIN THE CHAMBER BEFORE REMOVING THE UV MONITOR


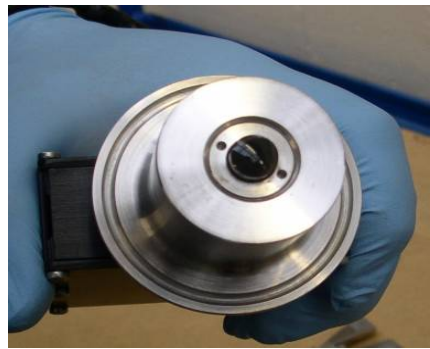
7.5.1. UV Monitor removal

1.	Close inlet and outlet valves on pipework connected to the unit, if available, to avoid draining down a large section of pipework.	
2.	Remove the drain plug or open the drain valve if one is fitted. NOTE – depending on the plant room it may be necessary to have a suitable container available to catch the water released from the drain point. See drawing 120186-XXXX-iss in Appendix A for the volume of the chamber.	
3.	Hold the knurled area around the body of the electrical connector.	
4.	Pull the electrical connector out of the monitor.	



<p>5. Open the tri-clamp sanitary connector and withdraw the monitor from the chamber.</p>	
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7.5.2. Cleaning the UV Monitor

The monitor quartz probe that protrudes into the chamber should be cleaned periodically with IPA. Ideally this will be carried out whenever the quartz thimble is being cleaned but the procedures above for removing and fitting the UV monitor have been written so they can also be carried out as stand alone operations.

<p>1. After removal the UV monitor should be set in a clean, dry location.</p>	
<p>2. The monitor probe should be cleaned with IPA using a lint free cloth or Acid free tissue</p>	
<p>3. If there are deposits on the probe which cannot be removed it may be necessary to replace the entire monitor.</p>	


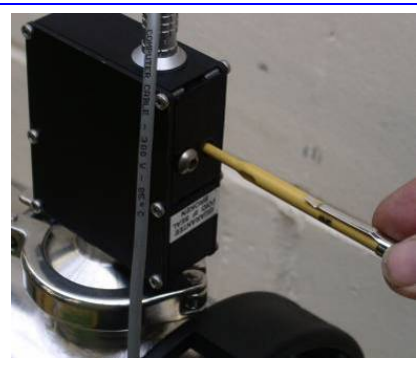
7.5.3. UV Monitor Installation

1.	Refit the drain plug or close the drain valve if one is fitted.	
2.	Place the monitor onto the connection on the chamber.	
3.	Fit the tri-clamp to secure it in place.	
4.	Push the electrical connector into the fitting on top of the sensor. NOTE – this connector can only be fitted in one direction when the red polarisation dots on the mating connectors are lined up.	
5.	Open the inlet and outlet valves on the pipework supplying the unit if they have been closed and re-pressurise the hydraulic system. Check the tri-clamp seal for leakage. If leakage occurs repeat monitor removal / installation procedure and check seal and mating surfaces.	

7.5.4. Adjusting the % Intensity Monitor Gain Setting


	THE FOLLOWING PROCEDURE CAN ONLY BE PERFORMED WITH THE CABINET DOOR OPEN AND WITH THE POWER ON
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When a new UV Monitor is installed, or during the commissioning of a new unit, it is necessary to adjust the Gain Setting. It may be necessary to do this also when a new lamp and clean thimble are installed.

<p>1. Place a digital volt meter (DVM) set to Volts DC across connections TB12 Black wire (-ve) and TB9 White wire (+ve). Max range needed 12V.</p>	
<p>2. Adjust the gain setting via the small access port on the side of the monitor.</p> <p>Note as you look at the two screws it is the screw indicated that needs removing to make the gain adjustment.</p>	
<p>3. The ideal meter reading is 3.75V DC (acceptable limits are 3.0 to 4.0V DC).</p>	
<p>4. Then using the screen calibration set UV to 100%. Refer to section 6.4.1 Ensure liquid is flowing through the UV chamber and let the system run for at least 1 hour. Then reset the UV monitor intensity again to 100% This stage (4) should be repeated by the customer after 100 hours.</p>	



7.6. Auto Wiper Maintenance

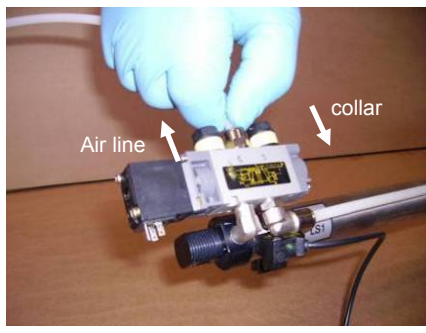



The auto wiper system needs to be serviced once a year to replace the service parts and check for wear. The parts detailed in the service kit (see 7.9) should be changed taking note of signs of excessive wear, pitting or abrasions.




	<p>ENSURE THE AIR SUPPLY TO THE PNEUMATIC CYLINDER IS ISOLATED AND VENTED</p> <p>ISOLATE AND DRAIN THE CHAMBER BEFORE PRECEEDING WITH MAINTENANCE ON WIPER</p>
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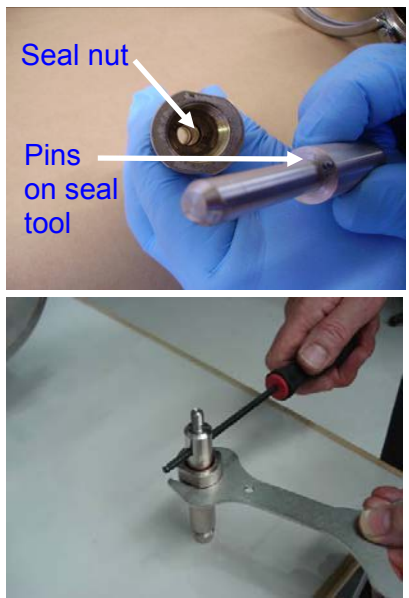



7.6.1. Auto wiper Removal and Servicing.







Refer to assembly drawing 120195-XXXX (Appendix A)

1.	Remove the arc-tube (See section 7.3.1)	
2.	Close the inlet and outlet valves on the pipework to the unit, if available, to avoid draining down a large section of pipework	
3.	Remove the drain plug or open the drain valve if one is fitted. NOTE – depending on the plant room it may be necessary to have a suitable container available to catch the water released from the drain point. See drawing 120195-XXXX-iss in Appendix A for the volume of the chamber.	
4.	Using a screwdriver unscrew and remove the Electrical terminal socket from the solenoid valve.	

5.	Push the collar ring inwards, towards the valve, whilst removing the 6mm air supply line.	
6.	Remove the limit switch from the mounting bracket, retain the screw for refitting later.	
7.	Unscrew the pneumatic cylinder with the bearing housing from the chamber using a suitable spanner (an optional special tool is available see 7.9)	
8.	Supporting the pneumatic cylinder at all times, to avoid damage to the shaft, pull the assembly from the chamber to expose the locknut on the end of the wiper shaft. Note: It may be necessary in order to help ease this operation to remove the UV monitor (if fitted or blank, see 7.5.1) and to wet the quartz thimble through the monitor port, replace monitor after (see 7.5.3)	



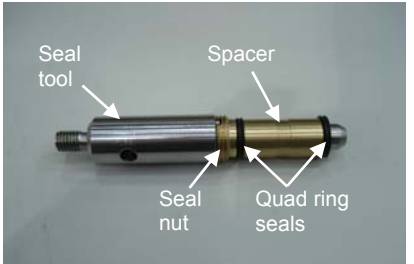


9.	<p>With two spanners loosen the locknut on the end of the pneumatic cylinder shaft. With a suitable spanner unscrew the cylinder from the wiper shaft.</p>	 The top photograph shows a person using two spanners to loosen a locknut on a shaft. The bottom photograph shows the pneumatic cylinder being unscrewed from the wiper shaft.
10.	<p>Remove the lock nut from the shaft.</p>	 A close-up photograph of a hand pulling a lock nut off a shaft.
11.	<p>With a suitable spanner (special tool available see 7.9) and a suitable open ended or adjustable spanner loosen the locknut on the pneumatic cylinder.</p> <p>Withdraw the pneumatic cylinder shaft from the seal housing.</p>	 The top photograph shows a person using a special tool and an open-ended spanner to loosen a locknut on a pneumatic cylinder. The bottom photograph shows a hand withdrawing the pneumatic cylinder shaft from a seal housing.




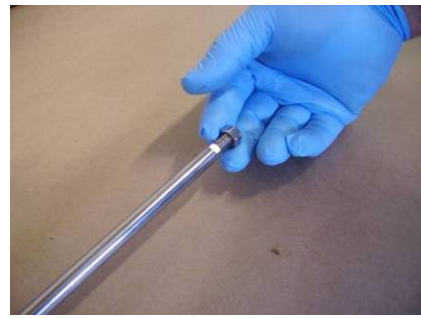
<p>12.</p>	<p>Insert the seal tool (special tool available see 7.9) into the seal housing and turn the tool until pins locate onto the seal nut.</p> <p>Insert a screwdriver through the hole on the seal tool and turn anti-clockwise to unscrew the seal nut.</p> <p>Remove the seal nut from the seal housing and then remove the quad seals and spacer.</p>	 <p>Seal nut</p> <p>Pins on seal tool</p>
<p>13.</p>	<p>Remove the quartz thimble (section 7.4.1)</p> <p>To help with the thimble removal, the seal tool screwed into the end of the wiper shaft can be used to partially pull the thimble out of the chamber. Then whilst preventing the thimble from going back in the chamber push the wiper shaft back along the chamber. This operation can be repeated to remove the quartz thimble completely.</p> <p>NB. The thimble must be supported at all times with a length of plastic pipe as described during this procedure, ideally by another person.</p>	
<p>14.</p>	<p>Fully remove the quartz thimble and dispose of in an appropriate manner or place somewhere clean & dry if it is to be reused. (Refer to 7.4.2 Cleaning the Quartz Thimble)</p>	
<p>15.</p>	<p>Hanovia recommend replacing these items each time a new quartz thimble is installed or replaced.</p>	




16.	Unscrew the clamp to release the chamber end plate.	
17.	Remove the end plate and withdraw the wiper shaft assembly from the chamber. Note: the position of the wiper housing and drain port in relation to the UV monitor for re-assembly.	
18.	Remove the O-ring seal from the end plate as indicated.	
19.	Using a 7mm spanner or hex driver remove the M4 nyloc nuts (4 off).	
20.	Remove the wiper flap support plate (2 off)...	
21.and then remove the wiper rings.	




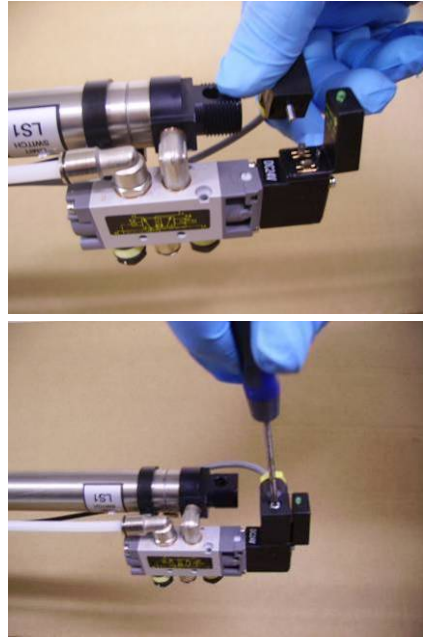
7.6.2. Auto Wiper Assembly

Replace all perishable parts supplied with the service kit. (see 7.9)

1.	Fit the wiper rings over the M4 screws. Ensure the wiper rings are seated flush against the yoke and centralised over the M4 spacers.	
2.	Next, fit the wiper flap support and secure with new M4 nyloc nuts from the service kit.	
3.	Fit the seal nut, quad rings and spacer on to the seal tool (special tool available see 7.9) as shown. If available liberally coat the seals with a food safe grade lubricant (NSF or FDA approved) before fitting into the seal housing.	
4.	Insert into the seal housing and with a suitable tool through the hole as indicated and using a suitable spanner (special tool available see 7.9) with the other hand, turn the seal tool clockwise until the seal nut locks into place.	
5.	Fit a new O-ring seal into the end plate as indicated	

6.	<p>With the end plate refitted on the UV chamber temporarily, screw the seal housing into the end plate using the special spanner. Then remove the end plate from the UV chamber.</p>	
7.	<p>Push the pneumatic cylinder shaft through the seal housing.</p> <p>Then screw the pneumatic cylinder into the seal housing.</p>	 
8.	<p>Fully screw on the lock nut onto the wiper shaft.</p>	

<p>9.</p>	<p>With an suitable spanner across the flats on the cylinder shaft. Fully screw the wiper assembly onto the cylinder shaft,.....</p> <p>..... then with another spanner tighten up the locknut back onto the wiper assembly.</p> <p>Ensure the wiper rings are in line with the quartz thimble hole in the endplate as shown for correct positioning when inserting assembly into the chamber.</p>	
<p>10.</p>	<p>Attach seal onto the UV chamber.</p> <p>Then insert the wiper assembly into the UV chamber. Position the wiper assembly so that the drain port is at the bottom of the UV chamber. (at the opposite side to the outlet as shown) Fit the end plate clamp and turn the clamp screw clockwise to tighten up.</p>	
<p>11.</p>	<p>Tighten up the pneumatic cylinder locknut using the special spanner and an adjustable spanner.</p>	

12.	Replace the Limit switch onto the Mounting bracket.	
13.	Then insert and tighten up the screw to keep the Limit switch firmly in place.	
14.	Attach the 6mm air supply line onto the pneumatic cylinder.....	
15.Connect the electrical terminal socket onto the Pneumatic cylinder solenoid valve and fix in place.	

16.	Insert the Quartz thimble into the UV chamber (See section 7.4.3 1 to 2), a little downwards pressure on the plastic pipe may be required to locate the quartz thimble into the wiper rings and into the far end of the UV chamber. It will be made easier if the quartz thimble is first wetted with water. The wiper ring also cleans the monitor probe (RCM versions only). To check the flap is aligned with the monitor port remove the UV monitor (see 7.5) and using the quartz thimble move the wiper rings until the flap appears through the open port. If the flap is not central release the end plate clamp on the chamber and rotate the end plate until the wiper flap is central to the monitor port. Tighten the end plate clamp and refit the monitor (see 7.5.3). Complete the assembly of the quartz thimble (see section 7.4.3 3 to 7)
17.	Open the inlet and outlet valves on the pipework supplying the unit if they have been closed and re-pressurise the hydraulic system. Check the "O" ring seal for leakage.
18.	If leakage occurs, repeat the first part of auto wiper maintenance to remove quartz thimble and recheck the "O" ring seals and quartz thimble sealing surfaces for damage. Replace the seals or thimble if necessary and reassemble.
19.	When the chamber is hydraulically sound, test the operation of the wiper, see Section 4.7, 6 to 8
20.	Install the Arc tube (see section 7.3.2). If it is a new arc tube, set the UV monitor intensity to 100% (see section 6.4.1)

7.7. Manual Wiper Maintenance

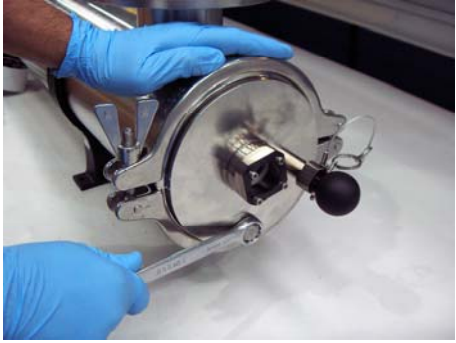







ISOLATE AND DRAIN THE CHAMBER BEFORE PROCEEDING WITH MAINTENANCE ON THE MANUAL WIPER





The manual wiper system needs to be serviced once a year to replace the service parts and check for wear. The parts detailed in the service kit (see 7.9) should be changed taking note of signs of excessive wear, pitting or abrasions.



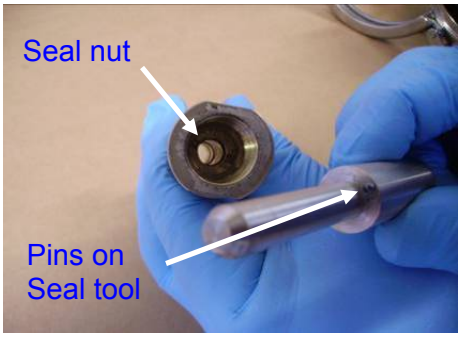


7.7.1. Manual wiper Removal and Servicing.



Refer to assembly drawing 120195-XXXX (Appendix A)

1.	Remove the arc-tube (See section 7.3.1)	
2.	Close inlet and outlet valves on pipework connected to the unit, if available, to avoid draining down a large section of pipework.	
3.	Remove the drain plug or open the drain valve if one is fitted. NOTE – depending on the plant room it may be necessary to have a suitable container available to catch the water released from the drain point. See drawing 120195-XXXX-iss in Appendix A for the volume of the chamber.	
4.	Remove the securing pin from the seal housing.	

<p>5.</p>	<p>Using an adjustable spanner or the correct size spanner (available as an optional extra, see 7.9) Unscrew and remove the quartz nipple. Do not use a pipe grip as this can damage the nickel plated brass fitting.</p>	
<p>6.</p>	<p>Pull the wiper as an aid to withdrawing the quartz thimble.</p>	
<p>7.</p>	<p>Remove the seals and O-rings and inspect for wear. Whilst preventing the quartz thimble from going back in the chamber push the wiper shaft back into the chamber then pull to expose more quartz thimble. This operation can be repeated to remove the quartz thimble completely. NB. The thimble must be supported at all times as described during this procedure, ideally by another person.</p> <p>Fully remove the quartz thimble from the chamber (see section 7.4.1) and dispose of in an appropriate manner or place somewhere clean and dry if it is to be re-used (refer to 7.4.2 for cleaning the quartz thimble).</p> <p>Note: It may be necessary in order to ease this operation to remove the UV monitor if fitted or blank (see 7.5.1) and wet the quartz thimble through the monitor port. Replace monitor / blank after (see 7.5.3)</p> <p>Hanovia recommend replacing these items each time a new quartz thimble is installed.</p>	 



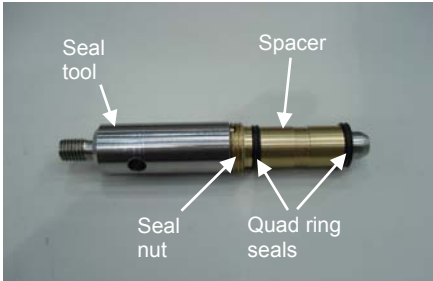
<p>8.</p> <p>Unscrew the clamp to release the chamber end plate.</p> <p>.....and supporting the weight of the wiper assembly, withdraw the assembly from the UV chamber.</p>	 	
<p>9.</p>	<p>With a 13mm spanner and holding the yoke with the other hand loosen the M8 locknut on the end of the wiper shaft. Then unscrew the wiper yoke assembly from the shaft.</p>	
<p>10.</p>	<p>Remove the lock nut from the shaft. The wiper shaft can then be withdrawn out of the seal housing.</p>	




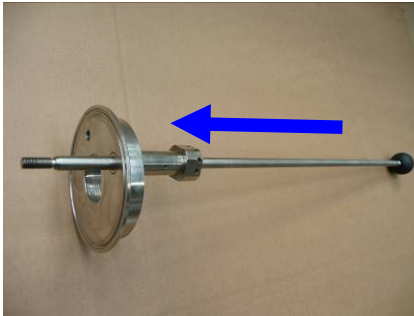
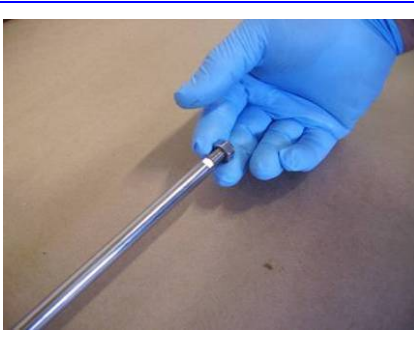
<p>11.</p>	<p>Refit the end plate back on to the UV chamber to hold it in place and with the special spanner remove the seal housing from the end plate.</p> <p>Then remove the end plate from the UV chamber.</p>	
<p>12.</p>	<p>Remove the O-ring seal from the end plate as indicated.</p>	
<p>13.</p>	<p>Insert the seal tool (special tool available see 7.9) into the seal housing and turn the tool until pins locate onto the seal nut.</p> <p>Insert a suitable tool through the hole on the seal tool and turn anti-clockwise to unscrew the seal nut.</p> <p>Remove the seal nut from the seal housing and then remove the quad seals and spacer.</p>	 
<p>14.</p>	<p>Using a 7mm spanner or hex drive remove the M4 nyloc nuts (4 off).</p>	

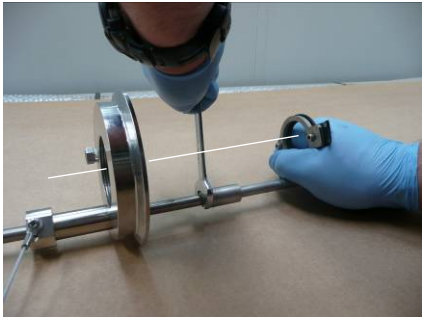


15.	Remove the wiper flap support plate (2 off)...	
16.and then remove the wiper rings.	


7.7.2. Manual Wiper Assembly

Replace all perishable parts supplied with the service kit. (see 7.9)

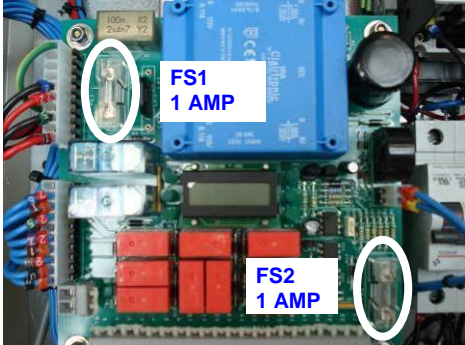


1.	Fit the wiper rings over the M4 screws. Ensure the wiper rings are seated flush against the yoke and centralised over the M4 spacers.	
2.	Next, fit the wiper flap support and secure with new M4 nyloc nuts from the service kit.	
3.	Fit the seal nut, quad rings and spacer on to the seal tool as shown. If available liberally coat the seals with a food safe grade lubricant (NSF or FDA approved) before fitting into the seal housing.	

4.	Insert into the seal housing and with a suitable tool through the hole as indicated and using the special spanner with the other hand, turn the seal tool clockwise until the seal nut locks into place.	
5.	Fit a new O-ring seal from the service kit into the end plate as indicated.	
6.	With the end plate refitted on the UV chamber screw the seal housing into the end plate using the special spanner. Then remove the end plate from the UV chamber.	
7.	Push the wiper shaft through the seal housing.	
8.	Fully screw on the M8 lock nut onto the wiper shaft.	

9.	<p>Screw the wiper assembly fully onto the wiper shaft and with a 13mm spanner tighten up the M8 locknut back onto the wiper assembly.</p> <p>Ensure the wiper rings are in line with the quartz thimble hole in the end plate as shown.</p>	
10	<p>Attach seal onto the UV chamber.</p> <p>Then insert the wiper assembly into the UV chamber. Position the wiper assembly so that the drain port is at the bottom of the UV chamber (at the opposite side to the outlet as shown). Fit the end plate clamp and turn the clamp screw clockwise to tighten up.</p>	 
11	<p>Insert the Quartz thimble into the UV chamber (See section 7.4.3, 1 to 2), a little downwards pressure on the plastic pipe may be required to locate the quartz thimble into the wiper rings and the far end of the UV chamber. It will be made easier if the quartz thimble is first wetted with water. The wiper ring also cleans the monitor probe (RCM version only) to check the flap is aligned with the monitor port remove the UV monitor (see 7.5) and actuate the wiper until the flap appears through the open port. If the flap is not central release the end plate clamp on the chamber and rotate the end plate until the wiper flap is central to the monitor port.</p> <p>Tighten the end plate clamp and refit the monitor (see 7.5.3). Complete the assembly of the quartz thimble (see section 7.4.3. 3 to 7).</p>	

12	Insert the pin into the wiper housing to secure the manual wiper.	
13	Open the inlet and outlet valves on the pipework supplying the unit if they have been closed and re-pressurise the hydraulic system. Check the “O” ring seal for leakage.	
14	If leakage occurs, repeat the first part of the manual wiper maintenance to remove the quartz thimble and check the “O” ring seals and quartz thimble sealing surfaces for damage. Replace the seals or thimble if necessary and reassemble.	
15	When the chamber is hydraulically sound, test the operation of the wiper.	
16	Install the Arc tube (see section 7.3.2). If it is a new arc tube, set the UV monitor intensity to 100% (see section 6.4.1)	

7.8. Circuit Breaker and Fuses

<p>1. Electron Control Panel (RC & RCM Model shown)</p> <p>There are two 1 Amp fuses in the system mounted on the Control PCB.</p>	 <p>FS1 1 AMP</p> <p>FS2 1 AMP</p>
<p>2. Electron Control Panel (RC & RCM Model shown)</p> <p>There is one 6 amp MCB in the system mounted next to the Control PCB.</p> <p>Note: on the basic version there is one 6 amp MCB in the system mounted next to the ballast.</p>	
<p>3. Electron Control Panel (Wiped versions shown)</p> <p>There is one 6 amp MCB in the system mounted near to the contactor.</p>	

7.9. Service Parts

UV Chamber Spares Recommended stock holding 1 Lamp, 1 Thimble and 1 seal kit, replace as used.		
Description	Qty	Part number
Seal Service Kit (Non-Wiped up to 6" Chamber)	x 1	180029-0138-iss
Seal Service Kit (Non-Wiped 8" Chamber)	x 1	180029-0140-iss
The Seal service kit includes the following:		
Backing Ring (for thimble O-ring)	x 1	Not available as separate parts.
Backing ring (for quartz thimble)	x 1	
O-ring (Quartz)	x 1	
Wiper and Seal Service Kit (4" Chamber)	1 From	180034-0138-iss
Wiper and Seal Service Kit (6" Chamber)		180035-0138-iss
Wiper and Seal Service Kit (8" Chamber)		180033-0140-iss
The Wiper service kit includes the following: (See Drg 120195-XXXX)	*1. See Note	Not available as separate parts.
Seals as above, plus	x 1	
Wiper Flap	x 2	
Rotary Seal (Wiper shaft)	x 2	
Seal 2" Tri-clamp	x 1	
Seal Tri-clamp (End plate)	x 1	
"O"-ring (End plate)	x 1	
M4 nyloc nuts	x 4	
Thimble (Pure quartz) AF3(S)-0002, -0003	1 From	320822-0975-iss
Thimble (Pure quartz) AF3(S)-0008, -0014, -0027, -0051		320822-1175-iss
Thimble (Pure quartz) AF3(S)-0116		320896-1770-iss
Arc tube 40W LP AF3(S)-0002	1 From	130062-0040-iss
Arc tube 80W AMAL AF3(S)-0003, -0008		130063-0080-iss
Arc tube 140W AMAL AF3(S)-0014		130063-0140-iss
Arc tube 270W AMAL AF3(S)-0027, -0051		130063-0270-iss
Arc tube 500W AMAL AF3(S)-0116		130059-0500-iss
Nipple Quartz (Open) AF3(S)-0002 to -0051	As Req'd	320775-iss
Nipple Quartz (Open) AF3(S)-0116		320899-iss
UV Monitor	As Req'd	170019-0013-iss
UV Monitor Lead		160337-0006-iss
UV Monitor Seal		410037-0051-iss
Limit Switch and Lead Assy	x 1	160349-0005-iss
Solenoid Valve Lead	x 1	160348-0006-iss
Air Cylinder (+ solenoid valve) AF3-0008 to 0051	x 1	450033-iss
Air Cylinder (+ solenoid valve) AF3-0116	x 1	450037-iss
Solenoid Valve	x 1	450036-iss

Note: *1 – it is recommended for wiped systems a seal tool and spanner are also kept in stock. (see special tools on the next page.)

Continued.....

Electron Cabinet Spares		
Description	Qty	Part number
Fuse 1AMP FS1 & 2 (Control Board)	2	610038-0102-iss
Special Tools		
Seal Tool (Wiped systems) AF3-0008 to -0051	x 1	320855-iss
Seal Tool (Wiped systems) AF3-0116	x 1	320877-iss
Spanner (Quartz Nipple / Wiper Housing)	x 1	320860-iss

8. Alarms and Fault Finding



	ENSURE ELECTRICAL POWER IS ISOLATED BEFORE REMOVAL OR REPLACEMENT OF ANY COMPONENTS. SEE SAFETY SECTION 2
	ELECTRICAL MEASUREMENTS MUST BE DONE BY QUALIFIED PERSONNEL


Table 5 Electron RC and RCM Fault Finding Table

FAULT	CAUSE	CHECK	ACTION
'Power On' LED off	Loss of mains supply.	Electrical supply is on.	Turn on electrical supply
	FS1 Fuse blown	Supply voltage. Fusing to unit, supply wiring and circuit breakers. FS1 fuse on control board.	Replace Fuses
	CB1 Tripped.	CB1 for electrical short circuits	Reset CB1
	Isolator not turned on.	Isolator on door	Turn on Isolator
'Display not lit'	Loss of mains supply.	Electrical supply is on.	Turn on electrical supply
	FS1 Fuse blown.	Check FS1	Replace FS1
	CB1 Tripped.	Check if CB1 has opened	Reset CB1.
	FS2 Fuse blown	Check FS2	Replace FS2
	Isolator not turned on.	Check if isolator is off	Turn on isolator
	Display dislodged	Check the display is engaged into the terminals properly.	Push the display into the terminals.
Lamp On & Low UV VFC open 'Low UV' or 'Starting' continuously displayed	Lamp Failure	The arc-tube(Premature failure of the arc lamp is the most likely cause of a lamp fault)	Replace arc tube if necessary.
	OR Contactor K1 failed to energise	Terminal connection to lamp. Check contactor K1 has energised.	OR Check voltage on contactor coil.
'Off – Unit Tripped' displayed	Temporary loss of mains supply.	Check for voltage on incoming Door Isolator terminals.	Press 'RESET' button to clear the message.
Lamp On VFC closed, Low UV VFC open. 'Low UV' displayed	Low UV	Cleanliness of quartz thimble and/or UV monitor probe.	Clean/Replace Quartz thimble Clean Monitor Probe
		Age and condition of lamp	Replace the arc tube
	Loss of Signal	Monitor lead is connected correctly. Continuity of monitor leads.	Push connector fully home into the UV monitor or terminal connections in Electron control panel are wired correctly.
		Change in constituents in the process stream	Check process conditions, i.e. UV transmittance of process water.

Table 6 Electron B Fault Finding Table

FAULT	CAUSE	CHECK	ACTION
'Lamp On' LED off.	Isolator not turned on	Isolator on door	Turn on Isolator
	CB1 tripped	For electrical short circuits.	Reset CB1
Lamp on VFC open across TB11 & TB14	Loss of mains supply	Electrical supply is on.	Turn on electrical supply
'Fault' LED on. Lamp on VFC open across TB11 & TB14	Lamp Failure.	The arc-tube(Premature failure of the arc lamp is the most likely cause of a lamp fault) Terminal connection to lamp.	Replace arc tube if necessary.

Table 7 Electron Wiper control Fault Finding Table

FAULT	CAUSE	CHECK	ACTION
'Wiper On' LED off.	Isolator not turned on	Isolator on door	Turn on Isolator
	CB1 tripped	For electrical short circuits.	Reset CB1
	Loss of mains supply	Electrical supply	Turn on electrical supply
'Wiper Fault' LED on. Wiper fault VFC open RL2 / 11 and 14	Loss of Air Supply / Low air pressure	Air Supply / damaged valve Air Tubing disconnected Check correct air Pressure	Turn on air supply Reconnect air tubing / replace if necessary Increase Air pressure
	Faulty Solenoid Valve	Electrical Short / Open Circuit Loss of supply to Solenoid Valve	Check wiring to Solenoid Valve. Valve has 24VDC. Replace if necessary.
	Faulty Air Cylinder	Worn seals in air cylinder. Check cylinder rod for pitting or abrasions	Replace if necessary
	Wiper Seized	Check wiper rod for pitting or abrasions. Check wiper runs freely in and out of bearing seal housing	Replace if necessary
	Faulty Limit switch	Wiring is terminated correctly. Limit switch is fitted to UV Chamber.	Test operation by placing a spare magnet next to the limit switch body. Replace if necessary.
	Wiper not in parked position	Limit switch indicator off	Actuate override button on solenoid valve (see 4.7.9)
	Air or water emerging from hole. 	Worn Quad ring seals. Worn seals in pneumatic cylinder. Worn piston rod in pneumatic cylinder.	Check quad ring seals. Check pneumatic cylinder.

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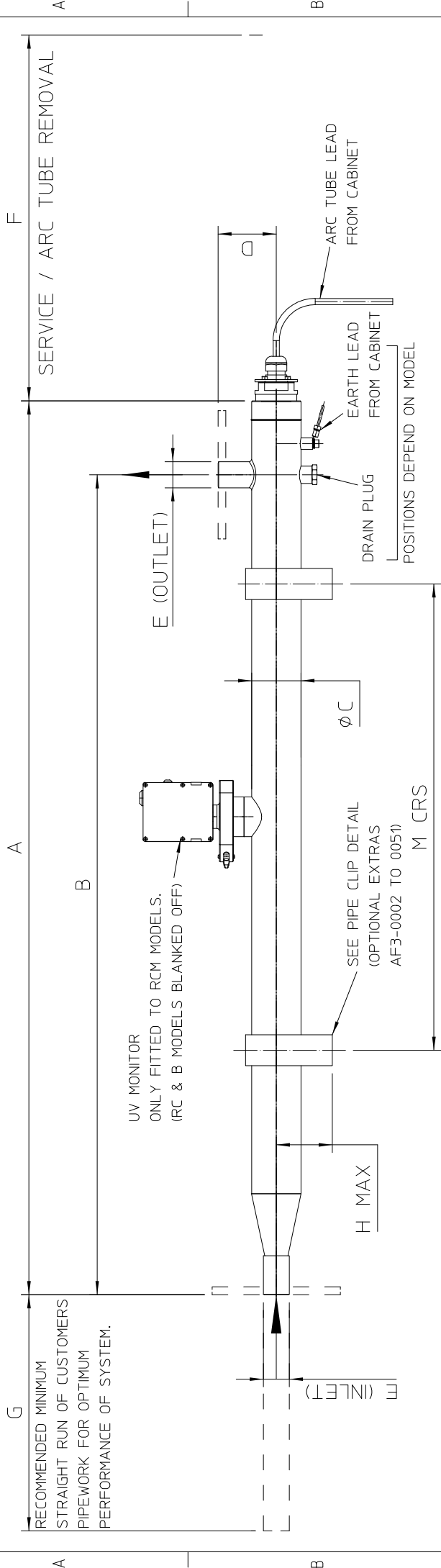
The following drawings are in Appendix A.

AF3 UV Chamber Assembly – unwiped	Drg 120186-XXXX Sht.1,2&3.....	80
AF3 UV Chamber Assembly - wiped	Drg 120195-XXXX Sht.1&2	80
Electron RC & RMC Assy (small cabinet 230V versions)	Drg 140118.....	80
Electron B Assy (small cabinet 230V versions)	Drg 140119.....	80
Electron RC & RMC Assy (large cabinet 115V versions)	Drg 140124-0001	80
Electron RC & RMC Assy (large cab. with wiper control)	Drg 140124-0002	80
Electron B Assy (large cabinet 115V versions)	Drg 140125-0001	80
Electron B Assembly (large cab. with wiper control)	Drg 140125-0002	80
Electron B Circuit Diag. (40W version)	Drg 210071-0001	80
Electron B Circuit Diag. (80,140,270W versions)	Drg 210071-0002	80
Electron B Wiped Circuit Diag. (80-270W versions)	Drg 210071-0003	80
Electron RC/ RCM Circuit Diag. (40W version)	Drg 210072-0001	80
Electron RC/ RCM Circuit Diag. (80,140,270W versions)	Drg 210072-0002	80
Electron RC/ RCM Circuit Diag. (500W version)	Drg 210072-0003	80
Electron RC/ RCM Wiped Circuit Diag. (80,140,270W versions)	Drg 210072-0005	80
Electron RC/ RCM Wiped Circuit Diag. (500W version)	Drg 210072-0006	80
Site Wiring B Unwiped 40-270W	Drg 210073-0001	80
Site Wiring B Wiped 80-270W	Drg 210073-0002	80
Site Wiring RC/RCM Unwiped 40-500W	Drg 210073-0003	80
Site Wiring RC/RCM Wiped 80-500W	Drg 210073-0004	80

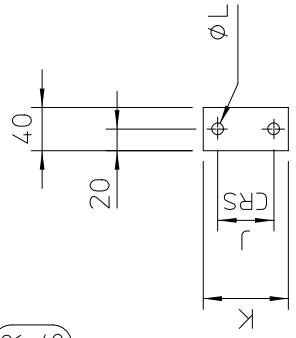
Appendix A. Drawings

IF IN DOUBT ASK

DO NOT SCALE



SEE SHEET 2 FOR DIMENSION TABLES



UNDERSIDE OF OPTIONAL PIPE CLIP

CHAMBER COMMON CHARACTERISTICS.

MATERIAL:- WETTED PARTS 316 ST. STEEL.
 MONITOR BODY ANODISED ALUMINIUM.
 ARC TUBE AND THIMBLE PURE QUARTZ.
 SEALS & GASKETS EPDM (FDA APPROVED OPTIONAL).
 OTHER PARTS NICKEL PLATED BRASS.
 MAXIMUM OPERATING PRESSURE 7 BAR. (10 BAR OPTIONAL)
 MAXIMUM FLUID TEMPERATURE 40°C.
 PROTECTION RATING IP65/NEMA 4.

FINISH:- ALL MODELS ELECTROPOLISHED.
 OUTSIDE:- ALL MODELS <1.6um (120/150 GRIT).
 INSIDE:- <1.0um HYG/IND VERSIONS. WELDS AS LAID
 <0.63um SF6 VERSIONS. WELDS AS LAID
 *SANITARY VERSIONS:- <0.375um
 WELDS GROUND OUT WHERE POSSIBLE
 (UNIFORM ORBITAL WELDS).

INSPECTION LEVEL	120186-XXXX
CLEAN & DECREASE ALL UNTREATED MACHINED METALLIC PARTS	
DIMENSIONS IN mm.	
TOLERANCES (UNLESS OTHERWISE STATED)	
WHOLE Nos	+0.5mm
HOLES	
1 DEC PLACE	+0.3mm
OVER 12mm DIA	+0.5mm
2 DEC PLACES	+0.15mm
6 TO 12mm DIA	+0.3mm
ANGLES	+0.5deg
UP TO 6mm DIA	+0.15mm
SURFACE FINISH 1.6um RA (▽) UNLESS OTHERWISE STATED	

TITLE:- CHAMBER ASSEMBLYS - TYP		DRN	G.W.	DATE
AF3 & AF3S UNWIPED		CKD	N.C.	APPRD
MATERIAL:- SEE DRG		SCALE		
PROCESS SPEC:-		ON		
FINISH:- SEE DRG		BASED		
THIS DRAWING IS THE COPYRIGHT OF HANOVIA LTD. AND IS COMPANY CONFIDENTIAL. IT MUST NOT BE COPIED, REPRODUCED OR OTHERWISE MADE USE OF WITHOUT THE COMPANY'S WRITTEN PERMISSION.		NO		
DRG		120186-XXXX-07		
SHT 1 OF 8		8		

MODEL	VERSION	LAMP POWER	A	B	C	D	E	F	G	H	J	K	L	M	CRS	WEIGHT	VOLUME	
			mm±5	mm±5	mm	mm±5	INLET/OUTLET	mm	mm	mm MAX	mm	mm	mm	mm	mm	EMPTY	FULL	LITRE
AF3-0002	STD	40W LP	1150	1055	Ø63.5	75	1" BSP/NPT/JIS	1000	70	72	52	78	Ø11	400-600		5	7	2
AF3-0002	HYG/SF6	40W LP	1150	1055	Ø63.5	75	1" TRI	1000	50	72	52	78	Ø11	400-600		5	7	2
*AF3S-0002	SANITARY	40W LP	1147	1052	Ø63.5	65	1" TRI	1000	50	72	52	78	Ø11	400-600		5	7	2
AF3-0003	STD	80W AMG	1150	1055	Ø63.5	75	1" BSP/NPT/JIS	1000	70	72	52	78	Ø11	400-600		5	7	2
AF3-0003	HYG/SF6	80W AMG	1150	1055	Ø63.5	75	1" TRI	1000	50	72	52	78	Ø11	400-600		5	7	2
*AF3S-0003	SANITARY	80W AMG	1147	1052	Ø63.5	65	1" TRI	1000	50	72	52	78	Ø11	400-600		5	7	2
AF3-0008	STD	80W AMG	1388	1273	Ø101.6	100 (1)	1.5" BSP/NPT/JIS	1300	100	96	86	124	Ø11	400-600		9	17.5	8.5
AF3-0008	HYG/SF6	80W AMG	1388	1273	Ø101.6	100	1.5" TRI	1300	80	96	86	124	Ø11	400-600		9	17.5	8.5
*AF3S-0008	SANITARY	80W AMG	1380	1265	Ø101.6	82	1.5" TRI	1300	80	96	86	124	Ø11	400-600		9	17.5	8.5
AF3-0014	STD	140W AMG	1388	1273	Ø101.6	100 (1)	2" BSP/NPT/JIS	1300	120	96	86	124	Ø11	400-600		9	17.5	8.5
AF3-0014	HYG/SF6	140W AMG	1388	1273	Ø101.6	100	2" TRI	1300	100	96	86	124	Ø11	400-600		9	17.5	8.5
*AF3S-0014	SANITARY	140W AMG	1380	1265	Ø101.6	82	2" TRI	1300	100	96	86	124	Ø11	400-600		9	17.5	8.5
AF3-0027	STD	270W AMG	1388	1273	Ø101.6	100 (1)	2" BSP/NPT/JIS	1300	120	96	86	124	Ø11	400-600		9	17.5	8.5
AF3-0027	HYG/SF6	270W AMG	1388	1273	Ø101.6	100	2" TRI	1300	100	96	86	124	Ø11	400-600		9	17.5	8.5
*AF3S-0027	SANITARY	270W AMG	1380	1265	Ø101.6	82	2" TRI	1300	100	96	86	124	Ø11	400-600		9	17.5	8.5
AF3-0051	STD	270W AMG	1437	1322	Ø168.3	150	3" PN/ANSI/JIS	1300	180	155	153	170	Ø8.5	400-600		24	50.5	26.5
AF3-0051	HYG/SF6	270W AMG	1437	1322	Ø168.3	150	3" TRI	1300	155	155	153	170	Ø8.5	400-600		24	50.5	26.5
*AF3S-0051	SANITARY	270W AMG	1405	1290	Ø168.3	150	3" TRI	1300	155	155	153	170	Ø8.5	400-600		19	45	26
AF3-0116	STD	500W AMG	1979	1825	Ø204	200	6" PN/ANSI/JIS	1900	340	145	220	250	Ø10	560		46	106.5	60.5
*AF3S-0116	SANITARY	500W AMG	1980	1820	Ø204	200	6" TRI	1900	340	145	220	250	Ø10	560		40	100.5	60.5

(1) JIS FLANGE VERSION DIMENSION = 125

INSPECTION LEVEL	120186-XXXX
CLEAN & DECREASE ALL UNTREATED MACHINED METALLIC PARTS	
DIMENSIONS IN mm.	
TOLERANCES (UNLESS OTHERWISE STATED)	
WHOLE Nos	+0.5mm
HOLES	
1 DEC PLACE	+0.3mm
OVER 12mm DIA	+0.5mm
2 DEC PLACES	+0.15mm
6 TO 12mm DIA	+0.3mm
ANGLES	+0.5deg
UP TO 6mm DIA	+0.15mm
SURFACE FINISH 1.6um RA (▽), UNLESS OTHERWISE STATED	

TITLE:- CHAMBER ASSEMBLYS - TYP		DRN	G.W.	DATE
AF3 & AF3S UNWIPED		CKD	N.C.	APPRD
MATERIAL:- SEE DRG		SCALE		
PROCESS SPEC:-		ON		
FINISH:- SEE DRG		BASED		
THIS DRAWING IS THE COPYRIGHT OF HANOVIA LTD. AND IS COMPANY CONFIDENTIAL. IT MUST NOT BE COPIED, REPRODUCED OR OTHERWISE MADE USE OF WITHOUT THE COMPANY'S WRITTEN PERMISSION.		DRG NO		
		120186-XXXX-07		
		SHT 2 OF 8		

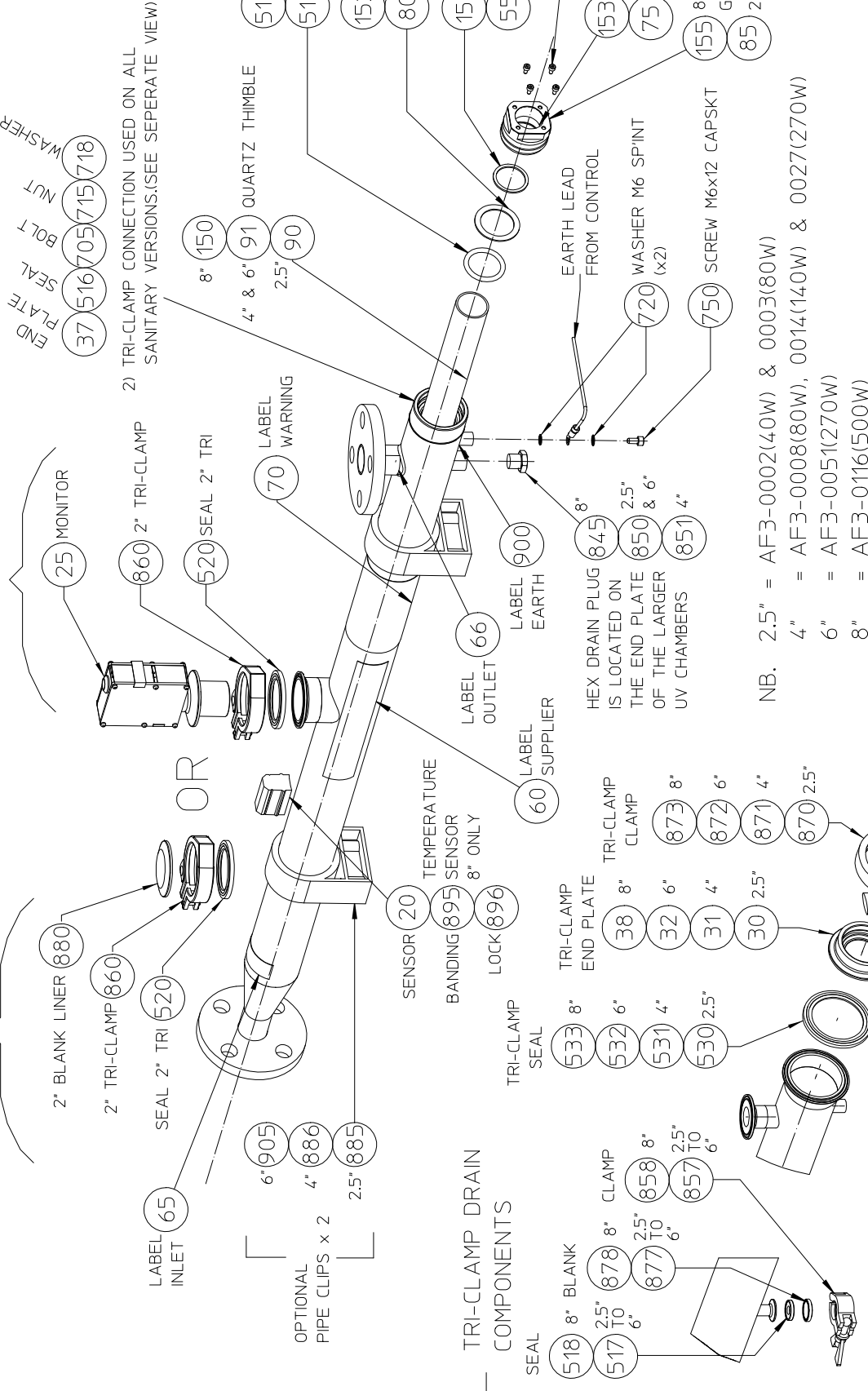
07	05/05/2010	CN6067	CN6067
ISSUE	DATE	CN No.	MOD OR AMENDMENT
2			

IF IN DOUBT ASK

DO NOT SCALE

RC OR B MODELS ONLY

RCM MODELS ONLY



ARC TUBES	
ITEM	PART NO.
15	130062-0040-ISS
16	130063-0080-ISS
17	130063-0140-ISS
18	130063-0270-ISS
19	130059-0500-ISS

1) WELDED END PLATE ON ALL VERSIONS AS SHOWN EXCEPT 8" AF3-0116. END PLATE, SEAL AND FIXINGS =

- 37 516 705 715 718
- WASHER
- NUT
- BOLT
- SEAL
- END PLATE

2) TRI-CLAMP CONNECTION USED ON ALL SANITARY VERSIONS.(SEE SEPARATE VIEW)

OPTIONAL PIPE CLIPS x 2

TRI-CLAMP DRAIN COMPONENTS

- 518 8" BLANK
- 517 2.5" CLAMP
- 878 8" CLAMP
- 877 2.5" CLAMP
- 858 8" CLAMP
- 857 2.5" CLAMP

- SENSOR (20)
- TEMPERATURE SENSOR (895)
- BANDING (895)
- 8" ONLY
- LOCK (896)
- TRI-CLAMP SEAL (533)
- 8"
- TRI-CLAMP SEAL (532)
- 6"
- TRI-CLAMP SEAL (531)
- 4"
- TRI-CLAMP SEAL (530)
- 2.5"
- 873 8"
- 872 6"
- 871 4"
- 870 2.5"

- HEX DRAIN PLUG (845)
- 8"
- IS LOCATED ON THE END PLATE OF THE LARGER UV CHAMBERS
- 851 4"
- 850 2.5"
- 845 8"
- 720 WASHER M6 SPIINT (x2)
- 750 SCREW M6x12 CAPSKT
- 730 SCREW M4x8 CAPSKT (x4)

NB. 2.5" = AF3-0002(40W) & 0003(80W)
 4" = AF3-0008(80W), 0014(140W) & 0027(270W)
 6" = AF3-0051(270W)
 8" = AF3-0116(500W)

INSPECTION LEVEL	120186-XXXX
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS	
DIMENSIONS IN mm.	
TOLERANCES (UNLESS OTHERWISE STATED)	
WHOLE Nos	+0.5mm
HOLES	
1 DEC PLACE	+0.3mm OVER 12mm DIA +0.5mm
2 DEC PLACES	+0.15mm 6 TO 12mm DIA +0.3mm
ANGLES	+0.5deg UP TO 6mm DIA +0.15mm
SURFACE FINISH 1.6um RA (1/8") UNLESS OTHERWISE STATED	

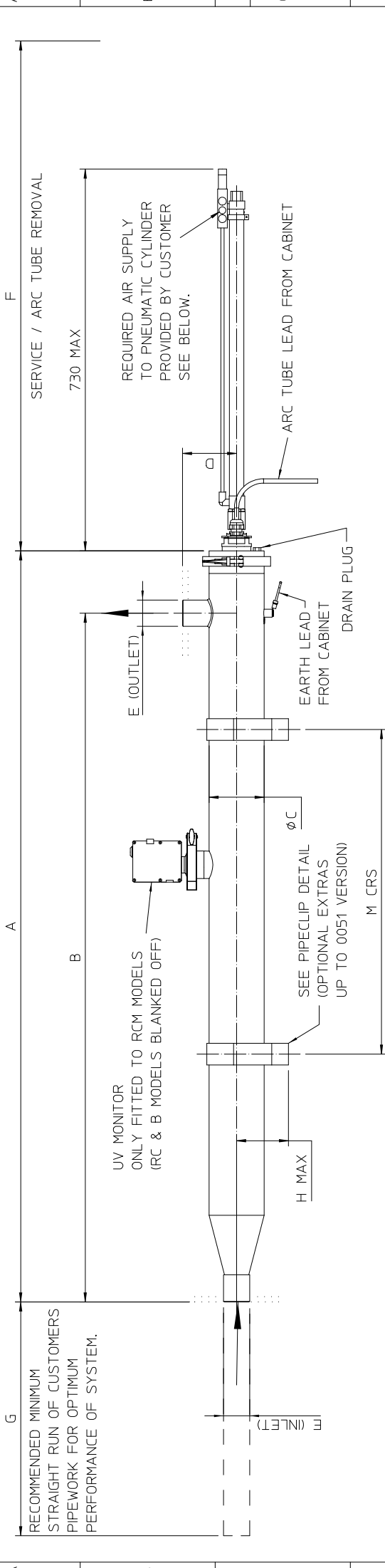
TITLE:- CHAMBER ASSEMBLYS - TYP
 AF3 & AF3S UNWIPED

MATERIAL:- SEE DRG
 PROCESS SPEC:-
 FINISH:- SEE DRG

DRN	G.W.	DATE
CKD	N.C.	APPRD
SCALE ON		
1:5		
DRG NO 120186-XXXX-07		
SHT 3 OF 8		

TRI-CLAMP END CONNECTION (SANITARY VERSIONS)

07	05/05/2010	CN6067	MOD OR AMENDMENT
ISSUE	DATE	CN No.	



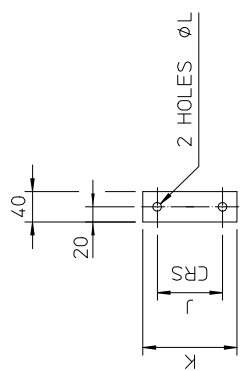
CHAMBER COMMON CHARACTERISTICS

MATERIAL:- WETTED PARTS 316 STAINLESS STEEL.
 MONITOR BODY ANODISED ALUMINIUM.
 ARC TUBE AND THIMBLE PURE QUARTZ.
 SEALS & GASKETS EPDM (FDA APPROVED OPTIONAL).
 PNEUMATIC CYLINDER - ALUMINIUM BODY,
 316 STAINLESS STEEL ROD.
 OTHER PARTS NICKEL PLATED BRASS.
 FINISH:- STANDARD ELECTROPOLISHED.
 INSIDE WELDS AS LAID MATERIAL AS BOUGHT.
 OUTSIDE <1.6um (120/150 GRIT).

MAXIMUM OPERATING PRESSURE 7 BAR (10 BAR OPTIONAL).

MAXIMUM FLUID TEMPERATURE 40°C.

PROTECTION RATING IP65/NEMA 4.



UNDERSIDE OF OPTIONAL PIPE CLIP

REED SWITCH WIRED TO WIPER CONTROL PANEL RATING 60V 500mA MAX 5MTR 3mm DIA LEAD 2 WIRE 0.14mm²

WIPER PARKED POSITION WIPER STROKE LENGTH 500MM

SOLENOID VALVE FROM WIPER CONTROL PANEL (RATING 24VDC 1.6W)

AIR SUPPLY = 25mm/32mm CYLINDER 1.65/2.76ltr/Hr (73/124ltr/Hr WHEN WIPING) BASED ON 4 CYCLES PER HOUR MAX.
 3 - 5 BAR
 CLEAN DRY AIR
 FILTERED 50µm MAX (VIA 6mm O/D TUBE CUSTOMER TO SUPPLY)

MODEL	LAMP POWER	A mm±5	B mm±5	C mm	D mm±5	E INLET/OUTLET	F mm	G mm	H mm MAX	J mm	K mm	L mm	M CRS mm	WEIGHT (KG) EMPTY	WEIGHT (KG) FULL	VOLUME LITRE
AF3-0008	80W ANG	1388	1273	Ø101.6	100*	1.5" BSP/NPT/JIS	1300	100	96	86	124	Ø11	400-600	11.5	20	8.5
AF3-0014	140W ANG	1388	1273	Ø101.6	100*	2" BSP/NPT/JIS	1300	120	96	86	124	Ø11	400-600	11.5	20	8.5
AF3-0027	270W ANG	1388	1273	Ø101.6	100*	2" BSP/NPT/JIS	1300	120	96	86	124	Ø11	400-600	11.5	20	8.5
AF3-0051	270W ANG	1437	1302	Ø168.3	150	3" PN/ANSI/JIS	1300	180	155	153	170	Ø8.5	400-600	26.5	53	26.5
AF3-0116	500W ANG	1979	1825	Ø204	200	6" PN/ANSI/JIS	1900	340	145	220	250	Ø10	560	48	108.5	60.5

* JIS FLANGE VERSION DIMENSION = 125

04	ISSUE	MOD. OR AMENDMENT	DATE	17/09/2009
	DRAWN	N.C.	DATE	17/09/2009
	CHECKED	N.C.	APPROD	N.C.
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS				
DIMENSIONS IN mm.				
TOLERANCES (UNLESS OTHERWISE STATED):				
HOLE NOS ±0.5mm				
HOLE OVER 12mm DIA ±0.5mm				
2 DEC PLACES ±0.3mm				
6 TO 12mm DIA ±0.3mm				
ANGLES ±0.5deg UP TO 6mm DIA ±0.5mm				
SURFACE FINISH 1.6um RA (▽) UNLESS OTHERWISE STATED				
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INSP.	120195-XXXX			
SCALE	1:5			
MATERIAL				
PR. SPEC				
FINISH				
TITLE:- AF3 CHAMBER ASSY TYPICAL				
WIPED				
BASED ON				
DRG NO	120195-XXXX-04			
SHT 1	OF 6			

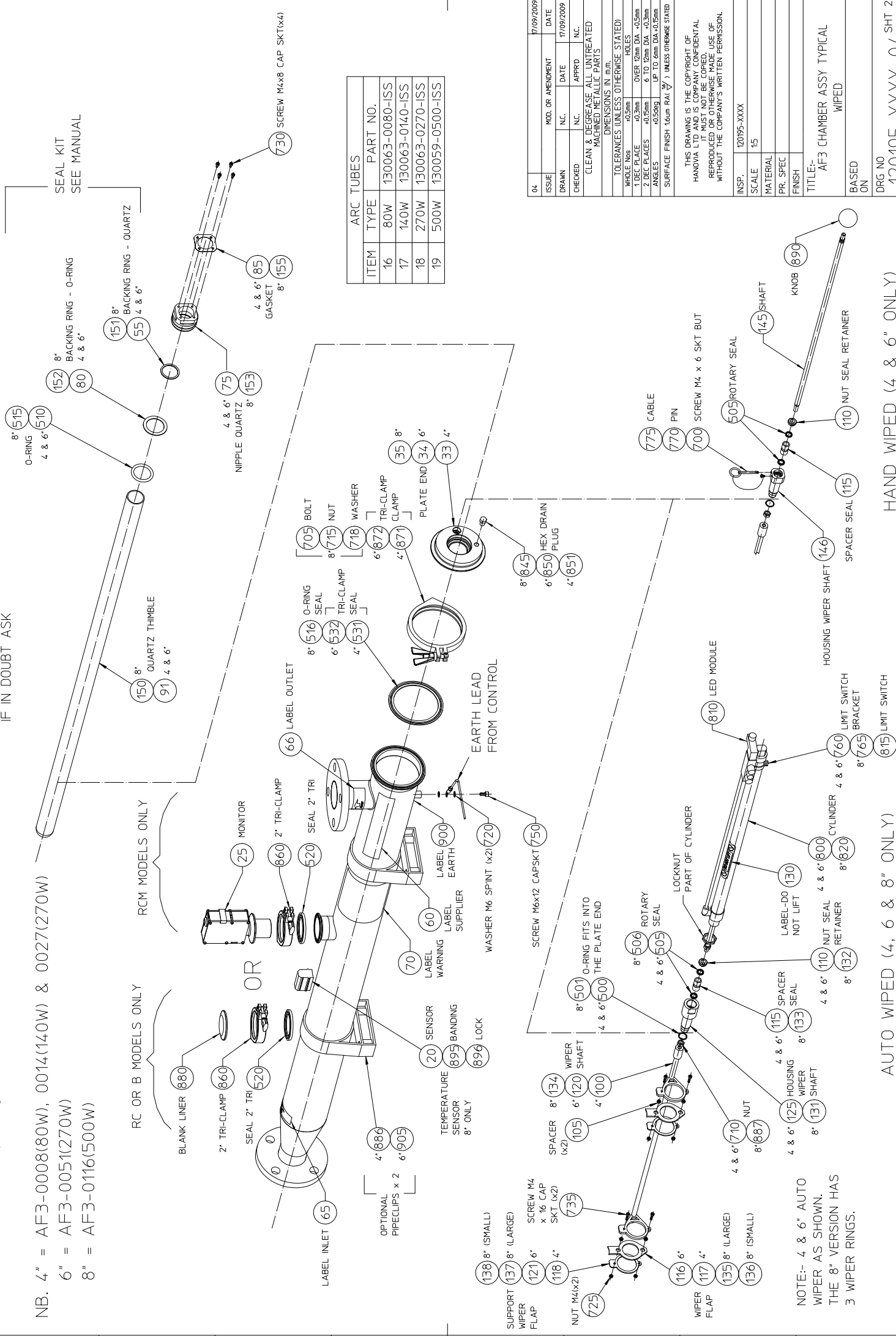
IF IN DOUBT ASK

DO NOT SCALE

NB. 4" = AF3-0008(80W), 0014(140W) & 0027(270W)
 6" = AF3-0051(270W)
 8" = AF3-0116(500W)

RC OR B MODELS ONLY

RCM MODELS ONLY



ITEM	TYPE	PART NO.
16	80W	130063-0080-ISS
17	140W	130063-0140-ISS
18	270W	130063-0270-ISS
19	500W	130059-0500-ISS

ISSUE	MOD. OR AMENDMENT	DATE
04		17/09/2009

DRAWN	N.C.	DATE	17/09/2009
CHECKED	N.C.	APPROD	N.C.

CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS

DIMENSIONS IN mm.

TOLERANCES UNLESS OTHERWISE STATED:	
WHOLE NOS	+0.5mm
HOLES	+0.3mm
1 DEC PLACES	OVER 12mm DIA +0.5mm
2 DEC PLACES	6 TO 12mm DIA +0.3mm
ANGLES	+0.5deg UP TO 6mm DIA +0.5mm
SURFACE FINISH	16um RAI (7) UNLESS OTHERWISE STATED

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INSP.	SCALE
120195-XXXX	15

MATERIAL	PR. SPEC	FINISH

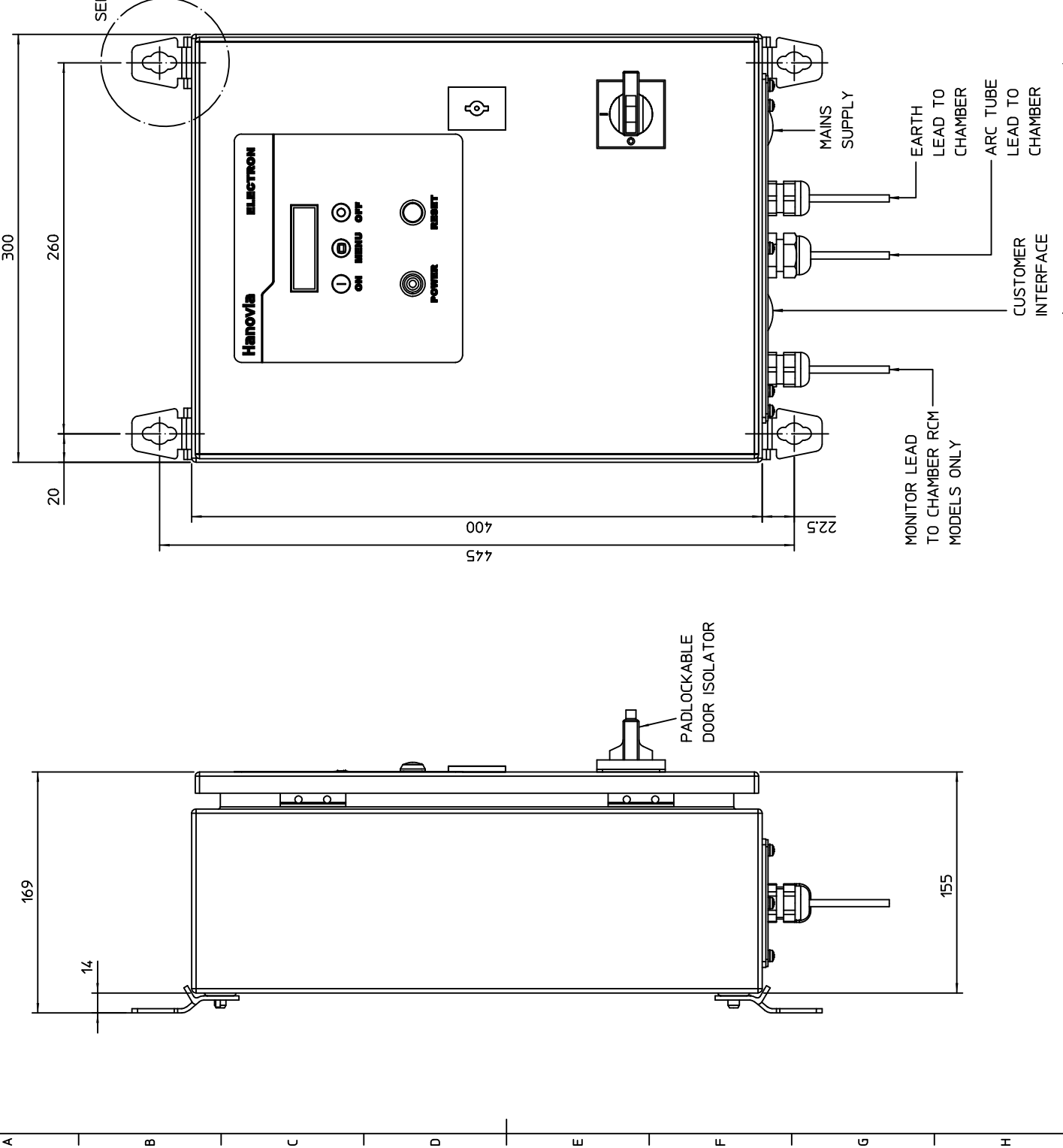
TITLE:- AF3 CHAMBER ASSY TYPICAL
 BASED ON WIPED

NOTE:- 4 & 6" AUTO WIPER AS SHOWN. THE 8" VERSION HAS 3 WIPER RINGS.

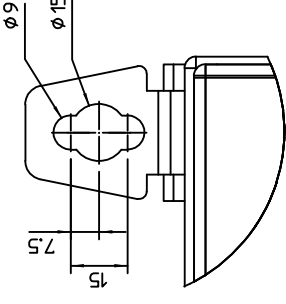
AUTO WIPED (4, 6 & 8" ONLY)

HAND WIPED (4 & 6" ONLY)

DRG NO 120195-XXXX-04 SHT 2 OF 6



SEE DETAIL 1



DETAIL 1
SCALE 1:1

CABINET DESCRIPTION

MATERIAL AND FINISH-
POLYESTER POWDER COATED (COLOUR
RAL 7032/7035) CARBON STEEL.
OR
304 BRUSHED STAINLESS STEEL.
PROTECTION RATING IP65/NEMA 4.
OPERATING TEMPERATURE RANGE +5°C TO +40°C.
SUPPLY VOLTAGE 230VAC AT 50Hz/60Hz.
WEIGHT 11kg.

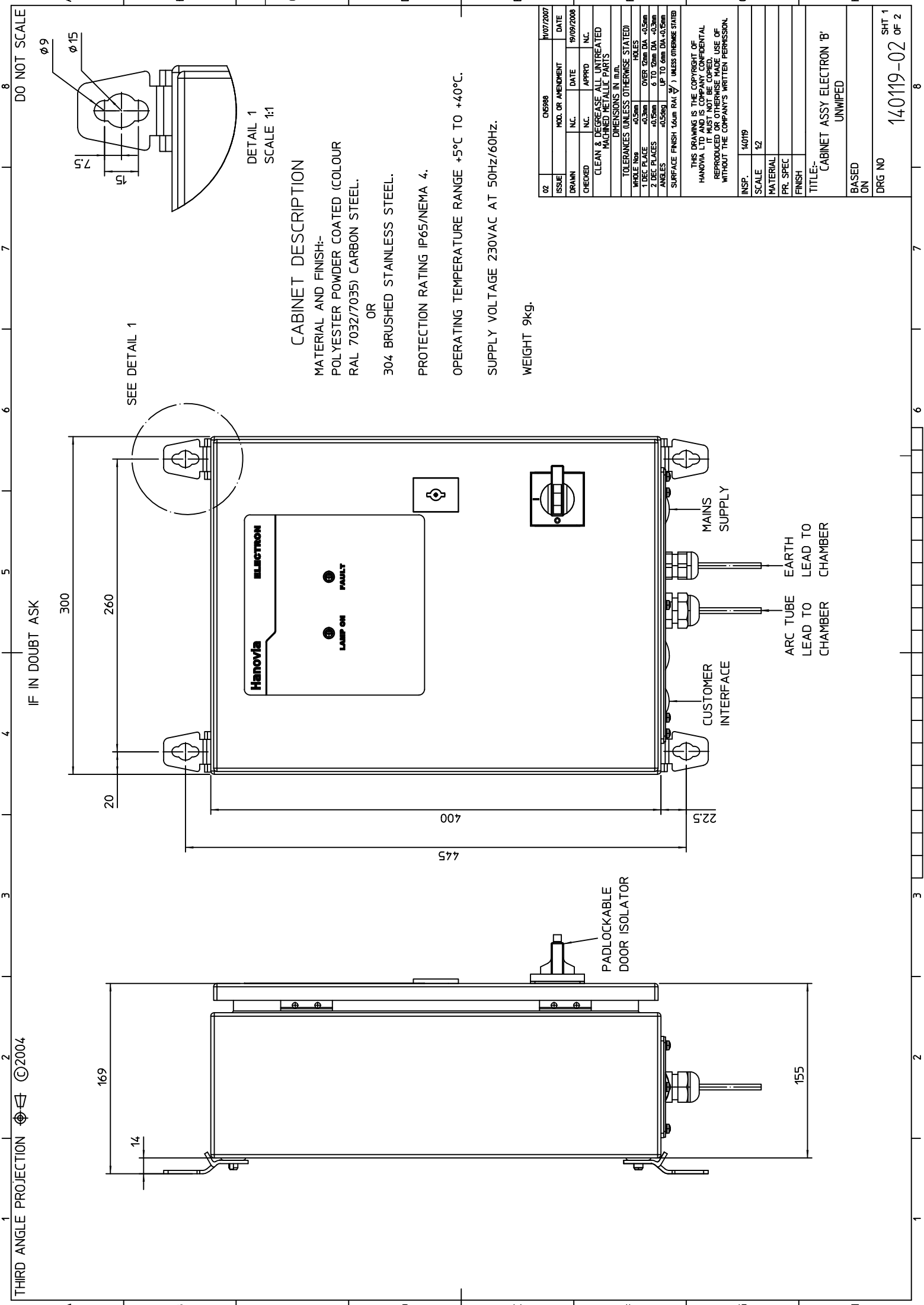
ISSUE	MOD. OR AMENDMENT	DATE
03		14/11/2007
DRAWN	LR	14/11/2007
CHECKED	NC	APPRD
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS		
DIMENSIONS IN mm		
TOLERANCES (UNLESS OTHERWISE STATED):		
WHOLE NOB	+0.5mm	HOLES
1 DEC PLACES	+0.3mm	OVER 2mm DIA
2 DEC PLACES	+0.15mm	6 TO 20mm DIA
ANGLES	+0.5deg	UP TO 6mm DIA
SURFACE FINISH 14um RAI ∇ UNLESS OTHERWISE STATED		

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INSP.	140118
SCALE	1:2
MATERIAL	
PR. SPEC	
FINISH	
TITLE- ELECTRON CABINET ASSEMBLY REMOTE CONTROL 'RC'	
BASED ON	

DRG NO	140118-03
SHT 3	OF 3

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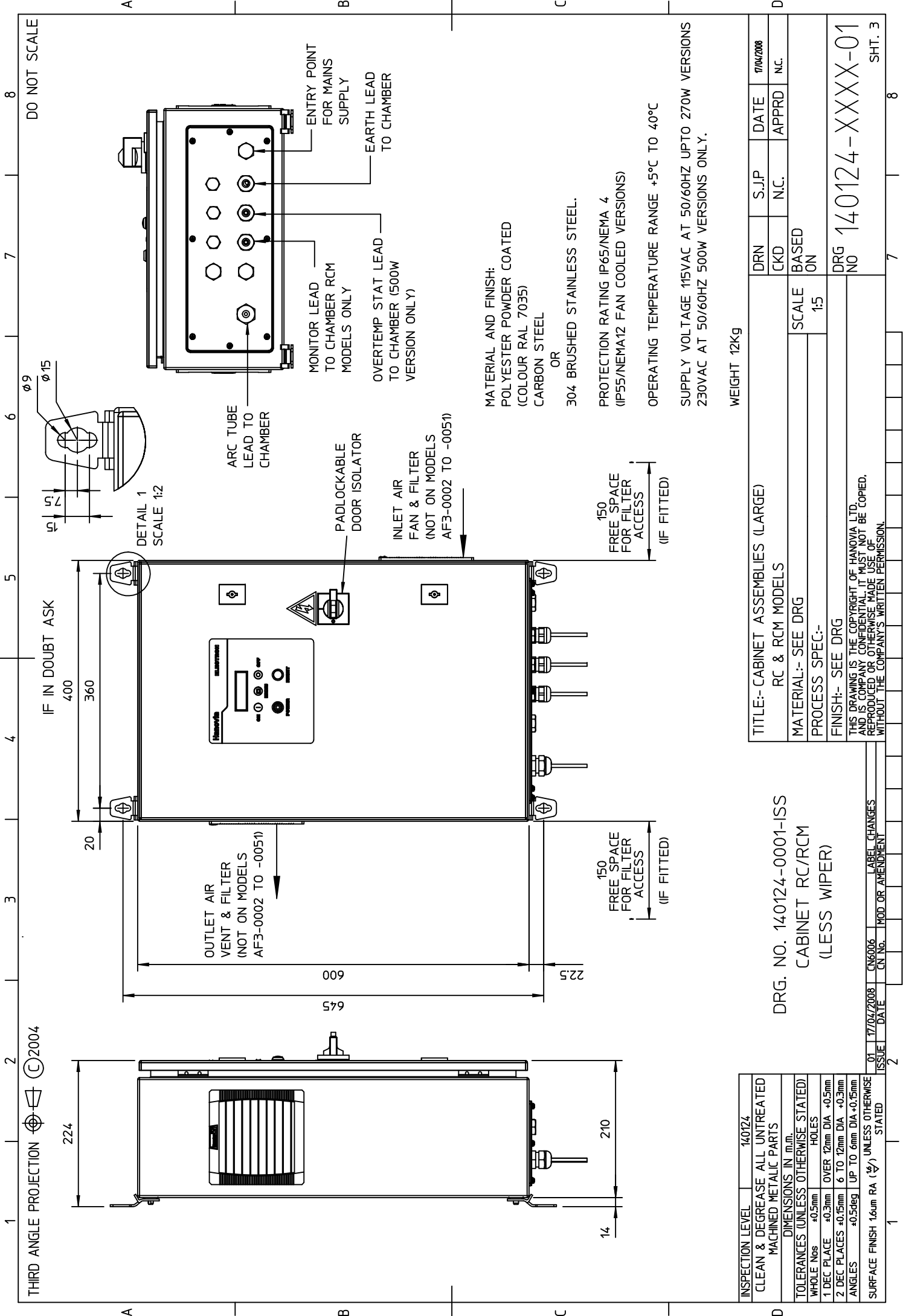
DETAIL 1
SCALE 1:1

CABINET DESCRIPTION
 MATERIAL AND FINISH-
 POLYESTER POWDER COATED (COLOUR
 RAL 7032/7035) CARBON STEEL.
 OR
 304 BRUSHED STAINLESS STEEL.
 PROTECTION RATING IP65/NEMA 4.
 OPERATING TEMPERATURE RANGE +5°C TO +40°C.
 SUPPLY VOLTAGE 230VAC AT 50Hz/60HZ.
 WEIGHT 9kg.

02	CNS988	11/07/2007
ISSUE	MOD. OR AMENDMENT	DATE
DRAWN	N.C.	DATE 19/09/2008
CHECKED	N.C.	APPROD. N.C.
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS		
DIMENSIONS IN mm.		
TOLERANCES (UNLESS OTHERWISE STATED):		
WHOLE NOS	+0.5mm	HOLES
1 DEC PLACES	+0.3mm	OVER 12mm DIA
2 DEC PLACES	+0.15mm	6 TO 20mm DIA
ANGLES	+0.5deg	UP TO 6mm DIA
SURFACE FINISH 16um RAI ∇ UNLESS OTHERWISE STATED		

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INSP.	140119
SCALE	1:2
MATERIAL	
PR. SPEC	
FINISH	
TITLE:- CABINET ASSY ELECTRON 'B'	
UNWIPED	
BASED ON	
DRG NO	140119-02
	SHT 1 OF 2



MATERIAL AND FINISH:
 POLYESTER POWDER COATED (COLOUR RAL 7035)
 CARBON STEEL
 OR
 304 BRUSHED STAINLESS STEEL.

PROTECTION RATING IP65/NEMA 4 (IP55/NEMA12 FAN COOLED VERSIONS)

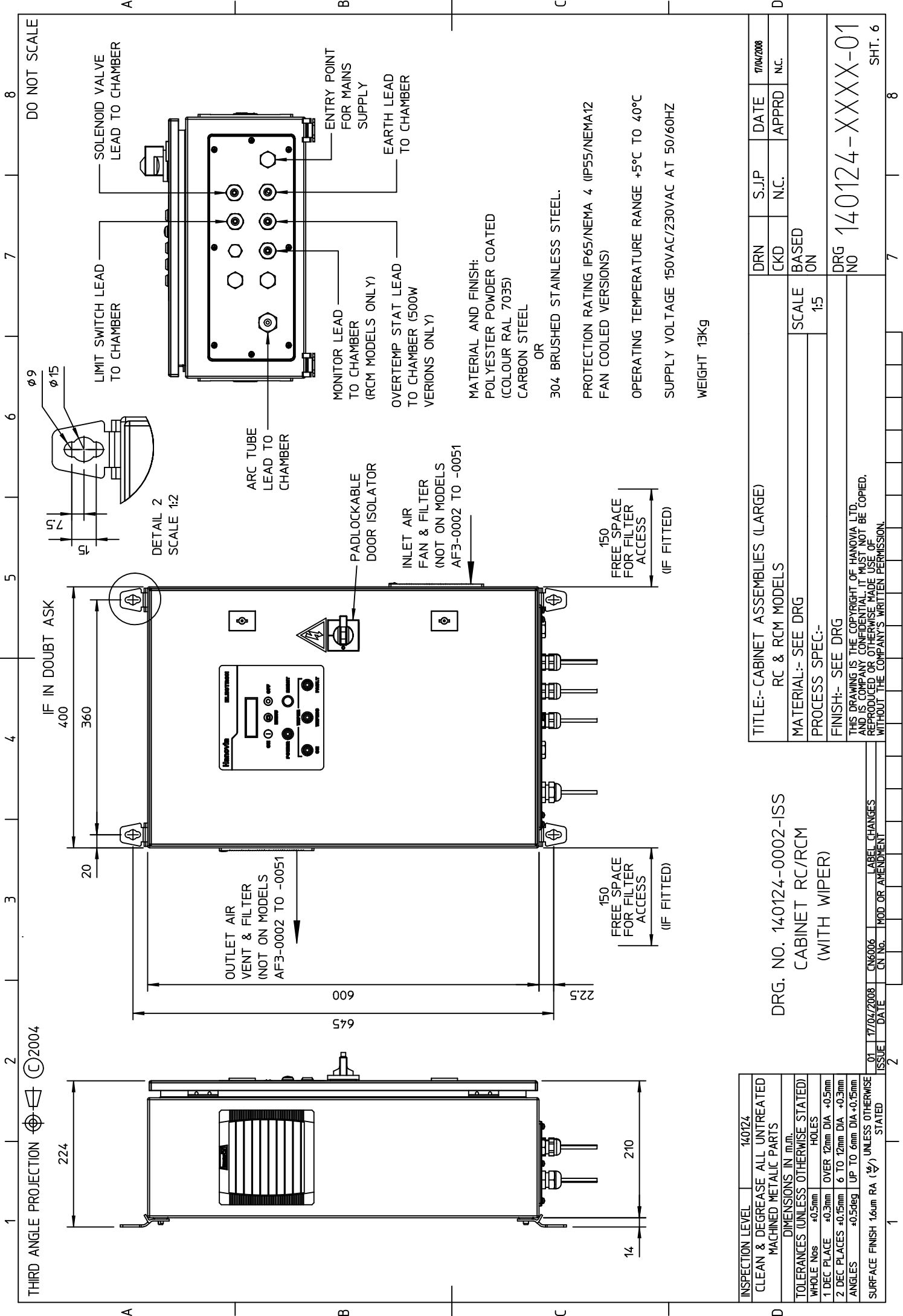
OPERATING TEMPERATURE RANGE +5°C TO 40°C

**SUPPLY VOLTAGE 115VAC AT 50/60HZ UPTO 270W VERSIONS
 230VAC AT 50/60HZ 500W VERSIONS ONLY.**

WEIGHT 12kg

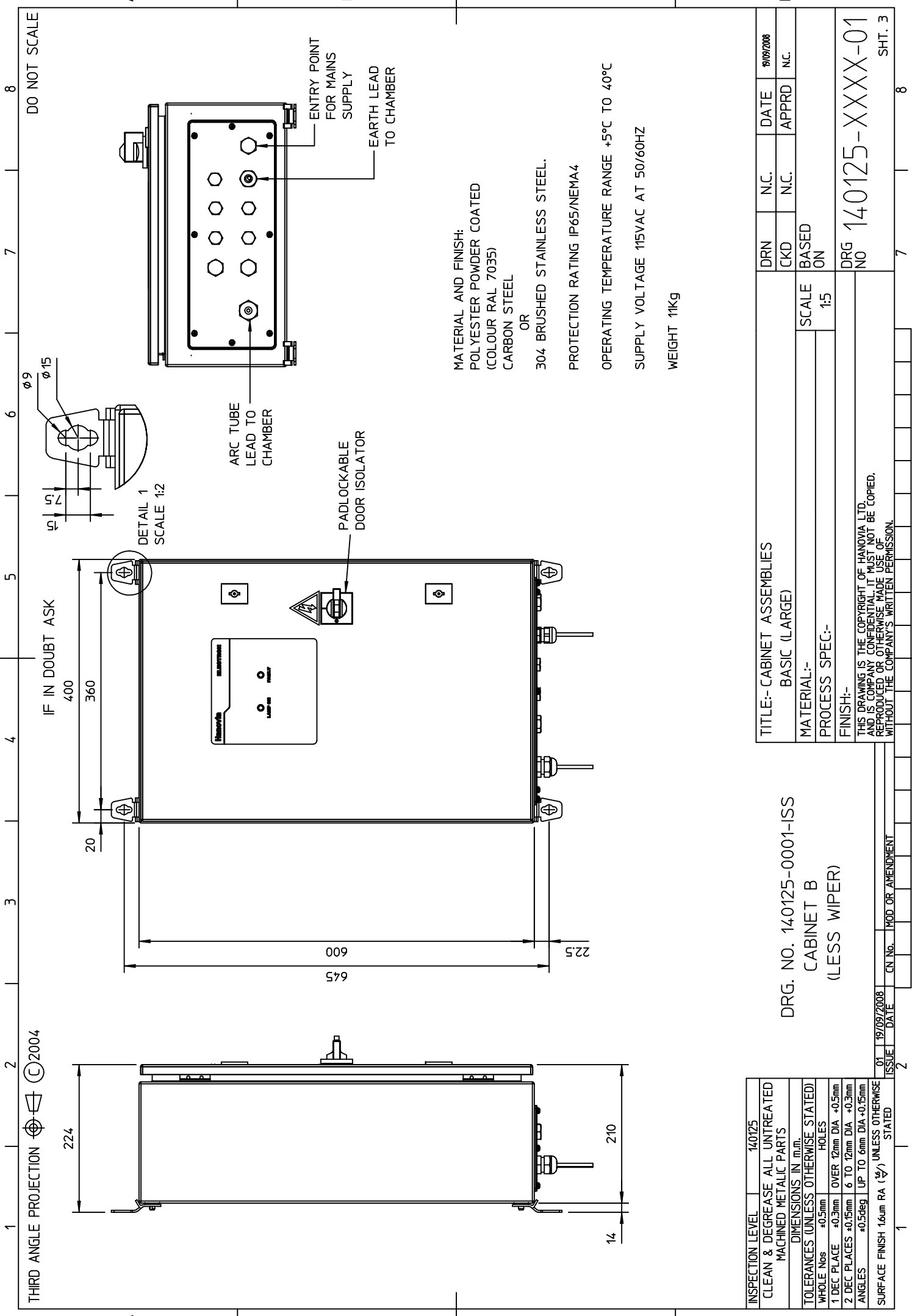
INSPECTION LEVEL	140124	DRN	S.J.P	DATE	17/04/2008
CLEAN & DEGREASE ALL UNTREATED MACHINED METALIC PARTS		CKD	N.C.	APPRD	N.C.
DIMENSIONS IN mm.		SCALE		BASED ON	
TOLERANCES (UNLESS OTHERWISE STATED)		SCALE		1:5	
WHOLE Nos		FINISH:-		SEE DRG	
1 DEC PLACE	+0.3mm	MATERIAL:-		SEE DRG	
2 DEC PLACES	+0.15mm	PROCESS SPEC:-		SEE DRG	
ANGLES	+0.5deg	FINISH:-		SEE DRG	
SURFACE FINISH	16um RA (▽)	THIS DRAWING IS THE COPYRIGHT OF HANOVIA LTD. AND IS COMPANY CONFIDENTIAL. IT MUST NOT BE COPIED, REPRODUCED OR OTHERWISE MADE USE OF WITHOUT THE COMPANY'S WRITTEN PERMISSION.		DRG NO 140124-XXXX-01	
		CN6006		SHT. 3	
		CN No.		7	
		MOD OR AMENDMENT		8	
		LABEL CHANGES		9	
		DATE		10	
		ISSUE		11	
		01		12	
		17/04/2008		13	
		DATE		14	
		MOD OR AMENDMENT		15	
		CN No.		16	
		CN6006		17	
		LABEL CHANGES		18	
		MOD OR AMENDMENT		19	
		DATE		20	
		ISSUE		21	
		01		22	
		17/04/2008		23	
		DATE		24	
		MOD OR AMENDMENT		25	
		CN No.		26	
		CN6006		27	
		LABEL CHANGES		28	
		MOD OR AMENDMENT		29	
		DATE		30	
		ISSUE		31	
		01		32	
		17/04/2008		33	
		DATE		34	
		MOD OR AMENDMENT		35	
		CN No.		36	
		CN6006		37	
		LABEL CHANGES		38	
		MOD OR AMENDMENT		39	
		DATE		40	
		ISSUE		41	
		01		42	
		17/04/2008		43	
		DATE		44	
		MOD OR AMENDMENT		45	
		CN No.		46	
		CN6006		47	
		LABEL CHANGES		48	
		MOD OR AMENDMENT		49	
		DATE		50	
		ISSUE		51	
		01		52	
		17/04/2008		53	
		DATE		54	
		MOD OR AMENDMENT		55	
		CN No.		56	
		CN6006		57	
		LABEL CHANGES		58	
		MOD OR AMENDMENT		59	
		DATE		60	
		ISSUE		61	
		01		62	
		17/04/2008		63	
		DATE		64	
		MOD OR AMENDMENT		65	
		CN No.		66	
		CN6006		67	
		LABEL CHANGES		68	
		MOD OR AMENDMENT		69	
		DATE		70	
		ISSUE		71	
		01		72	
		17/04/2008		73	
		DATE		74	
		MOD OR AMENDMENT		75	
		CN No.		76	
		CN6006		77	
		LABEL CHANGES		78	
		MOD OR AMENDMENT		79	
		DATE		80	
		ISSUE		81	
		01		82	
		17/04/2008		83	
		DATE		84	
		MOD OR AMENDMENT		85	
		CN No.		86	
		CN6006		87	
		LABEL CHANGES		88	
		MOD OR AMENDMENT		89	
		DATE		90	
		ISSUE		91	
		01		92	
		17/04/2008		93	
		DATE		94	
		MOD OR AMENDMENT		95	
		CN No.		96	
		CN6006		97	
		LABEL CHANGES		98	
		MOD OR AMENDMENT		99	
		DATE		100	

DRG. NO. 140124-0001-ISS
CABINET RC/RCM
(LESS WIPER)



INSPECTION LEVEL	140124	
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS		
DIMENSIONS IN mm.		
TOLERANCES (UNLESS OTHERWISE STATED)	HOLEs	
WHOLE Nos	+0.5mm	
1 DEC PLACE	+0.3mm	
2 DEC PLACES	+0.15mm	
ANGLES	+0.5deg	
SURFACE FINISH 1.6um RA (∇) UNLESS OTHERWISE STATED		
01	17/04/2008	CN6006
ISSUE	DATE	CN No.
2		MOD OR AMENDMENT
LABEL CHANGES		
DRG. NO. 140124-0002-ISS		
CABINET RC/RCM		
(WITH WIPER)		
TITLE:- CABINET ASSEMBLIES (LARGE)		
RC & RCM MODELS		
DRN	S.J.P	DATE
CKD	N.C.	APPRD
SCALE BASED ON		
PROCESS SPEC:-		
FINISH:- SEE DRG		
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DRG NO 140124-XXXX-01		
SHT. 6		

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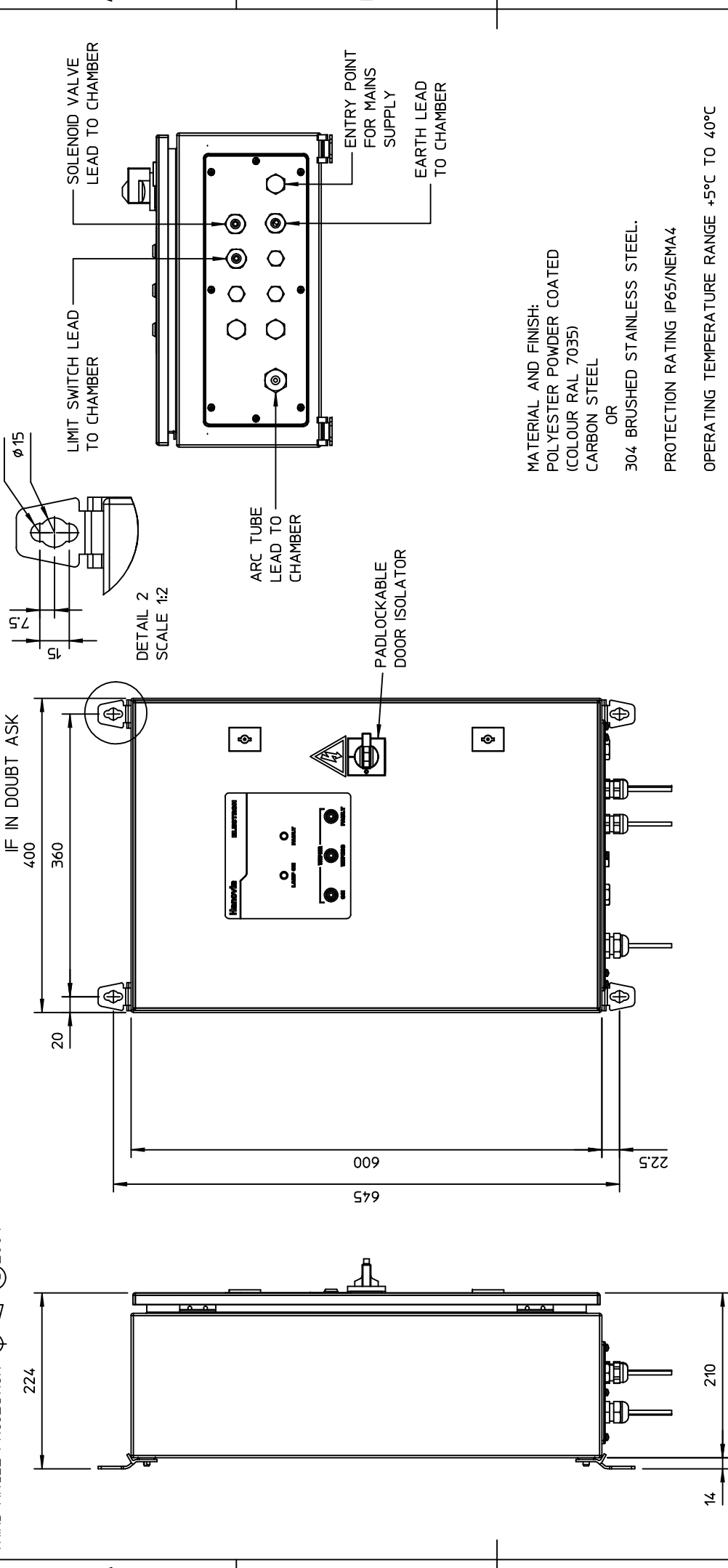
MATERIAL AND FINISH:
 POLYESTER POWDER COATED
 (COLOUR RAL 7035)
 CARBON STEEL
 OR
 304 BRUSHED STAINLESS STEEL.
 PROTECTION RATING IP65/NEMA4
 OPERATING TEMPERATURE RANGE +5°C TO 40°C
 SUPPLY VOLTAGE 115VAC AT 50/60HZ
 WEIGHT 11KG

INSPECTION LEVEL	140125
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS	
DIMENSIONS IN mm.	
TOLERANCES (UNLESS OTHERWISE STATED)	
WHOLE Nos	+0.5mm
1 DEC PLACE	+0.3mm
2 DEC PLACES	+0.15mm
ANGLES	+0.5deg
SURFACE FINISH 16um RA (▽) UNLESS OTHERWISE STATED	
HOLE	OVER 12mm DIA +0.5mm
	6 TO 12mm DIA +0.3mm
	UP TO 6mm DIA +0.15mm

DRG. NO. 140125-0001-ISS
 CABINET B
 (LESS WIPER)

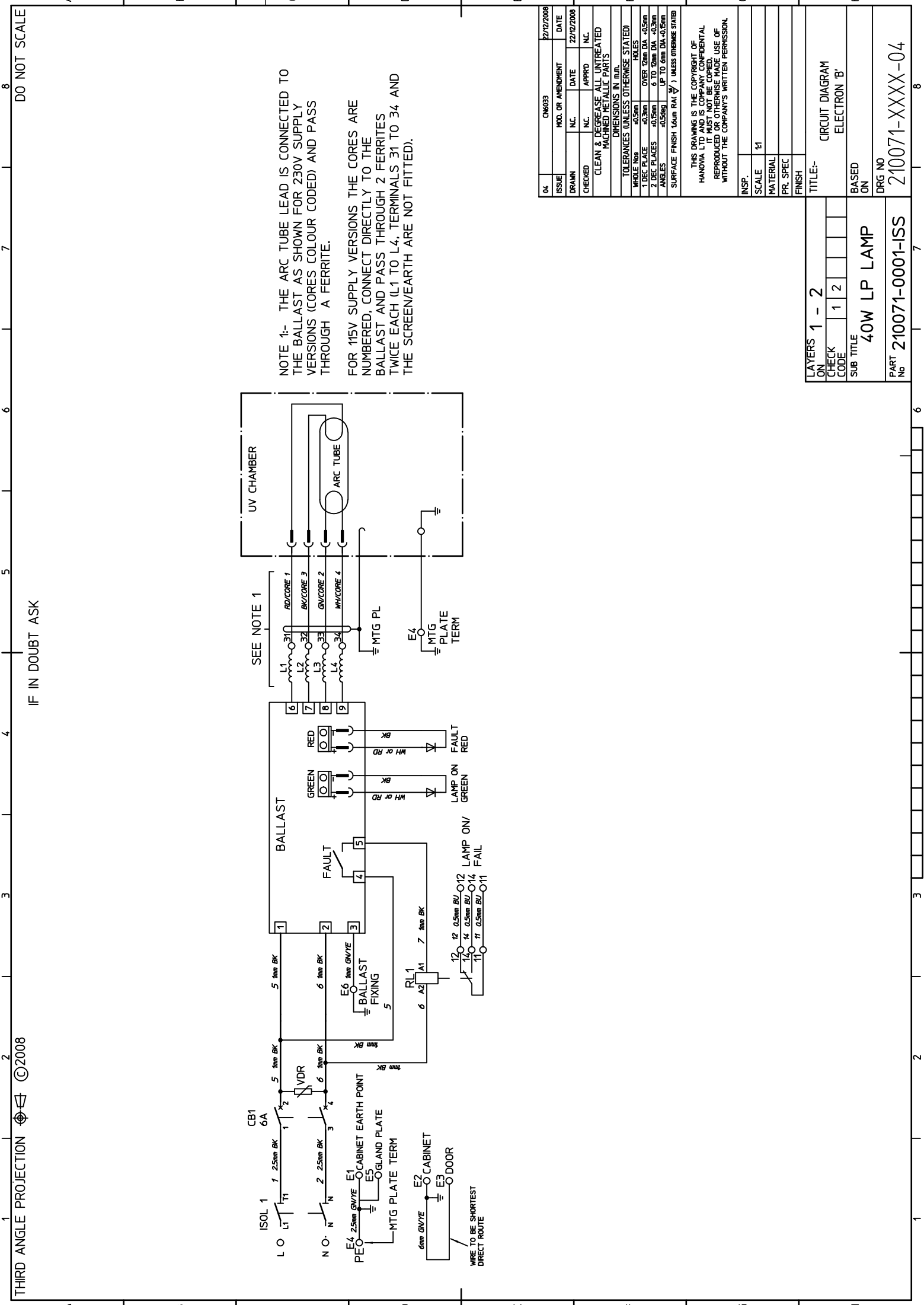
TITLE:- CABINET ASSEMBLIES		DRN	N.C.	DATE	19/09/2008
BASIC (LARGE)		CKD	N.C.	APPRD	N.C.
MATERIAL:-		SCALE			
PROCESS SPEC:-		BASED ON			
FINISH:-		SCALE 1:5			
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01	19/09/2008	CN No.	MOD OR AMENDMENT	7	8
ISSUE	DATE				

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MATERIAL AND FINISH:
POLYESTER POWDER COATED
(COLOUR RAL 7035)
CARBON STEEL
OR
304 BRUSHED STAINLESS STEEL.
PROTECTION RATING IP65/NEMA4
OPERATING TEMPERATURE RANGE +5°C TO 40°C
SUPPLY VOLTAGE 115VAC/230VAC AT 50/60HZ
WEIGHT 12Kg

INSPECTION LEVEL		140125			
CLEAN & DEGREASE ALL UNTREATED MACHINED METALIC PARTS					
DIMENSIONS IN mm.					
TOLERANCES (UNLESS OTHERWISE STATED)					
WHOLE Nos	HOLES				
1 DEC PLACE	+0.3mm	OVER 12mm DIA	+0.5mm		
2 DEC PLACES	+0.15mm	6 TO 12mm DIA	+0.3mm		
ANGLES	+0.5deg	UP TO 6mm DIA	+0.15mm		
SURFACE FINISH 1.6um RA (▽) UNLESS OTHERWISE STATED					
01	19/09/2008	CN No.	MOD OR AMENDMENT		
2					
TITLE:- CABINET ASSEMBLIES		DRN	N.C.	DATE	19/09/2008
BASIC (LARGE)		CKD	N.C.	APPRD	N.C.
MATERIAL:-		SCALE		BASED ON	
PROCESS SPEC:-		1:5			
FINISH:-		DRG NO 140125-XXXX-01			
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DRG. NO. 140125-0002-ISS		SHT. 6			
CABINET B					
(WITH WIPER)					



NOTE 1:- THE ARC TUBE LEAD IS CONNECTED TO THE BALLAST AS SHOWN FOR 230V SUPPLY VERSIONS (CORES COLOUR CODED) AND PASS THROUGH A FERRITE.

FOR 115V SUPPLY VERSIONS THE CORES ARE NUMBERED, CONNECT DIRECTLY TO THE BALLAST AND PASS THROUGH 2 FERRITES TWICE EACH (L1 TO L4, TERMINALS 31 TO 34, AND THE SCREEN/EARTH ARE NOT FITTED).

04	CM0033	22/02/2008
ISSUE	MOD. OR AMENDMENT	DATE
DRAWN	N.C.	22/02/2008
CHECKED	N.C.	APPRD
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS		
DIMENSIONS IN mm		
TOLERANCES (UNLESS OTHERWISE STATED):		
WHOLE NOB	+0.5mm	HOLE
1 DEC PLACES	+0.3mm	OVER 2mm DIA
2 DEC PLACES	+0.5mm	6 TO 2mm DIA
ANGLES	+0.5deg	UP TO 6mm DIA
SURFACE FINISH 16um RA1 (V) UNLESS OTHERWISE STATED		

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INSP.	
SCALE	1:1
MATERIAL	
PR. SPEC	
FINISH	

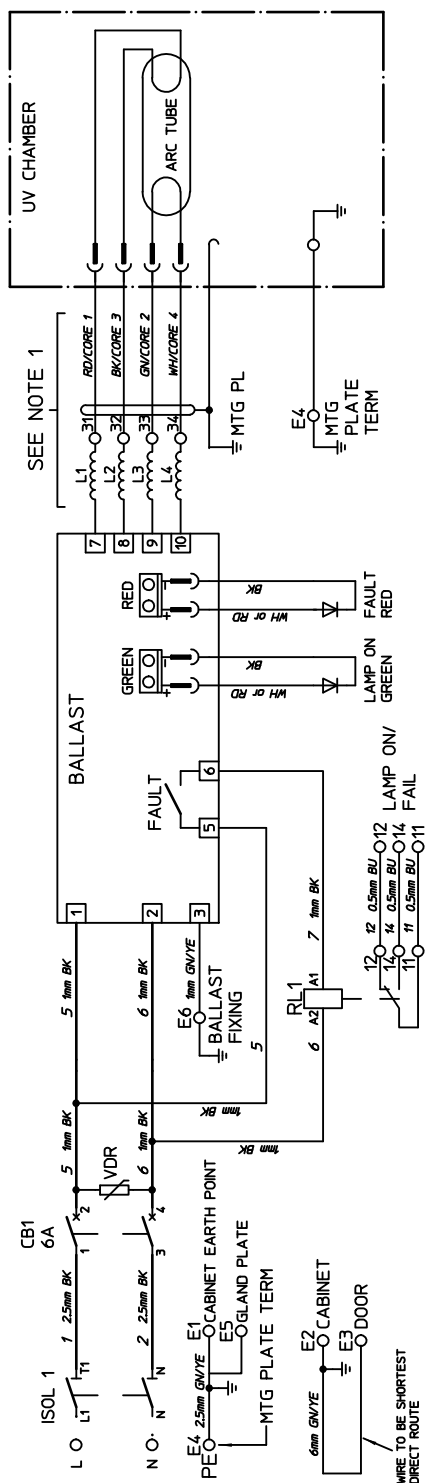
TITLE:-	
CIRCUIT DIAGRAM	
ELECTRON 'B'	
BASED ON	
DRG NO	210071-XXXX-04

LAYERS	1 - 2
CHECK CODE	1 2
SUB TITLE	40W LP LAMP
PART No	210071-0001-ISS

THIRD ANGLE PROJECTION

IF IN DOUBT ASK

DO NOT SCALE



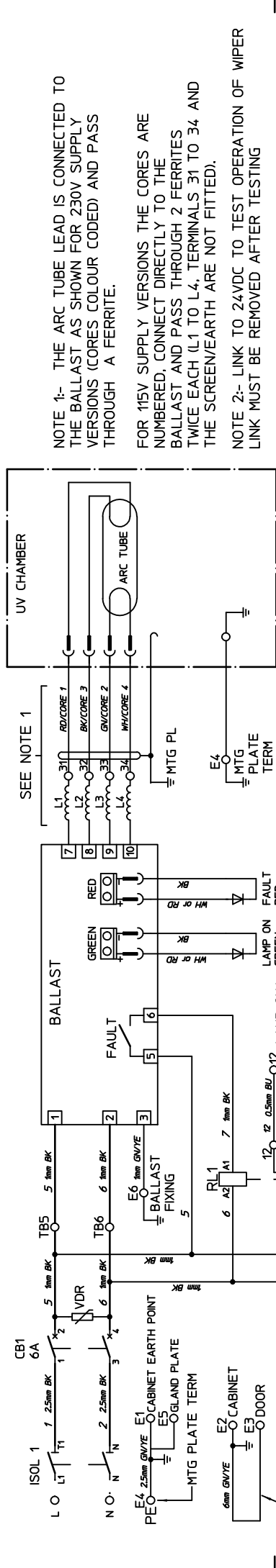
SEE NOTE 1

NOTE 1:- THE ARC TUBE LEAD IS CONNECTED TO THE BALLAST AS SHOWN FOR 230V SUPPLY VERSIONS (CORES COLOUR CODED) AND PASS THROUGH A FERRITE.

FOR 115V SUPPLY VERSIONS THE CORES ARE NUMBERED, CONNECT DIRECTLY TO THE BALLAST AND PASS THROUGH 2 FERRITES TWICE EACH (L1 TO L4, TERMINALS 31 TO 34, AND THE SCREEN/EARTH ARE NOT FITTED).

04	CM0033	22/02/2008
ISSUE	MOD. OR AMENDMENT	DATE
DRAWN	N.C.	DATE 22/02/2008
CHECKED	N.C.	APPROD. N.C.
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS		
DIMENSIONS IN mm		
WHOLE NOB	+0.5mm	HOLE
1 DEC PLACES	+0.3mm	OVER 2mm DIA
2 DEC PLACES	+0.15mm	6 TO 2mm DIA
ANGLES	+0.5deg	UP TO 6mm DIA
SURFACE FINISH 16um RA1 (V) UNLESS OTHERWISE STATED		
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INSP.		
SCALE	1:1	
MATERIAL		
PR. SPEC		
FINISH		
TITLE:-	CIRCUIT DIAGRAM ELECTRON 'B'	
BASED ON		
DRG NO	210071-XXXX-04	

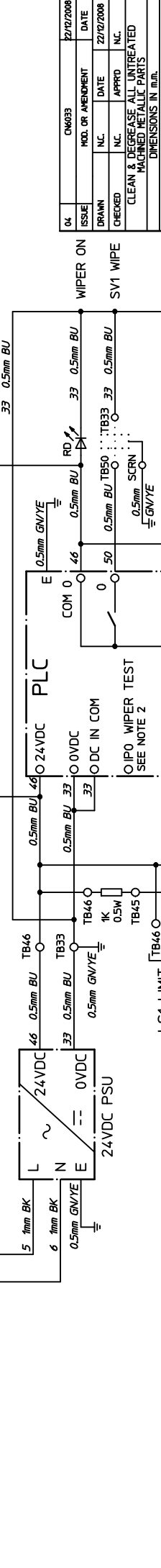
LAYERS	1 - 3
CHECK CODE	1 3
SUB TITLE	80W, 140W & 270W AMALGAM LAMP
PART No	210071-0002-ISS



NOTE 1:- THE ARC TUBE LEAD IS CONNECTED TO THE BALLAST AS SHOWN FOR 230V SUPPLY VERSIONS (CORES COLOUR CODED) AND PASS THROUGH A FERRITE.

FOR 115V SUPPLY VERSIONS THE CORES ARE NUMBERED, CONNECT DIRECTLY TO THE BALLAST AND PASS THROUGH 2 FERRITES TWICE EACH (L1 TO L4, TERMINALS 31 TO 34, AND THE SCREEN/EARTH ARE NOT FITTED).

NOTE 2:- LINK TO 24VDC TO TEST OPERATION OF WIPER LINK MUST BE REMOVED AFTER TESTING



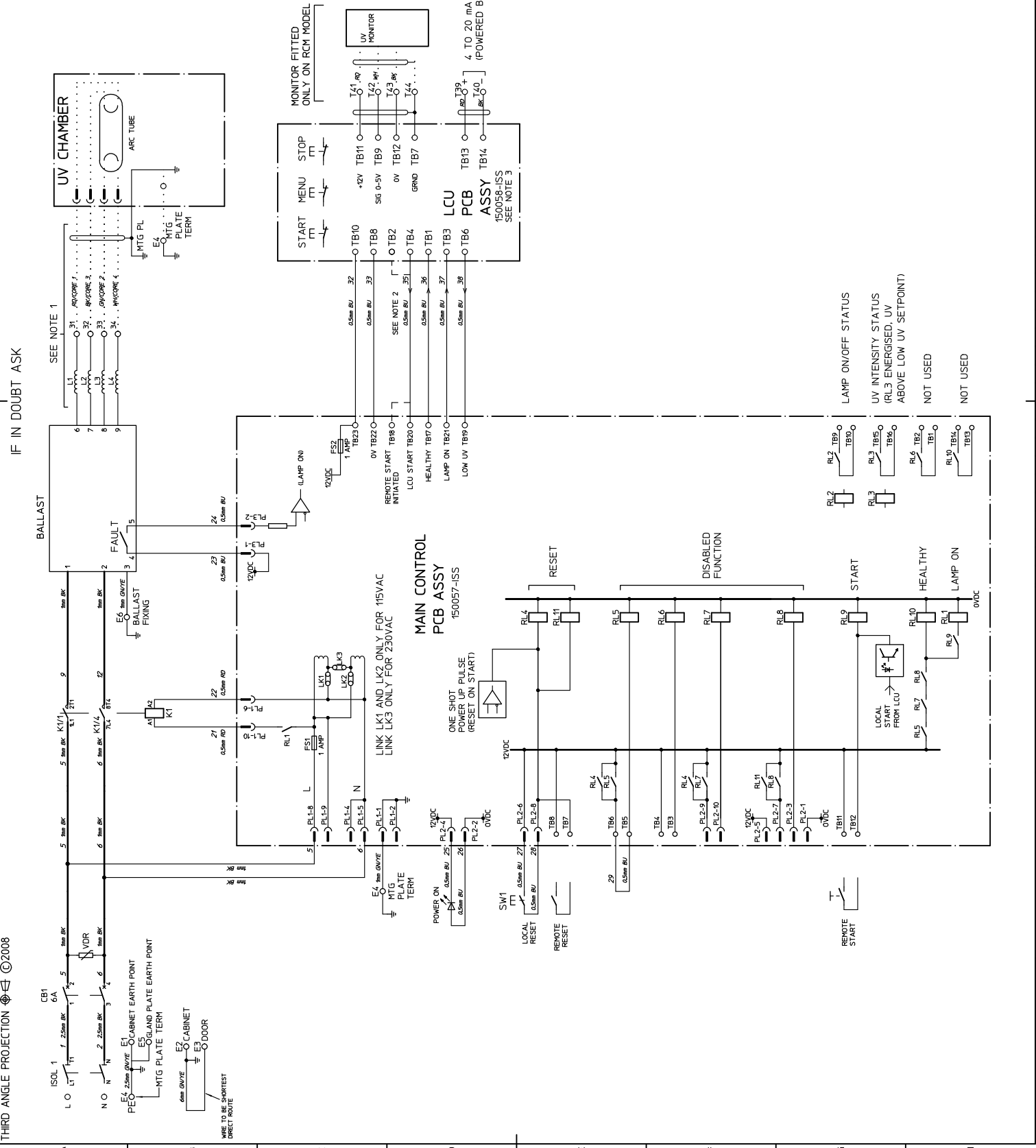
04	ISSUE	CW0033	MOD. OR AMENDMENT	DATE	22/02/2008
	DRAWN	N.C.	DATE	22/02/2008	
	CHECKED	N.C.	APPROD	N.C.	
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS DIMENSIONS IN mm					
TOLERANCES (UNLESS OTHERWISE STATED)					
HOLE					
1	DEC PLACES	+0.5mm	OVER 20mm DIA	+0.5mm	
2	DEC PLACES	+0.5mm	6 TO 20mm DIA	+0.5mm	
	ANGLES	+0.5mm	UP TO 6mm DIA	+0.5mm	
SURFACE FINISH 16um RA (▽) UNLESS OTHERWISE STATED					
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INSP.	SCALE	1:1			
MATERIAL	PR. SPEC				
FINISH					
TITLE:-					
CIRCUIT DIAGRAM					
ELECTRON 'B'					
BASED ON					
DRG NO	210071-XXXX-04				

LAYERS	1 - 4			
CHECK CODE	1	4		
SUB TITLE	WIPED 80W, 140W & 270W AMALGAM LAMPS			
PART No	210071-0003-ISS			

NOTES:-
 1. THE ARC TUBE LEAD IS CONNECTED TO THE BALLAST AS SHOWN FOR 230V SUPPLY VERSIONS. THE CORES ARE COLOUR CODED AND PASS THROUGH A FERRITE (EXCEPT MODEL -0116).
 FOR 115V SUPPLY AND MODEL -0116 VERSIONS THE CORES ARE NUMBERED. CONNECT DIRECTLY TO THE BALLAST AND PASS THROUGH 2 FERRITES TWICE EACH, NB. L1 TO L4, TERMINALS 31 TO 34 AND THE SCREEN/EARTH OF THE CABLE ARE NOT FITTED ON THESE SYSTEMS.
 2. CIRCUIT IS SHOWN FOR LOCAL START OPERATION. FOR REMOTE START OPERATION WIRE 35 IS TO BE MOVED FROM MAIN PCB TB20 AND LCU PCB TB4, TO MAIN PCB TB18 AND LCU PCB TB2.
 3. SEE TABLE BELOW FOR SW4 DIP SWITCH OPTIONS ON LCU BOARD

SWITCH 1	OFF	MONITOR FITTED
ON	NO MONITOR	
OFF	LOCAL OPERATION	
ON	REMOTE OPERATION (SEE NOTE 2)	
SWITCH 3		
SWITCH 4		
SWITCH 5		
SWITCH 6		

HANOVIA USE ONLY



REV	DATE	BY	CHKD	APP'D	DATE	REV	DATE	BY	CHKD	APP'D	DATE
06	06/08				20/07/2009	07					
08						08					

DESIGN: CLEAN, BALANCED, UNIFORM DIMENSIONS IN D.B.
 TOLERANCES UNLESS OTHERWISE STATED:
 HOLE DIA: 0.25mm OVER DIA: 0.25mm
 DRILL DIA: 0.25mm OVER DIA: 0.25mm
 HOLE DIA: 0.25mm OVER DIA: 0.25mm
 SURFACE FINISH: SAAR BA17 UNLESS OTHERWISE STATED

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NSP: SCALE: 1:1
 MATERIAL: FR. SPEC: FINISH: H1

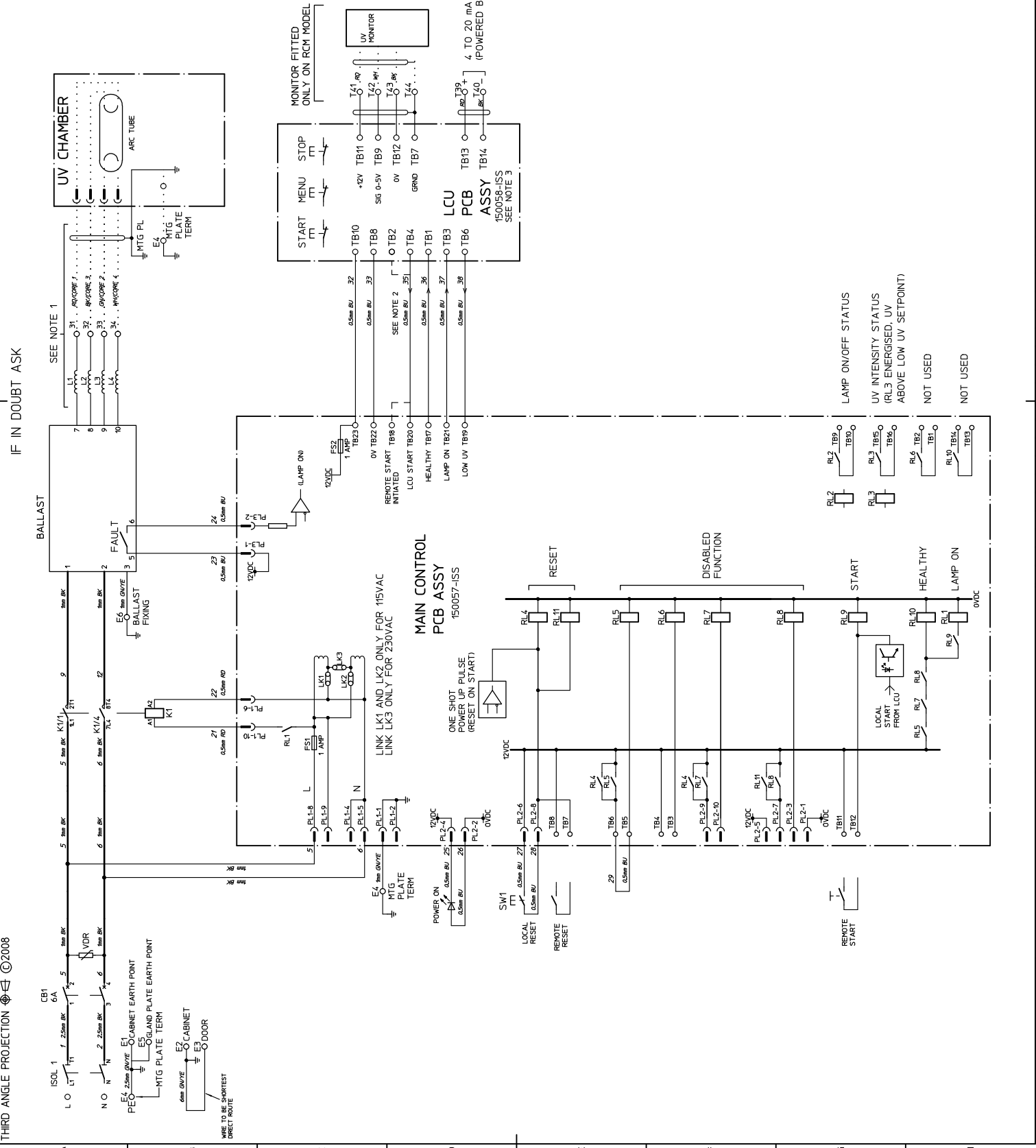
TITLE: CIRCUIT DIAGRAM
 ELECTRON RC & RCM

LAYERS: 1 - 2 - 51
 CHECK CODE: 1 | 2 | 51
 SUB TITLE: 40W LP LAMP
 BASED ON: PART No: Z10072-0001-SS
 DRG NO: Z10072-XXXX-06

NOTES:-
 1. THE ARC TUBE LEAD IS CONNECTED TO THE BALLAST AS SHOWN FOR 230V SUPPLY VERSIONS. THE CORES ARE COLOUR CODED AND PASS THROUGH A FERRITE (EXCEPT MODEL -0116).
 FOR 115V SUPPLY AND MODEL -0116 VERSIONS THE CORES ARE NUMBERED. CONNECT DIRECTLY TO THE BALLAST AND PASS THROUGH 2 FERRITES TWICE EACH, NB. L1 TO L4, TERMINALS 31 TO 34 AND THE SCREEN/EARTH OF THE CABLE ARE NOT FITTED ON THESE SYSTEMS.
 2. CIRCUIT IS SHOWN FOR LOCAL START OPERATION. FOR REMOTE START OPERATION WIRE 35 IS TO BE MOVED FROM MAIN PCB TB20 AND LCU PCB TB4, TO MAIN PCB TB18 AND LCU PCB TB2.
 3. SEE TABLE BELOW FOR SW4 DIP SWITCH OPTIONS ON LCU BOARD

SWITCH 1	MONITOR FITTED
OFF	NO MONITOR
ON	LOCAL OPERATION
OFF	REMOTE OPERATION (SEE NOTE 2)
ON	
SWITCH 2	
SWITCH 3	
SWITCH 4	
SWITCH 5	
SWITCH 6	

HANOVIA USE ONLY



REV	DATE	BY	CHKD	APP'D	DATE	REV	DATE	BY	CHKD	APP'D	DATE
06	06/08				20/07/2009						

DESIGN: CLEAN, BALANCED, UNIFORM DIMENSIONS IN DRA.

TOLERANCES UNLESS OTHERWISE STATED:
 HOLE DIMS: 0.25mm
 DRILL DIMS: 0.25mm
 OVER DIMS: 0.25mm
 UNDER DIMS: 0.25mm
 SURFACE FINISH: SAAR BA17 UNLESS OTHERWISE STATED

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NSP: SCALE: H1

FINISH: MATERIAL: RC. SPEC: FINISH: RC. SPEC: FINISH: RC. SPEC:

TITLE: CIRCUIT DIAGRAM
 ELECTION RC & RCM

BASED ON: DRG NO: Z10072-XXXX-06

PART NO: Z10072-0002-ISS

LAYERS	1	3	52
CHECK CODE	1	3	52
SUB TITLE	80W, 140W & 270W AMALGAM LAMP		

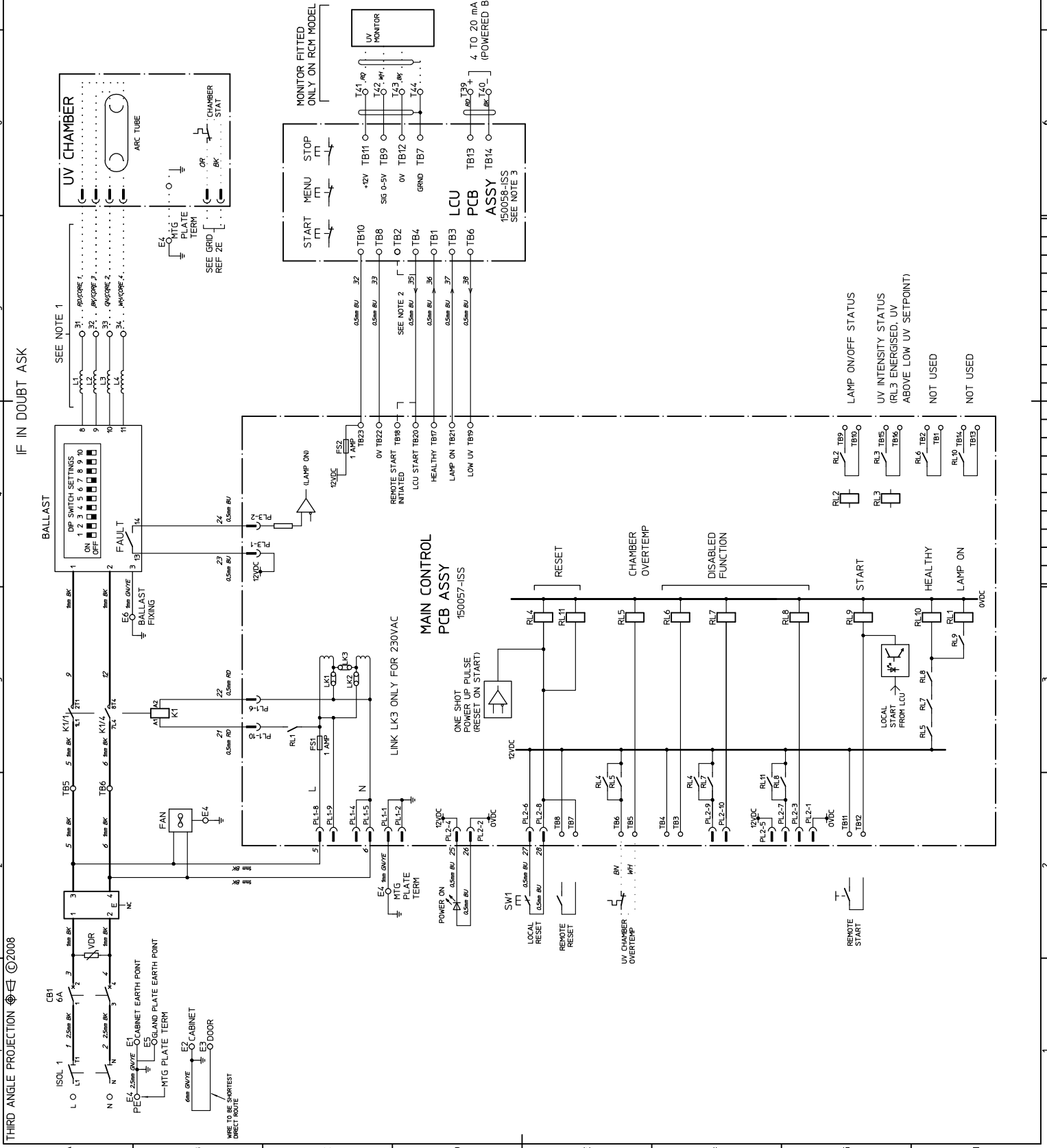
NOTES:-

1. THE ARC TUBE LEAD IS CONNECTED TO THE BALLAST AS SHOWN FOR 230V SUPPLY VERSIONS. THE CORES ARE COLOUR CODED AND PASS THROUGH A FERRITE (EXCEPT MODEL -0116).
FOR 115V SUPPLY AND MODEL -0116 VERSIONS THE CORES ARE NUMBERED. CONNECT DIRECTLY TO THE BALLAST AND PASS THROUGH 2 FERRITES TWICE EACH, NB. L1 TO L4, TERMINALS 31 TO 34 AND THE SCREEN/EARTH OF THE CABLE ARE NOT FITTED ON THESE SYSTEMS.
2. CIRCUIT IS SHOWN FOR LOCAL START OPERATION. FOR REMOTE START OPERATION WIRE 35 IS TO BE MOVED FROM MAIN PCB TB20 AND LCU PCB TB4, TO MAIN PCB TB18 AND LCU PCB TB2.
3. SEE TABLE BELOW FOR SW4 DIP SWITCH OPTIONS ON LCU BOARD

SWITCH 1	OFF	MONITOR FITTED
SWITCH 2	ON	NO MONITOR
SWITCH 3	OFF	LOCAL OPERATION
SWITCH 4	ON	REMOTE OPERATION (SEE NOTE 2)
SWITCH 5		
SWITCH 6		

HANOVIA USE ONLY

REV	DATE	BY	DESCRIPTION
06	06/08	06/08	20/07/2009
ISSUE IN	REV. OR AMENDMENT	DATE	DATE
DRAWN	GM	DATE	20/07/2009
CREATED	INC.	APPRO.	INC.
CLEAN, UNLACED, UNDRIPPED, UNPREPARED DIMENSIONS IN M.M.			
TOLERANCES UNLESS OTHERWISE STATED:			
MAX. DIM.	MIN. DIM.	OVER DIM.	MAX. DIM.
0.25mm	0.25mm	0.25mm	0.25mm
0.50mm	0.50mm	0.50mm	0.50mm
1.00mm	1.00mm	1.00mm	1.00mm
2.00mm	2.00mm	2.00mm	2.00mm
3.00mm	3.00mm	3.00mm	3.00mm
4.00mm	4.00mm	4.00mm	4.00mm
5.00mm	5.00mm	5.00mm	5.00mm
6.00mm	6.00mm	6.00mm	6.00mm
7.00mm	7.00mm	7.00mm	7.00mm
8.00mm	8.00mm	8.00mm	8.00mm
9.00mm	9.00mm	9.00mm	9.00mm
10.00mm	10.00mm	10.00mm	10.00mm
SURFACE FINISH (MAIN BULK) UNLESS OTHERWISE STATED			
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NSP			
SCALE			
INTERNAL			
FINISH			
R1			
TITLE:-			
CIRCUIT DIAGRAM			
ELECTRON RC & RCM			
BASED ON			
500W AMALGAM LAMP			
PART NO			
210072-0003-ISS			
DRG NO			
Z10072-XXXX-06			

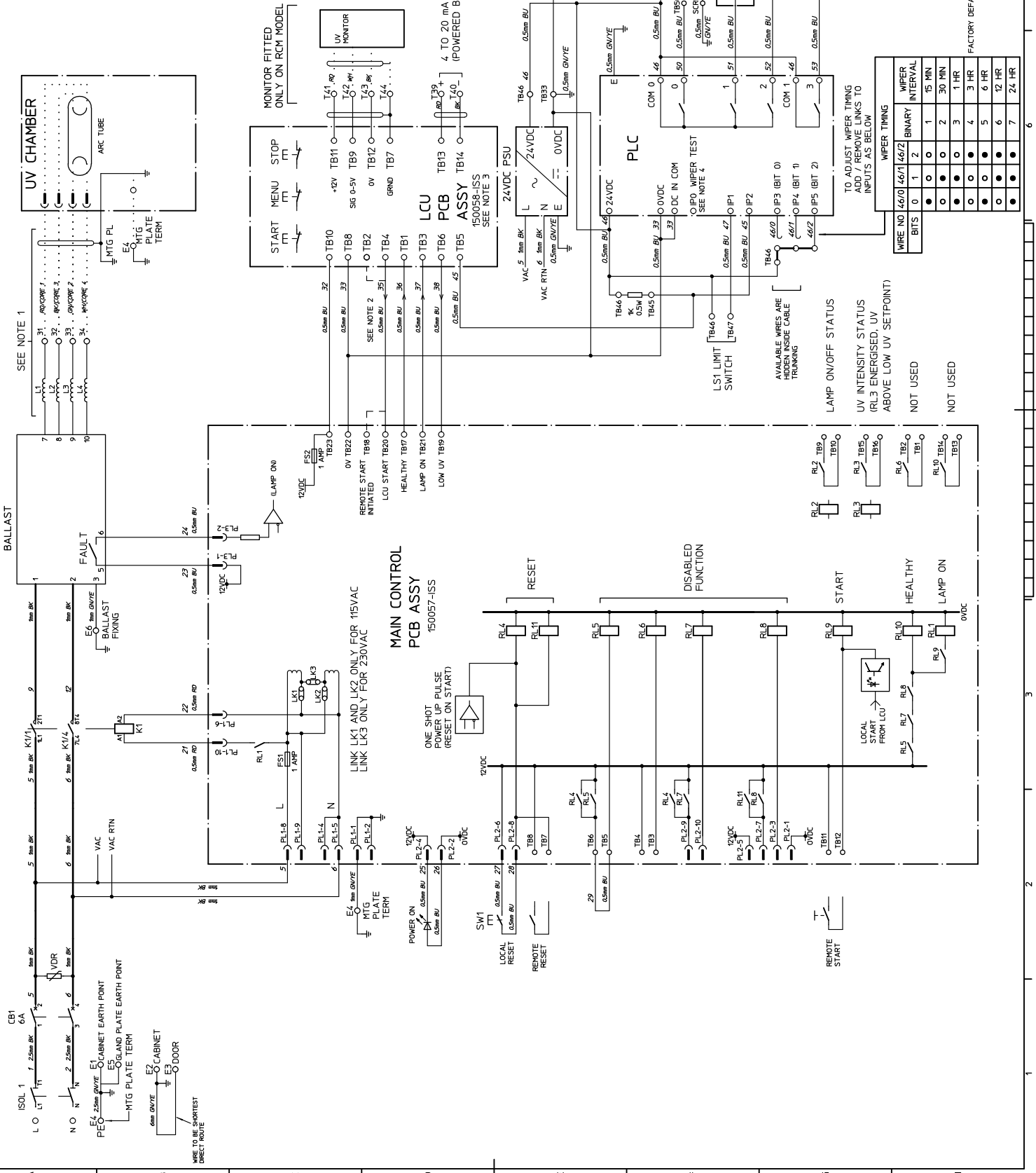


NOTES:-
 1. THE ARC TUBE LEAD IS CONNECTED TO THE BALLAST AS SHOWN FOR 230V SUPPLY VERSIONS. THE CORES ARE COLOUR CODED AND PASS THROUGH A FERRITE (EXCEPT MODEL -0116).
 FOR 115V SUPPLY AND MODEL -0116 VERSIONS THE CORES ARE NUMBERED. CONNECT DIRECTLY TO THE BALLAST AND PASS THROUGH 2 FERRITES TWICE EACH, NB. L1 TO L4. TERMINALS 31 TO 34 AND THE SCREEN/EARTH OF THE CABLE ARE NOT FITTED ON THESE SYSTEMS.
 2. CIRCUIT IS SHOWN FOR LOCAL START OPERATION. FOR REMOTE START OPERATION WIRE 35 IS TO BE MOVED FROM MAIN PCB TB20 AND LCU PCB TB4, TO MAIN PCB TB18 AND LCU PCB TB2.
 3. SEE TABLE BELOW FOR SW4 DIP SWITCH OPTIONS ON LCU BOARD

MONITOR FITTED	
SWITCH 1	OFF NO MONITOR
SWITCH 2	ON LOCAL OPERATION
SWITCH 3	OFF REMOTE OPERATION (SEE NOTE 2)
SWITCH 4	
SWITCH 5	
SWITCH 6	

HANOVIA USE ONLY

4. LINK TO 24VDC TO TEST OPERATION OF WIPER LINK MUST BE REMOVED AFTER TESTING



REV	DATE	BY	CHKD	APP'D	DATE	REV	DATE	BY	CHKD	APP'D	DATE
000009	20/03/2009					000009	20/03/2009				

CLEAN BALANCED METAL PARTS
 DIMENSIONS IN M.M.
 TOLERANCES UNLESS OTHERWISE STATED
 HOLE DIA. ±0.05mm
 DRILL DIA. ±0.05mm
 OVER DIA. ±0.05mm
 UNDER DIA. ±0.05mm
 SURFACE FINISH (MAIN SURF.) UNLESS OTHERWISE STATED

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NSP SCALE 1:1
 MATERIAL FINISH
 FINISH

TITLE:- CIRCUIT DIAGRAM
 ELECTRON RC & RCM

BASED ON
 ON
 PART No 210072-0005-ISS
 DRG NO 210072-XXXX-06

TO ADJUST WIPER TIMING ADD / REMOVE LINKS TO INPUTS AS BELOW

WIRE NO	16/0	16/1	16/2	16/3	16/4	16/5	16/6	16/7	16/8	16/9	16/10			
BITS	0	1	2	3	4	5	6	7	8	9	10			
WIPER INTERVAL	0	15 MIN	2	30 MIN	3	1 HR	4	3 HR	5	6 HR	6	12 HR	7	24 HR

WIPER TIMING

TO ADJUST WIPER TIMING ADD / REMOVE LINKS TO INPUTS AS BELOW

NOT USED

NOT USED

AVAILABLE WIRES ARE INSIDE CABLE TRUNKING

LAMP ON/OFF STATUS

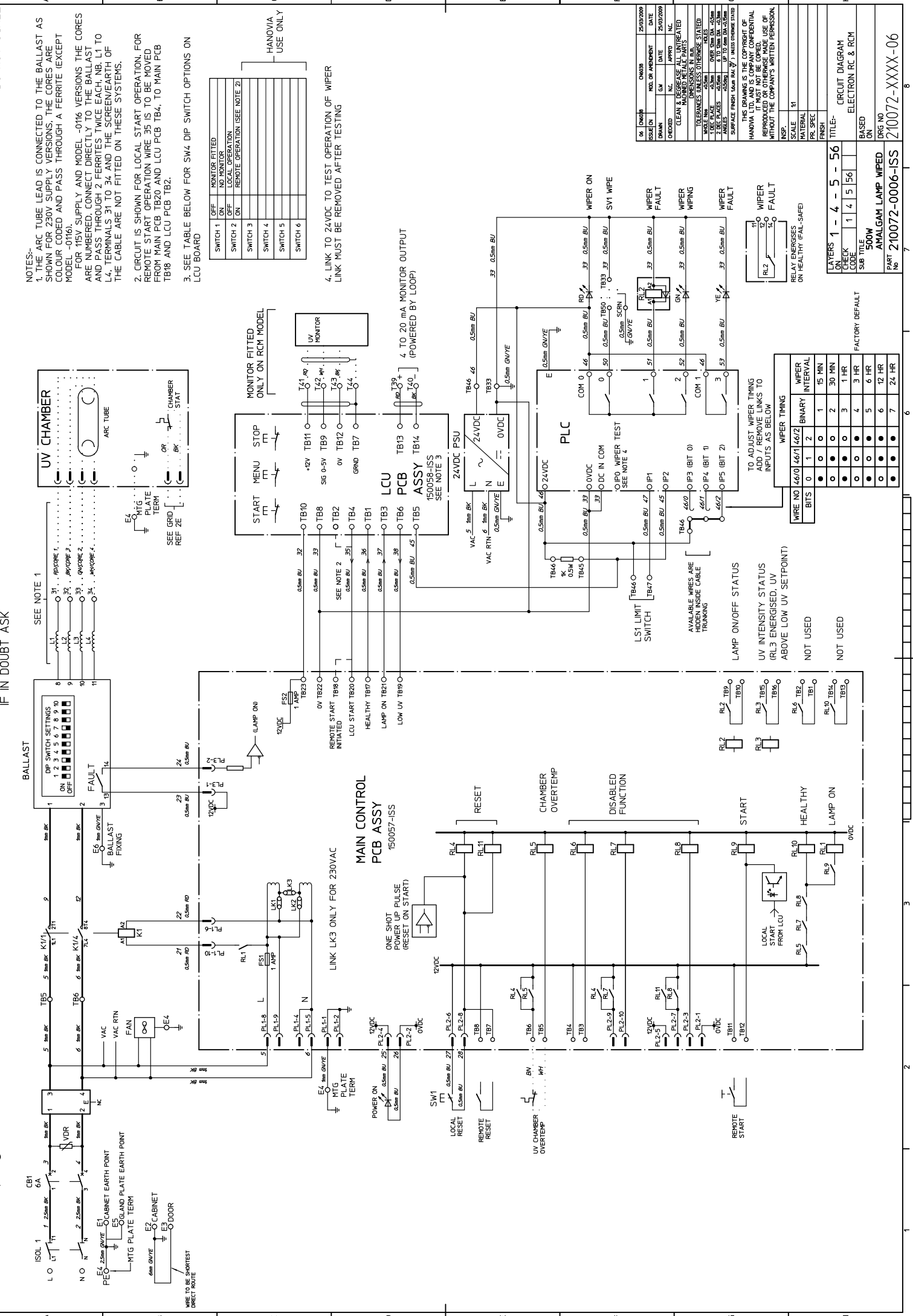
UV INTENSITY STATUS (RL3 ENERGISED, UV ABOVE LOW UV SETPOINT)

NOT USED

NOT USED

RELAY ENERGISES ON HEALTHY (REAL-SAFED)

RELAY	1	2	3	4	5	6	7	8	9	10
WIPER	0	0	0	0	0	0	0	0	0	0
WIPER INTERVAL	0	1	2	3	4	5	6	7	8	9



NOTES:-

1. THE ARC TUBE LEAD IS CONNECTED TO THE BALLAST AS SHOWN FOR 230V SUPPLY VERSIONS. THE CORES ARE COLOUR CODED AND PASS THROUGH A FERRITE (EXCEPT MODEL -0116).
2. FOR 115V SUPPLY AND MODEL -0116 VERSIONS THE CORES ARE NUMBERED. CONNECT DIRECTLY TO THE BALLAST AND PASS THROUGH 2 FERRITES TWICE EACH. NB. L1 TO L4, TERMINALS 31 TO 34 AND THE SCREEN/EARTH OF THE CABLE ARE NOT FITTED ON THESE SYSTEMS.
3. CIRCUIT IS SHOWN FOR LOCAL START OPERATION. FOR REMOTE START OPERATION WIRE 35 IS TO BE MOVED FROM MAIN PCB TB20 AND LCU PCB TB4, TO MAIN PCB TB18 AND LCU PCB TB2.
4. LINK LK3 ONLY FOR 230VAC
5. LINK TO 24VDC TO TEST OPERATION OF WIPER LINK MUST BE REMOVED AFTER TESTING

SWITCH 1	OFF	MONITOR FITTED
SWITCH 2	ON	NO MONITOR
SWITCH 3	OFF	LOCAL OPERATION
SWITCH 4	ON	REMOTE OPERATION (SEE NOTE 2)
SWITCH 5		
SWITCH 6		

HANOVIA USE ONLY

2. CIRCUIT IS SHOWN FOR LOCAL START OPERATION. FOR REMOTE START OPERATION WIRE 35 IS TO BE MOVED FROM MAIN PCB TB20 AND LCU PCB TB4, TO MAIN PCB TB18 AND LCU PCB TB2.

3. SEE TABLE BELOW FOR SW4 DIP SWITCH OPTIONS ON LCU BOARD

4. LINK TO 24VDC TO TEST OPERATION OF WIPER LINK MUST BE REMOVED AFTER TESTING

REV	DATE	BY	CHKD	DESCRIPTION
01	20/03/2009			ISSUED
02	20/03/2009			REVISED

TOLERANCES UNLESS OTHERWISE STATED

RESISTORS: 0.5% (E), 1% (F), 5% (G), 10% (H)

CAPACITORS: 5% (K), 10% (M), 20% (N)

WIRE GAUGE: 0.5mm (AWG 30), 0.75mm (AWG 28), 1.0mm (AWG 26)

WIRE COLOR: BROWN (BR), RED (RD), GREEN (GR), BLUE (BL), WHITE (WH), BLACK (BK), GREY (GY), YELLOW (YL), PURPLE (PL)

WIRE MARKING: 33 0.5mm BU, 37 0.5mm BU, 46 0.5mm BU, 50 0.5mm BU, 51 0.5mm BU, 52 0.5mm BU, 53 0.5mm BU

TERMINAL BLOCKS: 150058-ISS (SEE NOTE 3)

RELAY TIMING: 15 MIN, 30 MIN, 1 HR, 3 HR, 6 HR, 12 HR, 24 HR

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NSP: SCALE: 1:1

TITLE: CIRCUIT DIAGRAM

BASED ON: ELECTRON RC & RCM

DRG NO: Z10072-XXXX-06

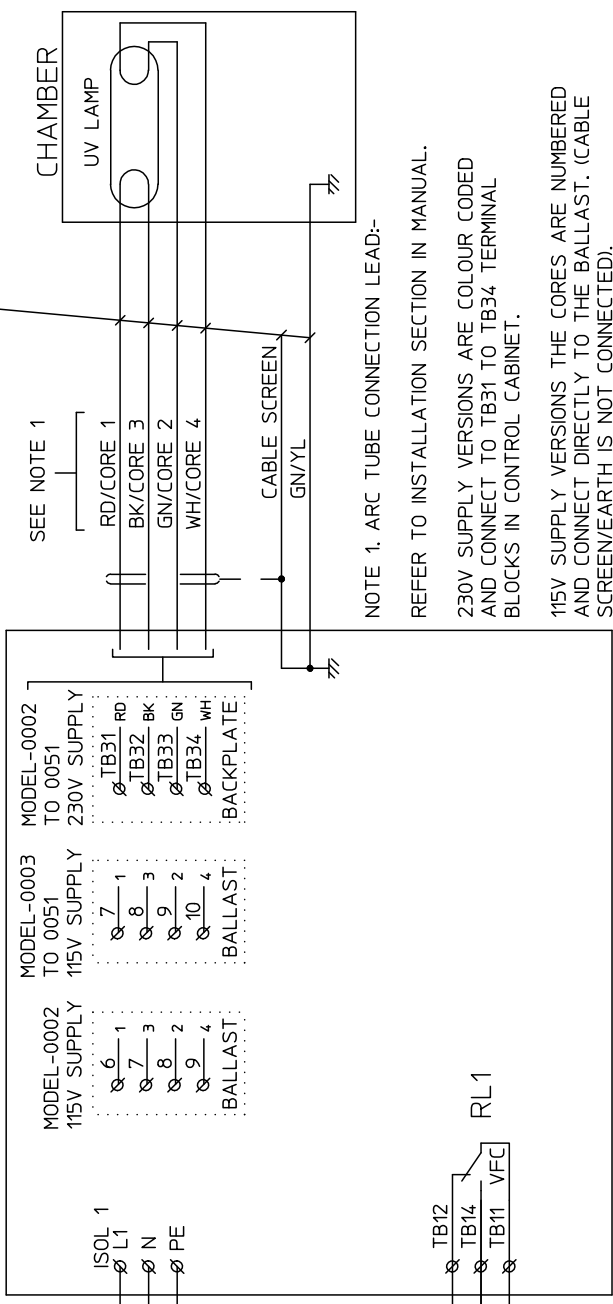
WIRE NO	16/0	16/1	16/2	16/3	16/4	16/5	16/6	16/7	16/8	16/9	16/10
BITS	0	1	2	3	4	5	6	7	8	9	10
WIPER INTERVAL	0	1	2	3	4	5	6	7	8	9	10
WIPER INTERVAL	0	1	2	3	4	5	6	7	8	9	10

THE CONTROL CABINET WILL BE CONFIGURED FOR CUSTOMERS MAINS SUPPLY REQUIREMENTS. PLEASE CHECK THAT THE INFORMATION ON THE CABINET RATING PLATE CONFORMS WITH YOUR LOCAL SUPPLY BEFORE WIRING IN THE MAINS CABLE.

IF IN DOUBT ASK

CABLES BETWEEN THE CONTROL CABINET AND CHAMBER ARE SUPPLIED WITH THE UV SYSTEM

CONTROL CABINET



SEE *1
LAMP ON/OFF
STATUS

*1. LAMP ON/OFF CONTACT
CLOSED = LAMP ON
OPEN = FAULT

CABLES BETWEEN THE CONTROL CABINET AND ANY CUSTOMER CONTROL DEVICE (I.E. SCADA OR PLC) IS TO BE SUPPLIED BY THE CUSTOMER IF REQUIRED

03	ISSUE	MOD. OR AMENDMENT	DATE
	DRAWN	N.C.	22/12/2008
	CHECKED	N.C.	APPROD. N.C.
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS			
DIMENSIONS IN (mm)			
TOLERANCES (UNLESS OTHERWISE STATED)			
WHOLE NOS	+0.5mm	HOLES	
1 DEC PLACE	+0.3mm	OVER 2mm DIA +0.5mm	
2 DEC PLACES	+0.15mm	6 TO 2mm DIA +0.3mm	
ANGLES	+0.5deg	UP TO 6mm DIA +0.5mm	
SURFACE FINISH 16um RAI (7) UNLESS OTHERWISE STATED			

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INSP.	
SCALE	1:1
MATERIAL	
PR. SPEC	
FINISH	

TITLE:-	SITE WIRING DIAGRAM
	AF3 UV SYSTEM

BASED ON	
DRG NO	210073-XXXX-03

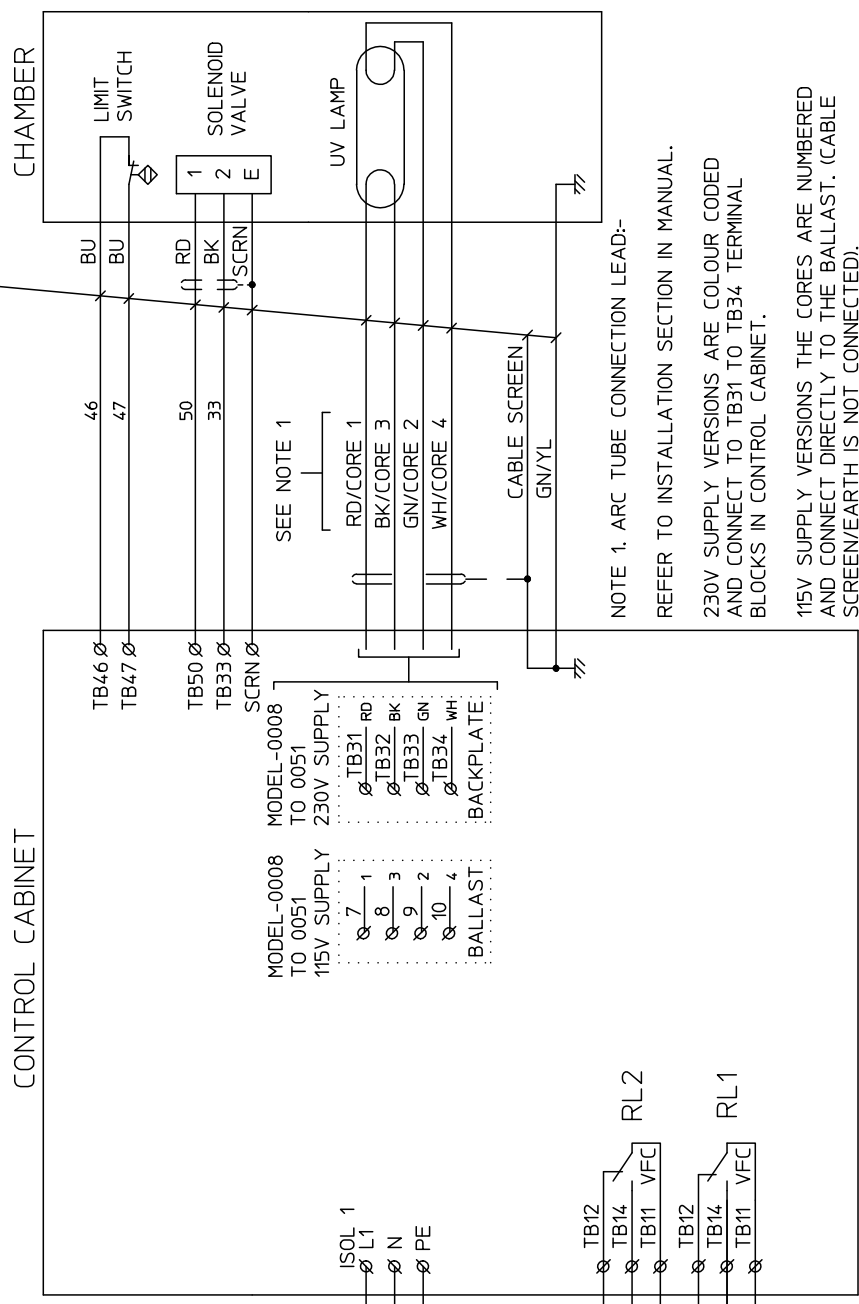
LAYERS	1-2-51
ON	
CHECK CODE	1 2 51
SUB TITLE	AF3 40-270W B UNWIPED
PART No	210073-0001-ISS

THE CONTROL CABINET WILL BE CONFIGURED FOR CUSTOMERS MAINS SUPPLY REQUIREMENTS. PLEASE CHECK THAT THE INFORMATION ON THE CABINET RATING PLATE CONFORMS WITH YOUR LOCAL SUPPLY BEFORE WIRING IN THE MAINS CABLE.

IF IN DOUBT ASK

CABLES BETWEEN THE CONTROL CABINET AND CHAMBER ARE SUPPLIED WITH THE UV SYSTEM

CONTROL CABINET



MODEL-0008 TO 0051 115V SUPPLY

MODEL-0008 TO 0051 230V SUPPLY

BALLAST

BACKPLATE

RD/CORE 1

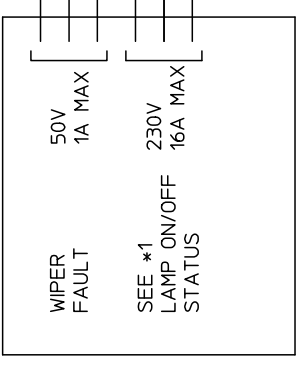
BK/CORE 3

GN/CORE 2

WH/CORE 4

SEE NOTE 1

CUSTOMER INFORMATION



*1. LAMP ON/OFF CONTACT CLOSED = LAMP ON OPEN = FAULT

NOTE 1. ARC TUBE CONNECTION LEAD- REFER TO INSTALLATION SECTION IN MANUAL.

230V SUPPLY VERSIONS ARE COLOUR CODED AND CONNECT TO TB31 TO TB34 TERMINAL BLOCKS IN CONTROL CABINET.

115V SUPPLY VERSIONS THE CORES ARE NUMBERED AND CONNECT DIRECTLY TO THE BALLAST. (CABLE SCREEN/EARTH IS NOT CONNECTED).

CABLES BETWEEN THE CONTROL CABINET AND ANY CUSTOMER CONTROL DEVICE (I.E. SCADA OR PLC) IS TO BE SUPPLIED BY THE CUSTOMER IF REQUIRED

ISSUE	MOD. OR AMENDMENT	DATE
DRAWN	N.C.	22/02/2008
CHECKED	N.C.	APPROD. N.C.
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS DIMENSIONS IN (mm)		
TOLERANCES (UNLESS OTHERWISE STATED):		
WHOLE NOS	+0.5mm	HOLES
1 DEC PLACE	+0.3mm	OVER 12mm DIA
2 DEC PLACES	+0.15mm	6 TO 12mm DIA
ANGLES	+0.5deg	UP TO 6mm DIA
SURFACE FINISH 16um RAI UNLESS OTHERWISE STATED		

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INSP.	SCALE	1:1
MATERIAL	PR. SPEC	
FINISH		

TITLE:-	SITE WIRING DIAGRAM
	AF3 UV SYSTEM

BASED ON	DRG NO
AF3 80-270W B WIPED	210073-XXXX-03

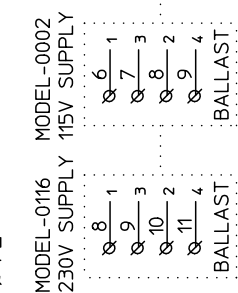
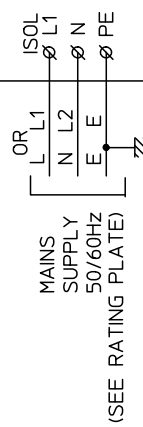
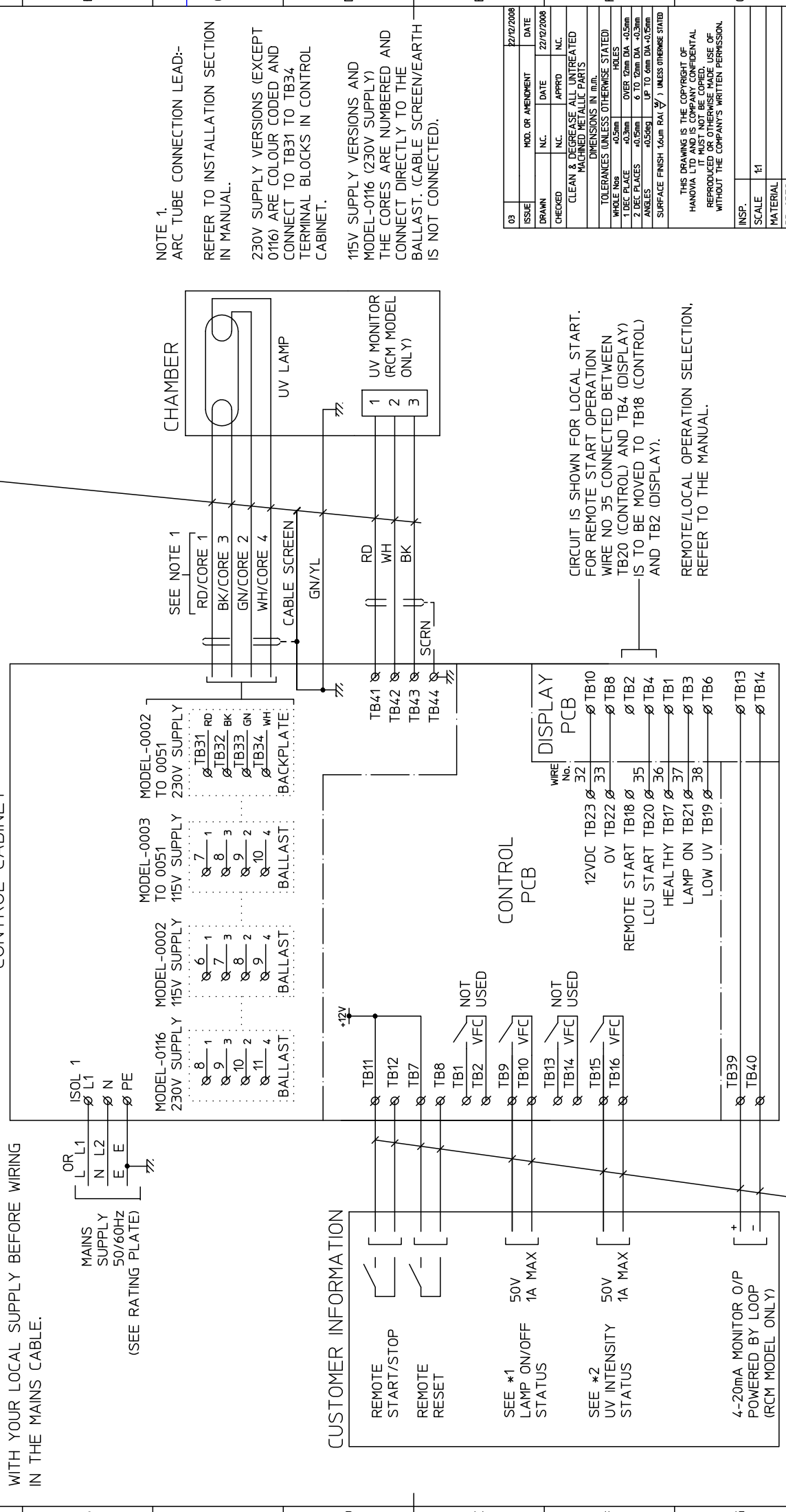
PART No	210073-0002-ISS
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THE CONTROL CABINET WILL BE CONFIGURED FOR CUSTOMERS MAINS SUPPLY REQUIREMENTS. PLEASE CHECK THAT THE INFORMATION ON THE CABINET RATING PLATE CONFORMS WITH YOUR LOCAL SUPPLY BEFORE WIRING IN THE MAINS CABLE.

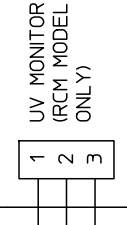
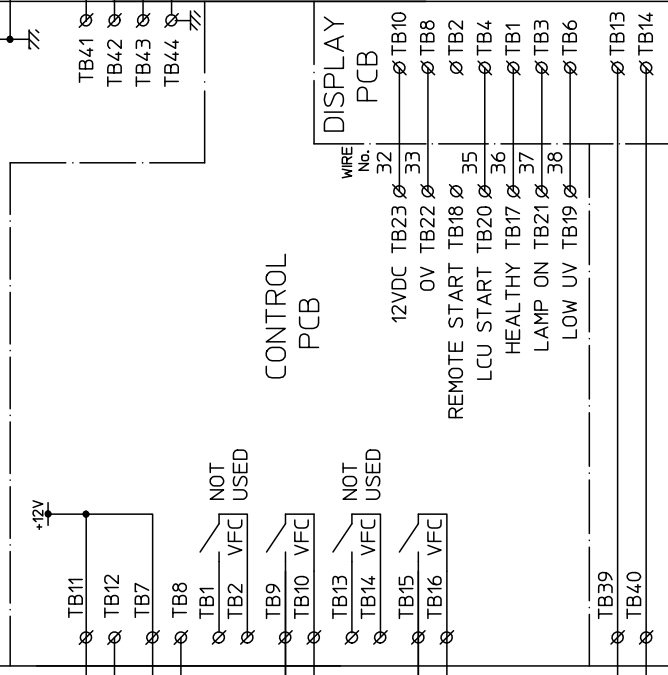
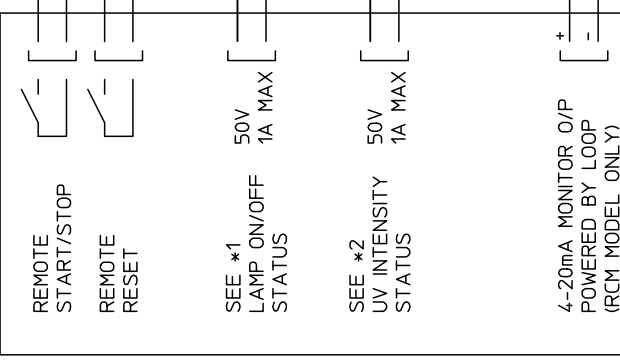
IF IN DOUBT ASK

CABLES BETWEEN THE CONTROL CABINET AND CHAMBER ARE SUPPLIED WITH THE UV SYSTEM

CONTROL CABINET



CUSTOMER INFORMATION



NOTE 1
 ARC TUBE CONNECTION LEAD:- REFER TO INSTALLATION SECTION IN MANUAL.

230V SUPPLY VERSIONS (EXCEPT 0116) ARE COLOUR CODED AND CONNECT TO TB31 TO TB34 TERMINAL BLOCKS IN CONTROL CABINET.

115V SUPPLY VERSIONS AND MODEL-0116 (230V SUPPLY) THE CORES ARE NUMBERED AND CONNECT DIRECTLY TO THE BALLAST. (CABLE SCREEN/EARTH IS NOT CONNECTED).

CIRCUIT IS SHOWN FOR LOCAL START. FOR REMOTE START OPERATION WIRE NO 35 CONNECTED BETWEEN TB20 (CONTROL) AND TB4 (DISPLAY) IS TO BE MOVED TO TB18 (CONTROL) AND TB2 (DISPLAY).

REMOTE/LOCAL OPERATION SELECTION, REFER TO THE MANUAL.

*1. LAMP ON/OFF CONTACT CLOSED = LAMP ON OPEN = FAULT

*2. UV HEALTHY CONTACT CLOSED = HEALTHY OPEN = LOW UV (RCM MODEL ONLY)

CABLES BETWEEN THE CONTROL CABINET AND ANY CUSTOMER CONTROL DEVICE (I.E. SCADA OR PLC) IS TO BE SUPPLIED BY THE CUSTOMER IF REQUIRED

03	ISSUE	MOD. OR AMENDMENT	DATE
	DRAWN	N.C.	22/12/2008
	CHECKED	N.C.	APPRD. N.C.
CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS			
DIMENSIONS IN mm			
TOLERANCES (UNLESS OTHERWISE STATED)			
HOLE DIMENSIONS			
WHOLE NOS	+0.5mm	OVER 12mm DIA	+0.5mm
1 DEC PLACES	+0.3mm	6 TO 12mm DIA	+0.3mm
2 DEC PLACES	+0.15mm	UP TO 6mm DIA	+0.15mm
ANGLES UP TO 6mm DIA +0.5mm			
SURFACE FINISH 16µm RA (✓) UNLESS OTHERWISE STATED			

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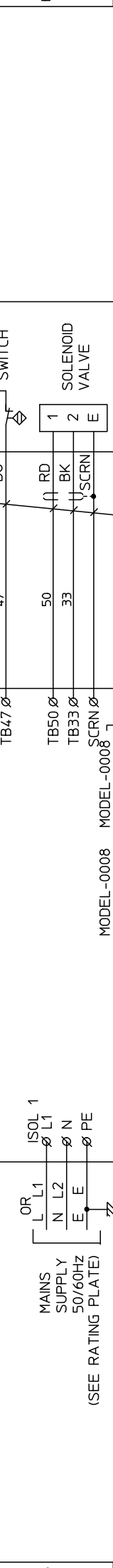
INSP.	
SCALE	1:1
MATERIAL	
PR. SPEC	
FINISH	

TITLE:-	
SITE WIRING DIAGRAM	
AF3 UV SYSTEM	
BASED ON	
AF3 40-500W RCM UNWIPE	
DRG NO	
210073-XXXX-03	

LAYERS		1-4-54	
ON	CHECK CODE	1	4
SUB TITLE		AF3 40-500W RCM UNWIPE	
PART No		210073-0003-ISS	

IF IN DOUBT ASK CABLES BETWEEN THE CONTROL CABINET AND CHAMBER ARE SUPPLIED WITH THE UV SYSTEM

THE CONTROL CABINET WILL BE CONFIGURED FOR CUSTOMERS MAINS SUPPLY REQUIREMENTS. PLEASE CHECK THAT THE INFORMATION ON THE CABINET RATING PLATE CONFORMS WITH YOUR LOCAL SUPPLY BEFORE WIRING IN THE MAINS CABLE.



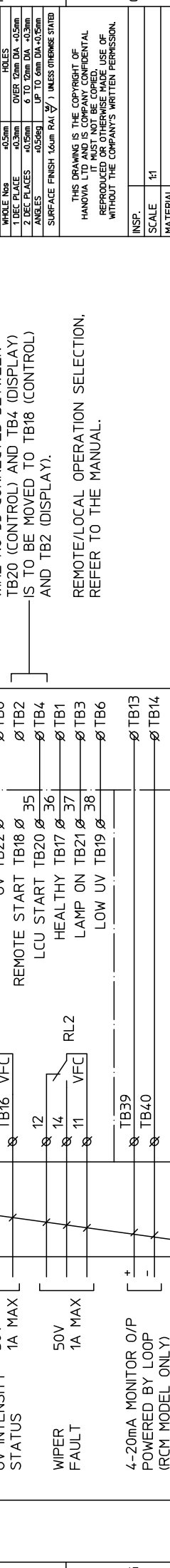
NOTE 1:
ARC TUBE CONNECTION LEAD:-
REFER TO INSTALLATION SECTION IN MANUAL.

230V SUPPLY VERSIONS (EXCEPT 0116) ARE COLOUR CODED AND CONNECT TO TB31 TO TB34 TERMINAL BLOCKS IN CONTROL CABINET.

115V SUPPLY VERSIONS AND MODEL-0116 (230V SUPPLY) THE CORES ARE NUMBERED AND CONNECT DIRECTLY TO THE BALLAST. (CABLE SCREEN/EARTH IS NOT CONNECTED).

CIRCUIT IS SHOWN FOR LOCAL START. FOR REMOTE START OPERATION WIRE NO 35 CONNECTED BETWEEN TB20 (CONTROL) AND TB4 (DISPLAY) IS TO BE MOVED TO TB18 (CONTROL) AND TB2 (DISPLAY).

REMOTE/LOCAL OPERATION SELECTION, REFER TO THE MANUAL.



CABLES BETWEEN THE CONTROL CABINET AND ANY CUSTOMER CONTROL DEVICE (I.E. SCADA OR PLC) IS TO BE SUPPLIED BY THE CUSTOMER IF REQUIRED

CUSTOMER INFORMATION

REMOTE START/STOP

REMOTE RESET

SEE *1 LAMP ON/OFF STATUS

SEE *2 UV INTENSITY STATUS

WIPER FAULT

4-20mA MONITOR O/P POWERED BY LOOP (RCM MODEL ONLY)

*1. LAMP ON/OFF CONTACT CLOSED = LAMP ON OPEN = FAULT

*2. UV HEALTHY CONTACT CLOSED = HEALTHY OPEN = LOW UV (RCM MODEL ONLY)

ISSUE	MOD. OR AMENDMENT	DATE
03		22/12/2008

DRAWN	N.C.	DATE	22/12/2008
CHECKED	N.C.	APPROD	N.C.

CLEAN & DEGREASE ALL UNTREATED MACHINED METALLIC PARTS DIMENSIONS IN (mm)

WHOLE NOS	TOLERANCES (UNLESS OTHERWISE STATED)
1 DEC PLACES	OVER 12mm DIA +0.5mm HOLES
2 DEC PLACES	6 TO 12mm DIA +0.3mm
ANGLES	UP TO 6mm DIA +0.5mm
	SURFACE FINISH 16µm RAI (✓) UNLESS OTHERWISE STATED

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INSP.	SCALE	1:1
MATERIAL		
PR. SPEC		
FINISH		

TITLE:-
SITE WIRING DIAGRAM
AF3 UV SYSTEM

BASED ON	WIPED
DRG NO	210073-XXXX-03

LAYERS	1-5-56
CHECK CODE	1 5 56
SUB TITLE	AF3 80-500W RCM/RCM
PART No	210073-0004-ISS

**Appendix B.
Certificate of Conformity**

Hanovia
U V B Y D E S I G N



FM 29365

DECLARATION OF CONFORMITY

We: -

HANOVIA LTD

780 Buckingham Avenue
SLOUGH
Berkshire SL1 4LA

Declare under our sole responsibility that the product:-

Water Steriliser Model – AF3 Series (270W Max)

To which this declaration relates are in conformity with the following standards or other normative documents

EN61000-3-2 : 2000
EN61000-3-3 : 1995 + A1: 2001
EN61000-6-2 : 2001
EN61000-6-4 : 2001

Following the provisions of :-

The Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EEC.

Signed by:

A handwritten signature in black ink, appearing to read 'John Ryan', written over a light blue horizontal line.

Name: John Ryan
Position: Managing Director
Done at: Slough
Dated: 1st May 2009



FM 29365

DECLARATION OF CONFORMITY

We: -

HANOVIA LTD

780 Buckingham Avenue
SLOUGH
Berkshire SL1 4LA

Declare under our sole responsibility that the product:-

Water Steriliser Model – AF3 Series (500W)

To which this declaration relates are in conformity with the following standards or other normative documents

EN61000-6-2 : 2005
EN61000-6-4 : 2007
EN61000-3-2 : 2000 + A2 : 2005
EN61000-3-3 : 1995 + A1 : 2001 + A2 : 2005

Following the provisions of :-


The Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EEC.

Signed by:

A handwritten signature in black ink, appearing to read "John Ryan".

Name: John Ryan
Position: Managing Director
Done at: Slough
Dated: 1st May 2009

Appendix D.
Acceptance test Record

		ACCEPTANCE TEST RECORD	
		AF3 Electron UV Disinfection system. SOP No	
Description		Monitor Serial No	
Customer		UV lamp Serial No	
End User (If known)		Chamber Serial No	
Software Version		Cabinet Serial No	
Electrical Settings		Function Checks	
Primary Circuit breaker (CB1,)		6A	
		Lamp On / Fail VFC	<input type="checkbox"/>
Earth continuity checks In milliohms (Max 100 milliohms)	Door	mΩ	Low UV VFC operation <input type="checkbox"/>
	Cabinet	mΩ	Low UV delay (sec) <input type="checkbox"/>
	Mounting Plate	mΩ	Alarm Reset. <input type="checkbox"/>
	Gland Plate	mΩ	
	Ballast Box	mΩ	Remote Start VFC (may not be enabled) <input type="checkbox"/>
	Fan body	mΩ	Remote Reset VFC. <input type="checkbox"/>
Megger Check Supply Wiring @ 500V DC		MΩ	
Supply volts at customer terminals		V 50 Hz	Hours Counter reset. <input type="checkbox"/>
PCB Volts	+12V	V	
	+5V	V	Wiper Fault VFC <input type="checkbox"/>
Measure when UV lamp is at full power (after 10min)	Supply Current	A	4-20mA Output <input type="checkbox"/>
			Chamber O/T <input type="checkbox"/>
Options enabled		Chamber Pressure Test (Bar)	
Monitor	<input type="checkbox"/>	Max Working Pressure	7 Bar
Remote Start	<input type="checkbox"/>	Test Pressure	10 Bar
Parameter settings			
Low UV.		%	
Wiper Interval			
Comments / Notes (Other special functions)			
Tested By		Stamp	Date