Instruction Manual

Theimer
Printing Light Assemblies
VIOLUX MULTI 4
VIOLUX MULTI 6
VIOLUX MULTI 10

DOUTHITT

THE DOUTHITT CORPORATION

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Established 1919

Table of Contents

INSTALLATION

OPERATION

MAINTENANCE

VIOLUX MULTI 4, 6 and 10 Tri-level Printing Lights

The VIOLUX MULTI 4, MULTI 6 and MULTI 10 Tri-level Printing Lights are used for exposing printing plates, proofing materials, screen printing resists, daylight films and similar sensitized products which require a high intensity ultraviolet light source. The Violux MULTI printing lights utilize metal halide lamps whose spectral output matches the sensitivity of these materials.

The VIOLUX MULTI Printing Lights use metal shutters to obtain short exposure times by eliminating warm ups and spectral changes that are normally associated with mercury vapor arc "instant-start" light sources. They feature an ECONOMY / HIGH PERFORMANCE switch which enables the user to tailor the operation of the lights to the requirements of the material being exposed. They also feature an internal cooling fan in the lamp housing which increases the allowable distance between the light source and vacuum frame for a given ceiling height to improve coverage of larger frames.

The installation and operation of the VIOLUX MULTI 4, 6 and 10 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.

INSTALLATION

Unpacking the Equipment

The VIOLUX MULTI 4, MULTI 6, AND MULTI 10 Printing Lights are shipped in two cartons, one containing the power supply and the other containing the lamp housing. If a printing stand is ordered it is 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 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 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 carriers agent within 15 days of delivery date. Then file a claim with the carrier since such damage is the carriers 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 properly operating.

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

Electrical Connections

Power supplies for the VIOLUX MULTI 4, 6 AND 10 are designed to operate from 190 to 250 volts, single phase, 60 hz balanced line. A 220 volt grounded wall receptacle is provided to match the plug assembly on the power supply. The receptacle should be wired to a 220 volt line with appropriate fuse or circuit breaker rated to handle the current drawn by the equipment as shown:

VIOLUX MULTI 4	VIOLUX MULTI 6	VIOLUX MULTI 10
20 amps	25 amps	30 amps

The cable from the lamphouse must be connected to the terminal board inside the power supply. This can be accomplished by removing the three screws and lowering the hinged front panel. Loosen the two screws on the large cable clamp on the front panel and insert the lamp house cable through the clamp. Connect the wires to their proper terminals on the printed circuit board by matching the wire numbers. Tighten cable clamp screws securely over the cable sheath.

Loosen the smaller cable clamp screws on the front panel. Insert the cable from the Remote Control Box, through the cable clamp. Connect the wires to their proper terminals by matching the wire numbers. Tighten cable clamp screws.

TAP Setting

Before closing the hinged front panel the incoming line voltage should be measured with an AC voltmeter and the wire on the main transformer marked TAP should be connected to the appropriate terminal as follows:

incoming voltage	set Tap to terminal no.
190-209v	1 (200v)
210-229v	2 (220v)
230-250v	3 (240v)

The equipment is shipped with the Tap connected to terminal 3 (240v). **Failure to move the Tap wire to the terminal appropriate for the incoming voltage may cause premature lamp failure or longer exposure times than are necessary.**

After the TAP wire is properly connected the hinged front panel can be closed and fastened with the three screws.

Installation of Lamp

The lamp is supplied separately and must be mounted in the lamphousing. Lamps are installed from the front of the housing before the safety glass is installed. For this purpose the shutter on the lamphousing is left open during shipment.

To install or replace the lamp the following procedure should be followed. **When replacing the lamp make sure the equipment is 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. Failure to follow these instructions may lead to loss of UV intensity or premature lamp failure due to devitrification of the quartz. A yellow brown residue, ball of mercury, or a rectangular piece of metal may be visible inside the glass envelope. These are normal characteristics of VIOLUX metal halide lamps. They contain the additives which account for the lamp's actinic effectiveness.

The equipment is supplied with a pre-focus 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 a flat mounting ends which will match the socket. Older style TH designated lamps will not fit in the lamp mounting socket. The newer THS lamps will fit older VIOLUX equipment.

Metal Halide Lamps manufactured by other suppliers should not be used. They may have different electrical voltage and current characteristics and may damage the equipment and void the warranty. In general other lamps have a much shorter operating life than genuine Theimer replacement lamps.

For ease in identifying the lamp's spectral output, the quartz ends are color coded. A white end identifies a multi-spectrum lamp, a gold end is a diazo sensitized lamp.

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. Make sure that the lamp wires do not touch any of the metal parts in the lamphousing.

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.

Safety Glass

The safety glass mounts in the tracks at the bottom of the lamphousing. It can be installed by sliding it into the tracks at both sides of the lamphousing. 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. The screws for the air deflectors will secure the safety glass. The screws for the air deflectors are supplied with the lamphousing.

It is recommended that the safety glass be cleaned whenever the lamp is replaced. A dirty glass may increase the exposure times by more than 50%.

Ultraviolet Emission

VIOLUX lamps emit ultra-violet energy as do carbon arcs, mercury vapor and similar light sources used in printing applications. The safety glass which is furnished with all VIOLUX lamphousings provides adequate protection for the operator by filtering out all UV wavelengths below 320nm. However, as with any high intensity light source, the light should never be looked at directly. Under no circumstances should the VIOLUX be operated with out the safety glass in place.
Should the safety glass break it should be replaced only with Theimer replacement glass. Although some

lighting manufacturers use Pyrex® as a safety shield, Pyrex transmits considerably more energy in the UV-A and UV-B regions of the spectrum than Theimer's heat treated safety glass and does not offer as much protection to the operator. We do not recommend the use of Pyrex as a replacement glass unless the lamphousing and vacuum frame are completely enclosed by UV absorbing material.

Overhead Mounting

Equipment designed for overhead mounting is provided with mounting brackets and cable fittings. The lamphousing can be mounted with wire cables or chains attached to the ceiling, or by overhead mounting assemblies furnished by DOUTHITT to fit VIOLUX printing lamps.

When mounting the lamphousing over a vacuum frame it is important that the normal air flow to the lamphousing is not restricted. The blower inside the top of the lamphousing draws cool air from the room into the lamphousing. The lamphousing should not be mounted closer than 6 inches from the ceiling. Locating the lamphousing in a dropped ceiling should be avoided to prevent the normally hot air trapped above the ceiling from recirculating back into the lamphousing. If it is necessary to mount the lamphousing higher than a level of a dropped ceiling, it is recommended that the opening in the ceiling above the lamphouse be at least 24 inches wider than the lamphousing on all sides. This will allow the air drawn into the housing to come from the printing area.

A thermal switch inside the lamphousing will automatically turn off the equipment if the temperature inside the lamphousing exceeds safety limits.
Refer to section on BTU ratings of the equipment for hints on ducting the exhausted hot air from the lamphousing.

Printing Lamp Stand

Equipment designed to be used with a vertical printing frame is furnished with a Printing Lamp Stand. The stand consists of a base with rollers, a lower support bracket, and an adjustable mounting bracket. The stand can be assembled as follows:

Place the roller base on the floor. Attach the lower support bracket to the sides of the base with the four nuts and bolts provided. Set the VIOLUX power supply inside the support bracket on top of the base. Remove the reflector hood from the lamphousing. Place the lamphousing upside down so that the four screw inserts for mounting the adjustable bracket face up. Remove the four mounting screws and washers from the center of each side of the bottom lamp housing panel. Place the adjustable mounting bracket upside down over the lamphousing and align the slotted holes with the four inserts. Attach with the four screws and washers. Slide back the latches on the lower support bracket. Turn the lamphousing upright and slide the legs of the upper mounting bracket into the lower support bracket. The lamphousing weighs approximately 65 lbs so it may be helpful to use two people for the previous step.

Adjust the height of the lamphousing to match the center of the vacuum frame by raising or lowering the upper mounting bracket and latch both sides securely.

Light Coverage

Proper coverage is determined by the distance between the lamphousing and the vacuum frame, and the centering of the lamphousing both horizontally and vertically to the frame. Improved coverage is obtained when the lamphousing is oriented so that the axis of the lamp is parallel to the short dimension of the vacuum frame, i.e. front-to-back on overhead systems. For stand mounted units, the lamphousing must be oriented so that the lamp is horizontal.

The VIOLUX MULTI Reflectors are computer designed to provide excellent light collimation with even coverage. Their large paraboloid shape and integral reflector hood cover a rectangular format of approximately 3:4. This assures the maximum usable UV energy for the formats usually found in the graphics industry.

For better collimation of light in film applications, it is recommended that the distance from the safety glass be a minimum of 40 inches, especially if exposures are to be made through the base of the film.

The distance between the light source and the frame determines the exposure times. For shortest exposures, the lamphousing 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 since these factors depend on the materials being exposed, the frame size, and other variables. Light intensity readings on the vacuum frame made with standard light meters should only be used for comparative purposes since most light meters do not have proper response in the actinic energy emitted by the VIOLUX

Light Integrator Connection

The VIOLUX MULTI may be used with a light integrator using one of two types of Remote Control Box. One

Remote Control Box will work with any type of light integrator having a switched 115v ac output, power level and power on/off selection is done on the Remote Control Box. The second type of Remote Control Box works in conjunction with Advanced Integrators such as the MAGIC 83 and Magic 782 having a "CONTROL" 5 pin receptacle on the back of the integrator. The power level and power on/off selection is done on the light integrator control panel.

Power Connections

When the lamp has been installed, the lamphousing is in position and all accessories such as light integrators are connected, the VIOLUX can be plugged into its wall outlet. Before plugging the unit in make sure that the main power switch on the Power Supply and the ON/OFF switch on the Remote Control Box are both in the OFF position.

OPERATION

ECONOMY / HIGH PERFORMANCE SWITCH

The VIOLUX MULTI Printing Lights provide a unique feature which enables the lights to be tailored to the type of materials being exposed. Although the VIOLUX MULTI Printing Lights have special lamps designed for more stable operation at low power levels, multi-level light sources show a warm-up characteristic when switching from their very low standby position to full power. This warming up of the lamp can cause exposure inconsistencies with color proofing materials such as Chromalin ®, Matchprint ®, Color Art ®, etc., or with daylight films where the latitude or reciprocity failure of the materials will not tolerate exposure variations. For printing plates, screen printing emulsions, Dylux ®, and similar materials with good exposure latitude, a good integrator can accurately track the exposure changes during this warm up period.

The VIOLUX MULTI Light incorporates an ECONOMY / HIGH PERFORMANCE switch on the front panel of the power supply. This operator control changes the standby power of the lamp. In the ECONOMY position, the lamp standby is in its lowest power level. This conserves electrical power and minimizes room air conditioning requirements. This ECONOMY position is recommended when exposing the less critical materials.
If the light is to used for exposing color proofing materials or film the HIGH PERFORMANCE position should be used. In this mode, the equipment idles in its middle power level where the lamp is heated sufficiently to come to its proper high intensity level immediately without any proper additional warmup.

® Dylux and Cromalin are registered trademarks of Dupont Corp.

® Matchprint is a registered trademark of 3M Co.

® Color-Art is a registered trademark of Fuji Photo Film.

Turning on the Equipment

The VIOLUX MULTI can be left in a ready position by turning on the main power switch on the power supply. To operate the VIOLUX the ON/OFF switch on the Remote Control Box or Integrator must be turned on. The printing light in the lamphousing will ignite and gradually increase in intensity as it warms up, and the shutter will close if it was open. During the initial part of the warm up period the blower in the lamphousing will not operate. As soon as the lamp reaches its proper operating temperature, the electronic sensor in the VIOLUX will activate the blower motor for proper cooling. This will normally take between 90 and 120 seconds. After the blower has started, the equipment is ready for operation.

Power Control

The VIOLUX MULTI has three power levels for operation. These power levels are controlled by a selector switch on either the Remote Control Box or the Light Integrator. The desired power level is automatically switched when an exposure is made. The choice of stand by power level is selected by the position of the ECONOMY / HIGH PERFORMANCE switch as described above.

CAUTION: It is recommended that the power levels are not switched during an exposure. They should be changed while the shutter is closed.

Exposure Control

Exposure times can vary due to line voltage fluctuations, lamp aging, or even a dirty safety glass. For this reason use of a light integrator is recommended to maintain precise repeatable exposure control. For the most accurate control the photocell which controls the integrator should be located on the vacuum frame. The photocell should never be located in the lamphousing behind the safety glass since dirt which accumulates on the inside of the glass could increase exposure times by more than 50% and the photocell if located behind the glass will not respond to this change.

Turning off the Equipment

The VIOLUX can be turned off if it will not be used to make an exposure in 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. Each time the equipment is turned on, the reignition of the lamp may shorten the life by as much as one hour use, and the electrical cost for one hour of standby operation is minimal. The VIOLUX MULTI, because of its improved electronic circuitry, removes the high ignition voltage immediately when the lamp fires, so that it is better with respect to lamp aging caused by ignition than other equipment with fixed time delay controlled starting circuits.

Blower Motor Control

The blower motor in the VIOLUX lamp housing is electronically controlled by the temperature of the lamp. If the lamp cools down between exposures the blower may shut off until the lamp again reaches its proper standby temperature. Cooling off of the lamp may be caused by the lamphousing intake blower being located too close to an air conditioning duct forcing cold air into the blower system. This is not a desirable condition.

BTU Ratings of the Equipment

The BTU / hour ratings of the VIOLUX MULTI lights are shown in the chart below. To calculate the actual BTU / hour ratings, the total exposure time (in minutes per hour) should be known or estimated, and the figure calculated from the second chart added to the BTU ratings from the first chart, See example below.

BTU / hour ratings in standby positions

VIOLUX MULTI	4	6	10
ECONOMY	3,000	4,750	7,250
HIGH PERFORMANCE	6,000	9,500	14,500

Additional BTU / hour during exposure. (to be added to above) E is total exposure time per hour (in minutes)

For example, if a VIOLUX MULTI 6 is to be used in the ECONOMY mode for making plates, with a total hourly exposure time of 10 minutes, it should be rated at 7,100 BTU / hour (4,750 + 235 x 10). If it were to be used in the HIGH PERFORMANCE mode with the same total hourly exposure time, it should be rated at 11,100 BTU / hour (9,500 + 160 x 10).

Since most of the heat generated by the equipment comes from the lamphousing, considerable savings on room air conditioning requirements can be made by installing a canopy type fan system above the lamphousing. These systems, which are used over kitchen stoves, can divert much of the hot air above the lamphousing into a dropped ceiling. Additional cost savings may be realized if the fan system can be ducted so that the hot air radiating from the lamphousing can be used in the winter to supplement heating other areas of the plant.

If installing the canopy fan system described above is not practical, it is recommended that a small muffin type fan be installed so that it can blow horizontally over the top of the lamphousing. This will dissipate much of the stagnant hot air normally collected above the lamp housing, and it will result in increased lamp life. It will pay for itself in a few months of operating the equipment, especially for the high powered lights.

Factors Affecting Exposure Times

The VIOLUX MULTI 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 greater increase in exposure time than normal lamp aging.

Type of glass used on vacuum frame. Older glass or glass that has been cleaned with polymer cleaners tend 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.

Improper TAP setting will affect normal exposure times.

Overheating or overcooling of the lamp can also increase exposure times.

Exposure times for the VIOLUX MULTI 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 enclosed arc lamps. VIOLUX multispectrum lamps, because of their smaller electrodes and improved halogen cycle, produce less blackening than similar metal halide lamps of other manufacturers and retain their actinic output for longer periods of time.

For this reason it is recommended that only genuine Theimer THS lamps be used in the equipment. These lamps are warranteed to loose no more than 20% of their actinic energy, measured at 365 nm, during the first 1000 hours of operation. Other lamps typically loose 50% of their actinic energy after only 500 hours of operation.

Accessories for VIOLUX MULTI Printing Lamps

Several accessories are available for the VIOLUX MULTI Printing Lamps. A double rail extended slide-in filter holder, mounts below the reflector hood. It receives VIOLUX Proofing filters (#PFV) Clearing Filters (#CFV) and Attenuation (#AFV-50 or #AFV-90) all of which can be slid in place and easily stored out of the way when not required.

MAINTENANCE

Caution: Any services of the VIOLUX MULTI Lamp housing or Power Supply should only be done by an approved technician or competent electrician. Several terminals for operation of the lamp have high voltages.

Electrical Operation

As an aid to trouble-shooting the operation and functions of various components are described below. Simplified schematics of some of the important circuits are shown for convenience. For more details please refer to the schematics at the end of this section.

Fuses located on the front panel of the Power Supply protect the various circuits as follows:

F1	1.8 amps	Remote control circuits
F2	4 amps	Fan & blower circuits
F3 & F4	4 amps	Shutter and dc control circuits

A thermal overload switch shut off the equipment. It is located in the lamphousing, F5.

A1 Printed Circuit Board

Contains lamp ignition circuit, electronic blower control, dc rectifier for shutter circuit, K4 and K5 relays and time delay circuit.

C1 Lamp Capacitors

Connected in series with lamp for medium power operation.

C2 Lamp Capacitors

Connected in parallel with C1 capacitors for high power operation.

C3 Blower motor capacitor

Operates blower motor at slow speed during low power operation or standby.

C4 Blower motor capacitor

Operates blower motor at moderate speed when lamp is at its medium power level.

C5 Blower capacitor

Motor capacitor for blower in lamp housing.

F5 Thermal switch

Normally closed switch inside the lamphousing that activates when the temperature exceeds safety limits.

K1 Line Voltage Power Contactor

Actuates when ON/OFF switch on the Remote Control Box or Integrator is turned on. Contacts apply incoming voltage to equipment.

K2 Low Power Contactor

Actuates when ECONOMY / HIGH PERFORMANCE switch is in ECONOMY position, or during exposure when Power Level I is selected. The contacts bypass lamp capacitors and apply main transformer output voltage to lamp for low power operation. Other contacts switch stand by blower capacitor for proper cooling of lamp at low power.

K3 High Power Contactor

Actuates whenever Power Level III is selected. The contacts switch additional lamp capacitors into circuit for high power operation. The second set of contacts bypass standby blower capacitors for high speed operation of lamp cooling blower.

K4 Expose Relay

Located on main printed circuit board. Actuates when Integrator is operated to make an exposure. Two sets of contacts switch dc voltage to shutter motor from - to + to open shutter. Third set of contacts actuates timer for K5 delay relay if low power is selected.

K5 Delay Relay

Located on main printed circuit board. Activates to switch equipment to low power when ECONOMY / HIGH PERFORMANCE is in the ECONOMY position, or during an exposure when Power Level I is selected. Deactivates through time delay circuit.

M1 Fan motor

Located in power supply to cool main power transformer.

M2 Blower Motor

Cools lamp for proper operation.

M3 Shutter Motor

Located on outside of lamphousing. Operates shutters when polarity is switched by K4 relay.

S1-2 Limit Switches

Located outside lamphousing inside small coverplate. Removes dc voltage from shutter motor and connects braking diodes to stop shutter.

T1 Main Power Transformer

Supplies lamp, blower, and shutter with ac voltages for operation of equipment.

V1,V2 Braking Diodes

Shorts out shutter motor armature to dynamically brake shutter motor when its associated limit switch is activated.

Check of Main Transformer

With the TAP voltage properly set, the main transformer should provide the following ac voltages measured with respect to terminal 4 (R) unless otherwise specified. Note: Terminal 6 voltages are with bulb not lit.

Terminal	Voltage
1	200
2	220
3	240
6	800 for MULTI 10
	600 for MULTI 6
	310 for MULTI 4

Voltages between terminals 8 and 9, and 10 and 9 should be 11 vac.

Shutter Motor Control Circuit

The shutter motor control circuit consists of only five component parts. A separate low voltage winding on the main transformer generates 22 volts ac which is applied through two fuses 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 to the motor through contacts of relay K4 and through either of the two shutter limit switches.

The proper polarity dc voltage is fed to the shutter motor through the normally closed contacts of the limit switch that is not actuated. The motor will drive the shutter in the direction to actuate 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 causes of shutter circuit failure are blown fuses F3 and F4. 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.

Blower Circuit

The lamp cooling blower is electronically controlled to turn on after the lamp reaches a predetermined temperature. This control is located on the printed circuit board. The capacitors are in series with the blower in order to maintain the proper blower speeds which coincide with each power level.

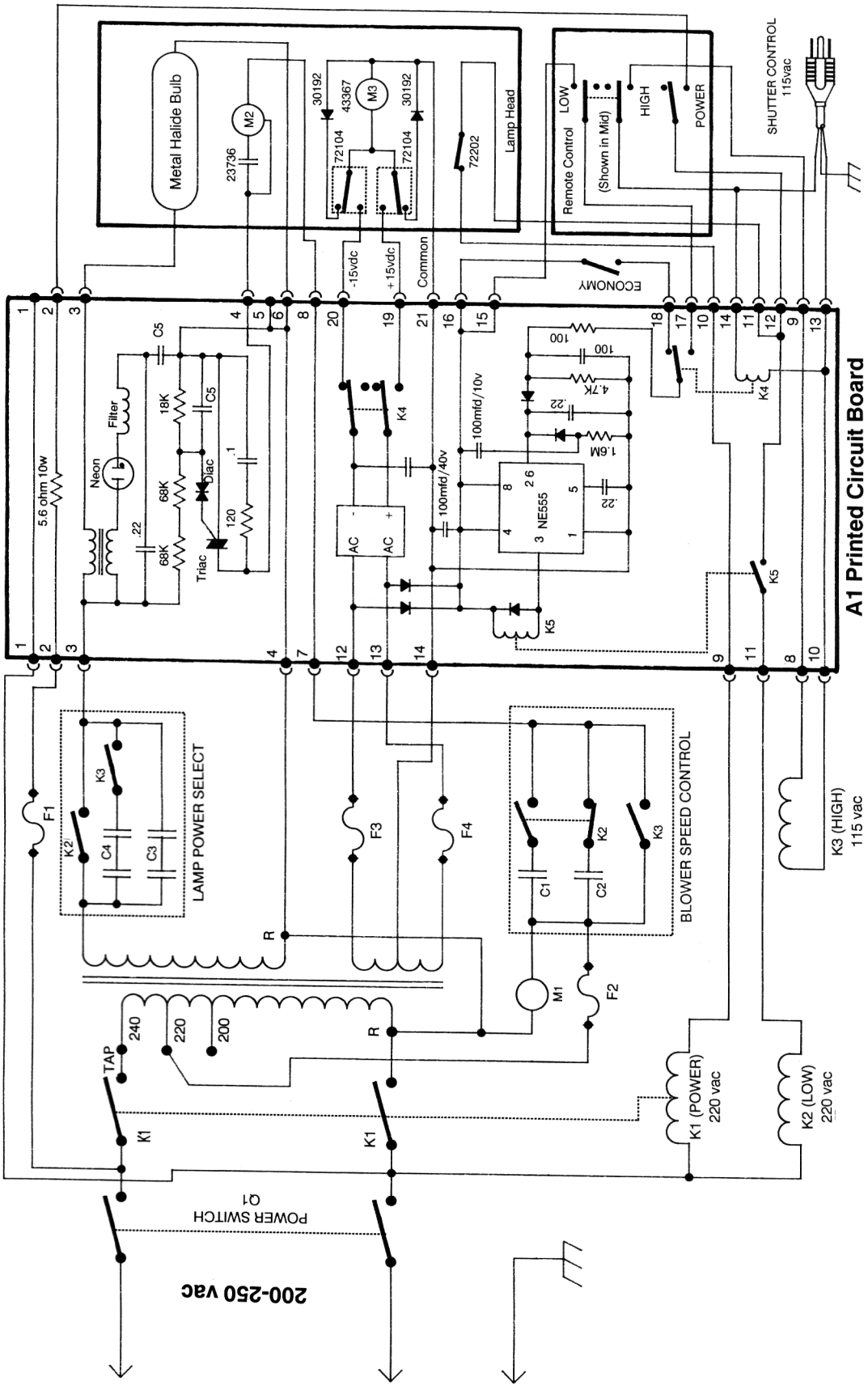
Lamp Ignition Circuit

The Lamp ignition circuit is located on the printed circuit board. The ignition circuit is automatically turned on when lamp is not lit. Ignition can be verified by noting intermittent firing of neon lamp on printed circuit board when lamp is not lit.

VIOLUX MULTI Trouble Shooting Guide

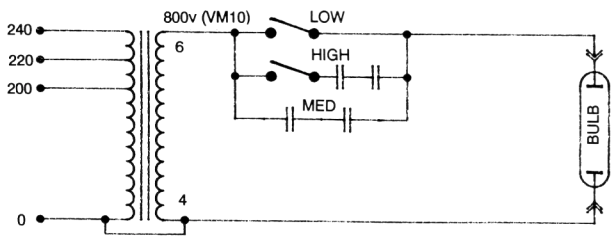
Problem	Possible cause or symptom	Test procedure or remedy
Lamp does not ignite	No line voltage.	Check line voltage fuses or circuit breakers.
	Lamp is too hot	Allow lamp to cool down before re-starting.
	Lamp is defective or at end of operating life	Check lamp for glass or electrode breakage. Replace lamp.
	a) Main Power Contactor K1 not energized	Check integrator or Remote Control Box connections.
	b) Main Power Contactor K1 is energized	Check voltage between terminals 2 and 4 and 3 and 4 of main transformer. If voltage is not present, main power contactor may be defective or TAP wire may not be making proper contact.
Lamp does not switch to high power for exposure	Power Level switch incorrectly set	Check setting of Power Level Switch.
	Defective High Power Contactor K3	Check to see that contactor K3 energizes during exposure. Contactor or selector switch may be defective.
Low light output	TAP improperly set	Check incomming line voltage at main power switch and reset TAP wire accordingly.
	Lamp is at end of operating life	Check for blackening of glass envelope. Replace lamp.
Uneven light coverage	Lamp or lamphousing not properly mounted	Check that lamphousing is parallel to printing frame. Follow instructions for installation of lamp. Check that shutter is fully opened during exposure.
Shutter does not open	Relay K4 not activating	Check integrator for proper connections.
	Shutter fuse F3 or F4 blown	Check fuses
	Defective or sticky limit switch	Check that actuating arm of 'open' limit switch is not sticking. Readjust limit switch if necessary.
Shutter does not close	Integrator or timer not shutting off	Check that relay K4 releases at end of exposure count-down. If K4 deactivates, check 'closed' limit switch as above. If K4 remains closed check integrator.
Shutter opens or closes noisily	Limit switches not adjusted properly	Adjust limit switch.

System Schematic

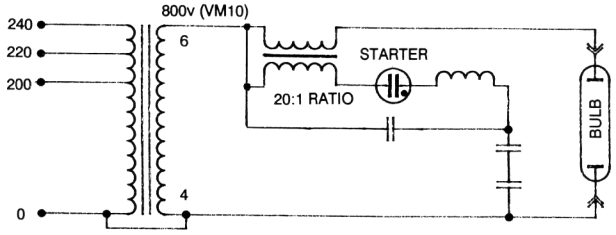


REFERENCE DRAWING

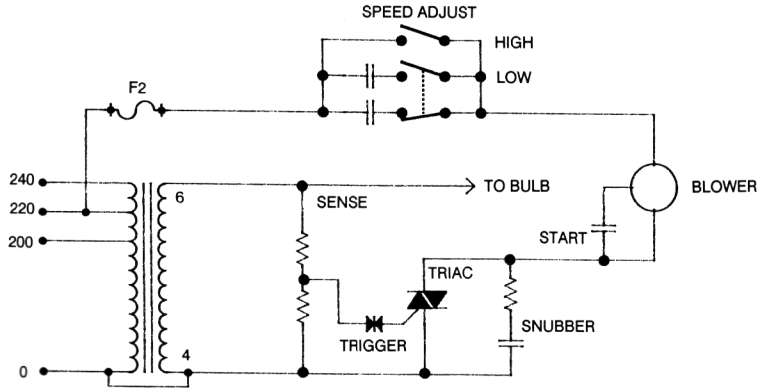
BULB "RUN" CIRCUIT



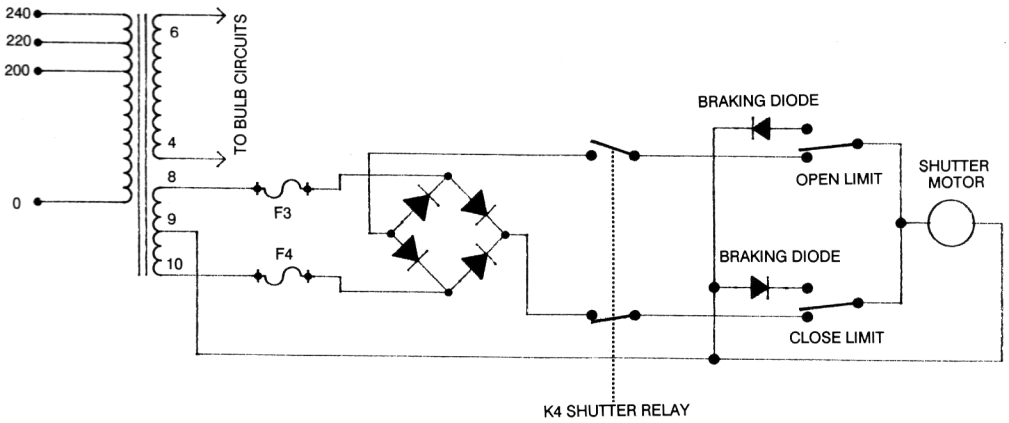
BULB "IGNITION" CIRCUIT



BLOWER CIRCUIT



SHUTTER CIRCUIT



PARTS LIST

VIOLUX MULTI 4, 6 and 10

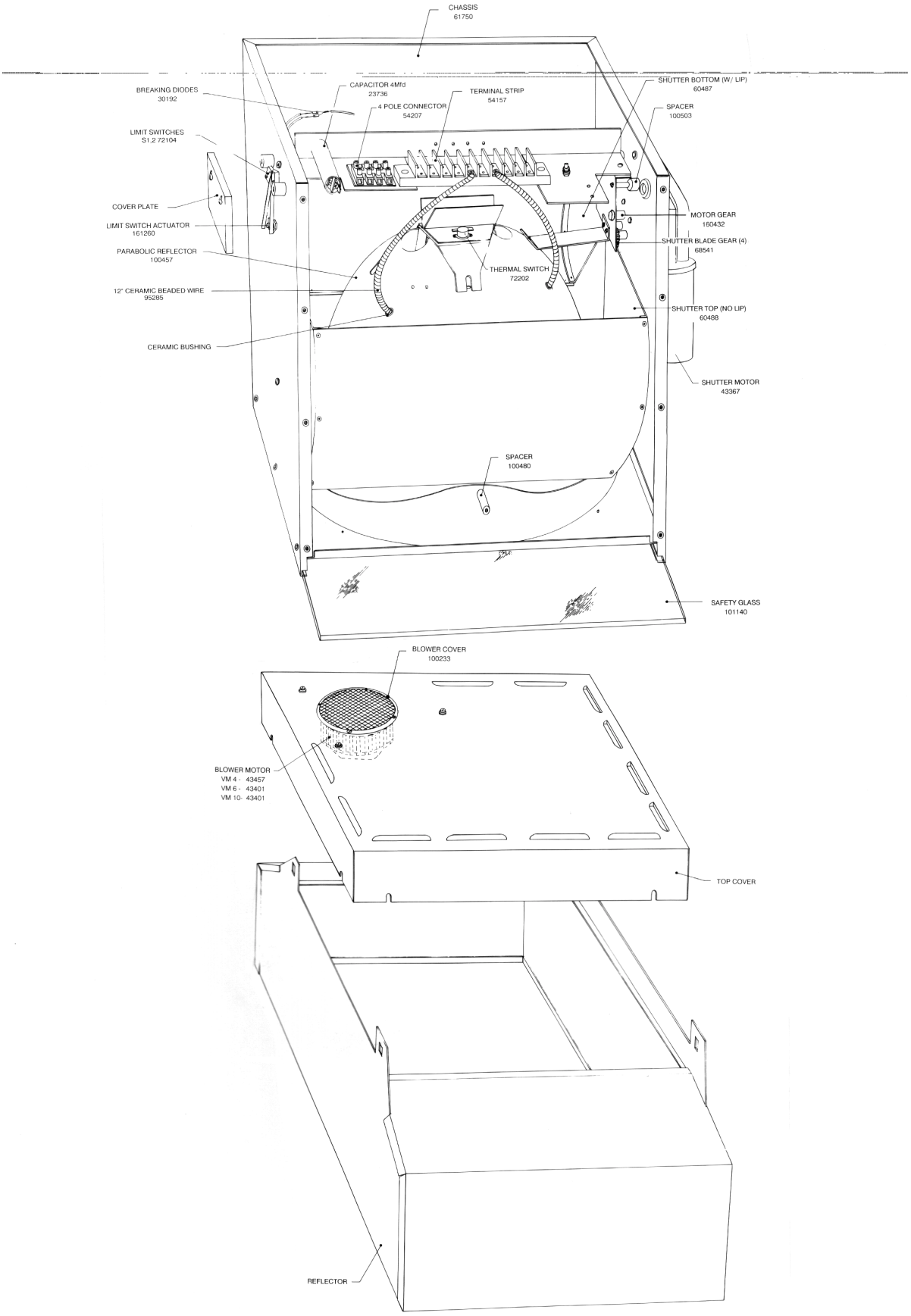
Circuit Symbol	Description	Part Number Multi 4	Multi 6	Multi 10
Power Supply				
A1	Printed Circuit Board	56869	56855	56853
C1	Blower Capacitor	23736	23738	23738
C2	Blower Capacitor	23738	23756	23738
C3,4	Lamp Capacitor, 20 Mfd	23310*	(5) 23310*	(4) 23310*
C3,4	Lamp Capacitor, 10 Mfd		(2) 23321	(8) 23321
C4	Lamp Capacitor, 30 Mfd	(3) 20972		
C3	Lamp Capacitor, 5 Mfd			23758
K1	Contactor, 220 vac	63794	63794	63794
K2	Contactor, 220 vac	63796	63796	63796
K2a	Auxiliary Contact for K2	63797	63797	63797
K3	Contactor, 110 vac	63856	63856	63856
M1	Fan Motor, 220 vac	43410	43410	43410
Q1	Main Power Switch	71755	71755	71755
S3	Economy Switch	71301	71301	71301
T1	Main Power Transformer	44051	44052	44053
	Line Cord, 30 amps	80519	80519	80519
	Power Supply Cover	60068	60068	60068
	Receptacle, 30 amps	50303	50303	50303
	Surge Resistor, .25 ohm 10W	4 reqd.	4 reqd.	5 reqd.
	Bleeder Resistor, 1 meg 2W	4 reqd.	4 reqd.	5 reqd.
Lamphousing				
C7	Capacitor	23736	23737	23737
F5	Thermal Switch	72202	72202	72202
M2	Blower Motor, 220 vac	43457	43401	43401
M3	Shutter Motor, 12 vdc	43367	43367	43367
S1,2	Limit Switch	72104	72104	72104
V1,2	Braking Diode Assembly	95516	95516	95516
	Shutter Assembly	171729	171729	171729
	Motor Gear with extension	160432	160432	160432
	Shutter Gear (4 total)	68714**	68714**	68714**
	Lamp Cable, 10 conductor	80521	80521	80521
	Safety Glass	101140	101140	101140
Metal Halide Lamps				
	Multi Spectrum	THS4027	THS6027	THS8027
	Diazo	THS4020	THS6020	N/A
Remote Control Box				
S4	Power Level Pushbuttons	56821	56821	56821
S5	Power Switch (green)	71384	71384	71384

NOTE:

* These Part Numbers are for reference only as they are no longer available, contact Douthitt for the capacitor update kit if these capacitors fail.

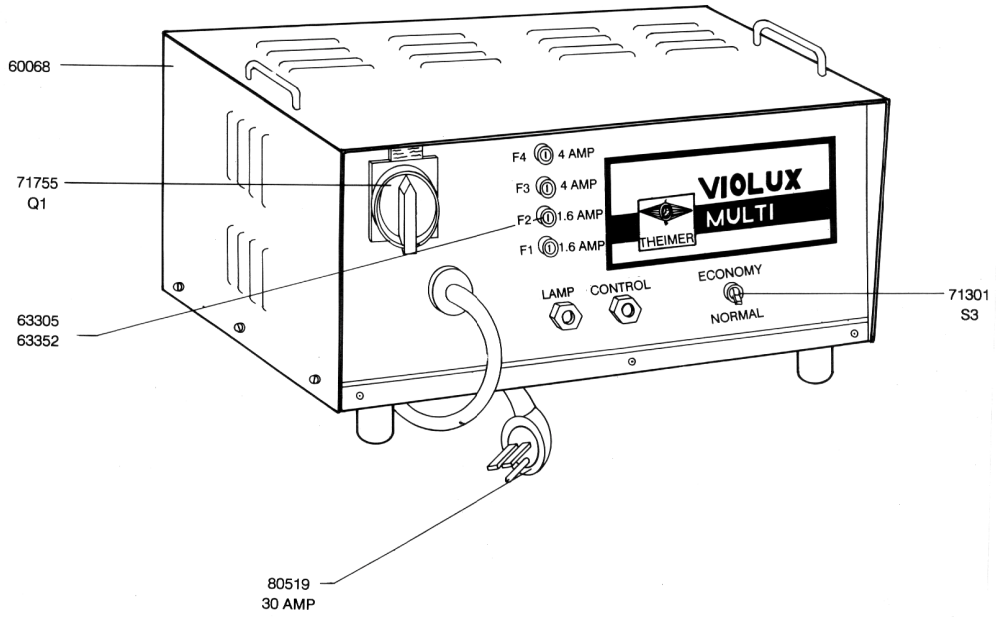
****** These are a new updated gear with needle bearings.

REFERENCE DRAWING

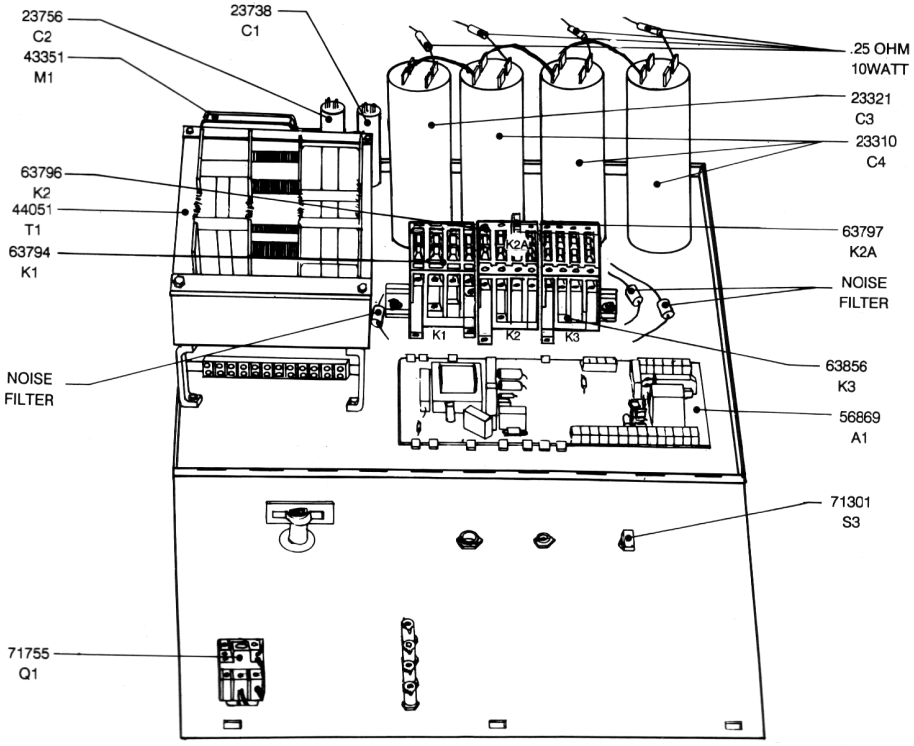


REFERENCE DRAWING

VM 4, 6 and 10 Power Supply

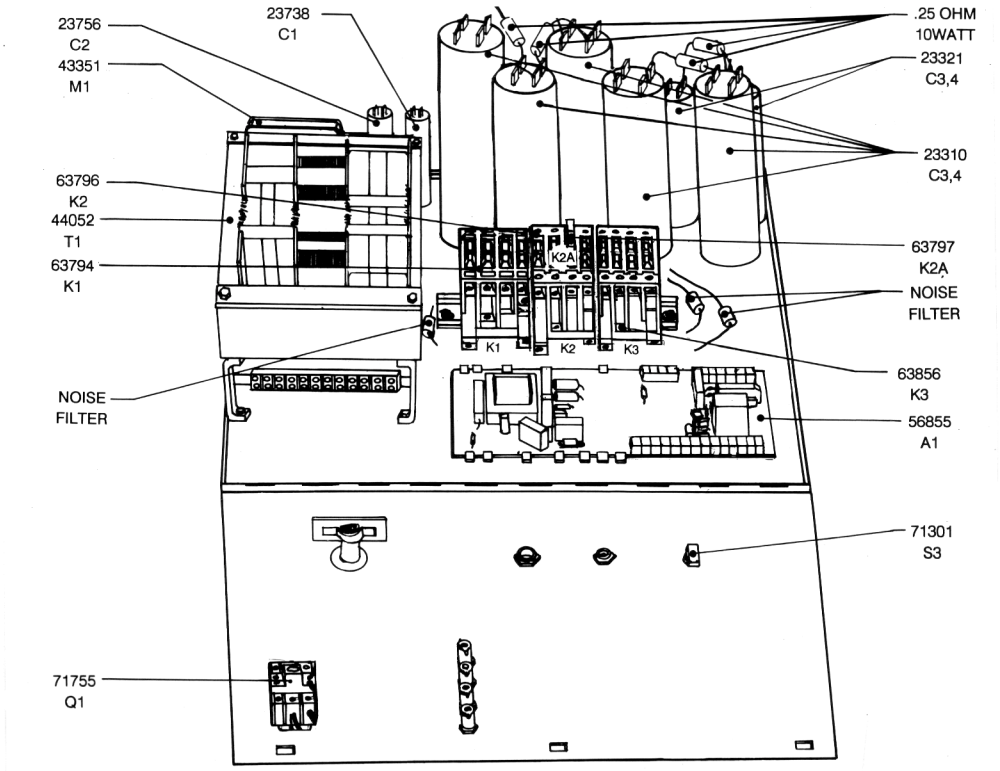


VM4 Power Supply Parts

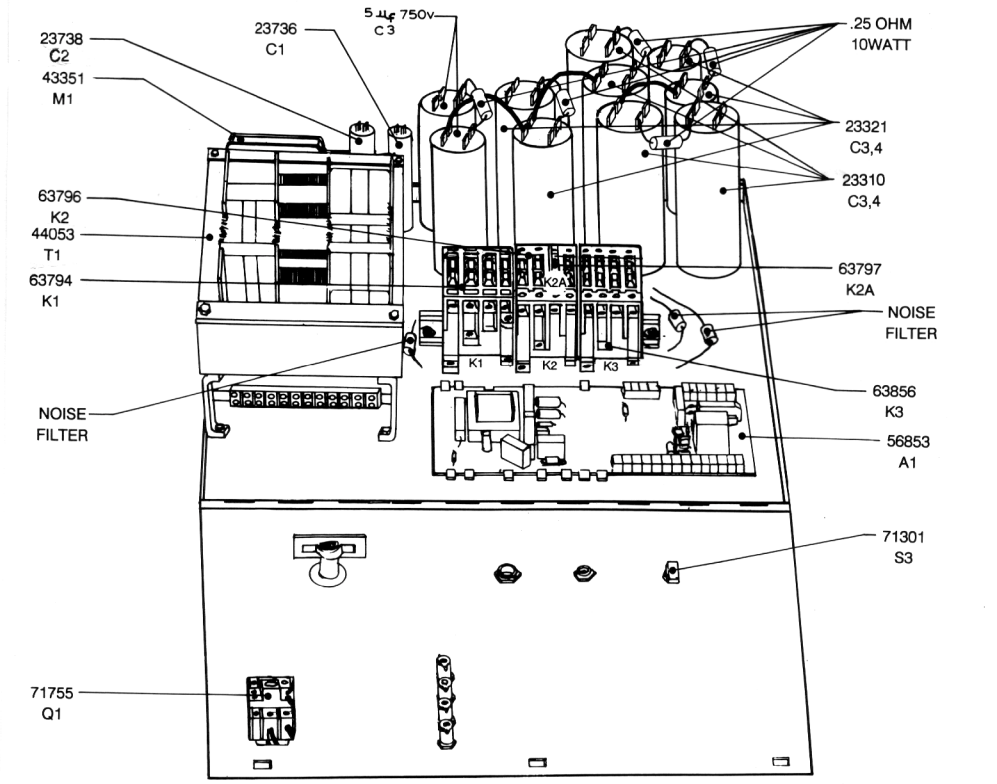


REFERENCE DRAWING

VM6 Power Supply Parts



VM10 Power Supply Parts



WARRANTY

The Douthitt Corporation warrants all equipment manufactured by them for a period of one year, against breakage of parts resulting from defects in material or workmanship under normal conditions of operation, installation and usage. Douthitt's liability under this warranty shall extend only to repair or replacement, F.O.B. Douthitt's factory, and all broken or defective parts are to be returned to Douthitt if Douthitt so requests. Douthitt reserves the right to inspect such broken or defective parts prior to repairing or replacing same.

Douthitt's warranty of purchased parts and components is limited to the warranty extended by the original manufacturer of such purchased parts and components. This warranty shall apply only if complaint is made in writing to Douthitt's factory within the warranty period.

The period of this warranty shall begin on the date of shipment from Douthitt's factory, and shall extend for twelve (12) calendar months thereafter on all equipment installed without Douthitt's supervision. On all equipment installed under Douthitt's supervision, this warranty shall extend for twelve (12) calendar months after the date of completion of installation, unless installation is unreasonably delayed by the purchaser, or for causes beyond Douthitt's control, and in such cases the maximum warranty period shall be thirteen (13) calendar months after the date of shipment from Douthitt's factory.

This liability of Douthitt shall in no case exceed the obligation to replace such broken parts as herein provided.

This warranty shall be of no force or effect if alterations or modifications of any nature are made by the purchaser without Douthitt's full knowledge and consent.

No guarantees or warranties apply except as above set forth.