INSTRUCTION MANUAL
FOR
YD4 AND YD6
POWER SUPPLY

MODEL _____ SERIAL N0._____

(908)922-9300
ELECTRONIC MEASUREMENTS, INC.
405 ESSEX ROAD, NEPTUNE, N.J. 07753

83-490-001 REV. B

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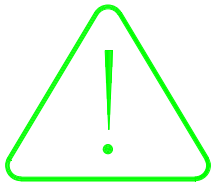
1.0 GENERAL

1.1 Safety Warning



All model YD power supplies contain hazardous voltage and energy. The power supply must only be operated by qualified personnel who have read this operator's manual and are familiar with the operation, hazards and application of the power supply. Proper care and judgement must always be observed. Ensure all covers are in place and securely fastened and the required grounding and cooling is supplied before connecting input AC power. Proper grounding from the input AC power is required to reduce the risk of electric shock. Use extreme caution when connecting input AC power and never apply the incorrect input power. Use extreme caution when connecting the high voltage output cable. Ensure all load capacitors are completely discharged prior to connection and never handle the output cable when the power supply is operating. Always replace fuses with the same type and Volt/Amp ratings. Never attempt to operate the power supply in any manner not described in this manual. Never remove DANGER or WARNING labels from the power supply, and replace lost or damaged labels immediately. The power supply should only be serviced by EMI factory qualified personnel.

1.2 Warranty Summary

This product is sold by EMI under the warranty set forth in our Standard Terms and Conditions of Sale and is summarized here for reference.

EMI warrants this product to be free from defects in materials and workmanship under normal use and service for a period of one year after the date of delivery. The liability of EMI under this warranty is limited, at our discretion, to repairing or replacing this product returned to EMI during the warranty period, provided EMI is notified within thirty days of the discovery of the defect. This warranty is extended only to the customer purchasing the product directly from EMI or an authorized representative.

The defective product shall be returned to EMI prepaid by the buyer only after informing the EMI customer service department and obtaining a return material authorization number (RMA). EMI shall inspect the product to determine that it has not been i) repaired or tampered with by other than factory qualified personnel, ii) any defect has not been caused by misuse, neglect, or accident, or iii) the product has not been operated under abnormal conditions.

EMI warrants repairs furnished under this warranty to be free from defects in materials and workmanship for a period of ninety days from date of delivery or the unexpired term of this warranty, whichever is longer.

EMI warrants spare parts and subassemblies sold by us to be free from defects in materials and workmanship for a period of ninety days from date of delivery.

EMI will return the repaired product via normal channels at the customer's expense. Special return shipment instructions shall be made by the customer when requesting the RMA number.

In no event shall EMI be liable for any incidental or consequential damages to the customer's property or personnel resulting from the use of this product or caused by any defect, failure, or malfunction of this product, whether a claim for such damage is based upon warranty, contract, negligence, or otherwise.

1.3 Service

Equipment may only be returned to EMI after a return material authorization (RMA) number has been issued. Obtain an RMA number by contacting the EMI customer service department and providing the following information:

1. Equipment model number
2. Serial number
3. Reason for return
4. Customer purchase order number (required for non-warranty items and customer-specified shipping instructions)

The equipment must be returned in a shipping container equivalent to the original. It is generally suggested that equipment be shipped by air freight rather than surface freight. All repairs will be completed and shipped within the repair period quoted at the time of RMA issuance. The minimum charge can also be quoted if requested. Consult factory for on-site servicing.

1.4 Description

The YD series are high voltage, switching power supplies designed specifically for igniting and powering an arc lamp. A block diagram of the YD series power supply is shown in Fig. 1.

The YD Series is available in four different OEM models; the YD4-SC, YD4-PC, YD6-SC and YD6-PC. All four models have the same mechanical dimensions, are air cooled, and can operate from single or three phase AC power sources. Each unit is easily controlled through a 26 pin control connector. The differences between each of the YD models is shown below:

Model	Maximum Output Power	Power Factor Correction
YD4-SC	4 kW	
YD4-PC	4 kW	Included
YD6-SC	1 Phase AC - 4 kW 3 Phase AC - 6 kW	
YD6-PC	6 kW	Included

A high-frequency IGBT pulse width modulated (PWM) regulator is used to efficiently generate the output power. A high- performance control module precisely regulates the output current, automatically compensating for line, load, temperature, rep rate, and program voltage variations. Normal external fault conditions such as line dropout, open or short circuit load, and over-temperature will not damage the unit. The lamp trigger circuit is included in the unit, and provides the high voltage pulse and boost voltage required to reliably start an arc lamp.

The power factor correction circuitry reduces the RMS input current and it's harmonic distortion when operating from a single phase AC input source. The YD4-PC and YD6-PC input power factor will typically be greater than 0.99, and the line current total harmonic distortion (THD) will typically be less than 6%. The active power factor correction circuitry also allows the PC models to achieve a higher output voltage than the SC models as shown in Fig. 2.

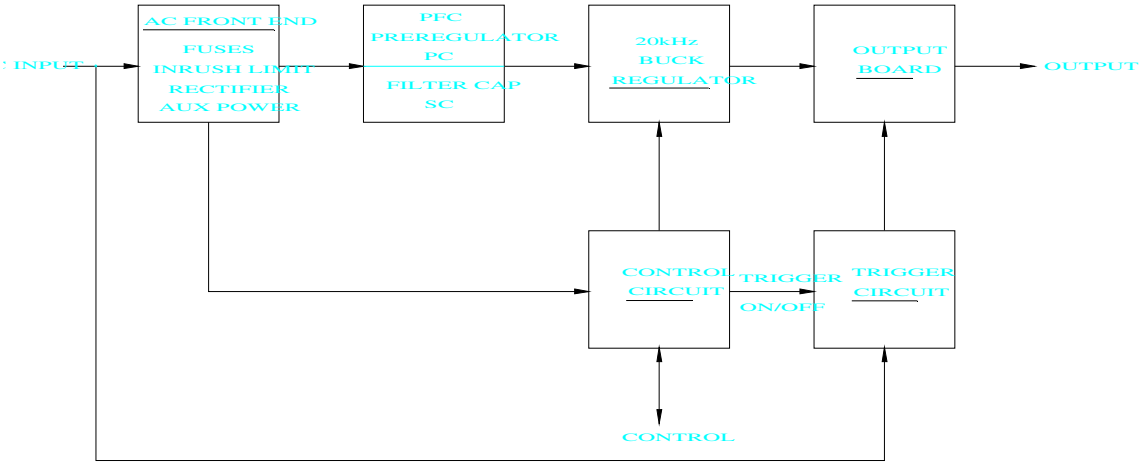


Figure 1. YD Series Block Diagram

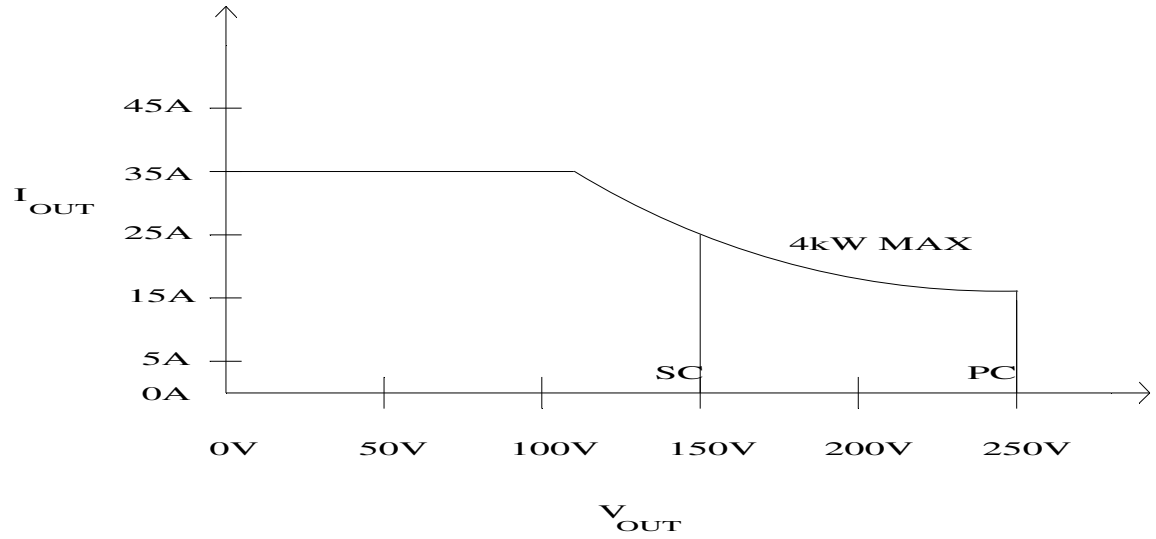


Figure 2a. YD4 Output Voltage vs Output Current Derating Curve

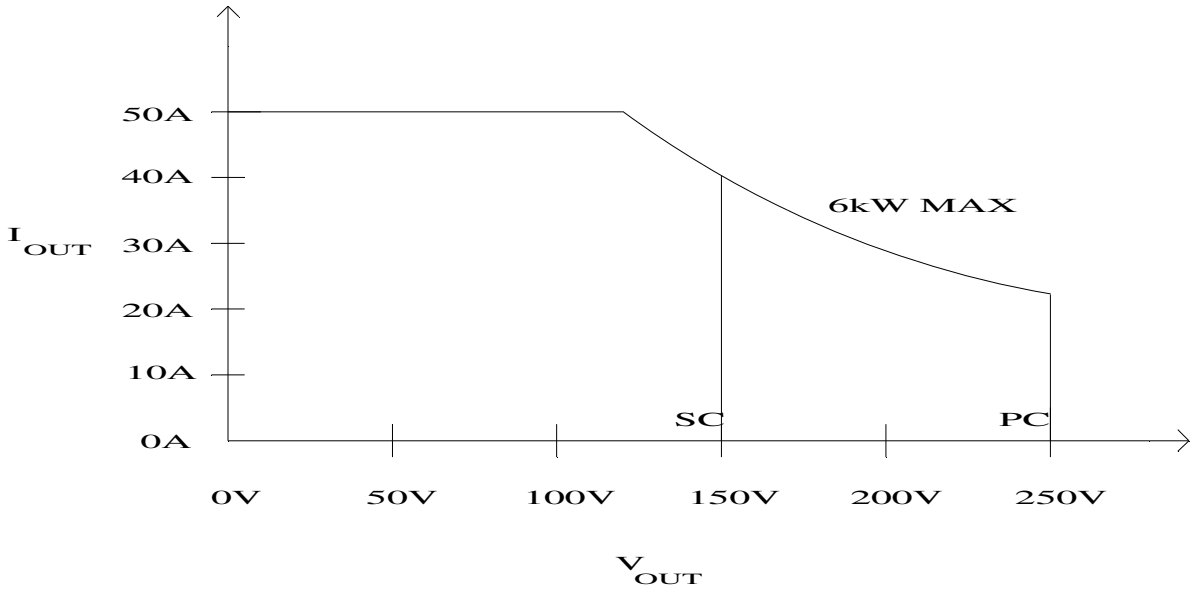


Figure 2b. YD Output Voltage vs Output Current Derating Curve

2.0 SPECIFICATIONS

2.1 OUTPUT CURRENT/VOLTAGE:

Model	Output Current Range	Current Limit	Output Voltage Range
YD4-SC	0 to 35A	37A ±5%	0 to 150V
YD4-PC	0 to 35A	37A ±5%	0 to 250V
YD6-SC	1 PH 0 to 35A 3 PH 0 to 50A	53A ±5%	0 to 150V
YD6-PC	0 to 50A	53A ±5%	0 to 250V

NOTE:

An increase in output current results in an increase in output voltage determined by the lamp characteristics. Full output power will not be available if i) the product of the output voltage and output current exceeds the power rating, or ii) the lamps V-I characteristic is such that the programmed output current requires an output voltage beyond the capability of the power supply.

2.2 ACCURACY:

Program voltage to output current accuracy is ±1.5%

2.3 REGULATION:

±1.0% Line and Load Regulation.

2.4 OUTPUT CURRENT RIPPLE:

750 mA Max., pk-pk, DC to 1 kHz. Max. 10% of Iout, pk-pk, from 1 kHz to 20 MHz.

2.5 IGNITER VOLTAGE:

25 kV min.

2.6 BOOST VOLTAGE:

1 kV min.

2.7 INPUT VOLTAGE RANGE:

180 - 240V, 1 Phase, 50/60 Hz
180 - 240V, 3 Phase, 50/60 Hz

2.8 INPUT CURRENT:

Model	Config.	Input Current	Full Load Power Factor
YD4-SC	1 Phase	40A max	0.60
	3 Phase	25A max.	0.88
YD4-PC	1 Phase	30A max.	0.98
	3 Phase	25A max.	0.95
YD6-SC	1 Phase	40A max.	0.6
	3 Phase	25A max.	0.9
YD6-PC	1 Phase	40A max.	0.98
	3 Phase	25A max.	0.96

Note: Maximum output power available from a YD6-SC connected to a single phase source is 4 kW.

2.9 EFFICIENCY:

YD4-SC, YD6-SC: 87% at full load.
YD4-PC, YD6-PC: 81% at full load.

2.10 INRUSH CURRENT:

Limited to below full power current.

2.11 PROTECTION FEATURES:

Short circuit and open circuit will not damage power supply. Automatic shutdown on Overtemp, Current Limit, Maximum Duty cycle clamp to limit output voltage. Highly buffered I/O for noise immunity in severe electrical environments.

2.12 COOLING:

Forced air with internal fan, -20.C to 40.C inlet temperature, 10% to 90% R.H. non-condensing.

2.13 SIZE: Refer to Fig. 3 for detailed dimensions.

2.14 WEIGHT: 46 lbs., 21 kg

2.15 OPTIONS: Pulsed/Simmer operation available.

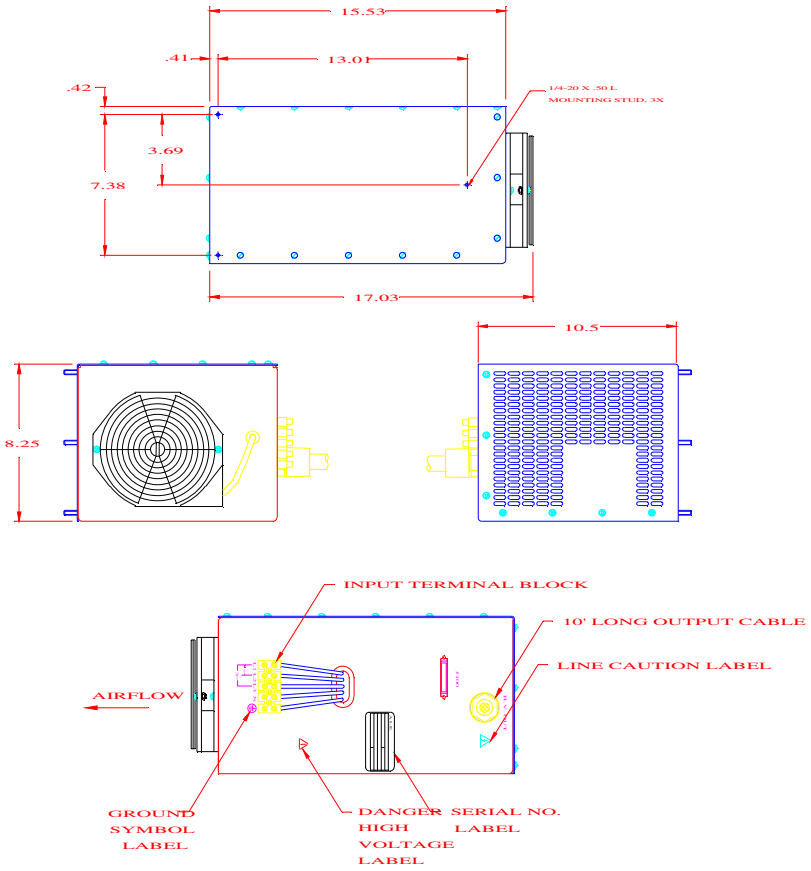


Figure 3. Mechanical Details

3.0 INSTALLATION

3.1 Safety Precautions

All model YD power supplies contain hazardous voltage and energy. The power supply must only be operated by qualified personnel who have read this operator's manual and are familiar with the operation, hazards and application of the power supply. Proper care and judgement must always be observed. Ensure all covers are in place and securely fastened and the required grounding and cooling is supplied before connecting input AC power. Proper grounding from the input AC power is required to reduce the risk of electric shock. Use extreme caution when connecting input AC power and never apply the incorrect input power. Use extreme caution when connecting the high voltage output cable. Ensure all load capacitors are completely discharged prior to connection and never handle the output cable when the power supply is operating. Always replace fuses with the same type and Volt/Amp ratings. Never attempt to operate the power supply in any manner not described in this manual. Never remove DANGER or WARNING labels from the power supply, and replace lost or damaged labels immediately. The power supply should only be serviced by EMI factory qualified personnel.

3.2 Initial Inspection

The shipping container should contain the following items: power supply with output cable attached and operator's manual. Examine the items immediately for damage. Locate the serial number label on the side of the power supply and verify the model number. In the event of any damage, promptly notify the transportation company and the EMI customer service manager.

3.3 Installation Requirements for IEC 601-1

For use with IEC-601-1 Isolation Transformer. Unit does not comply with the RFI regulation EN 55011/CISPR II (end product has to be evaluated).

3.4 Mounting and Cooling Requirements

The power supply is designed to mount in a mechanical enclosure, and can also operate on a bench or table top. In all cases adequate clearances must be provided for proper air flow and cable bends. Generally, at least 4 inches of clearance should be allowed at the fan side and vent side of the power supply.

When operating in an enclosed system, care must be taken to ensure the ambient inlet air to the power supply does not exceed the maximum operating temperature of 40C. This often requires addition of a system heat exchanger.

3.5 Grounding and Input AC Power

Proper grounding from the input AC power is required to reduce the risk of electric shock. The metal chassis of the power supply is grounded through the green earth ground wire at the input AC power terminal block. Use extreme caution when connecting input AC power and never apply the incorrect input power. Connect two single phase lines to L1 and L2, or three 3-phase lines to L1, L2, and L3. No connection to neutral is required.

3.6 Power Cord Specification

Use minimum AWG #10 wire (copper diameter 2.588 mm) Insulation 600V .

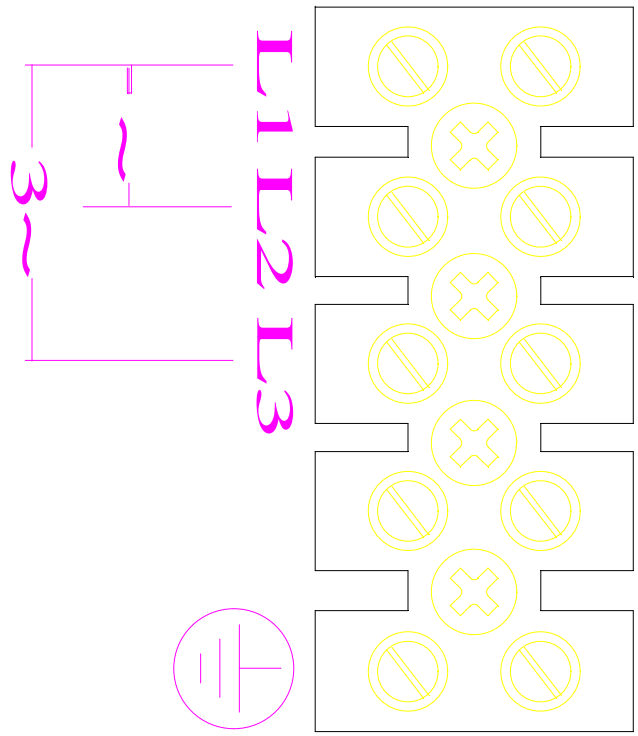


Figure 4. Input AC Power Connections

3.7 Connecting Arc Lamp

Ensure that the power supply is off and disconnected from the input power, that all load capacitors are discharged and that the output of the power supply is discharged before making any connections. Never handle the output cable during operation.

Always use the cable provided with the power supply or an equivalent substitute provided by EMI .

The cable ends are terminated with #10 ring terminals. The BLACK wire connects to the lamp ANODE (positive end). The WHITE wire connects to the lamp CATHODE (negative end). The cable shield is connected to the power supply chassis and does not connect to either of the output terminals. Keep the output terminals a minimum of 3 inches apart.

Keep the minimum HV cabe bend radius greater than 4 inches to minimize stress on the insulation. Keep the HV cable as distant as possible from the input power and the input control cables.

DO NOT connect either of the output terminals to chassis ground in a non-isolated system. If either of the output terminals is connected to chassis ground in a non-isolated system, permanent damage to the power supply may result.

EXTREME CAUTION should be applied if the output cable is left unconnected while the power supply is running. An unconnected output cable may allow the high voltage trigger pulse to arc across the open cable end terminals establishing a DC arc in air that the power supply will sustain at the programmed output current. Typically such an arc will not damage the YD power supply, but is hazardous to other equipment and personnel. Open circuit operation is NOT recommended.

CAUTION the output is floating at AC line voltage whenever the AC input is connected, regardless of whether the power supply is enabled.

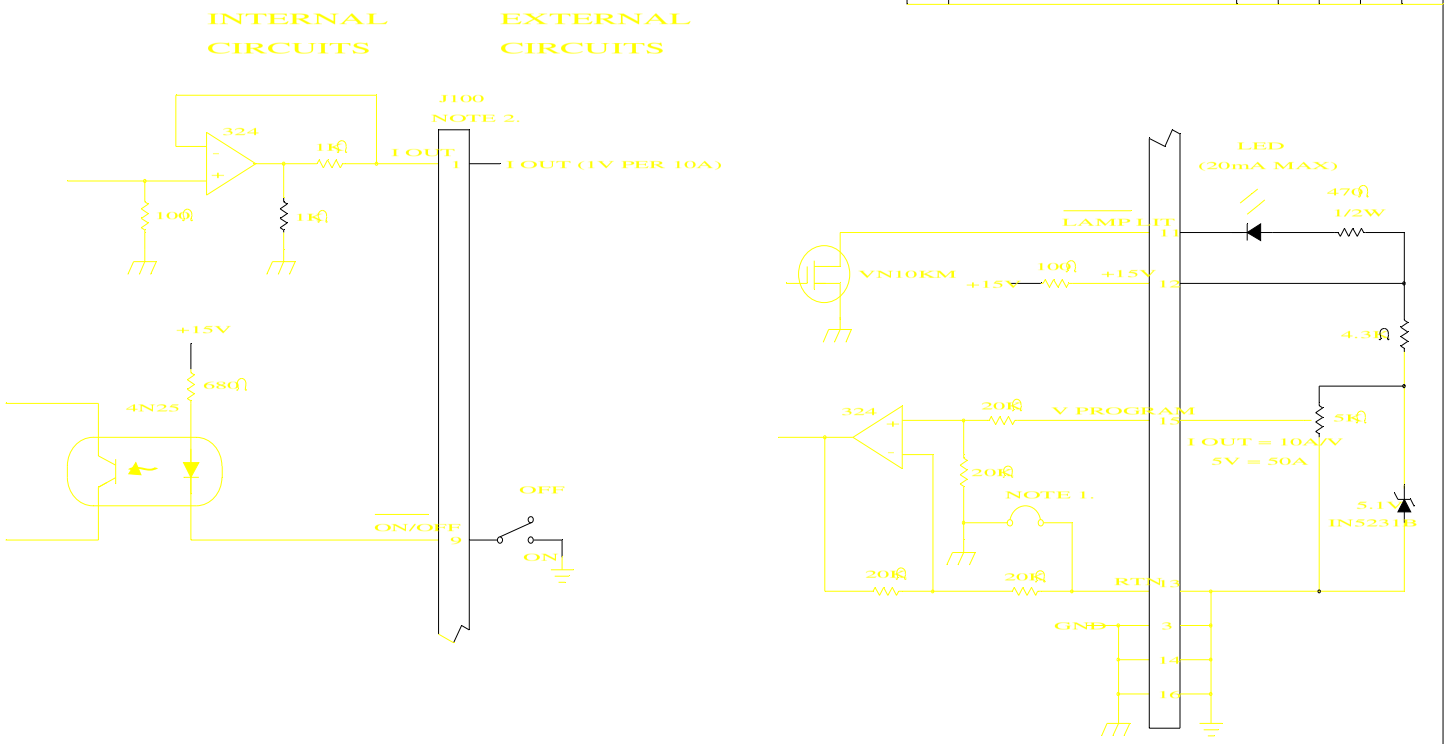
4.0 OPERATION

4.1 Remote Control

Each model of the YD power supply is easily controlled through the remote connector J100. Only the ON/OFF, V PROGRAM, and GND signals are required for operation. The remaining signals are provided for status monitoring. A schematic diagram showing the suggested interface circuit appears after the following description of control signals.

Pin	Signal Name	I/O	Description
9	$\overline{\text{ON/OFF}}$	INPUT	GND = ON, Open = OFF
15	V PROGRAM	INPUT	0 - 5V, Output current follows V PROGRAM at 10 Amps per Volt.
1	ANALOG OUT	OUTPUT	0 - 5V. Analog of output Current ±1.5%. Scale = 1V/10A.
12	+15V	OUTPUT	15V through 100 series resistor.
3,13 14,15	GND	OUTPUT	Control circuit return. Also chassis/earth ground.
11	$\overline{\text{LAMP LIT}}$	OUTPUT	Open collector. Indicates that the lamp is lit and that the power supply is providing the programmed output current.

REVISIONS						
REV.	DESCRIPTION	DATE	DRN.	CHK.	ENG.	MGR.
04E	PRELIMINARY	9/9	JT			



NOTE:

1. JUMPER CAN BE REMOVED FOR DIFFERENTIAL INPUT.
2. J100 - 26 PIN MALE .100" x .100" PLUG CONNECTOR - 3M P/N 4626-6000.

	YD-6-PC
	YD-6-SC
NEXT ASSEMBLY USED ON	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ~~ANGLES~~
%%P .XX %%P %%B
N/A .XXX %%P 1/2% %D

MATERIAL: N/A

FINISH: N/A

DO NOT SCALE DRAWING

APPROVALS	DATE
DRAWN	TURCOTTE 7/23/91
CHECKED	
PROJ. ENG.	
ENG. MGR.	

a.l.e. systems, inc.
150 homer avenue
ashland, ma 01721

SCHEMATIC
YAG DRIVE REMOTE

SIZE	DWG. NO.	REV
B	001-0247	04E

SCALE: N/A SHEET 1 OF 1

4.2 Igniting the Lamp

At initial power up the gas within an arc lamp appears as a near perfect insulator and must be made conductive for the lamp to operate. A trigger circuit is required to provide a high voltage pulse capable of ionizing the gas.

Fig. 5. below shows the trigger circuit included in all model YD power supplies. The trigger circuit consists of a boost power supply, a spark gap pulse generator, and a series injection transformer. When the pulse generator is triggered the series injection transformer will deliver a 25kV negative pulse across the arc lamp. During the trigger time a boost voltage of approximately 800 kV is also connected across the lamp to help it sustain an arc.

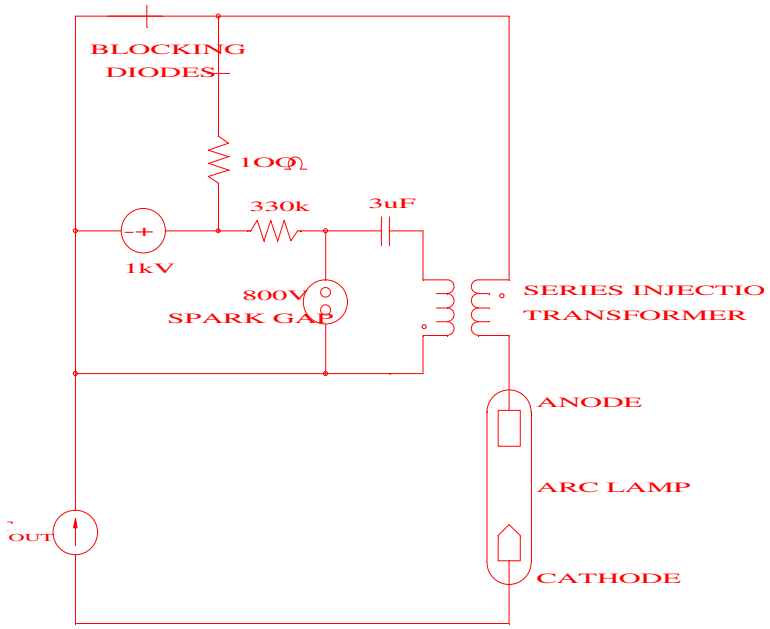


Figure 5. Trigger Circuit Block Diagram

The pulse generator uses a spark gap to couple energy stored in a capacitor to the primary of the series injection transformer. When the power supply is initially turned on it will take from 1 to 5 seconds for the first trigger pulse to occur. Fig. 6. below shows the timing relationships for triggering a lamp.

The trigger circuit is controlled by a timer which allows the lamp approximately 10 seconds to start. If the lamp does not start within the 10 second timer period the lamp trigger circuit will be disabled. The timer is enabled each time the ON/OFF signal transitions to the ON level (0 Volts). If the lamp is lit and then extinguishes the trigger circuit timer will be enabled and try to restart the lamp provided the ON/OFF signal remains at the ON level.

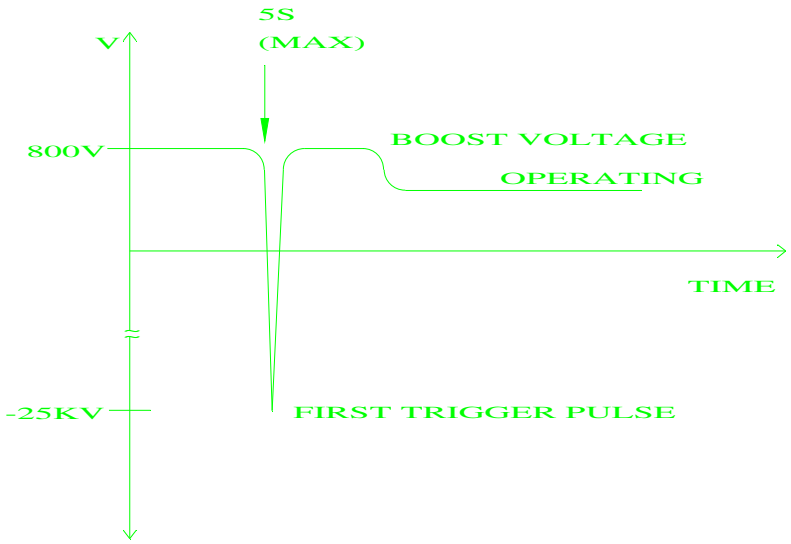


Figure 6. Trigger Cicuit Timing

4.3 Initial Check-Out Procedure

The power supply should have no visible damage or defects and the cover should be securely fastened. Properly connect the input power, control connector and HV output. Ensure the lamp has adequate cooling and that the cooling water is deionized. Double check all connections and ensure that all personnel are protected from the HV output. Before trying to ignite the lamp the output current program voltage (V PROGRAM) must be set to a value greater than 0V. A program voltage of 0.5V is usually sufficient to start an arc lamp. During initial power up the following sequence should be followed.

1. Set V PROGRAM signal (pin 15) to 0.5 Volts minimum.
2. Apply AC Power.
3. Connect ON/OFF signal (pin 9) to ground.
4. Verify adjustability of output current by varying V PROGRAM after the lamp is lit.

5.0 APPLICATIONS

5.1 Measuring Output

Any test equipment connected across the output of the power supply should be isolated from ground. If non-isolated test equipment is used damage to the power supply or test equipment may occur.

Do not connect any piece of test equipment other than a high voltage probe to the power supply output when it is triggering the lamp. Permanent damage to the test equipment may result, and the lamp may not ignite. If the lamp extinguishes while making a measurement the unit will try to restart the lamp. Since restarting the lamp requires a high voltage trigger pulse it is good practice to place a MOV across the terminals of any equipment used to make a steady state measurement. The MOV should be rated at a voltage greater than 450V.

5.1.1 Output Current

The output current can be observed by monitoring the ANALOG OUT signal on pin 1 of the J100 connector. This signal represents the output current at 1V per 10A and is accurate to within 1.5% of the actual output current.

The output current can also be measured with a DC current probe rated at the maximum output current of the power supply.

5.1.2 Trigger Voltage

The trigger voltage can be observed with a 1000X oscilloscope probe and a storage oscilloscope. The Tektronix P6015 is a high performance shielded probe and a good choice for this application.

5.1.3 Steady State Voltage

The steady state output voltage may be measured with a 10X or 100X oscilloscope probe and a standard oscilloscope. A voltmeter or DVM may also be used to measure the steady state DC output voltage.

5.2 Determining AC Line Current

In some applications the user may desire to know the exact AC line current. The following formulae may be used to calculate AC line current.

Three Phase Operation:

$$Iac = \frac{Pout}{\sqrt{3} * (Vac) * (PF) * (EFF)}$$

Single Phase Operation:

$$Iac = \frac{Pout}{(Vac) * (PF) * (EFF)}$$

I_{AC} = RMS Input Current

V_{AC} = RMS Input Voltage, line to line

PF = Input Power Factor

EFF = Efficiency of the power supply

P_{out} = Output Power in Watts

5.3 Regulating Optical Power

Some applications may require that a YD power supply be used in a system where the optical power of the lamp is precisely controlled. This can be accomplished with a closed loop control system similar to Fig. 7. A detector is used to measure the light output of the lamp. An operational amplifier is used as an error amplifier and compares the signal from the detector to a reference generating a current control signal. The current control signal will automatically adjust the VPGM signal to compensate for changes in optical power caused by lamp to lamp variation or aging.

A more detailed schematic of the required error amplifier electronics is shown in Fig. 8. This circuit uses a 5Kohm trim potentiometer to adjust the reference, a more precise external reference may also be used.

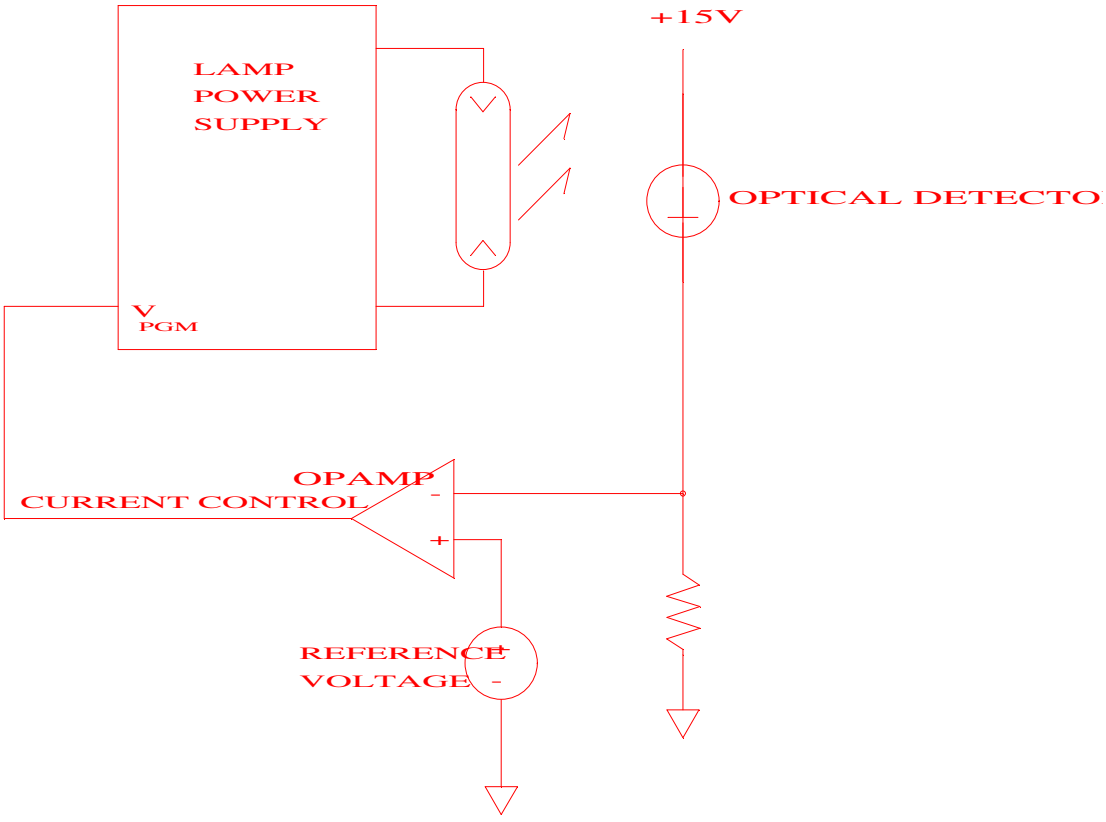


Figure 7. Yag Drive Optical Control

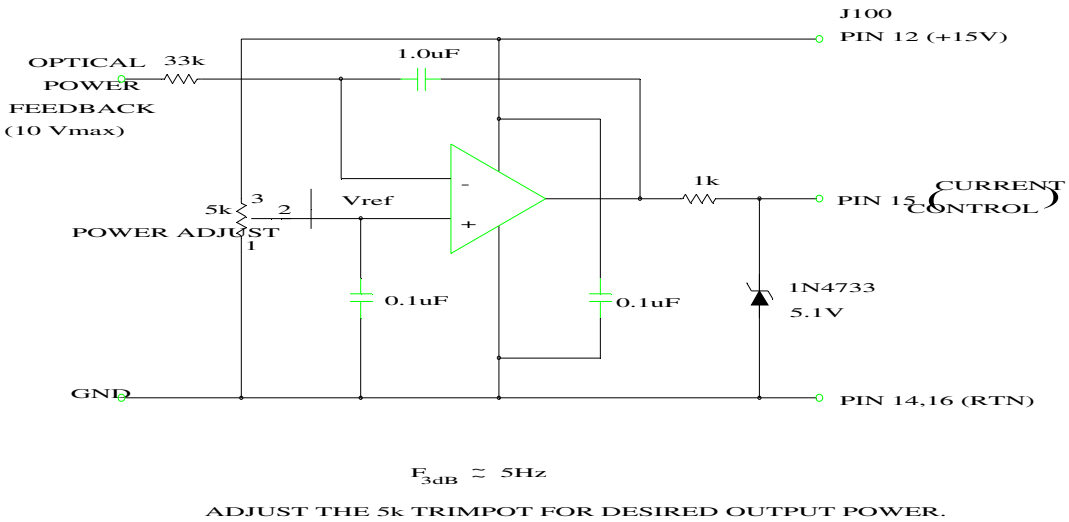


Figure 8. Optical Control Error Amplifier Circuit

6.0 MAINTENANCE AND TROUBLESHOOTING

6.1 Safety Precautions

The power supply should only be serviced by EMI factory authorized personnel. The troubleshooting steps described in this section require operation of the power supply with the cover removed. Proceed with extreme caution as hazardous voltages are exposed throughout the unit. Safety glasses must be worn to prevent serious injury in the event of a component failure (e.g., power transistors readily explode during fault conditions). Because the power supply does not receive proper cooling with the cover removed, operation at full power should be limited to less than ten minutes.

6.2 Maintenance

No maintenance is required under normal operating conditions. Occasional vacuum or blow-out of the chassis may be required when operated in extremely dirty environments.

6.3 Troubleshooting

First check for obvious trouble such as input power, output connections, control connections and signal levels. In particular, the V PROGRAM and ON/OFF signals. If there is no load connected, the power supply will try to ignite the lamp then the output will float at 250 to 375 VDC. If there is a short circuit across the output the power supply will try to regulate the current through the short.

1. If the power supply fails to ignite the lamp, first verify that the cooling water is clean and properly deionized. Also verify that the only thing connected across the output cable is the arc lamp. The arc lamp electrodes should make good electrical contact with the mounting hardware and the output cable ring terminals. The interface terminals should be clean and securely fastened. If the output current is initially programmed to a very low value the lamp may not trigger.

    1.1 A failed spark gap (SG1) on the power board is a probable cause for not igniting the lamp. Within 5 seconds of enabling the unit with the ON/OFF signal, a distinct pop should be heard and a visible flash of light should be seen from the vent side of the chassis. This is the normal triggering characteristic of the spark gap.

2. If the power supply input fuses are blown it is also likely that at least one power transistor, or power diode has failed. After replacing the input fuses check the power transistors and power diodes listed below to verify that they are not shorted.

    Input Board: Q1, Q2, Q3, D7, D8, D9.
    Power Board: Q5, Q6, Q7, D29, D30, D31

3. If the input fuses are not blown, and the trigger circuit appears to be working, yet the power supply does not seem to be operating correctly then:

3.1 Check the DC bus voltage on the large filter capacitors C1,2 on the fan side of the unit. In the YD4/6-SC the voltage across these caps should be between 250 and 375V, and between 370 and 425V in YD4/6-PC. If the DC bus voltage is less than 370V on the YD4/6-PC the problem is most likely on the input board.

3.2 Check for failed power transistors or diodes on the Input and Power Boards.

3.3 Check the +15V and -5V on the Power Board.

3.4 Check the +15V on the Input Board.

3.5 Check the input of the NAND-gate U4-1 on the power board. A low level will disable the power supply.

3.6 Check the input of the NAND-gate U4-2 on the Power Board. If the ON/OFF signal is low and if V PROGRAM is greater than 0V, a 20kHz (±10%) pulse train should be seen at this point.

3.7 Check the output of the current sensing LEM module T7 on the power board. The voltage at it's output should follow the output current at 1V per 10A.

3.8 Check the V PROGRAM input at U1-5 on the control board. This point should match the V PROGRAM input ±1.5%.

3.9 Check the gate drives on both the power and input board.

Input Board: U4, U5.
Power Board: U5, U6.

6.4 Recommended Spare Parts List

IC	CD4093BE	HARRIS	100-0008
IC	CD4093BE	HARRIS	100-0031
IC	ML4812CP	MICROLINEAR	100-0065
IC	UC3823N	UNITRODE	100-0066
IC	MC7815UC	MOTOROLA	100-0047
IC	LM339	MOTOROLA	100-0042
IC	LM324	MOTOROLA	100-0040
IC	MC34151P	MOTOROLA	100-0064
DIODE	IRKE61-18	IR	101-0116
DIODE	BYV96E	PHILIPS	101-0031
DIODE	1N4006	MOTOROLA	101-0001
DIODE	1N4734A	MOTOROLA	101-0012
DIODE	1N4742A	MOTOROLA	101-0008
DIODE	1N4746A	MOTOROLA	101-0011
DIODE	1N4936	MOTOROLA	101-0024
DIODE	1N5819	MOTOROLA	101-0104
XSTR	2N4401	IR	101-0072
XSTR	2N4403	IR	101-0073
XSTR	IXGH40N60	IXYS	101-0500
XSTR	VN2222LL	MOTOROLA	101-0501
XSTR	VN10KM	SILICONIX	101-0074
RES	12, 11w, 5%	OHMITE	102-0018
OPTO-ISO	4N25	GE	111-0001
OPTO-ISO	HC-2212-010	HP	111-0021
OPTO-ISO	4N40	GE	111-0004
THERMOST	67F100	AIRPAX	112-0004
FUSE	GDC-2A	BUSS	125-0049
FUSE	JJN-60	BUSS	125-0053
FAN	5915-PC-23T-B30	NMB	131-0005
SPKGAP	GT-BC-800L	LUMINEX	113-0011

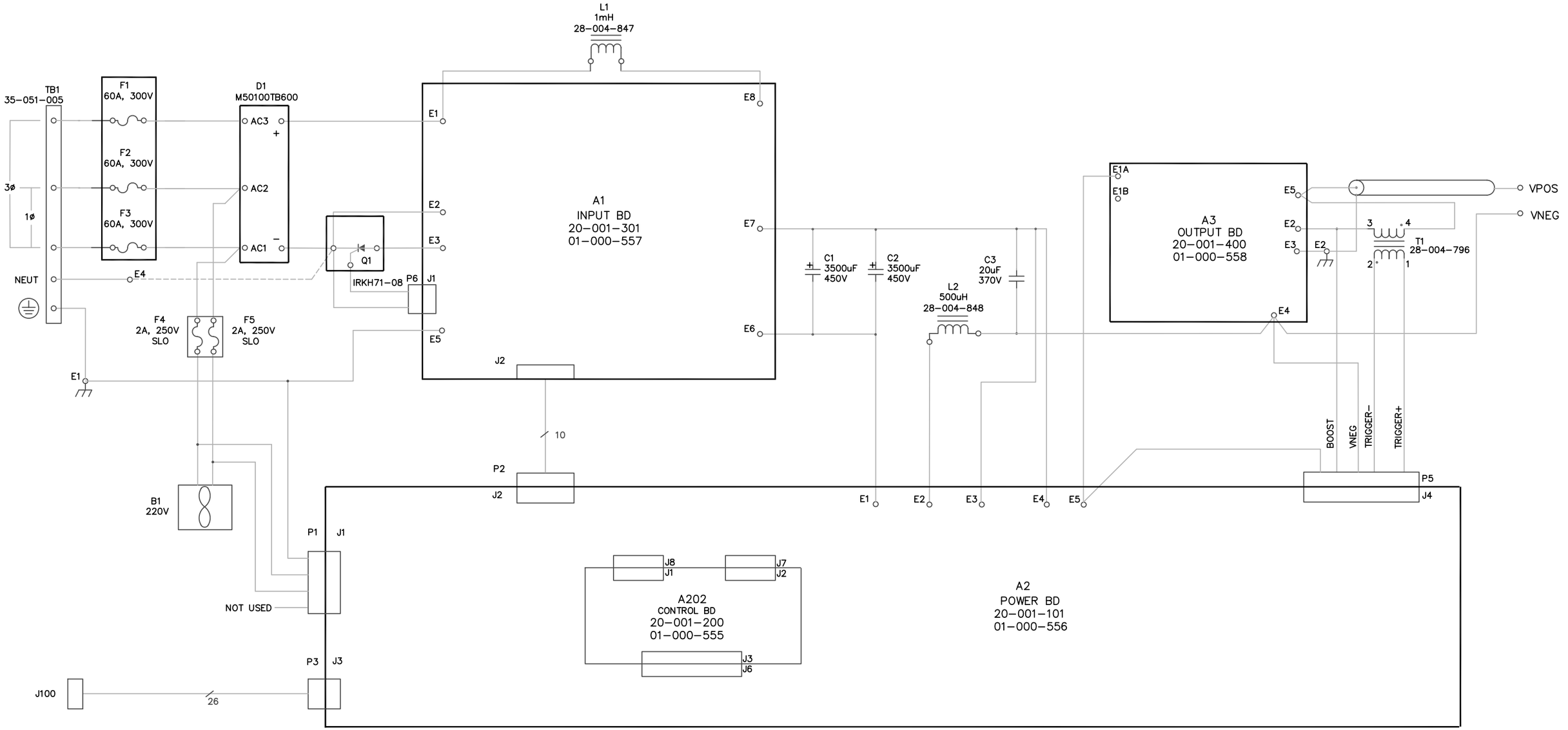
7.0 DIAGRAMS

7.1 List of Available Drawings

SCHEMATIC	YD SYSTEM	01-490-004
SCHEMATIC	YD-SC SYSTEM	01-490-005
SCHEMATIC	PWM CONTROL CARD	01-000-555
SCHEMATIC	INPUT BOARD YD4/6-PC	01-000-557
SCHEMATIC	INPUT BOARD YD4/6-SC	01-000-563
SCHEMATIC	POWER BOARD YD4/6-PC	01-000-556
SCHEMATIC	POWER BOARD YD4/6-SC	01-000-562
SCHEMATIC	OUTPUT BOARD	01-000-558

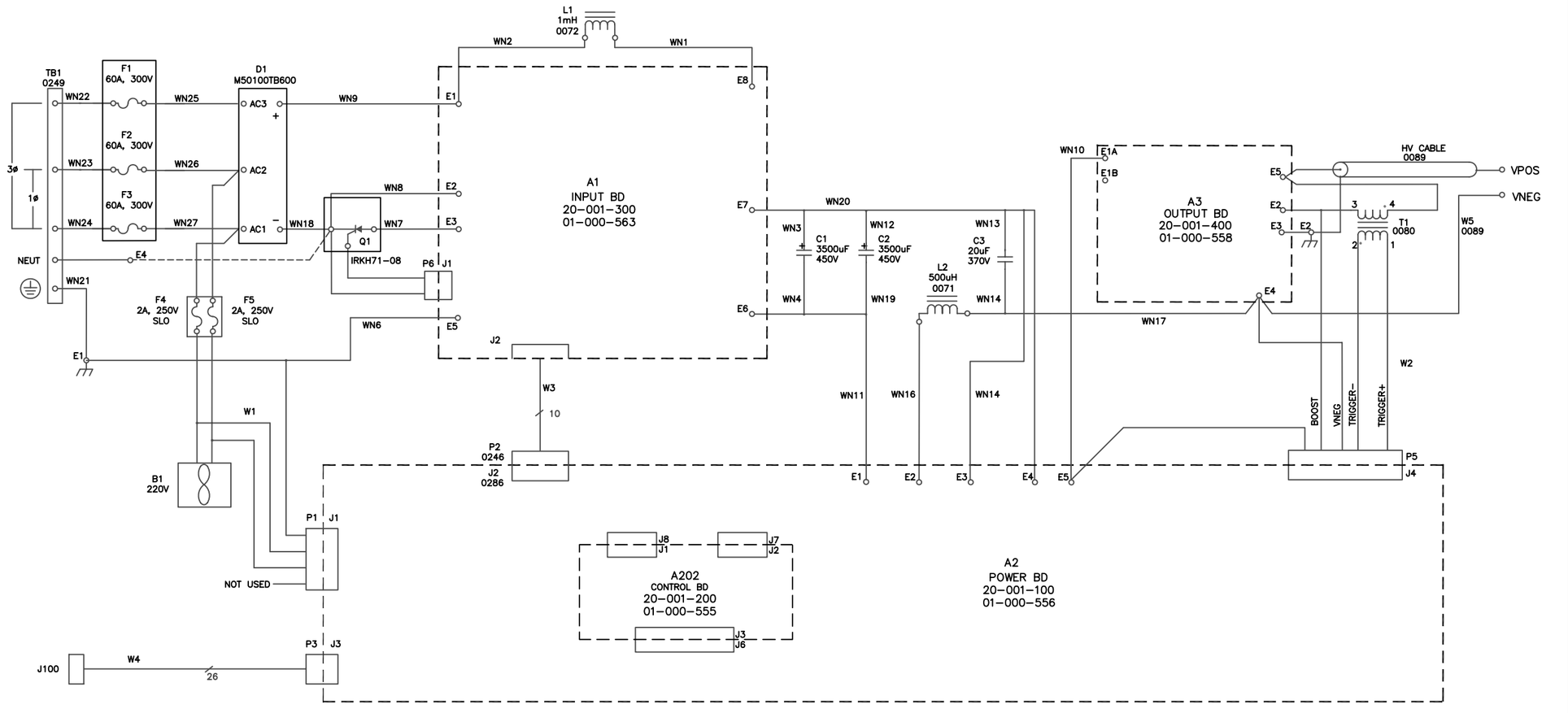
mfmfkkfke

APPLICATION			LTR	E.C.O. NO.	BY	APP.
USED ON	NEXT ASSY.	QTY.	A	REL TO MFG	WJW	
YD6–PC STD			B	ECO # 13116 6/28/94	SAdB	



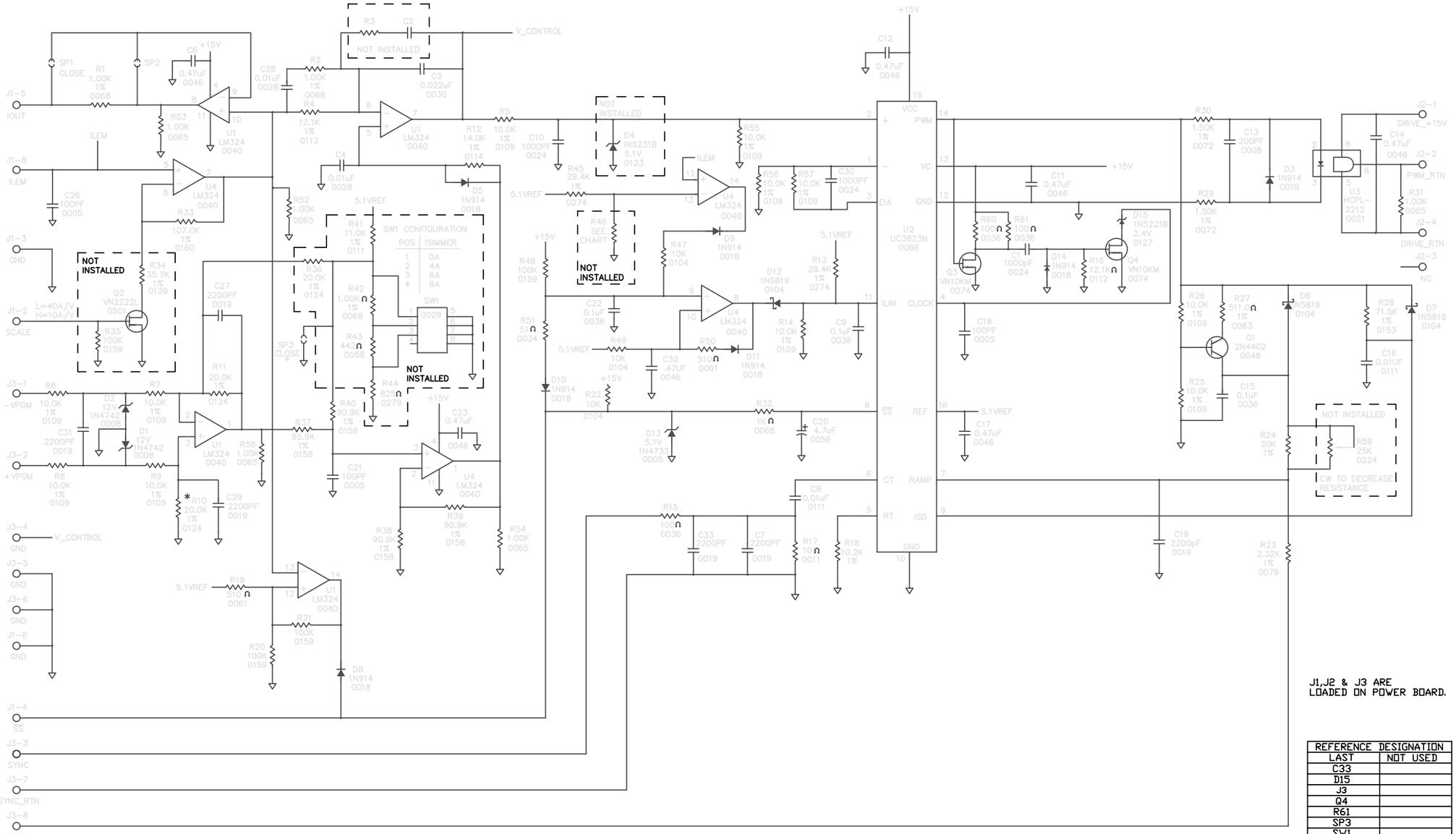
MTL:	TOL: .XX = ± .02" .XXX = ± .005" FRAC.= ± 1/64" ANGLES= ± 1/2°	REL. TO MFG. ENG: DATE:	ENG. CTL. DWN: WJW DATE: 8/7/93	ELECTRONIC MEASUREMENTS, INC.	
		MFG: DATE:	CHK: DATE:	TITLE: SCHEMATIC DIAGRAM YD6–PC STANDARD	
FIN:	P/L: 490	DOC.REL. DATE:	ENG: DATE:		
	SCALE: NONE		APP: DATE:	DWG. NO. 01–490–004	REV. B

APPLICATION				REVISIONS		
USED ON	NEXT ASSY.	QTY.	LTR	DESCRIPTION	BY	APP.
YD6-SC STD			A	REL TO MFG	WJW	
			B	ECO # 18845 11/2/99	LPN	



TOL: .XX = ± .02° .XXX = ± .005° FRAC = ± 1/64° ANGLES = ± 1/2°	REL. TO MFG. ENG: DATE: 3/31/99	ENG. CTL. DWN: W.JW DATE: 8/7/93	LAMBDA EMI
P/L: 490	MFG: B.H. DATE: 3/31/99	CHK: JSR DATE: 3/31/99	TITLE: SCHEMATIC DIAGRAM YD6-SC STANDARD
SCALE: NONE	DOC.REL. DATE: 3/31/99	ENG: DATE: 3/31/99	
		APP: DATE: 3/31/99	DWG. NO. 01-490-005 REV. B

APPLICATION			LTR	E.C.O. NO.	BY	APP.
USED ON	NEXT ASSY.	QTY.	00	INITIAL RELEASE		
YD-PC UNITS	PWM CONTROL BD	REF	A	TG REL 8/27/97	CJS	



J1,J2 & J3 ARE LOADED ON POWER BOARD.

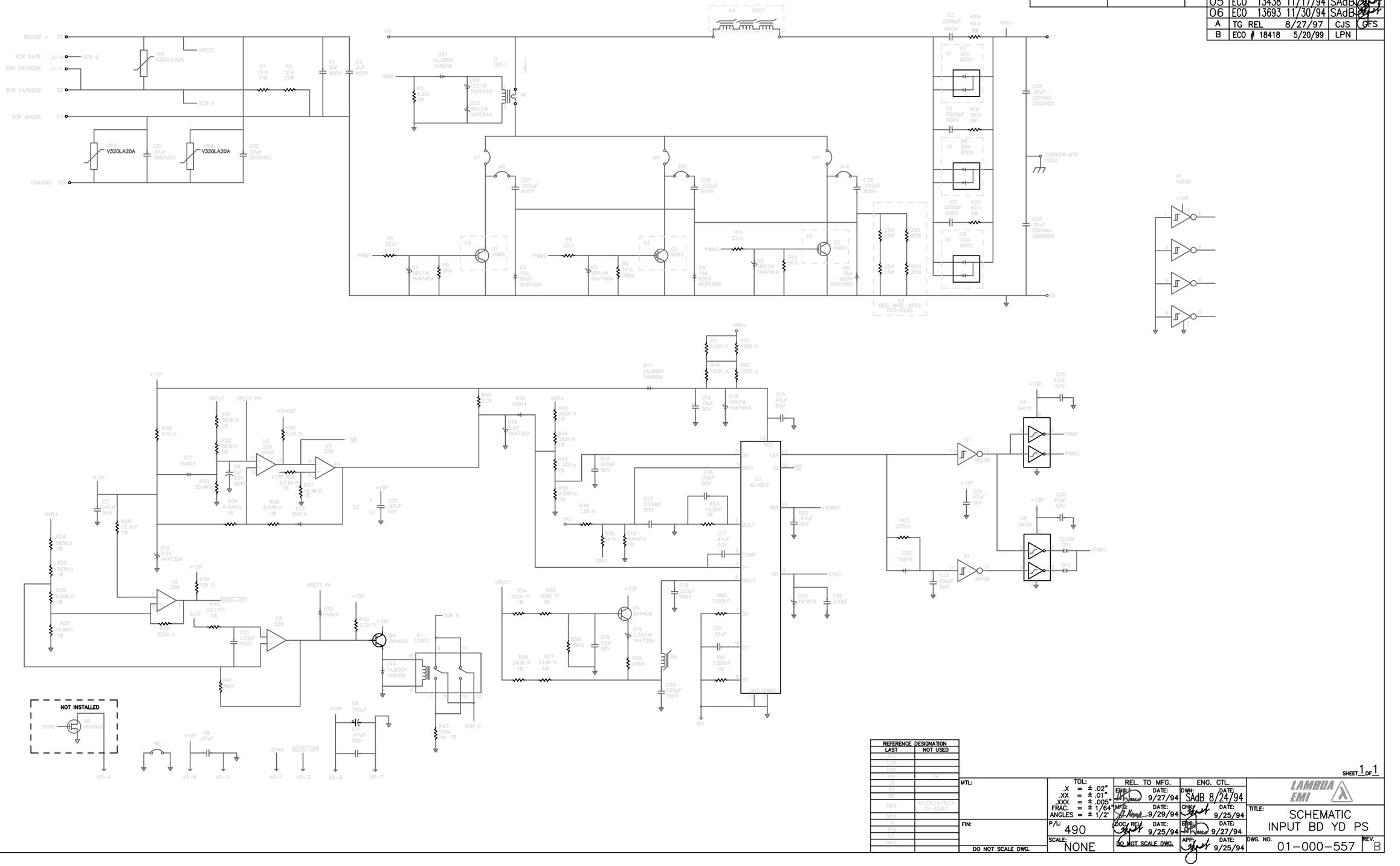
REFERENCE DESIGNATION	
LAST	NOT USED
C33	
D15	
J3	
Q4	
R61	
SP3	
SW1	
U4	

* R10 TO BE 10K 1/4W 1% P/N 0109 AND OPEN SP3 WHEN USING SIMMER OPTION

MTL:	TOL: .X = ± .02" .XX = ± .01" .XXX = ± .005" FRAC. = ± 1/64 ANGLES = ± 1/2°	REL. TO MFG. PRJ. ENG. DATE: 9/24/96 MFG: R. Laporte DATE: 9/24/96 DOC. REV. DATE: 9/24/96	ENG. CTL. DWN: W.J.W. DATE: 2/12/94 CHK: DATE: 9/24/96 ENG: DATE: 9/24/96 APP: DATE: 9/24/96	ELECTRONIC MEASUREMENTS, INC.
FIN:	P/L: 490			TITLE: SCHEMATIC DIAGRAM PWM CONTROL BOARD A202 PCB ASSY YD-PC
	SCALE: NONE			DWG. NO. 01-000-555 REV. A

THIS IS A COMPUTER GENERATED DWG.
NO MANUAL REVISIONS ARE PERMITTED.

APPLICATION			LTR	E.C.O. NO.	BY	APP.
USED ON	NEXT ASSY.	QTY.	02	ECO #415 8/91	JT	
YD-6-PC	003-0208		03	ECO # 524 5/91	DP	
			04	INITIAL RELEASE 8/24/94	SAdB	
			05	ECO 13438 11/17/94	SAdB	
			06	ECO 13693 11/30/94	SAdB	
			A	TG REL 8/27/97	CJS	GFS
			B	ECO # 18418 5/20/99	LPN	



REFERENCE DESIGNATION	
LAST	NOT USED
A12	
A13	
D24	
E8	E4
Q6	
R63	R7,10,13,16,17, 21-23,62
R67	
T1	
U5	
VR3	

MTL:
FIN:
DO NOT SCALE DWG.

TOL:
.X = ± .02"
.XX = ± .01"
.XXX = ± .005"
FRAC. = ± 1/64"
ANGLES = ± 1/2°

P/L: 490
SCALE: NONE

REL. TO MFG.		ENG. CTL.	
ENG:	DATE: 9/27/94	DWN: SAdB	DATE: 8/24/94
MFG:	DATE: 9/29/94	CHK:	DATE: 9/25/94
DOC. REL	DATE: 9/25/94	ENG:	DATE: 9/27/94
DO NOT SCALE DWG.		APP:	DATE: 9/25/94

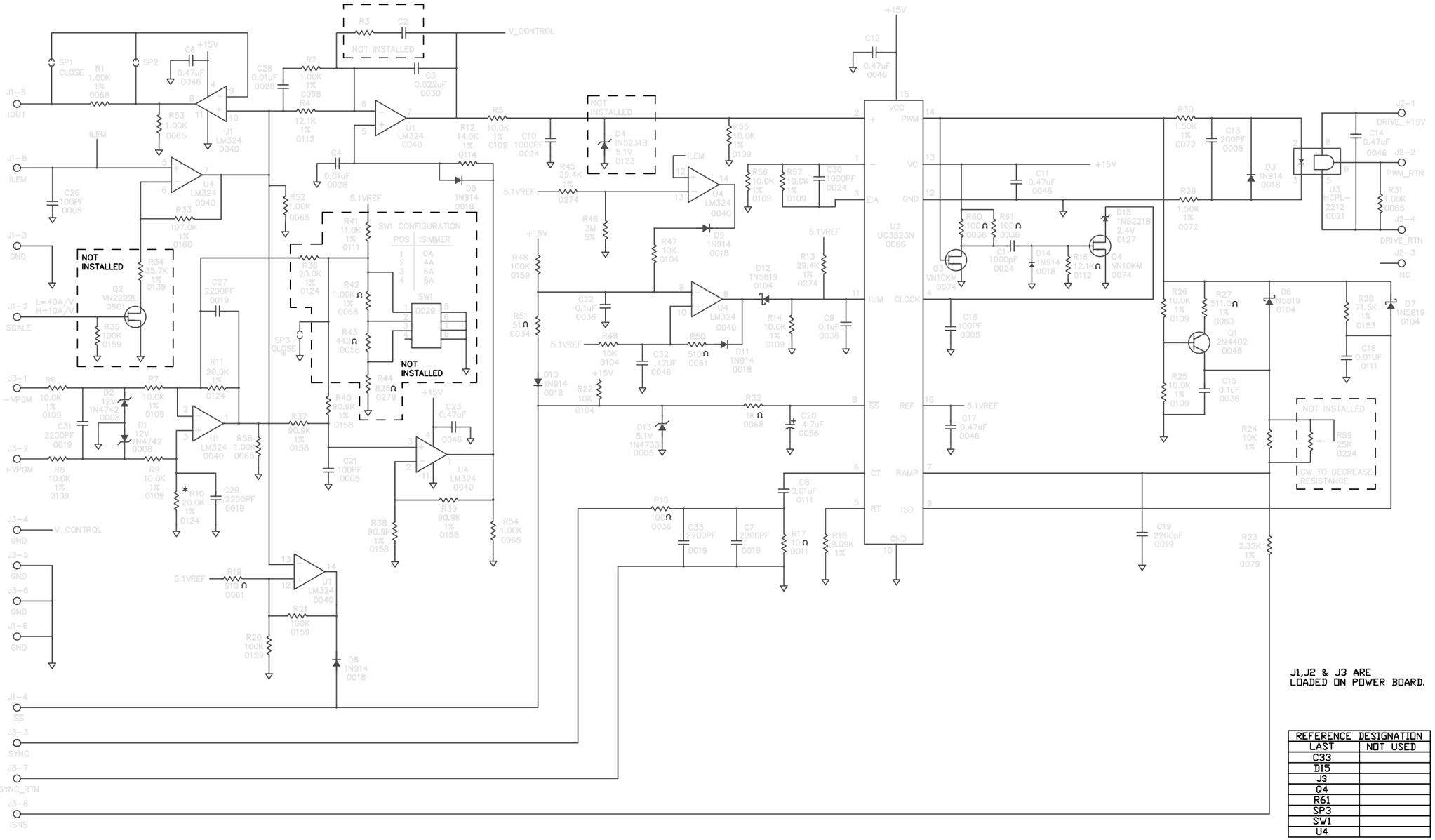
SHEET 1 OF 1

LAMBDA EMI

TITLE: SCHEMATIC INPUT BD YD PS

DWG. NO. 01-000-557 REV. B

APPLICATION			LTR	E.C.O. NO.	BY	APP.
USED ON	NEXT ASSY.	QTY.	00	INITIAL RELEASE		
YD-SC UNITS	PWM CONTROL BD	REF				



REFERENCE DESIGNATION	
LAST	NOT USED
C33	
D15	
J3	
Q4	
R61	
SP3	
SW1	
U4	

* R10 TO BE 10K 1/4W 1% P/N 0109
AND OPEN SP3 WHEN USING SIMMER OPTION

MTL:	TOL: .X = ± .02" .XX = ± .01" .XXX = ± .005" FRAC. = ± 1/64" ANGLES = ± 1/2°	REL. TO MFG. PRJ. ENG. DATE: / MFG: DATE: / DOC. REL. DATE:	ENG. CTL. DWN: DATE: W.J.W. 2/12/94 / CHK: DATE: / ENG: DATE: / APP: DATE:	ELECTRONIC MEASUREMENTS, INC.
FIN:	P/L: 490			TITLE: SCHEMATIC DIAGRAM PWM CONTROL BOARD A202 PCB ASSY YD-SC
	SCALE: NONE			DWG. NO. 01-000-563 REV. 00

THIS IS A COMPUTER GENERATED DWG.
NO MANUAL REVISIONS ARE PERMITTED.

APPLICATION			LTR	E.C.O. NO.	BY	APP.
USED ON	NEXT ASSY.	QTY.				
YD4–PC,SC	003–0508		00	ECO# 415 9/91	DP	
YD6–PC,SC	003–0207		01	ECO # 524 5/92	DP	
			02	ECO # 13116 6/94	SAdB	
			A	REL TO MFG 9/25/98	CJS	
			B	ECO # 18418 5/21/99	LPN	

PRODUCT	R27	R45
YD4–PC	442Ω 1% 0058	12 Ω 3W 1% 0019
YD6–PC	200Ω 1% 0048	8.2 Ω 3W 2% 0266
YD4–SC	442Ω 1% 0058	12 Ω 3W 1% 0019
YD6–SC	100Ω 1% 0037	8.2 Ω 3W 2% 0266

CONNECTOR PART NO.	
J1	0281
J2	0286
J3	0287
J4	0046
J5	0020
J6,J8	0308
J7	0309

REFERENCE DESIGNATIONS	
HIGHEST	NOT USED
A13	A6
C45	
D40	D1,16
E5	
F1	
J5	
Q9	
R60	
SG1	
SP7	SP3,4
T8	T2,3,4
TP3	TP2
TS2	
U11	
W3	

MTL:

FIN:

DO NOT SCALE DWG.

TOL:
.X = ± .02"
.XX = ± .01"
.XXX = ± .005"
FRAC. = ± 1/64"
ANGLES = ± 1/2°

P/L: 490

SCALE: NONE

REL. TO MFG.		ENG. CTL.	
ENG:	DATE:	DWN: D.DUBOIS	DATE: 10/90
9/25/98			
MFG: R Esposito	DATE: 9/25/98	CHK: DRP	DATE: 9/91
DOC. REL:	DATE: 9/25/98	ENG:	DATE: 9/25/98
DO NOT SCALE DWG.		APP:	DATE: 9/25/98

LAMBDA EMI

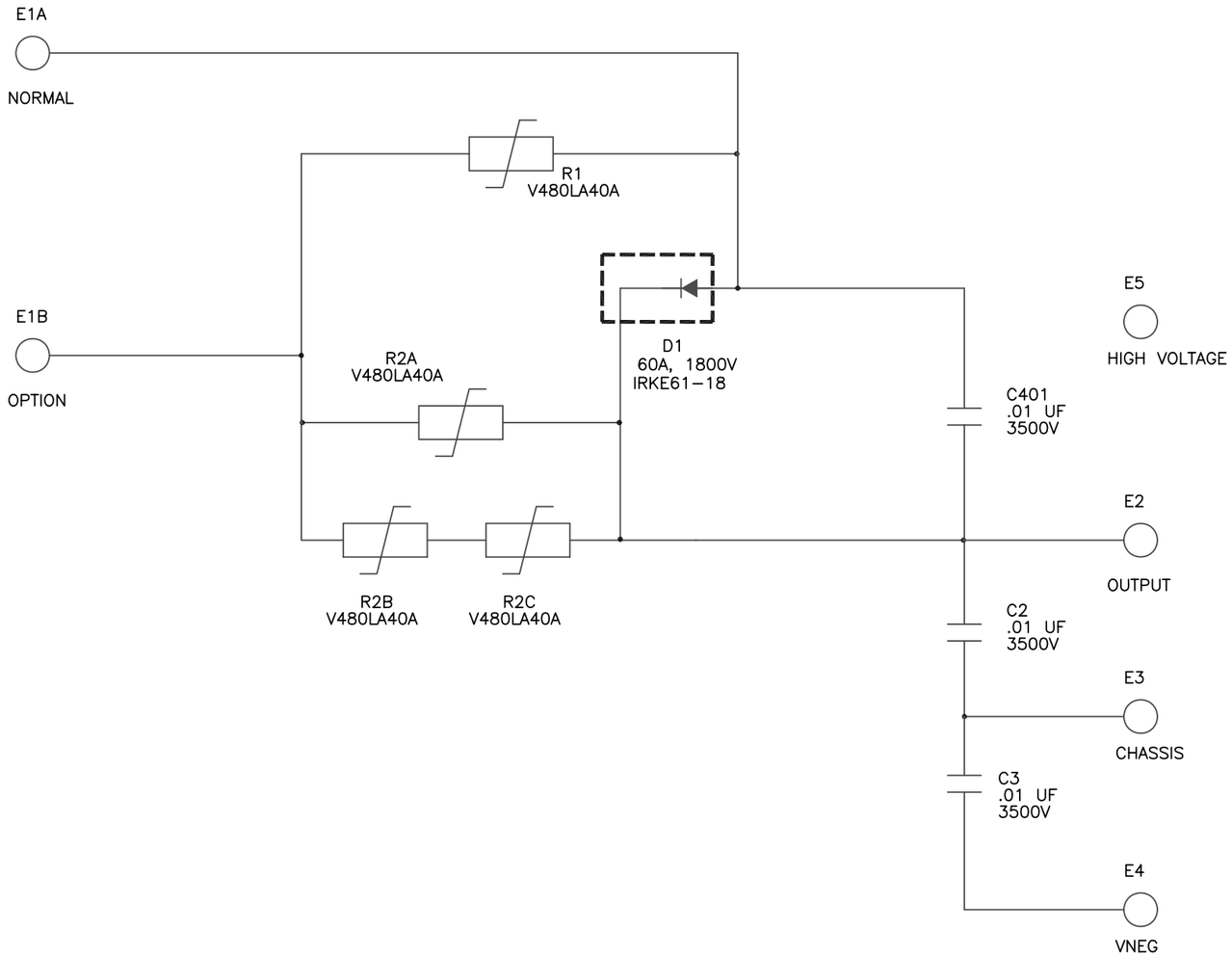
TITLE: SCHEMATIC DIAGRAM, POWER BOARD

DWG. NO. 01–000–556 REV. B

SHEET 1 OF 1

THIS IS A COMPUTER GENERATED DWG.
NO MANUAL REVISIONS ARE PERMITTED.

APPLICATION			LTR	E.C.O. NO.	BY	APP.
USED ON	NEXT ASSY.	QTY.	00	INITIAL RELEASE 8/24/94	SAdB	
YD SERIES PS	OUTPUT BOARD	REF	A	TG RELEASE TO MFG 11/11/94	SAdB	



SHEET 1 OF 1

MTL:	TOL: .X = ± .02" .XX = ± .01" .XXX = ± .005" FRAC. = ± 1/64" ANGLES = ± 1/2°	REL. TO MFG.	ENG. CTL.	ELECTRONIC MEASUREMENTS, INC.	
		PRJ. ENG. DATE:	DWN: WJW DATE: 2/5/94		
		MFG: DATE:	CHK: DATE: 8/23/94	TITLE: SCHEMATIC DIAGRAM OUTPUT BD A3 YD YD6-PC	
FIN:	P/L: 490	DOC. REL. DATE:	ENG: DATE: 8/24/94		
	SCALE: NONE	DO NOT SCALE DWG.	APP: DATE: 8/23/94	DWG. NO. 01-000-558	REV. A