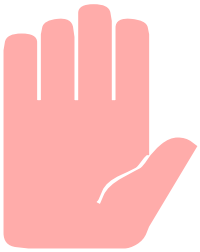
Instruction Manual

Theimer
Printing Light Assemblies
VIOLUX 4002T
VIOLUX 6002T
VIOLUX 8002T

Warning !

Ultra-Violet Emission



THEIMER lamps emit ultra-violet energy as well as carbon arcs, mercury vapor and similar light sources used in printing applications. The safety glass, which is furnished with all THEIMER VIOLUX lamp housing, provides protection for the operator by filtering out all UV B, wave lengths below 320 nm. Theimer Violux lighting systems use a DIN (DIN 1249) certified safety glass which meets the stringent European safety standards. Some Theimer self contained exposure systems are not equipped with the safety glass but incorporate electrical safety interlocks. These interlocks should not be defeated under any circumstance.

In all Theimer exposing machines UV A is present in the exposure area, as with similar light sources used in printing applications. Operators **must** be instructed not to look directly into the light source or stare at reflected light from the light source. They are not to work or stand in front of the light source while it is exposing. UV protective curtains should be used to limit the exposure to the operator and to prevent other sensitive materials in the work area from being fogged.

UNDER NO CIRCUMSTANCE should the THEIMER lighting system be **operated without** the **ORIGINAL SAFETY GLASS** in place or SAFETY INTERLOCKS DEFEATED.

Should the safety glass break, it should be replaced only with a Theimer replacement glass.

CAUTION

Service

All servicing of Theimer lighting systems should be performed by an approved technician or competent electrician. Several terminals within the lighting system carry high voltages and the unfiltered lamp produces high doses of UV A, B & C. When servicing, care must be taken to protect the service agent from the UV light generated by the lamp.

Contents

DESCRIPTION

The VIOLUX 4002T, 6002T and 8002T Printing Light Systems feature metal halide lamps whose spectral output matches the sensitivity of daylight films, sensitized plates and proofing materials. They utilize a metal shutter to obtain short exposures by eliminating warm-up times and spectral shifts that are normally associated with mercury vapor and "instant start" light sources.

The VIOLUX operates in a stand-by condition with the shutter closed until an exposure is to be made. The shutter is opened by a light integrator or timer for the duration of the exposure. After the exposure is completed and the shutter closes, the lamp remains lit so that it is immediately ready for the next exposure. Optional Theimotrol II and Timetronic Light Integrators monitor the light intensity to maintain exposure accuracy. Using the Power level push buttons on the Theimotroll II or the remote control box , the operator can select the appropriate power level for their photographic materials.

VIOLUX Printing Light Systems are designed for mounting over a horizontal printing frame. A printing lamp stand is available for use with vertical frames.

The installation and operation of the VIOLUX 4002T, 6002T and 8002T are identical and all units are covered in this manual. Before unpacking and installing the equipment, it is suggested that this instruction manual be read carefully.

Specifications

Electrical Specifications	**VT 4**	**VT 6**	**VT 8**
Line Voltage	200-250 VAC	200-250 VAC	200-250 VAC
Line Current	30 A	40 A	50 A
External Control (through RCB)	115 VAC*	115 VAC*	115 VAC*
Air Conditioning Load on High (BTU)	13680	20520	27360
Air Conditioning Load on Medium (BTU)	6840	10260	13680
Air Conditioning Load on Low (BTU)	3420	5130	6840
* 240 VAC & 24VDC optional			

Physical Specifications	**Width**	**Depth**	**Height**	**Weight**
Power Supply	10.75"	25"	10.75"	150 lbs
Light unit - with hood	22.5"	15.5"	32.5"	60 lbs
Light unit - without hood	15.5"	15.5"	24"	50 lbs
Remote Control Box (RCB)	6"	3.25"	2"	5 lbs
Timetronic Integrator	7"	6.75"	4.75"	7 lbs
Theimotrol II (ICS)	11.5"	6.75"	2.5"	7 lbs

INSTALLATION

The VIOLUX 4002T, 6002T and 8002T Printing Lights are shipped in two cartons; one containing the power supply and the other the lamp housing and accessories, such as the integrator or control box. Printing stand or filters are packed separately.

All equipment is thoroughly inspected., tested and carefully packed before leaving our warehouse. Responsibility for safe delivery is assumed by the carrier upon acceptance of the shipment. Any claim for damage or loss must be made by the consignee to the carrier. Should you notice any shipping damage contact your dealer and the carrier immediately.

Claim for Damage or Loss

VISIBLE DAMAGE OR LOSS:

Any external evidence of damage or loss must be noted on the freight bill or express receipt and signed by the carrier's agent. The form required to file a claim will be supplied by the carrier. Failure to adequately describe external evidence of damage may result in the carrier refusing to honor damage claim.

CONCEALED DAMAGE OR LOSS:

Damage or loss may not be apparent until the merchandise has been unpacked. The equipment should be unpacked immediately and inspected for concealed damage. If concealed damage or loss is discovered, make a written request for inspection by carrier's agent within- 15 days of delivery date. Then file a claim with the carrier since such damage is the carrier's responsibility.

In the event of damage or loss, SAVE ALL PACKING MATERIAL.

When unpacking the equipment, do not discard any shipping cartons until the equipment is completely installed and operating properly.

When removing the lamp housing from its shipping carton, DO NOT LIFT THE LAMP HOUSING BY THE MOTOR located on top of the unit.

Inspection of Power Supply and Lamp Housing

Prior to installation of the lamp housing and power supply, both units should be checked for loose hardware and electrical connections. Inspecting the equipment will assure greater operating reliability over it's life span.

Lamp Installation

The lamp is supplied separately and must be mounted in the lamp housing. Lamps are installed from the front of the housing prior to installing the safety glass.

The VIOLUX Tri-Level Printing Lights use the following lamp types:

Lamp Type / Lighting System	VT 4	VT 6	VT 8
Multi Spectrum	THS 3027	THS 6027	THS 8027
Diazo	THS 3020	THS 6020	n/a
Power Bulb	n/a	THS 6029	n/a

Note:
1. Use of lamps not manufactured by Theimer will void all warranties.
2. To install or replace the lamp, the equipment must be unplugged from the wall receptacle.

CAUTION

Do not touch the glass envelope of the lamp with bare hands. Handle the lamps only by the ceramic ends or use lint free gloves. Lamps should be thoroughly cleaned with the Theimer cleaning cloth supplied to remove any fingerprints, grease or other contaminants on the glass.

The equipment is supplied with a special lamp socket to mount the lamp in a fixed position for optimum performance. It is important that only genuine Theimer lamps with **THS** designation be used in this equipment. These lamps have flat mounting ends which will match the socket.

Older style TH designated lamps (having round ends) will **not** fit in the lamp mounting socket, however, THS lamps can be installed in the earlier Violux equipment.To install the lamp, place the flat ceramic ends of the lamp into their mounting clips, making sure that the flat ends are tightly held. Plug the wire leads securely into their quick-connect terminals on the ceramic insulators. Loose connections can cause overheating of the lamp, lamp wires or terminals, resulting in reduced lamp life. Make sure that the lamp wires do not touch any of the metal parts in the lamp housing. When replacing a lamp, check the quick-connect terminals for signs of arcing or corrosion. If they are dirty, replace them with new terminal lugs which are supplied with each replacement lamp.

THS bulb

Ultra-Violet Emission

VIOLUX lamps emit ultra-violet energy as well as carbon arcs, mercury vapor and similar light sources used in printing applications. The safety glass, which is furnished with all VIOLUX lamp housing, provides protection for the operator by filtering out all UV B, wave lengths below 320 nm. Theimer lighting systems use a DIN (DIN 1249) certified safety glass which meets the stringent European safety standards. However, UV A is emitted as with similar light sources used in printing applications. Operators must be instructed not to look directly into the light source, or stare at reflected light from the light source, and not to work or stand in front of the light source while it is exposing. UV protective curtains should be used to limit the exposure to the operator and to prevent other sensitive materials in the work area from being fogged. Under no circumstance should the VIOLUX be operated without the safety glass in place.

Safety Glass

The safety glass mounts in the tracks at the bottom of the lamp housing. It can be installed by sliding it into the tracks at both sides of the lamp housing. Before installing the safety glass, it should be thoroughly cleaned to prevent exposure times from being unnecessarily increased. After the safety glass is in place, the two air deflector brackets should be installed over the ends of the tracks to secure the safety glass. The screws for the air deflectors are supplied with the lamp housing. It is recommended that the safety glass, blower motor intake and reflectors be cleaned whenever the lamp is replaced. A dirty safety glass may increase exposure times by more than 50%.

Note:
*Should the safety glass break, it should be replaced **only** with a Original Theimer replacement glass.*

Overhead Mounting

Equipment designed for overhead mounting is provided with mounting brackets and cable fittings. The lamp housing can be mounted with wire cables or chains attached to the ceiling, or by overhead mounting assemblies furnished by the vacuum frame manufacturer to fit the VIOLUX.

When mounting the lamp housing over a vacuum frame, it is important that the normal air flow to the lamp housing is not restricted. A minimum of 6" is required between the blower and ceiling for proper air circulation. Locating the lamp housing within a dropped ceiling should be avoided to prevent hot air normally trapped above the ceiling from recirculating back into the lamp housing. If it is necessary to mount the lamp housing higher than the level of a dropped ceiling, it is recommended that the opening in the ceiling above the lamp housing be at least 12" wider than the lamp housing on all sides. This will allow the air drawn into the housing to come from the printing area.

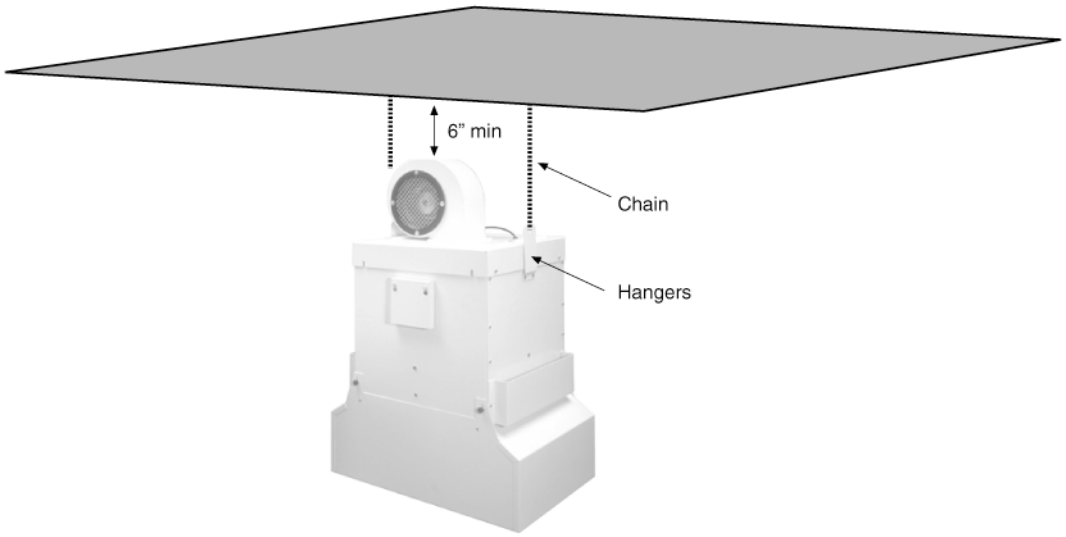
Light Coverage

Proper coverage is determined by the distance between the lamp housing and vacuum frame, centering the lamp housing both horizontally and vertically and the position of the lamp in its holder. Even coverage can be obtained for various size materials, according to the following table.

Frame Size or Material Format	Minimum Light to Frame Distance
30" x 40"	34"
37" x 45"	41"
42" x 52"	48"
48" x 60"	56"
60" x 80"	77"

For better collimation of light in film applications, it is recommended that the distance from the safety glass to the vacuum frame glass be a minimum of 40", for a 30" x 40" vacuum frame. This distance should be used especially if exposures are to be made through the base of the film.

The distance between the light source and the frame also determines the exposure times. For the shortest exposures, the lamp housing should be placed as close as possible to the vacuum frame where even coverage is still obtained. Exposure tests should be made to determine the proper coverage and exposure times. These factors are effected by the materials, the frame size and other variables.



Electrical Connections

Power supplies for the VIOLUX 4002T, 6002T and 8002T are designed to operate from 200 to 250 volts, single phase, 60 Hz.

Line Cord & Plug Installation

In order to add greater flexibility to the product, Lamp Express has included a NEMA 6-30/50 Plug and 8 ft. of Power Cord Cable. This will give your electrician the option of using your Plant standards, hard wiring the lighting system, or the using the NEMA 6-30/50 Plug with the 8 ft line cord. Please note, even though we supply 8 ft of line cord It should be cut to the length that is required for your installation. It is a good practice to keep power cable runs as short as possible.

1. Strip back 2 1 /4 " of the outer jacket from both ends of the Power Cable.
2. Strip back 5/8" of the insulation from each of the Black and the White wires.
3. Strip back 9/16" of the insulation from Green wire.
4. **VT 4 units only** 
   Install the NEMA 6-30/50 Plug in the 30 Amp configuration. Connect the black wire to a large flat blade.
4. **VT 6 and VT 8 units only** 
   Install the NEMA 6-30/50 Plug in the 50 Amp configuration. Connect the black wire to the small flat blade

All units

5. Connect the white wire to the large flat blade.
6. Connect the green wire to the round blade.
7. Remove the strain relief from the plug body and insert the plug blades into the vertical openings in the plug body.
8. Reinstall the strain relief and make sure that the blades are seated properly.
9. Make sure that there are no strands of wire out of place.
10. Install the cover and tighten the four cover screws.
11. Tighten the strain relief.
12. Remove the power supply cover.
13. Feed the cable through the strain relief.
14. Connect the white wire to the main power switch (Q1) L1 terminal.

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Line Cord & Plug Installation, con't.

15. Connect the black wire to the main power switch (Q1) L2 terminal.

16. Connect the green wire to the ground terminal on the main power switch (Q1).

17. Check the security of all electrical connections and mechanical fasteners.

18. Do not reinstall the power supply cover. (Follow transformer TAP adjustment instructions first)

VT Power Supply
Switch, Fan, Cable & Interface Connections

The light unit is connected to the rear of the power supply with a quick disconnect plug. Insert the plug into the socket and set the retaining latches.

Remote Control Box Connection

A Remote Control Box (RCB) is
supplied. This box includes switches for turning on the VIOLUX and selecting the power levels. The Remote Control Box also provides the interface for integrators utilizing 115 volts control outputs, such as our Timetronic line.

The Remote Control Box (RCB) is connected to the power supply with a 25
pin DIP interface plug. Insert the interface plug into the socket at the rear of the power supply and tighten the locking screws.

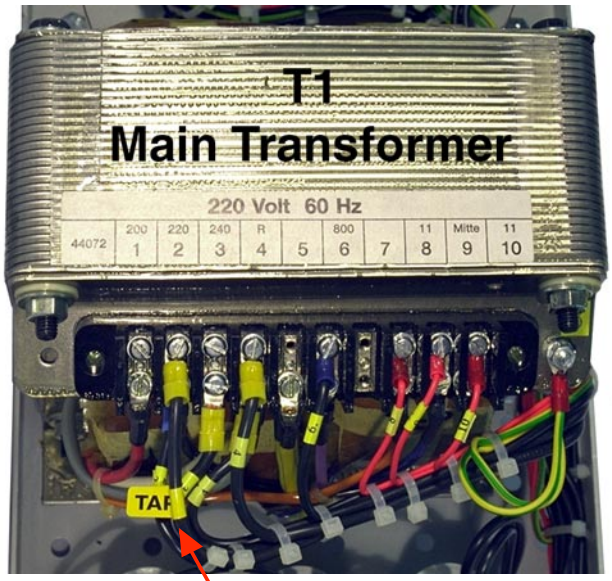
Transformer Tap Adjustment

The incoming TAP wire has **not** been installed on the main transformer. The wire is marked TAP and is in front of the incoming TAP terminals on the main transformer with a heat shrink boot over it.

Prior to installation all the electrical connections should be checked for security and the incoming tap wire has to be set to the proper terminal on the main transformer.

Remove the top cover from the power supply and tighten all electrical connections. Make sure that the main disconnect is set to the **OFF** position. Plug the power supply into a properly rated wall outlet. Measure the incoming line voltage at the main disconnect. Unplug the power supply from the wall outlet and set the incoming **TAP** wire to the proper voltage terminal on the main transformer.

The equipment may be operated with line voltage below 200 volts without damage to the equipment. However to achieve maximum performance the line voltage should be raised to at least 200 volts. This can be achieved by purchasing a buck boost transformer from a local electrical suppliers.



TAP wire

Incoming Voltage (Volts)	TAP Position
200 - 210	1 (200 V)
211 - 230	2 (220 V)
231 - 250	3 (240 V)

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19. After the tap is set turn off the unit and unplug the power supply from the wall outlet.

20. Now reinstall the power supply cover.

OPERATION

Turning On The Equipment

The VIOLUX Tri-Level can be left in a ready position by turning on the power disconnect switch located at the rear of the Power Supply. Depress the **ON** push button on the Power Supply or the Remote Control Box to turn the system on.
The lamp will ignite and gradually increase in intensity as it
warms up. During the initial warm up period, the blower in the lamp housing will not operate. As soon as the lamp reaches its proper operating temperature, an electronic sensor in the VIOLUX will activate the blower motor for proper cooling. This will normally require approximately 90 seconds.

Remote Control Box (RCB)

Power Control

The VIOLUX Tri-Level has three power levels of operation. These power levels are controlled by a selector switch on the Remote Control Box. The desired power
level is automatically switched when an exposure is made.

Exposure Control

Exposure times can vary due to line voltage fluctuation, lamp aging or a dirty safety glass. For this reason the use of a light integrator is
recommended to maintain precise repeatable exposure control. For the most accurate control, the photocell should be located on the vacuum frame. The photocell should never be located in the lamp housing behind the safety glass.

For details on calibrating the light source to the integrator and other features, refer to the instruction manual of the integrator being used.

Turning Off The Equipment

The VIOLUX may be turned off if it is not going to be used to make an exposure within the next hour. If it is anticipated that an exposure will have to be made in less than an hour, it is more economical to leave the equipment on.

Note:
*Each time the equipment is turned on, the re-ignition of the lamp may shorten the lamp life. The electrical cost for one hour of standby operation is minim*al.

To turn the system off, depress either the OFF push button on the Power Supply or the Remote Control Box.

When the VIOLUX Tri-Level Lighting System is turned off by the OFF push button, the blower will run at high speed for about 120 seconds. Turning the unit off by the main disconnect will defeat the post cooling feature.

If the VIOLUX is turned on before the lamp has sufficiently cooled down, the lamp may not ignite. The blower in the lamp housing will automatically start cooling the lamp until re-ignition temperature is obtained. The blower will then stop and remain off until the lamp reaches its proper standby temperature. For best results in reigniting the lamp, it is recommended that the equipment not be started until the post cooling fan has turned itself off.

Factors Affecting Exposure Times

The VIOLUX Tri-Level Printing Lights are designed to expose various materials, printing plates, color proofing materials, screen printing resists, daylight films, etc. Some of the factors that can affect the exposure times on these materials are:

Cleanliness

A dirty safety glass can often cause a significant increase in exposure time.

Type of glass used on vacuum frame:

Older glass or glass that has been cleaned with polymer cleaners tends to pass less actinic energy and could increase exposure times. Acetate overlay sheets will lengthen exposure times. Some manufacturers film bases are less transparent to UV energy than others and could cause longer exposure times.

Lamp

Overheating or over cooling of the lamp can also increase exposure times.

Exposure times for the VIOLUX Tri-Level Printing Lights should remain relatively constant during the life of the lamp. A gradual decrease in actinic output due to blackening of the quartz is a typical characteristic of all high intensity arc lamps. VIOLUX multi spectrum lamps, because of their smaller electrodes and improved halogen cycle, produce less blackening than similar metal halide lamps made by other manufacturers and retain their actinic output for longer periods of time.

For this reason, it is strongly recommended that only genuine Theimer THS lamps be used in the equipment. These lamps are warranted to retain 80% of their actinic energy, measured at 365 nm, during the first 1000 hours of operation. Other lamps typically lose 50% of their actinic energy after only 500 hours of operation.

MAINTENANCE

Electrical Operation

Trouble-shooting the operation and functions of various components are described below. Simplified schematics of the important circuits are shown for your convenience. For more details, please refer to the schematics at the end of this section.

Fuses

Index	Rating, Amps	Description
F1	4	Main power control circuit and post cooling
F2	2	Control and light unit blower
F3 & F4	4	Shutter and DC control circuits
F5	1	Power Supply cooling fan

CAUTION

All servicing of the VIOLUX Lamp Housing or Power Supply should only be performed by an approved technician or competent electrician.

Several terminals within the lighting system carry high voltages.

Relays and Contactors

K1 - Main Power Contactor

Actuates when the ON push button is depressed. Contacts apply incoming power to the equipment. A set of latching contacts bridge the ON push button to maintain power.

K2 - Post Cooling Timer

Actuated when the OFF push button is depressed. Provides power to the cooling system to accelerate cool down of the lamp which allows for quick re-ignition. The time interval is set for 120 seconds and is adjustable by the thumb wheel on top of the contactor.

K3 - Expose Relay

Actuated when the integrator is operated to make an exposure. Two sets of contacts switch DC voltage to shutter motor from Minus (-) to Plus (+) to open the shutter. The auxiliary timer delays the return to medium power when making exposures in power Level I & III. The timer is set for approximately one second and is adjustable by a conveniently located dial.

K4 - Low Power Contactor

Actuated whenever exposures are made in low power. N.O. contacts select the full winding of the reduced power inductor, L-1. It also selects the low speed cooling capacitor. When the contactor is relaxed, the N.C. contacts select half of the reduced power inductor and the medium speed cooling capacitor.

K5 - High Power Contactor

Actuated whenever exposures are made in Power Level III. Contacts bypass the reduced power inductor for high power operation. A second set of contacts bypasses standby blower capacitors for high speed operation of blower motor.

K9 - Remote Off Relay

This is located on the A5 printed circuit board. When the remote OFF push button is depressed and the K9 energized, the normally closed points interrupt power to the K1, main power contactor. The normally open contacts apply power to the K2, post cooling relay.

K10 - Remote Exposure Control-Relay

This provides a 110 volt interface for the power supply shutter control circuit. The coil is connected to the integrator input connector on the remote box. The points apply power to the K3 contactor in the power supply.

Capacitors

C1 - Line Compensation Capacitors
Balances the heavy inductive currents drawn by the main power transformer to reduce the line current.

C2 - Reduced Cooling Capacitor
Reduces voltage to the cooling fan for low speed.

C3 - Reduced Cooling Capacitor
Reduces voltage to the cooling fan for medium speed.

C4 -Blower Starting Capacitor
Starting capacitor for blower in lamp housing. Advances current to the starter winding in the blower motor.

Motors

M1 - Fan Motor, 220 VAC
Located in the power supply, and cools the main power transformer.

M2 - Blower Motor, 220 VAC
Located in the lamp housing, and cools the exposure lamp.

M3 - Shutter Motor, 12 VDC
Located on the outside of the Violux lamp housing.
This operates the shutter when polarity is switched by the K3 relay.

Transformers

T1 - Main Power Transformer
This supplies proper AC voltages to the lamp, blower and shutter circuits for operation of equipment.

L1 - Reduced Power Inductor
This dual section choke reduces lamp power in medium and low power levels.

Printed Circuit Boards

A1 - Shutter Power Printed Circuit Board (rectifier board)
Changes the low voltage AC from the main power transformer to DC to operate the shutter motor.

A2 - Blower Motor Printed Circuit Board
Senses lamp voltage to allow for the proper warm up before applying power to the lamp cooling circuit.

A4 - Starting Printed Circuit Board
This is used in the Tri-Level 6 and 8 to insure positive ignition of lamp.

A5 - Remote Control Printed Circuit Board
Located on the remote control printed circuit board, are the K9 remote off control relay and the K10 remote exposure control relay.

Switches

Q1 - Main Power Switch
Located on rear panel of power supply. Connects line power to K1, the main power contactor.

L1 & L2 - Limit Switches
Located outside lamp housing under small cover plate. Removes DC voltage from shutter motor and connects braking diodes to stop shutter.

S1 - Safety Thermostat
Located inside the Main Transformer, interrupts power to the coil of the main power contactor, if the transformer coil temperature exceeds a safe limit.

S2 - Stop Push Button
Interrupts power to the main power contactor to turn the unit off. A second set of contacts trigger the post cooling timer.

S3 - Power On Push Button
Applies power to the main power contactor to turn unit the on.

S4 - Safety Thermostat, Light Unit
This is located in the lamp housing and will turn equipment off if the temperature in lamp housing exceeds safety limits.

Switches, cont.

S5 - Remote Power On Push Button
This applies power to the coil of the main power contact, K1.

S6 - Remote Power Off Push Button
This applies power to the remote off control relay, K9.

S7 - Low Power Push Button
This completes the circuit to the low power contactor, K4.

S8 - High Power Push Button
This completes the circuit to the high power contactor, K5.

S9 - Remote Shutter Switch
This is parallel to the K10 relay contacts, it provides a manual means to open the shutter.

Other Components

H1 - Power Indicator
Located on the front cover of power supply, glows when power is present within the power supply.

H2 - Remote Power On Indicator
Located on the remote control box, glows when power is present within the power supply.

E1 - Lamp
Main exposure lamp.

V1 & V1 - Braking Diodes
Shorts out shutter motor armature to dynamically brake shutter when limit switch is activated.

Main Transformer Check

With the TAP voltage properly set, the main transformer will provide the following AC voltages measured with respect to Terminal 4 (R) unless otherwise specified:

Terminal #	AC Voltage	Notes
1 (200)	200 to 210 VAC	
2 (220)	211 to 230 VAC	output to cooling fan
3 (240)	231 to 250 VAC	
4 (R)	REF	
6 (800)	800 VAC ± 20 V	with wire on terminal 6 disconnected
8 (11)	11 VAC	
9 (M)	REF	for term 8 & 10 only
10 (11)	11 VAC	

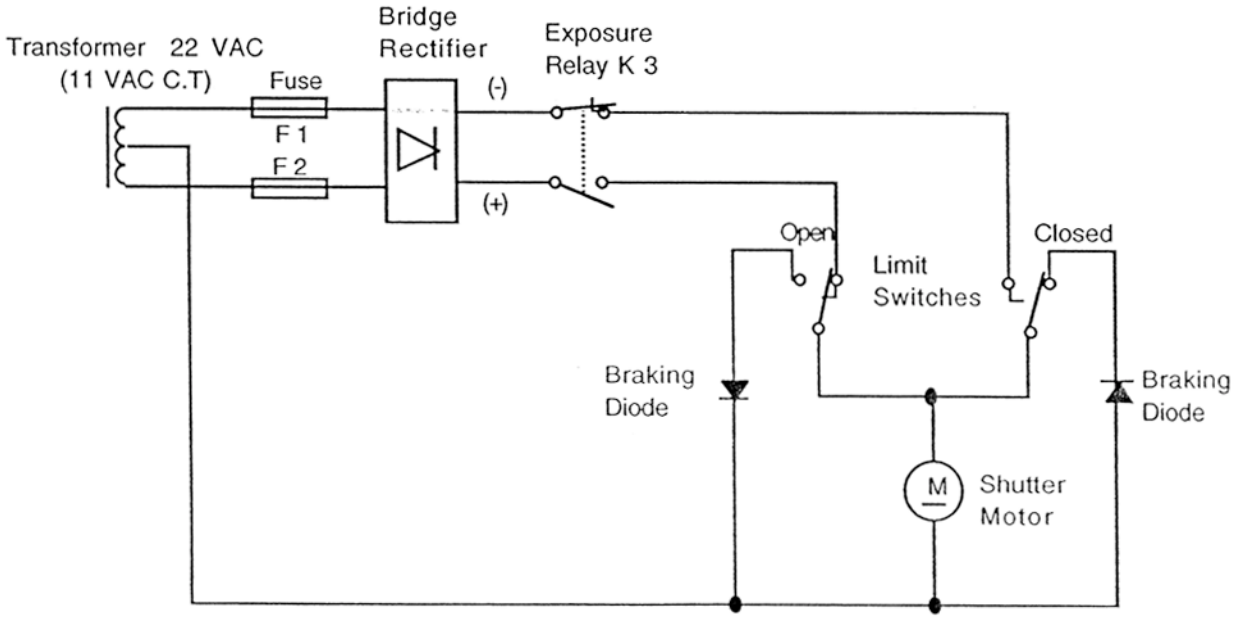
Shutter Motor Circuit

The shutter motor circuit consists of five component parts. A low voltage winding on the main transformer generates 22 Volts AC which is applied through fuses F3 and F4 to a DC full wave bridge rectifier. The positive and negative DC voltage, which determines the direction of rotation of the shutter motor is fed through contacts of relay K3 and through the corresponding two shutter limit switches.

The proper DC voltage polarity is fed to the shutter motor through the normally closed contact of the open sensing limit switch. The motor will drive the shutter in the direction of the switch. When the shutter reaches the actuating arm of the switch, the DC voltage will be disconnected from the motor and the braking diode connected across the motor armature.

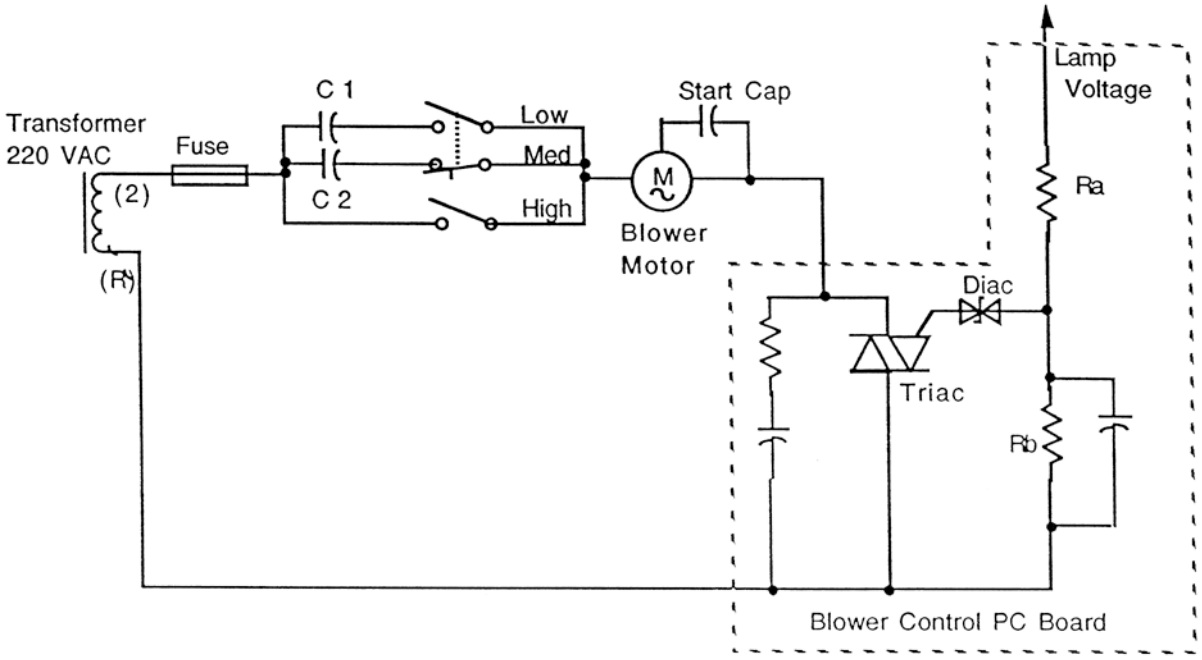
The most common cause of shutter circuit failure is blown fuses, F2 or F3. If the fuses are good, failure may be due to a misadjusted limit switch. The limit switches are accessible from the outside of the lamp housing by removing the square cover plate.

(Refer to simplified schematic of Shutter Motor Circuit).



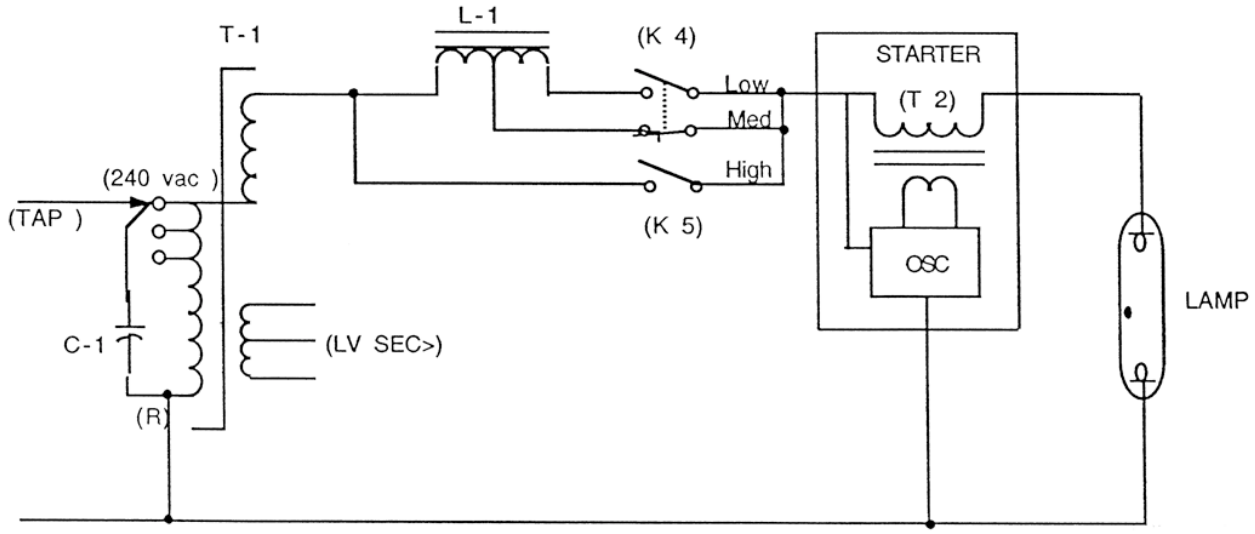
Blower Control Circuit

The lamp cooling blower is controlled electronically to turn on after the lamp reaches operating temperature. This circuit is located on the A2 printed circuit board in the power supply. Capacitors in series with the blower reduce the speed of the blower when the lamp is switched to medium or low power to maintain proper cooling. (Refer to the simplified schematic of Blower Control Circuit).



Lamp Ballast

The lamp ballast is a ferromagnetic regulator. The ballast consists of the main power transformer T1, inductor L1, contactors, K4 and K5 and compensation caps C1.



The transformer T1 has two separate secondary windings. The low voltage secondary is used for the shutter circuit and a high voltage secondary for the lamp. The lamp secondary is a saturable reactor. When the lamp ignites its impedance is very low, which creates a heavy current load on the transformer. The heavy current load reduces the output voltage to the lamp. As the lamp warms up its impedance increases, the load on the transformer decreases which in turn raises the lamp voltage. When the lamp reaches operating temperature the transformer continues to adjust its output voltage to maintain a constant wattage to the lamp.

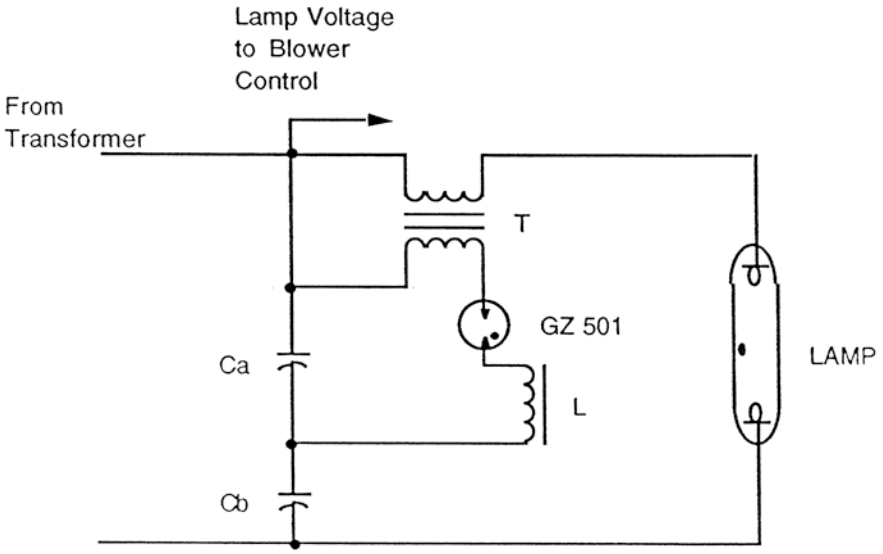
The inductor L1 is divided into 2 sections. Section 1 is a portion of the inductor and is in series with the lamp when medium power is selected or in stand-by. Section 2, is the full length of the inductor, which is in series with the lamp during low power operation. Whether the unit is in low power or medium power, the inductor acts as a current regulator, reducing power to the lamp.

Contactor K4 switches the ballast from medium to low power. When the contactor energizes, normally closed contacts of the contactor disconnect the lamp from the medium power section of inductor L1. Normally open contacts connect the lamp to the low power section of inductor L1. The K4 contactor also changes the blower motor from medium speed to low speed. Normally closed auxiliary contacts on top select the medium speed cooling capacitor C2 when the unit is in medium power. When the unit is in low power, the low speed cooling capacitor C3 is selected.

Contactor K5 switches the ballast from medium power to high power. One set of contacts bypasses the inductor L1 and applies full transformer output to the lamp. Another set of contacts apply 220 Volts to the blower motor. This is done by bypassing the medium and low speed cooling capacitors. The compensation capacitors C1, add a heavy capacitive current. This counteracts the heavy inductive current inherent in the transformer. The overall effect is to reduce line currents. These capacitors do not effect light output.

Lamp Starting Circuit

The lamp starting potential for the Tri-Level 4 is the open circuit voltage of the main transformer T1. The Tri-Level 6 and 8 will also start on the open circuit potential of T1, but to insure quick reliable starts, the Tri-Level 6 and 8 use a starting circuit.

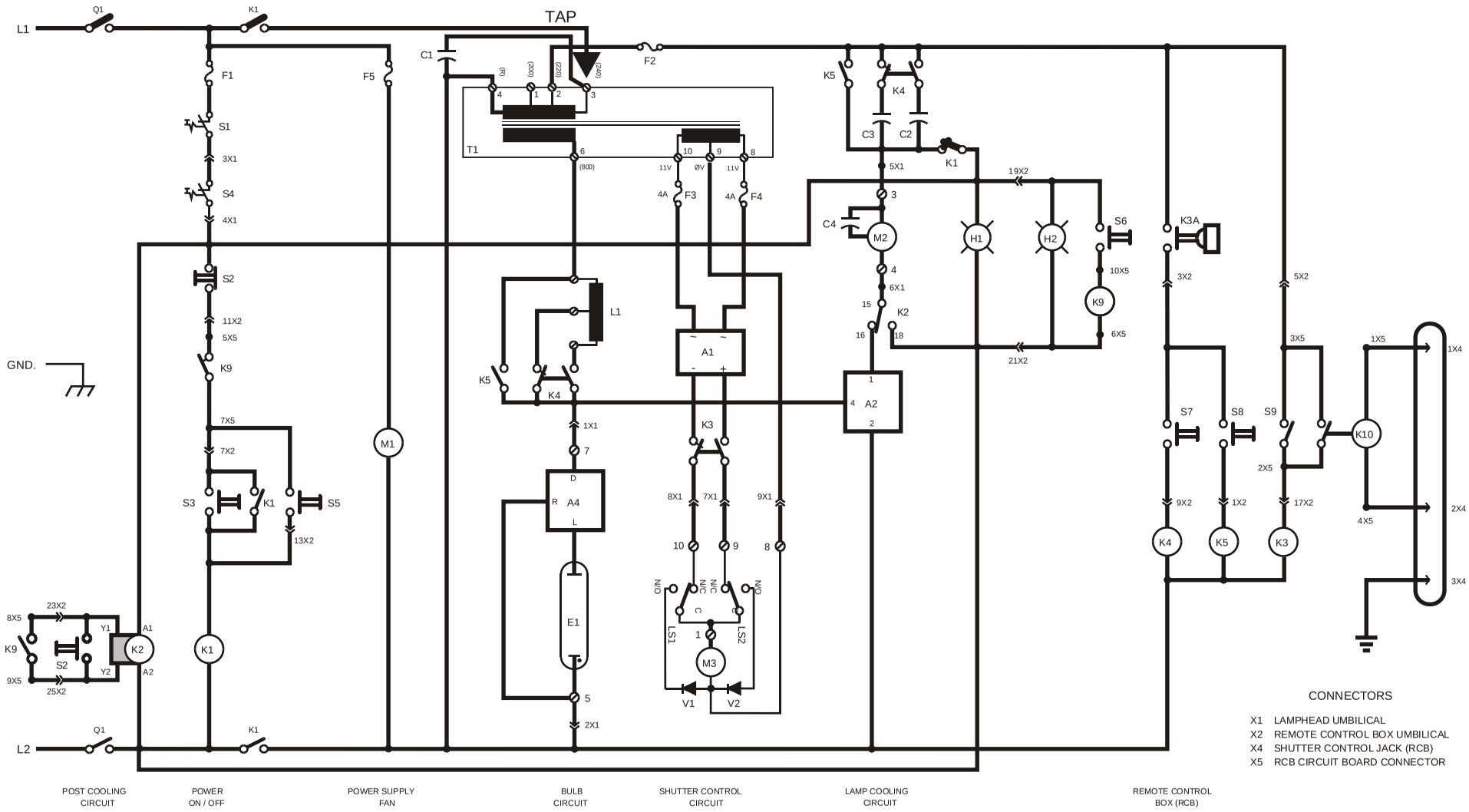


The starting circuit consists of a oscillator and a step up transformer. The transformer (T) secondary is in series with the lamp, and its primary is the inductor for the oscillator. Capacitor (Ca) is the capacitor for the oscillator, (L) is additional inductance for the oscillator. The spark gap (GZ 501) is a break down device, which monitors the charging of capacitor (Ca). When the charge on capacitor (Ca) is between 150 Volts and 175 Volts, the spark gap (GZ 501) breaks down and the capacitor (Ca), discharges through the primary of the transformer (T). The transformer (T) steps the voltage up to approximately 3600 Volts and applies it to the lamp. Capacitor (Cb) is in the charge path for capacitor (Ca) and buffers the voltage source when the spark gap (GZ 501) breaks down.

When the lamp ignites, the voltage source drops below the firing point of the spark gap (GZ 501) and the starter is turned off.

NOTE:
Due to the voltage and frequency characteristics of this circuit, the output voltage cannot be read with conventional test equipment.

VIOLUX VT TRI-LEVEL SCHEMATIC



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TROUBLE SHOOTING GUIDE

Lamp does not light and contactor is not energized

No Line voltage to equipment

Check power line, fuses & circuit breakers. Check connections between integrator , or remote control box, lamp housing and power supply.
If voltage is present check, fuse (F1) in power supply.

Lamp does not light and contactor is energized

Lamp is too hot

a) Allow lamp to cool down for at least five minutes before attempting to restart.
b) Thermal overload fuse (F5) may be open.

Lamp is defective or has reached end of operating life.

Check lamp for glass or electrode damage. Replace lamp.

Defective starter (VT6 and VT8 only)

Check igniter (GZ 501) on starter circuit board in light unit for flickering. Replace igniter if it does not glow at all or glows steadily when lamp is not lit.

Main power transformer defective

Follow procedure: **Main Transformer Check**

Lamp does not switch to proper power level

Power level pushbutton incorrectly set

Check power level pushbutton

Defective High or Low Power Contactor (K4) or (K5)

Check power contactors that (K4) or (K5) energizes during exposure.
Contactor or pushbutton may be defective.

Low Light Output

TAP improperly set

Check TAP setting

Lamp near end of operating life

Check for blackening of glass envelope. Replace lamp.

Uneven Light Coverage

Lamp or lamp housing not properly mounted

Check that the lamp housing is parallel to vacuum frame. Follow instructions for installing lamp.

TROUBLE SHOOTING GUIDE, cont.

Shutter Does Not Open

Expose relay (K3) not actuating

Check integrator connections.

Limit switch defective or sticking

Check actuating arm of “open” limit switch.

Shutter Does Not Close

Integrator not turning off or limit switch sticking

Check that exposure relay release end of exposure. If K3 releases check “closed” limit switch. If K3 remains energized check integrator.

Shutter Opens or Closes noisily

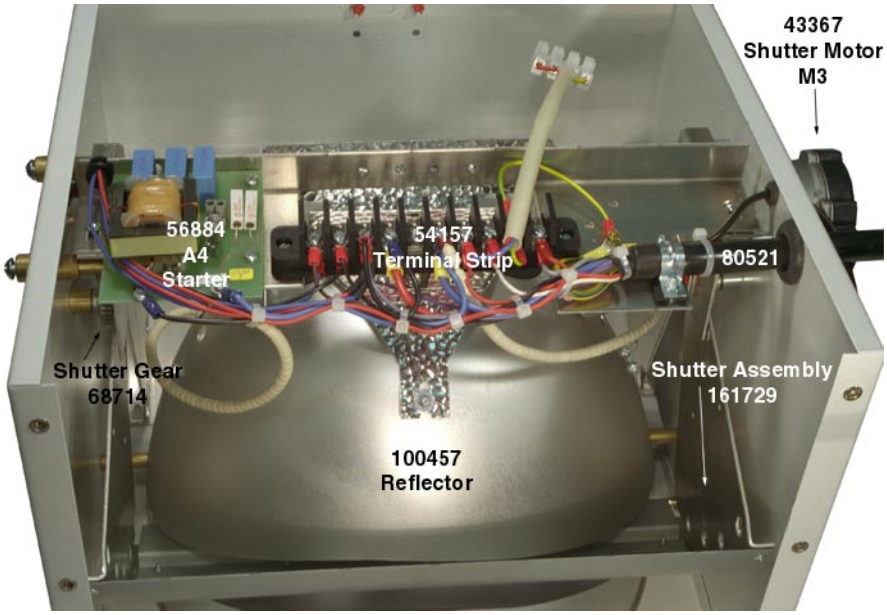
Limit switches not adjusted properly

Readjust limit switch.

Braking diodes defective

Check braking diodes

Power Supply & Lamp Housing



PARTS LIST

Power Supply

Violux VT4, VT6 & VT8 Tri-Level Printing Light

		VT 4	VT 6	VT 8
Symbol	**Description**	**Part#**	**Part#**	**Part#**
A1	Shutter Rectifier	31313	31313	31313
A2	Blower Motor, PCB	56528	56528	56528
C1	Capacitor, Power Line Compensation	20972 (x4)	20972 (x6)	20972 (x6)
C2	Capacitor, Low Cooling	23740	23738	23738
C3	Capacitor, Medium Cooling	23738	23756	23737+23756
F1	Fuse, Main Power Control, 4 Amp	63336	63336	63336
F2	Fuse, Fan & Blower Circuit, 2 Amp	63337	63337	63337
F3 & F4	Fuse, Shutter, 4 Amp	63336	63336	63336
F5	Fuse, 1 Amp	63305	63305	63305
H1	Power ON Indicator	70114	70114	70114
K1	Contactor, Main Power	63796	63796	63796
K2	Timer, Post Cooling	40596	40596	40596
K3	Contactor, Exposure Timer	63798	63798	63798
	Power Level Delay	63861	63861	63861
K4	Contactor, Medium to Low Power	63859	63859	63859
K5	Contactor, Medium to High Power	63794	63794	63794
	Normally Closed Auxiliary Contacts	63795	63795	63795
L1	Choke, Reduced Power	44596	44596	44596
M1	Cooling Fan	43409	43409	43409
S1	Thermostat, Transformer Safety	72206	72206	72206
S2	OFF, Push Button, Red	70911	70911	70911
S3	ON, Push Button, Green	70910	70910	70910
	Switch for Push Button	70943	70943	70943
T1	Transformer, Main Power	44071	44072	44073
Q1	Switch, Main Disconnect Line Cord	71755	71747	71747
	Receptacle	50305	50305	50305
	Complete Power Supply	97290	97291	97292

PARTS LIST

Light Unit

Violux VT4, VT6 & VT8 Tri-Level Printing Light

		VT 4	VT 6	VT 8
Symbol	**Description**	**Part#**	**Part#**	**Part#**
A4	Starter, PCB	n/a	56884	56884
C4	Capacitor, Blower Motor Starting	23736	23737	23756
E1	Lamp, Multi-Spectrum	THS 3027	THS 6027	THS 8027
E1	Lamp, Diazo	THS 3020	THS 6020	n/a
E1	Lamp, Power Bulb	n/a	THS 6029	n/a
LS1/LS2	LS1 & LS2 Limit Switch Assembly, Shutter	72104	72104	72104
M2	Motor, Lamp Cooling	43455	43401	43423
M3	Motor, Shutter Drive	43367	43367	43367
S4	Thermostat, Lamp Safety	72202	72202	72202
V1 & V2	Diode, Shutter Braking	95516	95516	95516
	Lamp Cable	80521	80521	80521
	Lamp Holder	101450	101450	101450
	Gear, Shutter Motor	160432	160432	160432
	Gear, Shutter	68714	68714	68714
	Reflector	100457	100457	100457
	Safety Glass	101140	101140	101140
	Shutter Assembly	161729	161729	161729
	Spacer, Shutter & Reflector Support	100503	100503	100503
	Terminal Strip	54157	54157	54157
	Screw for Terminal Strip	66023	66023	66023
	Complete Light Unit	97294	97295	97296
	Spacer, Shutter Bearing	161251	161251	161251
	Bearing for Spacer	68730	68730	68730
	Gear & Pin, Shutter	161260	161260	161260

PARTS LIST

Remote Control Box

Violux VT4, VT6 & VT8 Tri-Level Printing Light

		VT 4	VT 6	VT 8
Symbol	**Description**	**Part#**	**Part#**	**Part#**
A5	Printed Circuit Board	56886	56886	56886
S5/S6	Push Button, ON / OFF	71708	71708	71708
S7A/S7B	Push Button, Power Select	72120	72120	72120
S9	Shutter Switch	71384	71384	71384