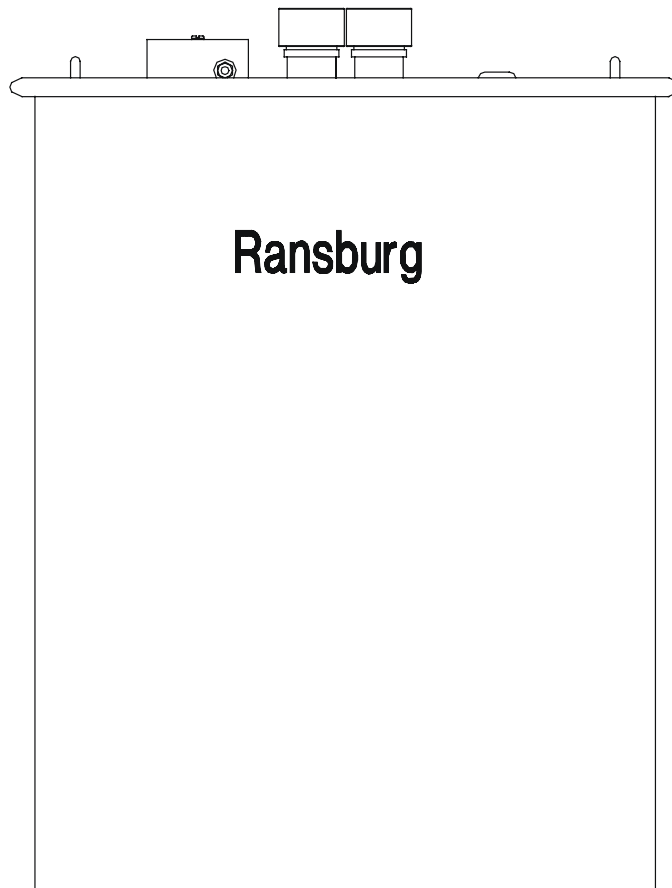

LEPS5001 POWER SUPPLY

For Control Panel Model LECU5003



MODEL: LEPS5001



IMPORTANT: Before using this equipment, carefully read **SAFETY PRECAUTIONS**, starting on page 1, and all instructions in this manual. Keep this Service Manual for future reference.

NOTE: This manual has been changed from revision **CP-95-02.4** to revision **CP-95-02.5**. Reasons for this change are noted under “Manual Change Summary” inside the back cover of this manual.

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SAFETY

SAFETY PRECAUTIONS

Before operating, maintaining or servicing any Ransburg electrostatic coating system, read and understand all of the technical and safety literature for your Ransburg products. This manual contains information that is important for you to know and understand. This information relates to **USER SAFETY** and **PREVENTING EQUIPMENT PROBLEMS**. To help you recognize this information, we use the following symbols. Please pay particular attention to these sections.

A WARNING! states information to alert you to a situation that might cause serious injury if instructions are not followed.

A CAUTION! states information that tells how to prevent damage to equipment or how to avoid a situation that might cause minor injury.

A NOTE is information relevant to the procedure in progress.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and appropriate Ransburg equipment manuals to reconcile such differences.

Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for your Ransburg system, contact your local Ransburg representative or Ransburg.




WARNING



- The user **MUST** read and be familiar with the Safety Section in this manual and the Ransburg safety literature therein identified.
- This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to ALL local building and fire codes and ordinances as well as **NFPA-33 SAFETY STANDARD, LATEST EDITION**, prior to installing, operating, and/or servicing this equipment.

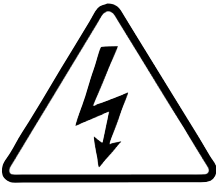





WARNING

- The hazards shown on the following pages may occur during the normal use of this equipment. Please read the hazard chart beginning on page 2.

<p>AREA Tells where hazards may occur.</p>	<p>HAZARD Tells what the hazard is.</p>	<p>SAFEGUARDS Tells how to avoid the hazard.</p>
<p>Spray Area</p> 	<p>Fire Hazard</p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.</p>	<p>Fire extinguishing equipment must be present in the spray area and tested periodically.</p> <p>Spray areas must be kept clean to prevent the accumulation of combustible residues.</p> <p>Smoking must never be allowed in the spray area.</p> <p>The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance.</p> <p>When using solvents for cleaning:</p> <ul style="list-style-type: none"> • Those used for equipment flushing should have flash points equal to or higher than those of the coating material. • Those used for general cleaning must have flash points above 100°F (37.8°C). <p>Spray booth ventilation must be kept at the rates required by NFPA-33, OSHA, country, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents.</p> <p>Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times.</p> <p>Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed.</p> <p>Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury.</p> <p>If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled.</p> <p>Never use equipment intended for use in waterborne installations to spray solvent based materials.</p> <p>The paint process and equipment should be set up and operated in accordance with NFPA-33, NEC, OSHA, local, country, and European Health and Safety Norms.</p>

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
<p>Spray Area</p> 	<p>Explosion Hazard</p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation.</p> <p>Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.</p>	<p>Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times.</p> <p>Unless specifically approved for use in hazardous locations, all electrical equipment must be located outside Class I or II, Division 1 or 2 hazardous areas, in accordance with NFPA-33.</p> <p>Test only in areas free of flammable or combustible materials.</p> <p>The current overload sensitivity (if equipped) MUST be set as described in the corresponding section of the equipment manual. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if the current overload sensitivity is not properly set. Frequent power supply shutdown indicates a problem in the system which requires correction.</p> <p>Always turn the control panel power off prior to flushing, cleaning, or working on spray system equipment.</p> <p>Before turning high voltage on, make sure no objects are within the safe sparking distance.</p> <p>Ensure that the control panel is interlocked with the ventilation system and conveyor in accordance with NFPA-33, EN 50176.</p> <p>Have fire extinguishing equipment readily available and tested periodically.</p>
<p>General Use and Maintenance</p> 	<p>Improper operation or maintenance may create a hazard.</p> <p>Personnel must be properly trained in the use of this equipment.</p>	<p>Personnel must be given training in accordance with the requirements of NFPA-33, EN 60079-0.</p> <p>Instructions and safety precautions must be read and understood prior to using this equipment.</p> <p>Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, EN Norms and your insurance company requirements.</p>

<p>AREA Tells where hazards may occur.</p>	<p>HAZARD Tells what the hazard is.</p>	<p>SAFEGUARDS Tells how to avoid the hazard.</p>
<p>Spray Area / High Voltage Equipment</p> 	<p>Electrical Discharge</p> <p>There is a high voltage device that can induce an electrical charge on ungrounded objects which is capable of igniting coating materials.</p> <p>Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.</p>	<p>Parts being sprayed and operators in the spray area must be properly grounded.</p> <p>Parts being sprayed must be supported on conveyors or hangers that are properly grounded. The resistance between the part and earth ground must not exceed 1 meg ohm. (Refer to NFPA-33.)</p> <p>Operators must be grounded. Rubber soled insulating shoes should not be worn. Grounding straps on wrists or legs may be used to assure adequate ground contact.</p> <p>Operators must not be wearing or carrying any ungrounded metal objects.</p> <p>When using an electrostatic handgun, operators must assure contact with the handle of the applicator via conductive gloves or gloves with the palm section cut out.</p> <p>NOTE: REFER TO NFPA-33 OR SPECIFIC COUNTRY SAFETY CODES REGARDING PROPER OPERATOR GROUNDING.</p> <p>All electrically conductive objects in the spray area, with the exception of those objects required by the process to be at high voltage, must be grounded. Grounded conductive flooring must be provided in the spray area.</p> <p>Always turn off the power supply prior to flushing, cleaning, or working on spray system equipment.</p> <p>Unless specifically approved for use in hazardous locations, all electrical equipment must be located outside Class I or II, Division 1 or 2 hazardous areas, in accordance with NFPA-33.</p>

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Electrical Equipment 	Electrical Discharge High voltage equipment is utilized in the process. Arcing in the vicinity of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance. Protection against inadvertent arcing that may cause a fire or explosion is lost if safety circuits are disabled during operation. Frequent power supply shut-down indicates a problem in the system which requires correction. An electrical arc can ignite coating materials and cause a fire or explosion.	Unless specifically approved for use in hazardous locations, the power supply, control cabinet, and all other electrical equipment must be located outside Class I or II, Division 1 and 2 hazardous areas in accordance with NFPA-33 and EN 50176. Turn the power supply OFF before working on the equipment. Test only in areas free of flammable or combustible material. Testing may require high voltage to be on, but only as instructed. Production should never be done with the safety circuits disabled. Before turning the high voltage on, make sure no objects are within the sparking distance.
Toxic Substances 	Certain material may be harmful if inhaled, or if there is contact with the skin.	Follow the requirements of the Material Safety Data Sheet supplied by coating material manufacturer. Adequate exhaust must be provided to keep the air free of accumulations of toxic materials. Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and be NIOSH approved.
Spray Area 	Explosion Hazard – Incompatible Materials Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1,-Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.	Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your coating supplier. Any other type of solvent may be used with aluminum equipment.

INTRODUCTION

GENERAL DESCRIPTION

The LECU5003 Control Panel and LEPS5001 Power Supply produce 0 to negative 100 kVDC continuous operating voltage. The two outputs of the LEPS5001 Power Supply provide spray devices with up to 2500 microamps at 100 kV. This heavy duty source of high voltage provides for rugged, reliable operation in a variety of industrial finishing applications.

The LEPS5001 Power Supply is Factory Mutual Approved when used with the LECU5003-01 or LECU5003-02 Control Panel for Aerobell® rotary atomizer and REA III™ automatic systems. Reference the LECU5003 manual or contact your local Ransburg representative for more details.

A maximum allowable current level is selected by the user on the Sensitivity Module located inside the LECU5003 Control Panel. The Sensitivity Module circuit determines if the power supply output current exceeds the desired maximum current as set on the Sensitivity Module. If so, the control panel immediately enters an overload condition which de-energizes the high voltage. The sense circuitry is sufficient to eliminate most possible arcing conditions, however, the overload sensitivity **must be properly set** as described in the "Safety Overload Adjustment" section of the LECU5003 Control Panel manual, to ensure safe operation.

All components of this power supply were design selected for reliable, heavy-duty service. The components, including the high voltage transformer, operate immersed in high quality (non-pcb) dielectric oil to insulate against corona discharge and provide heat dissipation.

Systems include, but are not limited to the following:

- LEPS5001-02 High Voltage Power Supply
- LECU5003-01 or -02 Control Panel

The LECU5003-01 and -02 Control Panels, when connected to the LEPS5001-02 Power Supply, will generate an unregulated output voltage of up to 100 kV.

- Remote (push-button) ON/OFF Station
- Remote Alarm Bell
- High Voltage Cable
- Air Logic Station
- High Voltage Junction Tank

A high voltage junction tank accepts high voltage input from one output of the LEPS5001 Power Supply and provides multiple high voltage outputs to supply multiple applicators. Consult the appropriate junction tank service manual or your authorized Ransburg representative for further information.

- High Voltage Switch Tank

A high voltage switch tank provides a means of discharging residual charge from the applicator(s) when the control panel is turned off or an overload condition occurs. The switch tank accepts high voltage input from one output of the LEPS5001 Power Supply and independently controls high voltage to two outputs. When the system is operating normally, the switch tank passes high voltage from its input to its output. When the system is turned off or an overload occurs, the switch tank automatically grounds the applicator. Consult the appropriate switch tank service manual or your authorized Ransburg representative for further information.

SPECIFICATIONS

Environmental / Physical

Nominal

Dimensions: 21" diameter x 28" height
(.53 m diameter x .71 m height)

Weight: 254 lbs. (115.2 kg) including
28 gallons (90.8 liters) of
dielectric oil

Electrical


AC Input: 0 to 120 Volts AC
(from LECU5003 Control Panel)


DC Output: Maximum Continuous
Operating Voltage: 100 kV
Current: 0-100 kV: 2500 μ A (max.)

NOTES:

INSTALLATION

LOCATION


 WARNING
<ul style="list-style-type: none"> ▶ The LEPS5001 Power Supply MUST be located outside the hazardous area (see NFPA Bulletin No. 33). The user should be aware of and adhere to all local building codes and ordinances. ▶ This manual MUST be read and thoroughly understood by ALL personnel who operate, clean, or maintain this equipment. Special care should be taken to ensure that the WARNINGS and requirements for operating and servicing safely are followed.

 CAUTION
<ul style="list-style-type: none"> ▶ Do not locate the LEPS5001 Power Supply near or adjacent to heat producing equipment such as ovens, high wattage lamps, steam pipes, etc.

SAFETY GROUND

Crimp the appropriate connector onto the Ground Wire Assembly (Part No. 70539, supplied) and install from the Power Supply ground stud G1 (see Figure 5) to a true earth ground.

Install the LEPS5001 Power Supply in a convenient area outside the hazardous location, where it will be protected from the possibility of any contact with water, vapor or high humidity, and ambient temperatures in excess of 120°F. The area should be clean, dry, and well ventilated.

 CAUTION
<ul style="list-style-type: none"> ▶ The Ground Wire Assembly MUST be connected from the Power Supply ground stud to a true earth ground.

LECU5003 CONTROL PANEL CONNECTIONS

From LEPS5001 (TB2)	Wire #	Color	To LECU5003 Terminal #
AC Neutral (4)	1	White	1
AC Hot (5)	17	Black	17
I (6)	31	Black	31
kV (7)	34	Red	34
Field Ground	Shield	Grn/Yel	G1

Figure 1: LECU5003 Control Panel Connections

17264 CONTROL PANEL CONNECTIONS

From 20593 Power Supply	To LECU5003 Terminal	Description
1	1	AC Common
17	29	AC Control (HOT)
31	26	Current Feedback
34	25	kV Feedback
Field Ground	1	Cable Ground Shield

Figure 2: 17264 Control Panel Connections

CONNECTIONS TO LECU5003 CONTROL PANEL

Route the control cable from the LEPS5001 Power Supply through one of the external wiring grommets located on the bottom of the control panel, and connect to the control panel terminal block as described in Figure 1. After making the connections, tighten the external wiring grommet around the black heat shrunk portion of the control cable. In general, conduit should be used to route the control cable (**check your local codes for conduit requirements**). Figure 3 shows a schematic of the LEPS5001 Power Supply and its connections to the LECU5003 Control Panel.

NOTE

- ▶ The LEPS5001 Power Supply can also be used with older model 17264 Control Panels. For wiring connections, refer to Figure 2.

HIGH VOLTAGE CABLE

-ROUTING & GENERAL GUIDELINES

SSW-1064

Unshielded High Voltage Cable

According to OSHA standard 1910.107,(h)(5), high voltage cable “shall be properly insulated and protected from mechanical injury or exposure to destructive chemicals”. To facilitate compliance with this code, the following recommendations **must** be followed:

1. **Never** route cables so that they lie on the floor or are subject to vehicular traffic.

WARNING

- ▶ Sheathing is NOT a safe method of protecting a cable from wear or traffic!

2. **Never** route cables from different power supplies along parallel paths unless they are separated by at least 18 inches.
3. **Always** route cables along appropriate insulators.
4. **Always** properly support cables at least 12 inches from metal beams. The support should be made of material that does not conduct electricity, such as most plastics. Ransburg part number 45773-011 is one such support.
5. **Always** route cables from overhead, down to the applicator.

CAUTION

- ▶ Do NOT make the approach to the applicator at or below floor level. Route high voltage cables from overhead down to the applicator. Routing the cables up and out of the way will result in less exposure to dirt and traffic.

6. If an insulating sheathing is used around the cable, it **MUST** be of a nonabsorbent material, such as polyethylene, and should be routed to prevent contact with or entrapment of solvents or cleaning solutions. The cable should **NOT** be sheathed from its last point of physical support after it enters the spray area, to the applicator! Insulating sheathing is available from Ransburg as part number 9704-13.
7. If a cable must be routed through a metal (or conductive) surface, cut an opening with a minimum radius of five inches and mount a nonconductive bulkhead therein. Route the cable through the center of the bulkhead and secure it with a suitable, nonconductive strain relief. (The opening may be any configuration as long as there is at least five inches from the nearest conductor.)

8. Make cable runs as short as possible by mounting the power supply as close to the spray device as codes and environment allow.



WARNING

- ▶ Whenever removing high voltage cable(s) from equipment, ground the plug end of the cable(s) by contacting the plug to electrical ground. Do not touch the plug until it has been grounded. This will eliminate the possibility of residual charge causing electrical shock.

Cut the high voltage cable (SSW-1064) according to the length required and screw an EPS-4245 connector (supplied as part of the LKIT0003 Connection Kit) onto the cable end which will be inserted into the power supply. Be careful to keep the screw centered in the middle of the cable as it is installed. Thread the cable end through the metal nut and then through the rubber bushing (supplied as part of the LKIT0003 Kit). Insert the cable fully into a high voltage output of the power supply, then tighten the nut until the cable is secure. Tighten the nut retaining screw with very light force (see Figure 4). An LKIT0003-00 Connection Kit is required for each high voltage cable connection to the power supply or junction tank when using SSW-1064 cable.

NOTE

- ▶ If a high voltage junction tank or switch tank is to be used in the system, refer to the appropriate service manual for cable terminations and installation requirements.

NOTES:

118VAC MAX.
4 AMP MAX

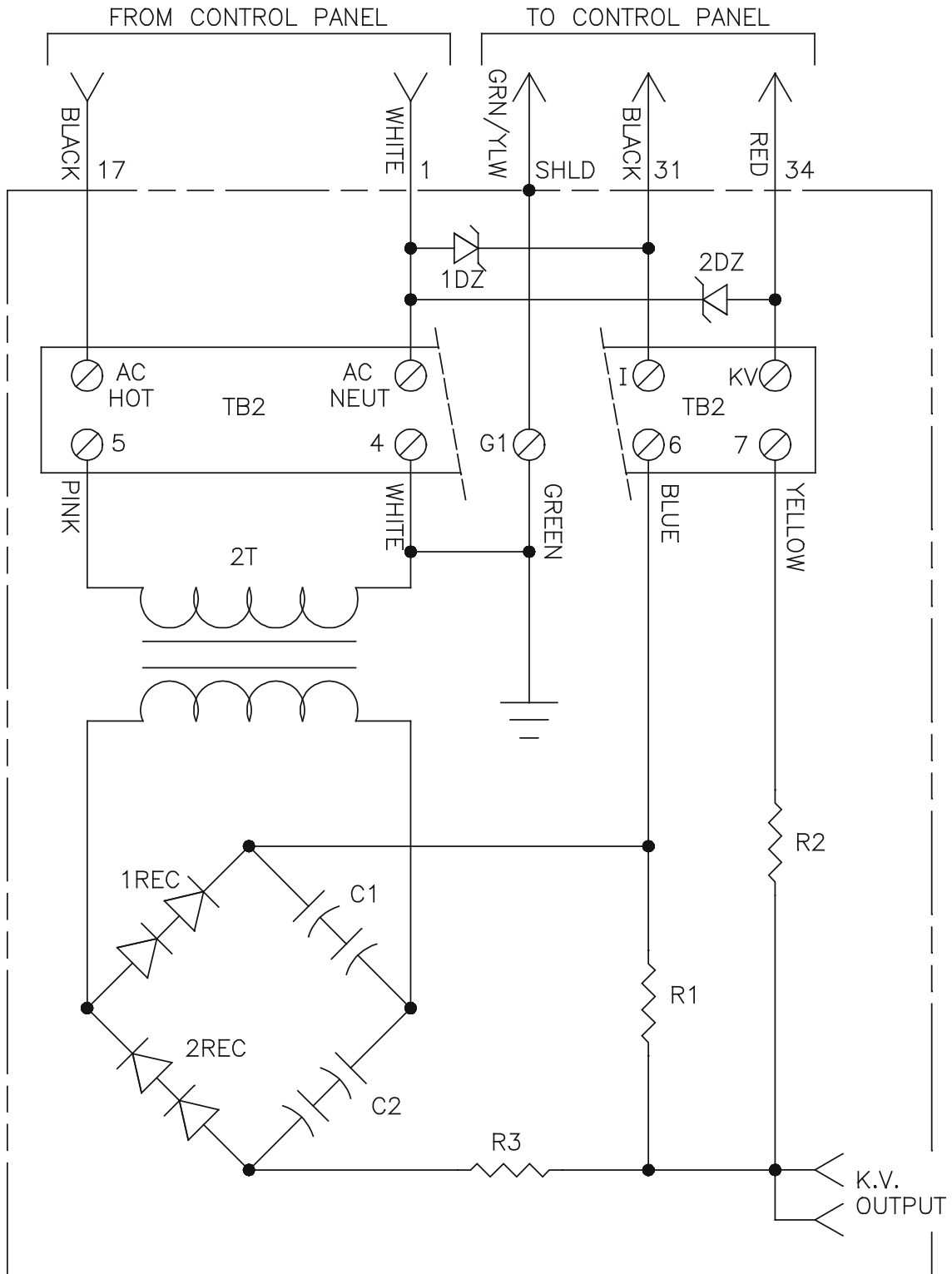


Figure 3: Schematic of LEPS5001 Power Supply Showing Connections to LECU5003 Control Panel

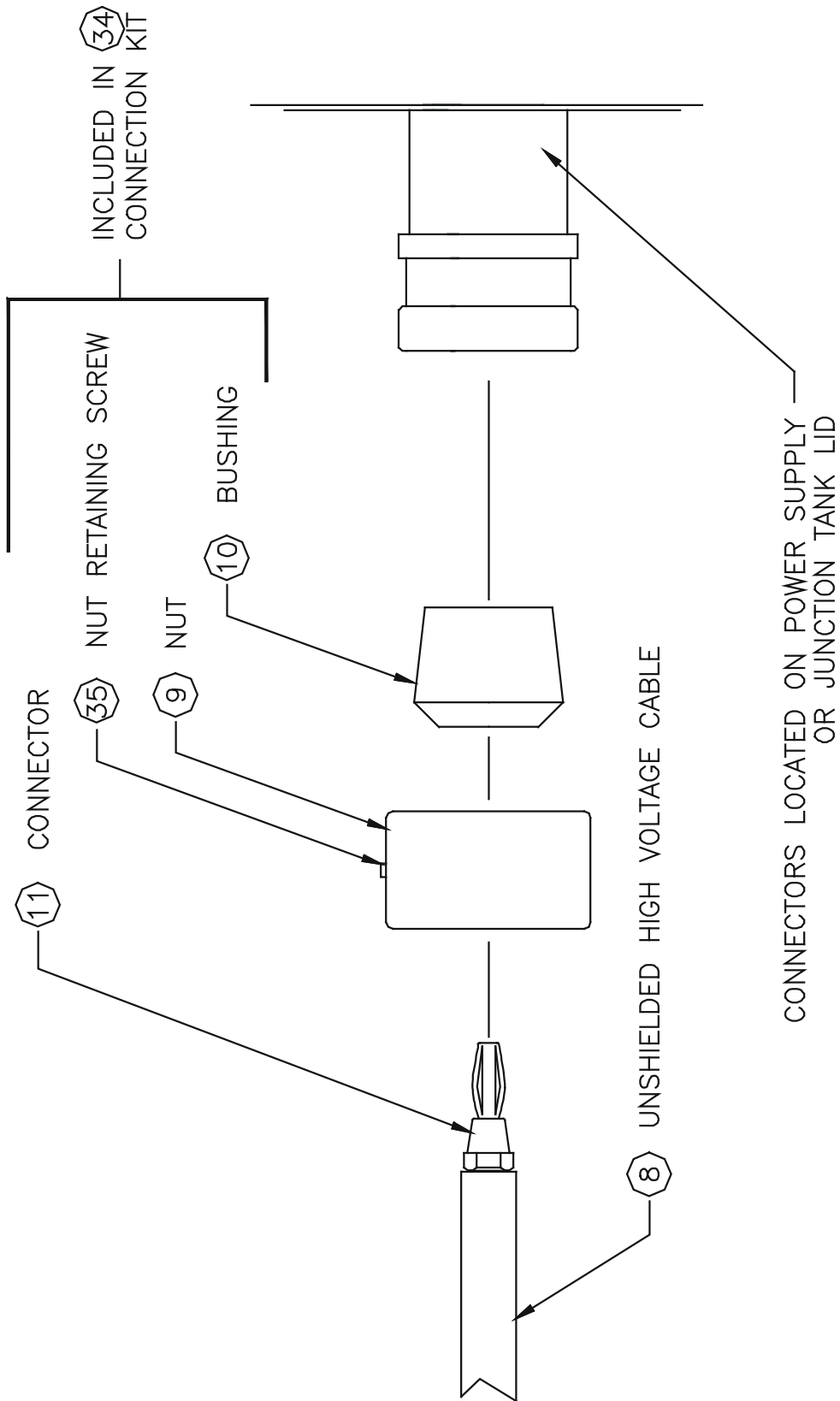


Figure 4: High Voltage Connections

OPERATION

THEORY OF OPERATION

-REFER TO FIGURE 3

0 to 120 VAC input is supplied to terminals TB2-4 and TB2-5 of the LEPS5001 Power Supply from the LECU5003 Control Panel. Inside the LEPS5001 Power Supply, this 0 to 120 VAC signal is supplied to the primary of high voltage transformer 2T. In operation, alternate halves of transformer 2T's high voltage secondary AC waveform charge capacitors C1 and C2 to the peak voltage of the secondary output. Since the capacitors are connected in series, the power supply output voltage is nearly twice the peak voltage from the transformer, in this full-wave voltage doubler circuit.

High voltage from the doubler circuit is connected to an output series resistor (R3) as protection against output transients. A current feedback signal is supplied to the control panel from the cathode of 1REC and voltage feedback signal is supplied through R2.

Zener diodes 1DZ and 2DZ serve as voltage limiting devices in the event that the kV or current feedback wires (31 or 34) become accidentally disconnected from the LECU5003 Control Panel.

MAINTENANCE

⚠ WARNING

- ▶ Electrical shock hazard. ALWAYS turn power to equipment OFF prior to cleaning or servicing any part of the system. Failure to do so could result in serious injury or death.
- ▶ Whenever removing high voltage cable(s) from equipment, ground the plug end of the cable(s) by contacting the plug to electrical ground. Do not touch the plug until it has been grounded. This will eliminate the possibility of residual charge causing electrical shock.
- ▶ Whenever the high voltage cable is removed from the LEPS5001 Power Supply, ALWAYS discharge any residual high voltage charge from the power supply by attaching an appropriate ground wire to the grounded power supply container and then inserting it down the free end of the high voltage tube.
- ▶ To assure continuous, efficient, trouble-free operation of the LEPS5001 Power Supply and to extend its service life, keep the exterior clean and dry. It is also very important to keep the areas around the high voltage cable connections clean, to protect against static discharges.

Periodically clean the unit with a clean, dry, lint-free cloth and visually inspect for any loose wiring connections.

Remove the high voltage cables, make sure that they are clean and reinsert into the power supply.

NOTE

- ▶ Apply a liberal amount of dielectric grease (59972-00) to the high voltage cable plug before inserting back into the power supply.
- ▶ Make sure that the high voltage cables are fully inserted into the power supply and that the strain relief connections are secure.

TROUBLESHOOTING

⚠ WARNING

- ▶ Field repair and troubleshooting of the LECU5003 Control Panel may require exposure to potentials that can cause **SERIOUS BODILY INJURY** or **DEATH** if proper procedures are not followed. For this reason, troubleshooting and field repair should only be accomplished with specific test equipment by qualified electronics technicians or authorized Ransburg representatives.

in Figure 3, illustrations in Figures 5a and 5b, "Theory of Operation" and "Parts Identification" sections of this manual, and the LECU5003 Control Panel service manual.

If a high voltage output problem is suspected in the system, perform the following troubleshooting procedure:

Equipment required: Ransburg High Voltage Test Probe and Meter (20791) AC RMS Voltmeter (150 volt scale or greater)

1. With the power OFF, remove the cover from the junction box that houses

terminal block 2 (TB2) on top of the LEPS5001 Power Supply. Check for any loose wiring connections to TB2.

2. Connect an AC RMS voltmeter (150 volt scale or greater) from TB2-4 to TB2-5.
3. Put the LECU5003 Control Panel into the high voltage on condition and turn its high voltage adjust knob to mid-range.
4. If the RMS voltage indicated on the voltmeter **is not** approximately 60 VAC, the problem is with the LECU5003 Control Panel. Consult the "Troubleshooting" section of the LECU5003 Control Panel manual for appropriate troubleshooting procedures.

If the RMS voltage indicated on the voltmeter **is** approximately 60 VAC, continue troubleshooting as follows:

5. Turn the high voltage OFF at the control panel. Remove the AC voltmeter from TB2. Remove the high voltage cable(s) from the power supply.
6. Set up a calibrated Ransburg High Voltage Test Probe and Meter (20791) with

WARNING

► Whenever removing high voltage cable(s) from equipment, ground the plug end of the cable(s) by contacting the plug to electrical ground. Do not touch the plug until it has been grounded. This will eliminate the possibility of residual charge causing electrical shock.

the 3/8" diameter high voltage cable attachment (see 20791, High Voltage Test Probe and Meter, service manual for setups and procedures).

7. Connect the 20791 high voltage test probe ground clamp to a true earth ground, insert the cable end of the test probe into the power supply high voltage tube, and turn the test probe on.

8. Put the LECU5003 Control Panel into the high voltage on condition and turn its high voltage adjust knob to mid-range.

CAUTION

► Ensure that the cable end of the test probe is fully inserted into the high voltage tube and tighten the strain relief connection.

9. If the 20791 high voltage test probe display **reads** approximately 70 kVDC, the problem is with the high voltage cable, junction tank or switch tank (if installed), or the spray applicator. Consult the appropriate service manual for troubleshooting procedures.
10. If the 20791 high voltage test probe **does not read** approximately 70 kVDC, the problem is with the LEPS5001 Power Supply.

If the LEPS5001 Power Supply has been isolated as the problem, contact your authorized Ransburg representative for repair or replacement.

PARTS IDENTIFICATION

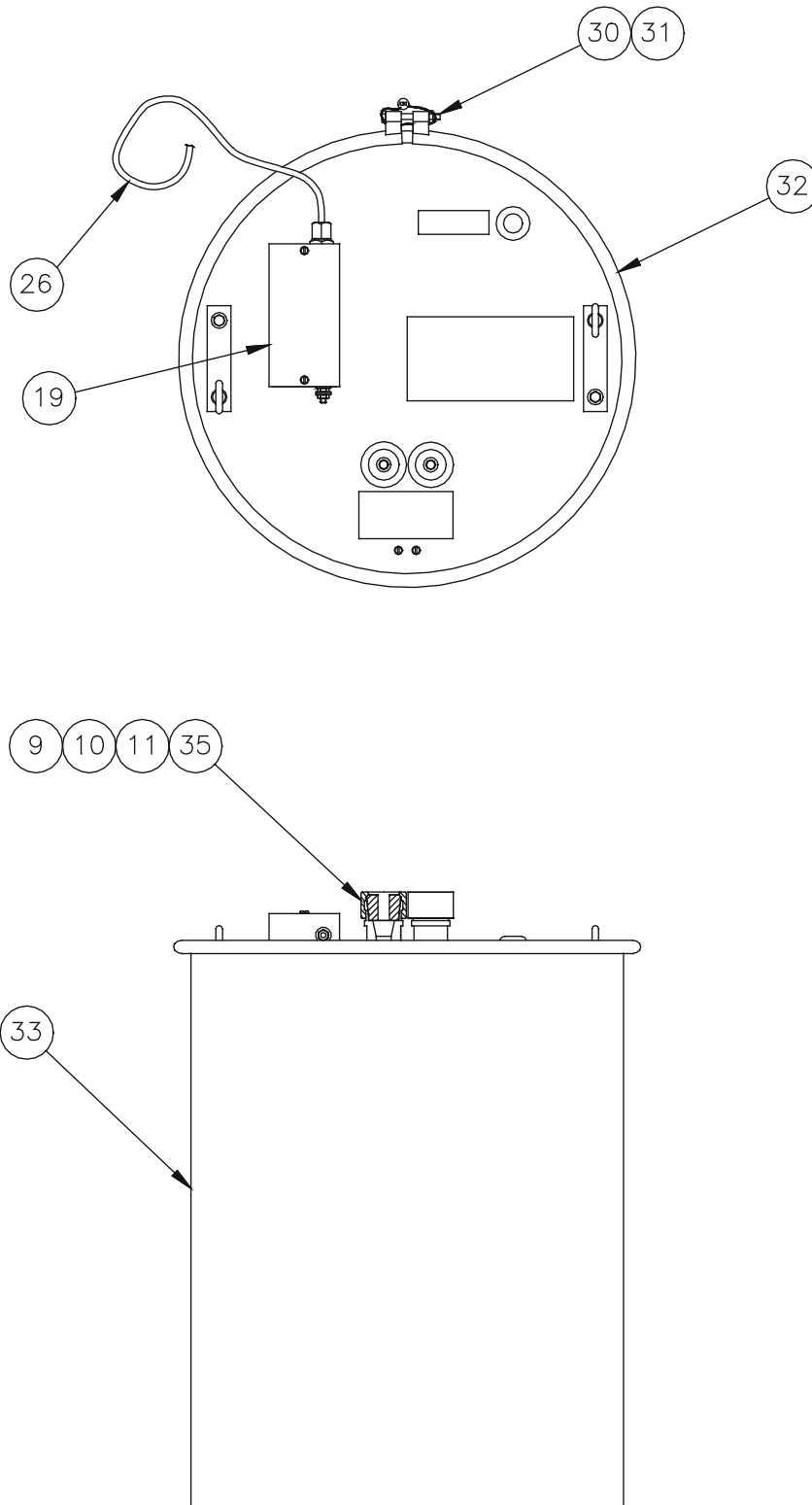


Figure 5a: LEPS5001 Power Supply

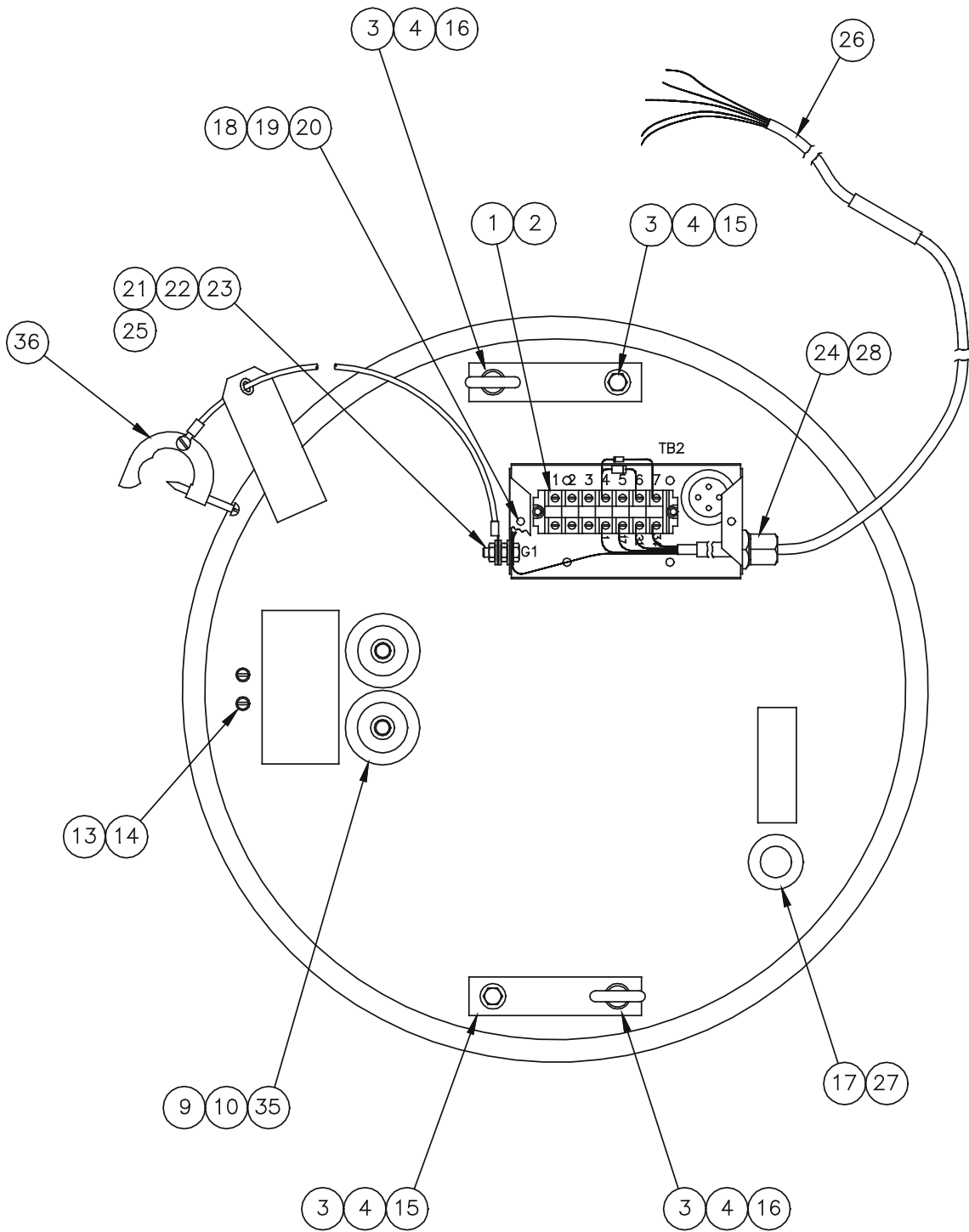


Figure 5b: Top View of LEPS5001 Power Supply

LEPS5001 POWER SUPPLY - PARTS LIST (Figure 5)			
Item #	Description	Part #	Qty
1	Terminal Block End	7987-00	2
2	Terminal Block	7988-00	7
3	Lockwasher, Spring, 5/16, Cad or Zinc Pl.	*	4
4	Nut, Std. 5/16-18 x 17/64 Thd, Cad Pl.	*	4
5	-----	-----	-----
6	-----	-----	-----
7	-----	-----	-----
8	High Voltage Cable	SSW-1064	-----
9	Rubber Bushing, Tapered	LSMM0006	2
10	High Voltage Adapter	LEPS0005	2
11	Nut	7296-00	2
12	High Voltage Cable Connector	EPS-4245	2
13	Screw, #10-24 x 1/4, Round Head Slot Machined, Cad Pl.	*	2
14	Seal, Dyna, 3/16	2857-00	2
15	Screw, 5/16-18 x 1, Hex Head Cap, Cad Pl.	*	2
16	Eyebolt, 7/8, 5/16-18	*	2
17	Oil Dipstick	LD0057	1
18	Junction Box	*	1
19	Junction Box Lid	36511-142	1
20	Screw, #8-32 x 1/4, Round Head Slot Machined, Cad Pl.	*	2
21	Screw, 1/4-20 x 1, Hex Head Cap, Zinc Pl.	*	1
22	Nut, Hex, Standard, 1/4-20	*	3
23	Lockwasher, 1/4, Cad or Zinc Pl.	*	1
24	Connector	SSW-8230	1
25	Washer, Flat, 1/4, Cad or Zinc Pl.	*	2
26	Cable Assembly, PTFE, 4 Cord/Shield	LEPS4005	35 Feet
27	Nut, Gland	3755-01	2
28	Nut	5307-01	1
29	Screw, #8-32 x 1/4, Hex Socket Head Cap, Cad Pl.	8301-08C	2
30	Screw, 3/8-16 x 3, 1/2 Round Head Slot Machined, Cad Pl.	*	1
31	Nut, 3/8-16 x 2, 1/64 Thick, .562 Hex, Zinc Pl.	*	1
32	V-Band Bolt Clamp	8691-00	1
33	Container	18093-00	1
34	Connection Kit (for SSW-1064 cable) (Includes Items 9, 11, 12, and 35)	LKIT0003-00	-----
35	Nut Retaining Screw	8521-06F	-----
36	Ground Wire Assembly	70539-00	1

* Parts without part numbers may be purchased locally.

WARRANTY POLICIES

LIMITED WARRANTY

Ransburg will replace or repair without charge any part and/or equipment that falls within the specified time (see below) because of faulty workmanship or material, provided that the equipment has been used and maintained in accordance with Ransburg's written safety and operating instructions, and has been used under normal operating conditions. Normal wear items are excluded.

THE USE OF OTHER THAN RANSBURG APPROVED PARTS, VOID ALL WARRANTIES.

SPARE PARTS: One hundred and eighty (180) days from date of purchase, except for rebuilt parts (any part number ending in "R") for which the warranty period is ninety (90) days.

EQUIPMENT: When purchased as a complete unit, (i.e., guns, power supplies, control units, etc.), is one (1) year from date of purchase. **WRAPPING THE APPLICATOR, ASSOCIATED VALVES AND TUBING, AND SUPPORTING HARDWARE IN PLASTIC, SHRINK-WRAP, OR ANY OTHER NON-APPROVED COVERING, WILL VOID THIS WARRANTY.**

FLUID HANDLING: One (1) year from date of purchase (i.e., Totalizer, CCV Valves, etc.).

AIR BEARING ROTATORS: Fifteen thousand (15,000) hours or three (3) years, whichever occurs first. Warranty period begins on the date of purchase.

RANSBURG'S ONLY OBLIGATION UNDER

THIS WARRANTY IS TO REPLACE PARTS THAT HAVE FAILED BECAUSE OF FAULTY WORKMANSHIP OR MATERIALS. THERE ARE NO IMPLIED WARRANTIES NOR WARRANTIES OF EITHER MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. RANSBURG ASSUMES NO LIABILITY FOR INJURY, DAMAGE TO PROPERTY OR FOR CONSEQUENTIAL DAMAGES FOR LOSS OF GOODWILL OR PRODUCTION OR INCOME, WHICH RESULT FROM USE OR MISUSE OF THE EQUIPMENT BY PURCHASER OR OTHERS.

EXCLUSIONS:

If, in Ransburg's opinion the warranty item in question, or other items damaged by this part was improperly installed, operated or maintained, Ransburg will assume no responsibility for repair or replacement of the item or items. The purchaser, therefore will assume all responsibility for any cost of repair or replacement and service related costs if applicable.

APPENDIX

PAINT AND SOLVENT SPECIFICATIONS

	REA® / EFM™	REM® / M90™	NO. 2 HAND GUN	TURBODISK™	AEROBELL II™*** AEROBELL® AEROBELL 33™ RMA-101™
RECOMMENDED VISCOSITY USING A ZAHN NO. 2	18 TO 30 SEC	18 TO 30 SEC	20 TO 60 SEC	20 TO 60 SEC	20 TO 60 SEC
PAINT ELECTRICAL RESISTANCE**	.1 MΩ TO ∞	.1 MΩ TO ∞	.1 TO 1 MΩ	.1 MΩ TO ∞	.1 MΩ TO ∞
RECOMMENDED DELIVERY (UP TO)	1000 cc/min	1500 cc/min	180 cc/min	1000 cc/min	500 cc/min

GUIDE TO USABLE SOLVENT SELECTION

CHEMICAL NAME	COMMON NAME	CATEGORY	*CAS NUMBER	EVAP. RATE†	ELECTRICAL RESISTANCE**
DICHLOROMETHANE	Methylene Chloride	Chlorinated Solvents	75-09-2	14.5	HIGH
METHYL ACETATE		Esters	79-20-9	11.8	LOW
VM & P NAPHTHA	Naptha	Aliphatic Hydrocarbons	803-232-4	10	HIGH
ACETONE		Ketones	67-64-1	5.6	LOW
BENZENE		Aromatic Hydrocarbons	71-43-2	5.1	HIGH
ETHYL ACETATE		Esters	141-78-6	3.9	MEDIUM
2-BUTANONE	MEK	Ketones	78-93-3	3.8	MEDIUM
ISO-PROPYL ACETATE		Esters	108-21-4	3.4	LOW
ISOPROPYL ALCOHOL	IPA	Alcohols	67-63-0	2.5	LOW
2-PENTANONE	MPK	Ketones	107-87-9	2.5	MEDIUM
METHANOL	Methyl Alcohol	Alcohols	67-56-1	2.1	LOW
PROPYL ACETATE	n-Propyl Acetate	Esters	109-60-4	2.1	LOW
TOLUOL	Toluene	Aromatic Hydrocarbons	108-88-3	1.9	HIGH
METHYL ISOBUTYL KETONE	MIBK	Ketones	108-10-1	1.6	MEDIUM
ISOBUTYL ACETATE		Esters	110-19-0	1.5	LOW
ETHANOL	Ethyl Alcohol	Alcohols	64-17-5	1.4	LOW
BUTYL ACETATE		Esters	123-86-4	1.0	LOW
ETHYLBENZENE		Aromatic Hydrocarbons	100-41-4	.89	HIGH
1-PROPANOL	n-Propyl Alcohol	Alcohols	71-23-8	.86	LOW
2-BUTANOL	sec.-Butyl Alcohol	Alcohols	78-92-2	.81	LOW
XYLOL	Xylene	Aromatic Hydrocarbons	133-02-07	.80	HIGH
AMYL ACETATE		Esters	628-63-7	.67	MEDIUM
2-METHYLPROPANOL	iso-Butyl Alcohol	Alcohols	78-83-1	.62	LOW
METHYL AMYL ACETATE		Esters	108-84-9	.50	LOW
5-METHYL-2-HEXANONE	MIAK	Ketones	110-12-3	.50	MEDIUM
1-BUTANOL	n-Butyl Alcohol	Alcohols	71-36-3	.43	LOW
2-ETHOXYETHANOL		Glycol Ethers	110-80-5	.38	LOW
2-HEPTANONE	MAK	Ketones	110-43-0	.40	MEDIUM
CYCLOHEXANONE		Ketones	108-94-1	.29	MEDIUM
AROMATIC-100	SC#100	Aromatic Hydrocarbons		.20	HIGH
DIISOBUTYL KETONE	DIBK	Ketones	108-83-8	.19	MEDIUM
1-PENTANOL	Amyl Alcohol	Alcohols	71-41-0	.15	LOW
DIACETONE ALCOHOL		Ketones	123-42-2	.12	LOW
2-BUTOXYETHANOL	Butyl Cellosolve	Glycol Ethers	111-76-2	.07	LOW
CYCLOHEXANOL		Alcohols	108-93-0	.05	LOW
AROMATIC-150	SC#150	Aromatic Hydrocarbons		.004	HIGH
AROMATIC-200		Aromatic Hydrocarbons		.003	HIGH

* CAS Number: Chemical Abstract Service Number.

** Using the Ransburg Meter.

*** Solvent base Configuration Only.

† Information Obtained From: <http://solvdb.ncms.org>

Evaporation Rate is Based Upon Butyl Acetate Having a Rate of 1.0

NOTE: This page provides resistivity determination and control information that we feel is necessary when using Ransburg equipment.

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VISCOSITY CONVERSION CHART																		
Poise	Centipoise	Parlin 7	Parlin 10	Fisher 1	Fisher 2	Ford Cup 3	Ford Cup 4	Gardner - Holdt Bubble	Gardner - Lithographic	Krebs Unit KU	Saybolt Universal SSU	Zahn 1	Zahn 2	Zahn 3	Zahn 4	Zahn 5	Sears Craftsman Cup	Din Cup 4
.1	10	27	11	20			5	A-4			60	30	16					10
.15	15	30	12	25			8	A-3			80	34	17					11
.2	20	32	13	30	15	12	10				100	37	18					12
.25	25	37	14	35	17	15	12	A-2			130	41	19					13
.3	30	43	15	39	18	19	14	A-1			160	44	20					14
.4	40	50	16	50	21	25	18	A			210	52	22				19	15
.5	50	57	17		24	29	22			30	260	60	24				20	16
.6	60	64	18		29	33	25	B		33	320	68	27				21	18
.7	70		20		33	36	28			35	370		30				23	21
.8	80		22		39	41	31	C		37	430		34				24	23
.9	90		23		44	45	32			38	480		37	10			26	25
1.0	100		25		50	50	34	D		40	530		41	12	10		27	27
1.2	120		30		62	58	41	E		43	580		49	14	11		31	31
1.4	140		32			66	45	F		46	690		58	16	13		34	34
1.6	160		37				50	G		48	790		66	18	14		38	38
1.8	180		41				54		000	50	900		74	20	16		40	43
2.0	200		45				58	H		52	1000		82	23	17	10	44	46
2.2	220						62	I		54	1100			25	18	11		51
2.4	240						65	J		56	1200			27	20	12		55
2.6	260						68			58	1280			30	21	13		58
2.8	280						70	K		59	1380			32	22	14		63
3.0	300						74	L		60	1475			34	24	15		68
3.2	320							M			1530			36	25	16		72
3.4	340							N			1630			39	26	17		76
3.6	360							O		62	1730			41	28	18		82
3.8	380										1850			43	29	19		86
4.0	400							P		64	1950			46	30	20		90
4.2	420										2050			48	32	21		95
4.4	440							Q			2160			50	33	22		100
4.6	460							R		66	2270			52	34	23		104
4.8	480								00	67	2380			54	36	24		109
5.0	500							S		68	2480			57	37	25		112
5.5	550							T		69	2660			63	40	27		124
6.0	600							U		71	2900			68	44	30		135
7.0	700									74	3375				51	35		160
8.0	800								0	77	3380				58	40		172
9.0	900							V		81	4300				64	45		195
10.0	1000							W		85	4600						49	218
11.0	1100									88	5200						55	
12.0	1200									92	5620						59	

VISCOSITY CONVERSION CHART (Continued)																		
Poise	Centipoise	Parlin 7	Parlin 10	Fisher 1	Fisher 2	Ford Cup 3	Ford Cup 4	Gardner - Holdt Bubble	Gardner - Lithographic	Krebs Unit KU	Saybolt Universal SSU	Zahn 1	Zahn 2	Zahn 3	Zahn 4	Zahn 5	Sears Craftsman Cup	Din Cup 4
13.0	1300							X		95	6100					64		
14.0	1400								1	96	6480							
15.0	1500									98	7000							
16.0	1600									100	7500							
17.0	1700									101	8000							
18.0	1800							Y			8500							
19.0	1900										9000							
20.0	2000									103	9400							
21.0	2100										9850							
22.0	2200										10300							
23.0	2300							Z	2	105	10750							
24.0	2400									109	11200							
25.0	2500							Z-1		114	11600							
30.0	3000									121	14500							
35.0	3500							Z-2	3	129	16500							
40.0	4000									133	18500							
45.0	4500							Z-3		136	21000							
50.0	5000										23500							
55.0	5500										26000							
60.0	6000							Z-4	4		2800							
65.0	6500										30000							
70.0	7000										32500							
75.0	7500										35000							
80.0	8000										37000							
85.0	8500										39500							
90.0	9000										41000							
95.0	9500										43000							
100.0	10000							Z-5	5		46500							
110.0	11000										51000							
120.0	12000										55005							
130.0	13000										60000							
140.0	14000										65000							
150.0	15000							Z-6			67500							
160.0	16000										74000							
170.0	17000										83500							
180.0	18000										83500							
190.0	19000										88000							
200.0	20000										93000							
300.0	30000										140000							

Note: All viscosity comparisons are as accurate as possible with existing information. Comparisons are made with a material having a specific gravity of 1.0.

**VOLUMETRIC CONTENT OF HOSE OR TUBE
(English Units)**

I.D. (inches)	cc/ft.	Cross Section (in. ²)	Length				
			5ft. (60")	10ft. (120")	15ft. (180")	25ft. (300")	50ft. (600")
1/8	2.4	.012	.003 gal. .4 fl. oz.	.006 gal. .8 fl. oz.	.010 gal. 1.2 fl. oz.	.016 gal. 2.0 fl. oz.	.032 gal. 4.1 fl. oz.
3/16	5.4	.028	.007 gal. .9 fl. oz.	.014 gal. 1.8 fl. oz.	.022 gal. 2.8 fl. oz.	.036 gal. 4.6 fl. oz.	.072 gal. 9.2 fl. oz.
1/4	9.7	.049	.013 gal. 1.6 fl. oz.	.025 gal. 3.3 fl. oz.	.038 gal. 4.9 fl. oz.	.064 gal. 8.2 fl. oz.	.127 gal. 16.3 fl. oz.
5/16	15.1	.077	.020 gal. 2.5 fl. oz.	.040 gal. 5.1 fl. oz.	.060 gal. 7.6 fl. oz.	.100 gal. 12.7 fl. oz.	.199 gal. 25.5 fl. oz.
3/8	21.7	.110	.029 gal. 3.7 fl. oz.	.057 gal. 7.3 fl. oz.	.086 gal. 11.0 fl. oz.	.143 gal. 18.4 fl. oz.	.287 gal. 36.7 fl. oz.
1/2	38.6	.196	.051 gal. 6.5 fl. oz.	.102 gal. 13.1 fl. oz.	.153 gal. 19.6 fl. oz.	.255 gal. 32.6 fl. oz.	.510 gal. 65.3 fl. oz.

**VOLUMETRIC CONTENT OF HOSE OR TUBE
(Metric Units)**

I.D. (mm)	cc/m	Cross Section (mm ²)	Length				
			1.5m	3.0m	4.5m	6.0m	7.5m
3.6	10.2	10.2	15.3 cc	30.5 cc	45.8 cc	61.1 cc	76.3 cc
5.6	24.6	24.6	36.9 cc	73.9 cc	110.8 cc	147.8 cc	184.7 cc
6.8	36.3	36.3	54.5 cc	109.0 cc	163.4 cc	217.9 cc	272.4 cc
8.8	60.8	60.8	91.2 cc	182.5 cc	273.7 cc	364.9 cc	456.2 cc

MANUAL CHANGE SUMMARY

This manual was published to replace Service Manual **CP-95-02.4**, LEPS5001 Power Supply, to make the following changes:

1. Revised "Contents" page.
2. Revised "Warranty Policies" section under "Equipment".
3. Revised "Volumetric Content of Hose or Tube" chart in "Appendix".
4. Updated information on back cover.

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