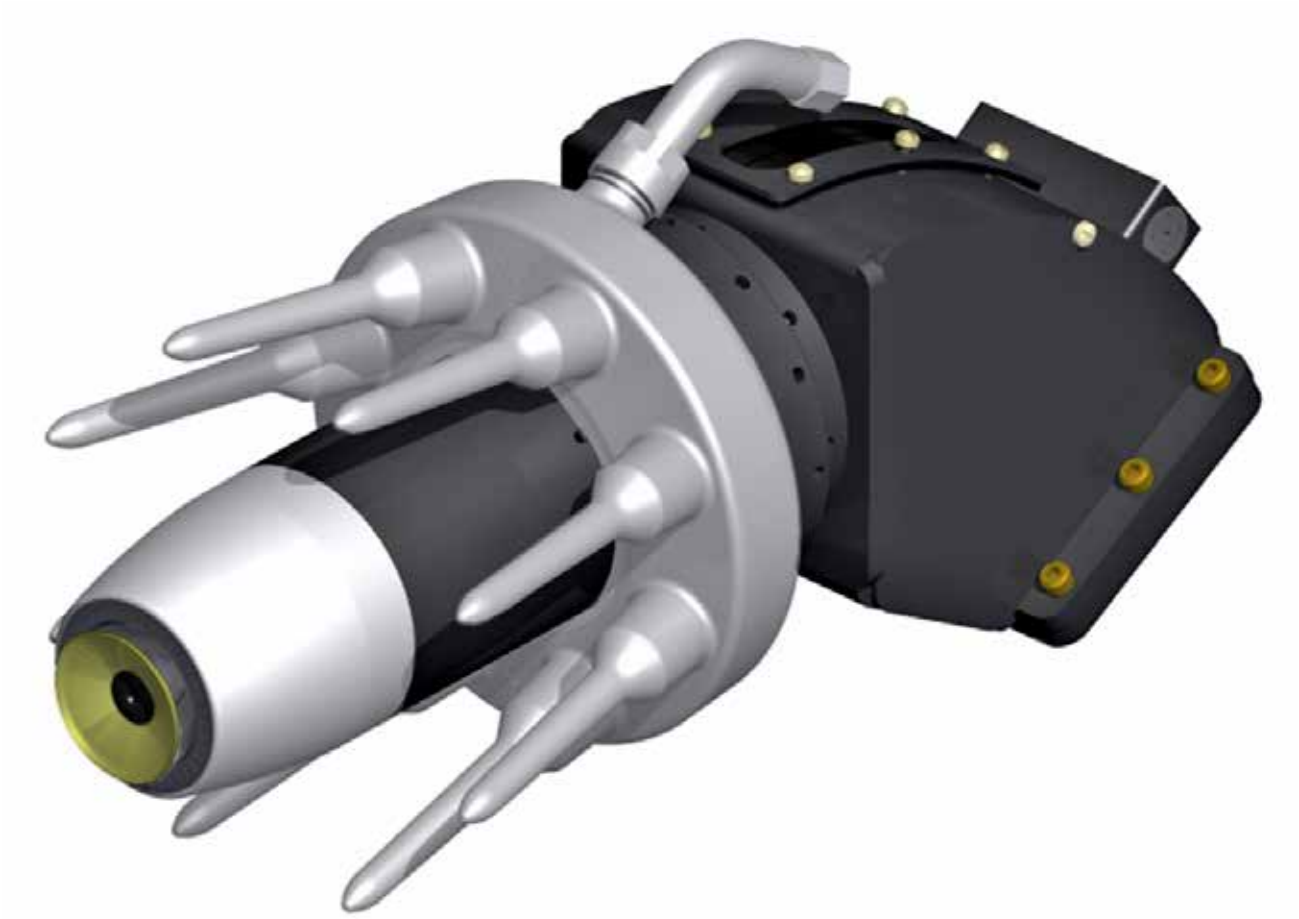
SERVICE MANUAL
LN-9276-14.3
MAY - 2017

Ransburg

RMA 590 ROBOT MOUNTED ROTARY ATOMIZER



MODEL: A13368

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: $50.00 (U.S.)

NOTE: This manual has been changed from revision **LN-9276-14.2** to revision **LN-9276-14.3**. Reasons for this change are noted under “Manual Change Summary” on page 98 of this manual.

CONTENTS

(Continued on next page)

CONTENTS (Cont.)

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 equipment is intended to be used by trained personnel **ONLY**.

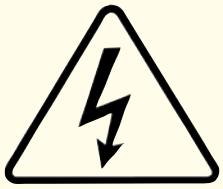
➤ This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as **NFPA-33 AND EN 50176 SAFETY STANDARDS, LATEST EDITION**, or applicable country safety standards, 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.

AREA Tells where hazards may occur.	**HAZARD** Tells what the hazard is.	**SAFEGUARDS** Tells how to avoid the hazard.
Spray Area 	**Fire Hazard** Improper or inadequate operation and maintenance procedures will cause a fire hazard. 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.	Fire extinguishing equipment must be present in the spray area and tested periodically. Spray areas must be kept clean to prevent the accumulation of combustible residues. Smoking must never be allowed in the spray area. The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance. When using solvents for cleaning: • Those used for equipment flushing should have flash points equal to or higher than those of the coating material. • Those solvents used for general cleaning must have a flash point at minimum of 15°C (27°F) greater than the ambient temperature. It is the end user's responsibility to insure this condition is met. 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. 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. Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed. Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled. Never use equipment intended for use in waterborne installations to spray solvent based materials. 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.

AREA Tells where hazards may occur.	**HAZARD** Tells what the hazard is.	**SAFEGUARDS** Tells how to avoid the hazard.
Spray Area 	**Explosion Hazard** Improper or inadequate operation and maintenance procedures will cause a fire hazard. 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.	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. 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. Test only in areas free of flammable or combustible materials. 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. Always turn the control panel power off prior to flushing, cleaning, or working on spray system equipment. Before turning high voltage on, make sure no objects are within the safe sparking distance. Ensure that the control panel is interlocked with the ventilation system and conveyor in accordance with NFPA-33, EN 50176. Have fire extinguishing equipment readily available and tested periodically.
General Use and Maintenance 	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, EN 60079-0. 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. Reference OSHA, NFPA-33, EN Norms and your insurance company requirements.

AREA Tells where hazards may occur.	**HAZARD** Tells what the hazard is.	**SAFEGUARDS** Tells how to avoid the hazard.
Spray Area / High Voltage Equipment 	**Electrical Discharge** There is a high voltage device that can induce an electrical charge on ungrounded objects which is capable of igniting coating materials. Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.	Parts being sprayed and operators in the spray area must be properly grounded. 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.) 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. Operators must not be wearing or carrying any ungrounded metal objects. 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. NOTE: REFER TO NFPA-33 OR SPECIFIC COUNTRY SAFETY CODES REGARDING PROPER OPERATOR GROUNDING. 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. Always turn off the power supply prior to flushing, cleaning, or working on spray system equipment. 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. Avoid installing an applicator into a fluid system where the solvent supply is ungrounded. Do not touch the applicator electrode while it is energized.

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 	**Chemical Hazard** Certain materials may be harmful if inhaled, or if there is contact with the skin.	Follow the requirements of the 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.	Spray applicators require that aluminum inlet fittings be replaced with stainless steel. 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

APPLICATOR DESCRIPTION

The RMA-590 Applicator is an automatic robot mounted rotary atomizer. This device is capable of applying waterborne and solvent borne coatings electrostatically. The waterborne coatings are applied using a method known as Indirect Charge. This is where the coating material passes through an electrostatic field created between the charging probes, the bell cup and the target to be coated. The solvent borne coatings are applied using a method known as Direct Charge. This is where the coating material has the electrostatic voltage applied directly to it.

This applicator incorporates the latest in high speed spindle technology, bell cup and shape air design to provide the best in atomization and pattern control. The bell cups are designed for durability using the best materials available. All wetted components are designed to offer the maximum in wear and chemical resistance. The applicator is capable of applying 70,000 VDC for the Indirect charge and up to 100,000 VDC for the Direct charge.

FEATURES

Features which make the RMA-590 advantageous:

- The ability to apply waterborne and solvent borne coatings with the same applicator without cleaning out the entire system.
- Assembly components and bell made of durable engineered resin material for optimum mechanical strength and solvent resistance.
- Heavy duty design insures excellent service life even when subjected to the quick motions of robotic applications.
- Proven long life turbine motor capable of speeds up to 100 krpm. (See “Specifications” in the “Introduction” section of this manual for bell cup speed ratings.)
- Serrated and non-serrated bell cups are available for application flexibility and color match. All bell cups are made using Titanium, Aluminum, or Coated Aluminim. The 55mm bell cup is Titanium only.
- Aerodynamic design for ease of cleaning external surfaces.
- 60° and 90° angled adapters provide more maneuverability and facilitates robotic programming.
- Fast change out. With the quick disconnect feature, an atomizer can be exchanged in less than 2 minutes for off-line maintenance.
- Fast color changes are achieved using center feed fluid delivery and the fluid valves provide for simultaneous paint push while solvent washes the feed tube and bell cup interior.
- Internal and external bell wash is quick and efficient. Solvent and air valves are located near the rear of the applicator on the robot adapter.
- Less waste to the spray booth, with the dump valve located internally next to the feed tube.

GENERAL DESCRIPTION

Air Bearing Turbine Assembly

The air bearing turbine assembly with bell cup is mounted to the atomizer body assembly with a turbine retaining ring.

Atomizer Body Assembly

The atomizer body assembly houses the turbine, fluid tube assembly, fiber optic transmitter and the fluid valves. The assembly incorporates 5 valves to control the fluid delivery to the bell cup, to change colors via dump valves and supply solvent to clean the fluid tube assembly and bell cup. The assembly is attached to the mounting manifold with a threaded quick disconnect ring.

Mounting Manifold Assembly

The mounting manifold assembly is attached to the robot adapter with 8 non-metallic screws and is the connection point for all the various air and fluid supply tubing.

Robot Adapter

The robot adapter is available in both 60° and 90° configurations. These angles allow for more flexibility in robot painting processes. The adapter houses the solvent and air valve block to clean the exterior of the bell cup surface. The rear plate lends itself to attaching various configurations for mounting on several manufacturers robots.

Robot Adapter Plate

The adapter plate can be configured so that the applicator can be used with most manufacturers of robots. The plate also incorporates a center non-metallic bearing that it rotates as fluid/air tubes and high voltage cables move and rotate during the robots motion.

Power Supply and Controls

The high voltage cascade is located outside the applicator and is controlled by the MicroPak control unit. The low voltage output of the MicroPak is multiplied by the cascade to the high voltage level required.

The MicroPak is designed to electronically limit current to provide safe operation in a spray booth. The voltage and current draw of the atomizer are continuously displayed on the MicroPak control panel. Voltage and over-current limits are adjustable on the front of the MicroPak. MicroPak internal safety circuits will shut down the system on over-current and cable faults.

The speed of the rotary atomizer is controlled via the multifunction I/O board and the MicroPak controller using a fiber optic transmitter located on the applicator. The I/O board controls the paint, solvent, and dump valves located on the atomizer.

SPECIFICATIONS

Electrical:

Power Supply Type:	MicroPak/MicroPak 2e
Charging Method:	Direct / Indirect
Output Voltage:	30-70 kV Variable (70 kV Maximum indirect charge) 30-100 kV Variable - Direct Charge
Output Current:	1000 µa- Indirect Charge 125 µa- Direct Charge
Part Spray Ability:	Determine spray ability of part to be coated using Test Equipment (76652) (Paint Conductivity Meter)

Mechanical:

Length:	(See RMA Tool Point, Center of Gravity, and Envelope Dimension (65mm Dual Flex) figure in the “Introduction” section.)
Diameter:	(See RMA Tool Point, Center of Gravity, and Envelope Dimensions (65mm Dual Flex) figure in the “Introduction” section.)
Approximate Weight	
Atomizer with Indirect Charge Ring and Probes attached:	23.85 lbs. (10.82 Kg) max.
Atomizer without Indirect Charge Ring and Probes attached:	16.6 lbs (7.53 Kg)
Turbine Type:	Air Bearing Impulse Drive
Turbine Air Supply:	Variable (See “Pressure Flow Data Charts” in the “Introduction” section.)
Maximum/Minimum Turbine Speed:	Continuous 100K* rpm max. /20K rpm min. (See exception at “Fluid Flow Rate”)
Maximum Angular Velocity for Turbine (Robot Motion):	250˚/sec.
Tubing Bundle Max. Rotation:	450˚ in Either Direction
Bearing Air Supply at Applicator:	90 psig (±10 psi)
(Nominal):	(621 kPa ±69 kPa) 2.9 SCFM (82 slpm)
Shaping Air #1 (SAI) Supply:	Variable (See “Pressure Flow Data Charts” in the “Introduction” section)
Shaping Air #2 (SAO) Supply:	Variable (See “Pressure Flow Data Charts” in the “Introduction” section)
Brake Air Supply (Nominal):	60-100 psig (414-689 kPa)
Maximum Fluid Pressure Supply:	
Paint:	200 psi (1379 kPa)
Solvent:	150 psi (1035 kPa)
Fluid Flow Rate:	25-1000 cc/min. (See exclusion below)
55mm Bell Cup	Max. Flow Rate: 500 cc/min. at 80,000 rpm Max. Max. Flow Rate: 800 cc/min. at 70,000 rpm Max.
65mm Bell Cup	Max. Flow Rate: 200 cc/min. at 100,000 rpm Max. Max. Flow Rate: 500 cc/min. at 80,000 rpm Max. Max. Flow Rate: 800 cc/min. at 70,000 rpm Max. Max. Flow Rate: 1000 cc/min. at 60,000 rpm Max.
81mm Bell Cup	Max. Flow Rate: 500 cc/min. at 40,000 rpm Max

(Continued on next page)

Mechanical (Cont.):

Bell Cup Cleaning Time (Internal/External):	2.7 sec. (approx.)
Color Change Time:	Dependent on system configuration, fluid pressures, fluid viscosity, fluid line lengths, etc.
Speed Readout:	Magnetic pick-up, unidirectional fiber optic transmission
Atomizer Replacement Time:	Less than 5 min.
Bell Cup Replacement Time:	Less than 2 min.
Minimum Control Equipment Requirements: (Versions listed or higher)	
MicroPak	LECU5004-17 (V.3.84)
Atomizer Module	A11925-00 (V.0.4)
I/O Module	A11435-00 (V.1.4) (0.01V) (4-20 mA)
MicroPak 2e	V1.1.00 or Higher
Air Heater Recommendation:	An Air Heater is recommended for the turbine air supply. See Air Heater and filtration recommendation later in this manual

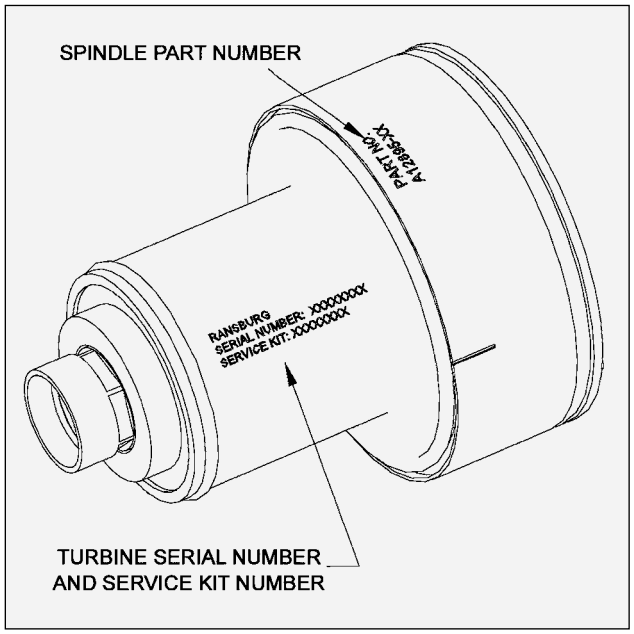
*Although this turbine assembly is capable of operating at continuous speeds up to 100,000 rpm, nearly all high quality finishes can be achieved within our recommended operating range of 20,000 to 70,000 rpm, based on experience with a wide variety of materials and various markets. Operating above this range is for highly specialized applications, and may reduce efficiency and equipment life. Contact your Finishing Brand representative for additional information as required.

The air turbine only is warranted for 15,000 operating hours, or 3 years from date of first installation, whichever occurs first. If, after inspection by Ransburg, defect is confirmed, we will repair or replace the air turbine, free of charge, during the warranty period. The repaired air turbine (or replacement air turbine) will continue to be warranted for the remainder of the initial warranty period (from installation date). The warranty period for the air turbine does not begin again when a repair is completed under warranty. Air turbines repaired by Ransburg after the warranty period will be warranted for 90 days from the date of shipment from the repair center. (See Warranty section on last page for specific exclusions)

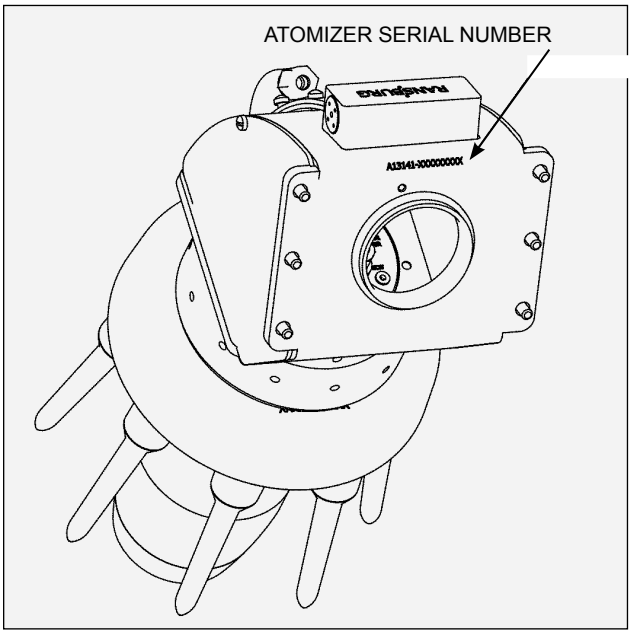
**Specifications and ratings based on testing at sea level standard conditions.

IMPORTANT NUMBERS

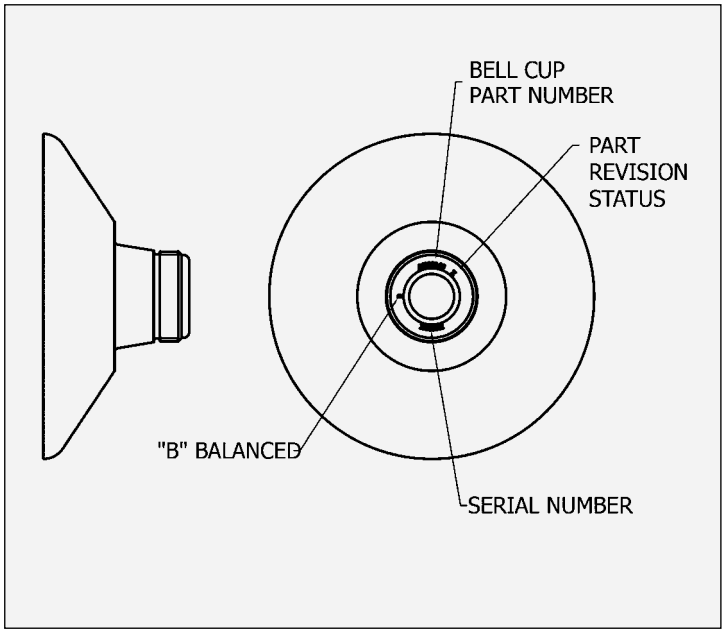
Record these numbers in a log book for future reference. The last digits of the Atomizer serial number are also the Turbine serial numbers.



Turbine Serial Number



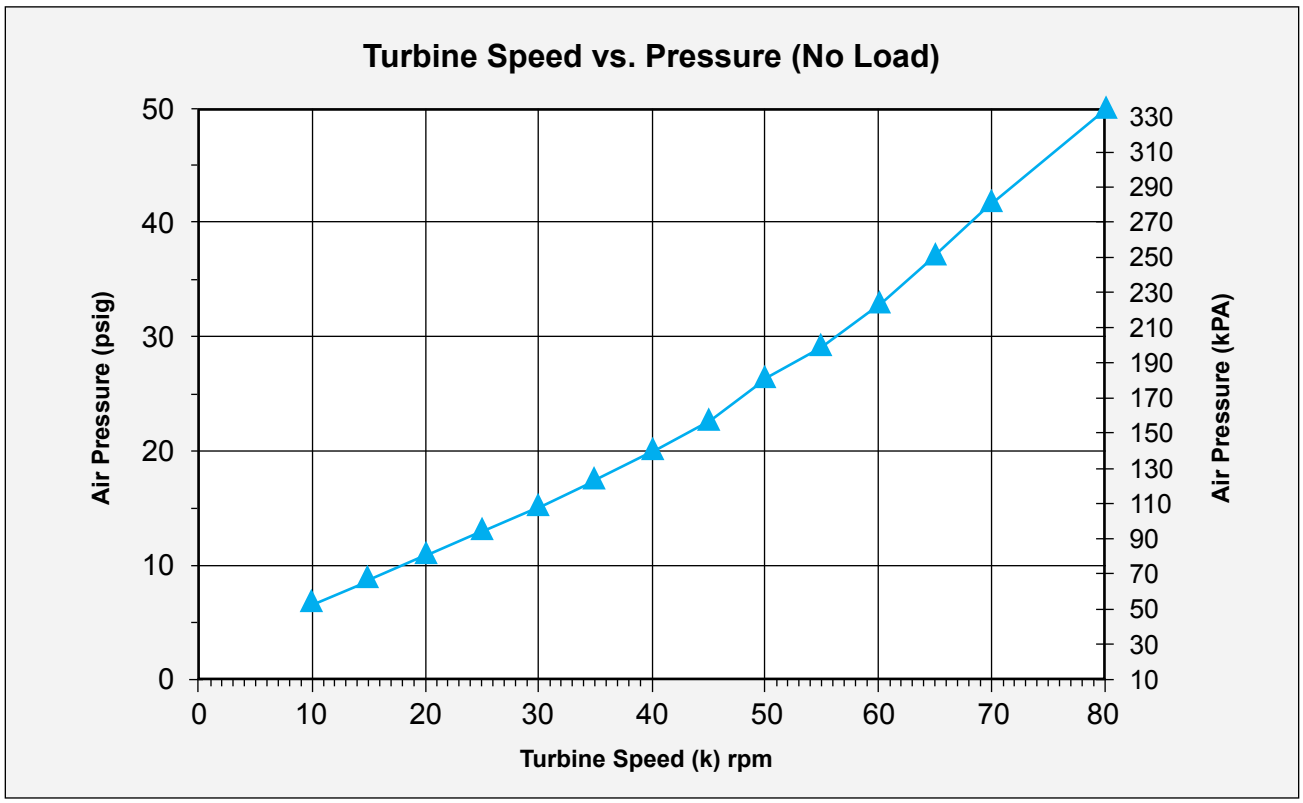
Atomizer Serial Number

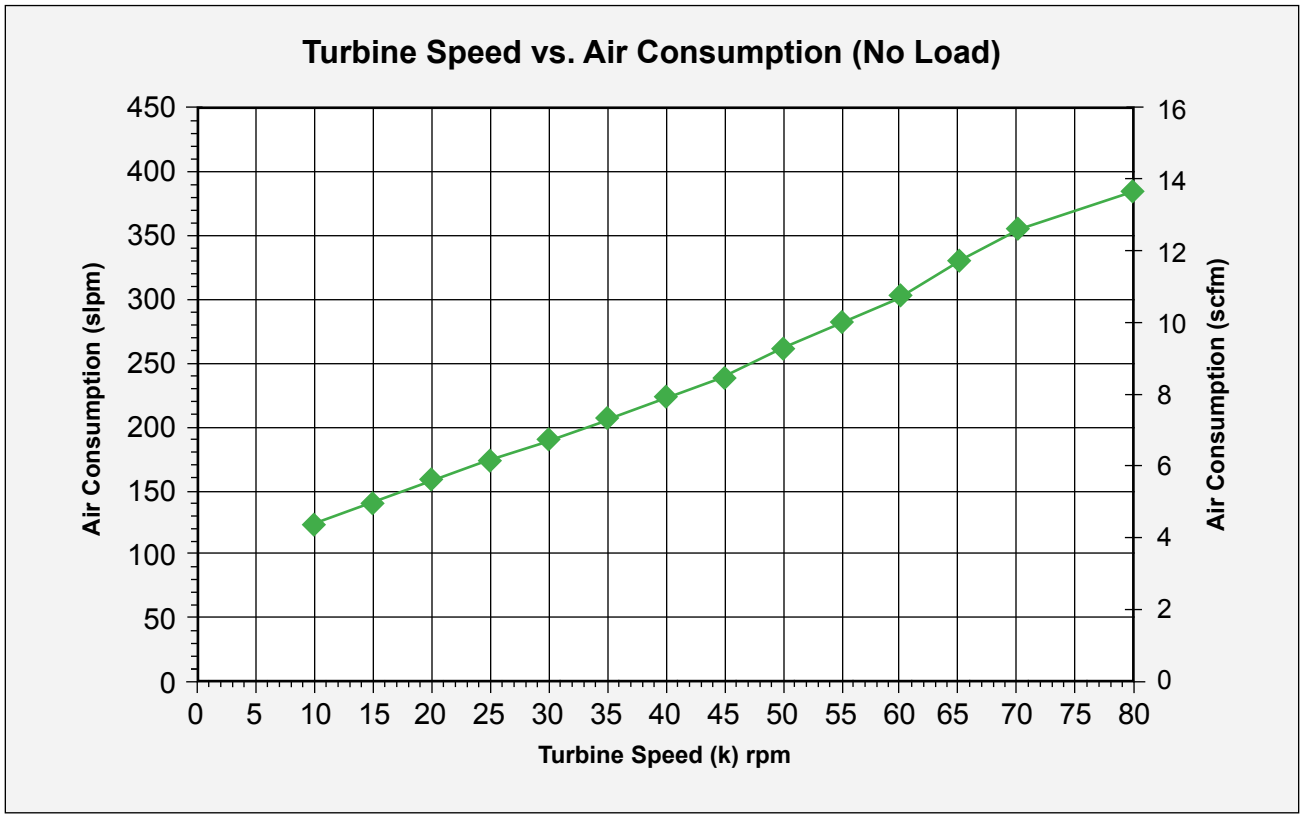


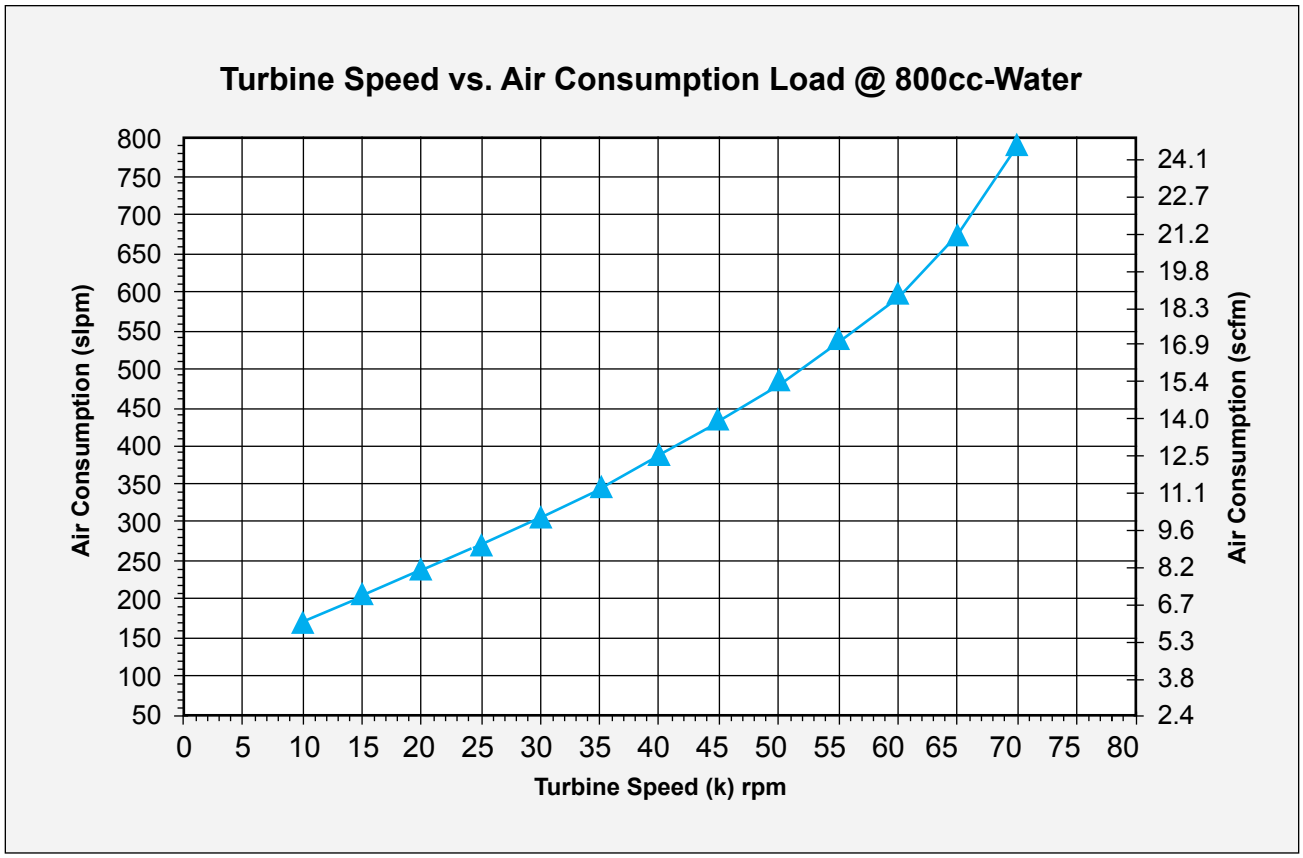
Bell Cup Part Numbers/Serial Number
(cup only, not with splash plate)

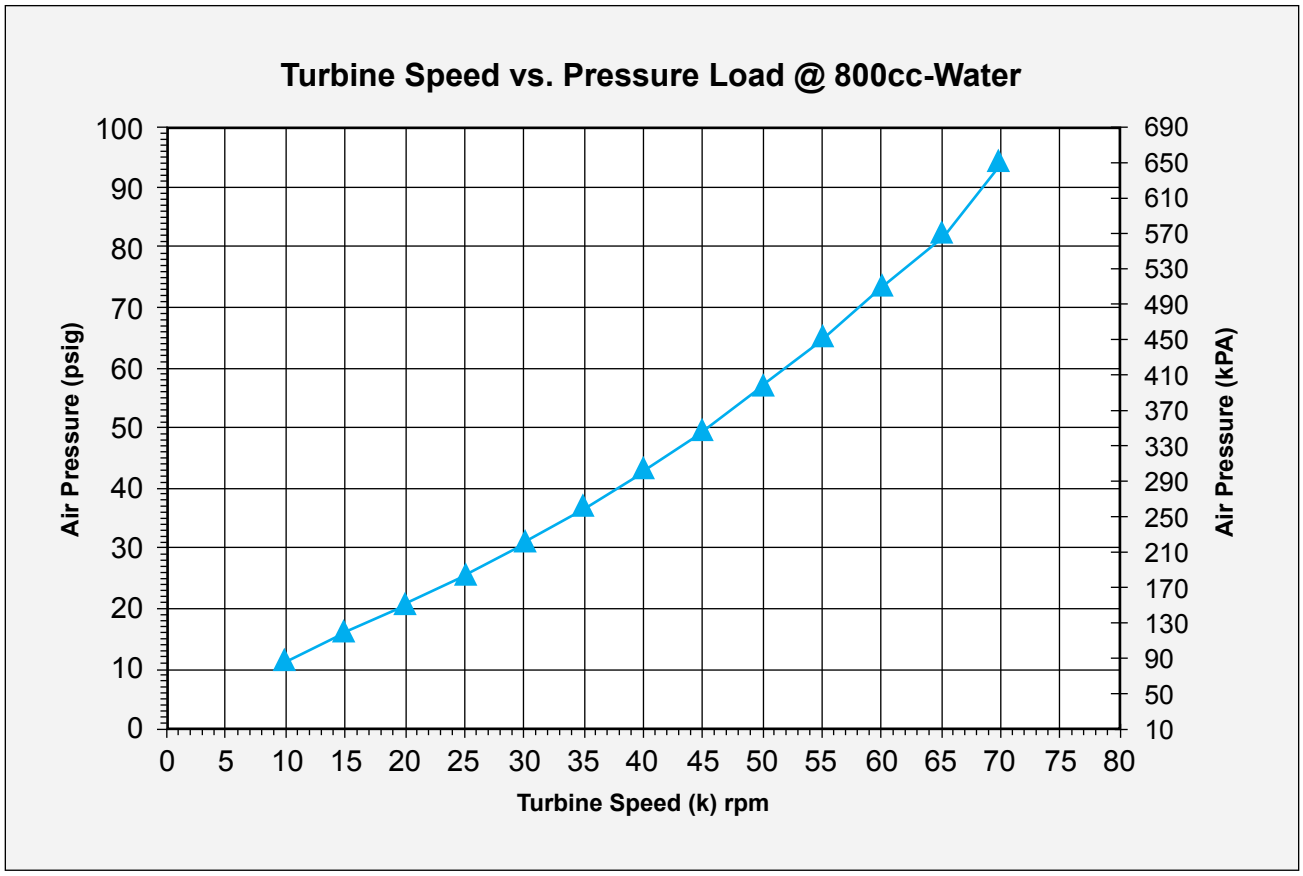
GRAPHS

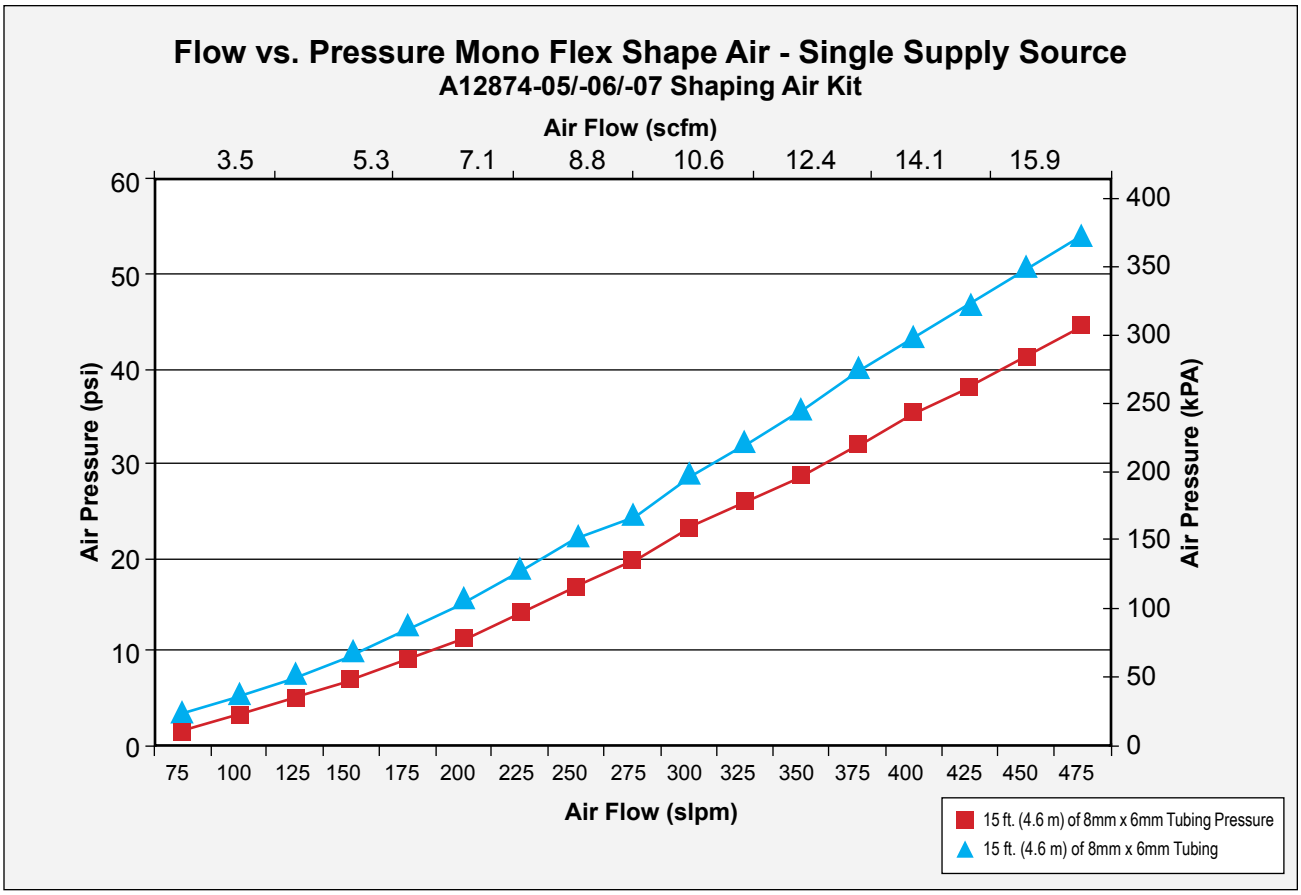
Graphical information provided for reference only for all charts. Unless otherwise specified, all pressure data shown was measured 12-inches (305mm) upstream from the applicator.

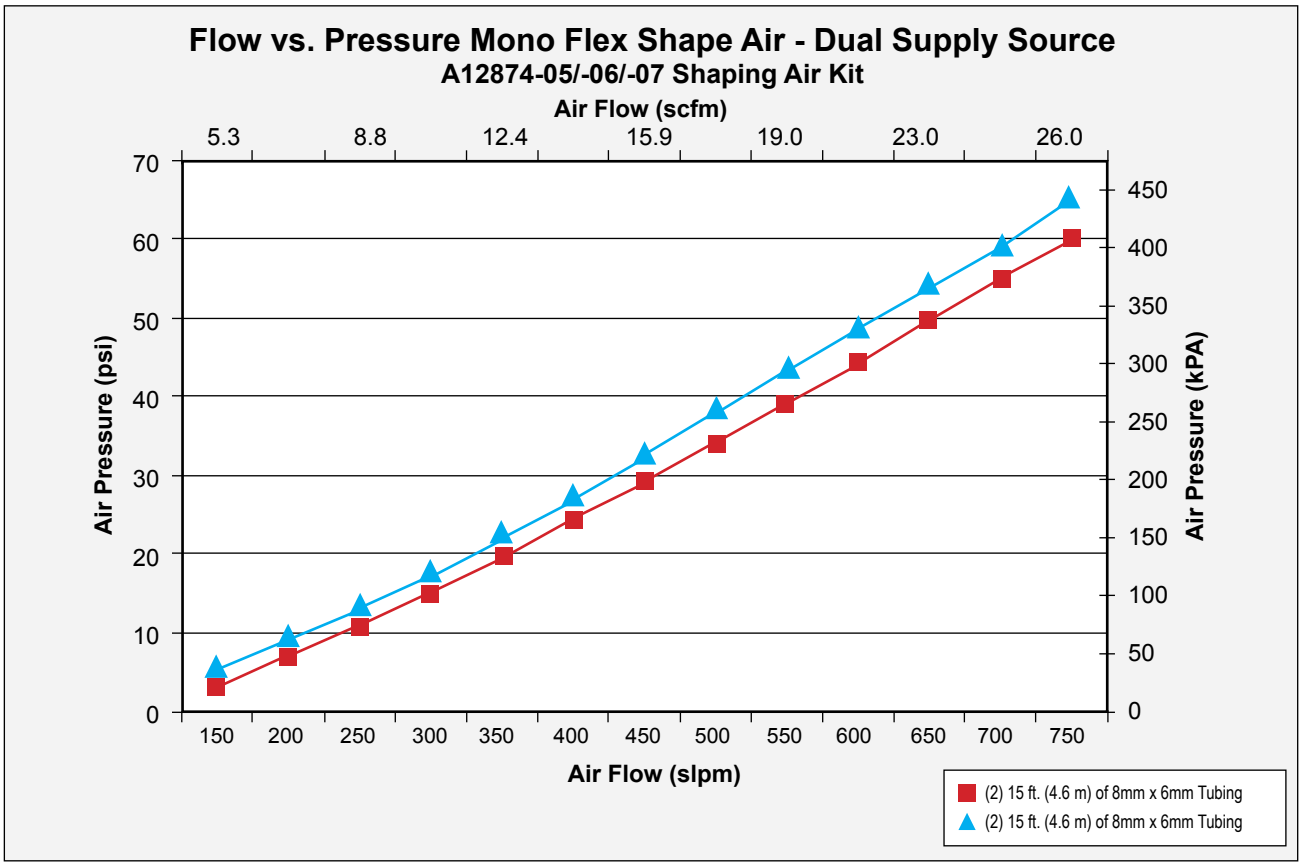


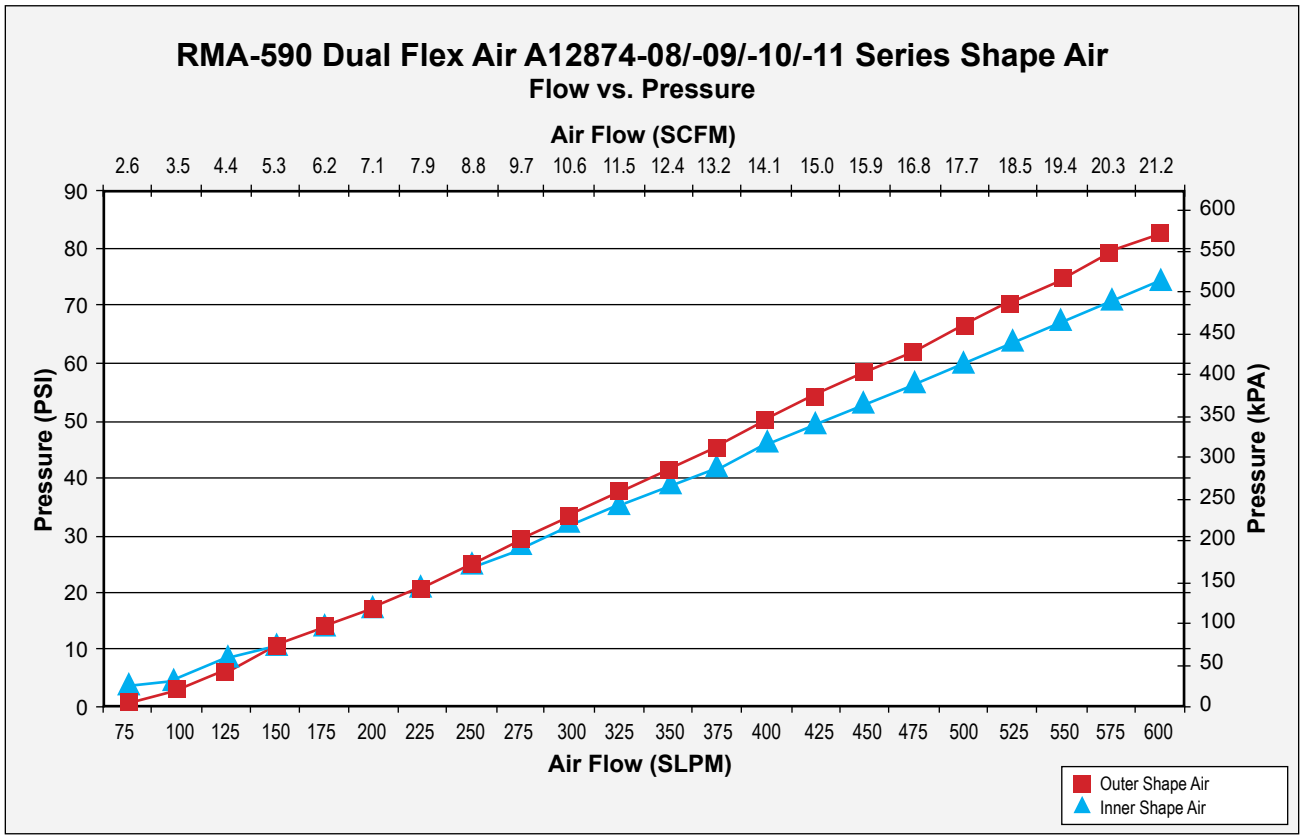


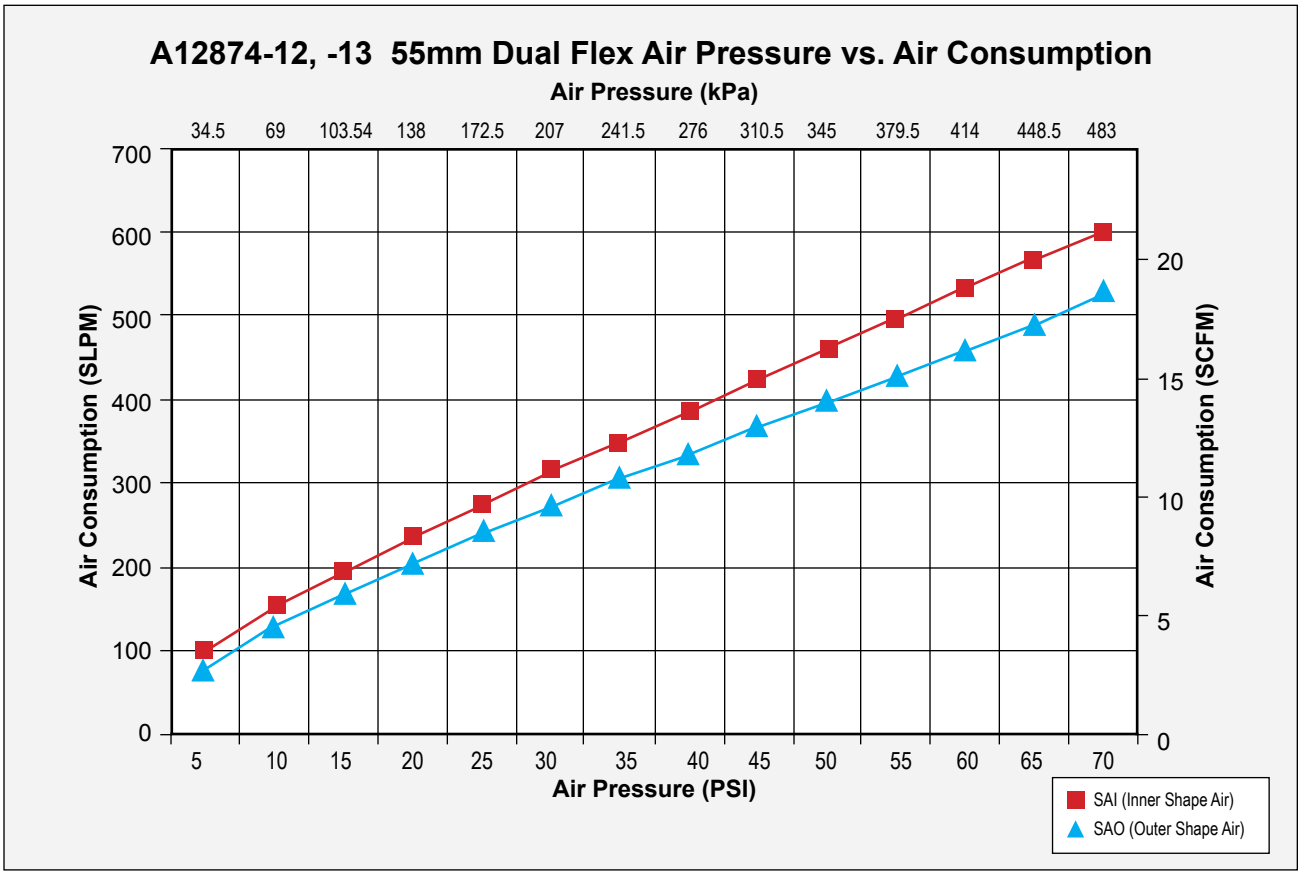

Turbine Speed vs. Air Consumption Load @ 800cc-Water
Air Consumption (slpm)
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
Air Consumption (scfm)
24.1
22.7
21.2
19.8
18.3
16.9
15.4
14.0
12.5
11.1
9.6
8.2
6.7
5.3
3.8
2.4
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
Turbine Speed (k) rpm

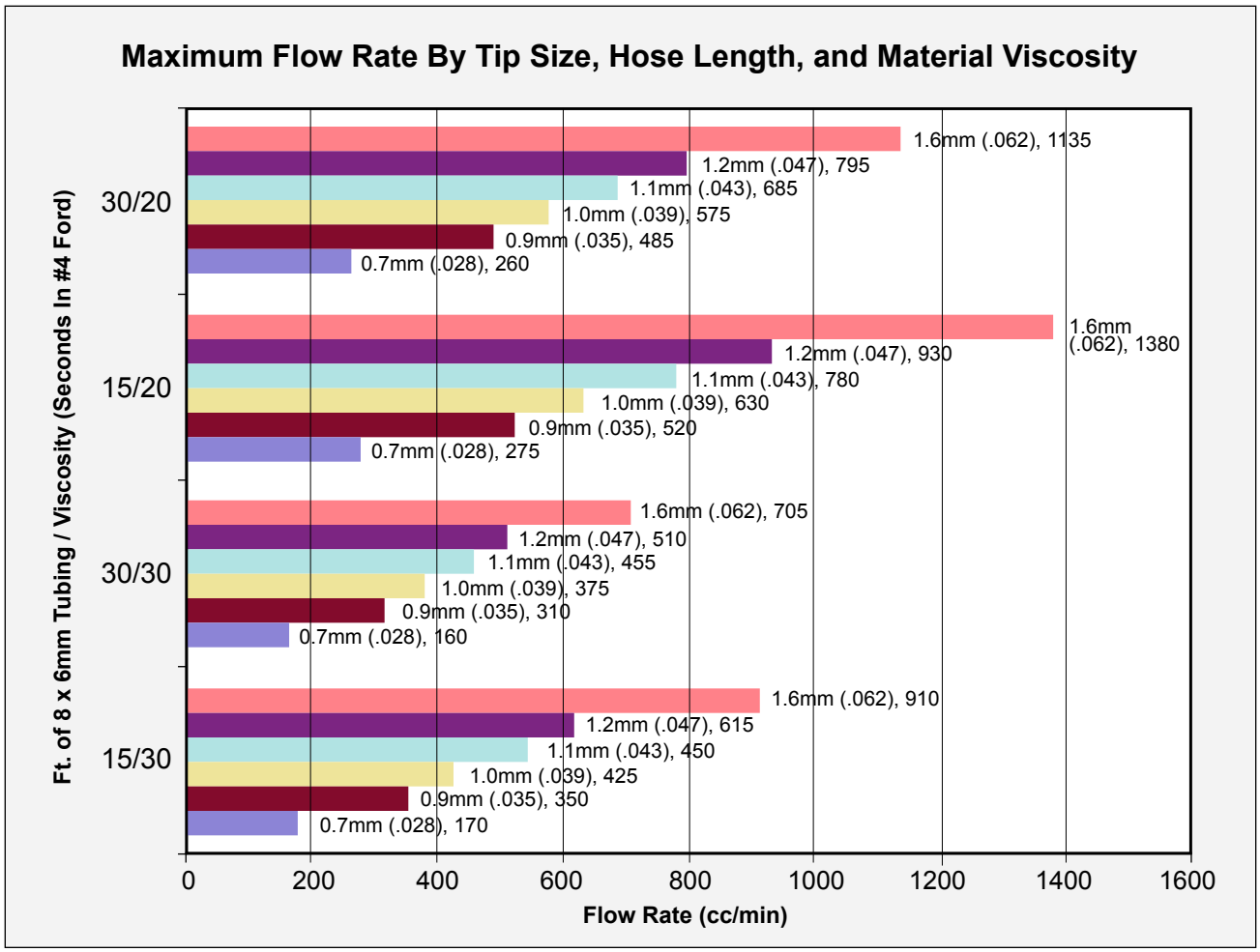

Turbine Speed vs. Pressure Load @ 800cc-Water
Air Pressure (psig)
100
90
80
70
60
50
40
30
20
10
0
Air Pressure (kPA)
690
650
610
570
530
490
450
410
370
330
290
250
210
170
130
90
50
10
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
Turbine Speed (k) rpm


Flow vs. Pressure Mono Flex Shape Air - Single Supply Source
A12874-05/-06/-07 Shaping Air Kit
Air Flow (scfm)
3.5
5.3
7.1
8.8
10.6
12.4
14.1
15.9
Air Pressure (psi)
0
10
20
30
40
50
60
Air Pressure (kPA)
0
50
100
150
200
250
300
350
400
75
100
125
150
175
200
225
250
275
300
325
350
375
400
425
450
475
Air Flow (slpm)
15 ft. (4.6 m) of 8mm x 6mm Tubing Pressure
15 ft. (4.6 m) of 8mm x 6mm Tubing

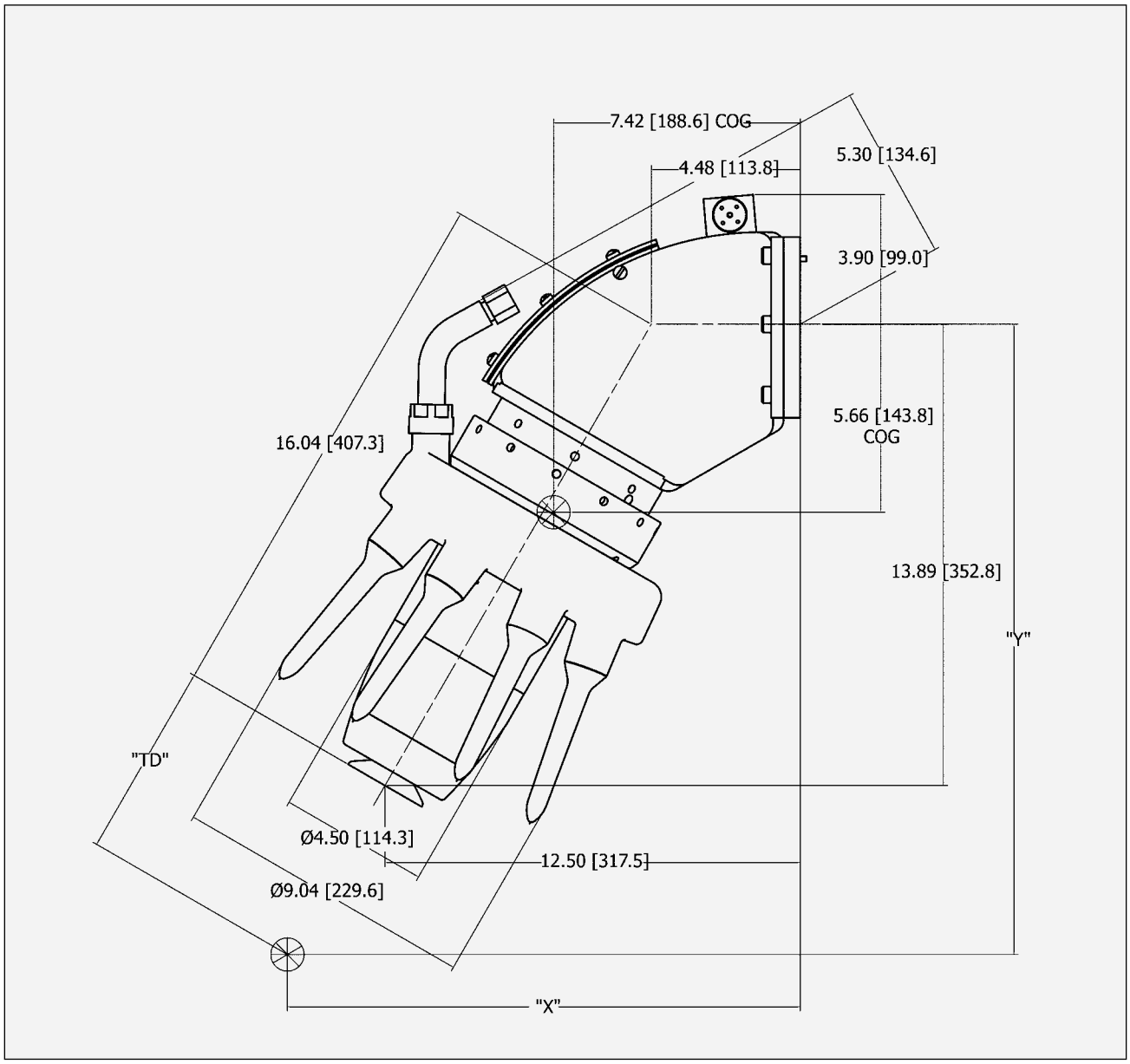

Flow vs. Pressure Mono Flex Shape Air - Dual Supply Source
A12874-05/-06/-07 Shaping Air Kit
Air Flow (scfm)
5.3
8.8
12.4
15.9
19.0
23.0
26.0
Air Pressure (psi)
0
10
20
30
40
50
60
70
Air Pressure (kPA)
0
50
100
150
200
250
300
350
400
450
150
200
250
300
350
400
450
500
550
600
650
700
750
Air Flow (slpm)
(2) 15 ft. (4.6 m) of 8mm x 6mm Tubing
(2) 15 ft. (4.6 m) of 8mm x 6mm Tubing


RMA-590 Dual Flex Air A12874-08/-09/-10/-11 Series Shape Air
Flow vs. Pressure
Air Flow (SCFM)
2.6 3.5 4.4 5.3 6.2 7.1 7.9 8.8 9.7 10.6 11.5 12.4 13.2 14.1 15.0 15.9 16.8 17.7 18.5 19.4 20.3 21.2
Pressure (PSI)
0 10 20 30 40 50 60 70 80 90
Pressure (kPA)
0 50 100 150 200 250 300 350 400 450 500 550 600
75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575 600
Air Flow (SLPM)
Outer Shape Air
Inner Shape Air


A12874-12, -13 55mm Dual Flex Air Pressure vs. Air Consumption
Air Pressure (kPa)
34.5 69 103.54 138 172.5 207 241.5 276 310.5 345 379.5 414 448.5 483
Air Consumption (SLPM)
0 100 200 300 400 500 600 700
Air Consumption (SCFM)
0 5 10 15 20
5 10 15 20 25 30 35 40 45 50 55 60 65 70
Air Pressure (PSI)
SAI (Inner Shape Air)
SAO (Outer Shape Air)

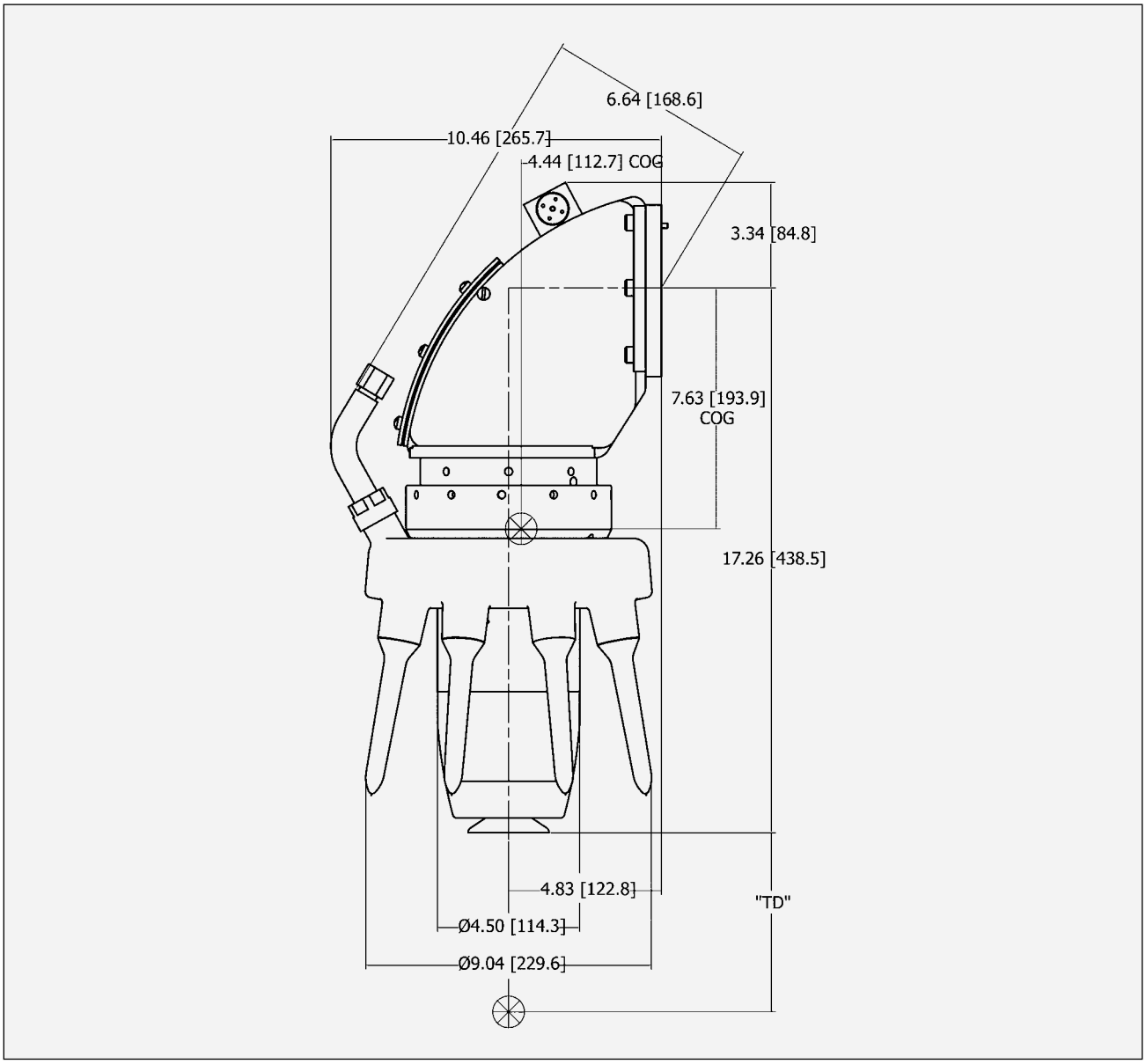

Maximum Flow Rate By Tip Size, Hose Length, and Material Viscosity
Ft. of 8 x 6mm Tubing / Viscosity (Seconds In #4 Ford)
30/20
1.6mm (.062), 1135
1.2mm (.047), 795
1.1mm (.043), 685
1.0mm (.039), 575
0.9mm (.035), 485
0.7mm (.028), 260
15/20
1.6mm (.062), 1380
1.2mm (.047), 930
1.1mm (.043), 780
1.0mm (.039), 630
0.9mm (.035), 520
0.7mm (.028), 275
30/30
1.6mm (.062), 705
1.2mm (.047), 510
1.1mm (.043), 455
1.0mm (.039), 375
0.9mm (.035), 310
0.7mm (.028), 160
15/30
1.6mm (.062), 910
1.2mm (.047), 615
1.1mm (.043), 450
1.0mm (.039), 425
0.9mm (.035), 350
0.7mm (.028), 170
0
200
400
600
800
1000
1200
1400
1600
Flow Rate (cc/min)

RMA-590 TOOL CENTER POINT DIMENSIONS - SHORT BODY 60° ADAPTER - INDIRECT CHARGE - 65MM - DUAL FLEX



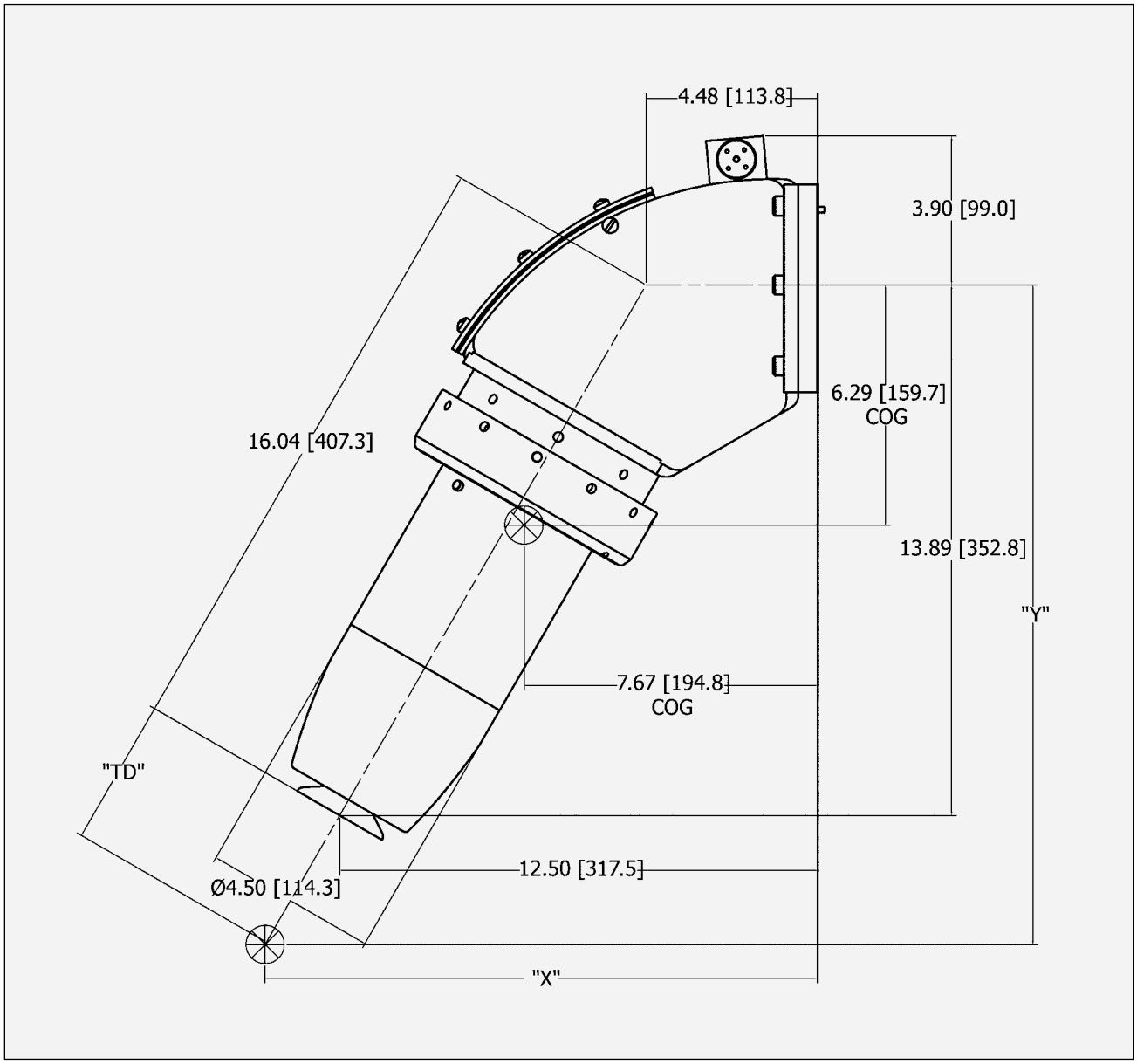
RMA-590 SHORT BODY 60° ADAPTER - INDIRECT CHARGE - 65MM - DUAL FLEX		
TD (Target Distance)	**X**	**Y**
6-Inches (152mm)	15.50-Inches (393.7mm)	19.09-Inches (484.9mm)
8-Inches (203mm)	16.50-Inches (419.1mm)	20.82-Inches (528.8mm)
10-Inches (254mm)	17.50-Inches (444.5mm)	22.55-Inches (572.8mm)
12-Inches (305mm)	18.50-Inches (469.9mm)	24.28-Inches (616.7mm)

RMA-590 TOOL CENTER POINT DIMENSIONS - SHORT BODY 90° ADAPTER - INDIRECT CHARGE - 65MM - DUAL FLEX



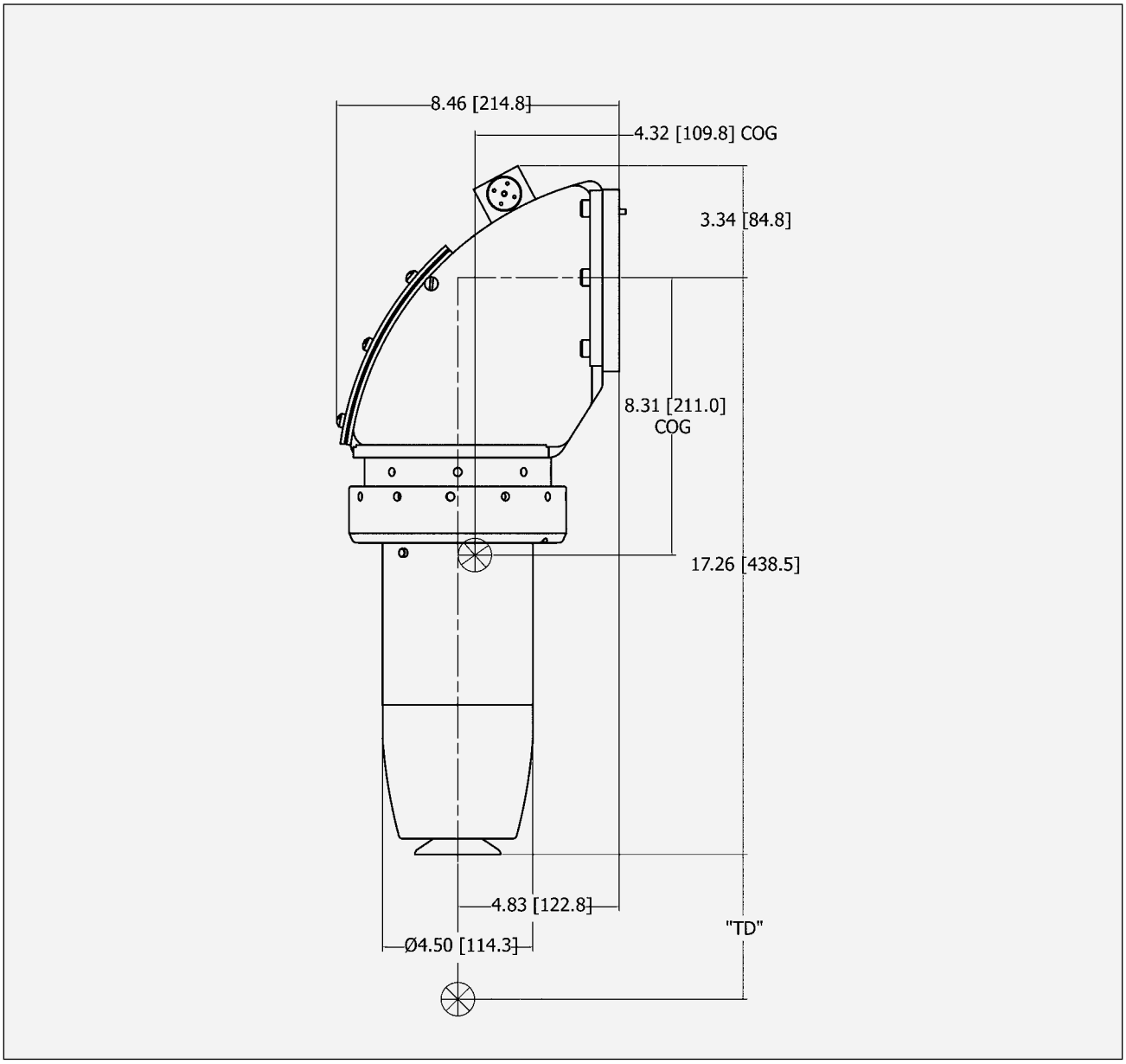
RMA-590 SHORT BODY 90° ADAPTER - INDIRECT CHARGE - 65MM - DUAL FLEX		
TD (Target Distance)	**X**	**Y**
6-Inches (152mm)	23.26-Inches (590.8mm)	4.83-Inches (122.8mm)
8-Inches (203mm)	25.26-Inches (641.6mm)	4.83-Inches (122.8mm)
10-Inches (254mm)	27.26-Inches (692.4mm)	4.83-Inches (122.8mm)
12-Inches (305mm)	29.26-Inches (743.2mm)	4.83-Inches (122.8mm)

RMA-590 TOOL CENTER POINT DIMENSIONS - SHORT BODY 60° ADAPTER - DIRECT CHARGE - 65MM - DUAL FLEX



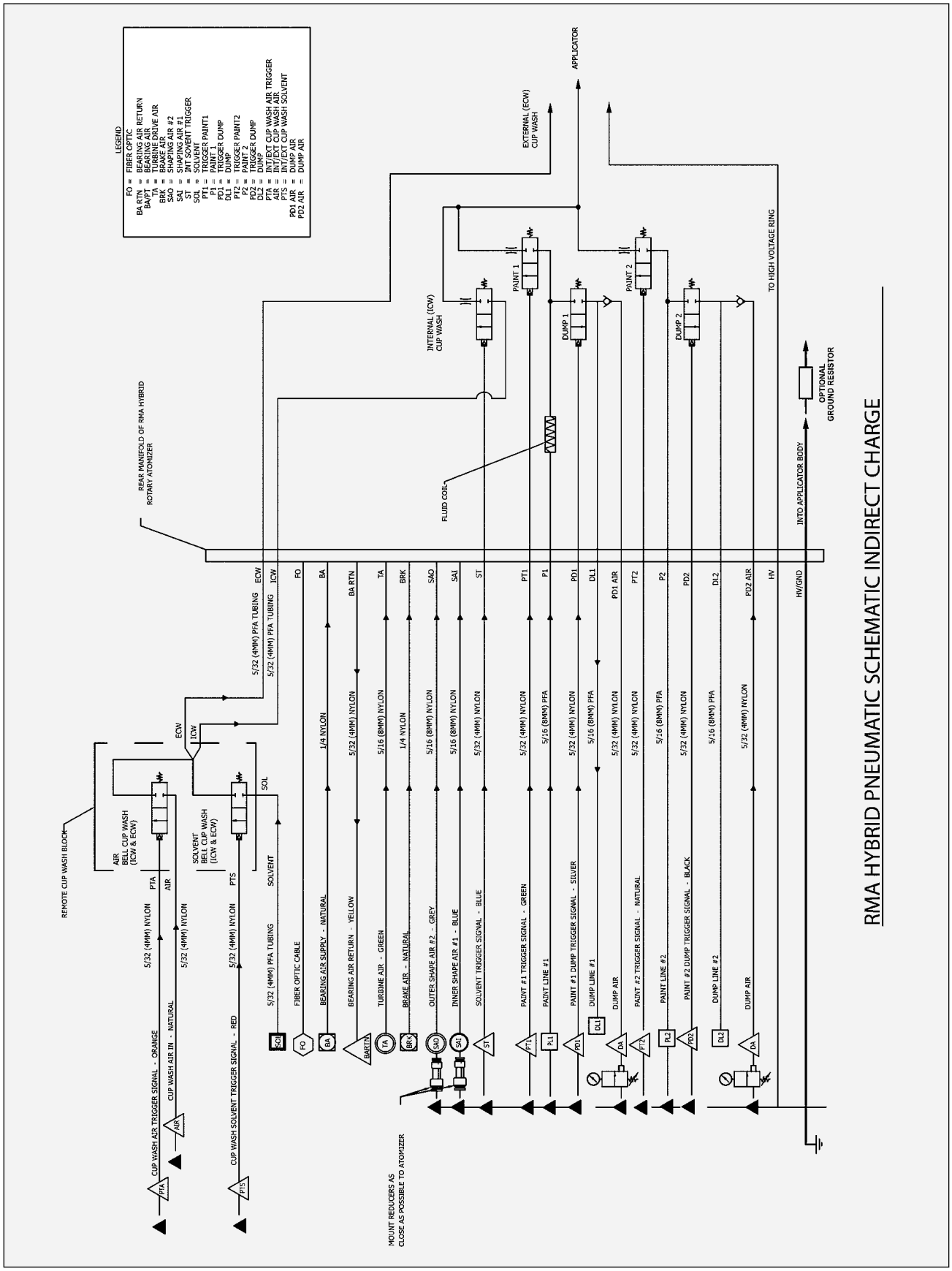
RMA-590 SHORT BODY 60° ADAPTER - DIRECT CHARGE - 65MM - DUAL FLEX		
TD (Target Distance)	**X**	**Y**
6-Inches (152mm)	15.50-Inches (393.7mm)	19.09-Inches (484.9mm)
8-Inches (203mm)	16.50-Inches (419.1mm)	20.82-Inches (528.8mm)
10-Inches (254mm)	17.50-Inches (444.5mm)	22.55-Inches (572.8mm)
12-Inches (305mm)	18.50-Inches (469.9mm)	24.28-Inches (616.7mm)

RMA-590 TOOL CENTER POINT DIMENSIONS - SHORT BODY 90° ADAPTER - DIRECT CHARGE - 65MM - DUAL FLEX

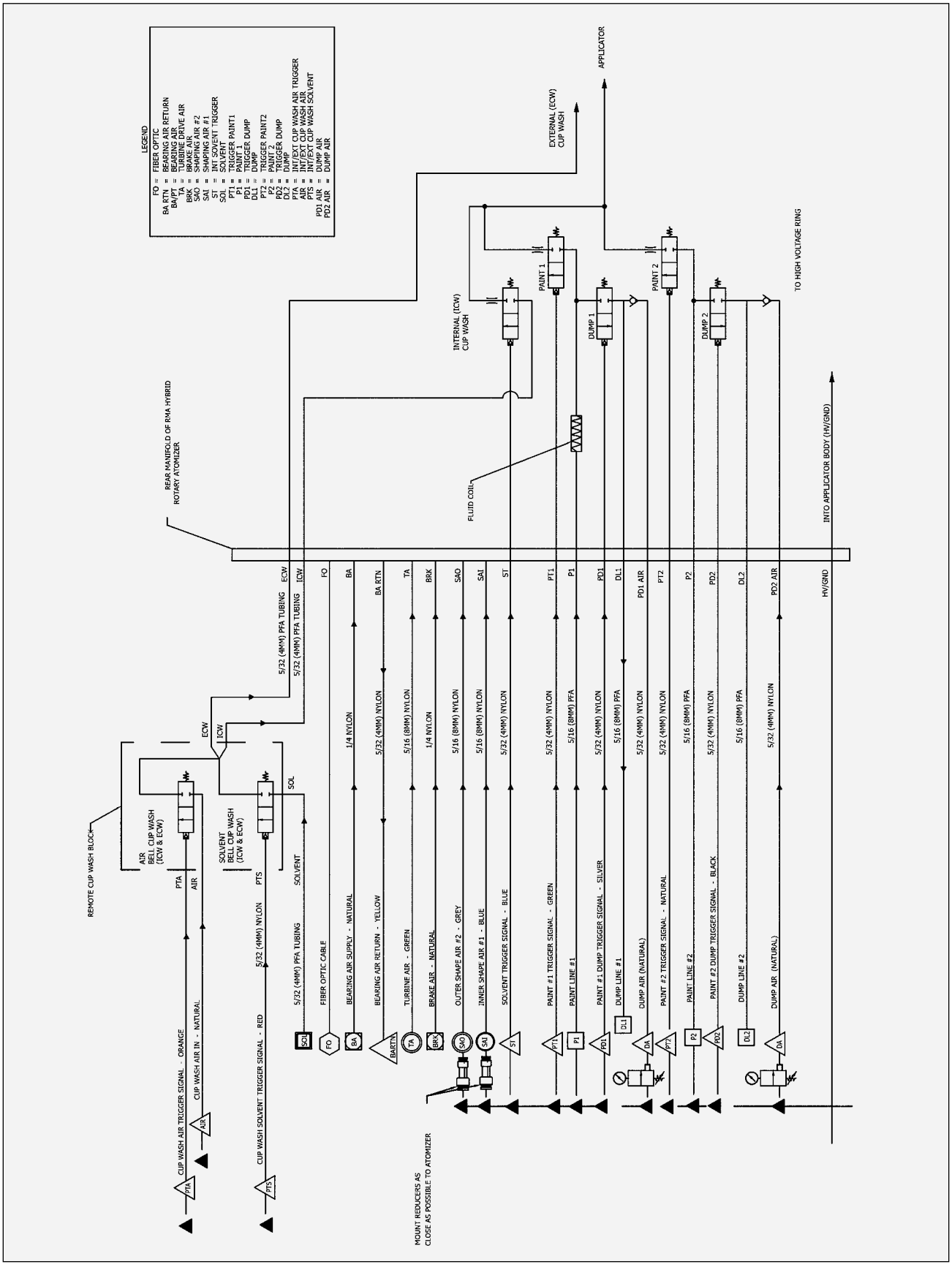


RMA-590 SHORT BODY 90° ADAPTER - DIRECT CHARGE - 65MM - DUAL FLEX		
TD (Target Distance)	**X**	**Y**
6-Inches (152mm)	23.26-Inches (590.8mm)	4.83-Inches (122.8mm)
8-Inches (203mm)	25.26-Inches (641.6mm)	4.83-Inches (122.8mm)
10-Inches (254mm)	27.26-Inches (692.4mm)	4.83-Inches (122.8mm)
12-Inches (305mm)	29.26-Inches (743.2mm)	4.83-Inches (122.8mm)

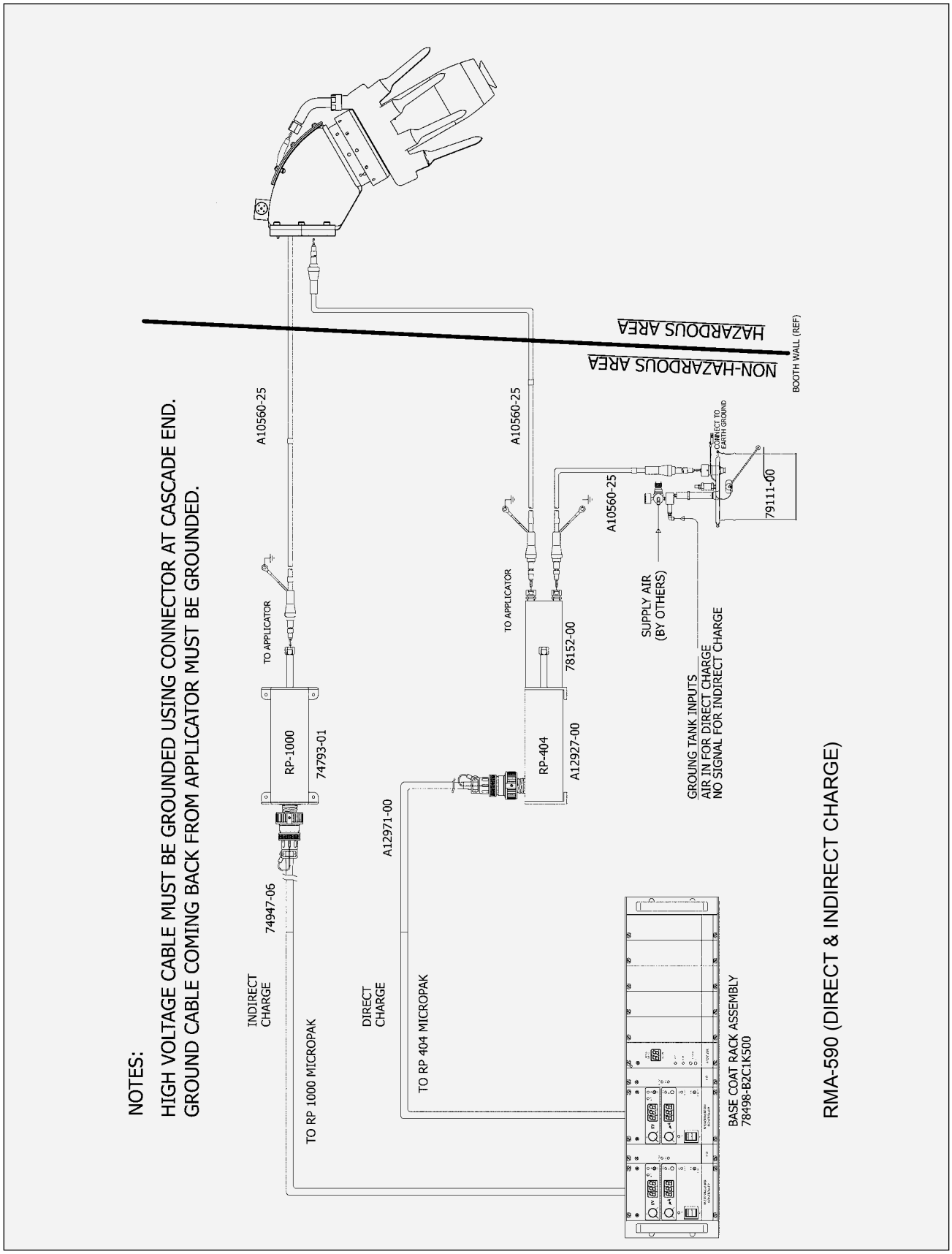
CIRCUIT SCHEMATIC - INDIRECT CHARGE



CIRCUIT SCHEMATIC - DIRECT CHARGE



HIGH VOLTAGE CIRCUIT SCHEMATIC



INSTALLATION

AIR FILTER INSTALLATION (GENERAL GUIDELINES)

The following air filter installation guidelines are essential for optimum performance:

1. Use 25mm OD (1-Inch OD) minimum inbound main air line.
2. Use only recommended pre-filters and bearing air filters as shown in "Air filtration Requirements" chart in the "Installation" section. Additional system air filtration (i.e., refrigerated air dryer) may also be used if desired.
3. Mount all the air filters as close as possible to the RMA-590 applicator. (DO NOT mount further than 30-Feet (9.1 meters) away.)
4. DO NOT use tape, pipe dope, or other thread sealant downstream of the bearing air filter. Loose flakes of tape or other sealant can break loose and plug the very fine air holes in the turbine air bearings.
5. Air heaters are highly recommended for use in the system to minimize the effect of excessively humid conditions and maintain turbine load capabilities. If the heated air will exceed 120°F (48.9°C), the heater must be located after all filters to prevent damage to the filter media.

NOTE

➤ Each applicator must have its own filter for bearing air. Recommended: RPM-418 or equivalent.

With the exception of fluid, dump, and bearing air, all other pilot and air supply lines should be bulk-headed and their diameters increased one size. For example: Turbine air should be increased to 12mm OD from bulkhead plate to the volume booster or heater outlet.

Volume Booster Recommendation (Turbine Air): (For use with A11065-05 Air Heater or Non-Air Heater System)

Ransburg Part # A11111-00

- Pilot Operated Regulator Non-Bleed Pilot
- SCFM-200
- Supply - 300 P.S.I.
- Temperature Range: 40˚ - 120° F

TUBE SIZE AIR PRESSURE REQUIREMENTS

	Tube Size	Air Pressure Requirements
Bearing Air Supply (BA)	1/4" OD	90 +/- 10 psi (621 +/- 69 kPa)
Pilot Dump 2 Air (PD2 AIR)	4mm OD (5/32" OD)	30 psi (207 kPa) Max.
Paint Valve 2 (PT2)	4mm OD (5/32" OD)	80 +/- 10 psi (552 +/- 70 kPa)
Bearing Air Return (BA RTN)	4mm OD (5/32" OD)	90 +/- 10 psi at atomizer card (552 +/- 70 kPa)
Brake Air (BRK)	1/4" OD	60-100 psi (414-689 kPa)
Pilot Dump 1 Air (PD1 AIR)	4mm OD (5/32" OD)	30 psi (207 kPa) Max.
Pilot Dump Valve 1 (PD1)	4mm OD (5/32" OD)	80 +/- 10 psi (552 +/- 70 kPa)
Shape Air Outer (SAO)	8mm OD X 6mm (5/16" OD)	Variable (see graphs in this manual)
Shape Air Inner (SAI)	8mm OD X 6mm (5/16" OD)	Variable (see graphs in this manual)
Paint Valve 1 (PT1)	4mm OD (5/32" OD)	80 +/- 10 psi (552 +/- 70 kPa)
Turbine Air (TA)	8mm OD X 6mm (5/16" OD)	Variable (see graphs in this manual)
Solvent Valve (ST)	4mm OD (5/32" OD)	80 +/- 10 psi (552 +/- 70 kPa)
Pilot Dump Valve 2 (PD2)	4mm OD (5/32" OD)	80 +/- 10 psi (552 +/- 70 kPa)
Paint #1 (P1)	8mm OD (5/16" OD) PFA	200 psi Max. (1379 kPa)
Paint #2 (P2)	8mm OD (5/16" OD) PFA	200 psi Max. (1379 kPa)
Dump #1 (DL1)	8mm OD (5/16" OD) PFA	200 psi Max. (1379 kPa)
Dump #2 (DL2)	8mm OD (5/16" OD) PFA	200 psi Max. (1379 kPa)
Solvent (SOL)	4mm OD (5/32" OD) PFA	100 psi Max. (689.5 kPa)

EQUIPMENT GROUNDING / SAFETY RECOMMENDATIONS

In electrostatic coating systems, the flow of high voltage power from the power supply to the atomizer is insulated from ground and isolated from all other functions equipment. When the voltage reaches the atomizer, it is transferred to the coating material where, by introducing a negative charge, it causes the atomized fluid to seek the nearest positive ground. In a properly constructed and operated system, that ground will be the target object.

The directed conduction of the electric charge, through its array of wires, cables, and equipment, is accompanied by a variety of stray electrical charges passing through the air by various means such as: air ionization, charged particles in the air and radiated energy. Such charges may be attracted to any conductive material in the spray area. If the conductive material does not provide a safe drain to electrical ground, which will allow the charge to dissipate as fast as it accumulates, it may store the charge. When its electrical storage limit is reached, or when it is breached by external circumstances (such as the approach of a grounded object or person, or one at lower potential), it may discharge its stored charge to the nearest ground. If there is no safe path to ground (such as a ground wire or braided cable) it may discharge through the air as a spark. A spark may ignite the flammable atmosphere of a spray area. The hazard area extends from the point of origin up to as much as a twenty-foot radius. (See the NFPA-33 for definition and limitations of a hazard area.)

It is simple, but vital matter to be sure that all conductive objects within the spray area are grounded. All cabinets, housing, bases, supports, and stands, which are not by design, insulated from ground, be connected directly and **INDIVIDUALLY** to earth ground. ***Resting on a concrete floor or being attached to a building column may not always be sufficient ground.***

In order to provide the best ground connection possible, always attach a ground wire or insulated braided cable the terminal indicated by the ground symbol and then to a proven ground. Always check ground connections for integrity. Some items, such as rotators and paint stands, may be supported on an insulator, but all components of the system up to the insulator **MUS**T be grounded.

NOTE

➤ Ransburg recommends that ground connections to earth ground be 3/4" insulated copper braided wire. Grounds between assemblies within a machine should be run to a central point within the machine using #18 insulated stranded copper wire minimum. All connections should be mechanically sound and have less than 5 ohms of resistance between assemblies and the common point. The resistance between the central point and earth ground should be less than 5 ohms as well.

Where items are mounted directly on structural components such as building columns, the ground connection MUST still be made. In many cases the structural component may be painted or coated with an insulated material and in all cases, the equipment will provide the necessary connection at one end, but the user must be sure that the other end is secured to an earth ground. This may be achieved by the use of a standard ground clamp (properly secured), by brazing or by piercing the structural component enough to assure connection. All ground connections should be made to the most conductive metallic structural ground available.

To be sure that everything is properly grounded, the following steps should be undertaken at least daily:

1. Inspect all ground wires. Look for good, firm joints at all points of connection. Look for breaks in the ground wire. Repair all defects IMMEDIATELY!

2. Inspect the floor or grates for excessive accumulation of dried coating material or other residue. If there is any, remove it!

SAFE GROUNDING IS A MATTER OF PROPER EQUIPMENT MAINTENANCE AND INSTALLATION, CORRECT OPERATION AND GOOD HOUSEKEEPING. Daily inspection of grounding apparatus and conditions, however, will help prevent hazards that are cause by normal operations.

BE SURE THAT:

1. All objects in the spray area are grounded.
2. Personnel in the spray area are properly grounded. (Conductive safety shoes and coveralls.)
3. That the target object is properly grounded (less than 1 megohm resistance).
4. That the high voltage is off except during normal application.
5. That the high voltage is off and applicators are grounded during maintenance operations.
6. The spray area is kept free of accumulated coating deposits.
7. All combustible liquids in the spray area (outside of automatic delivery systems) are kept to minimum and are kept in fire safe, grounded containers. (See NFPA-30 and chapter 6 of NFPA-33.)
8. Proper ventilation is provided.
9. Personnel must thoroughly understand the equipment, its operation and maintenance, and all safety precautions.

AIR HEATER REQUIREMENTS

Turbine drive air expands as it moves through the turbine wheel cavity and as it exits the turbine from the exhaust port. This expansion will cause cooling of the exhaust air and the surfaces it contacts. This same expansion cooling can occur across the shaping air exit ports. This cooling affect can cause surface temperatures to fall below the dew point of the booth, which will result in condensation on the interior and exterior of the atomizer, machine, and its components. It is even possible that the temperature of the supply air may be below the booth dew point, even without additional expansion cooling.

Condensation is especially probable in waterborne applications when booth temperature and relative humidity levels are typically maintained very high. This condensation will allow sufficient conductivity of the surfaces such that they act as an erratic ground source potential. This can cause damage to the equipment.

It is therefore, a requirement that turbine exhaust air temperature be maintained above the booth dew point to prevent condensation from forming on atomizer surfaces. Doing so will eliminate moisture as a potential defect in painted surfaces as well as extending equipment life. Thus, it is recommended that air heaters be installed into the atomizer air supply lines, i.e. turbine drive air, shaping air, and seal air. The air heaters must be of sufficient capacity, capable of raising the incoming air temperature at least 40°F (4.4°C) at a flow rate of 60 SCFM per applicator.

The actual air heater process setting depends on applicator fluid flow rate load, booth conditions, turbine airflow settings, and incoming air temperature. The heater should be set as low as possible, sufficient to maintain the applicator surface temperatures above the dew point in the booth.

Example: With the incoming air temperature at 72°F (22.2°C), and RMA Hybrid with 65mm bell cup rotating unloaded at 60 krpm has a turbine outlet temperature drop of approximately 28°F (-2.2°C) @ 40 krpm unloaded, Δ~14°F (-10°C). Referring to the ASHRAE Psychrometric chart, the saturation temperature range (dew point) of a spray booth maintained at 70-75°F/65-70% RH is 62-68°F (21.1-23.9°C/65-70°RH is 16.7-20°C). Thus it is almost certain that the surface temperatures of the applicator will fall below the dew point of the booth, and an air heater will be needed in this case.

To prevent condensation, a Ransburg air heater assembly should be assembled after the air filters and volume booster. (See heater and filtration options later in this manual).

AIR HEATER AND FILTRATION OPTIONS

NOTE

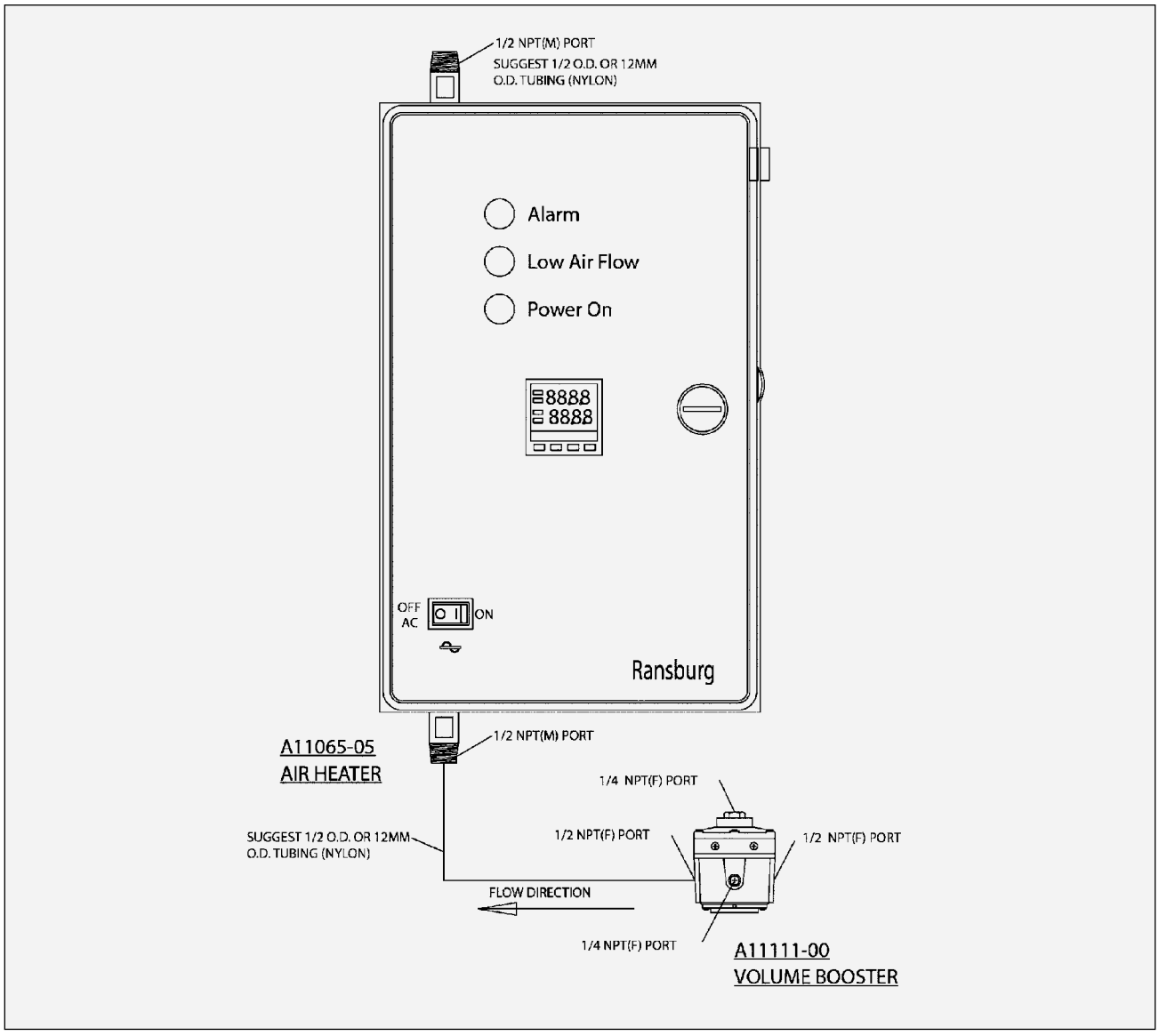
➤ Failure to use an air heater may cause damage to equipment or ruin the finished component being processed.

NOTE

➤ If using the A11065-05 Air Heater, air filters equivalent to HAF-503, HAF-508 and RPM-418 must be used. (See descriptions in this manual).

NOTE

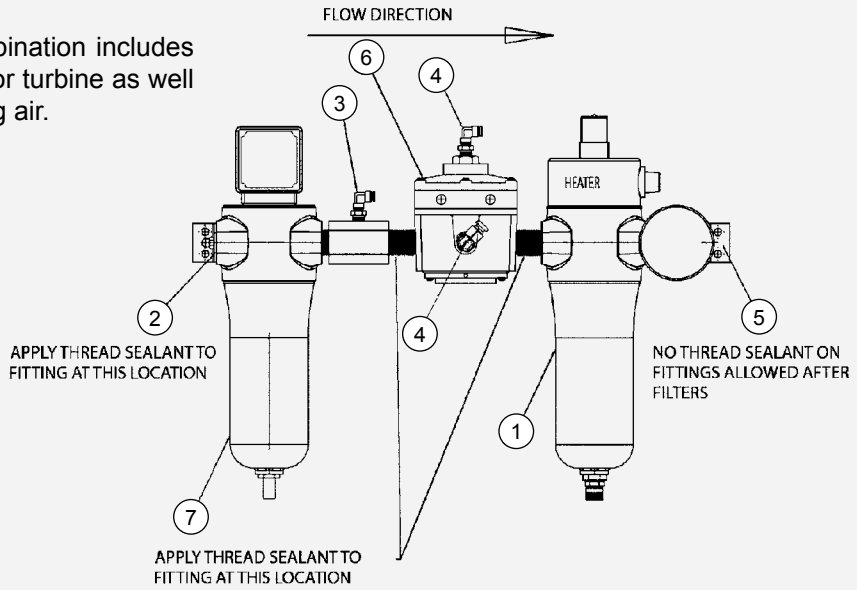
➤ Connect air heater to turbine air tubing.



A11065-05 Air Heater

A13230-XX AIR HEATER AND FILTER COMBINATION

This combination includes filtration for turbine as well as bearing air.



FILTER & HEATER ASSEMBLY A13230-XX

Dash No.	Description	"A"	"B"	"C"	"E"
A13230-01	115 V.@ 13A METRIC FITTINGS	A13434-01	A13426-00	A13429-00	A13726-00
A13230-02	230 V.@ 6.5A METRIC FITTINGS	A13434-02	A13426-00	A13429-00	A13726-00
A13230-03	115 V.@ 13A FRACTIONAL FITTINGS	A13434-01	SSP-6439	A13428-00	A13727-00
A13230-04	230 V.@6.5A FRACTIONAL FITTINGS	A13434-02	SSP-6439	A13428-00	A13727-00

A13230-XX AIR HEATER AND FILTER COMBINATION

Item	Part #	Description	Qty.
1	"A"	AIR BLOCK, NIPPLES & AIR HEATER	1
2	A13427-00	INLET FITTING, 3/8 NPS(M) X 1/2 NPT(M)	1
3	"B"	BEARING AIR FEED, SWIVEL ELBOW 1/4 O.D.TUBE X 1/4 NPT(M) BEARING AIR FEED, 6mm O.D. TUBE X 1/4 NPT(M) STRAIGHT ADAPTER	1
4	79253-02	AIR FITTING, SWIVEL ELBOW 5/32 O.D. TUBE X 1/4 NPT(M)	2
5	"C"	OUTLET FITTING, 1/2 O.D. TUBE X 1/2 NPT(M) STAINLESS STEEL OUTLET FITTING, 12mm O.D. TUBE X 1/2 NPT(M) STAINLESS STEEL	1
6	"E"	VOLUME BOOSTER	1
7	A13433-00	AIR FILTER & NIPPLE INCLUDED	1
8	SI-13-07	A13230-XX SERVICE LITERATURE (PROVIDED BY OTHER)	REF.

ALL UNITS: REPLACEMENT PARTS: (SERVICE NOTE)
HEATING ELEMENT USE: A13432-01 FOR A13230-01 AND A13230-03 (115V UNITS)
A13432-02 FOR A13230-02 AND A13230-04 (230V UNITS)
AIR FILTER ELEMENT USE A13232-00
THERMOMETER USE A13431-00

AIR FILTRATION REQUIREMENTS WHEN USED WITH A11065-05 AIR HEATER OR NO AIR HEATER		
Ransburg Filter Model No.	**Description / Specifications**	**Replacement Element Part No.**
HAF-503	Pre-filter, removes coarse amounts of oil, moisture and dirt. Used upstream of HAF-508 pre-filter (used in systems with poor air quality.	HAF-15 Element One
HAF-508	Pre-filter, coalescing type, 136 SCFM, 98.5% efficiency particulate removal .3 to .6 micron, max. aerosol passed 1.0 micron, max. solid passed .4 micron (dependent upon SCFM requirement per applicator, one HAF-508 can be used with up to three applicators.	HAF-38 Elements, Carton of 4
RPM-418	Bearing air filter, coalescing type,19 SCFM, 99.995% efficiency particulate removal .3 to .6 micron, max. passed .6 micron max. solid passed .2 micron (one per applicator)	RPM-33 Elements, Carton of 8

⚠ CAUTION

➤ Air must be properly filtered to ensure extended turbine life and to prevent contamination of the paint finish. Air which is not adequately filtered will foul the turbine air bearings and cause turbine failure. The correct type filters musts be used in an RMA-590 system. The filter elements must be replaced regular schedule to assure clean air.

➤ It is the user's responsibility to ensure clean air at all times. Turbine failure resulting form contaminated air will not be covered under warranty. If other filters are incorporated in the system, the filters to be used must have filtering capacities equal or better than those shown in "Air Filtration Requirements Charts."

➤ The user must ensure the bearing air supply is not inadvertently turned off while the RMA-590 air motor is turning. This will cause air bearing failure.

NOTE

➤ Each applicator must have its own filter for bearing air. Recommended: RPM-418 or equivalent.

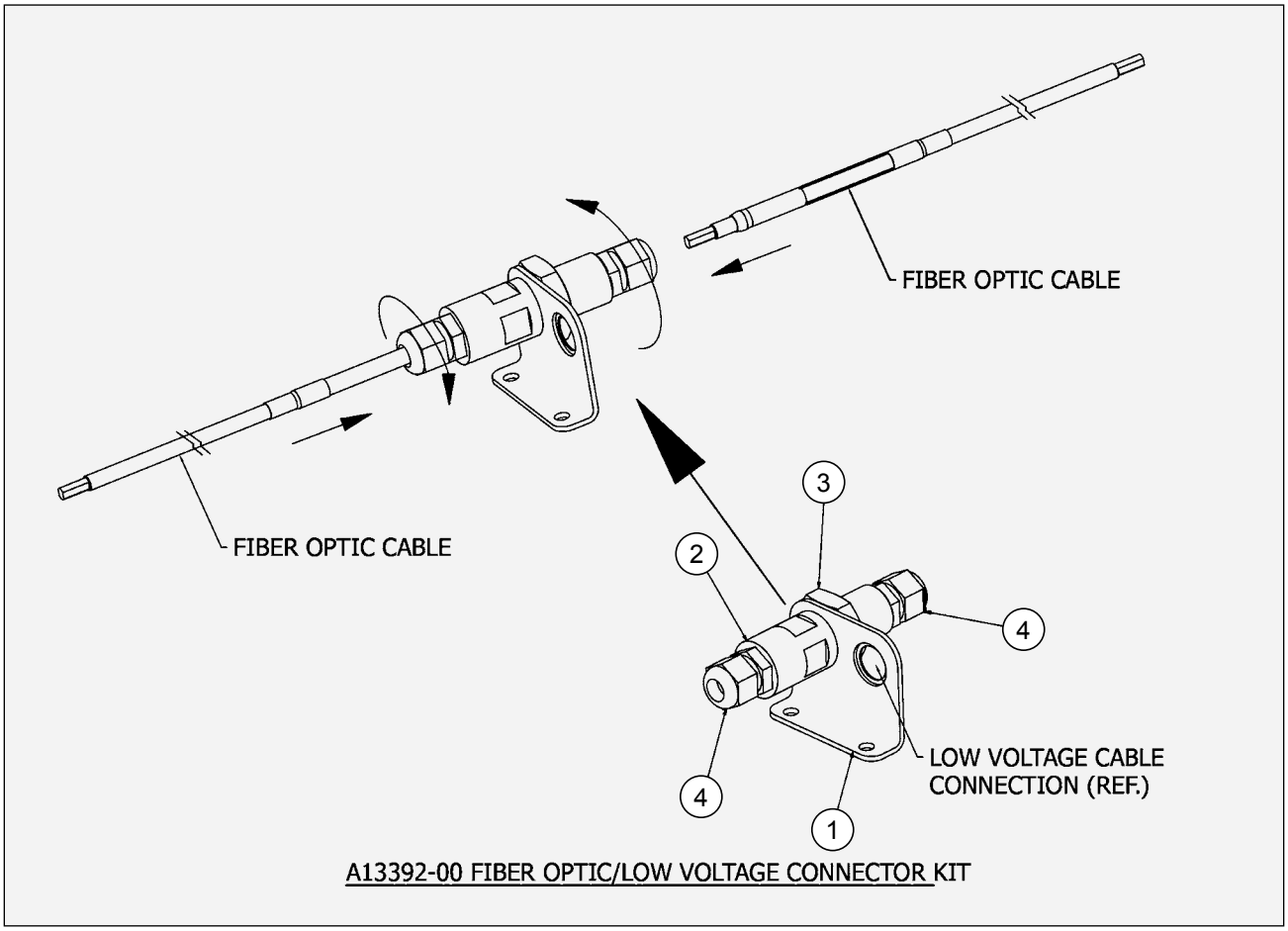
MOUNTING

The RMA-590 is equipped with a quick disconnect assembly. The quick disconnect feature consists of mounting manifold which is permanently mounted to the robot adapter and an atomizer body assembly. The atomizer body assembly is secured to the mounting manifold with a threaded ring.

ELECTRICAL AND FIBER OPTIC CONNECTIONS

The fiber optic connection is made on the back of the atomizer's mounting manifold. The fiber optic cable comes pre-assembled with connectors that are secured in place by set screws tightened from the side of the robot plate. Set screws should be tightened 15-20 lbs•in (1.7-2.2 Nm).

Maximum amount of splices for any length of cable is 3, including the mounting manifold and transceiver card. The speed detection signal may be affected if splices are exceeded. Length in any combination for the fiber optic is 100-feet.

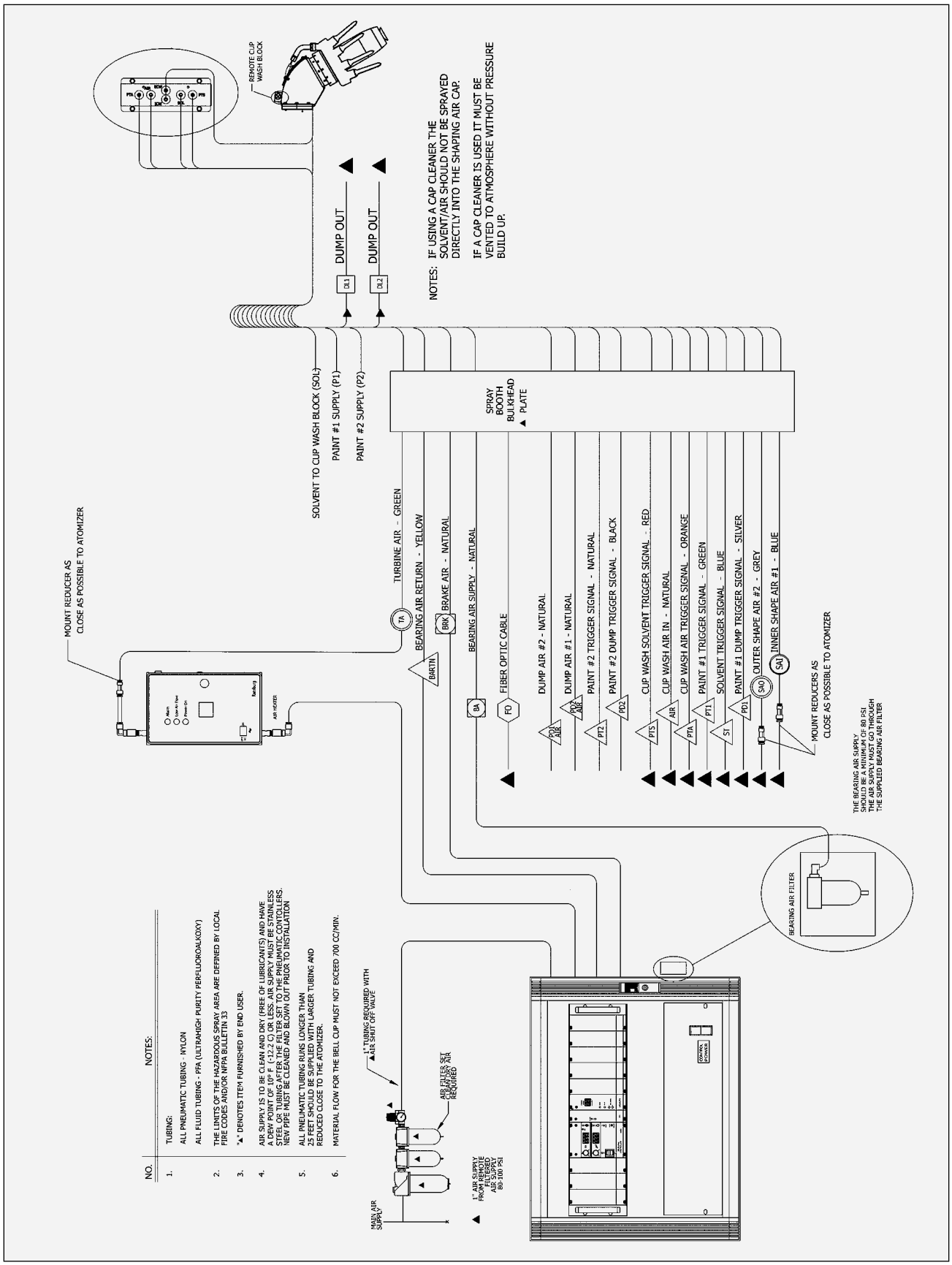


A13392-00 FIBER OPTIC/LOW VOLTAGE CONNECTOR KIT

A13392-00 FIBER OPTIC/LOW VOLTAGE CONNECTOR KIT - PARTS LIST

Item	Qty.	Part #	Description
1	1	A13393-00	BRACKET, FIBER OPTIC/LOW VOLTAGE
2	1	A13391-00	FIBER OPTIC BULKHEAD CONNECTOR
3	1	A13537-00	HEX NUT, M22 X 1.5
4	2	80073-00	STRAIN RELIEF, CABLE GLAND

TYPICAL INSTALLATION OF RMA-590



INTERLOCKS

The following system interlocks are required to prevent equipment damage.

- Bearing air should remain on at all times and should be shut-off by turning off the main air to the pneumatic control cabinet.
- It should not be possible for the coating material to be sprayed unless the turbine is spinning.
- Two inter-connected bearing air ports are provided, one for supply air and the other to be used as a return signal for measuring bearing air pressure at the atomizer. If bearing air falls below 80 psi (551.6 kPa) at the atomizer, the turbine air should be automatically interlocked to shut off. This interlock is provided by the Serial Atomizer Module. (See current “Serial Atomizer” service manual.)
- High voltage must be interlocked with the solvent valve pilot signal to prevent solvent flow while high voltage is energized (direct charge only).
- Turbine air and brake air must be interlocked to prevent both from being used simultaneously. This interlock is provided by the Serial Atomizer Module. (See current “Serial Atomizer” service manual).
- Any other interlocks required by local national code or international code.
- The following system interlocks are required to prevent equipment and personal damage when using automated cap cleaners:

  1. Voltage OFF
  2. Bell cup rotating (20-30 KRPM)
  3. Shape air ON (70 SLPM min.)
  4. Applicator centered in device

⚠ CAUTION

➤ When the turbine air is turned off, the turbine will continue to operate or “coast down” for about two minutes. Provisions should be made to assure that the operator waits at least three minutes, after shutting off the turbine air and before shutting off the main air supply.

➤ The bell cup must be removed when making flow checks. If the paint is turned on when the bell is mounted and the turbine shaft is not rotating, paint will enter the shaft and possibly damage the air bearing. Material flow checks (flow rate verification) must be made with the bell cup off and the turbine not rotating. Normally pneumatic interlocks will not allow the paint to trigger on when the turbine air is off.

⚠ WARNING

➤ The high voltage and/or coating material must never be turned on unless the bell cup is mounted on the motor shaft and the turbine is rotating.

➤ Pneumatic input to the turbine air inlet must be controlled to prevent the turbine from exceeding the maximum rated speed of 100,000 rpm. (See “Specifications” in the “Introduction” section).

➤ High voltage must never be turned on while cleaning solvent is being sprayed either through the applicator supply or the cup wash line. High voltage and both solvent triggers must be interlocked (direct charge only).

➤ **Never Spray solvent with high voltage on.**

OPERATION

⚠ WARNING

➤ Operators must be fully trained in safe operation of electrostatic equipment. Operators must read all instructions and safety precautions prior to using this equipment (see NFPA-33).

As with any spray finishing system, operation of the RMA-590 involves properly setting the operating parameters to obtain the best finish quality for the coating material being sprayed, while maintaining correct operation and reliability of the equipment used. Adjustments to operating parameters, which cover spraying, cleaning, and on/off control, include:

- Coating materials
- Fluid flow rate control
- Fluid valve control
- Turbine speed
- Bearing air adjustment
- Shaping air
- Brake air
- Electrostatic voltage
- Target distance

⚠ WARNING

➤ Electrical discharge of a high electrical capacitance fluid/paint system can cause fire or explosion with some materials. If arcing occurs when a specific coating material is used, turn the system off and verify that the fluid is non-flammable. In these conditions the system is capable of releasing sufficient electrical and thermal energy to cause ignition of specific hazardous materials in the air.

FLUID FLOW RATE CONTROL

Externally mounted fluid regulators or gear pumps are typically used to control fluid flow. Paint is supplied to the RMA-590 by way of the tubing bundle through the robot arm.

The atomizer assembly is equipped with micro valves which are pneumatically operated to direct the flow of paint to either the feed tube or dump line and to supply an intermittent solvent to clean the interior and exterior of the bell cup.

The feed tube has several sized removable tips available from .7mm - 1.6mm (.027-inch - .062-inch). The viscosity and volume of the coating material being sprayed determine the correct size of feed tube tip for each installation. (Reference “Fluid Tip Flow Rate” chart in the “Introduction” section.)

Fluid Flow Rate Check

In the test mode, the flow rate can be measured by removing the bell cup from the atomizer, turning the fluid flow on, and capturing the material in a graduated beaker or measuring cup for a fixed period of time (shaping air, high voltage, and turbine air must be off).

⚠ WARNING

➤ Danger of shock and/or personal injury can occur. Proper grounding procedures must be followed. Personnel must never work around the turbine when the turbine is spinning or when high voltage is turned on.

(See “Circuit Diagram” in the “Introduction” section.) The fluid valves in the RMA-590 are actuated by an air signal. The air pressure must be greater than 70 psi (482.6 kPa) to assure proper actuation of the valve. Applying air to the valve actuator turns on the fluid or air for that valve.

The paint trigger valve controls the paint flow to the bell. When actuated, paint flows through the valve to the fluid tube, and into the rear of the bell cup. The bell cup must be spinning at least 30,000 rpm when fluid is turned on to enable the fluid to flow through the bell paint passage and be atomized.

The dump valve controls the paint flow through the dump line. When actuated, paint flow is directed to the dump return line. This provides a method of rapidly removing paint from the incoming line for cleaning and/or color change. Normally, the dump valve is not actuated at the same time as the paint trigger valve since the trigger valve is intended to cause the fluid to flow to the bell at the prescribed input pressure.

During spraying, a separate air line supplies constant flow of air to the dump line to keep it dry. The air supply line is protected by a check valve to prevent reverse flow.

The solvent valve controls the flow of cup wash solvent. When actuated, solvent flows through a separate fluid tube passage and into the bell cup. This provides cleaning of the inside of the bell cup. The outside of the cup is simultaneously cleaned by a nozzle mounted on the shaping air ring and shroud. The solvent valve should never be triggered at the same time as the paint trigger valve to prevent solvent from flowing backward into the paint line.

To color change the applicator, a solvent air chop must be provided through the main paint line (see ”Typical Installation RMA-590” in the Installation” section).

⚠ CAUTION

➤ **Never perform the interior/exterior cup clean process with high voltage on.**

⚠ WARNING

➤ The normal fluid flow range is 25-1000 cc/min. During a color change or when flushing the system, high flow rates may be required. However, the maximum flow rate through the bell cup must not exceed 1000 cc/min., to avoid solvent or paint from flooding into the internal portion of the air bearing motor assembly or front shroud.

➤ **High voltage must be interlocked with the solvent valve to prevent solvent spraying while high voltage is on.**

TURBINE SPEED

Turbine speed is determined by the input air pressure/flow at the rear of the atomizer.

Turbine speed is intended to be closed loop controlled using the fiber optic speed transmitter, located on the turbine manifold. A speed input to a remote speed controller, such as the Serial Atomizer Module, is required. (See “Speed and Pressure” charts in the “Introduction” section.)

NOTE

➤ The bell rotational speed determines the quality of atomization and can be varied for various paint flow rates and paint formulations. For optimum transfer efficiency and spray pattern control, the bell rotational speed should be set at the minimum required to achieve proper atomization. **Excessive speed reduces transfer efficiency!**

⚠ WARNING

➤ **DO NOT** exceed the maximum rated operating speed and turbine inlet pressure. Excessive speed may cause air turbine damage or damage to the bell.

BEARING AIR ADJUSTMENT

The nominal bearing air pressure is 90 psi (620.5 kPa), measured at the rear of the atomizer. Minimum pressure is 80 psi (551.6 kPa) and maximum pressure is 100 psi (689.5 kPa). The turbine should never be operated with less than 80 psi (551.6 kPa) bearing air pressure.

Bearing air must be present when turning the turbine on. Bearing air must remain on when the turbine air is turned off until the turbine stops spinning. Never turn off bearing air to cause the turbine to stop spinning. If connected, brake air can be used to slow the turbine.

The RMA-590 is equipped with a bearing air return line to monitor bearing air pressure at the turbine manifold. When connected to the remote Serial Atomizer speed controller, operation of the turbine will automatically be shut down whenever the bearing air pressure falls below the dip switch setting of 80 psi (551.6 kPa).

⚠ WARNING

➤ Bearing air **MUST** be **ON** and supplied at a minimum of 80 psig (551.6 kPa) whenever the turbine is operated. If not, severe bearing damage will occur. It is recommended that bearing air be left turned on at all times, except during maintenance or disassembly.

➤ Bearing damage (and subsequent turbine failure) caused by running the turbine without bearing air **WILL NOT** be covered under the Ransburg warranty.

Direct Charge Spraying

When spraying solvent borne material you must provide voltage to the indirect charge ring and probes. The voltage at the probes should be at a lower potential than that applied to the bell cup directly. For example 70kv is applied to the bell cup directly. 65kv should be applied to the high voltage probes. Having a higher potential on the probes may cause high voltage arching during spray operation. This may cause fire or damage. Use plastic or metal shape air component when spraying in direct charge mode.

Indirect Charge Spraying

When spraying in this mode, the bell cup is at earth ground potential. High voltage is applied to the high voltage ring and probes (70kV maximum). An electrostatic field develops between the high voltage probes, the bell cup and the spray target. An electrostatic charge is applied to the paint as it passes through this field. Use only plastic shape air component when spraying in indirect charge mode.

NOTE

➤ A minimum of 70 slpm (2.6SCFM) should always be kept flowing in the inner shaping air passage to keep the face of the applicator clean during manual cleaning breaks.

⚠ WARNING

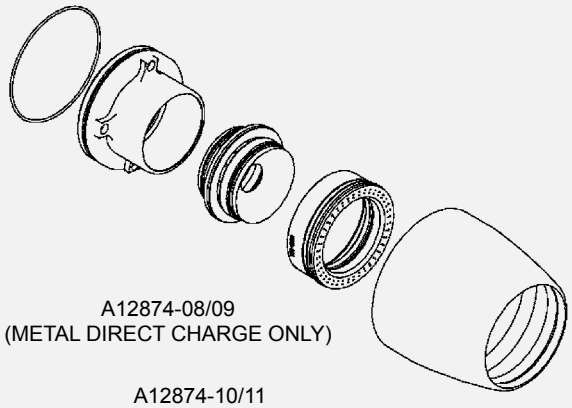
➤ Never spray solvent when high voltage is on.

⚠ WARNING

➤ **DO NOT** use metal shape air components when using the indirect charge ring.

NOTE

➤ If using optional ground resistor assembly for the indirect charge applicator, current draw will be lower than standard since the bell cup voltage is higher than earth ground.



A12874-08/09
(METAL DIRECT CHARGE ONLY)

A12874-10/11
(PLASTIC INDIRECT DIRECT CHARGE)

DUAL FLEX PATTERN SAMPLE				
Turbine Speed (krpm)	Inner Shape Air (slpm)	Outer Shape Air (slpm)	Fluid Flow (cc/min)	Pattern Size (mm/inches)
60	550	0	100	75/3
50	550	0	100	114/4.5
60	500	150	100	89/3.5
50	500	150	100	121/4.75
60	75	500	200	203/8
50	75	500	200	248/9.75
40	0	500	200	254/10

SHAPING AIR KIT #1

A12874-10/11 Dual Flex Shaping Air Kits for Use with 65mm Bell Cup A12874-08/09 Direct Charge Only

As the name implies, both shaping air outlets supply air that is counter to the rotation of the bell cup. This combination will provide a pattern size from 3-inch to 10-inch (76mm - 254mm) depending on bell rotation speed, fluid flow, and air flow. Both sets of shaping air holes are independently controlled. The inner set of holes are supplied by connecting the tube labeled “SAI” to a regulated air source. The outer set of shaping air holes are supplied by connecting the tube labeled “SAO” to a regulated source. The air supplies work in combination with each other to provide desired results. This combination of shaping air can be used with any 65mm bell cup.

Sample Dual Flex Shape Air Configurations:

Pattern sizes based on solvent borne metallic paint with a viscosity of 30-32 centipoise, target distance: 175mm (7 inches), no electrostatics applied (Results will vary depending on fluid flow rate, material viscosity, target distance and with electrostatics applied) Typical pattern size achievable with this shaping air configuration is 75mm-300mm (3-12 inches).

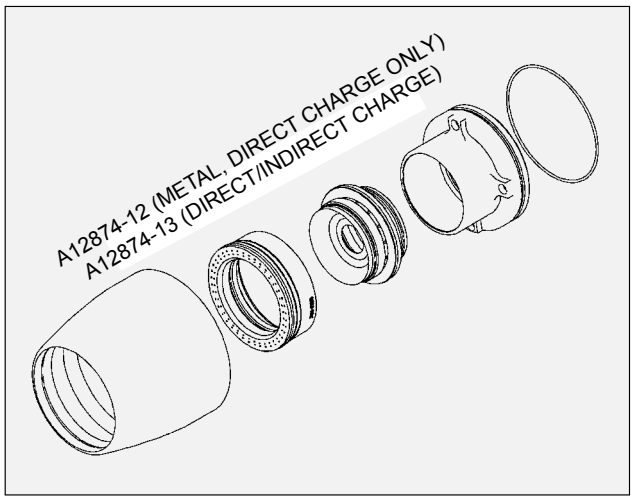
As per the chart above, as the outer shape air is increased, the pattern increases. It should also be noted that when the turbine speed is increased, the pattern size will decrease. By varying combinations, patterns between 75mm and 254mm can be achieved.

NOTE

➤ Use only plastic shape air components for indirect charge spraying.

NOTE

➤ A minimum of 70 slpm (2.6 SCFM) should always be kept flowing in the inner shaping air passage to keep the face of the applicator clean during manual cleaning breaks.



NOTE

➤ Use only plastic shape air components for indirect charge spraying.

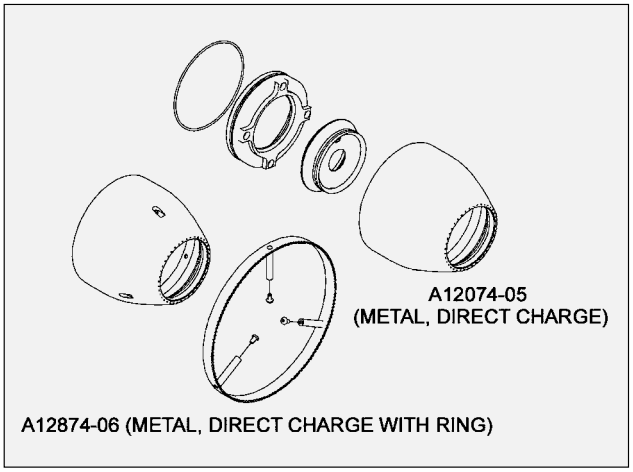
NOTE

➤ A minimum of 70 slpm (2.6 SCFM) should always be kept flowing in the inner shaping air passage to keep the face of the applicator clean during manual cleaning breaks.

SHAPING AIR KIT #2

A12874-12 Dual Flex Shaping Air Kits 55mm Bell Cups. Direct Charge Only. A12874-13 Direct/Indirect Charge

As the name implies, both shaping air outlets supply air that is counter to the rotation of the bell cup. Both sets of shaping air holes are independently controlled. The inner set of holes are supplied by connecting the “blue” tube labeled “SAI” on the tubing bundle to a regulated air source. The outer set of shaping air holes are supplied by connecting the “gray” tube labeled “SAO” on the tubing bundle to a regulated source. The air supplies work in combination with each other to provide desired results. This combination of shaping air can be used with any 55mm bell cup.



SHAPING AIR KIT #3

A12874-05/06 Shaping Air Kits (Mono Flex Air - Direct Charge - A12874-07 Indirect/Direct Charge for Use with All 65mm Bell Cups Only)

As the name implies, shaping air outlet supply air that is counter to the rotation of the bell cup. This combination will provide a pattern size from 10-inch to 24-inch (250mm - 610mm) depending on air flow, fluid flow, and cup rotation speed. Connection is made using the "blue" 8mm tube labeled "SAI" on the tubing bundle. The other 8mm tube labeled "SAO" is "gray" in color and must be plugged. However, if additional air is required, this tube can be connected to a secondary controlled air source. Precautions must be taken that one does not have a significantly higher pressure than the other to avoid any back flow. This shaping air combination can be used with any 65mm bell cup. (See "Pressure and Flow Data Charts" in the "Introduction" section.)

Sample Mono Flex Shape Air Configurations:

Patterns sizes based on waterborne basecoat paint, target distance: 230mm (9 inches), 70kV electrostatics applied (Results will vary depending on fluid rate, material viscosity, target distance and with electrostatics applied) Typical pattern size achievable with this shaping air configuration is 230mm-860mm (9 - 34 inches).

MONO FLEX PATTERN SAMPLE

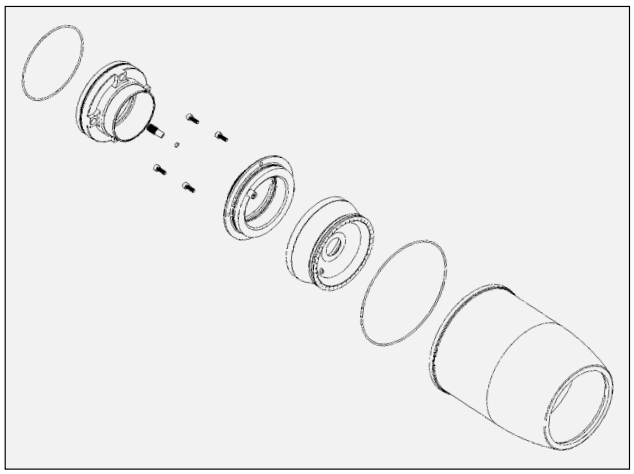
Turbine Speed (krpm)	Inner Shape Air (slpm)	Fluid Flow (cc/min)	Pattern Size (mm/inches)
50	120	100	457/18
60	120	200	660/26
70	120	300	737/29
70	120	400	864/34
60	350	200	279/11
70	350	300	381/15
70	350	400	482/19
60	525	300	228/9
70	525	400	10.5

NOTE

➤ Use only plastic shape air components for indirect charge spraying.

NOTE

➤ A minimum of 70 slpm (2.6SCFM) should always be kept flowing in the inner shaping air passage to keep the face of the applicator clean during manual cleaning breaks.



SHAPING AIR KIT #4

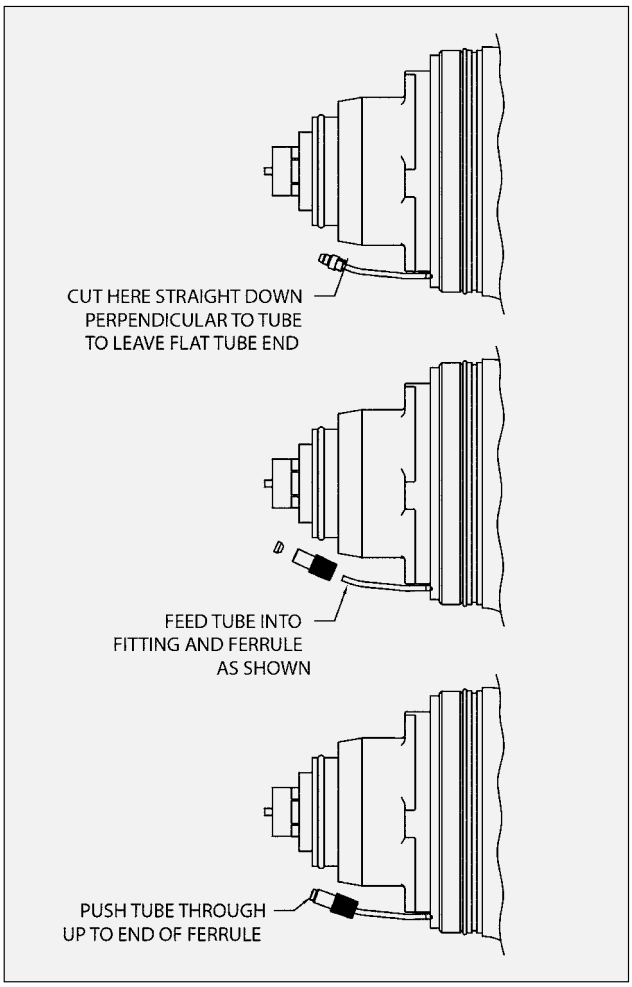
A13858-07 Dual Flex Shaping Air Kits
81mm Bell Cups

As the name implies, both shaping air outlets supply air that is counter to the rotation of the bell cup. Both sets of shaping air holes are independently controlled. The inner set of holes are supplied by connecting the "blue" tube labeled "SAI" on the tubing bundle to a regulated air source. The outer set of shaping air holes are supplied by connecting the "gray" tube labeled "SAO" on the tubing bundle to a regulated source. The air supplies work in combination with each other to provide desired results. This combination of shaping air can be used with any 81mm bell cup.

NOTE

➤ A minimum of 70 slpm (2.6 SCFM) should always be kept flowing in the inner shaping air passage to keep the face of the applicator clean during manual cleaning breaks.

➤ When using 81mm Shaping Air kits, external cup wash fitting and ferrule must be switched to new click style and corresponding ferrule, part numbers A12821 and A12822 respectively. To remove old fitting, cut tubing right before fitting with a sharp blade. Cut must be perpendicular to tubing. Slide new fitting on tubing, knurled end first, then follow with ferrule, tapered end first (see images below). This style fitting is intended to be tightened by hand until a click is heard. This fitting is self-torqueing, the click indicates that it has been adequately tightened.



⚠ WARNING

➤ Maximum speed for 81mm bell cup is 40,000 RPM.

BRAKE AIR

Brake air is used to slow the turbine speed in a minimum length of time. It is advantageous for short cycle times during color change, or may be used to reduce speed or stop the turbine. Never operate brake air with the turbine air on.

ELECTROSTATIC VOLTAGE

The RMA-590 Rotary Atomizer receives a low voltage control input from the MicroPak to control the operating electrostatic voltage. (refer to the current "MicroPak" manual for detailed for operating instructions.)

NOTE

➤ If paint defects occur, such as fatty edges or picture framing, reducing the voltage should be a last resort. To correct the problem, lead and lag trigger adjustments should be optimized first.

➤ The electrostatic voltage applied to the RMA-590 will affect pattern size, transfer efficiency, wrap and penetration into cavity areas.

CUP WASH

It is recommended for water based material that heated solvent be recirculated at the rear input of the atomizer (140° F, 60° C). Typical wash solvent is di-water and amine (8-10% solution).

TARGET DISTANCE

The distance between the RMA-590 atomizer and the target will affect the finish quality and efficiency. Closer distances give a smaller pattern, wetter finish, and greater efficiency. Greater distance will provide a large pattern size and drier finish. The MicroPak control circuit will enable the applicator bell to be operated to within a few inches of the target without adjusting the voltage setting. The recommended target distance is 6 to 12-inches (152.4-304.8mm). In general, allow 1-inch (25.4mm) target distance for every 10kV.

GENERAL OPERATING SEQUENCE

⚠ WARNING

➤ It is recommended to leave bearing air on, unless the applicator is being serviced or removed for service.

Normally, for painting application, the process sequence should always be:

- Bearing air on (Always On)
- Turbine air on
- Turbine speed to application speed
- Shaping air on
- Start fluid flow off part
- Voltage on

After spraying the object, the sequence should be:

- Voltage lowered to 30-50 kV
- Fluid off
- Shaping air to setback volume
- Turbine speed to set back speed (30,000 rpm recommended)

Recommended sample cup flush sequence is as follows (voltage must be off) (internal and external cup wash):

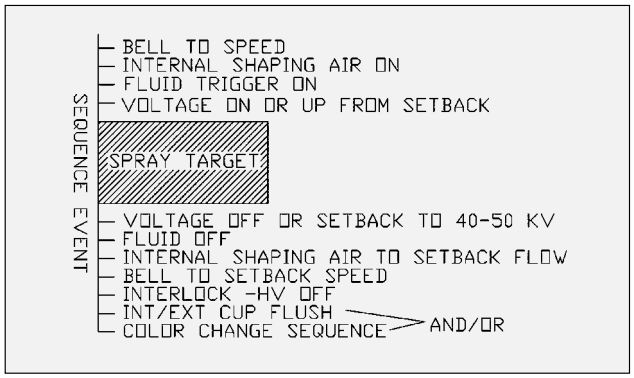
1. Turbine speed set to 25,000-30,000 rpm.
2. Set shaping to 350-450 slpm (12.4-15.9 SCFM).
3. Point atomizer at a grounded object such as a booth grate.
4. Maintain solvent pressure of 100-150 psi (689-1,034 kPa). Maintain air push pressure at 80-100 psi (552-689 kPa).
5. Use an alternating trigger sequence of solvent/air to create a chopping effect. Always ensure that the last step in the sequence is an air push.

   A typical sequence is .2 seconds solvent, 1.0 second air push, 1.7 seconds solvent and 2.0 seconds final air push. This sequence may be modified for other paints and applications.
6. It is recommended that an in-line fluid filter be installed to ensure that no foreign debris enters the fluid tip or the external wash nozzle.

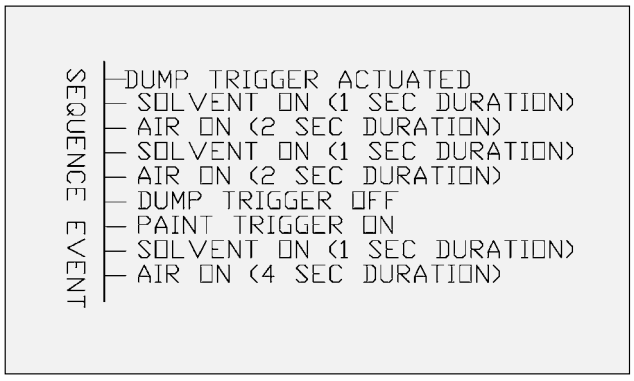
The RMA-590 is versatile in processing the finish of a component. It can be setup as shown in "Typical Paint Sequence" figure.

Recommended sample cup purge sequence is as follows (voltage must be off) (internal cup cleaning):

1. Turbine speed set to 25,000-30,000 rpm.
2. Increase shaping air to 350-450 slpm (12.4-15.9 SCFM).
3. Paint atomizer at booth grate or insert into bell cleaning station.
4. Maintain solvent pressure of 100-150 (689-1,034 kPa). Maintain air push pressure at 80-100 psi (552-689 kPa).
5. Use an alternating trigger sequence of solvent/air to create a chopping effect. Always ensure that the last step in the sequence is an air push.
6. A typical sequence is .3 seconds solvent, 1.7 seconds air push, repeat 3 times. This sequence may be modified for other paint and applications.



Typical Paint Sequence



Typical Color Change Sequence

Sequence Event Explanation:

1. **Bell to Speed** - This is accomplished by a set point command from either the PLC, robot, or other input device, through the I/O module.
2. **Shaping Air** - Set to 350-450 (12.4-15.9 SCFM) while performing a cup flush.
3. **Voltage On** - The voltage is turned on from a signal to the MicroPak. The lag time to full voltage may be reduced if a setback voltage is used. Recommended setback voltage is between 30 kV and 50 kV.
4. **Trigger Fluid** - An air signal is sent through the PT line of the tubing bundle. This should occur when the target is 6-12-inches (152.4-304.8mm) from the applicator centerline. (Not to be confused with target distance.)
5. **Voltage Off/Setback Voltage** - Immediately precedes the trigger off. Using a setback voltage shortens the cascade voltage ramp up time.
6. **Fluid Trigger Off** - This should occur when the target is typically 0-6-inches (0-152.4mm) past the applicator centerline.
7. **Shaping Air to Setback** - The setback flow of air should never be below 70 slpm (2.6 SCFM) for the shape air.
8. **Color Change Sequence** - Used when color is changed one to the other. Typical sequence is shown in “Typical Color Change Sequence” figure in the “Operation” section. The sequence shown is a starting point for processing, but the final sequence will depend on the material being sprayed and the solvent used to purge the applicator with.

NOTE

➤ **During this sequence, the applicator should be moved to a position to collect the waste material.**

MAINTENANCE

O-RINGS

All O-rings in this atomizer are solvent proof except those on the air bearing spindle. These O-rings must not be soaked in solvent; if these are exposed or soaked in solvent, they must be replaced. These O-rings are engineered to provide a fit between the air bearing spindle and it's mating parts to reduce or eliminate harmonic resonance (vibration).

Some O-rings are encapsulated. These O-rings have a limited amount of stretch and will not return to their original diameters if over stretched. These O-rings are subject to being distorted more easily than rubber O-rings, so it is important that they be sufficiently lubricated when mating parts are installed onto them. They also will take a square set over time and should be replaced periodically if mating parts are removed repeatedly or if a new mating part is installed onto them.

Any O-ring that is cracked, nicked, or distorted must be replaced.

A suitable lubricant is food grade petroleum jelly or A11545-00 Petrolatum Jell.

⚠ WARNING

➤ Electrical shock and fire hazards can exist during maintenance. MicroPak supply must be turned off before entering the spray area and performing any maintenance procedures on the atomizer. Spray booth fans should remain on while cleaning with solvents.

➤ Never touch the atomizer bell while it is spinning. The front edge of the bell can easily cut into human skin or cut through gloves and other materials. Be sure the atomizer bell has stopped spinning before attempting to touch it. Approximate time for the bell to stop spinning after turning off turbine drive air is three minutes.

➤ Ensure high voltage is off during any manual cleaning procedure.

⚠ WARNING

➤ Ensure that all energy sources are dissipated, (electrical, air, paint, solvent, etc.) before removing the applicator or performing any maintenance.

In addition to the previous Warning, which relates to potential safety hazards, the following information must be observed to prevent damage to the equipment.

⚠ CAUTION

➤ **DO NOT** immerse the RMA Hybrid turbine in solvent or other liquids. Turbine components will be damaged and warranty will be voided.

➤ Bearing air must be on during all cleaning procedures to protect the air bearing components.

CLEANING PROCEDURES

Internal Fluid Path Purge Cleaning

Cleaning the incoming paint line (from paint supply source such as color manifold through the fluid manifold and bell assembly): Turn off the high voltage and turn on the color stack trigger valve for solvent supply. With the bell spinning, open the dump valve and flush the incoming paint line with solvent or an air/solvent chop. Make sure the last step of the sequence is air to purge the dump line of remaining solvent. To speed the loading of the new paint, leave the dump line open to allow the air in front of the paint push to escape. The length of time the dump valve is open depends on several factors such as viscosity, paint pressure, etc. Timing should be such that the dump is closed as the paint reaches the trigger valve in the atomizer. Paint in the dump line may cause high voltage issues.

The fluid coil and fluid tube can be cleaned independently by actuating the solvent valve in the atomizer. **High voltage must be turned off during this operation and the bell cup must be spinning (typically 30,000 rpm for cup flushing sequences).**

Bell Cup Cleaning (Cup Wash) Without Cleaning the Incoming Paint Line

Turn off the high voltage and trigger valve. With the bell spinning at 30,000 rpm, turn on the external solvent valve to allow cleaning solvent to flow through the manifold passages, through the fluid tube, and onto the bell. The spinning bell will atomize the solvent, clean out the bell passages both internally and externally. It is always required to blow the solvent line dry after the cleaning operation. Typical bell speed during the cup flush sequence is 30,000 rpm. Follow sequence as outlined for cup wash in "General Operating Sequence" in the "Operation" section.

⚠ CAUTION

➤ The maximum flow rate of 1000 cc/min. must not be exceeded during a flush routine. Use of an in-line fluid restrictor is recommended.

External Atomizer Surface Cleaning

- Verify that the high voltage is turned off.
- All external surfaces may be cleaned using a mild solvent and lint free rags to hand wipe the RMA-590. Turbine drive air must be off, but leave bearing air on. The inner and outer shaping air (if applicable) should have approximately 70 slpm air flow through each to prevent the solvent from entering these passages.
- Do not spray the RMA-590 unit with a solvent applicator used for cleaning. The cleaning fluid under pressure may aid conductive materials to work into hard to clean areas or may allow fluids to be forced into the turbine assembly.
- Do not reuse an atomizer bell cup that shows any sign of damage such as nicks, heavy scratches, dents, or excessive wear.
- For best operating conditions, the atomizer surfaces must be dry.
- Always final wipe all parts with a non-polar solvent and wipe dry (high flash Naphtha, etc.).

⚠ WARNING

➤ **NEVER** wrap the applicator in plastic to keep it clean. A surface charge may build up on the plastic surface and discharge to the nearest grounded object. Efficiency of the applicator will also be reduced and damage or failure of the applicator components may occur. **WRAPPING THE APPLICATOR IN PLASTIC WILL VOID WARRANTY**.

⚠ WARNING

➤ To reduce the risk of fire or explosion, OSHA and NFPA-33 require that solvents used for exterior cleaning, including bell cleaning and soaking, be nonflammable (flash points higher than 100°F/ 37.8°C). Since electrostatic equipment is involved, these solvents should also be non-polar. Examples of non-flammable, non-polar solvents for cleaning are: Amyl acetate, methyl amyl acetate, high flash naphtha, and mineral spirits.

➤ Do not use conductive solvents such as MEK to clean the external surfaces of the RMA-590 without a second cleaning with a non-polar solvent.

➤ When using a rag to hand wipe the RMA-590, the turbine air should be off, but leave both the shaping air and bearing air turned on. Ensure that rotation has come to a complete stop.

VIBRATION NOISE

If the RMA-590 is vibrating or making an unusually loud noise, it usually means there is an imbalance situation. The atomizer bell cup may have dried paint on it or the bell may be physically damaged, or there may be paint trapped between the bell cup and shaft preventing the bell cup from properly seating. If any of these conditions exist, they **MUST** be corrected. Excessive imbalance caused by one of these conditions may result in bearing damage and turbine failure. Warranty **DOES NOT** cover failure caused by imbalanced loading conditions.

To determine if the bell is dirty or damaged, remove the bell cup and turn the turbine ON. If the noise is eliminated, the bell cup is the problem. If the noise continues, the turbine may be damaged and should be inspected. Excessive air required to achieve same speed may indicate a faulty or contaminated turbine. **DO NOT** continue to operate a noisy turbine.

⚠ WARNING

➤ If a bell cup comes off a rotating shaft because of motor seizing or any other reason, the Atomizer and bell cup must be returned to Ransburg for inspection and evaluation to determine if the bell can be used in operation.

TURBINE MAINTENANCE

DO NOT attempt to rebuild the turbine. Any endeavor to disassemble a turbine during the warranty period will void the warranty. Contact your authorized distributor or Ransburg for instructions.

GENERAL/PREVENTIVE MAINTENANCE

Verify daily that the operating parameters have not varied significantly from the normal. A drastic change in high voltage, operating current, turbine air, or shaping air, can be an early indicator of potential component failure.

A laminated poster entitled “Rotary Atomizer Checklist” (AER0075-02) is included with the assembly in the Literature Kit to be posted near the station as a handy reference.

Due to the close proximity of high voltage to ground potential, a schedule must be developed for equipment maintenance (cleanliness).

PREVENTIVE MAINTENANCE

Daily Maintenance (During Each Preventive Maintenance Break)

1. Verify that high voltage is OFF and that shaping air, bearing air, and turbine drive air are ON.
2. Open the dump valve, flushing all paint from the supply lines and valve module.
3. Open the solvent valve, flushing all paint from the fluid tube and through the atomizer bell assembly.
4. Re-verify that high voltage is OFF, turbine drive air is OFF, and that the bell cup has stopped spinning. The bearing air and shaping air should remain ON.
5. Clean all external surfaces of the applicator using a lint-free rag dampened with solvent.
6. After cleaning, all conductive residue must be removed using a non-conductive solvent. Since electrostatic equipment is involved, these solvents should also be non-polar (Naphtha).
7. Inspect bell cup for nicks, dents, heavy scratches, or excessive wear. Replace if necessary.
8. Check bell cup tightness. Tighten to 50-70 lbs•in (5.65-7.91 Nm) torque.
9. Check the amount of paint build-up on the outer protective cloth covers, if used. If excessive, replace covers as required. If cloths are wet, find source and replace with dry cloth covers.

⚠ WARNING

➤ The high voltage must be turned OFF before entering the spray area and performing any maintenance procedures. Spray booth exhaust fan(s) should remain ON while cleaning the equipment with solvents.

➤ Make sure high voltage is OFF before approaching applicator with solvent cloth.

➤ DO NOT use reclaim solvent containing d-Limonene. This can cause damage to certain plastic components.

➤ DO NOT stop bell rotation by using a rag or gloved hand against the bell cup edge.

⚠ CAUTION

➤ Maximum flow rate should not exceed 1000 cc/min.

➤ Daily removal and soaking of the bell cup may not be required if the bell cup is properly flushed. However, the frequency of the feed tube and internal motor shaft inspection indicated below under weekly maintenance can be done daily and later adjusted to weekly or as required depending on the results of the inspection.

⚠ WARNING

➤ In the event the bell cup comes in contact with a part, that cup should be replaced before continuing to spray.

➤ Do Not place high voltage test probe on bell edge unless rotation is fully stopped.

➤ Make sure that no solvent or other contamination is allowed to enter the motor assembly (air bearing and outer shaft).

NOTE

➤ Refer to the “Troubleshooting Guide” in the “Maintenance” section for details on determining the causes of low or no high voltage at the bell cup.

Weekly Maintenance (Prior to Start or End of Production Week)

- Monitor rotational speed of all belts at the speed control. Investigate cause if abnormal.
- Monitor high voltage and current output indicated on the MicroPak display. Investigate cause if abnormal.
- Check paint flow on all bells at minimum and maximum specified settings by taking beakered readings.
- Check solvent flow by opening solvent valve and taking a beakered reading (should be within approx. 10% of target flow rate).
- Paint residue found in the shaping air holes is not acceptable and must be removed prior to applicator use (see “Cleaning Shaping Air Holes” in the “Maintenance” section).
- Clean any paint on outer surface of front and rear housing with a soft cloth dampened with solvent. (See “Warning” on avoiding the use of cleaning solvent containing d-Limonene.)
- Remove the front shroud and check for any signs of solvent or paint leakage. Clean as required as required.
- Remove bell cup and soak in solvent for 1-2 hours. Clean with a soft brush as required. Remove from cleaning solution and blow dry before replacing.
- With bearing air off, carefully inspect the feed tube tip and clean any paint build-up that has occurred on the feed tube tip. Using a pen light, determine if there is build-up of paint in the motor shaft and/or around the paint feed tube. If so, remove

the motor assembly following the disassembly procedures and clean out the inside diameter of the motor shaft using a tube brush and solvent. Clean the outer surfaces of the feed tube.

NOTE

➤ It may be necessary to remove the bell cups for cleaning more frequently than weekly. (See Note under "Daily Maintenance" in the "Maintenance" section.)

- Visually inspect for signs of fluid leaks around fluid connections and manifold. Correct problem and clean paint from all components, including internal portion of shroud.
- Reinstall bell cup and front shroud, replace cover on the outer housing. (Refer to "Disassembly Procedures" in the "Maintenance" section for definite instructions.)
- Recheck bell cup tightness. Torque to 50-70 lbs•in (5.65-7.91 Nm).

BELL CUP PREVENTIVE MAINTENANCE

It is the user's responsibility to ensure proper maintenance of the atomizer bell at all times. Bell cup failure due to inadequate cleaning or handling will not be covered under the Warranty. The **"DO NOT"** bullets (see "Operator/Maintenance Warnings" in the "Maintenance" section) listed are some examples of improper handling which could adversely affect performance or personnel safety and should not be attempted for any reason.

Bell Cup Handling

Always verify that high voltage is turned off and the atomizer bell has stopped spinning before performing any type of handling maintenance.

Bell Cup Replacement

Bell cup wear is dependent on many factors such as bell speed, flow rate, and type of coating being applied.

The bell cups shown in the photos below indicate if a bell cup has some usable life or should be replaced. Photo 1 shows a bell cup that has some usable life. The grooves worn around the splash plate pins are shallow. The general appearance of the cup surface is smooth and uninterrupted. Photo 2 shows a bell cup that needs to be replaced, as well as the splash plate that was installed into the cup. The grooves are deep, a visible groove exists at the outer edge diameter of the splash plate and there are noticeable lateral grooves extending towards the outer edge of the cup.

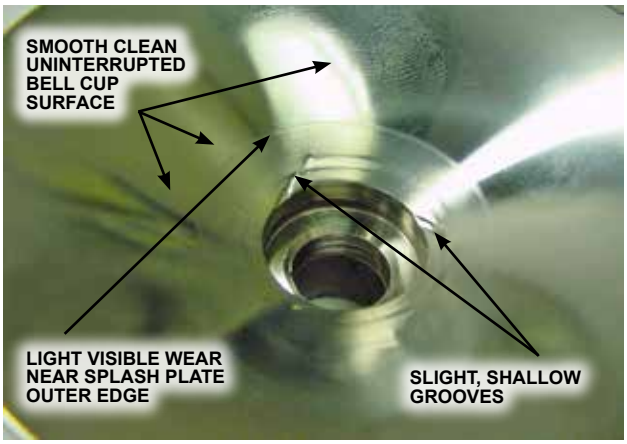


Photo 1

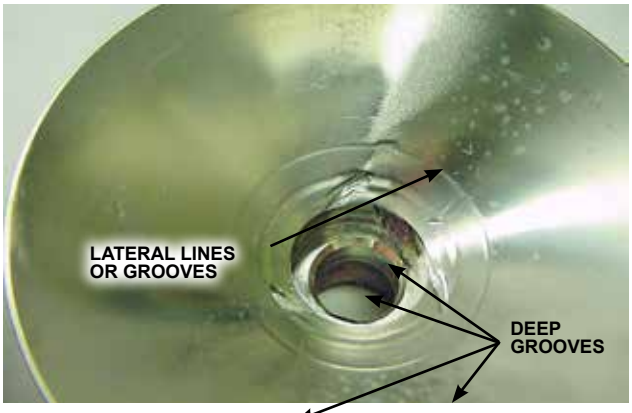


Photo 2

BELL CUP CLEANING

Always verify that high voltage is OFF and that the atomizer bell is spinning before performing any type of color change or bell flush cleaning cycle.

To reduce the risk of fire or explosion, the solvents used for exterior cleaning must have flash points above 100°F (37.8°C). Since electrostatic equipment is involved, these solvents should also be non-polar.

Solvents used for equipment flushing should have flash points equal to or higher than those of the coating material being sprayed.

1. The atomizer bell will normally be fully cleaned during a bell flush cycle. Flushing should be done before any down time or break in production. A bell flush cycle may also be required while spraying batch parts of the same color. Verify that high voltage is in off and that the atomizer bell is spinning before flushing through the bell.

2. If there is any remaining paint build-up on any areas of the bell after flushing, the bell cup should be removed for hand cleaning. The bell's leading edge, splash plate, serration cuts, and rear of cup are some examples of areas for special attention.

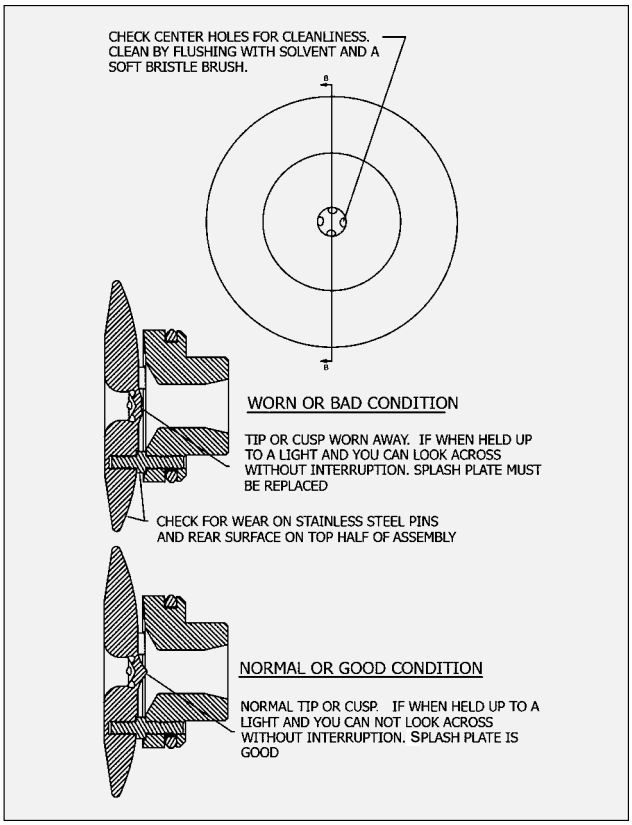
Bell Cup Soaking

3. Bell cups and splash plates can be soaked in a heated solution for up to 2 hours in an ultrasonic cleaner (120°F. 49°C maximum). Bell cups alone may be soaked for an extended amount of time.

Manual Inspection

4. Visually inspect the bell cup edge for signs of abrasion. If the edge is excessively worn or badly chipped as the result of a collision with a part, replace the cup immediately.

5. Remove splash plate. Inspect for wear on the bell cup where the fluid leaves the large diameter of the splash plate. If any undercut in this area, the cup should be replaced.



Inspection of Bell Cups

6. Also, check the three (3) pins between the front and rear splash plate halves. If worn, replace entire assembly.

7. Check the center holes of the splash plate for wear. Hold splash plate up to a light source and look straight into the holes. If light is clearly seen, the angled holes are worn and the splash plate must be replaced.

8. Splash plate assemblies may be soaked for a short time, under 2 hours, to loosen dried material. Clean with a soft bristle brush. Blow out center holes to dislodge material. Never use any kind of pick instrument to clean these holes.

9. Soaking the bell in solvent may aid in loosening or removing paint build-up. It is recommended that the splash plate be removed and cleaned separately.

10. Use a soft bristle brush dipped in solvent to remove paint build-up from the serration cuts, paint feed holes or slots, and external and internal surfaces of the bell.

11. A soft, lint free rag dampened with solvent may be used to remove any paint residue from the external and internal surfaces of the bell.

12. After removing all paint build-up or residue, rinse the bell in clean solvent and blow dry.

13. Before reinstalling the bell on the shaft, check the mating surfaces of the thread and taper for any paint build-up or residue. Also, check the fluid tip, fluid tube outside diameter, and the shaft for any further paint build-up. These surfaces should be cleaned before installing the bell.

14. It is recommended that extra bell cups be purchased. The cups can then be cleaned off line in an automated cup cleaner.

15. Reinstall cups to proper torque 50-70 lbs•in (5.65-7.91 Nm).

CLEANING SHAPING AIR HOLES

In order to maintain uniform pattern control, the shaping air holes of the inner ring and the shaping air cap must be clean and free of any blockage.

It is best to leave the shaping air supply ON during normal production break cleaning periods. Shaping air can be reduced to 70 slpm during this time. This will help stop material from entering the passage ways.

Periodically (weekly) the outer shaping air cap and the inner shaping air ring should be removed and thoroughly cleaned. Use of an ultrasonic cleaner would make cleaning of hole diameters easier. Inspect all holes for blockage. Blow holes clear with compressed air after some time of soaking in solvent. **DO NOT use any type of pick to clear the holes.** Damage may result to parts and could affect performance of the equipment. If holes are damaged (over-sized holes, blockage, and gauges) it must be replaced.

"Schedule is based on a 10 hour / 6 day week. Repair or replacement of components may need to be more frequent if operating equipment for a 2-3 shift operation 6-7 days per week".

RMA-590 PREVENTIVE MAINTENANCE SCHEDULE

	Frequency (Maximum)							
Procedure	**Mid-Shift**	**End of Shift**	**Weekly**	**2 Weeks**	**Monthly**	**3 Months**	**6 Months**	**Yearly**
Mid Shift Cleaning • Wipe electrodes • Wipe shroud • Visually inspect cup	●							
End of Shift Cleaning • Wipe electrodes • Wipe shroud • Wipe bell cup down • Change cloth cover		●						
Shaping Air Shroud • Clean inner shape air ring • Clean outer shape air ring • Remove and clean	●	●	●					
Bell cup removal/inspection/ cleaning		●	●					
Fluid tip inspection/cleaning		●	●					
Inspect Valve and Seat Assembly in valve module for leaking				●				
Replace Valves and Seats in valve module							●	
High Voltage Cable Inspections				●	●			
High Voltage Testing						●		
Regreasing of High Voltage Cables						●		
Check resistance of High Voltage Electrodes						●		
Regreasing Electrode Cavities of High Voltage Ring and High Voltage Input						●		
Inspect all screws • Replace if broken • Inspect for wear • Tighten per specifications						●		
Inspection of Electrode			●					
Replace Electrodes							●	
Inspection of Tubing Bundle					●			
Regrease Tubing Bundle							●	
Replace Tubing Bundle								●
Replace High Voltage Cable								●
Inspect Turbine Spindle taper and threads		●	●					

RMA-590 PREVENTIVE MAINTENANCE SCHEDULE (Cont.)

	Frequency (Maximum)							
Procedure	**Mid-Shift**	**End of Shift**	**Weekly**	**2 Weeks**	**Monthly**	**3 Months**	**6 Months**	**Yearly**
Replace Bell Cups						●	●	●
Replace Splash Plates						●	●	
Inspect and Clean Spindle Bore and Fluid Tube OD		●	●					
Check High Voltage Contact area for damage/arcing		●						
Inspect for Fluid Leaks	**DAILY**							
Check Exterior of High Voltage Ports for degradation	●							
Check External Cup Flush Carbide Tip for blockage	●	●						

TROUBLESHOOTING GUIDE (Indirect Charge)

General Problem	Possible Cause	Solution
Bad Spray Pattern	Bell cup damaged	Replace bell cup.
	Low voltage	See “Low or No High Voltage” below.
	Paint lodged in shaping air ring	Disassemble and clean (See “Maintenance” section).
Low or No High Voltage	High current draw	Check resistance of electrodes.
	MicroPak controller cascade	Inspect low voltage at the MicroPak and the cascade. a. Faulty low voltage cable.
	Improperly mounted air turbine	Verify ground connection of air turbine to earth ground at less than 1 megohm.
	Faulty low voltage connections (usually indicated by MicroPak feedback fault light)	a. Make sure quick disconnection electrical connection is aligned and clean. b. Check low voltage connection at cascade.
	Faulty high voltage connection	Verify that high voltage cable is fully seated in the cascade and the high voltage ring.
	MicroPak or cascade failure	Refer to current MicroPak manual for detailed Troubleshooting Guide.
	MicroPak settings not correct	Refer to current “MicroPak” manual for detailed “Troubleshooting Guide.”
	Damaged high voltage cable	Remove and inspect/measure resistance.
	Dielectric breakdown of high voltage parts Improper color change (i.e., paint or solvent in dump line)	Check cascade, high voltage ring, and high voltage cable. Replace defective parts. Optimize color change.
Low Transfer Efficiency (or light coverage)	Low or no high voltage	Verify high voltage at electrodes. Normally, a high voltage setting of 30-70 kV is appropriate for most applications.
	Poor grounding of parts being coated	Verify that parts being coated are properly grounded (the electrical resistance between the part and ground must not exceed 1 megohm).

(Continued On Next Page)

TROUBLESHOOTING GUIDE (Indirect Charge)

General Problem	Possible Cause	Solution
Low Transfer Efficiency (or light coverage) (Cont.)	Excessive turbine speed	For optimum transfer efficiency and spray pattern control, the bell rotational speed should be set at the minimum required to achieve proper atomization of the coating material.
	Excessive robot speed	For optimum transfer efficiency, spray pattern control, bell speed, and robot speed should be set at the minimum to achieve desired results of part to be coated.
	Excessive inner/outer shaping air	Shaping air should be set at the minimum volume required to gently direct the spray pattern toward the part being coated. Excessive shaping air will cause some atomized particles to “blow-by” the part or bounce back onto the atomizer.
	Excessive target distance	The recommended target distance is between 6 and 12-inches (152.4-304.8mm)
		(see “Target Distance” in the “Operation” section of this manual).
No Turbine Air	Turbine drive air not present	Verify supply air pressure.
	Bearing air return signal not present	a. Verify bearing air return signal. b. Increase bearing air supply pressure to 90 psig (±10 psig) (620.5 +/- 69 kPa).
	Brake air is activated	Remove brake air signal (turbine air and brake air must be interlocked to prevent both from being used simultaneously).
Speed Feedback Fault	Damaged fiber optic cable between robot plate and control panel	a. Repair or replace fiber optic cable. b. Bad splice connection or too many splices. Maximum three (3) splices permitted.
	Connection at robot or bell plate is loose	Re-install cable and tighten locking set screw.
	Fiber optic transmitter failure	Replace fiber optic transmitter.
	Bad transceiver module	Replace transceiver module.
	Excessive vibration	a. Check bell cup for damage b. Check bell cup for excessive paint buildup c. Insure bell cup is tightened properly d. Check cup and shaft tapers for cleanliness

(Continued On Next Page)

TROUBLESHOOTING GUIDE (Indirect Charge)

General Problem	Possible Cause	Solution
No Fluid Flow	Turbine is not rotating	Verify rotation of turbine (the paint valve air pilot must be interlocked with the turbine speed feed back signal to ensure that paint does not flow into the air bearing).
	Fluid valve does not actuate	a. Verify that air pilot signal is present. b. Fluid valve air pilot pressure is too low. Increase air pressure to 70 psig minimum. c. Replace fluid valve.
	Clogged fluid tube/fluid tip	Remove and inspect fluid tube or fluid tip.
	Bad transceiver module	Replace transceiver module.
	Clogged restrictor orifice	Remove appropriate microvalve and seat assembly. Remove orifice and clean.
Continuous Fluid Flow	Fluid valve open	a. Remove air pilot signal. b. If still open, replace fluid valve.
	Fluid valve seat damaged or worn	Replace fluid valve seat.
Uncontrollable Fluid Flow	Insufficient back pressure to fluid regulator	Replace fluid tip with the next smaller inner diameter size.
	Fluid regulator does not control flow (system)	Disassemble fluid regulator and inspect for failed components (system).

TROUBLESHOOTING GUIDE (Direct Charge)

General Problem	Possible Cause	Solution
Bad Spray Pattern	Bell cup damaged	Replace bell cup.
	Low voltage	See “Low or No High Voltage” below.
	Paint lodged in shaping air ring	Disassemble and clean (See “Maintenance” section).
Low or No High Voltage	High current draw	a. Paint resistivity to be .1 MW to h. b. Replace coiled fluid line.
	Solvent valve is actuated	Remove solvent valve air pilot signal (high voltage must be interlocked with the solvent valve air pilot signal to prevent solvent flow while high voltage is energized).
	Loss of low voltage cable connection between robot and bell plates	a. Remove atomizer and inspect low voltage connections on both plates. Verify bell plates alignment marks between connectors and plates and verify that connector face is flush with plate. Verify that set screws are secure, but not too tight, as this will prevent the spring-loaded pins on the robot plate from extending and making contact. b. Faulty low voltage cable.
	Improperly mounted air turbine	Verify correct orientation of air turbine so that high voltage spring makes contact with metal pad on turbine assembly.
	Improper limiting current and voltage settings high voltage parts	To readjust settings, refer to “MicroPak” operating manual.
	Atomizer grounding out (usually indicated by high current draw or by MicroPak over-current fault light)	a. Clean atomizer externally with non-polar solvent. b. Check the atomizer externally with non-polar solvent. c. Check for fluid leaks at quick disconnect mounting (between bell plate and robot plate). d. Check for internal arcing (usually indicated by internal sparking sounds). e. Make sure cascade low voltage connection is properly shielded.

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TROUBLESHOOTING GUIDE (Direct Charge)

General Problem	Possible Cause	Solution
Low or No High Voltage (Cont.)	Faulty low voltage connections (Usually indicated by MicroPak. feedback fault light)	Make sure quick disconnect electrical connection is aligned and clean. a. Check low voltage connection at cascade.
	Faulty high voltage connection	Remove cascade and check continuity between cascade connection and turbine shaft.
	MicroPak or cascade failure	Refer to "MicroPak" service manual for detailed "Troubleshooting Guide".
	Improper color change (i.e., paint or solvent in dump line)	Optimize color change.
Low Transfer Efficiency (or light coverage)	Low or no high voltage	Verify high voltage at bell cup edge. Normally a high voltage setting of 70-100 kV is appropriate for most applications.
	Poor grounding of parts being coated	Verify that parts being coated are properly grounded (the electrical resistance between the part and ground must not exceed 1 megohm).
	Excessive turbine speed	For optimum transfer efficiency and spray pattern control, the bell rotational speed should be set at the minimum required to achieve proper atomization of the coating material.
	Excessive inner/outer shaping air	Shaping air should be set at the minimum air volume required to gently direct the spray pattern toward the part being coated. Excessive shaping air will cause some atomized particles to "blow-by" the part or bounce back onto the atomizer.
	Excessive target distance	The recommended target distance is between 6-12 inches (152.4-304.8 Nm) (see "Target Distance" in the "Operation" section of this manual).
No Turbine Air	Turbine drive air not present	Verify supply air pressure.
	Bearing air return signal not present	a. Verify bearing air return signal. b. Increase bearing air supply pressure to 90 psig (± 10 psig) (620.5 ± 68.9 kPa).
	Brake air is activated	Remove brake air signal (turbine air and brake air must be interlocked to prevent both from being used simultaneously).

(Continued On Next Page)

TROUBLESHOOTING GUIDE (Direct Charge)

General Problem	Possible Cause	Solution
Speed Feedback Fault	Damaged fiber optic cable between robot plate and control panel	a. Repair or replace fiber optic cable. b. Bad splice connection or too many splices. Maximum three (3) splices permitted.
	Connection at robot or bell plate is loose	Re-install cable and tighten locking set screw.
	Fiber optic transmitter failure	Replace fiber optic transmitter.
	Bad transceiver module	Replace transceiver module.
	Excessive vibration	a. Check bell cup for damage b. Check bell cup for excessive paint build up c. Insure bell cup is tightened properly d. Check cup and shaft tapers for cleanliness
No Fluid Flow	Turbine is not rotating	Verify rotation of turbine (the paint valve air pilot must be interlocked with the turbine speed feed back signal to ensure that paint does not flow into the air bearing).
	Fluid valve does not actuate	a. Verify that air pilot signal is present. b. Fluid valve air pilot pressure is too low. Increase air pressure to 70 psig minimum. c. Replace fluid valve.
	Clogged fluid tube/fluid tip	Remove and inspect fluid tube or fluid tip.
	Bad transceiver module	Replace transceiver module.
	Clogged restrictor orifice	Remove appropriate microvalve and seat assembly. Remove orifice and clean.
Continuous Fluid Flow	Fluid valve open	a. Remove air pilot signal. b. If still open, replace fluid valve.
	Fluid valve seat damaged or worn	Replace fluid valve seat.
Uncontrollable Fluid Flow	Insufficient back pressure to fluid regulator	Replace fluid tip with the next smaller inner diameter size.
	Fluid regulator does not control flow (system)	Disassemble fluid regulator and inspect for failed components (system).

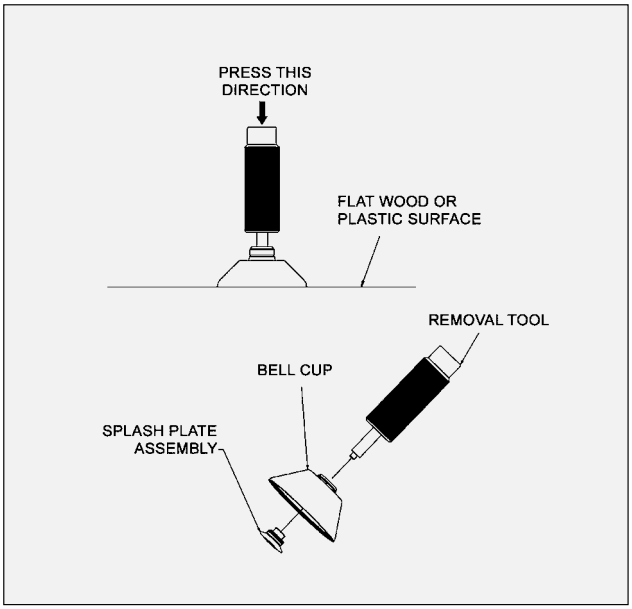
(Continued On Next Page)

TROUBLESHOOTING GUIDE (Direct Charge)

General Problem	Possible Cause	Solution
Fluid and/or Air Leakage Between the Atomizer Body and Mounting Manifold	Atomizer mounting manifold ring is loose	Tighten mounting ring.
	O-ring is missing	Install O-ring.
	O-ring is damaged	Visually inspect for damage and replace.
Fluid Leakage In Robot Adapter	Fluid tubing not properly installed or tightened.	Inspect and retighten.
Fluid Leakage Around Fluid Valve	Damaged o-ring(s) on outer diameter of valve body	Replace o-ring(s).
	Damaged or worn needle seals inside valve assembly	Replace valve assembly.
Turbine Cannot Attain Desired Speed	Excessive vibration	a. Check bell cup for damage b. Check bell cup for excessive paint buildup c. Bell cup loose - tighten to proper torque d. Check cup and shaft tapers for cleanliness e. Have manufacturing check bell cup balance
	Low or no bearing air	a. Check bearing air pressure (minimum 80 psi) (352 kPa) b. Check filters for contamination c. Check for bent or damaged bearing air line d. Poor turbine air pressure - plant air e. Damaged speed control cards
	Loss of fiber optic/no feedback	Damaged fiber optic sensor, bad cable, too many splices. Maximum three (3) slices permitted.
Loss of Exterior/ Interior Cup Wash or Lack of Flow	Bent of kinked supply tube	Replace.
	No fluid flow	Check microvalve, check fluid supply source.
	Blocked fluid tip or external nozzle.	Clean parts, remove obstruction.
	Ferrules holding tubing over -tightened.	Replace tubing and ferrule assembly.

Splash Plate Removal (All Bell Cups)

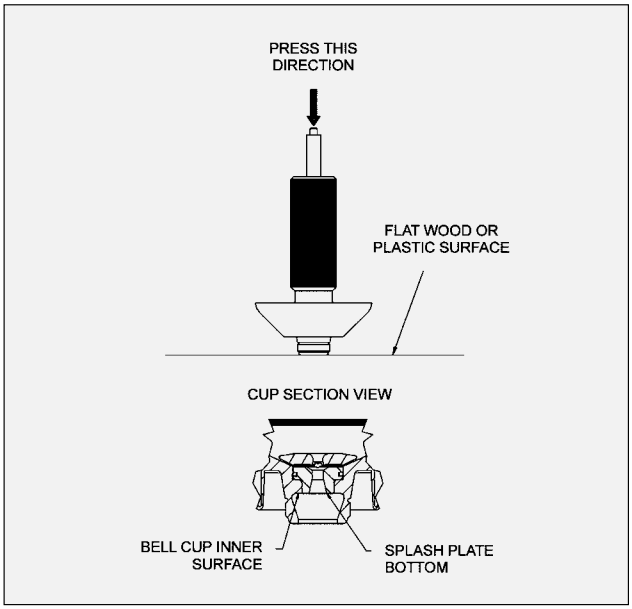
After removing the bell cup from the applicator, put it on a plastic or wood surface to prevent damage to the edge of the cup. Using the splash plate removal tool (A11388-00), insert the small end of the tool into the end of the splash plate assembly. Press the splash plate out. It may be necessary to tap lightly with a hammer.



Splash Plate Removal

Splash Plate Insertion (All Bell Cups)

Turn the splash plate removal tool over and use the large diameter end to press the splash plate back in place by hand. It may be necessary on occasions to use an arbor press to install the splash plate. Press splash plate to a hard stop (see "Splash Plate Insertion" figure).



Splash Plate Insertion

⚠ CAUTION

➤ Failure to replace a damaged bell cup will cause vibration of the applicator and/or premature turbine failure.

Splash plate and bell cup gap for the A12900-XX (65mm) bell cups can be checked with gage tools (optional) A14283-00. The tool is a "GO - NO GO" gage. The "GO" must be able to travel freely in the gap all around the diameter.

⚠ WARNING

➤ When removing splash plate do not drive splash plate into table surface. Press slowly until splash plate is loose.

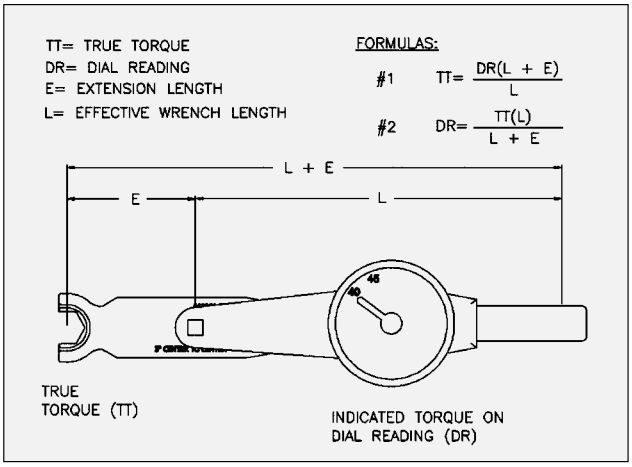
➤ When reinstalling, press firmly with fingers or tool but do not overpress. Damage to gap between splash plate top and bottom will be reduced or damaged.

NOTE

➤ There is a 3-inch center-to-center distance between the bell cup and the 3/8-inch socket square on the wrench. This distance must be factored in when reading the proper torque on the wrench.

Example: A desired true torque is desired using a 9-inch effective length torque wrench. Wrench offset is 3-inches.

L = 9-inches
TT = 50lbs•in
E = 3-inches
DR = is dial reading.
DR = 50 (9)
(9+3)
DR = 37.5 lbs•in



Effective Length Torque Wrench

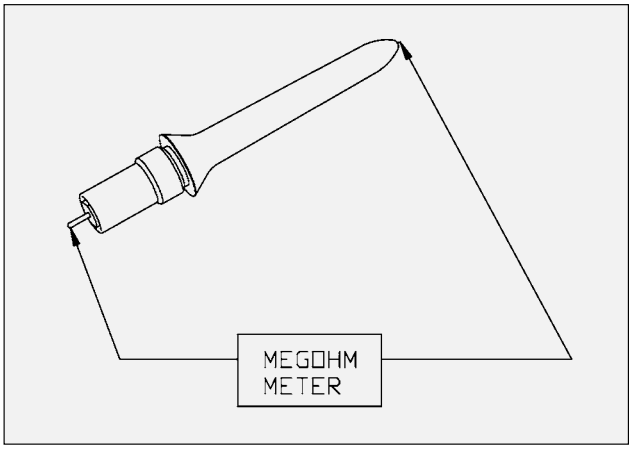
CHECKING PROBES

Check atomizer voltage using the Ransburg Test Meter Kit (76652-01 or 76652-04). Verify that the output voltages have not varied much from the setup standard. A drastic change in voltage can be an early indicator of a component or system problem. The data shown was collected under the ideal lab conditions using a clean atomizer and an unloaded fluid delivery system.

The following data is for use with the RMA-590. The output voltage measured at the bell will normally range between 91% and 97% of the kV set-point displayed at the control unit. Typical setting for spraying is 70 kV.

ELECTRODE RESISTANCE TEST

To verify that all indirect charge electrodes are functioning, place one lead of a Yokogama megohm meter or equivalent to the metal contact at the base of the electrode and the other end to the small metal wire at the tip of the electrode. Refer to the “Electrode Assembly Resistance Reading” chart for the proper resistance reading for the electrode assembly.

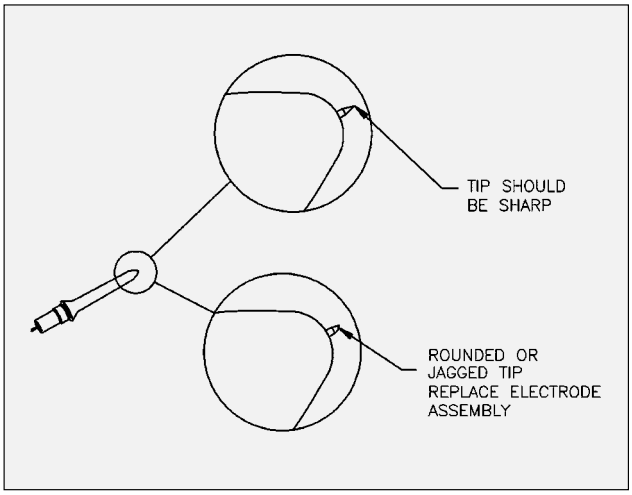


ELECTRODE ASSEMBLY RESISTANCE READING

Part No.	Resistance Reading (Megohms)	Used At (Locations)
A11343-02	209-231	Sea Level
A11343-03	129-151	Above 5,000 ft.

If readings fall out of this range, disassemble electrode assembly and check reading of resistor only. If reading is in the acceptable range, discard the electrode body (A11342-00) and replace with a new one. Rebuild electrode assembly as follows: apply a small amount of dielectric grease to each end of the resistor, slide resistor into the electrode body (A11342-00). Install the contact assembly after the resistor. Finally, apply a small amount of dielectric grease to contact area of plunger contact assembly. Thread plunger contact assembly into electrode body by hand until it stops. Hand-tight is good enough. Over-tightening will damage the electrode body (see “Disassembly/Assembly Electrode Assembly” figure).

If the tip is rounded or worn jagged, it must be replaced. Depending on use, electrode tips will last 3-6 months. The electrostatic field generated by these electrodes are very important to maintain paint transfer efficiency, pattern uniformity, and atomizer cleanliness.



NOTE

➤ The outer protective cover may have to be replaced more frequently than weekly. Daily inspection of the amount of paint build-up on the cover will determine the frequency of replacement.

Optional ground resistor assembly resistance check

To insure proper connection with the ground cable and verify that the ground resistor assembly is good, check resistance from the A12895-XX turbine body (not shaft) to the end of the ground cable assembly. Resistance must be between 152-168 megohms. Use an appropriate meter, such as a Yokogawa megohm meter for this test. (Voltage setting 1000 V DC).

DISASSEMBLY PROCEDURES

NOTE

➤ For reassembly instructions, use the reverse of the following disassembly procedures.

➤ To facilitate atomizer removal from hose manifold, a robot program should be made that purges all paints and solvents from the RMA-590. Ideally it would then position the bell assembly in a bell removal position where the bell cup is pointed downward at a 30° angle. Any residual solvents would be contained in the "J bend" of the robot wrist.

➤ All O-rings described in the "Maintenance" section of this manual should be lubricated with a food grade petroleum jelly or with A11545 lubricant.

⚠ WARNING

➤ Prior to removing applicator from the robot, the following tasks must be completed.

➤ Robot put into E-stop mode, locked and tagged out.

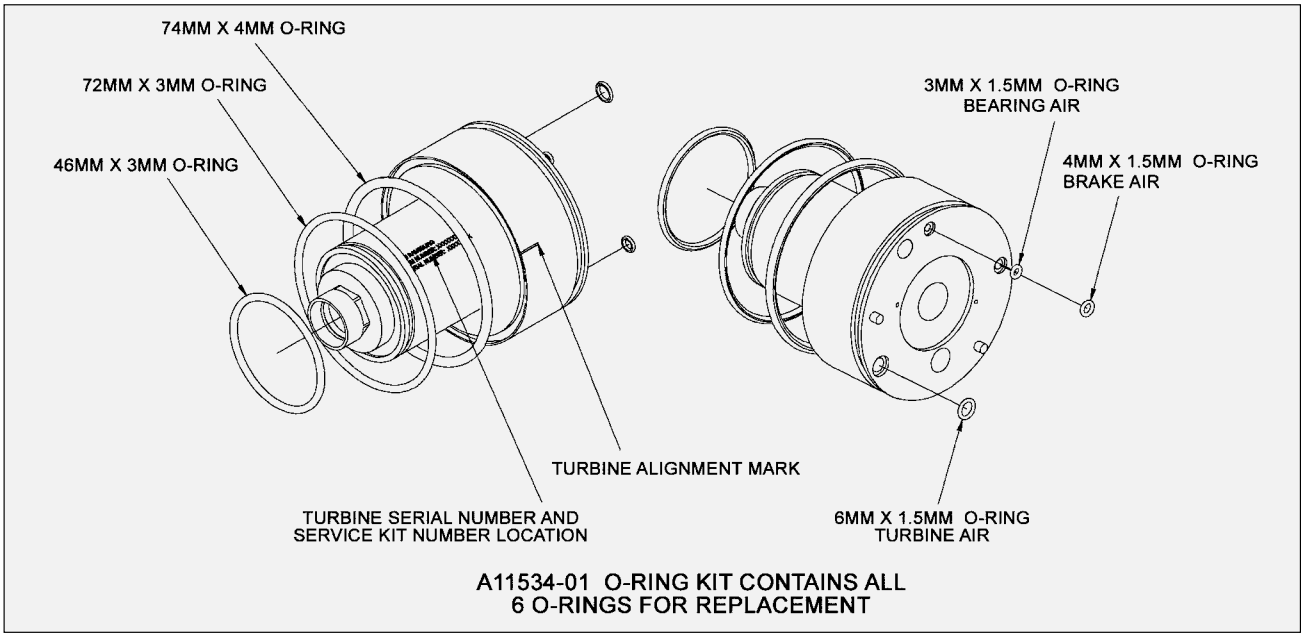
➤ All fluid passages are cleaned, purged out, and depressurized.

➤ Air turned off.

NOTE

➤ Direct Charge and Indirect Charge Atomizer removal instructions are the same with the exception of removing the high voltage ring.

Disassemble the turbine manifold from the mounting manifold by unscrewing the retaining ring counter-clockwise. Use of the spanner wrench to aid in removal may be necessary.



A11534-01 O-RING KIT CONTAINS ALL 6 O-RINGS FOR REPLACEMENT

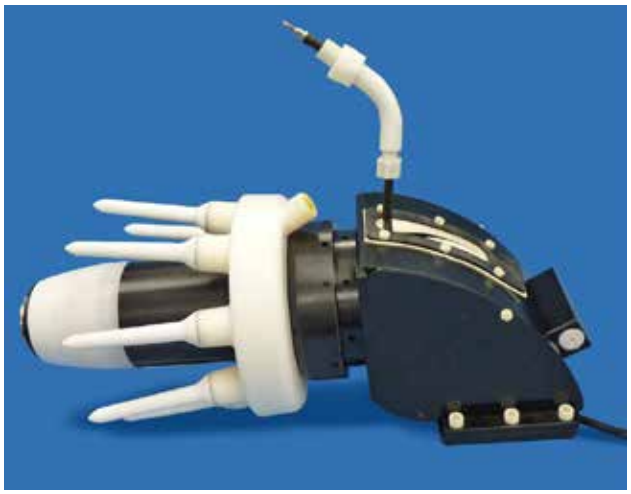
Turbine O-Ring Replacement

- Remove air bearing turbine from the atomizer.
- Remove all exterior O-rings.
- Lightly lubricate all O-rings with A11545 Petrolatum jell before reinstalling.
- O-Ring Kit (A11534-00) contains all required O-rings for replacement.

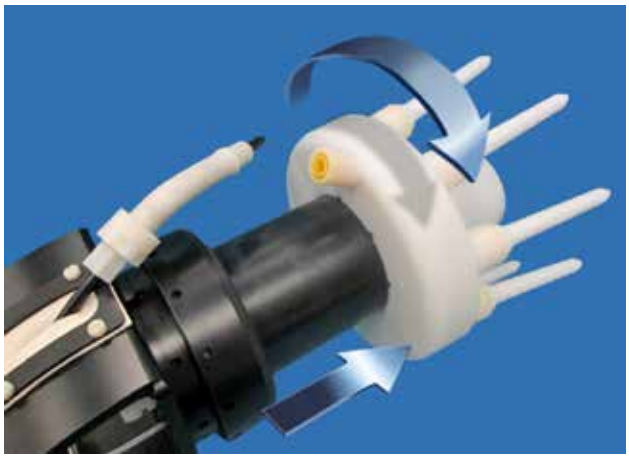
NOTE

➤ Turbine assemblies are field repairable after the initial one year warranty period. Consult a Ransburg representative for proper manuals and training before attempting any repairs. Any attempt to repair the turbine before the one year warranty period has expired will void the warranty.

DISASSEMBLY PROCEDURES

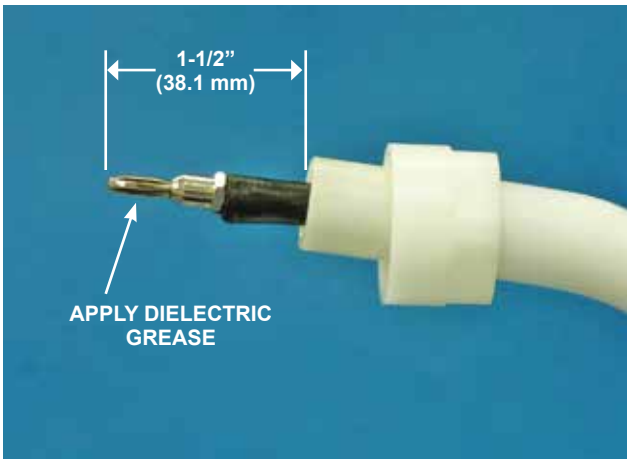


Remove high voltage cable assembly from high voltage ring.



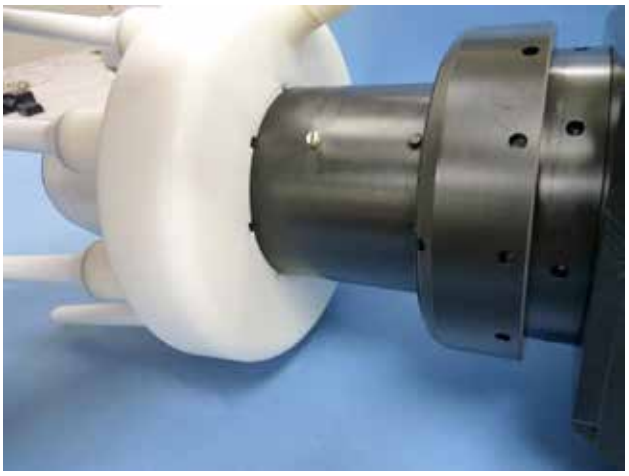
Grasp high voltage ring from the front and twist counter clockwise 10-15°. Slide the ring and probe forward off the applicator.

Clean old dielectric grease from high voltage connection in the center and in the groove. Fill groove only with dielectric grease.



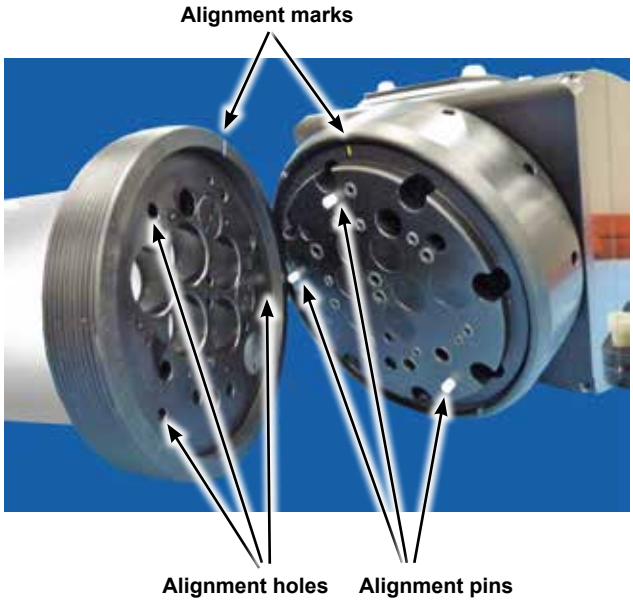
Clean old dielectric grease from the end of the high voltage cable. Verify cable protrudes from high voltage tube to dimension shown. Add a small amount of dielectric grease to the banana jack only.

DISASSEMBLY PROCEDURES (Cont.)

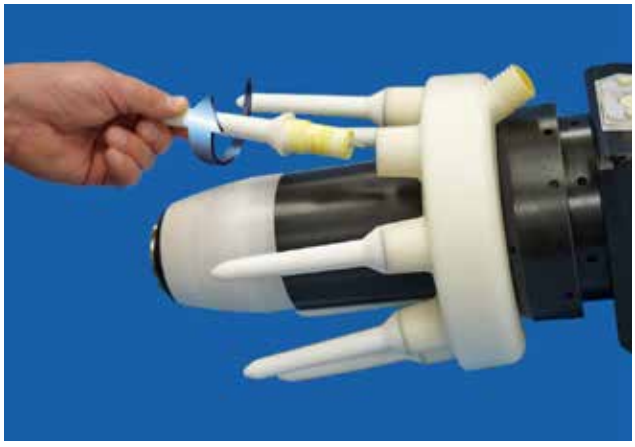


Push the high voltage ring onto the atomizer assembly. Position the high voltage input slightly to the left of center. Locate the high voltage ring on the locking pins and twist the high voltage ring 10-15° clockwise to lock into position. The high voltage input must be on center of the unit with the robot adapter.

Use (2) 76772-00 wrenches to remove the atomizer assembly from the mounting manifold. Hold the mounting ring with one wrench while removing the quick disconnect ring in a clockwise direction. Once loose, remove the wrench from the mounting manifold. Hold the atomizer with one hand while turning the ring until the unit is completely disengaged.

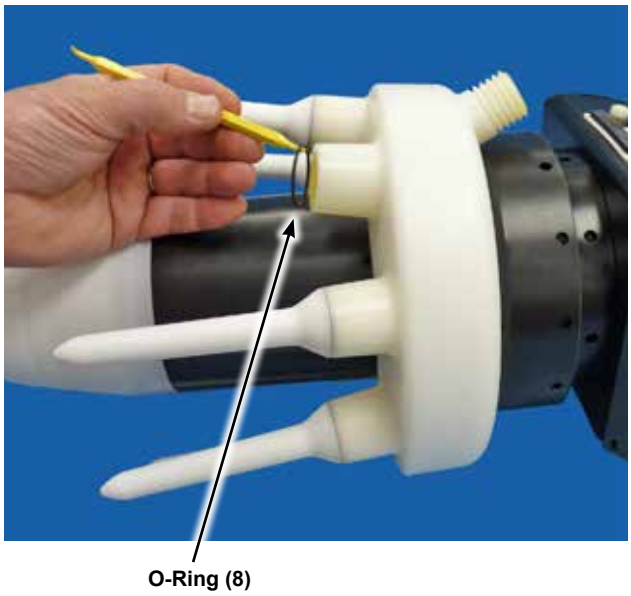


To re-install the atomizer to the mounting manifold, align the (3)white pins with the appropriate holes. Alignment marks at the top of each assembly are to be used as a guide. Make sure all o-rings are in position before re-assembly. While holding the applicator in position, pull the quick disconnect ring forward and tighten in a counter clockwise direction until snug. Further tighten the assembly together using the (2) 76772-00 wrenches. Use one wrench to hold the mounting manifold with tightening the quick disconnect ring in a counter clockwise direction until unit is tight.

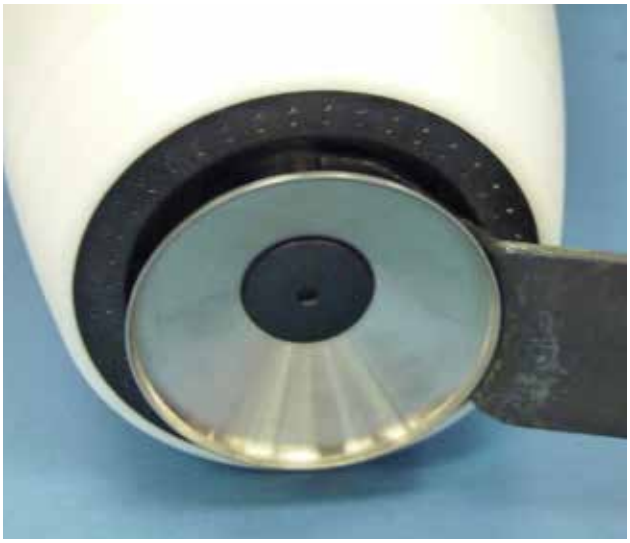


Remove electrode in a counter clockwise direction. Clean any old dielectric grease from the electrode body or the high voltage ring cavities. Insure o-ring is in place before re-assembling. Rubber gloves will help in removing the electrodes.

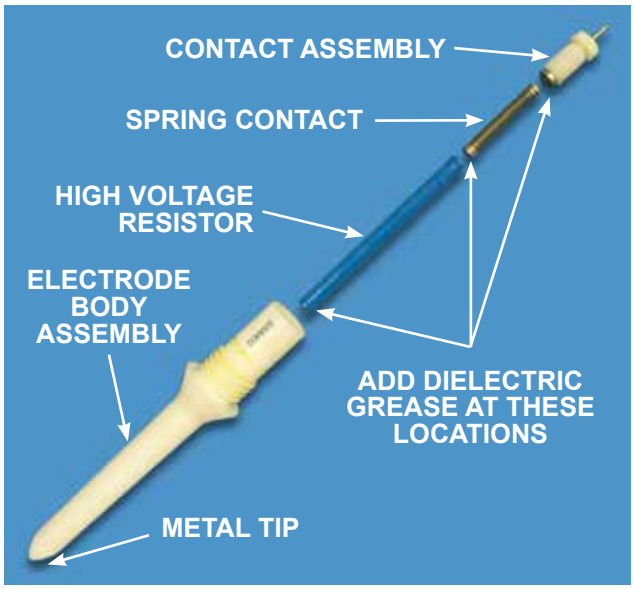
DISASSEMBLY PROCEDURES (Cont.)



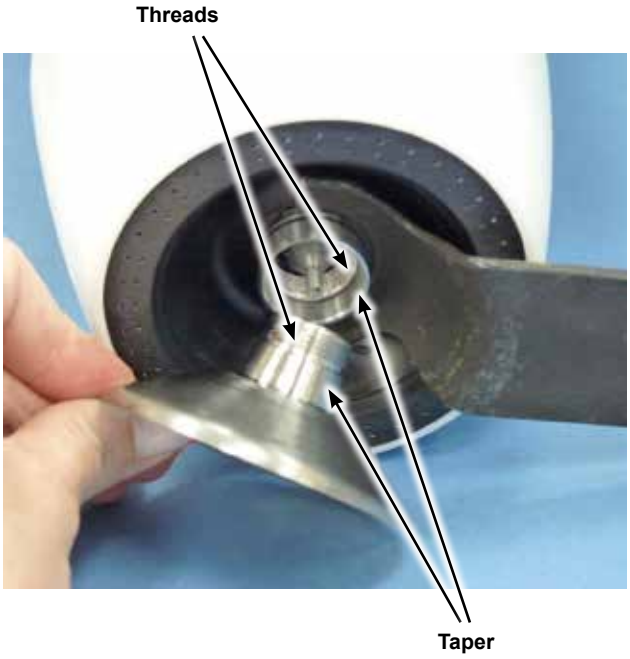
Use a non-metallic pick to remove any o-ring. Inspect o-rings for high voltage burning, cuts, etc. Replace if required. Add a small amount of dielectric grease to these o-rings before re-assembly.



Install bell cup wrench behind the bell cup and onto the hex flat of the shaft. Grasp the bell cup by hand and hold steady. Turn the bell cup wrench clockwise until the cup is loose.



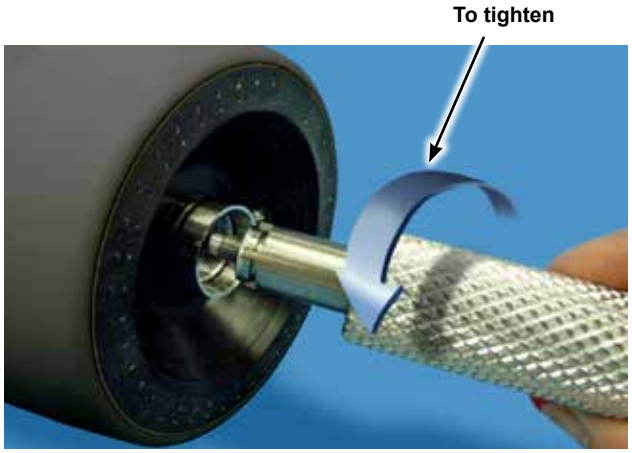
The electrodes are field repairable. Remove the end fitting, spring contact and high voltage resistor. Discard the electrode body if the metal tip is bent or eroded from high voltage. Check resistance of the high voltage resistor to the specification listed in this manual. Replace resistor only with a Ransburg part. Add dielectric grease to areas shown in the picture. Check resistance of the entire assembly to manufacturer's specification in this manual.



Inspect the taper and threads on both the bell cup and air turbine. Both components must be clean and free of paint or debris before re-assembly

DISASSEMBLY PROCEDURES (Cont.)

To install the bell cup to the proper torque. Install a 3/8" drive torque wrench into the space provided on the bell cup wrench. Re-assemble bell cup in reverse order of removal. Hold the bell cup steady while turning the torque wrench in a counter clockwise direction. Tighten to 50-70 lbs.In (5.69-7.91 Nm)

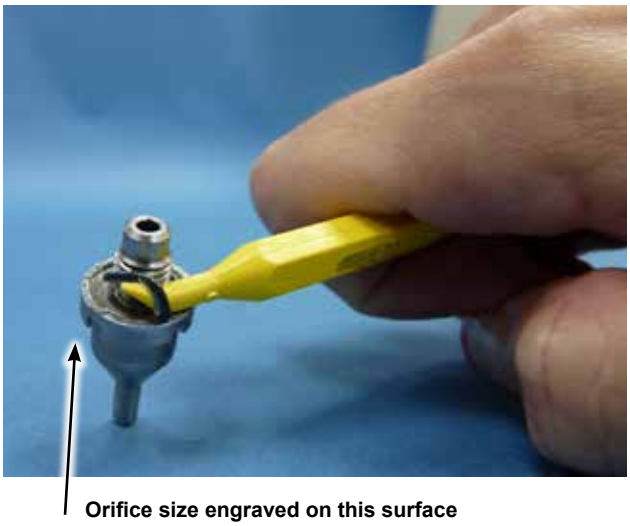


Insert the end of the A11229-00 tool over the fluid tip and align the (4) pins.

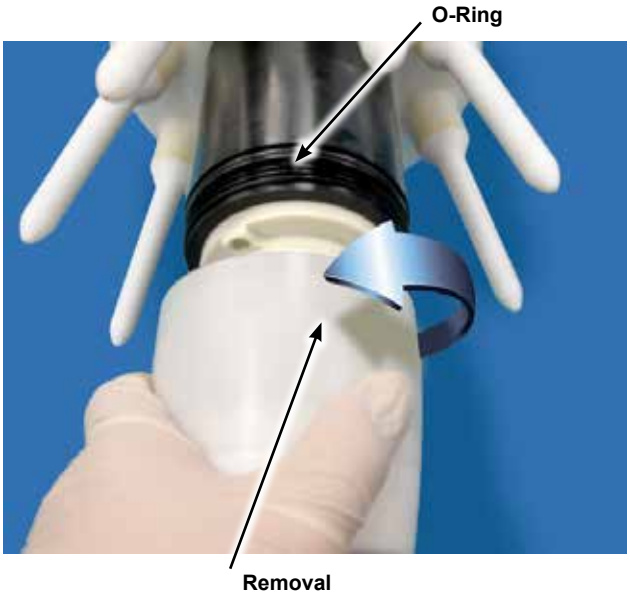
NOTE

➤ This is a left hand thread.

Turn clockwise to loosen and remove the fluid tip. The paint orifice size is engraved on the body. To install turn counter clockwise. Tighten to 25-30 lbs/in (2.83-3.4 Nm). Insure o-ring is located on the back side of the larger diameter. If omitted, a leak of cup wash solvent will result.



Fluid tip and cup wash o-ring.



Remove outer shroud by turning counter clockwise. Lubricate o-rings with petroleum jelly prior to re-assembly. Tighten until stop at the shoulder on the atomizer body.

DISASSEMBLY PROCEDURES (Cont.)

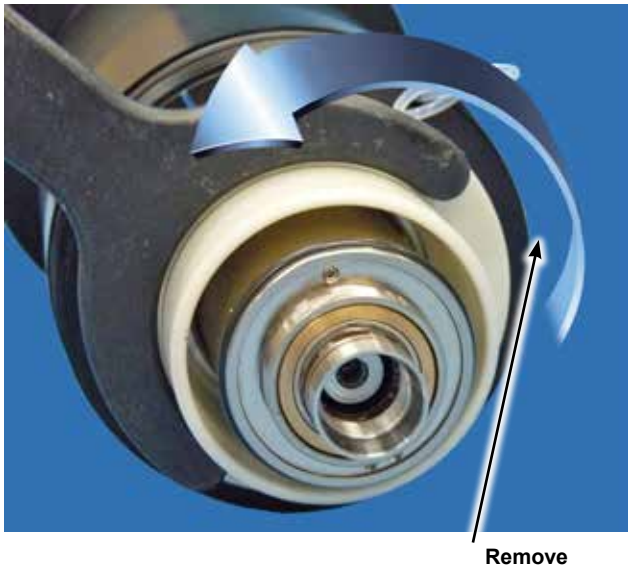
Loosen and remove exterior cup wash fitting and tube before removing shaping air parts.

Remove inner and outer shape air assembly from turbine body.

Loosen but do not remove the set screws (3) holding the inner shape air ring to the turbine body with a 2mm hex key. Turn counter clockwise to remove inner and outer shape air assembly. To re-install, tighten shape air assembly onto the turbine body threads until stop. (Lubricate o-rings with petroleum jelly prior to assembly) tighten set screw after making contact with the turbine body to 5 lbs/in (0.56 Nm) torque

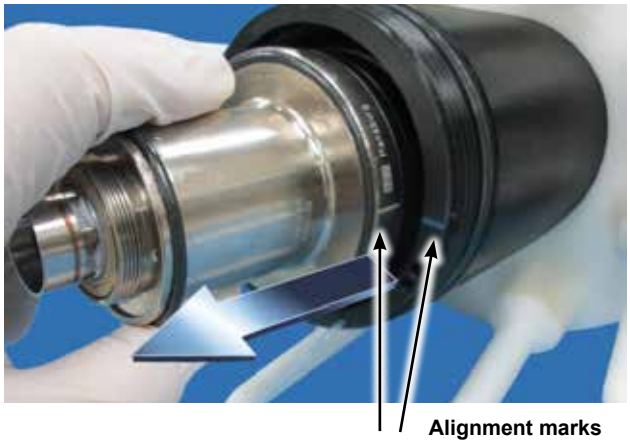
Separate the inner and our shape air components. Do not use sharp or metal picks to clean shaping air holes. Soak components and clean with a soft bristle brush, flush with solvent and blow dry. Inspect all o-rings prior to re-assembly for damage. Lubricate all o-rings with petroleum jelly prior to re-assembly.

DISASSEMBLY PROCEDURES (Cont.)

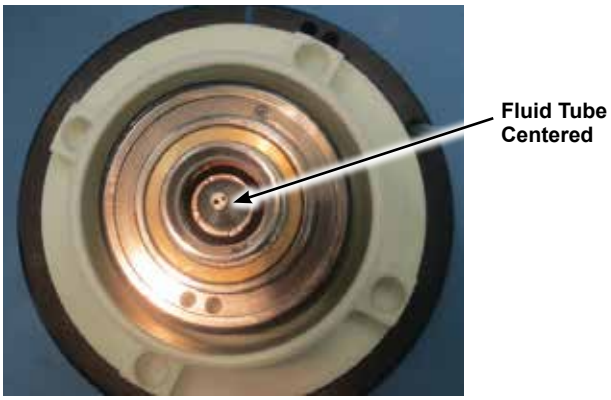


Remove the turbine retaining ring by engaging the pins on the A12088-00 spanner into the holes of the ring. Turn counter clockwise to loosen and remove.

Pull turbine retaining ring forward to remove.

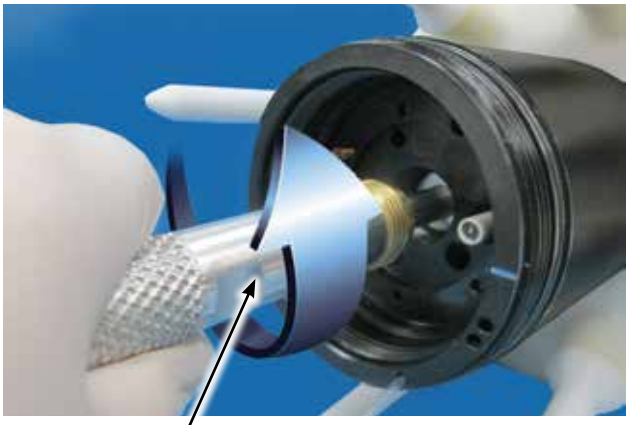


Pull the turbine straight out while gently rocking back and forth. Insure all o-rings are in place on the rear side of the turbine before re-assembly. Lubricate all o-tings with petroleum jelly. Align the mark on the turbine body with the mark on the atomizer body. Push and twist slightly until the locating pins align with the holes in the atomizer body and the turbine is fully seated.



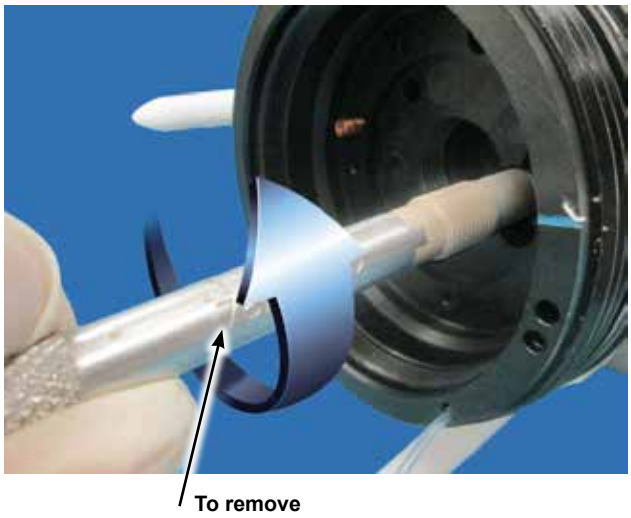
Fluid tube must be centered. If not, remove turbine and look for the cause. Re-assemble and check again. Install turbine retaining ring by hand. (Do not cross threads) tighten 1/8-1/4 turn more with the A12088-00 spanner wrench.

DISASSEMBLY PROCEDURES (Cont.)

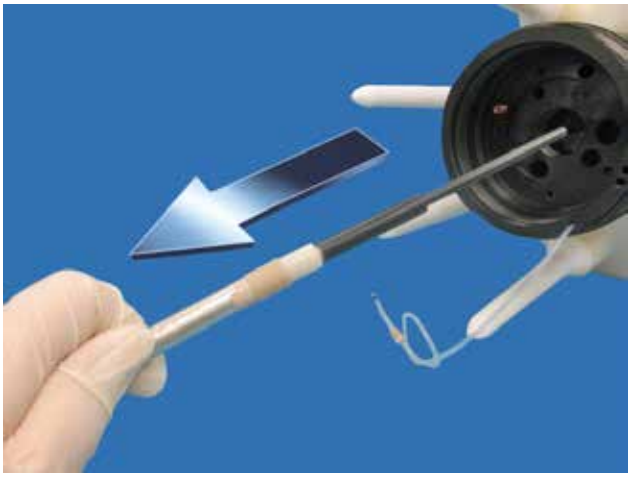


Use the opposite end of the A11229-00 fluid tube tool to remove the fluid tube retaining nut. Remove the fluid tube by pulling straight out.

Check all o-rings for damage. Lubricate all o-rings with petroleum jelly. Push fluid tube into atomizer body until seated. Tighten retaining nut clockwise to 45-50 lbs/in (7.34/8.47 Nm) torque.

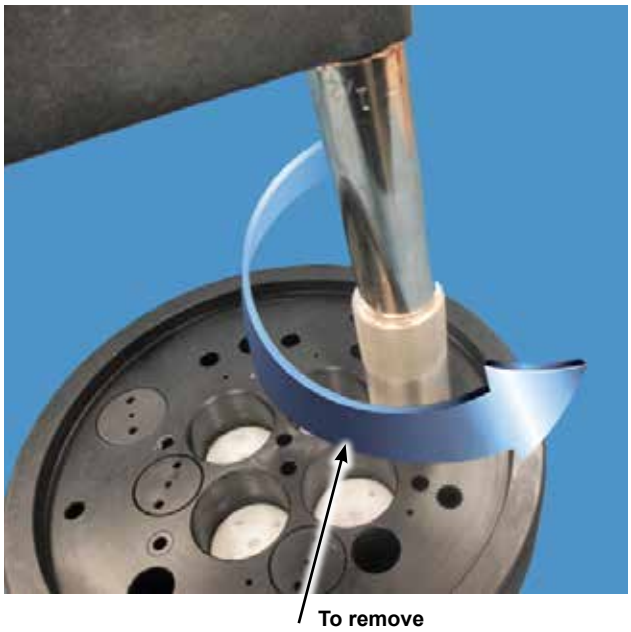


Remove fiber optic retaining nut with 78279-00 tool in a counter clockwise direction.



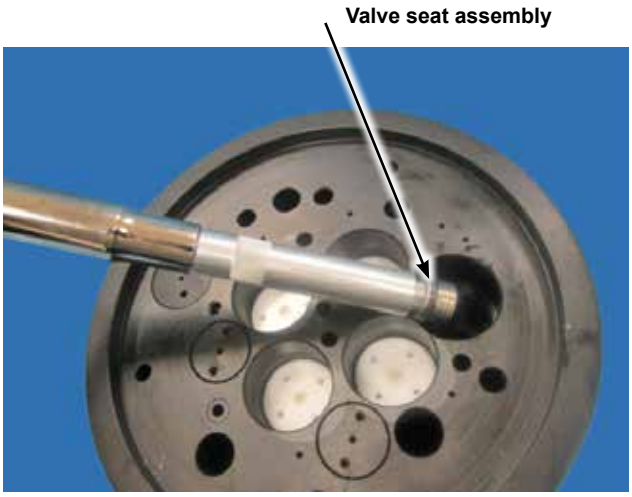
Pull fiber optic assembly straight out.

DISASSEMBLY PROCEDURES (Cont.)



Using the valve removal tool, A11922-00, engage the (4) pins an the tool with the (4) hole on the top of the valve body. Using a 1/2” (13mm) socket, end wrench or adjustable wrench, remove by turning counter clockwise.

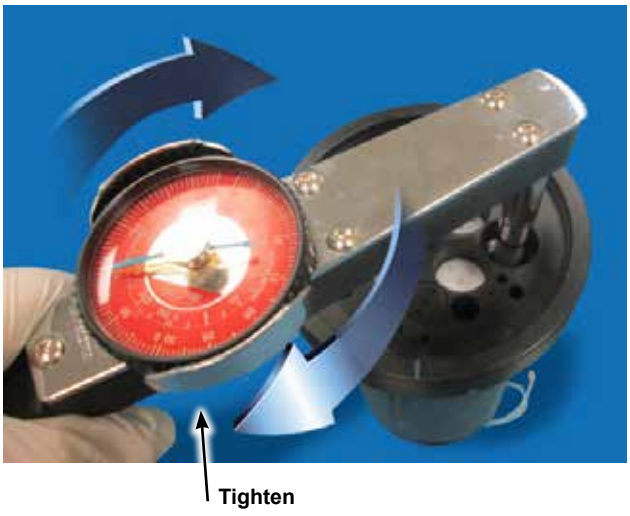
To replace, lubricate all o-rings and valve bore with petroleum jelly.



Using valve seat removal tool, a10756-00, insert the small hex end into the female hex of the seat assembly. Using a 3/8” (10mm) socket, end wrench or adjustable wrench, remove the seat by turning counter clockwise.

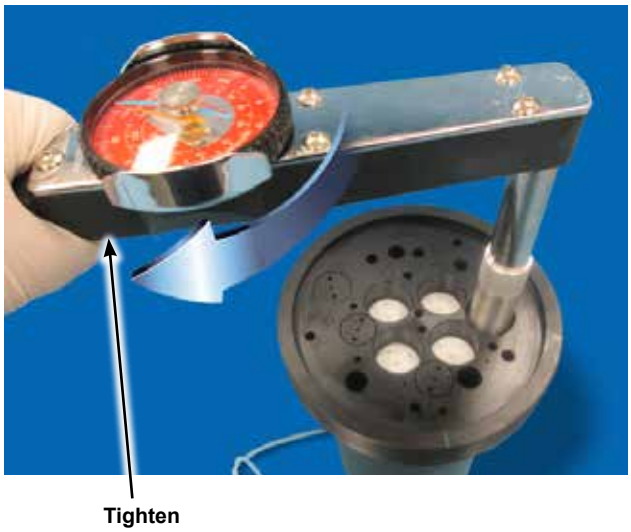
NOTE

➤ Seat should not be replaced unless there are indications of valve leakage during operation.

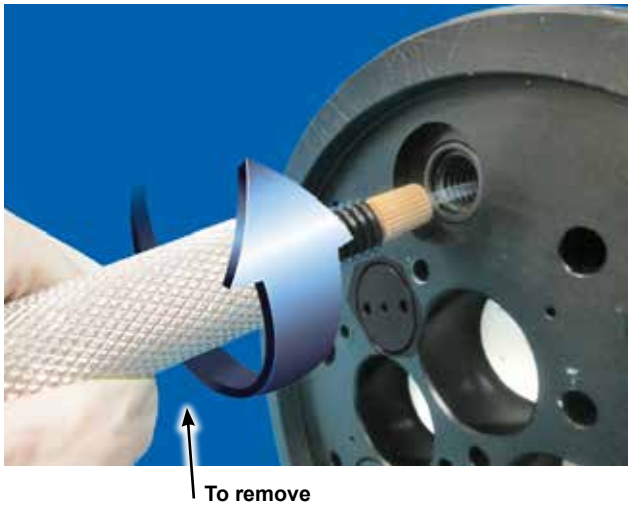


Carefully start the seat assembly by hand. It may be easily cross threaded. Tighten fully by hand. Final torque to 15-20 lbs/in (1.7-2.3 Nm)

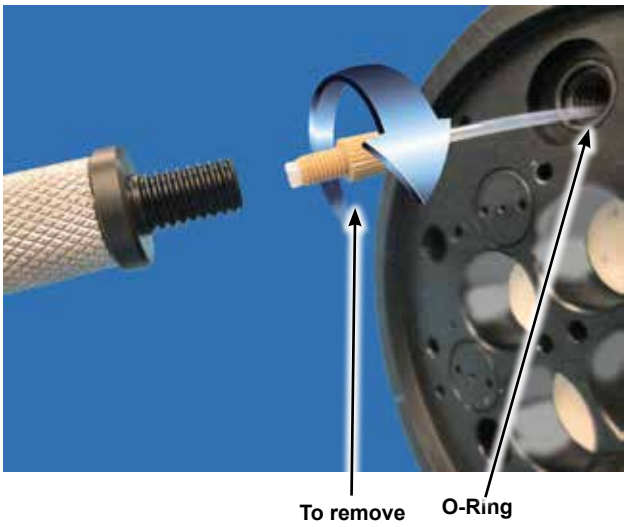
DISASSEMBLY PROCEDURES (Cont.)



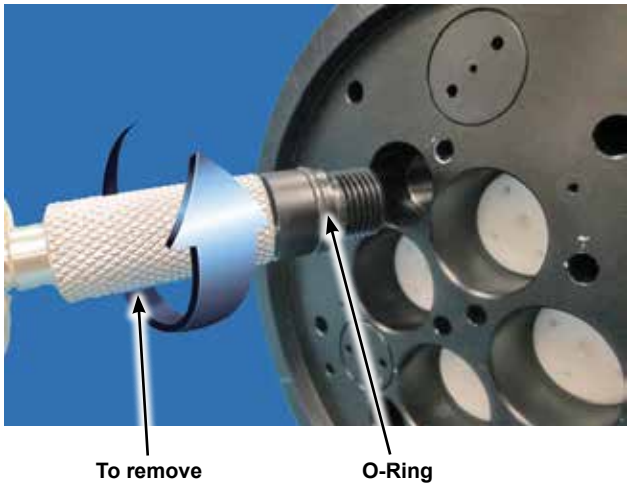
Hand tighten valve until seated, tighten fully to 15-20 lbs/in (1.7-2.3Nm) torque after valve is down



To remove external cup wash tube, insert the (2) pins of the tool into the holes of the fitting and remove by turning counter clockwise. Pull the fitting out to expose the interior fitting and tubing

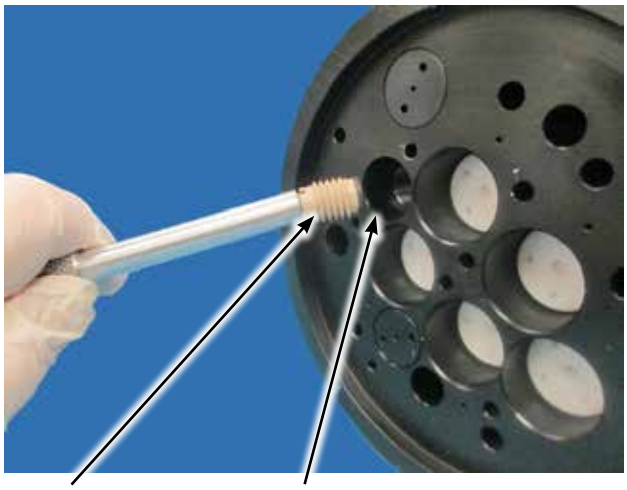


Remove the interior fitting in a counter clockwise direction. Note the direction of the ferrule for re-assembly purposes. To re-install slide fitting and ferrule over tubing as shown. Make sure o-ring is in its seat in the atomizer body. Tighten fitting into exterior fitting tightly until an audible clicking is heard. Tighten exterior fitting into atomizer body until tight. Exterior fitting must be flush with atomizer body face.



Remove check valve plug with A13142-00 tool. Align the pins of the tool with the holes in the plug. Remove by turning counter clockwise. When re-installing, inspect o-ring for damage. Lubricate o-ring with petroleum jelly. Tighten into place. Make sure top of plug is flush with atomizer face.

DISASSEMBLY PROCEDURES (Cont.)



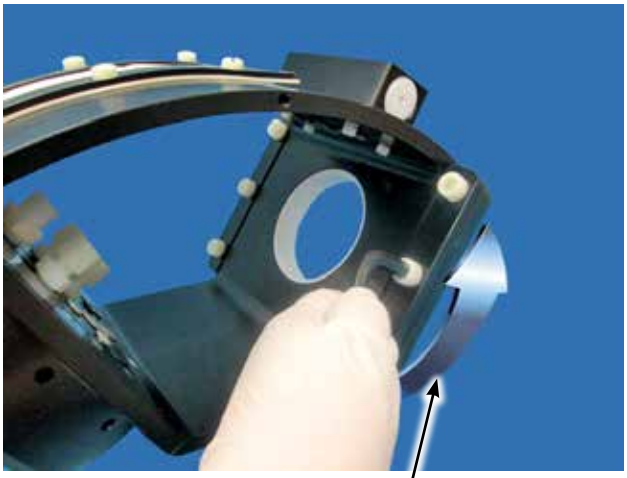
Use the opposite end of the A13142-00 tool to remove the check valve assembly. Align the end of the tool with the slot of the check valve. Remove by turning counter clockwise. Make sure that o-ring at the bottom of the bore is removed. Assemble in reverse order.

Remove side panels by removing holding screw with a flat blade screwdriver. To re-install panels, place in groove and tighten screw to 5-10 lbs/in (0.56 - 1.13 Nm) torque.

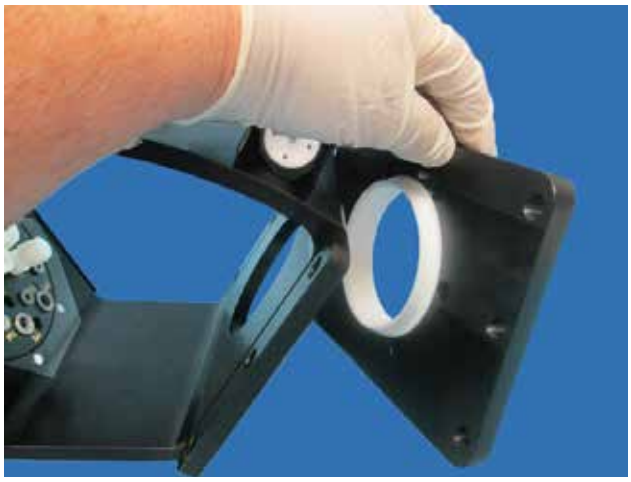
Remove high voltage cable cover by removing the (6) screws using a flat blade screwdriver. Re-install screws and tighten to 5-10 lbs/in (0.56 - 1.13 Nm) torque

Remove panel by sliding out from grooves of the robot adapter.

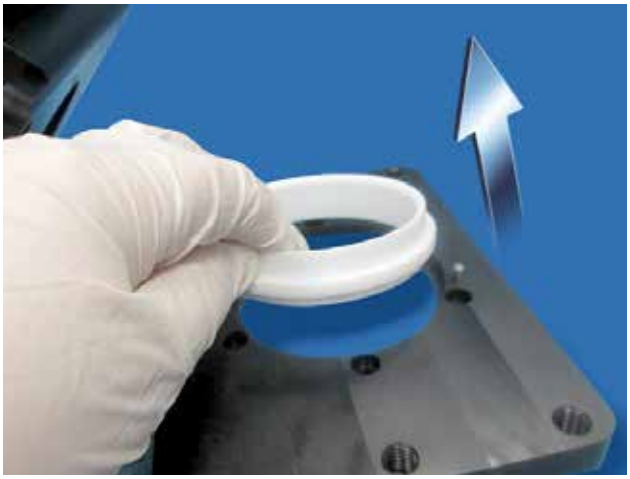
DISASSEMBLY PROCEDURES (Cont.)



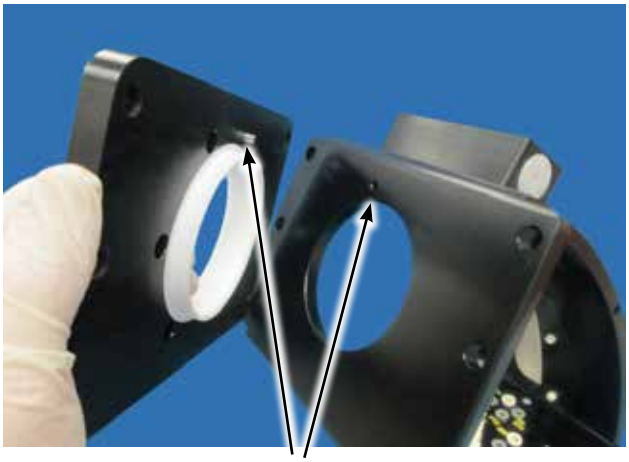
Remove the robot mounting adapter from the robot adapter by removing the (6) socket head cap screws with a 5/16” (8mm) hex key wrench.



Robot mounting adapter must be fitted to the robot wrist before installing robot adapter or applicator. Screws to fit the robot adapter to the robot wrist are supplied by the end users.

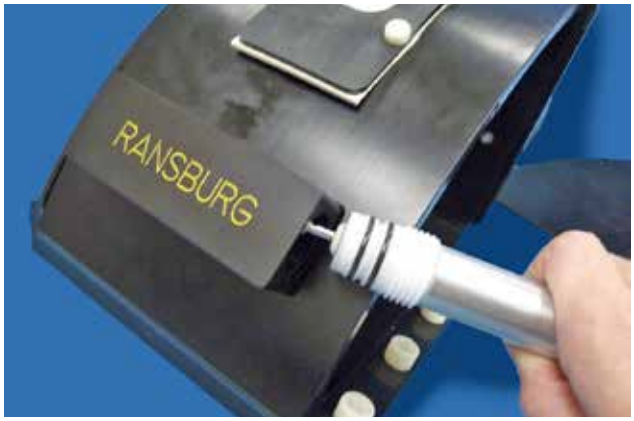


The center ring is remove by pulling straight out.



To mount the applicator to the robot adapter, align the locating pin of the robot mounting adapter with the hole of the robot adapter. Install the (6) screws and tighten to 15 lbs/in (1.7 Nm) torque

DISASSEMBLY PROCEDURES (Cont.)



Using the valve removal tool, A11922-00, engage the (4) pins an the tool with the (4) hole on the top of the valve body. Using a 1/2" (13mm) socket, end wrench or adjustable wrench, remove by turning counter clockwise.

To remove the valve seat assembly use the valve seat removal tool, A10756-00, insert the small hex end into the female hex of the seat assembly. Using a 3/8" (10mm) socket, end wrench or adjustable wrench, remove the seat by turning counter clockwise.

NOTE

➤ Seat should not be replaced unless there are indications of valve leakage during operation.

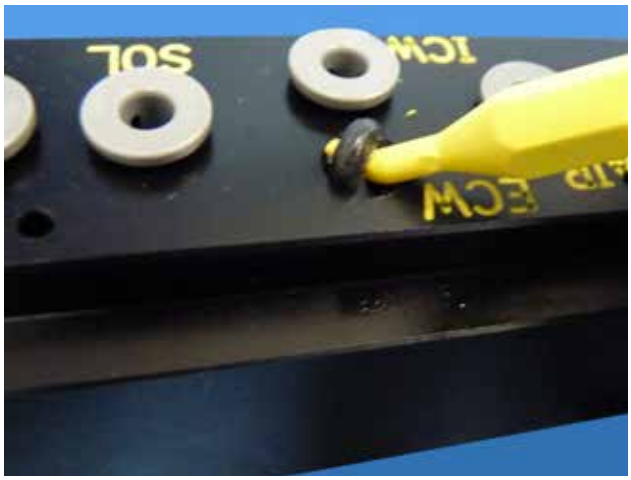
See re-assembly of the valve seat and valve assembly in prior sections with the applicator body.

To remove the cup wash block from the robot adapter, remove the (4) screws using a 5/32" (4mm) hex key wrench.

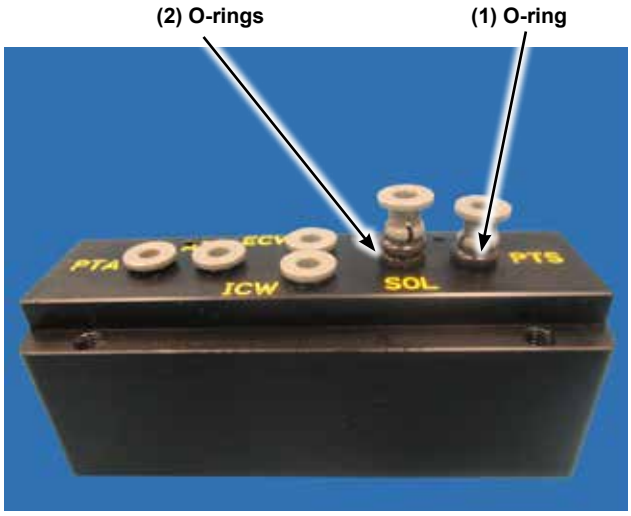
Cup wash block removed

To replace any collets, use a flat blade screwdriver to pry collet from the pocket.

DISASSEMBLY PROCEDURES (Cont.)

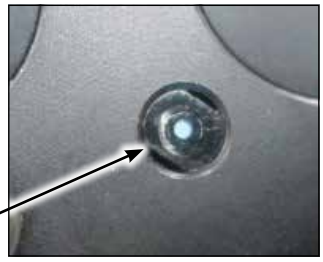


Remove the o-ring by using a non-metallic pick.

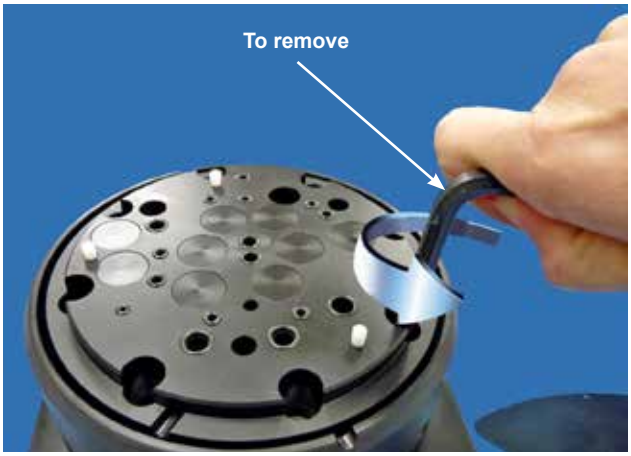


NOTE

➤ There are (2) o-rings in the holes labeled “air”, “ecw”, “icw” and “sol”. In holes labeled “pta” and “pts” there is only (1) o-ring in each hole.

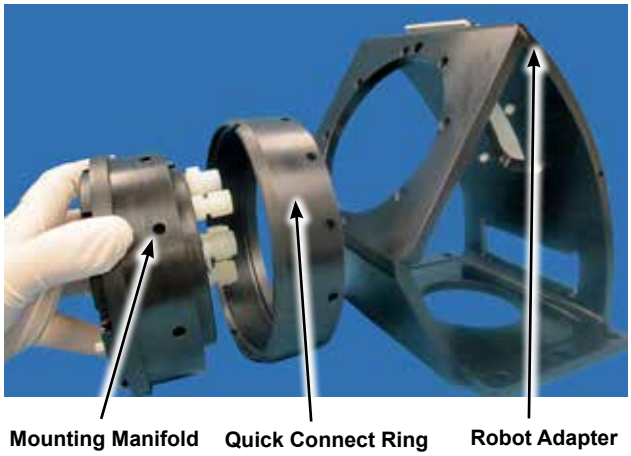


To install or remove the fiber optic cable, align the notch in the quick connect ring with the hole for the fiber optic set screw. Align the fiber optic ferrule flats with the set screw hole. Fiber optic cable is to be flush with mounting manifold face. Use a 3/32” hex key wrench to loosen or tighten. Tighten to 10 lbs/in (1.13 Nm) torque

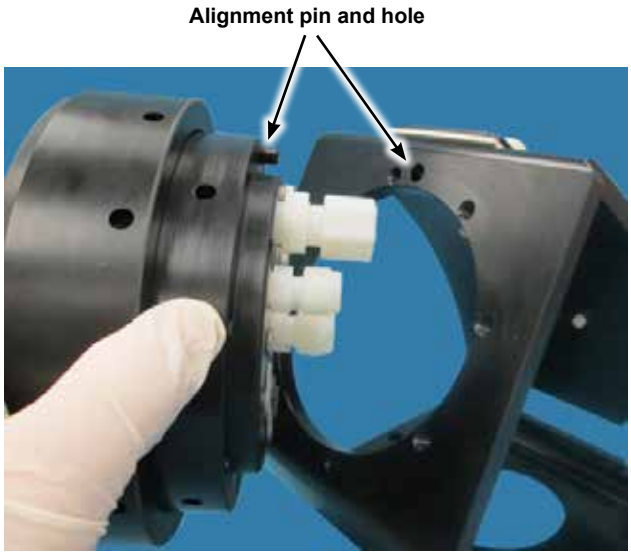


To remove the mounting manifold from the robot adapter, remove the (8) screws using a 1/4” hex key wrench.

DISASSEMBLY PROCEDURES (Cont.)



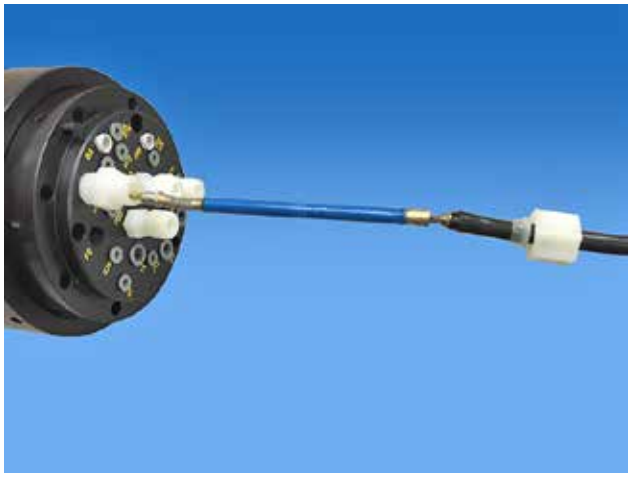
The quick disconnect ring is captured between the mounting manifold and the robot adapter.



To re-install, slide the quick connect ring over the mounting manifold, thread first. Align the pin on the mounting manifold with the hole in the robot adepter. Install the (8) screws with a 1/4” hex key wrench and tighten to 10 lbs/in (1.3 Nm) torque

OPTIONAL GROUND RESISTOR

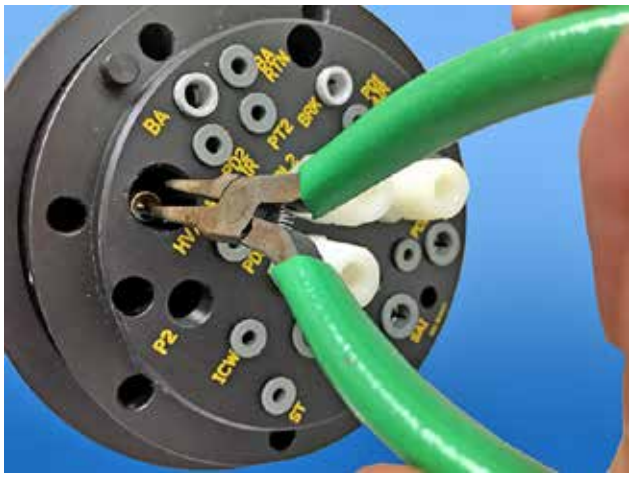
Place resistor assembly on to the ground cable as shown. Add a little amount of LSCH0009-00 dielectric grease to end of banana plug that will go into the atomizer manifold. Insert resistor assembly into the manifold until it engages into the banana jack. Push the cable into the fitting, you will feel the spring pushing against the cable. While compressed, tighten the nut and ferrule securely. Check resistance of the assembly as shown - must read 152-168 megohms at 1000VDC setting.

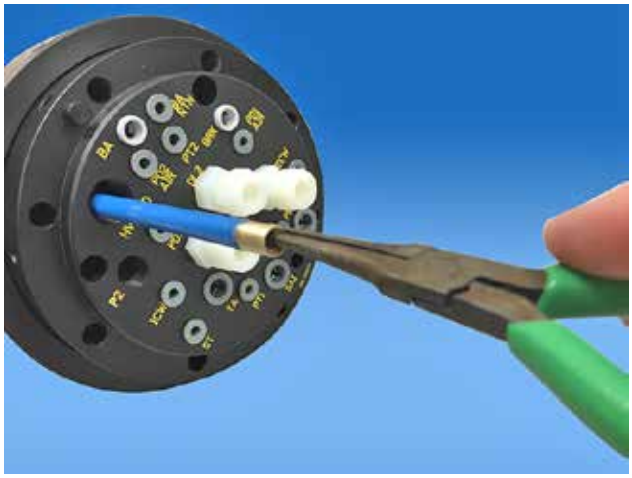


DISASSEMBLY PROCEDURES (Cont.)

RESISTOR REMOVAL

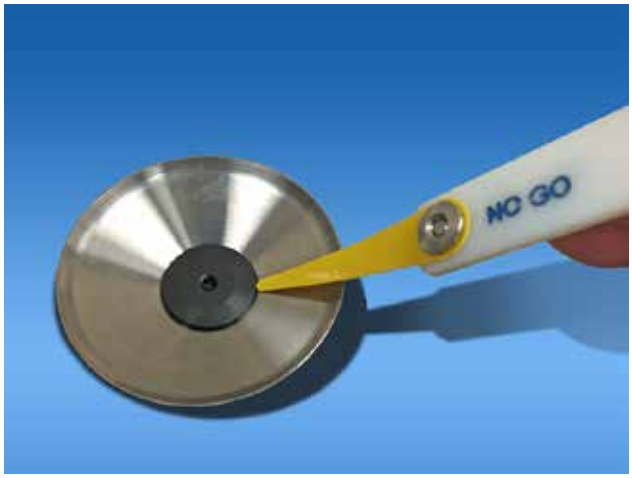
Remove ground cable, remove fitting, grasp resistor assembly with pliers and remove.





SPLASH PLATE GO - NO GO GAGE TOOL (OPTION)

To check if gap between the splash plate and bell cup is proper, insert the “GO” end into the gap between the splash plate and bell cup. The gap around the diameter should be equal. A slight drag is acceptable in some locations. If the gage will not go in, the splash plate needs to be replaced. If the “NO GO” gage fits into the gap, the splash plate is not fully seated.



DISASSEMBLY PROCEDURES (Cont.)

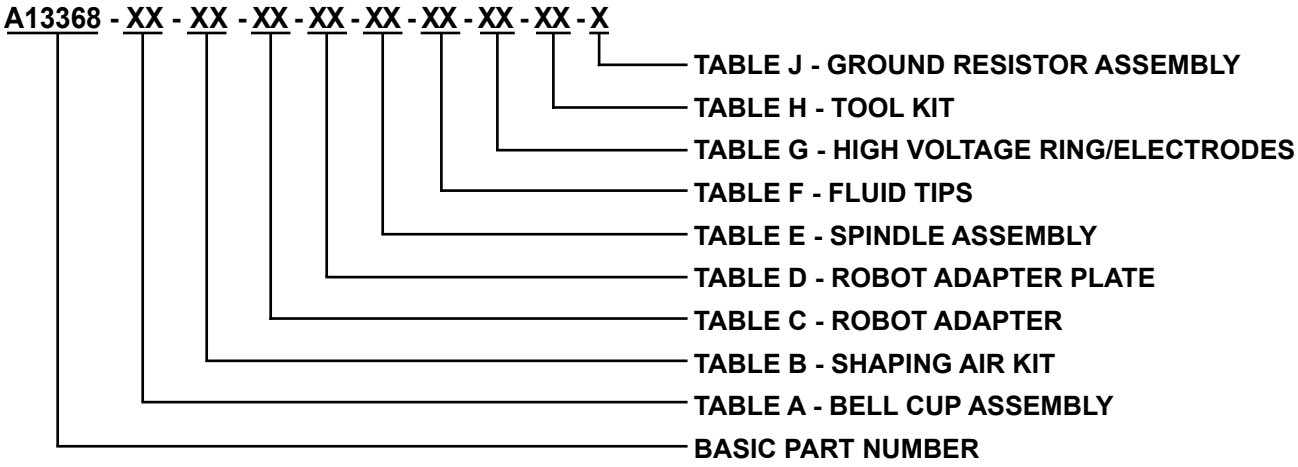
EXTERIOR CUP WASH FITTING

Install cup wash ferrule with tapered end toward fitting, leave approximately 1/16” (.5mm) tubing protruding past ferrule. Tighten fitting until an audible “click” is heard or felt.

PARTS IDENTIFICATION

RMA-590 HYBRID ROTARY ATOMIZER MODEL IDENTIFICATION

When ordering, use A13368-ABCDEFGH as indicated by Tables A, B, C, D, E, F, G, H and J.
Seventeen (17) digits must follow the basic part number.
For Example:



* Model number and serial number of the atomizer is located on the face of the robot plate. (See “Important Numbers” in the “Introduction” section.)

TABLE A - BELL CUP ASSEMBLY

Dash #	“A”	Description
00	NONE	NONE
01	A12900-00	65MM TITANIUM, SERRATED (TISF)
02	A12900-01	65MM TITANIUM, NON-SERRATED (TIF)
03	A12900-02	65MM TITANIUM, SERRATED, LONG LIFE SPLASH PLATE (TISF)
04	A12900-03	65MM TITANIUM, NON-SERRATED, LONG LIFE SPLASH PLATE (TIF)
05	A12900-04	65MM ALUMINUM, SERRATED, PLASTIC SPLASH PLATE (ALSF)
06	A12900-05	65MM ALUMINUM, NON-SERRATED, PLASTIC SPLASH PLATE (ALF)
07	A12900-06	65MM ALUMINUM, SERRATED, PLASTIC SPLASH PLATE, BLACK COATED BELL CUP (ALCSCF)
08	A12900-07	65MM ALUMINUM, NON-SERRATED, PLASTIC SPLASH PLATE, BLACK COATED BELL CUP (ALCF)
09	A13114-00	55MM TITANIUM, SERRATED (TISF)
10	A13114-01	55MM TITANIUM, NON-SERRATED (TIF)
11	A12900-08	65MM TITANIUM, BLACK COATED, SERRATED, PLASTIC SPLASH PLATE (TISF)
12	A12900-09	65MM TITANIUM, BLACK COATED, NON-SERRATED, PLASTIC SPLASH PLATE (TIF)
13	A12900-10	65MM TITANIUM, SERRATED, S.S. HARDENED SPLASH PLATE (TISF)
14	A12900-11	65MM TITANIUM, NON-SERRATED, S.S. HARDENED SPLASH PLATE (TIF)
15	A13832-00	81MM TITANIUM, SERRATED, PLASTIC SPLASH PLATE (TISF)
16	A13832-01	81MM TITANIUM, NON-SERRATED, PLASTIC SPLASH PLATE (TIF)
17	A13832-02	81MM TITANIUM, SERRATED, LONG LIFE SPLASH PLATE (TISF)
18	A13832-03	81MM TITANIUM, NON-SERRATED, LONG LIFE SPLASH PLATE (TIF)

TABLE B - SHAPING AIR KIT

Dash #	"B"	Description
01	A12874-05	65MM MONO FLEX, DIRECT CHARGE, STAINLESS STEEL
02	A12874-06	65MM MONO FLEX, DIRECT CHARGE, STAINLESS STEEL, REPULSION RING
03	A12874-07	65MM MONO FLEX, INDIRECT CHARGE, PLASTIC
04	A12874-08	65MM DUAL FLEX, DIRECT CHARGE STAINLESS STEEL
05	A12874-09	65MM DUAL FLEX, DIRECT CHARGE, STAINLESS STEEL, REPULSION RING
06	A12874-10	65MM DUAL FLEX, INDIRECT CHARGE, PLASTIC
07	A12874-11	65MM DUAL FLEX, INDIRECT CHARGE, TFE SHROUD
08	A12874-12	55MM DUAL FLEX, DIRECT CHARGE, STAINLESS STEEL
09	A12874-13	55MM DUAL FLEX, INDIRECT CHARGE, PLASTIC
10	A13858-07	81MM DUAL FLEX, INDIRECT CHARGE, PLASTIC

TABLE C - ROBOT ADAPTER

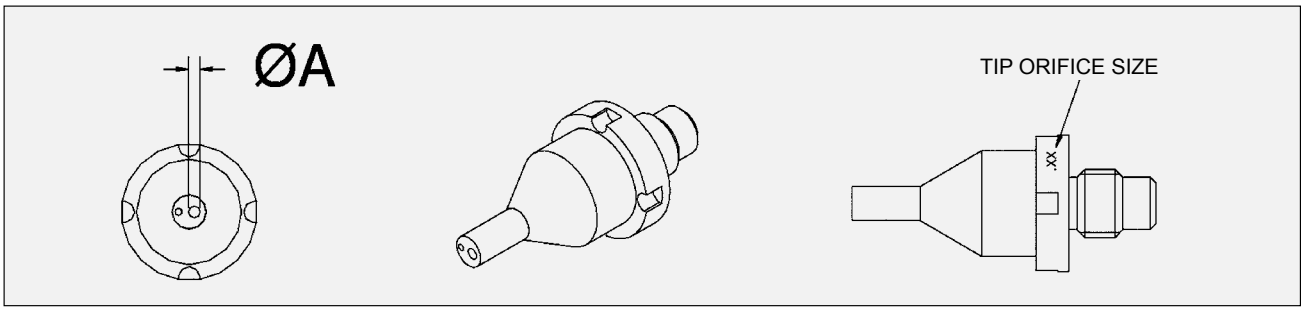
Dash #	"C" Robot Adapter	"D" Panel	Description
00	NONE	NONE	NONE
01	A13126-00	A13120-00	60 DEGREE ADAPTER
02	A13146-00	A13147-00	90 DEGREE ADAPTER

TABLE D - ROBOT ADAPTER PLATE

Dash #	"F"	Description
00	NONE	NONE
01	A13127-00	FANUC P200 SERIES

TABLE E - SPINDLE ASSEMBLY

Dash #	"G"	Description
00	A12895-01	SPINDLE ASSEMBLY, SILVER SHAFT
01	A12895-04	SPINDLE ASSEMBLY, BLACK SHAFT



Fluid Tip Selection

TABLE F - FLUID TIPS

Dash No.	"E"	Description
01	A11240-01	.028/.7MM OPENING
02	A11240-02	.035/.9MM OPENING
03	A11240-03	.043/1.1MM OPENING
04	A11240-04	.047/1.2MM OPENING
05	A11240-05	.062/1.6MM OPENING
06	A11240-06	.039/1.0MM OPENING

TABLE G - ELECTRODE ASSEMBLY

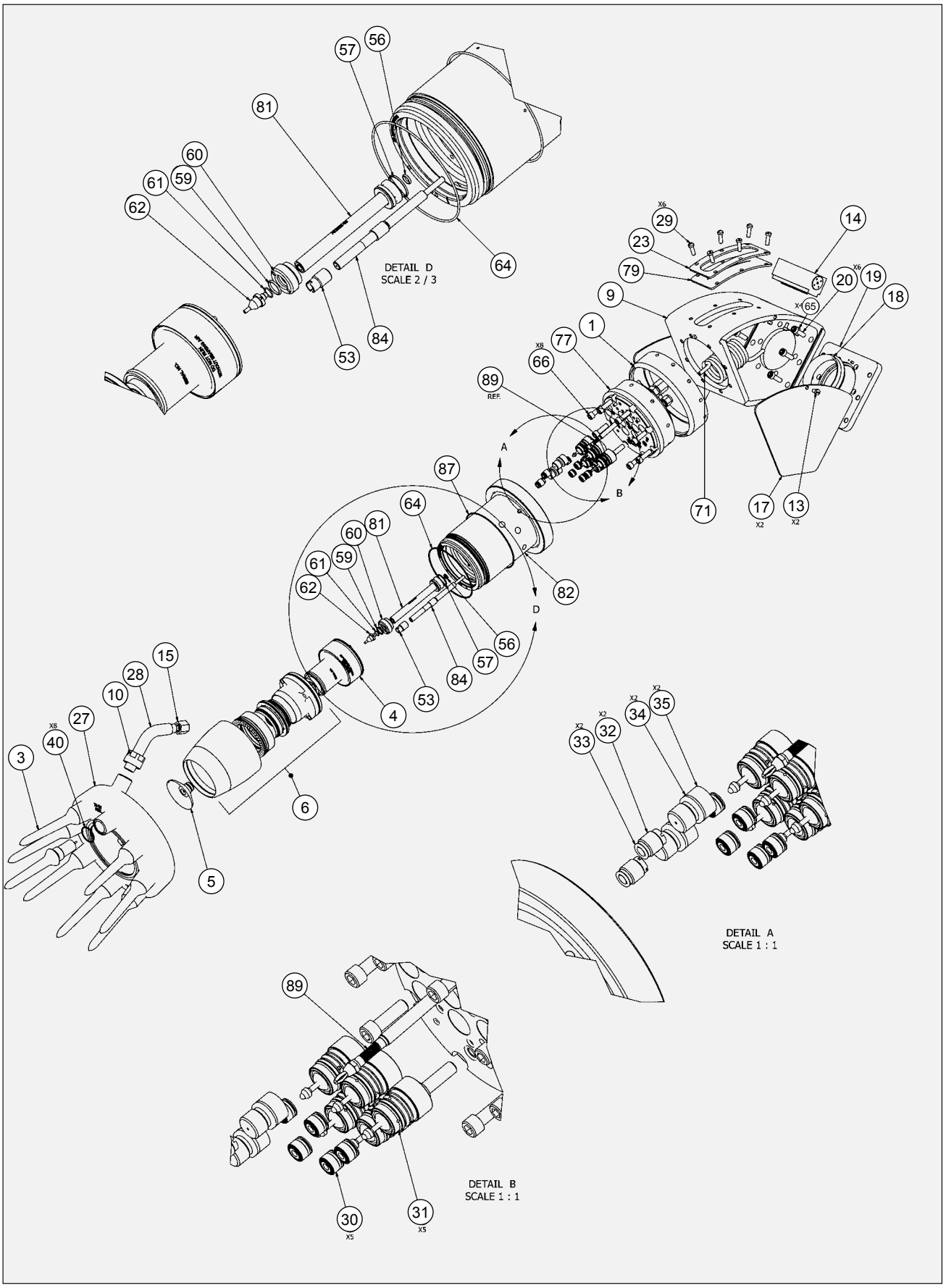
Dash No.	"J"	Description	"K" QTY	"L" QTY	"M" QTY	"N" QTY	"P" QTY	"Q" QTY
00	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
01	A11343-02	220 MEG OHMS- FOR USE AT SEA LEVEL CONDITIONS	1	1	1	1	8	8
02	A11343-03	140 MEG OHMS- FOR USE ABOVE 5000 FT. SEA LEVEL CONDITIONS	1	1	1	1	8	8

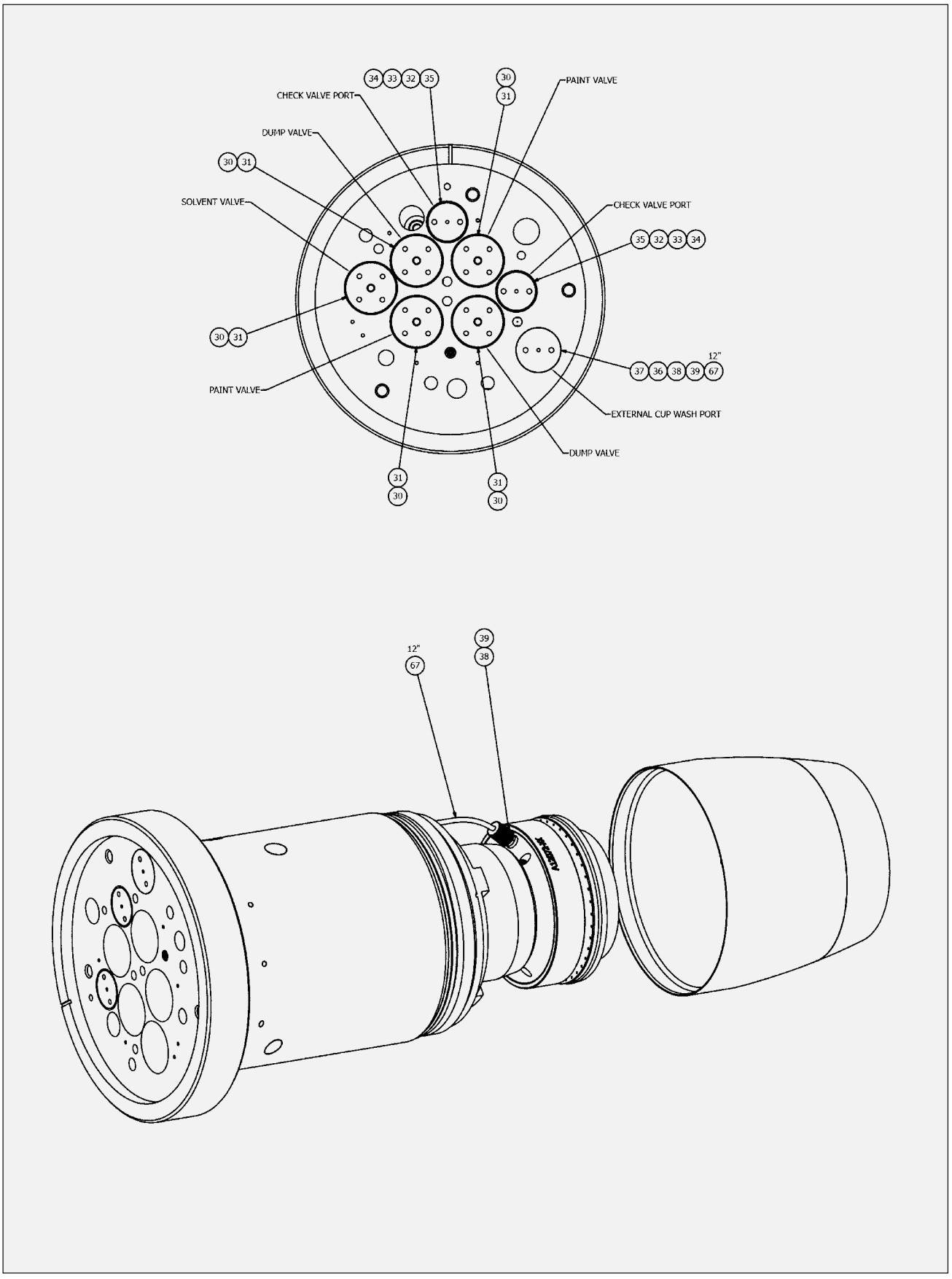
TABLE H - TOOL KIT

Dash #	"H"	Description
00	0	NONE
01	1	TOOL KIT AND CHECK VALVE TOOL

TABLE J - GROUND RESISTOR ASSEMBLY

Dash #	"R"	Description
0	0	
1	1	


DETAIL D
SCALE 2 / 3
DETAIL A
SCALE 1 : 1
DETAIL B
SCALE 1 : 1


34 33 32 35
30
31
PAINT VALVE
CHECK VALVE PORT
DUMP VALVE
30 31
SOLVENT VALVE
CHECK VALVE PORT
35 32 33 34
30 31
12"
37 36 38 39 67
PAINT VALVE
EXTERNAL CUP WASH PORT
DUMP VALVE
31
30
31
30
12"
67
39
38

RMA-590 - PARTS LIST

Item	Qty	Part #	Description
1	1	A13129-00	MOUNTING RING
3	“Q”	“J”	ELECTRODE ASSEMBLY
4	1	“G”	SPINDLE ASSEMBLY
5	1	“A”	BELL CUP ASSEMBLY
6	1	“B”	SHAPING AIR KIT
9	1	“C”	ROBOT ADAPTER
10	“K”	A11318-00	HIGH VOLTAGE TUBE NUT
13	2	A13737-12C	SCREW, 1/4-20 X 3/8 LG NYLON FILLISTER HEAD
14	1	A13125-00	SOLVENT BLOCK ASSEMBLY
15	“N”	78441-00	FERRULE NUT
17	2	“D”	PANEL
18	1	A13128-00	SLIP RING
19	1	“F”	ROBOT ADAPTER PLATE
20	6	A11338-00	SCREW, SOC HD CAP M8 X 25MM LG
23	1	A13140-00	HIGH VOLTAGE COVER
27	“L”	A13137-00	HIGH VOLTAGE RING ASSEMBLY
28	“M”	A13138-00	HIGH VOLTAGE TUBE
29	6	A13737-24C	SCREW, 1/4-20 X 3/8 LG NYLON FILLISTER HEAD
3 30	5	77367-00	VALVE SEAT ASSEMBLY
4 31	5	78949-00	VALVE ASSEMBLY
32	2	78944-00	ASSEMBLY, CHECK VALVE
33	2	79001-06	O-RING, SOLVENT PROOF
34	2	79001-01	O-RING, SOLVENT PROOF
35	2	A13132-00	CHECK VALVE PLUG
36	1	79001-08	O-RING, SOLVENT PROOF
37	1	A13130-00	EXTERNAL CUP WASH FITTING HOLDER
38	2	A12821-00	CUP WASH FITTING
39	2	A12822-00	CUP WASH FERRULE
40	“P”	79001-45	O-RING, SOLVENT PROOF
53	1	78278-00	NUT, FIBER OPTIC TENSIONING
56	1	79001-40	O-RING, SOLVENT PROOF
57	1	79001-41	O-RING, SOLVENT PROOF
59	1	79001-42	O-RING, SOLVENT PROOF
60	1	A11226-00	RETAINER, FLUID TUBE
61	1	79001-44	O-RING, SOLVENT PROOF
5 62	1	“E”	FLUID TIP
64	1	79001-22	O-RING, SOLVENT PROOF
65	4	A13143-00	SCREW, #10-32 X 3/8 SHCS NYLON
66	8	A13738-32C	SCREW, 5/16-16 X 1” SHCS, NYLON
67	12”	A11252-01	TUBING
71	1	78450-00	SOLVENT LINE TUBING COIL, RMA-101

RMA-590 - PARTS LIST (Cont.)			
Item	**Qty**	**Part #**	**Description**
77	1	A13196-00	MOUNTING MANIFOLD ASSEMBLY
79	1	A13144-00	RUBBER COVER
81	1	A13535-00	FLUID TUBE ASSEMBLY
82	1	A13195-00	APPLICATOR BODY ASSEMBLY (SHORT)
6 84	1	A13198-04	FIBER OPTIC ASSEMBLY (SHORT)
85	"H"	A12090-02	TOOL KIT
86	1	77141-31	LITERATURE KIT
87	1	LSOR0005-15	O-RING, PTFE ENCAPSULATED
88	1	SI-16-03	SERVICE INSTRUCTIONS (F.O. SENSOR)
89	"R"	A14288-00	GROUND RESISTOR ASSEMBLY
90	1	A13142-00	CHECK VALVE TOOL

6 TORQUE FLUID TUBE ASSEMBLY INTO ATOMIZER BODY USING A11220-00 TOOL TO 65-75 LBS./IN. (7.28 - 8.4 Nm)

5 TORQUE FLUID TIP USING A11229-00 TOOL TO 25-30 LBS./IN. (2.83 - 3.4 Nm)

4 TORQUE TO 15-20 LBS./IN. AFTER VALVE IS DOWN. (1.7 - 2.3 Nm)

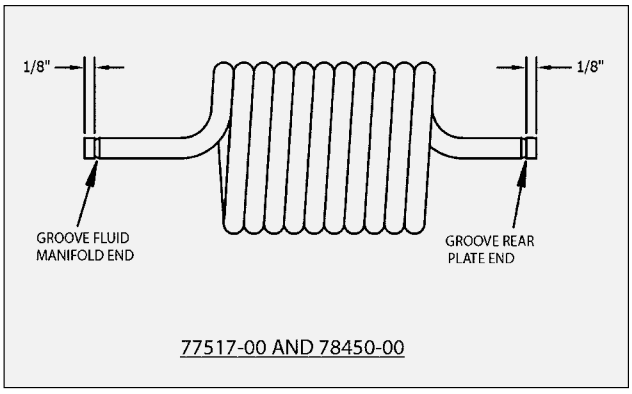
3 TORQUE TO 15-20 LBS./IN. (1.7 - 2.3 Nm)

2.) APPLY A11545-00 PETROLATUM JELL TO ALL O-RINGS PRIOR TO INSTALLATION.

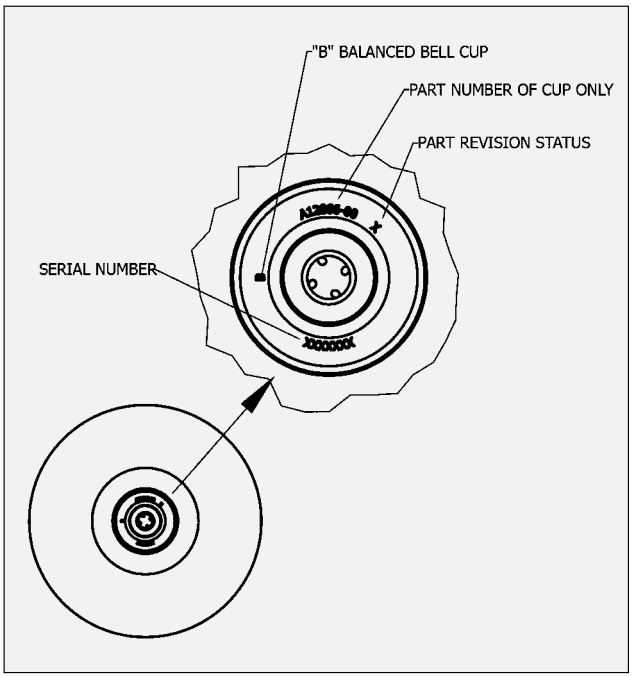
Fluid Coils (Separate Sales Parts Only)

If purchasing spare parts, they must be modified as explained.

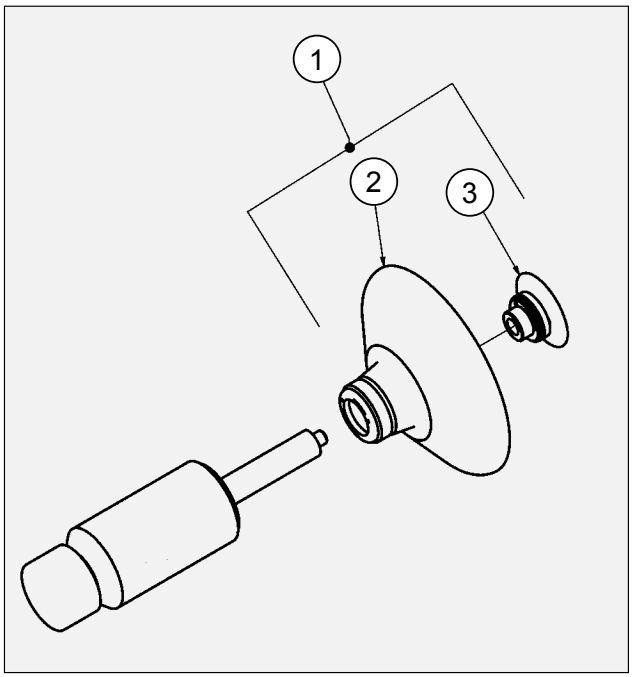
To ensure proper sealing and holding, the fittings require that the ends of the fluid coils have a groove cut into them as shown. Use groove cutter A11567-00, by sliding the end of the tool over the tubing until it bottoms out. Hold the tubing in one hand and the tool in the other. Make three complete revolutions of the tool on the tubing in the direction of the arrow stamped on the tool. To remove the tool, hold the tube and the main body of the tool with one hand, slide the rear portion of the tool back until it stops. Pull out the tubing from the end of the tool. By pulling back the rear portion of the tool, it relieves the pressure of the cutting edge off of the tubing before sliding it out. Trim off ends to dimensions shown. End should be cut off square.



77517-00 AND 78450-00



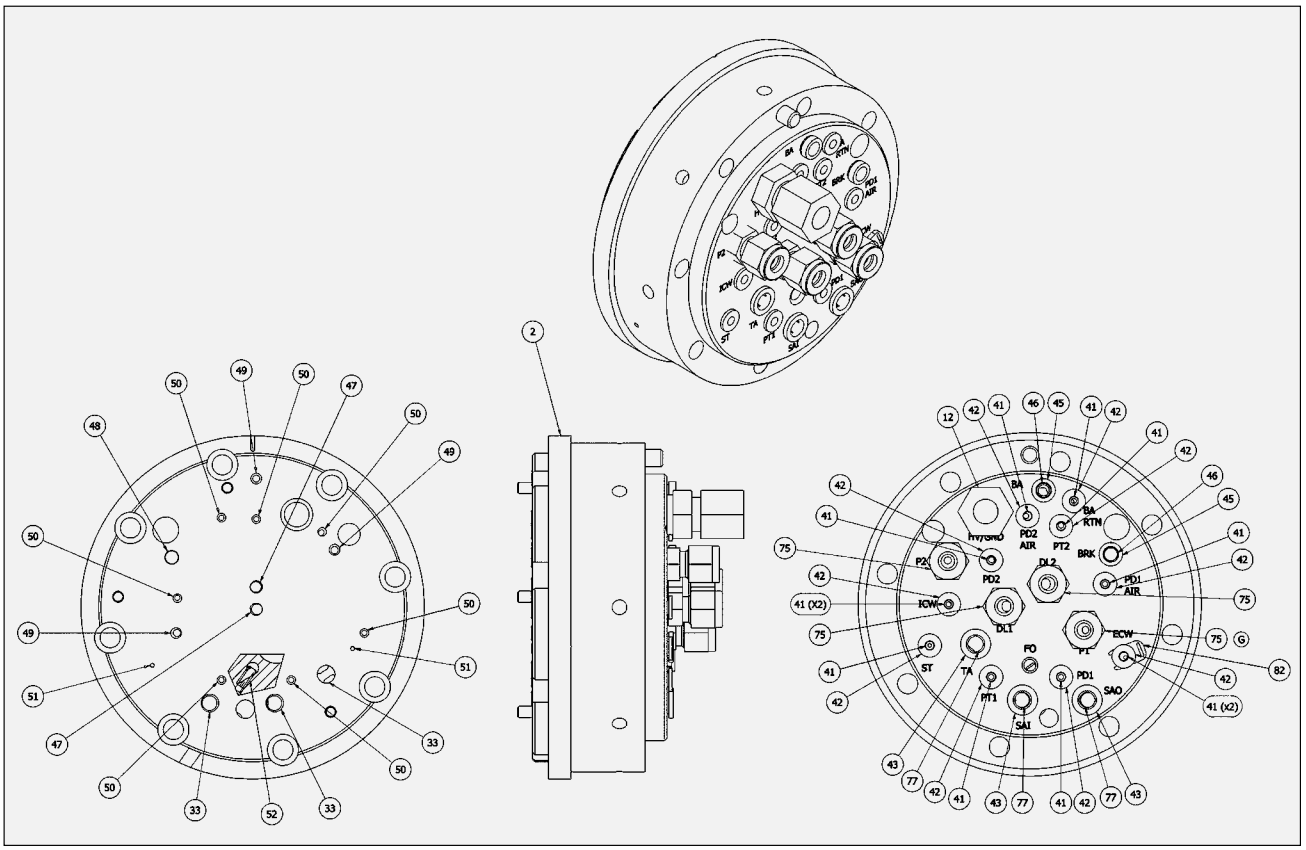
Bell Cup Part Number / Serial Number



Bell Cup Parts Breakdown

TYPICAL BELL CUP PARTS BREAKDOWN

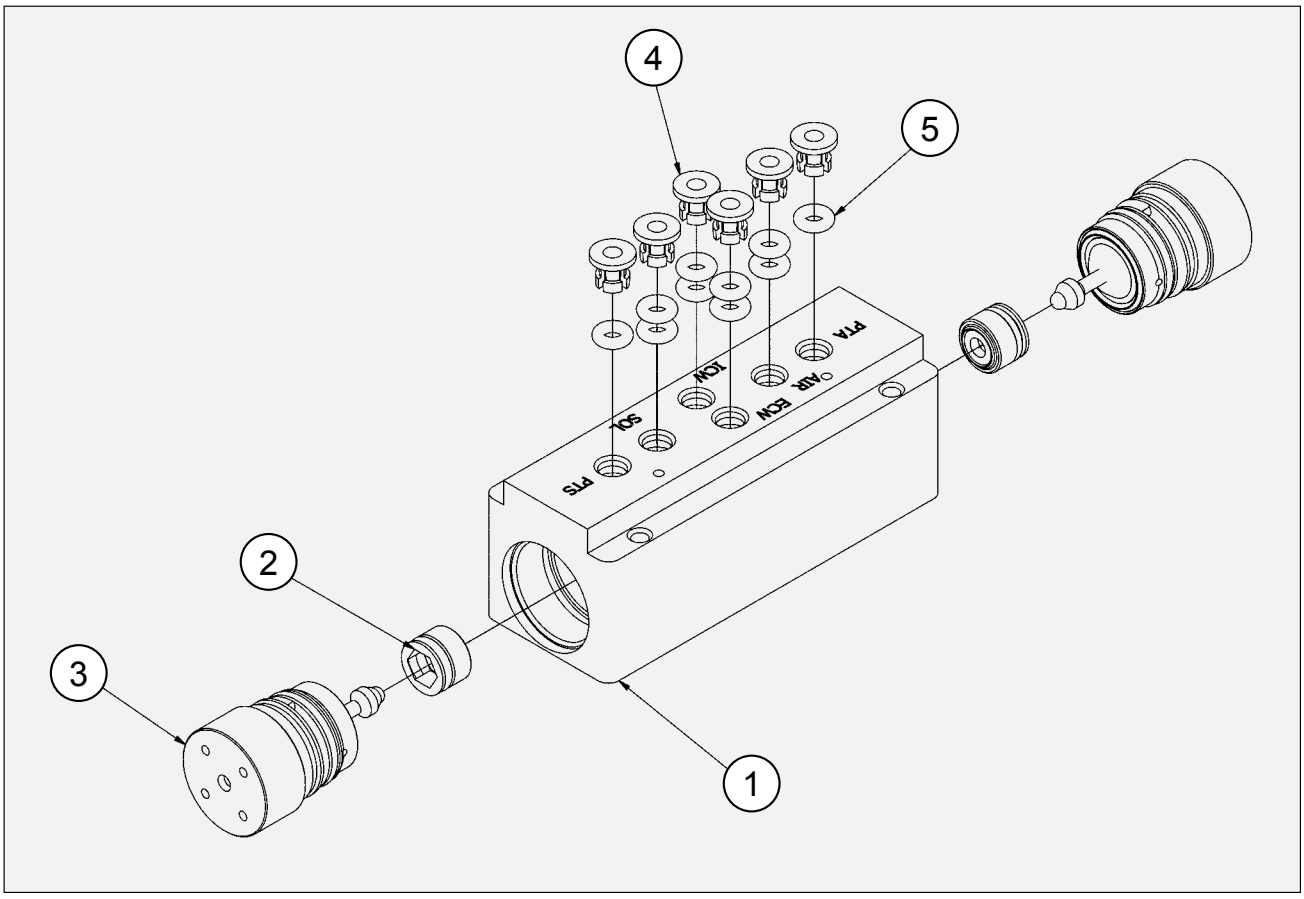
Complete Part #	Description	Splash Plate Part #
A12900-00	65MM TITANIUM, SERRATED (TISF)	A12071-00 (BLACK COLOR)
A12900-01	65MM TITANIUM, NON-SERRATED (TIF)	A12071-00 (BLACK COLOR)
A12900-02	65MM TITANIUM, SERRATED/LONG LIFE SPLASH PLATE (TISF)	A13004-00 (TITANIUM TOP)
A12900-03	65MM TITANIUM, NON-SERRATED/LONG LIFE SPLASH PLATE (TIF)	A13004-00 (TITANIUM TOP)
A12900-04	65MM ALUMINUM, SERRATED, PLASTIC SPLASH PLATE (ALSF)	A12071-00 (BLACK COLOR)
A12900-05	65MM ALUMINUM, NON-SERRATED, PLASTIC SPLASH PLATE (ALF)	A12071-00 (BLACK COLOR)
A12900-06	65MM ALUMINUM, SERRATED, BLACK COATED, PLASTIC SPLASH PLATE (ALSCF)	A12071-00 (BLACK COLOR)
A12900-07	65MM ALUMINUM, NON-SERRATED, BLACK COATED, PLASTIC SPLASH PLATE (ALCF)	A12071-00 (BLACK COLOR)
A13114-00	55MM TITANIUM, SERRATED (TISF) FOR 55MM DUAL FLEX SHAPE AIR KIT	A11269-00 (WHITE COLOR)
A13114-01	55MM TITANIUM, NON-SERRATED (TIF) FOR 55MM DUAL FLEX SHAPE AIR KIT	A11269-00 (WHITE COLOR)
A12900-08	65MM TITANIUM, BLACK COATED, SERRATED, PLASTIC SPLASH PLATE (TISF)	A12071-00 (BLACK COLOR)
A12900-09	65MM TITANIUM, BLACK COATED, NON-SERRATED, PLASTIC SPLASH PLATE (TIF)	A12071-00 (BLACK COLOR)
A12900-10	65MM TITANIUM, SERRATED, S.S. HARDENED SPLASH PLATE (TISF)	A14117-00 (STAINLESS STEEL TOP)
A12900-11	65MM TITANIUM, NON-SERRATED, S.S. HARDENED SPLASH PLATE (TIF)	A14117-00 (STAINLESS STEEL TOP)
A13832-00	81MM TITANIUM, SERRATED, PLASTIC SPLASH PLATE (TISF)	A12071-00 (BLACK COLOR)
A13832-01	81MM TITANIUM, NON-SERRATED, PLASTIC SPLASH PLATE (TIF)	A12071-00 (BLACK COLOR)
A13832-02	81MM TITANIUM, SERRATED, LONG LIFE SPLASH PLATE (TISF)	A13004-00 (TITANIUM TOP)
A13832-03	81MM TITANIUM, NON-SERRATED, LONG LIFE SPLASH PLATE (TIF)	A13004-00 (TITANIUM TOP)



A13196-00 MOUNTING MANIFOLD ASSEMBLY			
Item	**Qty**	**Part #**	**Description**
2	1	A13102-00	MOUNTING MANIFOLD
12	1	78803-00	FITTING, MODIFIED
33	3	79001-06	O-RING, SOLVENT PROOF
41	12	79001-30	O-RING, SOLVENT PROOF
42	10	77516-04	COLLET, 4 MM
43	3	77762-04	COLLET, 8 MM
45	2	77516-01	COLLET
46	2	79001-23	O-RING, SOLVENT PROOF
47	2	79001-13	O-RING, SOLVENT PROOF
48	1	79001-05	O-RING, SOLVENT PROOF
49	3	79001-04	O-RING, SOLVENT PROOF
50	7	79001-03	O-RING, SOLVENT PROOF
51	2	79001-15	O-RING, SOLVENT PROOF
52	1	SSF-2052	SET SCREW 3/8 LG X 10-24
2	75	4	LSFI0022-05	FITTING
77	3	79001-34	O-RING, SOLVENT PROOF
82	1	A13756-00	LOCKING CLIP (4MM)

2 APPLY 59915-01 THREAD TAPE (2 WRAPS)

1.) USE A LIGHT COATING OF A11545 PETROLATUM JELL ON ALL O-RINGS



A13125-00 SOLVENT BLOCK ASSEMBLY

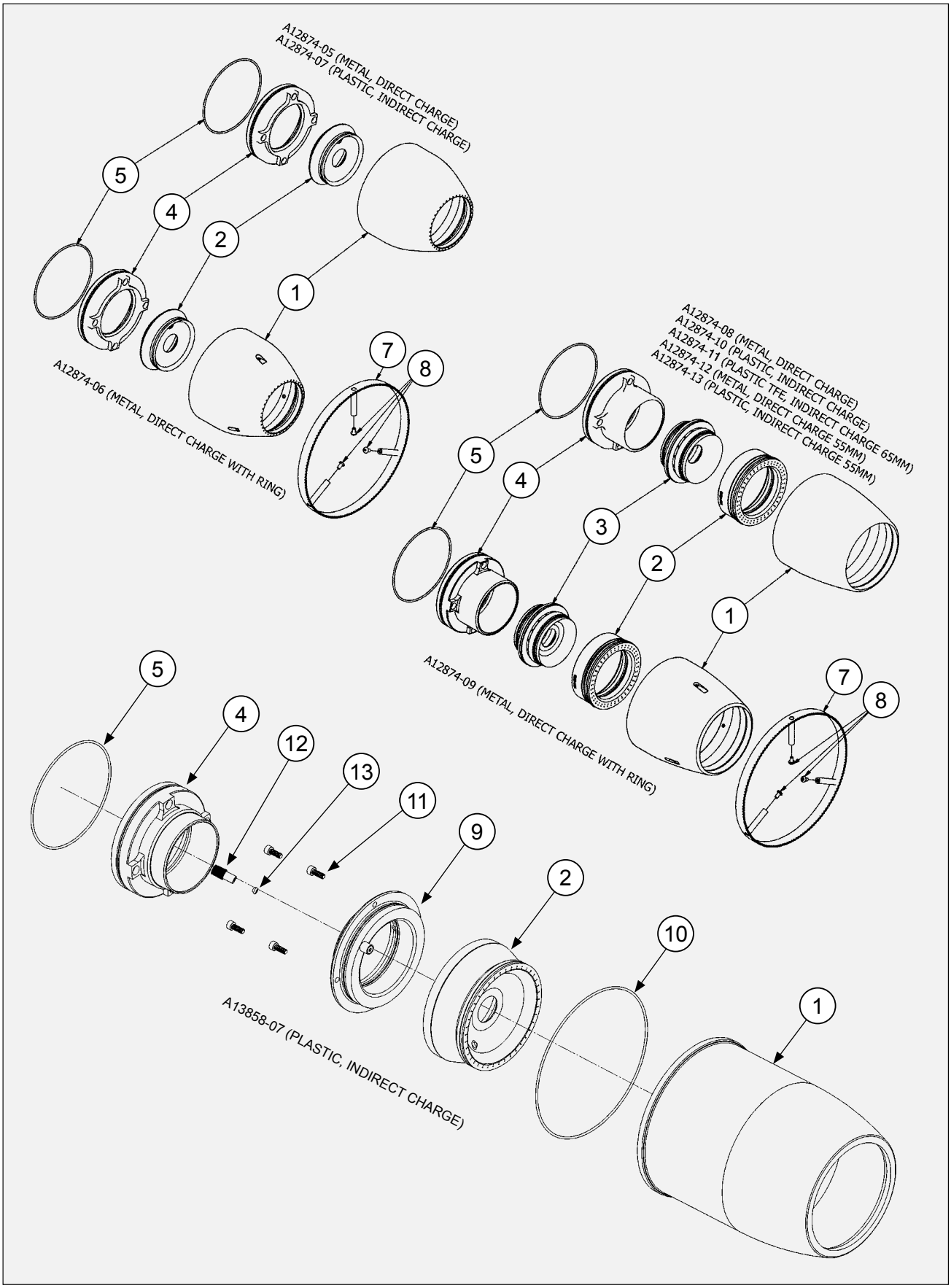
Item	Qty	Part #	Description
1	1	A13133-00	SOLVENT BLOCK
2	2	77367-00	VALVE SEAT ASSEMBLY
3	2	78949-00	VALVE ASSEMBLY (NON-REPAIRABLE)
4	6	77516-04	COLLET, 4 MM
5	10	79001-30	O-RING, SOLVENT PROOF

3 TORQUE TO 15-20 LBS./IN. AFTER VALVE IS DOWN. (1.7 - 2.3 Nm)

2 TORQUE TO 15-20 LBS./IN. (1.7 - 2.3 Nm)

1. USE A11545-00 PETROLATUM JELL ON ALL O-RINGS.

Part Number	Part "A"
A13125-00	A13133-00
A13125-01	A13133-01


A12874-05 (METAL, DIRECT CHARGE)
A12874-07 (PLASTIC, INDIRECT CHARGE)
A12874-06 (METAL, DIRECT CHARGE WITH RING)
A12874-08 (METAL, DIRECT CHARGE)
A12874-10 (PLASTIC, INDIRECT CHARGE)
A12874-11 (PLASTIC TFE, INDIRECT CHARGE 65MM)
A12874-12 (METAL, DIRECT CHARGE 55MM)
A12874-13 (PLASTIC, INDIRECT CHARGE 55MM)
A12874-09 (METAL, DIRECT CHARGE WITH RING)
A13858-07 (PLASTIC, INDIRECT CHARGE)

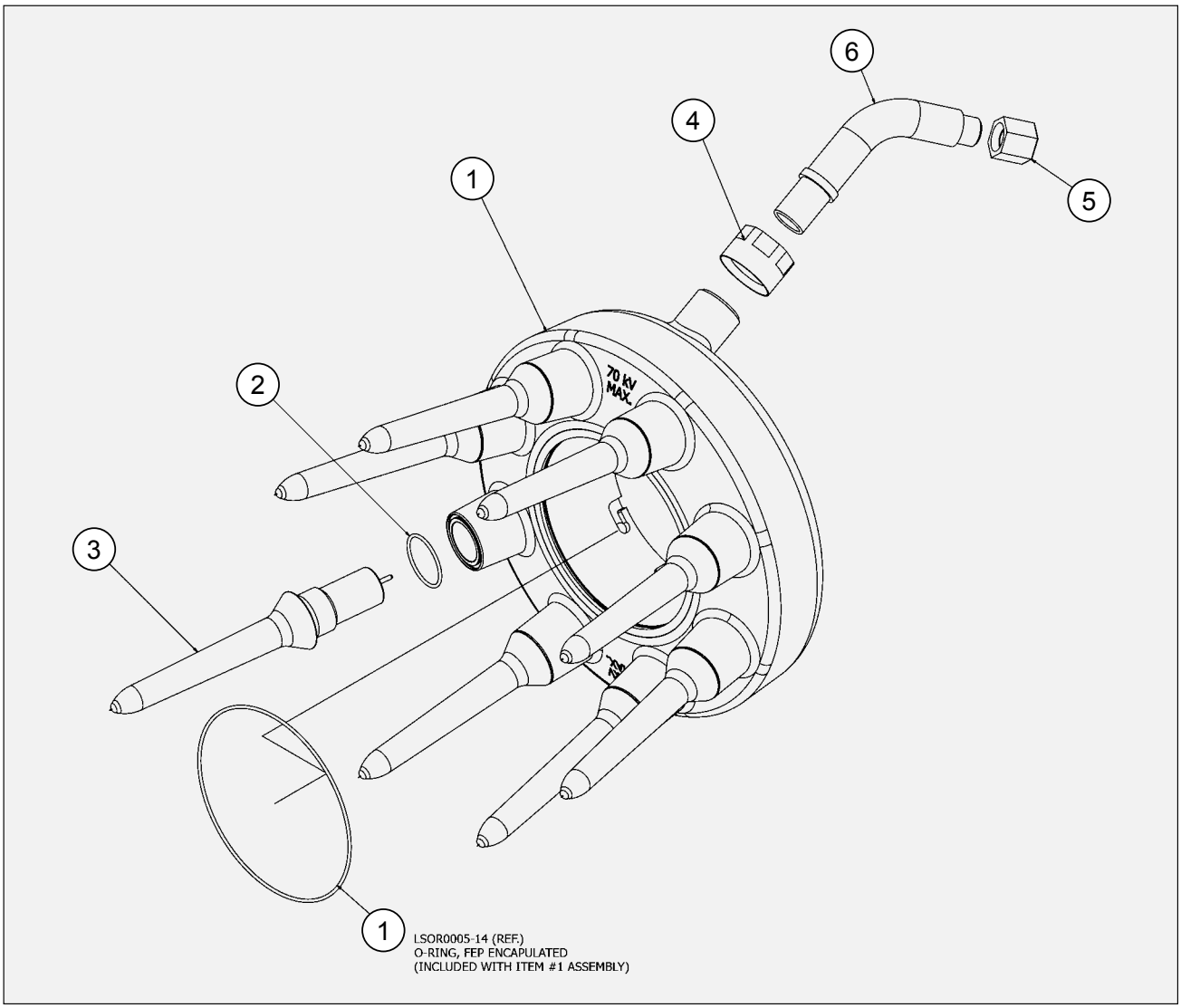
SHAPING AIR KIT ASSEMBLY PARTS BREAK-DOWN

Part #	Description	A	B	C	D	E	F	G	H	J	K	N	P	R	S
A12874-05	Direct Charge, Mono Flex	A12068-01	A12083-01	-	A12078-01	-	-	-	-	-	-	-	-	-	-
A12874-06	Direct Charge with Repulsion Ring, Mono Flex	A12068-02	A12083-01	-	A12078-01	A11945-01	-	-	-	-	-	-	-	1	3
A12874-07	Indirect Charge, Mono Flex	A12068-03	A12083-02	-	A12078-02	-	-	-	-	-	-	-	-	-	-
A12874-08	Direct Charge, Dual Flex	A12074-01	A12084-01	A12871-01	A12066-01	-	-	-	-	-	-	1	-	-	-
A12874-09	Direct Charge with Repulsion Ring, Dual Flex	A12074-02	A12084-01	A12871-01	A12066-01	A11945-02	-	-	-	-	-	1	-	1	3
A12874-10	Indirect Charge, Dual Flex	A12074-03	A12084-02	A12872-02	A12066-02	-	-	-	-	-	-	1	-	-	-
A12874-11	Indirect Charge, Dual Flex TFE	A12932-00	A12084-02	A12871-02	A12066-02	-	-	-	-	-	-	1	-	-	-
A12874-12	Direct Charge, Dual Flex 55mm	A13116-01	A13229-01	A13228-01	A12066-01	-	-	-	-	-	-	1	-	-	-
A12874-13	Direct Charge, Dual Flex	A13116-01	A13229-02	A13228-02	A12066-02	-	-	-	-	-	-	1	-	-	-
A13858-07	Indirect Charge Dual Flex 81mm	A14256-00	A13839-02	-	A13836-00	-	1	1	4	1	1	-	-	-	-

SHAPING AIR KIT - PARTS LIST

Item #	Part #	Description	Qty
1	A	Outer Shroud	1
2	B	Shaping Air Ring	1
3	C	Inner Shaping Air Ring	N
4	D	Turbine Retaining Ring	1
5	79001-11	O-Ring, Solvent Proof	1
6	79001-52	O-Ring, Solvent Proof	P
7	E	Repulsion Ring	R
8	77580-08C	Screw, 6-32X1/4” LG Button Cap Screw, SS	S
9	A13947-00	Shape Air Cover Assembly	F
10	79001-62	O-Ring, Solvent Proof	G
11	A13940-00	Screw 8 - 32x7/16 LG Socket Head Cap Screw, SS	H
12	A12821-00	Cup Wash Fitting	J
13	A12822-00	Cup Wash Ferrule	K

NOTE - Set screw for all shaping air configurations is A12253-00.



A13672-XX HIGH VOLTAGE RING KIT - PARTS LIST

Item	Qty	Part #	Description
1	1	A13137-00	HIGH VOLTAGE RING ASSEMBLY
2	8	79001-45	O-RING (SOLVENT PROOF)
3	8	"A"	ELECTRODE ASSEMBLY
4	1	A11318-00	HIGH VOLTAGE TUBE NUT
5	1	78441-00	FERRULE NUT (3/8 O.D. TUBE)
6	1	A13138-00	HIGH VOLTAGE TUBE

Part Number	"A"	Description
A13672-00	A11343-02	AT SEA LEVEL (220 MEGOHMS)
A13672-01	A11343-03	AT 5000 FT. ABOVE SEA LEVEL OR HIGHER (140 MEGOHMS)

ATOMIZER RECOMMENDED SPARE PARTS

Part #	Description	Qty
A12895-XX	Air Turbine Assembly*	1-2
A11318-00	High Voltage Tube Nut	0-1
A13737-24C	Screw, 1/4-20 x 3/8, Nylon	4-6
78441-00	Ferrule Nut	1-2
A13128-00	Slip Ring	0-1
A13137-00	High Voltage Ring Assembly	0-1
A13138-00	High Voltage Tube	0-1
A13737-24C	Screw, 1/4-20 x 3/4, Nylon	4-6
77367-00	Valve Seat assembly	3-5
78949-00	Valve Assembly	3-5
78944-00	Check Valve Assembly	2-4
A12821-00	Cup Wash Fitting	3-5
A12822-00	Cup Wash Ferrule	3-5
A11245-00	Fluid Tube Assembly	0-1
A13143-00	Screw, #10-32 x 3/8, Nylon	2-4
A13738-32C	Screw, 5/16/-18 x 1”, Nylon	4-6
A11252-01	Tubing (cup wash)	50 ft. (20 meters)
A11305-00	Lower Ferrule, Solvent	3-5
A11276-00	Fitting, Solvent	3-5
78450-00	Fluid Coil	1-2
A13144-00	Rubber Cover	1-2
78803-00	Fitting	0-1
77516-04	Collet, 4mm or 5/32 O.D. Tube	1-2
77762-04	Collet, 8mm or 5/16 O.D. Tube	1-2
77516-01	Collet, 1/4 O.D. Tube	1-2
SSF-2052	Set Screw	1-2
LSFI0022-05	Fitting, 8mm or 5/16 O.D. Tube	1-2
79001-01	O-ring, Solvent Proof	1-2
79001-03	O-ring, Solvent Proof	2-3
79001-04	O-ring, Solvent Proof	1-2
79001-05	O-ring, Solvent Proof	1-2
79001-06	O-ring, Solvent Proof	2-3
79001-08	O-ring, Solvent Proof	1-2
79001-13	O-ring, Solvent Proof	1-2
79001-15	O-ring, Solvent Proof	1-2
79001-22	O-ring, Solvent Proof	1-2
79001-23	O-ring, Solvent Proof	1-2
79001-30	O-ring, Solvent Proof	5-8
79001-34	O-ring, Solvent Proof	1-2
79001-38	O-ring, Solvent Proof	2-3
79001-40	O-ring, Solvent Proof	1-2
79001-41	O-ring, Solvent Proof	1-2
79001-42	O-ring, Solvent Proof	1-2
79001-44	O-ring, Solvent Proof	1-2
79001-45	O-ring, Solvent Proof	3-5
LSOR0005-14	O-ring, Encapsulated	1-2

* Customer must verify correct part number when re-ordering.

(Continued on next page)

ATOMIZER RECOMMENDED SPARE PARTS (Cont.)

Part #	Description	Qty
Select Option Below- Fluid Tip Size		
A11240-01	.7mm (.028”)	0-1
A11240-02	.9mm (.035”)	0-1
A11240-03	1.1mm (.043”)	0-1
A11240-04	1.2mm (.047”)	0-1
A11240-05	1.6mm (.062”)	0-1
A11240-06	1.0mm (.039”)	0-1
Select Option Below- Electrode Assembly		
A11343-02	Electrode Assembly, 220 Megohm	1-2
A11342-00	Electrode Body Assembly	1-2
	Resistor	0-1
Select Option Below- Bell Cup Assembly W/Splash Plate		
A13114-00	55mm Serrated, Titanium (TISF)	1
A13114-01	55mm Non-Serrated, Titanium (TIF)	1
A12900-00	65mm Titanium Serrated (TISF)	1
A12900-01	65mm Titanium Non-Serrated (TIF)	1
A12900-02	65mm Titanium Serrated W/Long Life Splash Plate (TISF)	1
A12900-03	65mm Titanium Non-Serrated W/Long Life Splash Plate	1
A12900-04	65mm Aluminum Serrated W/Plastic Splash Plate	1
A12900-05	65mm Aluminum Non-Serrated W/Long Life Splash Plate	1
A12900-06	65mm Aluminum, Serrated, Plastic Splash Plate, Black Coated Bell Cup, (ALCSCF)	1
A12900-07	65mm Aluminum, Non-Serrated, Plastic Splash Plate, Black Coated Bell Cup, (ALCF)	1
A13832-00	81mm Titanium Serrated W/Plastic Splash Plate (TISF)	1
A13832-01	81mm Titanium Non-Serrated W/Plastic Splash Plate (TIF)	1
A13832-02	81mm Titanium Serrated W/Long Life Splash Plate (TISF)	1
A13832-03	81mm Titanium Non-Serrated W/Long Life Splash Plate (TIF)	1
A13114-00	55mm Serrated Titanium (TISF)	1
A13114-00	55mm Non-Serrated Titanium (TIF)	1
Select Option Below- Splash Plate		
A11269-00	For 55mm Bell Cups (White Color)	1
A12071-00	For 65mm Bell Cups (Black Color)	1
A13004-00	For 65mm and 81mm Bell Cups (Long Life- Titanium top)	1
A12071-00	For 81mm Bell Cups (Black Color)	1
A14117-00	For 65mm and 81mm Bell Cups (Stainless Steel Top)	1
Select Option Below- Shaping Air Kit A12874-05 (65mm Mono Flex) (Stainless Steel)		
A12068-01	Outer Shroud	0-1
A12083-01	Shaping Air Ring	0-1
A12078-01	Turbine Retaining ring	0-1
79001-11	O-ring	1
79001-37	O-ring	1
A12253-00	Set Screw	1-2
Select Option Below- Shaping Air Kit A12874-06 (65mm Mono Flex) Repulsion Ring (Stainless Steel)		
A12068-02	Outer Shroud	0-1
A12083-01	Shaping Air ring	0-1
A12078-01	Turbine Retaining Ring	0-1

* Customer must verify correct Part number when re-ordering.

(Continued on next page)

ATOMIZER RECOMMENDED SPARE PARTS (Cont.)

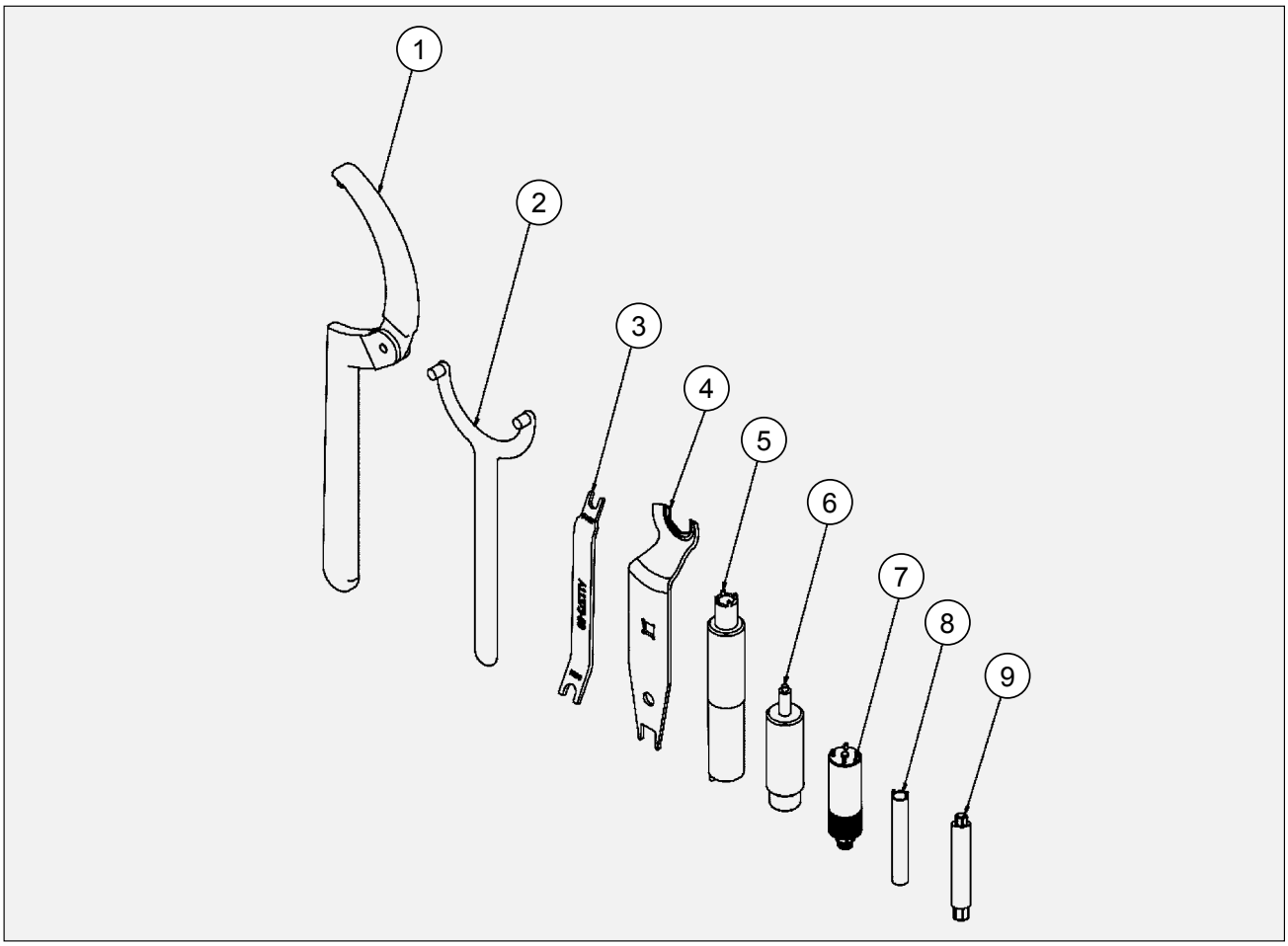
Part #	Description	Qty
Select Option Below- Shaping Air Kit A12874-06 (65mm Mono Flex) Repulsion Ring (Stainless Steel) (Cont.)		
A11945-01	Repulsion Ring	0-1
77580-08C	Screw	3
79001-11	O-ring	1
79001-37	O-ring	1
A12253-00	Set Screw	1-2
Select Option Below- Shaping Air Kit A12874-07 (65mm Mono Flex) (Plastic)		
A12068-03	Outer Shroud	0-1
A12083-02	Shaping Air Ring	0-1
A12078-02	Turbine Retaining ring	0-1
79001-11	O-ring	1
79001-37	O-ring	1
A12253-00	Set Screw	1-2
Select Option Below- Shaping Air Kit A12874-08 (65mm Dual Flex) (Stainless Steel)		
A12074-01	Outer Shroud	0-1
A12084-01	Shaping Air Ring	0-1
A12871-01	Inner Shaping Air ring	0-1
A12066-01	Turbine Retaining Ring	0-1
79001-11	O-ring	1
79001-37	O-ring	1-2
79001-54	O-ring	1
A12253-00	Set Screw	1-2
Select Option Below- Shaping Air Kit A12874-09 (65mm Dual Flex) Repulsion Ring (Stainless Steel)		
A12074-02	Outer Shroud	0-1
A12084-01	Shaping Air Ring	0-1
A12066-01	Turbine Retaining Ring	0-1
A12871-01	Inner Shaping Air ring	0-1
A11945-02	Repulsion Ring	0-1
77580-08C	Screw	3
79001-11	O-ring	1
79001-37	O-ring	1-2
79001-54	O-ring	1
A12253-00	Set Screw	1-2
Select Option Below- Shaping Air Kit A12874-10 (65mm Dual Flex) (Plastic)		
A12074-03	Outer Shroud	0-1
A12084-02	Shaping Air Ring	0-1
A12871-02	Inner Shaping Air ring	0-1
A12066-02	Turbine Retaining Ring	0-1
79001-11	O-ring	1
79001-37	O-ring	1-2
79001-54	O-ring	1
A12253-00	Set Screw	1-2

* Customer must verify correct Part number when re-ordering.

(Continued on next page)

ATOMIZER RECOMMENDED SPARE PARTS (Cont.)

Part #	Description	Qty
Select Option Below- Shaping Air Kit A12874-11 (65mm Dual Flex) (Plastic TFE)		
A12932-00	Outer Shroud	0-1
A12084-02	Shaping Air Ring	0-1
A12871-02	Inner Shaping Air Ring	0-1
A12066-02	Turbine Retaining Ring	0-1
A14256-00	Outer Shroud	0-1
A13839-02	Shape Air Ring	0-1
A13836-00	Turbine Retaining Ring	0-1
A13947-00	Shaping Air Cover Assembly	0-1
A13940-00	Screw	4
79001-11	O-Ring	1
79001-62	O-Ring	1
A12821-00	Cup Wash Fitting	1-2
A12822-00	Cup Wash Ferrule	1-2
Select Option Below- Shaping Air Kit A12874-12 (55mm Dual Flex)		
A13116-01	Outer Shroud	0-1
A13229-01	Shape Air Ring	0-1
A13228-01	Inner Shaping Air Ring	0-1
A12066-01	Turbine Retaining Ring	0-1
79001-11	O-Ring	1
79001-37	O-Ring	1-2
79001-54	O-Ring	1
A12253-00	Set Screw	1
Select Option Below- Shaping Air Kit A12874-13 (55mm Dual Flex)		
A13116-02	Outer Shroud	0-1
A13229-02	Shape Air Ring	0-1
A13228-02	Inner Shaping Air Ring	0-1
A12066-02	Turbine Retaining Ring	0-1
79001-11	O-Ring	1
79001-37	O-Ring	1
79001-54	O-Ring	1-2
A11253-00	Set Screw	1
Select Option Below- Shaping Air Kit A13858-07 (81mm Dual Flex)		
A14256-00	Outer Shroud	0-1
A13839-02	Inner Shaping Air Ring Assembly	0-1
79001-62	O-Ring	0-1
A12253-00	Set Screw	1-2
A13836-00	Turbine Retaining Ring	1
79001-11	O-Ring	1-2
A13940-00	Screw	1-2
79001-16	O-Ring	0-1
79001-10	O-Ring	0-1
79001-43	O-Ring	0-1
79001-63	O-Ring	0-1



Assembly Tools

ASSEMBLY TOOLS A12090-02 (INCLUDES ITEMS BELOW)		
Item #	**Part #**	**Description**
1	76772-01	Wrench, Spanner
2	A12088-00	Wrench, Turbine Retaining Ring
3	A11373-00	Tool, Tubing Removal
4	A12061-00	Wrench, Bell Cup
5	A11229-00	Tool, Fluid Tip/Tube Removal
6	A11388-00	Tool, Splash Plate Removal
7	A11922-00	Tool, Valve Removal
8	78279-00	Tool, Fiber Optic
9	A10766-00	Microvalve Seat Removal
10	LSCH0009-00	Dielectric Grease (.88 oz. tube) Not Shown

FILTER & HEATER ASSEMBLY A13230-XX

Dash No.	Description	"A"	"B"	"C"	"E"
A13230-01	115 V.@ 13A METRIC FITTINGS	A13434-01	A13426-00	A13429-00	A13726-00
A13230-02	230 V.@ 6.5A METRIC FITTINGS	A13434-02	A13426-00	A13429-00	A13726-00
A13230-03	115 V.@ 13A FRACTIONAL FITTINGS	A13434-01	SSP-6439	A13428-00	A13727-00
A13230-04	230 V.@6.5A FRACTIONAL FITTINGS	A13434-02	SSP-6439	A13428-00	A13727-00

A13230-XX AIR HEATER AND FILTER COMBINATION

Item	Part #	Description	Qty.
1	"A"	AIR BLOCK, NIPPLES & AIR HEATER	1
2	A13427-00	INLET FITTING, 3/8 NPS(M) X 1/2 NPT(M)	1
3	"B"	BEARING AIR FEED, SWIVEL ELBOW 1/4 O.D.TUBE X 1/4 NPT(M)	1
		BEARING AIR FEED, 6mm O.D. TUBE X 1/4 NPT(M) STRAIGHT ADAPTER	
4	79253-02	AIR FITTING, SWIVEL ELBOW 5/32 O.D. TUBE X 1/4 NPT(M)	2
5	"C"	OUTLET FITTING, 1/2 O.D. TUBE X 1/2 NPT(M) STAINLESS STEEL	1
		OUTLET FITTING, 12mm O.D. TUBE X 1/2 NPT(M) STAINLESS STEEL	
6	"E"	VOLUME BOOSTER	1
7	A13433-00	AIR FILTER & NIPPLE INCLUDED	1
8	SI-13-07	A13230-XX SERVICE LITERATURE (PROVIDED BY OTHER)	REF.

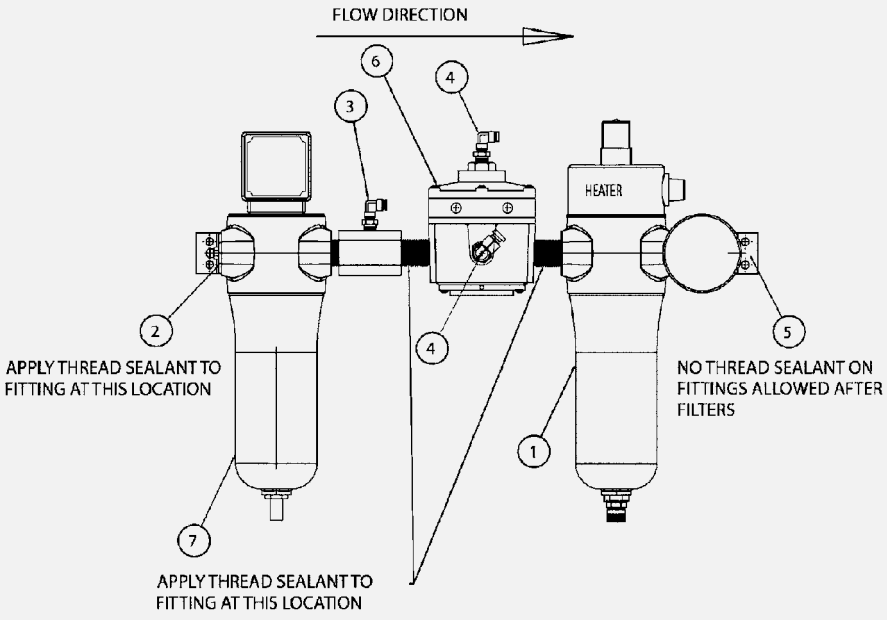
ALL UNITS: REPLACEMENT PARTS: (SERVICE NOTE)
HEATING ELEMENT USE: A13432-01 FOR A13230-01 AND A13230-03 (115V UNITS)
A13432-02 FOR A13230-02 AND A13230-04 (230V UNITS)
AIR FILTER ELEMENT USE A13232-00
THERMOMETER USE A13431-00

AIR FILTER / REPLACEMENT

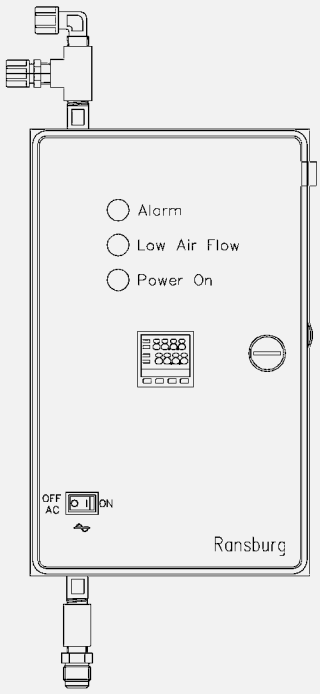
Ransburg Part #	Qty. Elements Per Carton	Used On
HAF-15	1	HAF-503
HAF-38	4	HAF-508
RPM-33	8	RPM-418

ACCESSORIES

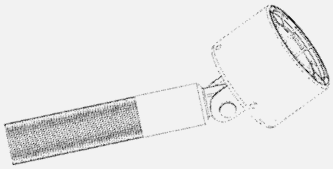
Part #	Description
LSCH0009-00	DIELECTRIC GREASE (.8 OZ. TUBE)
76652-01	KIT FOR MEASURING HIGH VOLTAGE. (INCLUDES MULTI-FUNCTION METER (76634-00) AND HIGH VOLTAGE PROBE ASSY. (76667-00).
76652-02	KIT FOR MEASURING SHORT CIRCUIT CURRENT (SCI), RESISTANCE, AND SPRAY ABILITY. INCLUDES MULTI-FUNCTION METER (76634-00) AND TEST LEAD ASSY. (76664-00).
76652-03	KIT FOR MEASURING PAINT RESISTIVITY. (INCLUDES MULTI-FUNCTION METER (76634-00) AND PAINT PROBE ASSY. (7922-00).
76652-04	DELUXE KIT (PERFORMS ALL FUNCTIONS LISTED ABOVE.) INCLUDES MULTI-FUNCTION METER (76634-00), PAINT PROBE ASSY. (7922-00), TEST LEAD ASSY. (76664-00), AND HIGH VOLTAGE PROBE ASSY. (76667-00).
A11567-00	GROOVE TOOL, ¼" OD TUBE
A14283-00	FEELER GAGE ASSEMBLY (65MM BELL CUPS)



A13230-XX Air Heater and Filter Combination



A11065-05 Air Heater



A14287-00 (55mm), A14208-00 (65mm), and A14204-00 (81mm) Bell Cup Tool

SERVICE KITS

Part #	Description
HAF-15	Pre-Filter Replacement Element (See below for qty. & where used)
HAF-38	Pre-Filter Replacement Element (See below for qty. & where used)
RPM-33	Bearing Air Filter Element (See below for qty. & where used)
A14208-00	65mm Bell Cup Removal Tool
A14204-00	81mm Bell Cup Removal Tool
A11570-01	Reducing Straight Connector, Push To Connect, 6mm OD Tube To 4mm OD Tube
A11570-02	Reducing Straight Connector, Push To Connect, 8mm OD Tube To 4mm OD Tube
A11570-03	Reducing Straight Connector, Push To Connect, 8mm OD Tube To 6mm OD Tube
A11570-04	Reducing Straight Connector, Push To Connect, 10mm OD Tube To 4mm OD Tube
A11570-05	Reducing Straight Connector, Push To Connect, 10mm OD To 6mm OD Tube
A11570-06	Reducing Straight Connector, Push To Connect, 10mm OD To 8mm OD Tube
A11570-07	Reducing Straight Connector, Push To Connect, 12mm OD To 8mm OD Tube
A11570-08	Reducing Straight Connector, Push To Connect, 12mm OD To 10mm OD Tube

LUBRICANTS AND SEALERS

Part #	Description
A11545-00	PETROLATUM JELL LUBRICANT FOR ALL O-RINGS

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 IN PLASTIC, SHRINK-WRAP, ETC., WILL VOID THIS WARRANTY.**

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.

Specific Air Turbine Warranty

The air turbine only is warranted for 15,000 operating hours, or 3 years from date of first installation, whichever comes first. If, after inspection by Ransburg, defect is confirmed, we will repair or replace the air turbine, free of charge, during the warranty period. The repaired air turbine (or replacement air turbine) will continue to be warranted for the remainder of the initial warranty period (from installation date). The warranty period for the air turbine does not begin again when a repair is completed under warranty. Air turbines repaired by Ransburg after the warranty period will be warranted for 90 days from the date of shipment from the repair center.

The Warranty does not cover:

1. An RMA 590 that has become inoperative because of:
   a. Misuse - Particularly the flooding of the rotor area due to turning on the fluid before the turbine is up to speed
   b. Negligence.
   c. Accidents - Collisions with external objects, fires, or similar occurrences.
   d. Improper maintenance procedures.
   e. Attempted customer repair of an air turbine during warranty.
   f. Failure to insure clean air to air bearing and turbine.
   g. Operating turbine without bearing air.
   h. Operating turbine with less than minimum specified air bearing pressure. (80 psi 5.51 Bar)
   i. Operating with imbalanced loads (heavy paint buildup on atomizer bell or shaft, or damaged atomizer bell cup).
   j. Acts of God, flood, earthquake, or similar occurrences.
   k. RMA-590's being operated by control systems not designed by Ransburg, or when others have
2. Labor or incidental costs occasioned by removal, replacement or repair of rotary atomizer or air turbine (other than by Ransburg) unless we have given specific written or telegraphic authorization for repair by someone other than Ransburg.
3. Rotary atomizers determined by Ransburg not to have been installed and maintained in accordance with Ransburg service manual instructions.
4. Cost of repair/replacement and return transportation from Ransburg of merchandise determined not to be defective.

MANUAL CHANGE SUMMARY

LN-9276-14.1 replaces Service Manual **LN-9276-14.** with the following changes:

LN-9276-14.2 replaces Service Manual **LN-9276-14.1** with the following changes:

LN-9276-14.3 replaces Service Manual **LN-9276-14.2** with the following changes:

1. Revise version number to .3 ..... ***All Pages***
2. Add text to MicroPak 2e specs. ***9***
3. Add optional resistor to image ***20***
4. Add second note ***34***
5. Add paragraph of text before schedule ***48***
6. Add paragraph after CAUTION and new WARNING ***57***
7. New copy after NOTE ***59***
8. Replace first image and copy ***65***
9. Remove fitting from the first image ***66***
10. Add “OPTIONAL GROUND RESISTOR” and photos ***74-76***
11. Add TABLE J to copy ***77***
12. Add TABLE J to the bottom of page ***79***
13. New images ***80-81***
14. Remove items 68 and 69 and add and replace 85 through 90 ..... ***82-83***
15. Remove the column for “Cup Only Part #” from table ***82***
16. Correct image ***85***
17. Correct item 1 in table 1 and add second table at the bottom ***86***
18. Correct part # in table 1 and add second table ***89***
19. Update SPARE PARTS LIST ***90-93***
20. Add part number A14283-00 as last item in last table ***95***
21. Correct part numbers for Bell Cup Tools in image ***96***
22. Incorporate new logo on back page ..... ***Back Cover***

Ransburg

Manufacturing

1910 North Wayne Street
Angola, Indiana 46703-9100
Telephone: 260-665-8800
Fax: 260-665-8516

Technical Service — Assistance

320 Phillips Ave.
Toledo, Ohio 43612-1493
Telephone (toll free): 800-233-3366
Fax: 419-470-2233

Technical Support Representative will direct you to the appropriate telephone number for ordering Spare Parts.

Form No. LN-9276-14.3
Litho in U.S.A.
05/17

CARLISLE FLUID TECHNOLOGIES | DeVILBISS | Ransburg | ms | BGK | BINKS

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