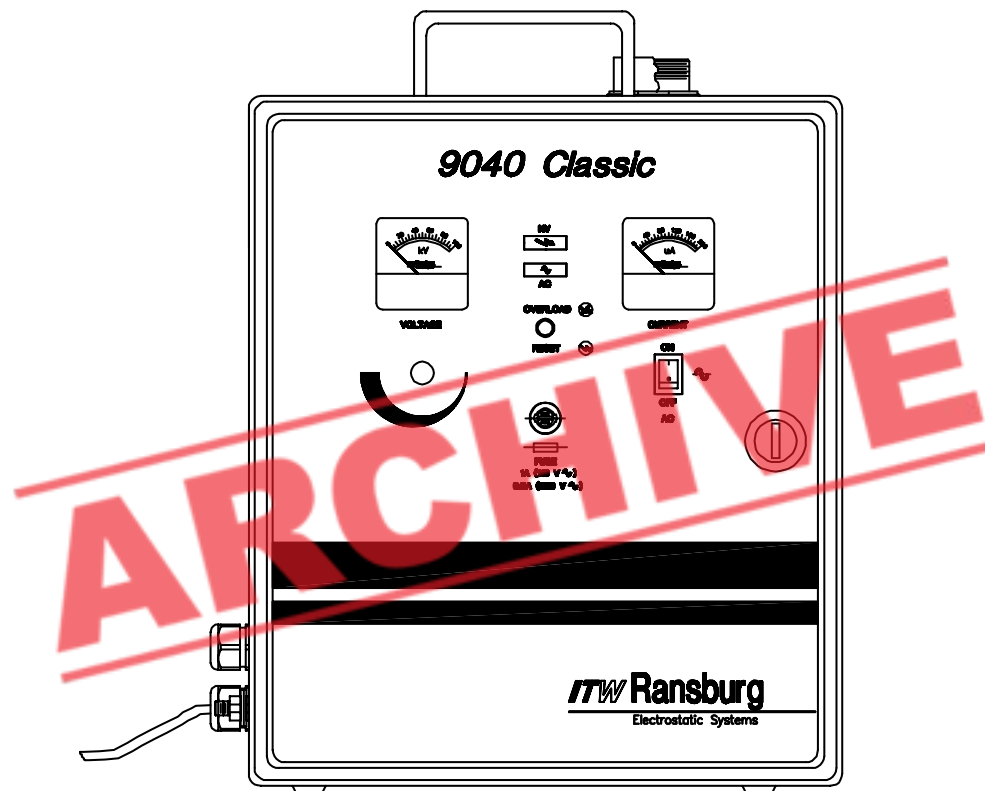


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## 9040 CLASSIC HIGH VOLTAGE POWER SUPPLY for the No. 2 Process™ Handgun

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### MODELS:

76657-14 NO.2 HANDGUN, ELECTRIC MOTOR, DOMESTIC VERSION  
76657-142 NO.2 HANDGUN, ELECTRIC MOTOR, EXPORT VERSION

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**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.

Service Manual Price: \$30.00 (U.S.)

**NOTE:** This manual has been changed from revision **CP-97-03.5** to revision **CP-97-03.6**.  
Reasons for this change are noted under “Manual Change Summary” inside the  
back cover of this manual.

**ARCHIVE**

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# SAFETY

## SAFETY PRECAUTIONS

Before operating, maintaining or servicing any Ransburg 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, 2000 EDITION**, prior to installing, operating, and/or servicing this equipment.



### WARNING


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

<b>AREA</b> Tells where hazards may occur.	<b>HAZARD</b> Tells what the hazard is.	<b>SAFEGUARDS</b> Tells how to avoid the hazard.
<p><b>Spray Area</b></p> 	<p><b>Fire Hazard</b></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 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> <p>Those used for equipment flushing should have flash points equal to or higher than those of the coating material.</p> <p>Those used for general cleaning must have flash points above 100°F (37.8°C).</p> <p>Spray booth ventilation must be kept at the rates required by NFPA 33, 2000 Edition, OSHA and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents.</p> <p>Electrostatic arcing must be prevented.</p> <p>Test only in areas free of combustible material.</p> <p>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>The paint process and equipment should be set up and operated in accordance with NFPA 33, NEC, and OSHA requirements.</p>
<p><b>Explosion Hazard/ Incompatible Materials</b></p> 	<p>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.</p>	<p>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 material supplier. Any other type of solvent may be used with aluminum equipment.</p>

<b>AREA</b> Tells where hazards may occur.	<b>HAZARD</b> Tells what the hazard is.	<b>SAFEGUARDS</b> Tells how to avoid the hazard.
<p><b>Spray Area</b></p> 	<p>Electrostatic Arcing</p>	<p>Never operate the spray gun without properly grounding the following.</p> <p>A. Operators:                      Operators must be grounded. Rubber soled insulating shoes should not be worn. Grounding leg straps may be used.</p> <p>Operators must maintain contact with the handle of the gun. If work gloves are used, the palm section should be cut out.</p> <p>Operators must remove from themselves all metal objects that are not grounded.</p> <p><b>NOTE: REFER TO NFPA 33, CHAPTER 10, 2000 EDITION REGARDING OPERATOR GROUNDING.</b></p> <p>B. Parts being sprayed: Resistance between the part and a grounded conveyor must not exceed 1 megohm.</p> <p>C. Every metal and conductive object in the spray area: This includes the booth, parts hangers, fire extinguishers, conductive flooring, etc.</p> <p>D. Unless specifically approved for use in hazardous locations, the power supply and other electrical equipment must not be used in Class I, Division 1 or 2 locations.</p> <p>Grounded conductive flooring must be provided in the spray area.</p> <p>Turn off voltage at the power supply before flushing out, cleaning, or removing any parts from the gun.</p> <p>Never install a spray gun into a fluid system using an isolated solvent supply.</p> <p>Do not touch gun electrode while gun is energized.</p> <p>Ensure the Ground Wire Assembly is connected from the power supply ground stud to a true earth ground.</p> <p>Ensure that the power supply is plugged in to a properly grounded outlet.</p>

<b>AREA</b> Tells where hazards may occur.	<b>HAZARD</b> Tells what the hazard is.	<b>SAFEGUARDS</b> Tells how to avoid the hazard.
<b>General Use and Maintenance</b>	Improper operation or maintenance may create a hazard.  Personnel must be properly trained in the use of this equipment.	Personnel must be given training in accordance with the requirements of NFPA 33, Chapter 16, 2000 edition.  Instructions and safety precautions must be read and understood prior to using this equipment.  Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. OSHA references are Sections 1910.94 and 1910.107. Also refer to NFPA 33, 2000 edition and your insurance company requirements.  Always turn power to the power supply OFF, unplug the electrical cord from its outlet, and remove the front panel fuse, before opening the power supply door. If necessary, lock the power supply out so that it cannot be turned ON until the work is finished.  Whenever removing high voltage cables from equipment, ground the contact end of the cable by holding the cable such that the contact touches earth ground for several seconds. Do not touch the contact until it has been grounded. This will reduce the possibility of residual charge causing electrical shock.  The High Voltage Multiplier Assembly contains energy storage components that can cause serious shock injury, and therefore is not field repairable. Warranty will be voided if the High Voltage Multiplier seal is broken. If the High Voltage Multiplier is defective contact your authorized Ransburg representative for exchange or repair.  The High Voltage Multiplier and high voltage cable contain significant capacitance that will store charge. Allow approximately 10 seconds for this charge to bleed off before opening the cabinet door or removing the high voltage cable from the power supply or spray gun.



<b>AREA</b> Tells where hazards may occur.	<b>HAZARD</b> Tells what the hazard is.	<b>SAFEGUARDS</b> Tells how to avoid the hazard.
<b>Toxic Substances</b> 	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.

# INTRODUCTION

## GENERAL DESCRIPTION

### The Ransburg No. 2 Handgun Process

The No. 2 Process™ is an electrical atomization method for applying coatings to objects electrostatically. The No. 2 Process Handgun system applies a high voltage, negative, DC charge to the applicator bell, creating an electrostatic field between the bell and the target object. The target is electrically grounded through its support which may be stationary or moving; or through an electrical connection to a known true earth ground.

A regulated pressure fluid system delivers coating material to the bell when the gun is triggered. There, the fluid travels across the face of the rotating bell and becomes charged. The fluid is electrically atomized at the edge of the bell forming a fine mist which, under the influence of the electrostatic field, is attracted to and deposited on the target object. The forces between the charged particles and the grounded target are sufficient to turn almost all overspray around and deposit it on the side and back surfaces of the target. Thus, a high percentage of the spray is deposited on the target and overspray is controlled.

### The 9040 Classic High Voltage Power Supply

The 9040 Classic Power Supply converts standard AC line voltage to a high frequency, low voltage signal ranging from 0 to 10 Vrms. This signal is supplied to the High Voltage Multiplier where it is converted to DC high voltage. The high voltage DC is then transferred from the 9040 Classic Power Supply to the No. 2 Process spray gun through a super flex high voltage cable. The voltage/current characteristic is designed to optimize the charging process under varying load conditions and to limit the operating current to a safe maximum value.

In addition to supplying high voltage output to the spray gun, the 9040 Classic power supply also provides controls for AC power ON/OFF, a high voltage meter, a current meter, a POWER ON indicator, a HIGH VOLTAGE ON indicator, and a CURRENT OVERLOAD indicator and reset switch. Additionally, output terminals are provided for remote overload reset and interlock connections for a conveyor, exhaust fan and high voltage control on all 9040 Classic Power Supplies.

#### NOTE

- ▶ The 9040 Classic No. 2 Power Supply is factory supplied with a cabinet latch that can be opened using a slotted screwdriver. If desired, the standard latch can be easily replaced with a latch that requires the use of a key to open. This key lock can be ordered from: Austin Hardware, Inc., 8001 Central Ave. N. E., Minneapolis, MN 55432; 1-800-328-2423; Key Lock Part Number: C8052-14A.

The 9040 Classic Power Supply is available as follows:

9040 Part No.	Used with No. 2 Gun Type	Gun No.
76657-14	Electric Motor, Domestic	19372
76657-142	Electric Motor, Export	19372

Figure 1: 9040 Classic Power Supply Availability

#### NOTE

- ▶ Except where indicated, this manual is applicable to all models of the 9040 Classic No. 2 Process Handgun Power Supply.

# SPECIFICATIONS

## Electrical

**Input:**  
**Voltage:** 90-264 VAC  
**Current:** 0.6/0.3 Amps AC  
**Frequency:** 50/60 Hertz  
**Wattage:** 60 Watts (Maximum)

**Output:**  
**Voltage:** 0-100 kV DC  
**Current:** 100 Microamps Max.

## Physical

**Height:** 14 inches (35.6 cm)  
**Width:** 12 inches (30.5 cm)  
**Depth:** 6 inches (15.2 cm)  
**Weight:** 24 pounds (10.9 kg)

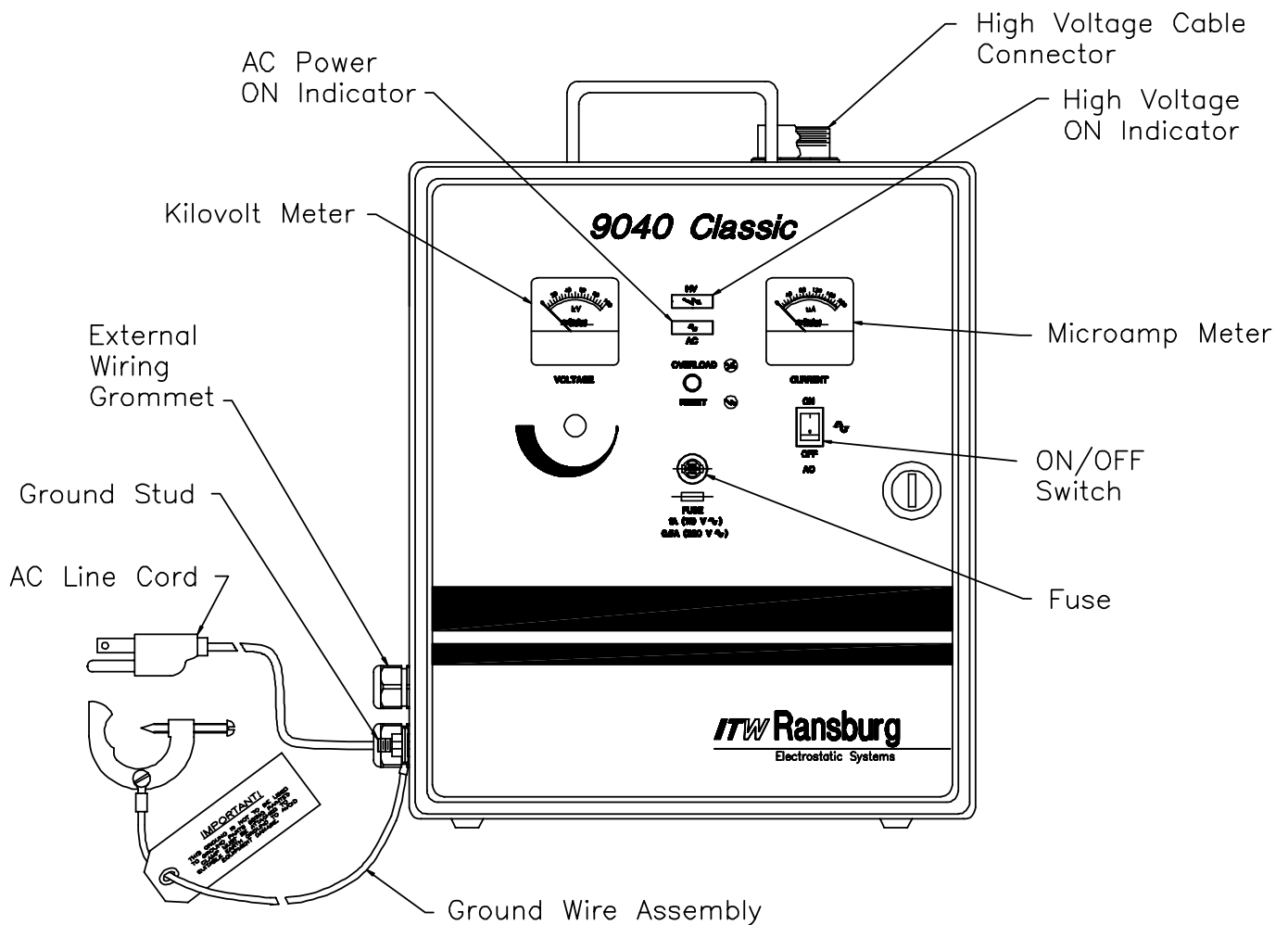


Figure 2: 9040 Classic No. 2 Power Supply Features

# INSTALLATION

## ⚠ WARNING

- ▶ The 9040 Classic Power Supply **MUST** be located outside the hazardous area. (See *National Fire Protection Association Bulletin No. 33*; the Occupational Safety and Health Act of 1970, sections 1910.106 and 1910.107 and Ransburg Bulletin IL-247, *Operating Your Electrostatic Coating System Safely*.)
- ▶ The user **MUST** read and be familiar with the SAFETY and SAFETY PRECAUTIONS SECTIONS of this manual.
- ▶ 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. The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as NFPA Standard 33 and The Occupational Safety and Health Act of 1970 (OSHA) prior to installing, operating and/or servicing this equipment.

## NOTE

- ▶ As each installation is unique, this information is intended to provide general installation information for the 9040 Classic Power Supply. Consult your authorized Ransburg distributor for specific directions pertaining to the installation of your equipment.

## LOCATION

Install the 9040 Classic Power Supply in an area outside the hazardous location, where it will be protected from the possibility of environmental intrusion, such as dust or moisture, and ambient temperatures do not exceed 120°F, but as close to the applicator as possible to mini-

mize the length of the high voltage cable. The Power Supply may be free standing on any flat surface or wall mounted by rotating the wall mount brackets (supplied) as shown in Figure 3. In either case, the power supply **MUST** be mounted in an upright position. **DO NOT** lay the power supply on its side or back.

## ⚠ CAUTION

- ▶ **DO NOT** locate the power supply near or adjacent to heat producing equipment such as ovens, high wattage lamps, etc.

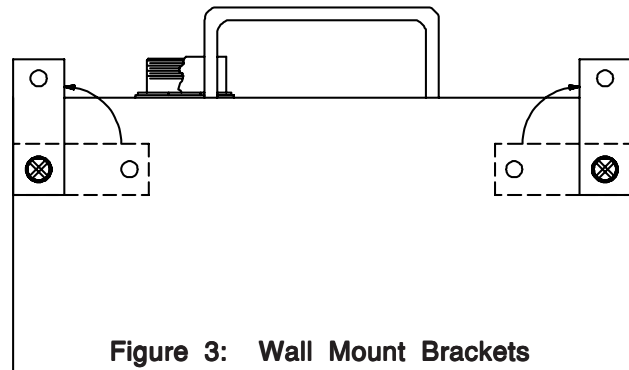


Figure 3: Wall Mount Brackets

## INPUT VOLTAGE SELECTION

The 9040 Classic Power Supply accepts universal input voltage between 90 and 264 VAC. There is no need to change any switch settings when changing input from 115 to 230 VAC or from 230 to 115 VAC.

## NOTE

- ▶ 9040 units shipped from the factory for 115 VAC input will have a 72771-06, 1 amp front panel fuse installed. While 9040 units shipped from the factory for 230 VAC input will have a 72771-01, 0.5 amp front panel fuse installed. If the other input is required, it is recommended that the fuse be changed in order to keep the same level of protection. Both fuses are shipped with 9040 power supplies.

## INPUT CONNECTIONS

Plug the AC line cord into a properly grounded AC outlet. Any extension of the AC line cord **MUST** conform to the following:

- It must be properly connected to wire with ground.
- It must be 14 gauge minimum.
- It must be less than 100 feet total length.
- It should be continuous (as few connections as possible).

### NOTE

► For portable use, the 9040 Classic No. 2 Power Supply comes factory wired with an AC line cord. For permanent installations, conduit is generally required. However, if national and local codes permit, the AC power may be supplied via the factory installed line cord for permanent installations also. If conduit is utilized, the power supply wiring **MAY** be routed through an optional explosion proof switch mounted on or near the spray booth where it will be convenient to the operator.

## Input Circuit Test

Prior to applying AC power to the Power Supply, the phase and ground of the AC receptacle and/or extension cord **MUST** be tested using the Circuit Tester, P/N 20868-00. If the circuit is found to be faulty or out of phase, the circuit **MUST** be corrected before operating the power supply.

### CAUTION

► Operation of the power supply on an ungrounded or improper circuit can lead to component failure or unsafe operation.

## EXTERNAL CONNECTIONS

### NOTE

► When connecting external control wires to the 9040 Classic Power Supply, route the wiring through the external wiring grommet located on the side panel.

## High Voltage (HV) Cable Connection

Remove the plastic protective plug from the HV Cable Connector and squirt enough of the supplied dielectric oil (70863-00) into the HV Tube to cover the electrical contact point.

### NOTE

► Squirted dielectric oil (70863-00) down the HV Tube significantly reduces corona discharge that can cause deterioration of the HV connection components.

With a clean, dry cloth, wipe the end of the HV Cable. Insert the HV Cable into the HV Cable Connector and tighten the cable nut securely.

## Safety Ground

Crimp the appropriate connector onto the Ground Wire Assembly and install from the power supply ground stud, located on the side panel, to a true earth ground.

### CAUTION

► The Ground Wire Assembly **MUST** be connected from the Power Supply ground stud to a true earth ground. **DO NOT** attach the ground wire from the Power Supply to the part being coated. Damage to the power supply will occur! Separate ground wires **MUST** be used for grounding the part and the Power Supply.

## Interlocks

### ⚠ WARNING

- ▶ **ALWAYS** ensure that high voltage is **OFF** before flushing the spray gun with solvent. **NEVER** flush the spray gun with high voltage **ON**, as this is a severe fire hazard and risk to personnel safety. It is recommended that the high voltage control be interlocked with the solvent flush signal so that high voltage is automatically locked out whenever flushing occurs. Consult your authorized Ransburg representative for information on interlocking the high voltage **OFF** signal with the solvent flush signal.

As outlined in NFPA 33 and OSHA standard 1910, the AC power line must be series interlocked with both the exhaust fan and conveyor. To interlock the 9040 Classic power supply with the exhaust fan and conveyor perform the following:

1. Ensure the front panel fuse is removed, the power supply is unplugged, and the ON/OFF switch is in the OFF position.
2. Open the power supply cabinet door.

### ⚠ WARNING

- ▶ **ALWAYS** double check that the power supply is unplugged from its AC Outlet before working with any internal wiring.

3. Using a small blade screw driver, remove the factory installed jumper from 1TB-L1 to 1TB-L2.
4. Route exhaust fan and conveyor interlock (supplied by user) wiring through the external wiring grommet on the side of the power supply and connect to 1TB-L1 and 1TB-L2 as shown in Figure 4. **The interlock contacts should be rated for at least 1 Amp at 240 volts AC.**
5. Secure the cabinet door, replace the fuse, and plug the power supply in.

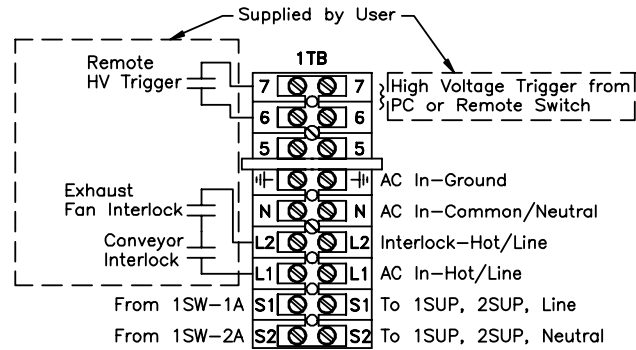


Figure 4: Terminal Block One (1TB)

## External Relay Contacts

A set of external relay contacts for High Voltage (K1) and overload (K2) conditions is provided at 6PL-5, -6, & -7. See Figure 10 in the "Maintenance" section of this manual for exact wiring locations. These relay contacts are sometimes useful in configuring the control of the spray gun system.

## External High Voltage Control

If a method of high voltage triggering, other than the factory supplied method, is required, the 9040 Classic Power Supply allows for external high voltage control from a PLC, pressure switch, air flow switch, or other user supplied device. To turn the high voltage on, the user supplied device must create a contact closure between terminals 6 and 7 of terminal block one (1TB). To connect the user supplied, external high voltage control device, perform the following:

1. Ensure the front panel fuse is removed, the power supply is unplugged, and the ON/OFF switch is in the OFF position.
2. Open the power supply cabinet door.
3. Route the contact wires of the control device through the external wiring grommet and connect to the existing wiring for 1TB-6 and 1TB-7. The control device contacts must be rated for at least 100 milliamps at 15 volts DC.
4. Secure the cabinet door, replace the fuse, and plug in the power supply.

# OPERATION

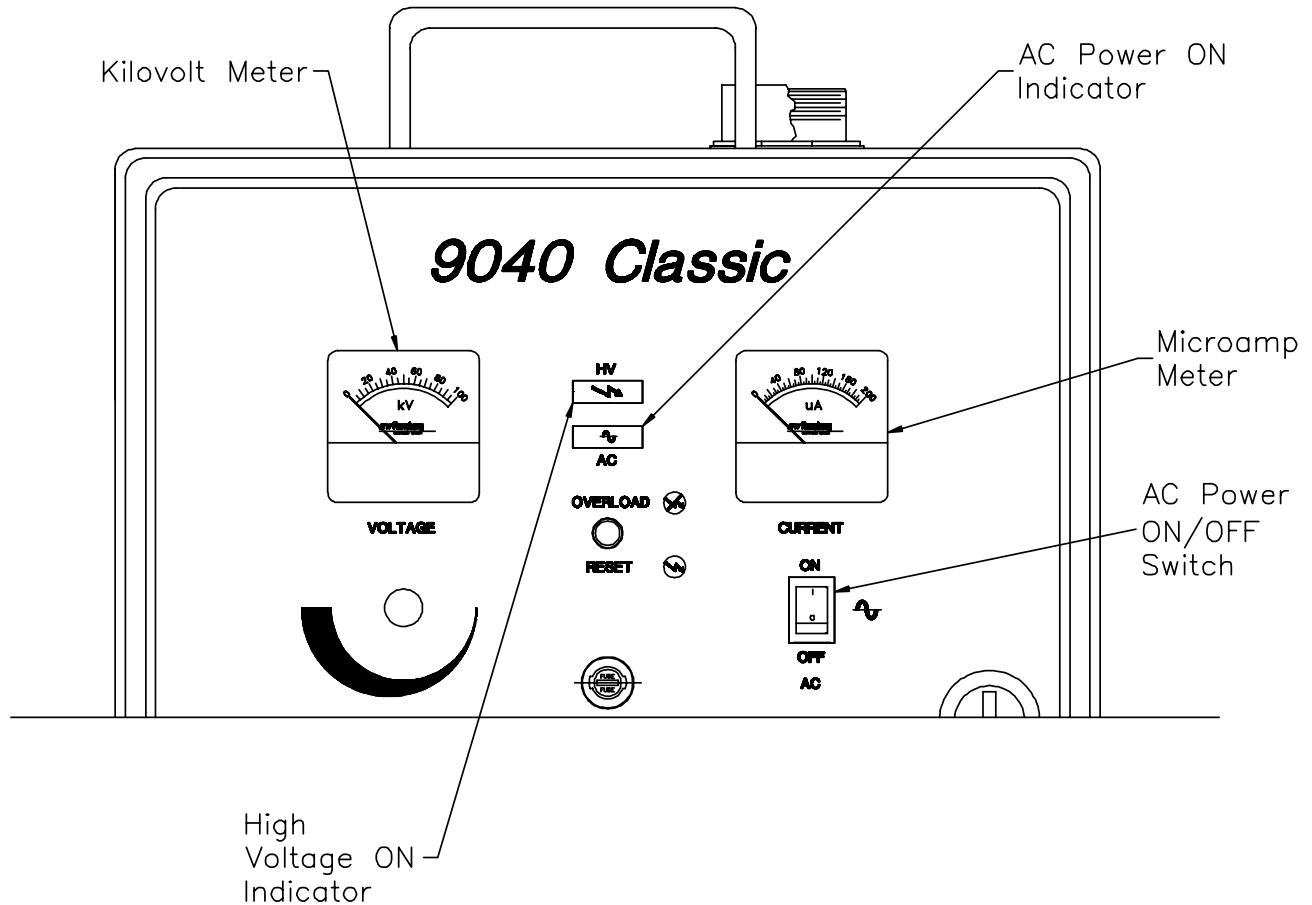


Figure 5: Operating Controls

**! WARNING**

► The electrical discharge which is available from the charging electrode of the applicator must not exceed 0.25 mJ of energy. To achieve this limit, any flow of energy from the paint supply through the paint line to the gun electrode **MUST** be prevented by grounding the paint line at the gun handle or body. Verify that the applicator is actually grounded **BEFORE** operating it! (See the appropriate spray gun manual.) If improper readings are obtained, check that the power supply is grounded (see "Ground Test Procedure" in the "Maintenance" section of this manual).

**! WARNING**

► The user **MUST** read and be familiar with the **"SAFETY" SECTION** of this manual and the Ransburg safety literature therein identified **BEFORE OPERATING** the 9040 Classic power supply.

## THEORY OF OPERATION

-REFER TO FIGURE 10

Line Voltage (90-264 VAC) is applied to input terminals 11PL-1 and 11PL-2 of 18 VDC Power Supply 1SUP through the user supplied exhaust fan and conveyor interlocks, fuse 1FU and ON/OFF switch 1SW. Line voltage from ON/OFF switch 1SW is also supplied to the input of the 24 VDC power supply 2SUP. The 24 VDC output of the power supply is then supplied to

LED1, the (+) end of relay coil K3 (mounted on the relay board), and one of its normally open contacts.

The output of power supply 1SUP, through PC board fuse F2, provides the DC voltage which powers the PC Board regulators and the AC power ON LED. The DC input to the oscillator circuit is obtained from a board regulator. The oscillator circuit outputs a low voltage, high frequency AC signal to the High Voltage Multiplier Circuit. The High Voltage Multiplier Circuit rectifies the AC voltage to DC and steps it up to provide rated kV to the spray gun via the high voltage cable.

The DC input to the oscillator is interlocked with 1TB terminals 6 and 7, such that the oscillator will not function unless terminals 6 and 7 are connected together. In this manner, high voltage to the spray gun is controlled as follows:

1. Turning the ON/OFF toggle switch at the back of the spray gun to the ON position grounds relay board coil K3, thereby activating the coil. Activation of the coil closes its two normally open contacts. Closure of one set of contacts supplies LED2 and 24 VDC to the motor. Closure of the second set of contacts connects 1TB-6 and 7 together, thereby providing high voltage to the handgun.
2. Contact closure of a programmable controller output, robot output, or some other user supplied device connected to terminals 1TB-6 and 7 will activate high voltage at the spray gun.
3. For testing and troubleshooting, board jumper JP4 connects 1TB-6 and 7 together, thereby providing high voltage output. (See "PC Board Test Jumper" in the "Maintenance" section of this manual.)

## OPERATING PROCEDURES

1. Ensure that the AC power and high voltage cables are connected as described in the "Installation" section of this manual.

### CAUTION

- ▶ Check that the power supply is properly grounded!

2. Turn the ON/OFF switch to the ON position. The green LED will light indicating that AC power is being supplied to the power supply.
3. The voltage to the No. 2 hand gun is activated by turning the toggle switch on the back of the gun to the ON position.

## Kilovolt and Microamp Meters

The kilovolt meter indicates the voltage in thousands of volts (kV) present at the bell edge. The microamp meter indicates the current in millionths of amps ( $\mu$ A) leaving the bell edge.

## High Voltage Safety Circuit

The 9040 Printed Circuit Board (PCB) contains a safety circuit that prevents high voltage from being present at the gun if the high voltage trigger device (gun toggle switch, flow switch, pressure switch, PC contact, etc.) has not been triggered. If a failure mode should occur that would attempt to send high voltage to the gun, even though the high voltage trigger has not been activated, the PC Board will shut down and enter an overload condition. If repeated overloads occur, every time the overload reset button is pushed, open the cabinet door and see if the red LED (LED1, see Figure 7 for location) on the PC Board lights for about 2 seconds after pushing the reset button. If it does, the PC Board has failed and should be replaced.

## High Voltage ON Indicator

The red high voltage on LED will light when high voltage is present at the spray gun.

## AC Power ON Indicator

The green AC power ON LED will light when the AC Power ON/OFF switch is in the ON position.



# MAINTENANCE

## ROUTINE PREVENTIVE MAINTENANCE

In general, little maintenance is necessary to ensure proper operation. It is important, however, to keep the interior of the unit clean and free from moisture or foreign material. For this reason:

1. Keep the exterior of the unit free from dust accumulation.
2. Always clean the exterior prior to opening the cabinet door.
3. Open the cabinet door only to perform maintenance or repair.
4. If the power supply end of the high voltage cable becomes dirty, clean the end of the cable with a suitable, clean, non-polar solvent and apply a light coat of dielectric grease. On a yearly basis, check to ensure that the dielectric oil (70863-00) is covering the electrical contact point in the High Voltage Tube. If not, add oil as needed.

### NOTE

► Squirting dielectric oil (70863-00) down the HV Tube significantly reduces corona discharge that can cause deterioration of the HV connection components.

5. Perform a Current Output (SCI) Test approximately every 50 hours of high voltage operation.

### CAUTION

► Never immerse any part of, or all of an assembled applicator in any liquid.

## TROUBLESHOOTING

### PC Board Test Jumper

To assist in testing and troubleshooting, a jumper (JP4) has been incorporated on the 9040 PC Board. By covering (shorting) both terminals the high voltage on relay is triggered. Thus, for testing and troubleshooting, high voltage output can be obtained without the need to trigger the spray gun or user supplied control device. Just remember to reposition the jumper after testing, so that it covers only one terminal (open) or the high voltage will stay on all the time (see Figure 7 for location of test jumper JP4).

### CAUTION

► If JP4 is left covering (shorting) both terminals, high voltage will be on whenever AC power is turned on. This could be hazardous in some applications.

### Ground Test Procedure

#### Equipment Required:

Ohmmeter - To Measure Resistance

If shocks or sparks are noticed at any point in the spray system, immediately turn off the power supply and check the complete system for proper grounding. Proper grounding of the spray gun system can be verified as follows:

1. Ensure that the clamp of the 14 AWG Ground Wire Assembly is connected to true earth ground. The resistance between the clamp and a known earth ground should read less than 25 ohms.
2. Place one end of the ohmmeter on the clamp of the Ground Wire Assembly and the other end on the Power Supply ground stud. If the ohmmeter reads greater than 25 ohms, replace the 14 AWG Ground Wire Assembly.

3. Connect one end of the ohmmeter to the Power Supply ground stud and the other to the metal gun handle. If the ohmmeter reads greater than 25 ohms repair or replace the high voltage cable.

### Current Output (SCI) Test

When a lack of high voltage at the applicator indicates a problem, a Current Output (SCI) Test should be performed to help determine if the power supply is at fault (see Figure 6).

#### NOTE

- ▶ If the power supply SCI is normal and the control circuit operates correctly when jumpered, then any lack of high voltage or control malfunction should be isolated to the gun and/or high voltage cable.

#### Equipment Required:

Test Assembly (76652-02)  
Test Resistor (16688-02)  
Clip Lead (User Supplied)

1. Turn high voltage OFF and disconnect AC power to the unit.
2. Remove the high voltage (HV) cable from the power supply.

#### ! WARNING

- ▶ Whenever removing high voltage cables 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.

3. Using the 76652-02 Test Assembly with gun test leads attached (or other suitable VOM), connect the negative lead (white) to the grooved, metal end of the Test Resistor (16688-02) and the positive lead (black) to the rim of the High Voltage Cable Connector.

#### ! WARNING

- ▶ **ALWAYS** ensure step 3 has been completed before proceeding with step 4.

4. Insert the Test Resistor (16688-02) into the High Voltage Tube of the power supply.
5. Set the switch on the Test Assembly (76652-02) to the  $\mu$ A position (if using a VOM set the scale for 200 microamps).
6. Connect the AC source power and turn the power supply ON/OFF switch to the ON position.
7. Using the clip lead, short circuit the High Voltage Cable Connector pin 1CON-3 to ground (rim of High Voltage Cable Connector), as shown in the balloon of Figure 6. When proper connection is made, the red high voltage ON Indicator will light.

#### NOTE

- ▶ PC Board Test Jumper JP4 may be used instead of the user supplied clip lead, to trigger the high voltage on. (See "PC Board Test Jumper", discussed earlier in this section, for further information.)

8. Read the current draw on the Test Assembly (76652-02) (or VOM). The reading should be approximately 75 to 110 microamps. Readings outside of these limits are indications of a defective power supply. Refer to the "Troubleshooting Guide" (Figure 9) to locate the specific problem.
9. Turn all power OFF, wait 10 seconds to allow high voltage charge to drain off, remove the Test Assembly and Resistor, and restore the unit to operating condition.

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### KV Output Test

When a lack of high voltage at the spray gun indicates a problem, a kV Output Test of the Power Supply may be performed to help determine whether it is at fault.

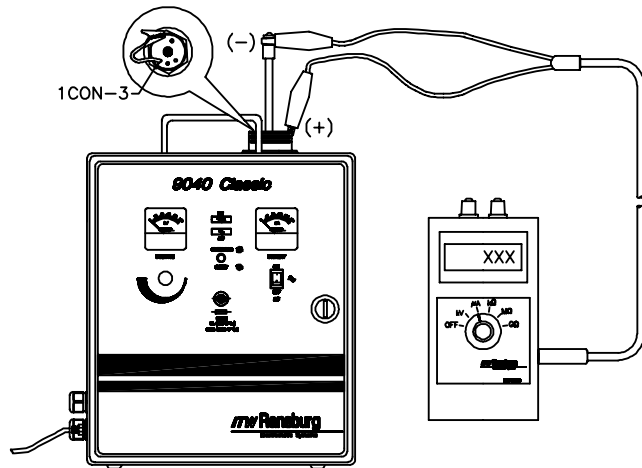


Figure 6: Current Output Test

#### Equipment Required:

Calibrated Ransburg High Voltage Test Probe and Meter (76652-01)

### KV Output Test Procedure

1. Turn AC power to the power supply **OFF**.
2. Remove the high voltage (HV) cable from the power supply.

**⚠ WARNING**

▶ Whenever removing high voltage cables 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.

3. Open the cabinet door and position jumper JP4 on the main PC Board so that it covers (shorts) both terminals.

4. Attach the appropriate HV cable to the Test Probe (76652-01), properly ground the probe to a true earth ground and turn the Test Probe Meter on (see Operation Manual of 76652-01 Tester).
5. Insert the Test Probe HV cable into the Power Supply HV Tube until it bottoms out.

**NOTE**

▶ Ensure that the Test Probe HV cable makes good contact both inside the Test Probe and inside the Power Supply HV Tube.

6. Turn the power supply **ON**.
7. Read the output voltage displayed on the meter, then turn the power supply **OFF**. If the voltage **DOES READ** correctly (see "Specifications" in the "Introduction" section of this manual), the problem is not in the Power Supply, therefore the HV Cable and spray gun should be checked for the cause. If the voltage **DOES NOT READ** correctly, the problem is with the power supply. Consult the "Troubleshooting Guide" (Figure 9) to locate the specific problem.
8. Disconnect the Test Probe (76652-01) and reposition JP4 so that it covers only one terminal. When ready to resume spray operations, reconnect the spray gun HV cable and turn the power supply on.

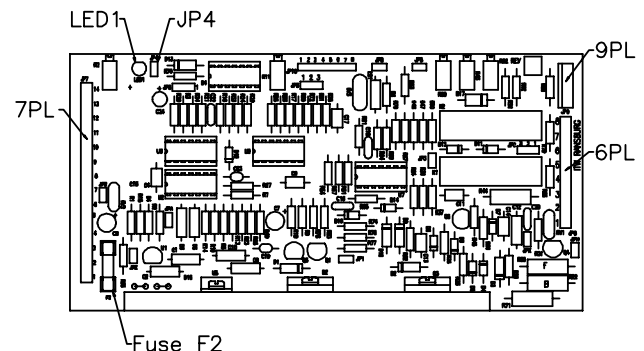


Figure 7: Main PC Board

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## Bench Testing

### Equipment Required:

Volt/ohmmeter

The "Troubleshooting Guide" (Figure 9) provides information for troubleshooting the power supply when improper operation is obtained and the problem has been traced to the power supply. Proper troubleshooting should **ONLY** be accomplished with specific test equipment by qualified electronics technicians or authorized Ransburg representatives.

### ⚠ WARNING

- Procedures outlined in the "Troubleshooting Guide" (Figure 9) require measurement of voltage potentials that can cause **SERIOUS BODILY INJURY** if proper measuring procedures are not followed. For this reason, proper troubleshooting should **ONLY** be accomplished with specific test equipment by qualified electronics technicians or authorized Ransburg representatives.

Before troubleshooting, ensure that the power supply is plugged into a live outlet of the appropriate voltage. All electrical measurements in the "Troubleshooting Guide" (Figure 9) are nominal and may vary as much as  $\pm 10\%$  depending on the test conditions and the test equipment used. Refer to Figures 7 and 8 for location of parts called out in the "Troubleshooting Guide".

For bench testing, jumper JP4 should be used to trigger the high voltage output (see "PC Board Test Jumper" previously discussed in this section).

### ⚠ CAUTION

- The High Voltage Multiplier and high voltage cable contain significant capacitance that will store charge. **ALLOW** approximately 10 seconds for this charge to bleed off **BEFORE** opening the cabinet door **OR REMOVING** the high voltage cable from the power supply or spray gun.

## Diagnostic LED's

There are two diagnostic LED's located on the relay board inside the cabinet (see Figure 8). LED1 is a green LED that indicates 24 VDC input is being received from power supply 2SUP. LED2 is a red LED that indicates 24 VDC is being output to the gun motor. LED2 should be lit whenever the toggle switch at the back of the gun is turned ON.

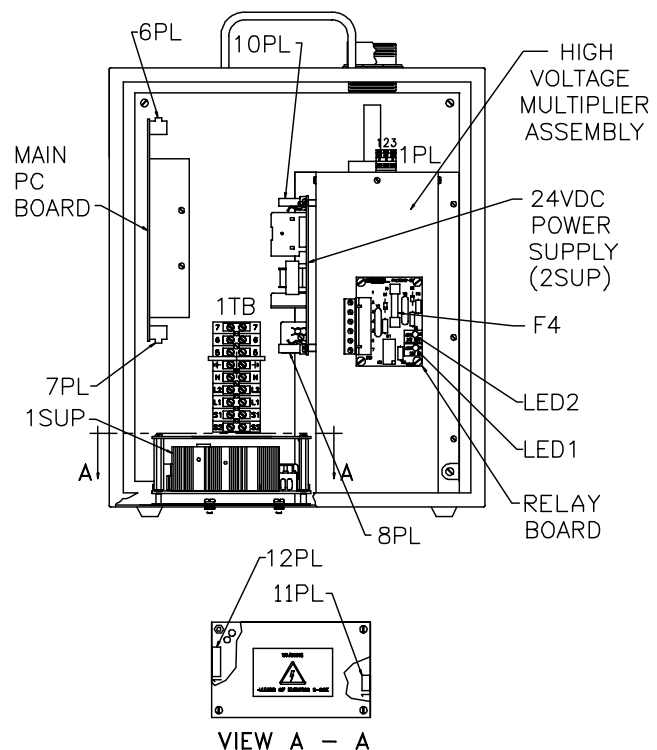


Figure 8: Troubleshooting Diagram

## TROUBLESHOOTING GUIDE

General Problem	Possible Cause	Solution
<p><b>AC Power ON Indicator (Green LED) Does Not Light When ON/OFF Switch Is On</b></p>	<ol style="list-style-type: none"> <li>1. Front panel fuse 1FU or PC Board fuse F2 defective</li> <li>2. Connector 7PL or 9PL not properly plugged into main PC board</li> <li>3. Improper input line voltage</li> <li>4. Improper exhaust fan or conveyor interlock connections</li> <li>5. Defective ON/OFF switch 1SW</li> <li>6. Defective power supply 1SUP</li> <li>7. Defective LED display board</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace defective fuse.</li> <li>2. Properly attach connector.</li> <li>3. Ensure voltage across terminals L1 and N of terminal block 1TB is between 90 and 264 VAC.</li> <li>4. Correct connection so that voltage across terminals L2 and N of 1TB is between 90 and 264 VAC.</li> <li>5. Voltage across terminals 1A and 2A of ON/OFF switch 1SW should be between 90 and 264 VAC. If not, replace switch 1SW.</li> <li>6. Voltage across terminals 2 and 3 of plug 7PL on main PC board should be 18 VDC. If not, replace power supply 1SUP.</li> <li>7. If all other functions of power supply are normal, replace LED display board.</li> </ol>
<p><b>Motor Rotating, But No Or Low kV Output At Spray Gun</b></p>	<ol style="list-style-type: none"> <li>1. Connector 6PL or 1PL not properly plugged in to respective locations</li> <li>2. Defective spray gun or high voltage cable</li> <li>3. Loose or broken wire in power supply</li> <li>4. Main PC board defective</li> <li>5. Defective high voltage multiplier</li> </ol>	<ol style="list-style-type: none"> <li>1. Properly attach connector.</li> <li>2. Perform a Current Output Test on the power supply. If proper readings are obtained, check cable or spray gun for cause. (See Spray Gun's Service Manual.)</li> <li>3. Check all wiring connections for integrity. Repair wiring as needed.</li> <li>4. Disconnect 1PL from high voltage multiplier and plug in to LTST5000 Tester. If improper readings are obtained, replace main PC board.</li> <li>5. Disconnect HV cable from power supply. If problem is still present, connect LTST5000 Tester to 1PL and test. If results of test are okay, replace high voltage multiplier.</li> </ol>

Figure 9: Troubleshooting Guide (Continued on Next Page)

General Problem	Possible Cause	Solution
<b>Motor Not Rotating And No kV Output At Spray Gun, LED1 Off</b>	<ol style="list-style-type: none"> <li>1. Improper input line voltage to connector 8PL</li> <li>2. Defective 24 VDC power supply 2SUP</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure voltage across terminals 1 and 2 of connector 8PL is between 90 and 264 VAC.</li> <li>2. Voltage across terminals 1 and 6 of plug 10PL of power supply 2SUP should be 24VDC. If not, replace power supply 2SUP.</li> </ol>
<b>Motor Not Rotating And No kV Output At Spray Gun, LED1 On</b>	<ol style="list-style-type: none"> <li>1. Defective control wires in cable or switch in gun</li> <li>2. Defective relay board</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for continuity from 2TB-3 of relay board to gun handle when switch at gun is ON. If no continuity, replace high voltage cable or gun ON/OFF switch.</li> <li>2. If #1 above checks ok, replace relay board.</li> </ol>
<b>Motor Not Rotating But kV Output Ok, LED2 Off</b>	<ol style="list-style-type: none"> <li>1. Defective relay board fuse F4</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace defective fuse.</li> </ol>
<b>Motor Not Rotating But kV Output Ok, LED2 On</b>	<ol style="list-style-type: none"> <li>1. Defective control wires in high voltage cable</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace high voltage cable.</li> </ol>
<b>Intermittent Motor Operation</b>	<ol style="list-style-type: none"> <li>1. Defective high voltage multiplier</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace high voltage multiplier.</li> </ol>
<b>Motor Rotating Too Fast</b>	<ol style="list-style-type: none"> <li>1. Defective power supply 2SUP</li> </ol>	<ol style="list-style-type: none"> <li>1. Voltage across terminals 1 and 6 of plug 10PL of power supply 2SUP should be 24VDC. If not, replace power supply 2SUP.</li> </ol>
<b>Excessive Current Draw</b>	<ol style="list-style-type: none"> <li>1. Short in cable or gun</li> <li>2. Defective main PC board</li> <li>3. Defective high voltage multiplier</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove cable from power supply. If problem goes away, check gun or cable for cause.</li> <li>2. Test PC board with LTST5000 Tester. Replace PC board if improper results are obtained.</li> <li>3. If 1 and 2 above are okay, replace high voltage multiplier.</li> </ol>
<b>Excessive Shocking</b>	<ol style="list-style-type: none"> <li>1. Discontinuity in ground circuit</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform the Ground Test Procedure as described in the "Maintenance" section of this manual.</li> </ol>

Figure 9: Troubleshooting Guide (Continued)

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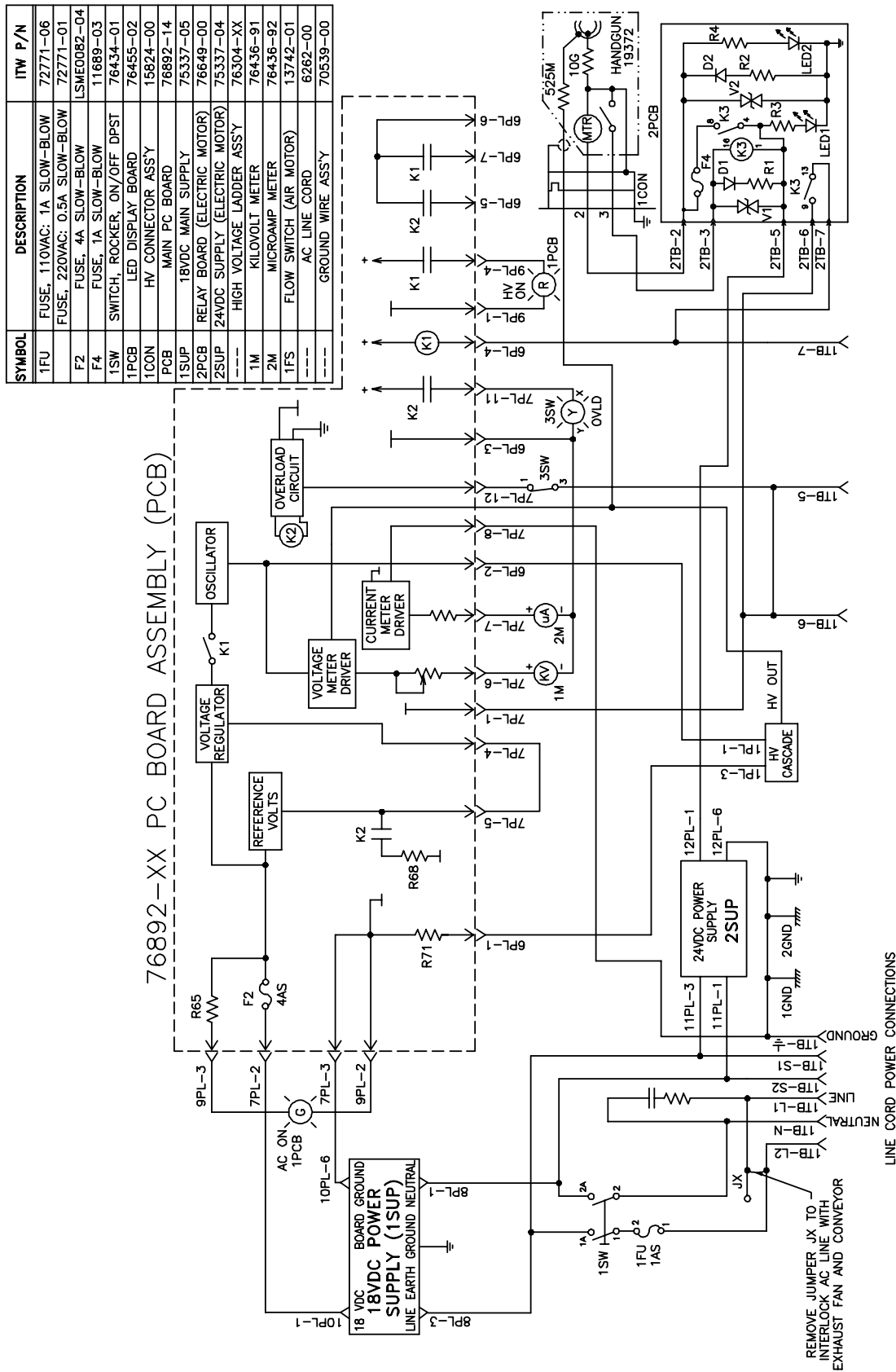


Figure 10: 9040 Classic No. 2 Power Supply Block Diagram

## SERVICE LEVEL

Personnel who service this unit must be qualified electronics technicians. Replacement parts are designed to be made at the assembly level. See "Parts Identification" section of this manual for part numbers and ordering information.

### WARNING

- ▶ **ALWAYS** turn power to the power supply **OFF**, unplug the electrical cord from its outlet, remove the front panel fuse, and lock the power supply out before making repairs or replacements.

### CAUTION

- ▶ **DO NOT** attempt to make repairs to the printed circuit board!
- ▶ **DO NOT** attempt to make repairs beyond those described. All others should be made **ONLY** by Ransburg service personnel.

## REPLACEMENT PROCEDURES

Before making replacements, check for defective wiring or connections between the affected components. If there is a broken wire, defective insulation, or dirty, loose or corroded connections, repair or replace them before going to the expense of replacing a component.

### Front Panel Fuse 1FU

1. Insert screwdriver into slot in front panel fuse holder, push in, and rotate counter-clockwise.
2. Remove screwdriver and fuse holder will slide out.
3. Remove fuse from fuse holder and replace with new fuse (see "Parts Identification" section of this manual for part numbers).

4. Insert fuse holder back into front panel and with a slight inward pressure, rotate screwdriver clockwise until it locks into place.

### PC Board Fuse F2

#### - REFER TO FIGURE 7 FOR FUSE LOCATION

1. Ensure power supply is unplugged from AC outlet and open cabinet door.
2. Replace defective fuse (see "Parts Identification" section of this manual for part numbers).

### NOTE

- ▶ A spare F2 PC board fuse, included from the factory, is located in the lower right hand corner inside the cabinet door.

3. Secure cabinet door and plug power supply back in.

### ON/OFF Switch 1SW

1. Ensure power supply is unplugged from AC outlet and open the cabinet door.

### WARNING

- ▶ **ALWAYS** double check that the power supply is unplugged from its AC outlet before working with any internal wiring.

2. Remove the four quick connect terminals from the rear of ON/OFF switch 1SW.

### NOTE

- ▶ It is recommended that the four ON/OFF switch wires be tagged with their respective terminal connections to 1SW before removing.

3. Press panel retaining clips on top and bottom of switch 1SW together and push switch out of panel from the inside.



4. Press new switch (see "Parts Identification" section of this manual for part numbers) into panel opening with terminals 1A and 2A to the bottom of the cabinet.
5. Reconnect the four quick connect terminals to the new switch as follows:

From	To
1FU-2	1SW-1
1TB-N	1SW-2
1TB-S1	1SW-1A
1TB-S2	1SW-2A

6. Secure cabinet door and plug power supply back in.

### AC Line Cord

1. Ensure power supply is unplugged from AC outlet and open the cabinet door.

#### **WARNING**

▶ **ALWAYS** double check that the power supply is unplugged from its AC outlet before working with any internal wiring.

2. Using a screwdriver, disconnect damaged line cord from 1TB-L1, 1TB-N, and 1TB-GROUND.
3. Loosen the line cord grommet on side panel and pull damaged cord out.
4. Insert new line cord (see "Parts Identification" section of this manual for part numbers) through grommet and connect to 1TB as follows:

1TB-GROUND	Line Cord Ground
1TB-N	Line Cord Neutral/Common
1TB-L1	Line Cord Hot/Line

5. Tighten side panel grommet.
6. Secure cabinet door and plug power supply back in.

### High Voltage Multiplier

#### **NOTE**

▶ Because the high voltage multiplier contains energy storage components that can cause serious shock injury, it is not field repairable. Warranty will be voided if the high voltage multiplier seal is broken. If the high voltage multiplier is defective, contact your authorized Ransburg representative for exchange or repair.

1. Remove HV cable from power supply.
2. Ensure power supply is unplugged from AC outlet and open cabinet door.
3. Unplug connector 1PL from the top of the high voltage multiplier.
4. Remove the screws that mount the high voltage multipliers' aluminum housing to the back panel.
5. Disconnect 8PL and 10PL from 24 VDC power supply 2SUP and remove (4) mounting screws from the relay board.
6. Rotate the high voltage multiplier assembly out from the power supply.
7. Remove the (3) screws that secure the aluminum housing to the high voltage multiplier.
8. Install the aluminum housing on the new high voltage multiplier (see "Parts Identification" section of this manual for ordering information). Ensure connector 1PL faces the front of the housing before installing.
9. Install the high voltage multiplier assembly in the power supply by securing the (6) mounting screws to the back panel.
10. Plug connector 1PL back into the high voltage multiplier, reconnect 8PL and 10PL to 24 VDC supply 2SUP and secure the relay board.

11. Secure the cabinet door and plug the power supply back in.
12. Reinstall the HV cable.

### LED Display Board

1. Ensure power supply is unplugged from AC outlet and open cabinet door.
2. Unplug display board connector from 9PL on main PC board.
3. Remove (2) hex nuts that mount display board to inside of cabinet door and remove display board from power supply.
4. Install new display board (see "Parts Identification" section of this manual for part numbers) in power supply.
5. Reconnect connector 9PL to main PC board.
6. Secure the cabinet door and plug the power supply back in.

### Kilovolt (kV) or Microamp ( $\mu$ A) Meter

1. Ensure power supply is unplugged from AC outlet and open cabinet door.
2. Remove (2) hex nuts from wiring terminals and remove wire lugs.
3. Remove (4) hex nuts that mount meter to door.
4. Remove old meter and install new one. (See "Parts Identification" section of this manual for part numbers.)
5. Reconnect wire lugs to meter (purple wire goes to + terminal of meter).
6. Secure cabinet door and plug power supply back in.

### Main PC Board

1. Ensure power supply is unplugged from AC outlet and open cabinet door.
2. Disconnect plugs 6PL, 7PL, and 9PL (see Figure 7).
3. Remove (2) screws from heat sink base and lift the PC board out.



### CAUTION

► **DO NOT** remove the PC board from the heat sink, as it is an integrated assembly.

4. Insert new PC Board (see "Parts Identification" section of this manual for part numbers) and secure the (2) heat sink screws.
5. Reconnect plugs 6PL, 7PL, and 9PL.
6. Secure cabinet door and plug power supply back in.

### Relay Board

1. Ensure power supply is unplugged from AC outlet and open cabinet door.
2. Disconnect plug 2TB from the relay board.
3. Remove the (4) mounting screws from the relay board.
4. Install new relay board (see "Parts Identification" section of this manual for part numbers) and secure mounting screws.
5. Reconnect plug 2TB to the relay board.
6. Secure the cabinet door and plug the power supply back in.

## Power Supply 1SUP

1. Ensure power supply is unplugged from AC outlet and open the cabinet door.
2. Remove the (4) screws from the 1SUP power supply cover plate and remove the plate.

### **WARNING**

► **ALWAYS** double check that the power supply is unplugged from its AC outlet before removing the cover plate from power supply 1SUP.

3. Remove connectors 11PL and 12PL from power supply 1SUP.
4. Remove the (4) cover plate standoffs from power supply 1SUP and remove the power supply from the unit.
5. Install new 1SUP power supply (see "Parts Identification" section of this manual for part numbers) using the (4) cover plate standoffs. Ensure larger terminal strip (12PL) of power supply 1SUP faces left side of unit as shown in Figure 8.
6. Connect connectors 11PL and 12PL to new power supply and reinstall cover plate.
7. Secure cabinet door and plug power supply back in.

## 24 VDC Power Supply 2SUP

1. Remove HV cable from power supply.
2. Ensure power supply is unplugged from AC outlet and open cabinet door.
3. Unplug connector 1PL from the top of the high voltage multiplier.

4. Remove the screws that mount the high voltage multipliers' aluminum housing to the back panel.
5. Disconnect plugs 8PL and 10PL from 24 VDC power supply 2SUP and remove the (4) mounting screws from the relay board.
6. Rotate the high voltage multiplier assembly out from the power supply.
7. Remove the (4) mounting screws from the 24 VDC supply.
8. Install the new 24 VDC supply (see "Parts Identification" section of this manual for part numbers). Ensure two pin connector of 24 VDC supply is closest to bottom of unit when installing.
9. Reinstall high voltage multiplier assembly in power supply.
10. Plug connector 1PL back into the high voltage multiplier. Reconnect plugs 8PL and 10PL to the 24 VDC supply and resecure the relay board.
11. Secure the cabinet door, plug the power supply back in and reinstall the HV cable.

# PARTS IDENTIFICATION

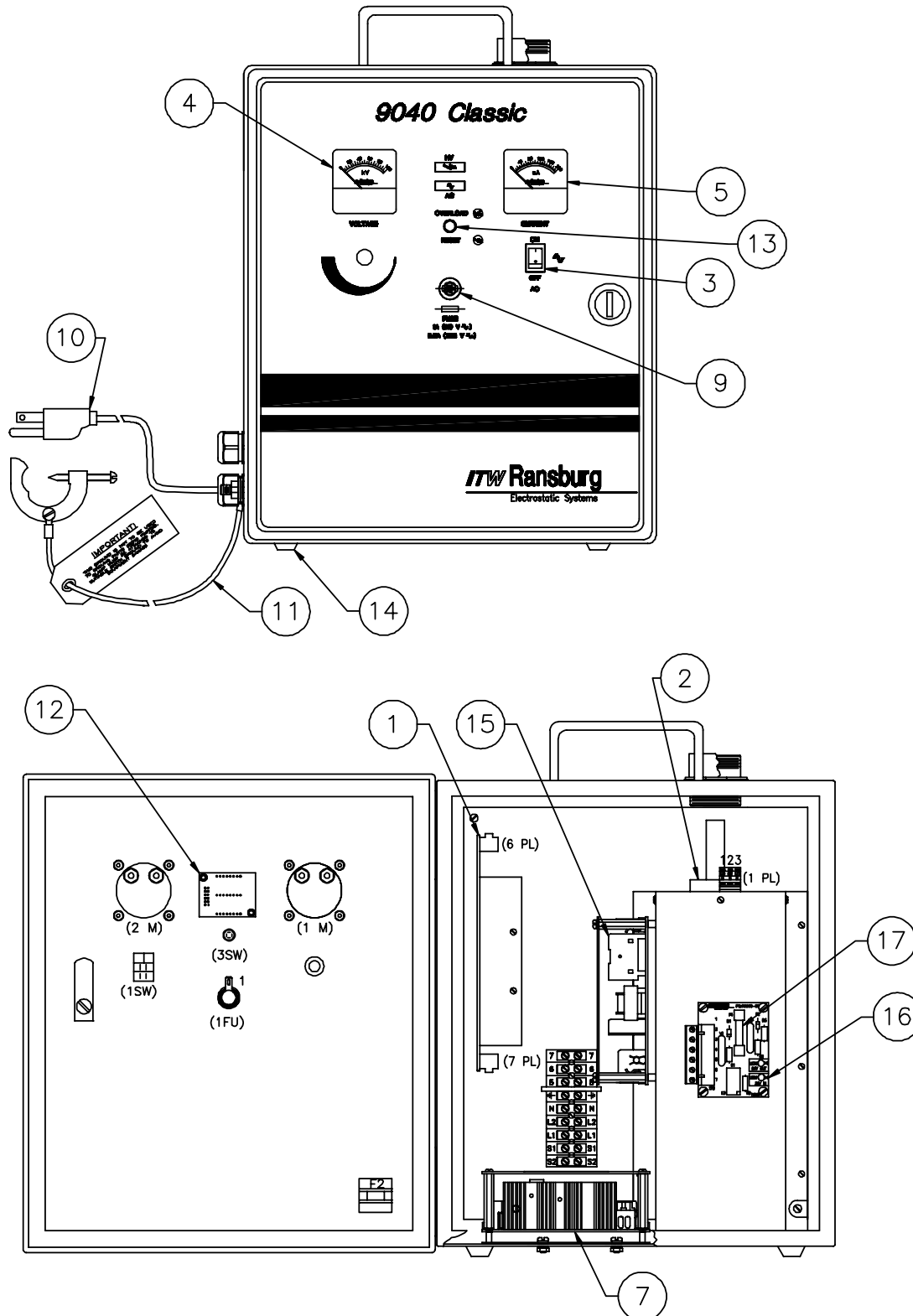


Figure 11: 9040 Classic No. 2 Power Supply Parts Diagram

<b>9040 CLASSIC NO. 2 POWER SUPPLY - PARTS LIST (Figure 11)</b>			
<b>Item #</b>	<b>Description</b>	<b>Part Number</b>	<b>Notation</b>
1	<i>PC Board &amp; Heat Sink Assembly:</i> For 76657-14 and 76657-142	76892-14	
2	<i>High Voltage Multiplier:</i> For 76657-14 and 76657-142	76304-03	
3	ON/OFF Switch	76434-01	1SW
4	Kilovolt (kV) Meter	76436-91	1M
5	Microamp (μA) Meter	76436-92	2M
7	18 VDC Power Supply	75337-05	1SUP
8	Fuse, PC Board, Slow Blow, 4 Amp (See Figure 7 for Location)	LSME0082-04	F2
9	<i>Fuse, Front Panel:</i> Slow Blow, 1 Amp, 110-120 VAC Input Slow Blow, 0.5 Amp, 220-240 VAC Input	72771-06 72771-01	1FU 1FU
10	AC Line Cord	6262-00	
11	Ground Wire Assembly	70539-00	
12	LED Display Board	76455-02	
13	<i>Overload Indicator &amp; Reset Switch Assembly:</i> Reset Switch, Normally Closed Lens, Yellow Bulb	76442-01 76441-00 76443-01	
14	Rubber Feet	5627-00	
15	24 VDC Power Supply	75337-04	2SUP
16	Relay Board	76649-00	
17	Fuse, Relay Board, Slow Blow, 1 Amp	11689-03	F4

<b>9040 CLASSIC NO. 2 POWER SUPPLY RECOMMENDED SPARE PARTS LIST</b>						
<b>Description</b>	<b>Part Number</b>	<b>No. of Guns</b>				<b>Notes</b>
Ammeter	76436-92	1	1	2	2	
Fuse, Front Panel	72771-06	2	2	4	4	Two Required
Fuse, PC Board	LSME0082-04	1	1	2	2	
Deluxe Test Kit	76652-04	1	1	1	1	For Troubleshooting Purposes Only
Tester	LTST5000-00	1	1	1	1	For Troubleshooting Purposes Only
Test Resistor	16688-02	1	1	1	1	For Troubleshooting Purposes Only
High Voltage Multiplier	76304-03	1	1	1	1	
24 VDC Supply	75337-04	1	1	1	1	
Relay Board	76649-00	1	1	1	1	
Fuse, Relay Board	11689-03	1	1	2	2	
Main PC Board	76892-14	1	1	1	1	
18 VDC Supply	75337-05	1	1	1	1	

**Figure 12: 9040 Classic High Voltage Power Supply Recommended Spare Parts List**

<b>9040 CLASSIC HIGH VOLTAGE POWER SUPPLY ACCESSORY PARTS LIST</b>			
<b>Item #</b>	<b>Description</b>	<b>Part Number</b>	<b>Notation</b>
1	Control Unit/Power Supply Test Assembly	LTST5000-00	
2	High Voltage Test Probe and Meter	76652-01	
3	Circuit Tester	20868-00	
4	Test Assembly, SCI & Sprayability	76652-02	
5	Test Resistor, 525 Megohms	16688-02	
6	Deluxe Test Kit (Includes Items 2 & 4 above and Paint Meter Test Probe)	76652-04	

**Figure 13: 9040 Classic High Voltage Power Supply Accessory Parts List**

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**NOTES:**

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# WARRANTY POLICIES

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## 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	Flash Point†† (TCC)	*CAS Number	Evap. Rate†	Elec. Res.**
DICHLOROMETHANE	Methylene Chloride	Chlorinated Solvents		75-09-2	14.5	HIGH
VM & P NAPHTHA	Naptha	Aliphatic Hydrocarbons	65°F	8030-30-6	10	HIGH
ACETONE		Ketones	-18°F	67-64-1	5.6	LOW
METHYL ACETATE		Esters	90°F	79-20-9	5.3	LOW
BENZENE		Aromatic Hydrocarbons	12°F	71-43-2	5.1	HIGH
ETHYL ACETATE		Esters	24°F	141-78-6	3.9	MEDIUM
2-BUTANONE	MEK	Ketones	16°F	78-93-3	3.8	MEDIUM
ISO-PROPYL ACETATE		Esters	35°F	108-21-4	3.4	LOW
ISOPROPYL ALCOHOL	IPA	Alcohols	53°F	67-63-0	2.5	LOW
2-PENTANONE	MPK	Ketones	104°F	107-87-9	2.5	MEDIUM
METHANOL	Methyl Alcohol	Alcohols	50°F	67-56-1	2.1	LOW
PROPYL ACETATE	n-Propyl Acetate	Esters	55°F	109-60-4	2.1	LOW
TOLUOL	Toluene	Aromatic Hydrocarbons	48°F	108-88-3	1.9	HIGH
METHYL ISOBUTYL KETONE	MIBK	Ketones	60°F	108-10-1	1.6	MEDIUM
ISOBUTYL ACETATE		Esters	69°F	110-19-0	1.5	LOW
ETHANOL	Ethyl Alcohol	Alcohols		64-17-5	1.4	LOW
<b>BUTYL ACETATE</b>		<b>Esters</b>	<b>78°F</b>	<b>123-86-4</b>	<b>1.0</b>	<b>LOW</b>
ETHYLBENZENE		Aromatic Hydrocarbons	64°F	100-41-4	.89	HIGH
1-PROPANOL	n-Propyl Alcohol	Alcohols	74°F	71-23-8	.86	LOW
2-BUTANOL	sec.-Butyl Alcohol	Alcohols	72°F	78-92-2	.81	LOW
XYLOL	Xylene	Aromatic Hydrocarbons	79°F	1330-02-07	.80	HIGH
AMYLACETATE		Esters	106°F	628-63-7	.67	MEDIUM
2-METHYLPROPANOL	iso-Butyl Alcohol	Alcohols	82°F	78-83-1	.62	LOW
METHYL AMYL ACETATE		Esters	96°F	108-84-9	.50	LOW
5-METHYL-2-HEXANONE	MIAK	Ketones	96°F	110-12-3	.50	MEDIUM
1-BUTANOL	n-Butyl Alcohol	Alcohols	95°F	71-36-3	.43	LOW
2-ETHOXYETHANOL		Glycol Ethers	164°F	110-80-5	.38	LOW
2-HEPTANONE	MAK	Ketones	102°F	110-43-0	.40	MEDIUM
CYCLOHEXANONE		Ketones	111°F	108-94-1	.29	MEDIUM
AROMATIC-100	SC#100	Aromatic Hydrocarbons	111°F		.20	HIGH
DIISOBUTYL KETONE	DIBK	Ketones	120°F	108-83-8	.19	MEDIUM
1-PENTANOL	Amyl Alcohol	Alcohols		71-41-0	.15	LOW
DIACETONE ALCOHOL		Ketones	133°F	123-42-2	.12	LOW
2-BUTOXYETHANOL	Butyl Cellosolve	Glycol Ethers	154°F	111-76-2	.07	LOW
CYCLOHEXANOL		Alcohols	111°F	108-93-0	.05	LOW
AROMATIC-150	SC#150	Aromatic Hydrocarbons	149°F		.004	HIGH
AROMATIC-200		Aromatic Hydrocarbons	203°F		.003	HIGH

\* CAS Number: Chemical Abstract Service Number.

\*\* Electrical Resistance using the Ransburg Meter.

\*\*\* Solvent Base Configuration Only.

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

†† The lowest temperature at which a volatile fluid will ignite.

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

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NOTE: Chart provides resistance and control information that we feel is necessary when using Ransburg equipment.

VISCOSITY CONVERSION CHART																		
Poise	Centipoise	DuPont Parlin 7	DuPont 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		

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<b>VISCOSITY CONVERSION CHART (Continued)</b>																		
Poise	Centipoise	DuPont Parlin 7	DuPont 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.

<b>VOLUMETRIC CONTENT OF HOSE OR TUBE (English Units)</b>							
I.D. (inches)	cc/ft.	Cross Section (in. <sup>2</sup> )	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.

<b>VOLUMETRIC CONTENT OF HOSE OR TUBE (Metric Units)</b>							
I.D. (mm)	cc/m	Cross Section (mm <sup>2</sup> )	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

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NOTES:

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## MANUAL CHANGE SUMMARY

This manual was published to replace Service Manual **CP-97-03.5**, *9040 Classic High Voltage Power Supply for the No. 2 Process Handgun*, to make the following changes:

1. Revised "Paint and Solvent Specifications" in the "Appendix" section.

Service Manual Price: \$30.00 (U.S.)

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