



SUBZERO 055/085

**SHUTTERED/UN-SHUTTERED LAMPS
MANUAL/NON MANUAL CONTROL**

ELECTRONIC TOWER PSU

**OPERATING & MAINTENANCE
MANUAL**

M102

V 5.1

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SubZero 055/085 Electronic Operating & Maintenance Manual

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WARNING: Safety / Terms and Conditions of Use

Read this manual before using the UV system

Electrical - PSU:

- ◆ There are no user-serviceable parts in the PSU.
- ◆ CAUTION: To reduce the risk of fire, or electric shock, connect the unit to a receptacle wired for 208Vac in USA, 250Vac in Europe, or correctly rated for use in specific country.
- ◆ This is a non-user serviceable configuration.
- ◆ The system must be shut down in the correct sequence to prevent impairing the lamp heads. The mains on/off switch should not switch off the UV lamp. Switching off by removing power may cause the lamps to overheat, causing permanent damage.
- ◆ It must be possible to electrically isolate the Mains power
- ◆ Refer to country-specific wiring regulations for the power inlet lead. Lead must comply with IEC60083, or other country specific wiring regulations.
- ◆ Do not occlude the vents at the front of the PSU, or at the back of the unit. Unimpeded airflow is essential for safe operation.
- ◆ Lamp cables must be fitted to the PSU. Cables form first level safety against high voltage hazards.
- ◆ The socket outlet shall be installed near the equipment & shall be easily accessible

Electrical - Lamps:

- ◆ There are no user-serviceable parts in the lamp heads. Only the lamp cartridge and filter mesh is user replaceable and only when the unit is not in operation.
- ◆ This unit must not be used until it is installed within a system of light shielding and air extraction, or sufficient ventilation.
- ◆ Do not block the vents around the lamp heads. Good air flow is essential for safe operation.
- ◆ Due to lamp case high temperatures, the lamp heads must be shielded from touch.
- ◆ The lamps should not be accessible to touch during operation.

Ultra-violet Radiation Emitting From the Lamps:

- ◆ Never look directly at a UV light source.
- ◆ UV light emitted from this system must be shielded from eyes and skin.
- ◆ Use UV radiation eye and skin protection during servicing.

General:

- ◆ Before conducting any maintenance work on the UV system, it must be isolated from the electrical supply and must have had ample cooling time following being switched off.
- ◆ Use only genuine Integration Technology components.
- ◆ This UV lamp head produces ozone. The system must be ventilated so as not to allow an ozone concentration of more than 0.1 PPM.
- ◆ This is a Class A electronic system. Suitable for commercial and industrial environments. It is not suitable for domestic environments.
- ◆ For Open Chassis Units, consult with Integration Technology for EMC compliance.

1. Contact Information

For spares, service or sales please contact **Integration Technology Limited**, or one of our authorised distributors.

**Integration Technology Ltd.
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Contact details of our authorised distributors and information on our full range of products can be found at the website address:

www.uvintegration.com

2. Model Information

The following table shows SubZero models by options covered by this manual:

Model	Description	Lamp Power levels
SubZero 085 E	Un-shuttered Electronic Single 85mm lamp, with no manual controls - remote interface only on PSU	40 - 100W/cm
SubZero 085 ES	Shuttered Electronic Single 85mm lamp, with no manual controls - remote interface only on PSU	40 - 100W/cm
SubZero 085 EM	Un-shuttered Electronic Single 85mm lamp, with manual controls & remote interface on PSU	40 - 100W/cm
SubZero 055 ESM	Shuttered Electronic Single 55mm lamp, with manual controls & remote interface on PSU	40 - 100W/cm
SubZero 085 ESM	Shuttered Electronic Single 85mm lamp, with manual controls & remote interface on PSU	40 - 100W/cm
SubZero 055 EST	Shuttered Electronic Dual 55mm lamps, with no manual controls - remote interface only on PSU	40 - 100W/cm
SubZero 085 EST	Shuttered Electronic Dual 85mm lamps, with no manual controls - remote interface only on PSU	40 - 100W/cm

3. Rating Information & Lamp Details

Singles

SubZero 055 ESM:

Voltage: 208 to 230Vac, 50 to 60Hz
Current: 6A

SubZero 085 E:
SubZero 085 ES:
SubZero 085 EM:
SubZero 085 ESM:

Voltage: 208 to 230Vac, 50 to 60Hz
Current: 6A

Twins

SubZero 055 EST:
SubZero 085 EST:

Voltage: 208 to 230Vac, 50 to 60Hz
Current: 10A

SubZero 085 T:
SubZero 085 ST:
SubZero 085 TM:

Voltage: 208 to 230Vac, 50 to 60Hz
Current: 10A

UV Lamp Details:

Arc Length: 55mm or 85mm
Focal Length: Typically 5mm from bottom of UV lamp head face
UV rating: 40 to 100W/cm

Weights:

055 Lamp head

0.725 Kg	Non-shuttered lamp head.
1.31 Kg	Shuttered lamp head.

085 Lamp head

0.875 Kg	Non-shuttered lamp head.
1.5 Kg	Shuttered lamp head.

9Kg	Single power supply.
14.6Kg	Dual power supply.

4. General Description

The SubZero 055/085 Electronic Unit comprises of single or dual UV (mercury arc or halide doped) lamps and a power supply together with a Standard 2m Power lead (Other lengths are available) & 1 or 2 Lamp Looms (Length to be specified by customer)

4.1. Power Supply

The Electronic Power Supply provides the electrical power and control circuitry necessary for lamp operation. Depending on which model the unit is, the following components exist:

- ◆ High voltage igniters
- ◆ Electronic Ballast Units
- ◆ Fuses
- ◆ Cooling fans
- ◆ Remote control interface
- ◆ Terminals
- ◆ Control Switches (If Manual Control)
- ◆ Mains IEC Socket with rocker switch (Mains On/Off)
- ◆ Front Indicator Lights (If Manual Control)
- ◆ Rear Mains on Indicator
- ◆ Lamp head Output Connector(s)



Figure 1: Typical Single Electronic PSU Rear View

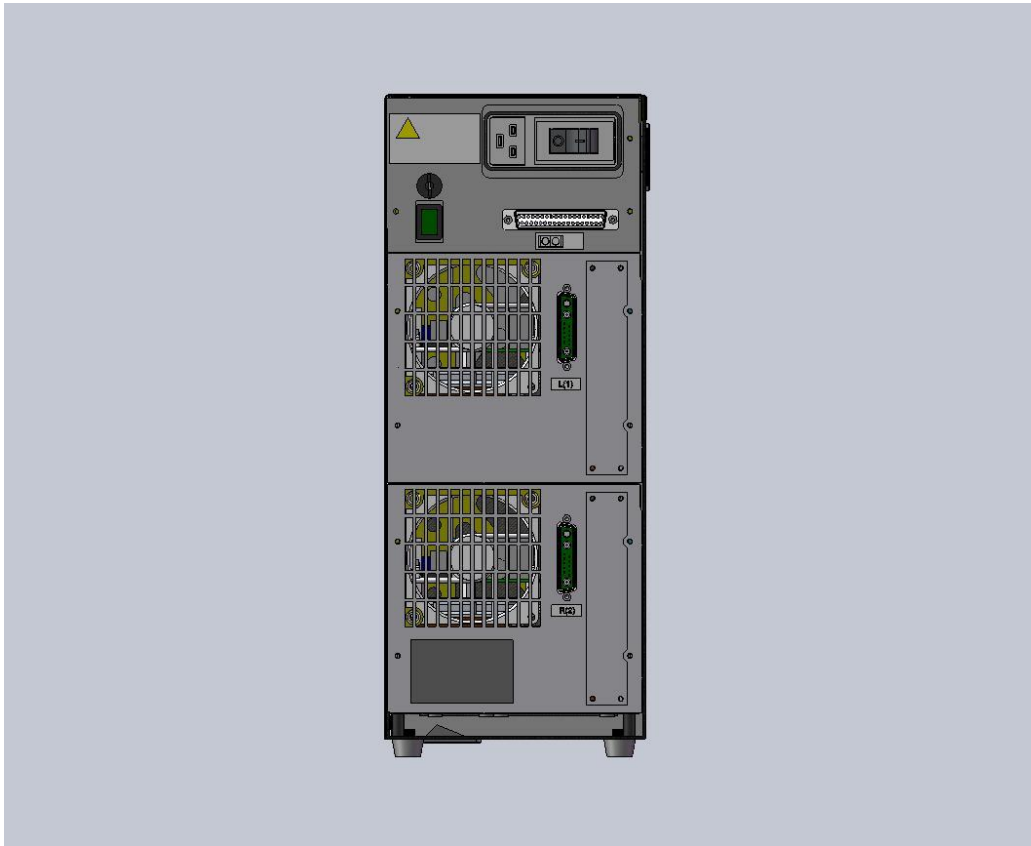


Figure 2: Typical Twin Electronic PSU Rear View

4.2. Power Levels available

055 Units The Std 055 PSU has 4 output levels

Power %		Watts	
40%	=	225W	40W/cm
65%	=	358W	65W/cm
80%	=	440W	80W/cm
100%	=	550W	100W/cm

085 Units The Std 085 PSU has 6 output levels

Power %		Watts	
40%	=	340W	40W/cm
50%	=	425W	50W/cm
60%	=	510W	60W/cm
70%	=	595W	70W/cm
85%	=	680W	85W/cm
100%	=	850W	100W/cm

Special 085 Unit The Special 085 PSU has 3 output levels

Power %		Watts	
40%	=	340W	40W/cm
60%	=	510W	60W/cm
100%	=	850W	100W/cm

4.3. Lamphead

The lamp head contains the following components:

- ◆ UV mercury arc or halide doped lamp
- ◆ Cooling fan(s)
- ◆ Overheat sensor
- ◆ Optional Shutter mechanism (bolt-on)
- ◆ Lamp Loom Connector
- ◆ Mother Board PCB
- ◆ Brake Board CB (If Shuttered)



Typical Un-shuttered Lamp

Typical Shuttered Lamp

Figure 3

The SubZero UV lamp head can be mounted by means of 2x M4 mounting holes in the side of the UV lamp head, or if shuttered then in the side of the bolt on shutter as shown below. On Piezo inkjet applications, or other heat sensitive applications, it is advisable to provide a heat insulation layer between the lamp heads and the print head carrier.

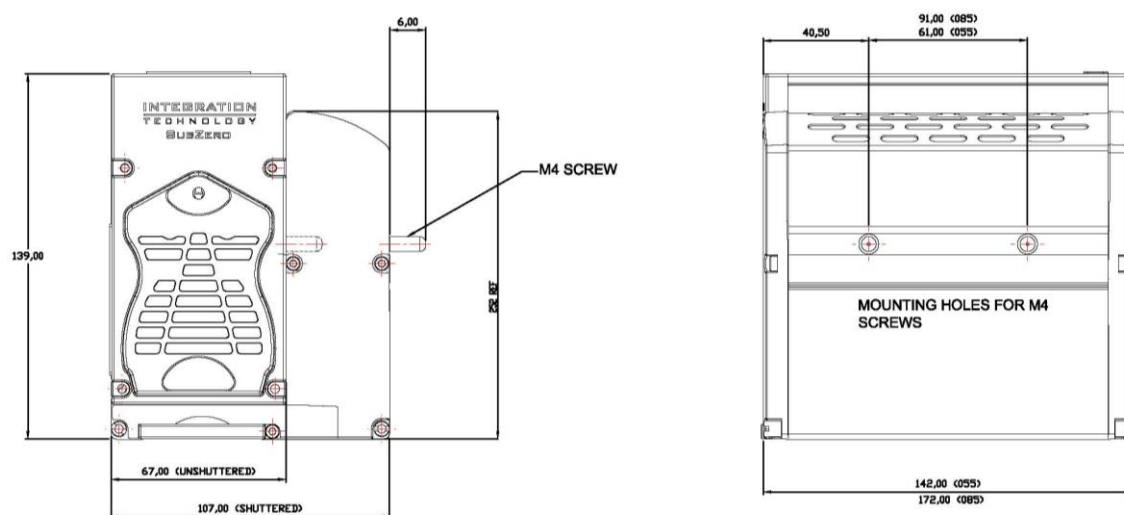
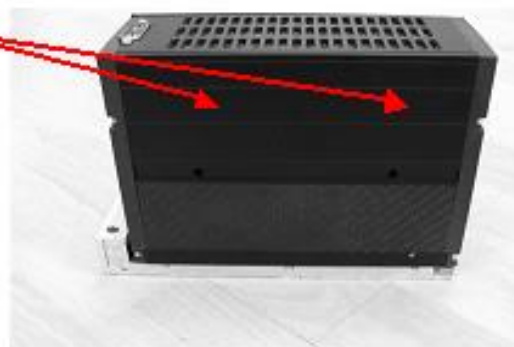


Figure 4: Lamphead Dimensions

The UV output must be completely shielded from eyes and skin. For applications requiring a high focal intensity, substrate should be passed under the UV lamp head at a distance of 5-7mm from the quartz window. For applications requiring a flood pattern, the substrate can be passed under the UV lamp head at a distance greater than 5mm. Alternatively the UV lamp head can be defocused by installing a “Defocusing

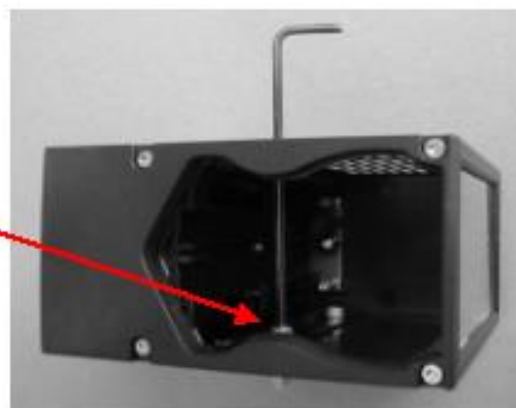
Kit" available from Integration Technology. Specific attention should be given to shielding light visible through cooling vents. Typically these are protected via external machine covers. Contact Integration Technology for advice on UV shielding.

Mounting the shutter is with the M4 screws protruding from the side of the body as shown



These can be reached by removing the cartridge from the side of the shutter then access through the appropriate holes.

M4 Screw with protective cap, & Retaining washer.



Remove cassette then, insert Allen wrench here to reach mounting screw.

Figure 5: Mounting the Lamphead

5. Usage & Installation

5.1. Connecting the Lamp to the PSU

The lamp loom will be between 3m and 10m in length (Customer specific) & connects the lamp head to the PSU. The connector each end is a 13W3 D Type. This cable is a high flexible type especially for Drag Chain use. Lamp looms longer than 10m are available but may affect the performance of the unit due to Voltage drop over the distance

The UV lamp head should not be used until it has been incorporated into a system with light shielding and were necessary, air extraction. UV light must be shielded from eyes and skin.

The UV lamp head is cooled by an internal fan. However the lamp head generates both heat and ozone. Ozone and heat build up around the UV lamp head must be removed by means of air extraction system, or adequate ventilation

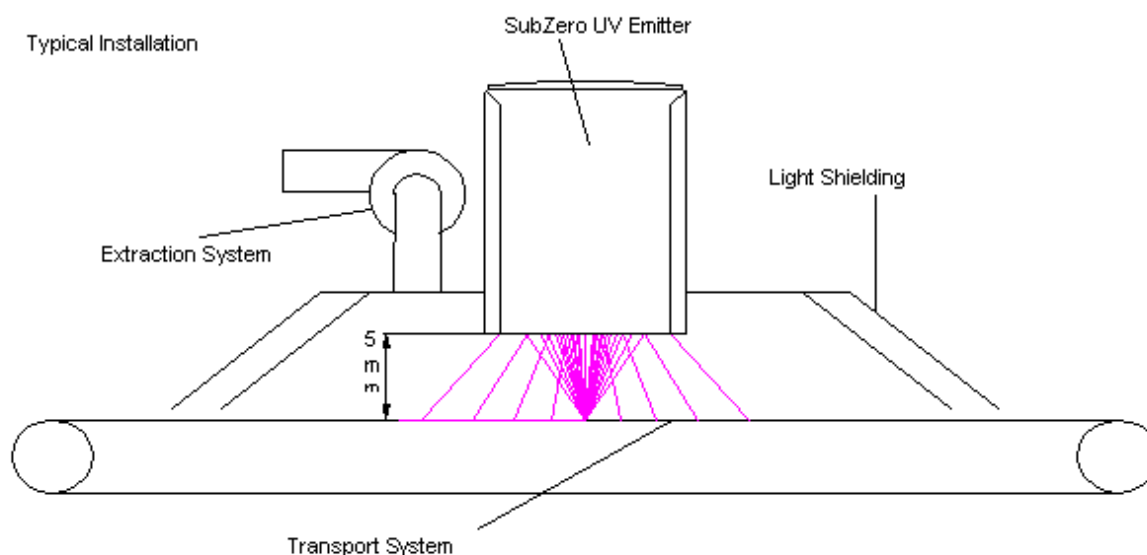


Figure 6: Typical Installation

The power supply also generates heat and must be located where there is adequate ventilation. The fan outlet on the rear of the power supply should not be constricted or blocked.

5.2. Usage with conveyor systems

The item to be cured is passed beneath the UV lamp head by means of a transport system. (See Fig 1)

5.3. Traversing Inkjet Systems

Alternatively the lamp can be traversed over a stationary substrate as in an inkjet printer. For mono-directional printing, one lamp can be attached to the side of the print head (Fig 2). For bi-directional printing a lamp either side of the print head is recommended for best results (Fig 3).

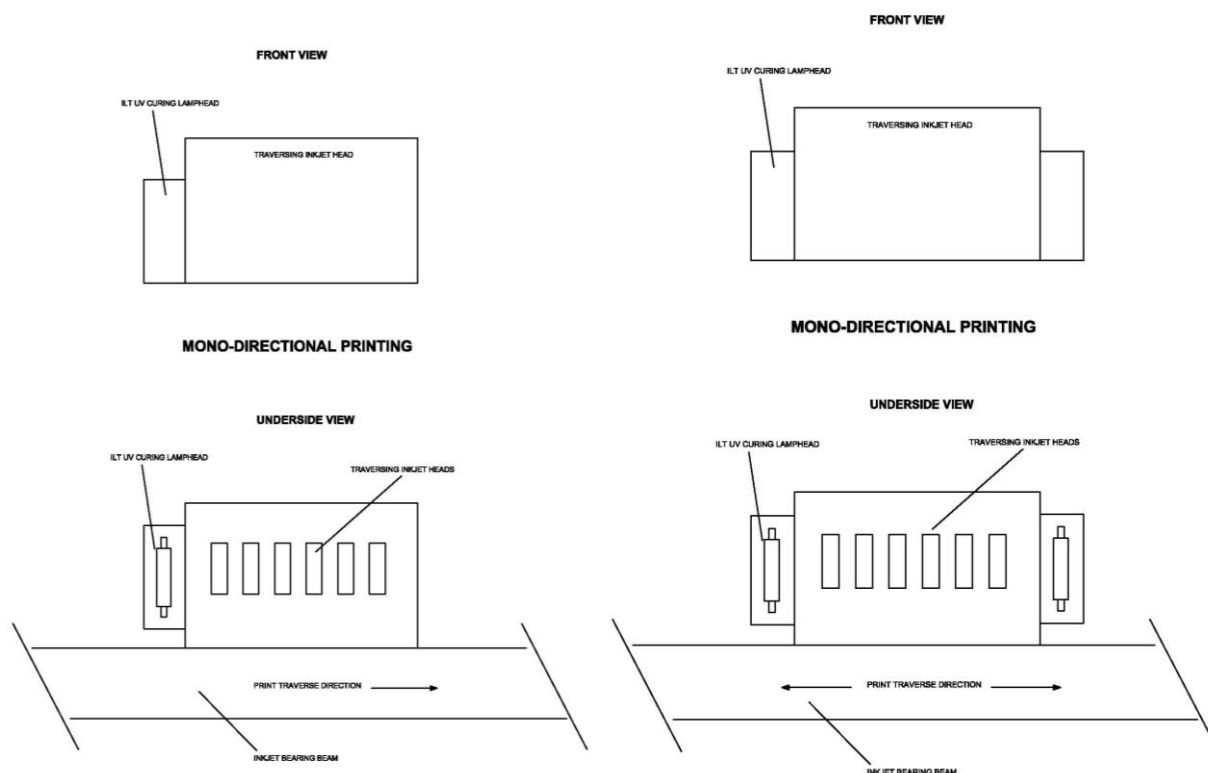


Figure 7: Traversing Inkjet Systems

6. Manual Control Operation

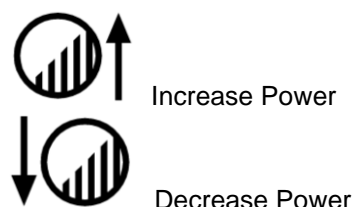
6.1. Start Up

Install and connect the system as described in earlier section. Ensure that the light shielding and extraction systems as required, are operational. The extraction system must be activated prior to switching on the lamps.

Closing the Mains “On/Off” Switch on the rear of the power supply activates the system. The blue “Mains On” light will illuminate on the Front panel. At this point the cooling fan on the UV power supply will start.

6.2. Local Button operation (If applicable)

Note: - If a remote control unit is plugged into the rear of the unit and a remote input signal is present. The Increase and Decrease buttons will be disabled. The red off button will remain active.



Pushbuttons

There are 3 or 4 pushbuttons on the front of the unit

OFF (Red)

ON/Power Down (Black)

Power Up (Black)

Shutter (Black If Fitted)

6.3. Burn In

Pressing the ON/Power Down button will turn the unit on. This will begin the burn in process: (the PLC (internal control of the PSU) makes sure that the lamp burns with full power). The shutter remains closed and the power level of the lamp cannot be changed. This process takes roughly a minute and once the lamp has burnt in, the UV Ready signal is activated.

6.4. Normal Operation

Once the burn in process has completed, pressing the Power Up button will increase the power to the next level, this will happen every time the power up button is activated until the highest level is reached

Electronic Systems will have a maximum of 4 levels (055 Units) or 6 levels (085 Units). A table of Power Levels is shown in Section 8.

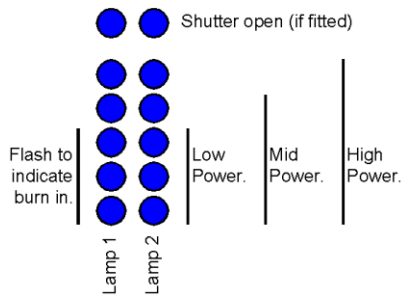
Note: - If Shutters are fitted; they need to be open in order to increase the power from the 1st level

For Shuttered Units

Pressing the shutter button will open the shutters and pressing it again will close the shutters

This button will only function when the lamps have “burnt in”.

6.5. LEDs



There are six LEDs per lamp to indicate power levels & shutter position.
The top one is to show shutter position – On = Open, Off = Closed.

The bottom 5 LEDs work as follows for normal operation for a 055 Lamp System

Flashing 1Hz
Flashing 1Hz
Flashing 1Hz >>>>> Indicating Burn In
Flashing 1Hz
Flashing 1Hz

Off
Off
On >>>>> Power Level 40%
On
On

Off
On
On >>>>> Power Level 65%
On
On

Flashing 1 Hz
On
On >>>>> Power Level 80%
On
On

On
On
On >>>>> Power Level 100%
On
On

They will all flash at 4Hz if there is a fault
The bottom 3 flash at 1s on and 0.1s off during re-strike suppression mode

The bottom 5 LEDs work as follows for normal operation for a 085 Lamp System

Flashing 1Hz
 Flashing 1Hz
 Flashing 1Hz >>>>> Indicating Burn In
 Flashing 1Hz
 Flashing 1Hz

Off
 Flashing ½ Hz
 On >>>>> Power Level 40%
 On
 On

Off
 Flashing 1 Hz
 On >>>>> Power Level 50%
 On
 On

Off
 On
 On >>>>> Power Level 60%
 On
 On

Flashing 1/2 Hz
 On
 On >>>>> Power Level 70%
 On
 On

Flashing 1 Hz
 On
 On >>>>> Power Level 85%
 On
 On

On
 On
 On >>>>> Power Level 100%
 On
 On

They will all flash at 4Hz if there is a fault

The bottom 3 flash at 1s on and 0.1s off during re-strike suppression mode

6.6. Fault

In case a high signal from Overheat or Interlock is detected, a fault is said to have occurred. In that case a fault flag is set, and the lamp power is disabled immediately.

6.7. Re-Strike Suppression

When a lamp turns off after operation, it is at a very high temperature. To strike again, it needs to get back to a lower temperature. If the ballast is powered in high power, it may not strike the lamp, causing damage to the power supply.

As a result a re-strike suppression mechanism is introduced. It makes sure that the ballast is not powered for 5 minutes after the lamp has been turned off, the lamp fans are kept on during this period to aid cooling. After this time has elapsed the lamp will be at a suitable temperature to be struck again.

6.8. Cool Down

After the lamp has been turned off, fans are kept running for five minutes. This is to make sure that the lamp comes back to ambient temperature after operation.

During the cool down cycle the lamp fans:

0.00 – 0.15 min	Remain On
0.15 – 3.00 min	Pulse for 0.15 seconds every 2.5 seconds
3.00 – 5.00 min	Remain On

7. Remote Operation

Some models are configured for remote control operation only (No Manual Control Pushbuttons on front of unit). Control of these systems will be via a host system.

The connector is a female 37 Way D Type on the rear of the PSU unit

An auxiliary remote control system can also be provided to replicate signals from the host system. This is available as an option.

7.1. 37 Way D-Sub Pin Assignments

The following is the pin out Assignment for the remote interface found at the back of the PSU assembly.

1. 24V Supply
2. UV Ready
3. Lamp 1 Fault
4. *Spare*
5. Lamp 1 Isolator
6. Lamp 2 Isolator
7. Lamp 1 Power Bit 1
8. Lamp 2 Power Bit 1
9. 0 V
10. *Spare*
11. Lamp 1 Shutter Open
12. Lamp 2 Fault
13. Lamp 2 Shutter Open
14. Host 0V/24V DC
15. *Spare*
16. Remote Enable (when LOW)
17. *Spare*
18. *Spare*
19. Lamp 1 Power Bit 0
20. *Spare*
21. *Spare*
22. Lamp 2 Power Bit 0
23. *Spare*
24. *Spare*
25. *Spare*
26. *Spare*
27. *Spare*
28. Lamp 1 Shutter Open
29. Lamp 1 Shutter Closed
30. Lamp 2 Shutter Open
31. Lamp 2 Shutter Closed
32. *Spare*
33. *Spare*
34. *Spare*
35. Lamp 1 Power Bit 2
36. Lamp 2 Power Bit 2
37. *Spare*

7.2. 37 Way D-Sub Pin Descriptions

7.2.1. Inputs

Lamp 1 Isolator & Lamp 2 Isolator

This basically controls a relay that activates, or isolates, the ballast that provide power to the lamp. Hence this is a safe way of controlling power going into the lamp. A high signal closes the relay, hence allowing current to flow through to the ballast. A low signal opens it up, hence disabling them.

In simple terms, this turns the system ON or OFF.

Lamp 1 Power Bits 0/1/2 and Lamp 2 Power Bits 0/1/2

The output power of the lamp is controlled via power bits. The power bits are used in combination to give certain levels of output from the lamp. They are explained further in the working of the lamp.

Lamp 1 Shutter Open and Lamp 2 Shutter Open

This input can be used to open the shutter of the respective lamp. Taking away the signal means the shutter is closed automatically.

7.2.2. Outputs

Lamp 1 Fault & Lamp 2 Fault

If a fault is detected in the system, like overheating, or interlock error (the lamp not properly connected or a cable being loose), a fault signal for the respective lamp is detected on these outputs.

UV Ready

This signal indicates that the system is ready to perform normal operation. A UV Lamp takes certain time to warm up and be ready for curing. For a SubZero 085 EST, this time is typically one minute. If a single lamp is being operated, the signal indicates that the particular lamp is ready, and if both of them are being operated, it waits till both of them are ready for the curing process.

Lamp 1 Shutter Open Feedback and Lamp 2 Shutter Open Feedback

This indicates that the shutter on the particular lamp head is in the open position.

Lamp 1 Shutter Closed Feedback and Lamp 2 Shutter Closed Feedback

This indicates that the shutter on the particular lamp head is in the closed position.

7.3. Start Up

Install and connect the system as described in earlier section. Ensure that the light shielding and extraction systems as required, are operational. The extraction system must be activated prior to switching on the lamps.

Closing the Mains “On/Off” Switch on the rear of the power supply activates the system. The “Mains On” light will illuminate on the Front panel. At this point the cooling fan on the UV power supply will start.

7.4. Burn In

During the burn in process, the PLC makes sure that the lamp burns with full power. The shutter remains closed and the customer cannot change the power level. This process takes roughly a minute and once the lamp has burnt in, the UV Ready signal is activated.

7.5. Normal Operation

After the UV Ready signal is detected, the lamp is ready for normal operation. The lamp fans come on and the shutter (if applicable) can now be operated, by providing the Shutter Open signal. The power levels can also be adjusted. See Section 8 for more information.

Note: - If Shutters are fitted; they need to be open in order to increase the power from the 1st level

7.6. Fault

In case a high signal from Overheat or Interlock is detected, a fault is said to have occurred. In that case a fault flag is set, and the lamp power is disabled immediately.

7.7. Re-Strike Suppression

When a lamp turns off after operation, it is at a very high temperature. To strike again, it needs to get back to a lower temperature. If the ballast is powered in high power, it may not strike the lamp, causing damage to the power supply.

As a result a re-strike suppression mechanism is introduced. It makes sure that the ballast is not powered for 5 minutes after the lamp has been turned off, the lamp fans are kept on during this period to aid cooling. After this time has elapsed the lamp will be at a suitable temperature to be struck again.

7.8. Cool Down

After the lamp has been turned off, fans are kept running for five minutes. This is to make sure that the lamp comes back to ambient temperature after operation.

During the cool down cycle the lamp fans:

0.00 – 0.15 min	Remain On
0.15 – 3.00 min	Pulse for 0.15 seconds every 2.5 seconds
3.00 – 5.00 min	Remain On

8. Power Bit Settings

The output power of the lamp is determined by the combination set on the 3 Power Bit signals. The 055 systems have 4 discrete power levels, and an 085 system has 6 discrete power levels, these can be seen in table 1 and 2 respectfully below.

055 BALLAST POWER BIT SETTINGS				
POWER BIT 2	POWER BIT 1	POWER BIT 0	POWER %	COMMENTS
0	0	0	0	DO NOT USE
0	0	1	26	DO NOT USE
0	1	1	40	LOWEST WORKING LEVEL FOR 055
0	1	0	65	WORKING LEVEL FOR 055
1	1	0	80	WORKING LEVEL FOR 055
1	1	1	100	WORKING LEVEL FOR 055
1	0	1	120	DO NOT USE - LAMP MAY OVERHEAT
1	0	0	140	DO NOT USE - LAMP MAY OVERHEAT

Table 1 – 055 Power Outputs

085 BALLAST POWER BIT SETTINGS				
POWER BIT 2	POWER BIT 1	POWER BIT 0	POWER %	COMMENTS
0	0	0	0	DO NOT USE
0	0	1	26	DO NOT USE
0	1	1	40	LOWEST WORKING LEVEL FOR 085
0	1	0	50	WORKING LEVEL FOR 085
1	1	0	60	WORKING LEVEL FOR 085
1	1	1	70	WORKING LEVEL FOR 085
1	0	1	85	WORKING LEVEL FOR 085
1	0	0	100	WORKING LEVEL FOR 085

Table 2 – 085 Power Outputs

Special units are available on request where only specific levels are used
Consult **Integration Technology Ltd** for details

9. Shut down

The system must be shut down in the following sequence:

The UV lamp head must be switched off using the UV Lamp Off Switch (Manual Control) or a signal from the remote Host via 37W rear connector

As the UV lamp head is switched off using the UV Lamp Off Switch, the UV lamp will be shut down and the indicator lights will be switched off.

The cooling fans will continue to operate in order to cool the lamp and power supply.

The lamp must be left to cool under the operation of the cooling fan and the extraction system for at least five minutes after the UV lamp head has been switch off.

WARNING

The mains on/off switch must never switch off the UV lamp. This can overheat the lamp causing permanent damage.

The extraction system must never be switched off before the UV lamp is switched off.

10. Shutters (If Fitted)

Certain models are available with slide plate shutters. These units slide a reflective plate beneath the lamp head to prevent significant light from exiting the front of the housing.

Shutter units are designed to work in conjunction with inkjet printing systems where it is desirable to reduce the light exiting the lamp head at the end of shuttle travel or during print change over. Primarily they are designed to reduce the reflected light available to cure residual ink on print heads.

Shutter units are **not** completely light proof.

Typical operation time of a slide plate shutter is 170ms open – closed or closed - open.

Units that are supplied with shutters have an additional cooling system for dissipating shutter blade heat. This heat exits the front and rear of the shutter housing.

Shutters are controlled by pulsing a run signal (100ms) to the shutter. The shutter will run until the next rest position is achieved. A 24V signal from 1 of 2 positional sensors detects open or closed.

Shutters require the 24V supply to the lamp head fans to be high, when movement is required. Should the shutter position require changing during “burn in”, it is acceptable to activate the lamp head fans for a short duration (typical < 5s).

It is mandatory that lamp power be reduced to the lowest power level when the shutter is closed.

This is typically 40W/cm.

The lamp head is normally run in high power with closed shutter for the “burn in” period (initial 60s) only. After which the lamp is returned to the lowest level and the cooling fans started.



Figure 8: View showing Underside of 085 Shuttered Lamp head

NOTE: Leaving the lamp head in full power with the shutter closed may permanently damage the shutter and or lamp head and will void warranty.

11. System/Emergency Stop

The normal stop procedure is to press the red button for the respective lamp, on the front of the unit (Manual Control) or a signal from Remote Host Connector.

The system will then enter a three-minute cool down process. All activity is inhibited whilst the fans in the lamp head operate at full power. The fan in the PSU will continue to operate.

If the power supply has been subjected to an emergency stop situation, i.e. the power has been suddenly removed from the unit. It is possible that the lamp heads will be extremely hot. The internal controller will be reset as the result of the power loss, and hence the cooling fans and hot restrike suppression will not be activated. It is essential that the system be left to fully cool for ten minutes. If the unit does not immediately restrike on attempted operation, switch off immediately and leave for a further two minutes. Repeat this until the lamp ignites.

Sudden removal of power and the subsequent uncontrolled shut down causes the lamp to cool down in an uncontrolled manner. This significantly reduces the life of the lamp and lamp housing.

WARNING

It is not recommended that the system be shut down in this manner except in a true emergency situation.

12. Maintenance

WARNING

Before conducting any maintenance work on the UV system, it must be isolated from the electrical supply and must have had ample cooling time following operation.

Other than the pre-operating checks, a qualified service engineer must carry out any maintenance on the UV system. In the case of removing the lamp head casing, removing covers from the power supply or replacing any electrical components or wiring, this work must be carried out by a qualified service engineer.

12.1. Pre-operating Checks

Before each use of the UV system, check that the light shielding is fully effective. Check that the extraction or ventilation system is fully operational and flowing freely.

Perform a visual check of the system to ensure no damage has occurred since the last usage. Check cables for breakdown of insulation.

After switching on the mains power, ensure that the cooling fans in both UV lamp head and power supply are functioning and not blocked.

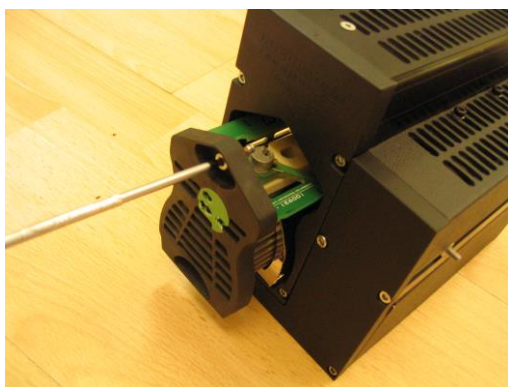
12.2. Weekly Checks

Once per week inspect the lamp and reflector for damage and decay.

12.3. Annual Checks

A full electrical continuity and insulation breakdown test should be performed annually.

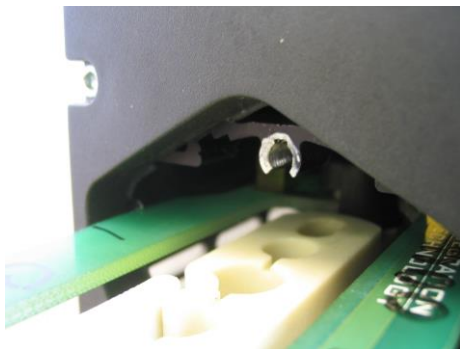
12.4. Removing the Lamp Cartridge



1. Ensure the lamp head is fully cooled.
2. Remove the power lead from the top of the lamp head.
3. Using a 3mm Allen key, remove the M4 screw retaining the cartridge. The cartridge will unwind from the lamp housing.
4. Grasp the sides of the cartridge and remove.
5. If the cartridge remains stiff, insert the short end of the Allen key into the centre of the cartridge vent and twist towards the top (back) of the lamp.
6. Using gentle pressure, pull the cartridge out of the housing.

Figure 9: Removing the Lamp Cartridge

12.5. Replacing the cartridge



1. Wipe the lamp quartz envelope & reflectors with an alcohol wipe.
2. Align the cartridge with the lamp housing.
3. Slide the Cartridge PCB into the aluminium runners.
4. The side opposite to the mounting face is located first.
5. It is essential that the cartridge is located correctly prior to pushing home.
6. The cartridge is pulled in the last 10mm by the retaining screw.

Figure 10: Replacing the Lamp Cartridge

The lamp cartridge is a replaceable part, consisting of lamp envelope, reflector mounting PCB and cover plate. Install a new cartridge, and return the old cartridge to Integration Technology for disposal.

Use cotton gloves when handling a UV lamp. Do not touch the lamp with skin. This can cause permanent damage to the lamp.

12.6. Changing the UV Bulb

Remove the cartridge.

Integration Technology recommends replacement of the entire cartridge assembly

However, the bulb can be changed as follows:

1. Remove the cartridge from the housing.
2. Remove the side reflectors by bending up the retaining tags. This is best achieved by using a small screwdriver. Then sliding out the side reflectors.
3. Release the M3 terminal screws securing the bulb crimps, and remove the bulb.
4. Ensure that the M3 screws are unscrewed sufficiently to provide a full clear bore.
5. Replace the bulb with a new unit. Ensure that the bulb sits firmly against the ceramic backer. And that the bulb crimps are approximately level with the front of the screw terminal. Tighten the M3 terminal screws. Ensure that the screws satisfactorily secure the bulb crimps.
6. Install new side reflectors, and bend the side reflector securing tags.
7. Important:- Use the wipe supplied with the replacement bulb to clean any finger prints or marks from the bulb quartz surface.
8. Replace the cartridge.

Consult with **Integration Technology** for details.

NOTE: UV Lamps contain Mercury and European Community and US Federal and State regulations cover their disposal. Those lamps cannot be thrown out with regular refuse. The end user has dual alternatives for lamp disposal. One is to have a local hazardous waste hauler dispose of the lamps according to local regulations. The other is to send the lamps to a lamp recycler who will remove the mercury from the lamps and separate the components for re-use.

NOTE: Medium pressure mercury arc lamps (UV Lamps) fall under the definition of an "Article" as defined in OSHA's Hazard Communication Standard (29CFR 1910.1200) and are exempted from the MSDS requirement by that standard. Each UV lamp has approximately 10 grams or less of mercury contained inside the glass tube. Under normal conditions, workers handling the UV lamps will never come into contact with the mercury. In case of lamp breakage, the mercury can escape and should be cleaned up with sand or other absorbent material. This material should then be disposed of as hazardous waste.

12.7. Removing the Shutter quartz window

1. Ensure that the System has had adequate time to cool.
2. Remove the quartz retaining end cap and spring, via the M3 screw.

NOTE:

This facility is available at either end of the Lamphead.

3. Slide out the quartz plate from the extrusion.
4. Replace the quartz plate by repeating the above steps in the reverse order.

NOTE:

Use cotton gloves when handling a UV quartz window. Do not touch the window with skin; this can cause permanent damage to the quartz.

The surface of the quartz is very hard and will not scratch easily, however it should be handled with care to avoid damage.

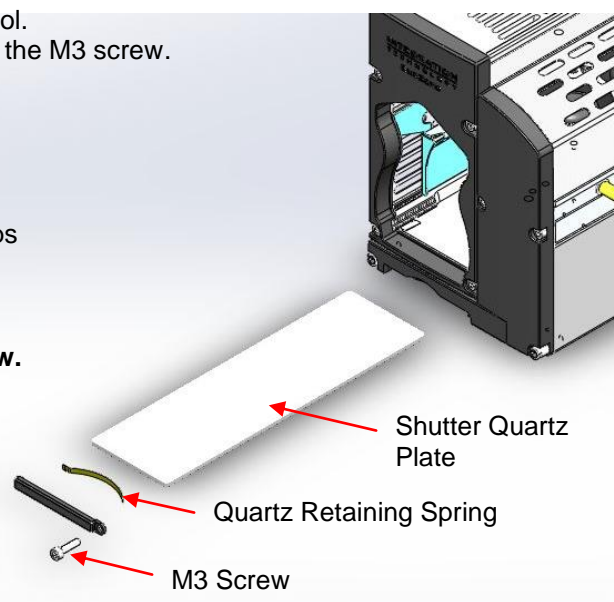


Figure 11: Removing the Shutter Quartz Plate

12.8. Removing the LH Lamphead Quartz Window

1. Ensure that the System has had adequate time to cool.
2. Remove the Lamp Cartridge, Refer to Section 12.4.
3. Remove both the Lamphead 'Front End Moulding' and 'Shutter End Cap' by removing the M4 Screws.
4. The 'Lamphead Quartz Plate' can then be removed by sliding it and the 'Light Mask' out from the extrusion.

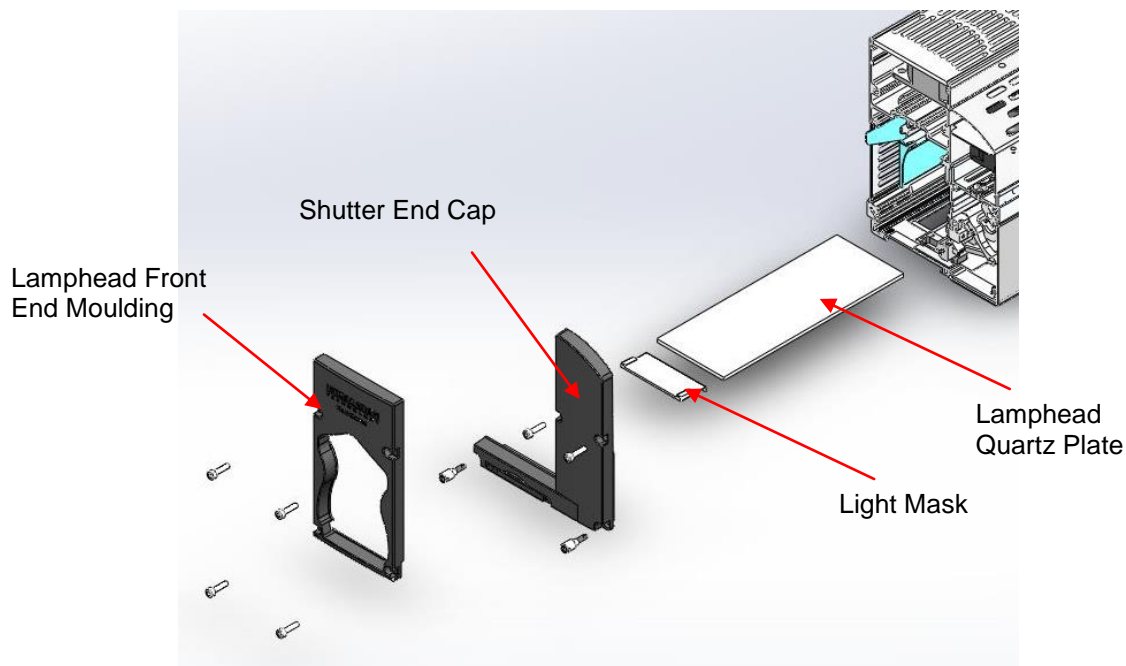


Figure 12: Removing the Lamphead Quartz Plate

NOTE: There are 2 Light Masks within the Lamphead 1 at each end of the Quartz Plate, 1 of these Light Masks will remain in situ.

5. Slide the replacement Quartz Plate into the extrusion and ensure that the Light Masks at both ends of Lamphead are properly secured to the Quartz Plate.
6. Fix the 'Shutter End Cap' and 'Front End Moulding' to the Lamphead assembly, to complete the process.

NOTE: Integration Technology recommend that this process is completed by a qualified technician, if in any doubt please contact Integration Technology.

12.9. Removing the RH Lamphead Quartz Window

1. Ensure that the System has had adequate time to cool.
2. Remove the Cartridge, Refer to Section 12.4.
3. Remove both the Lamphead 'Front End Moulding' and 'Shutter End Cap' by removing the M4 Screws.

NOTE: Care should be taken when removing the 'Shutter End Cap' as the 'Brake Board PCB' is fitted to this part. Therefore (due to the wiring) there will be limited movement of the 'Shutter End Cap' available.

4. The 'Lamphead Quartz Plate' can then be removed by sliding it and the 'Light Mask' out from the extrusion.

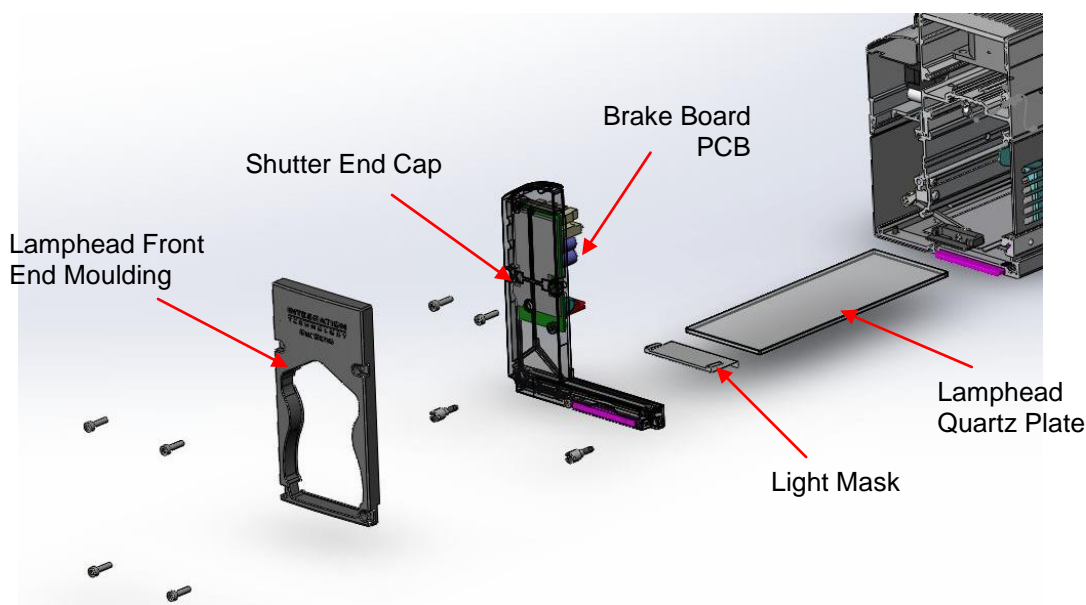


Figure 13: Removing the Lamphead Quartz Plate

NOTE: There are 2 Light Masks within the Lamphead 1 at each end of the Quartz Plate, 1 of these Light Masks will remain in situ.

5. Slide the replacement Quartz Plate into the extrusion and ensure that the Light Masks at both ends of Lamphead are properly secured to the Quartz Plate.
6. Fix the 'Shutter End Cap' and 'Front End Moulding' to the Lamphead assembly, to complete the process.

NOTE: Integration Technology recommend that this process is completed by a qualified technician, if in any doubt please contact Integration Technology.

12.10. Cleaning the quartz plate

All the UV light for reacting the ink is transmitted through the quartz plate, and any contamination of the plate may reduce the effective UV.

From time to time it is possible for the plate to become contaminated with ink mist or particles from the substrates, which become very hard cured and baked on. Cleaning of the plate can be completed as follows:

1. Remove the quartz plate from the lamp head, Refer to Section 12.8 and / or 12.9.

NOTE: Cured on UV ink can be removed using either Ketone or Acetone as a solvent to soften the cured ink chemistry. (Gloves should be worn when handling either of these solvents and all relevant safety and handling data observed). It may take some short time for the solvents to effectively soften the inks.

The quartz can be more easily cleaned if it is left to soak overnight in one of the above solvents. For more stubborn deposits, a non-metallic scouring pad can be used to add some abrasive action to the cleaning without scratching the quartz surface.

2. Once all deposits have been removed wipe the quartz plate clean with a lint-free cloth lightly moistened with the cleaning solvent and polish with a dry lint-free cloth to ensure no smearing or residue is left on the quartz surface.

NOTE: If the quartz plate is becoming opaque (devitrification), damaged, or no longer able to be cleaned, it should be replaced.

12.11. Replacing the Lamp head Fan

The lamp head fan is not a customer replaceable part. Return complete lamp unit to Integration Technology for replacement.

12.12. Replacing the Igniter

1. Remove the outer casing of the PSU by unscrewing the 4 x M4 socket screws and sliding cover off. The Igniters are mounted to the rear of the chassis of the power units. They are brown in colour.
2. Remove any power looms from connectors associated with the igniters, noting the connectors
3. Unscrew the Nuts securing the igniters and drop out the igniter.
4. Fit new igniter by reversing the above procedure.

12.13. Replacing Fuses

NOTE: The main supply is via a 16A circuit breaker style On/Off switch. No fuse is fitted to this part of the circuit.

NOTE: The fuses are accessible externally on a twin unit & internally on a single unit.

NOTE: The external fuse is clearly visible mounted in the top rear cover

NOTE: The internal fuse must only be changed by a trained service engineer.

1. Isolate the unit from the mains power supply.
2. Remove the outer casing and lift the flip top fuse terminal to access the 2A fuse.
3. Check for continuity and replace as necessary.

12.14. Replacing Electrical Components

NOTE: All electrical components can also be found in the PSU assembly

To replace components, remove the cover & unscrew any connecting looms, unscrew or unclip the components and replace.

NOTE: Most switch components are mounted to relevant PCBs and can only be replaced as a board. Contact **Integration Technology** for details.

The schematic diagram in appendix 1 shows full wiring details.

13. Trouble Shooting

Symptom	Secondary Condition	Probable Cause	Action
Keeps switching off	-	Internal fault	Service engineer to repair if continual tripping.
Mains light does not light	PSU fan still operating	Indicator lights board error	Check and replace as necessary
System over heats then switches off.	Fans not operating	Electrical connection or fuses	Check electrical connection to unit. Check fuse in plug, check fuses. If fuse has failed, find cause and replace as necessary.
PSU fan not operating	Mains light on	Fan faulty, fuse failed.	Check fuses. If failed find cause and replace.
Lamp fails to Ignite	Mains light out.	Electrical connection or fuses	Check electrical connection to unit. Check fuse in plug, check 2A fuse. If fuse has failed, replace fuse.
Lamp fails to Ignite	Mains light on, UV lamp on. Lamp was recently switched off	Hot re-strike after three minutes only.	Leave for three minutes to cool with mains connected and re-strike.
Lamp fails to Ignite	Mains light on, UV lamp on.	Fuse failed, Igniter failed.	Check fuse, if fuse failed check Board for faults. Replace as necessary. If igniter failed replace.
Lamp fails to Ignite	Mains light on, UV lamp on light out.	Lamp "On/Off" Switch or board failure.	Check and replace.
Lamp head fan does not cut in after burn-in time	Fan runs when lamp is switched off	Faulty PLC program	Contact Integration Technology.
Lamp not switching into low power	-	Faulty PLC program	Contact Integration Technology.
Lamp cutting out	Lamp on light stays on	Lamp overheat or lamp faulty.	Check cooling fan. Allow cool down and re-ignite.
Lamp cutting out	-	Lamp overheat or fan failed	Check cooling fan, Allow cool down and re-ignite. Replace cooling fans/ over heat.
Curing not properly effective	Application that has previously worked, no variables have been changed	Lamp or reflector degradation.	Check lamp and reflector, Replace as necessary.
Curing not properly effective	New Application.	Coating material is not matched to UV unit output	Consult Integration Technology for expert advice on balancing your UV material with your UV equipment.

Shutter will not actuate	Lamp recently started		Lamp is in warm up mode and no power is available to the shutter. Actuate cooling fans then operate shutter.
Shutter runs continuously	Light flashes on / off		Positional sensors are inactive. Consult Integration Technology for advice.
Shutter operates but fails to stop in alternative position.	Light flashes on/off but shutter returns to open/closed position		One of the two positional sensors is not operating correctly. Consult Integration Technology for advice.
Shutter fails to close/open fully. Shutter operates slowly(>0,5s)	Partial cut off of Light		Switch off immediately. Consult Integration Technology for advice.

14. Warranty

If any materials and equipment supplied by Integration Technology Ltd. under the contract is found to be defective due to faulty manufacture during a period not exceeding twelve months after the date of delivery, then the company will repair or replace free of charge such faulty materials and equipment.

Written notice of any claim must be given by the purchaser to Integration Technology Ltd. within seven days of the discovery of the fault. No liability shall attach to Integration Technology Ltd. in respect of second hand goods, modifications to the equipment where unauthorised repairs or alterations have been carried out or attempted, where damage has occurred after delivery of the goods or where the goods have been subjected to improper or unusual usage.

All freight charges, customs duties for equipment, travelling expenses and accommodation for the company's engineers to repair or replace items on site, will be borne by the customer. We reserve the right to have the machine returned to our factory for repair.

14.1. Liability

So far as permitted by the law, Integration Technology Ltd's liability shall be in lieu of any other warranty, express or implied, whether by statute or otherwise and in no event shall the company be liable for any direct or indirect loss or damage (whether consequential or otherwise). In particular, in the case of goods supplied but not manufactured by Integration Technology Ltd., the company's sole responsibility shall be to give the purchaser the same warranty as given by the manufacturer provided that Integration Technology Ltd. shall not be required to bear any liability or expense greater than the amount recovered from the manufacturer.

14.2. Performance

Any performance figures given by Integration Technology Ltd. are such as the company would expect the goods to attain in normal operating conditions. However, no liability for failure to attain such figures shall attach to the company unless such figures have been specifically warranted in writing. Integration Technology Ltd. accepts no liability for the goods being sufficient and suitable for the purchaser's purpose and the purchaser shall inform the company by written notice of any special circumstances or conditions affecting or liable to affect the premises where the goods are to be installed.

15. Spares

The SubZero 055/085 Electronic is the most compact and efficient high output UV lamp head of its type on the market. All of the components have been carefully developed, chosen and balanced to work harmoniously as a system. The use of non-genuine Integration Technology components in this unit may seriously affect the performance and/or safety of the SubZero 055/085 and will invalidate any warranty.

If used in a production environment, it is highly recommended that appropriate spares be carried at all times. Lamps are fragile items and can be damaged easily. It is recommended that at a minimum, spare left and right bulb assemblies be carried as on site spares.

Use only genuine original equipment Integration Technology components in this system.

Spares are only genuine original equipment if purchased from Integration Technology or one of its authorised distributors.

15.1. Recommended Spares

For spare parts and part numbers recommended in support of running of SubZero units, please contact Integration Technology or one of our authorised distributors.

16. Appendices

16.1. Electrical Diagram

16.2. Test Protocol

16.3. Certificates of Conformity