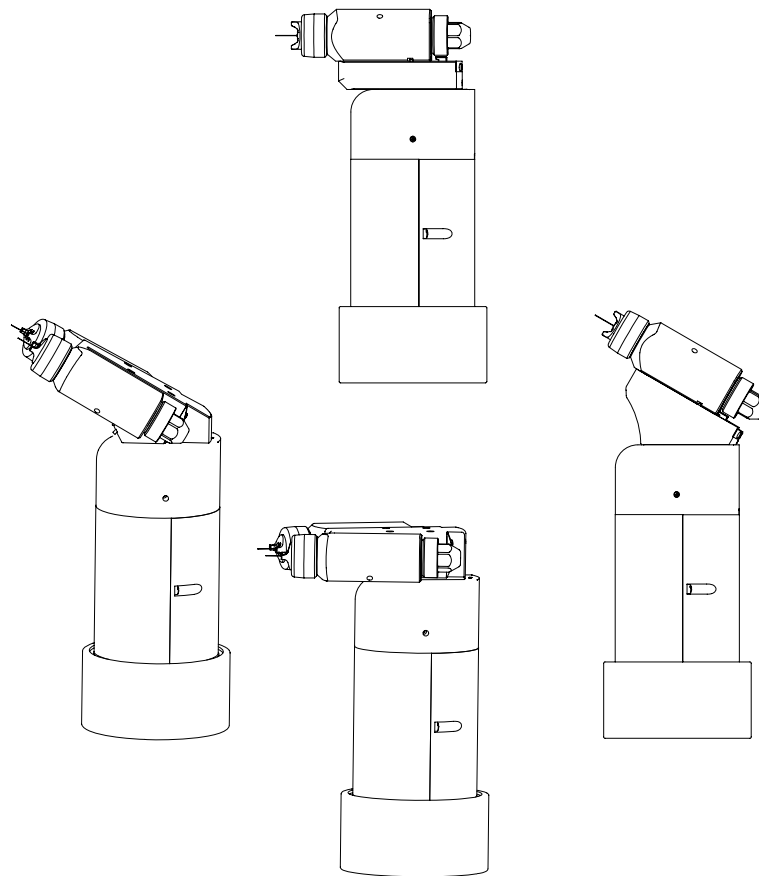


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# EVOLVER 202™ SOLVENTBORNE ROBOTIC ATOMIZERS

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**MODEL: A11918-XXX**

With  
**UNLINK**  
Technology

**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: €40.00 (Euro)  
\$50.00 (U.S.)



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# SAFETY

## SAFETY PRECAUTIONS

Before operating, maintaining or servicing any ITW Ransburg electrostatic coating system, read and understand all of the technical and safety literature for your ITW 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 ITW Ransburg system, contact your local ITW Ransburg representative or ITW Ransburg.




### WARNING

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

### WARNING

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

<b>AREA</b> Tells where hazards may occur.	<b>HAZARD</b> Tells what the hazard is.	<b>SAFEGUARDS</b> Tells how to avoid the hazard.
<p><b>Spray Area</b></p> 	<p><b>Fire Hazard</b></p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent power supply shut-down indicates a problem in the system requiring correction.</p>	<p>Fire extinguishing equipment must be present in the spray area and tested periodically.</p> <p>Spray areas must be kept clean to prevent the accumulation of combustible residues.</p> <p>Smoking must never be allowed in the spray area.</p> <p>The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance.</p> <p>When using solvents for cleaning:</p> <p>Those used for equipment flushing should have flash points equal to or higher than those of the coating material.</p> <p>Those used for general cleaning must have flash points above 100°F (37.8°C).</p> <p>Spray booth ventilation must be kept at the rates required by local and/or country codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents.</p> <p>Electrostatic arcing must be prevented.</p> <p>Test only in areas free of combustible material.</p> <p>Testing may require high voltage to be on, but only as instructed.</p> <p>Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury.</p> <p>If used, the key switch bypass is intended for use only during set-up operations. Production should never be done with safety interlocks disabled.</p> <p>The paint process and equipment should be set up and operated in accordance with local and/or country safety codes.</p>
<p><b>General Use and Maintenance</b></p> 	<p>Improper operation or maintenance may create a hazard.</p> <p>Personnel must be properly trained in the use of this equipment.</p>	<p>Personnel must be given training in accordance with the requirements of NFPA-33.</p> <p>Instructions and safety precautions must be read and understood prior to using this equipment.</p> <p>Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, and your insurance company requirements.</p>

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



<b>AREA</b> Tells where hazards may occur.	<b>HAZARD</b> Tells what the hazard is.	<b>SAFEGUARDS</b> Tells how to avoid the hazard.
<b>Robot Work Area -General Use and Maintenance</b>	Improper use or maintenance can lead to hazardous conditions, particularly from unexpected robot manipulator movement.	Applicator adjustments or maintenance should be done after the robot is taken out of service. Do not adjust or repair the applicator if the robot is operating or standing ready to start.  Refer to robot operating instructions for the procedures to take the robot out of service.
<b>Personnel Safety</b>	Skin puncturing by sharp electrode.	Take precautions to see that flesh is not punctured by sharp electrode.

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# INTRODUCTION

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## THE ITW RANSBURG ELECTROSTATIC PROCESS

This process is a method for electrostatically applying coatings to objects. A power supply produces a high voltage charge which is supplied to the applicator, creating an electrostatic field between the applicator and the target object. The target is electrostatically grounded through its support which may be either stationary or moving.

A regulated fluid system delivers coating material to the applicator, where it is atomized forming a spray mist. There, under the influence of the electrostatic field, the atomized coating becomes electrostatically charged. The charged particles are attracted to and deposited on the grounded target object. The forces between the charged particles and the target are sufficient to turn overspray around and deposit it on the back surface of the target. Therefore, a higher percentage of the spray is deposited.

## EVOLVER 202™ SOLVENTBORNE SPRAY APPLICATORS

The *Evolver 202 Spray Applicators System* will allow for the use of spray applicators or bell applicators with minimal required down-time during the switching process. This system can also operate as a spray applicator system only that later can be upgraded to allow for bell applicators to be used. Lastly, this system can allow a user currently possessing an RMA-202 bell system to use spray applicators as well, with minimal conversion required. The Evolver 202 solventborne applicator line consists of both 60° and 90° single and dual-headed 100 kV automatic electrostatic applicators. Developed for use on robots, the Evolver202 spray applicator incorporates a unique 1/3 turn quick-disconnect spray head and a two piece bolt together manifold cover, providing the user an efficient tool for the electrostatic application of coatings.

The Evolver 202 spray applicator also has the ability to color change while spraying with no voltage draw down, a true dual purge function (depending on the unit purchased).

There are two single head models of the Evolver 202 applicator (see Figure 1). Each model differs in the applicator to axis orientation of the spray head. These models are:

A11918-0XX 60° Single Head

A11918-1XX 90° Single Head

Two dual-head versions of the Evolver 202 applicator are also available (see Figure 1). The dual headed applicators are primarily used where high volume fluid delivery is required. The dual headed applicator is available in two different configurations as follows:

A11918-2XX 60° Dual Head

A11918-3XX 90° Dual Head

The Evolver 202 spray applicator system consists of four major components:

1. Quick-Disconnect Spray Head
2. Gun Head Mounting Block Assembly
3. Valve Manifold Assembly (Includes the High Voltage Cascade with a Quick-Disconnect Ring)
4. Rear Tubing Manifold Assembly (both English and Metric)

The spray head(s) and valve manifold contain the fluid, air, and high voltage passages. All fluid passages contain stainless steel and/or nylon fittings, compatible with halogenated hydrocarbon solvents. The robot manifold incorporates stainless steel fluid connections.

The high voltage cascade is entirely encapsulated with a solvent resistant epoxy. This cascade generates voltages up to 100 kV fed by a low voltage cable.

There are three sources for the high voltage supply to the Evolver 202 applicators:

- MicroPak™ Control Unit (LECU5004) (for non-FM installations)
- Stand-alone control/power supply unit (A10406) (for FM installations)
- MicroPak™ Control Unit (LECU5004-31) (for FM installations)

The MicroPak Power Supply Control unit provides a low voltage signal through the robot manifold to the spray applicator. The high voltage cascade located within the applicator converts the low voltage DC signal to a high voltage electrostatic output.

## NOTES

# SPECIFICATIONS

## Environmental/Physical

**Robot/Mounting Compatibility:**  
All hollow wrist robots

**Applicator Control Unit:**  
MicroPak Control Unit - LECU5004-31  
Stand-Alone Control Unit - A10406

**Operating Temperature Range:**  
55°F (12.8°C) - 131°F (55°C)

**Weight**

**Single-Headed:**

60°	10.87 lbs. (4.93 Kg)
90°	10.56 lbs. (4.79 Kg)

**Dual-Headed:**

60°	12.76 lbs. (5.79 Kg)
90°	12.61 lbs. (5.72 Kg)

**Manifold:**  
**A11919-XX** 8.67 lbs. (3.93 Kg)  
(No tubing or cable)

**Length**

**Single-Headed:**

60°	15.4 in. (39.1cm)
90°	12.6 in. (32.0cm)

**Dual-Headed:**

60°	14.7 in. (37.3cm)
90°	11.3 in. (28.7cm)

**Tubing Manifolds (English):**

<b>79106-0XXXXXX</b>	Air Tubing not included
<b>79106-1XXXXXX</b>	15 ft.
<b>79106-2XXXXXX</b>	30 ft.

**Tubing Manifolds (Metric):**

<b>A10892-0XXXXXX</b>	Air Tubing not included
<b>A10892-1XXXXXX</b>	4 1/2m (15 ft.)
<b>A10892-2XXXXXX</b>	9m (30 ft.)

## Electrical Requirements

**Output Voltage:** 30-100 kV

**Output Range:** 0-85 µA

**Paint Flow Rate:** Variable to 1500 cc/min.  
(Depending on viscosity & configuration)

**Trigger Response Time:** 191ms Open  
206ms Closed

**Operating Air Pressures**

**Atomizing Air:** 100 psig  
(6.9 bar) max.

**Fan Air:** 100 psig  
(6.9 bar) max.

**Trigger Pilot:** 70 psig min./100 psig  
(4.8 - 6.9 bar) max.

**Regulator Pilot:** 0 psig min./100 psig  
(0 - 6.9 bar) max.

**Dump Pilot:** 70 psig min./  
100 psig max.  
(4.8 - 6.9 bar)

**Operating Fluid Pressure:** 200 psig  
(13.8 bar) max.  
100 psig  
(6.9 bar) max.  
Regulated (with on-board regulator)

### Robot Manifold Tubing Requirements

	<i>Tubing Bundle</i>	<i>Tubing Bundle</i>
	<i>English</i>	<i>Metric</i>
<b>Atomizing Air</b>	3/8" OD Nylon	10mm OD Nylon
<b>Fan Air</b>	3/8" OD Nylon	8mm OD Nylon
<b>Trigger Air</b>	1/4" OD Nylon	4mm OD Nylon
<b>Regulator Pilot</b>	5/32" OD Nylon	5/32" OD Nylon
<b>Dump Pilot</b>	3/8" OD Nylon	10mm OD Nylon
<b>Fluid:</b>		
<b>Teflon</b>	1/4", 3/8", or 5/16" OD (Non-Shielded)	6mm, 8mm, or 10mm OD (Non-Shielded)
<b>Dump:</b>		
<b>Teflon</b>	1/4" ID	8mm ID

**EVOLVER 202 APPLICATOR ASSEMBLY**

A11918 - A B C

**Head Configuration**

- 0 = 60° Single Head
- 1 = 90° Single Head
- 2 = 60° Dual Head
- 3 = 90° Dual Head

**Body Style**

- 0 = Single Purge / No Regulator /  
For Highly Conductive Materials (Base/Clear)
- 1 = Dual Purge / No Regulator /  
For Highly Conductive Materials (Base/Clear)
- 2 = Single Purge / With Regulator
- 3 = Single Purge / No Regulator /  
For Conductive Materials (Base/Clear)
- 4 = Dual Purge / No Regulator /  
For Conductive Materials (Base/Clear)
- 5 = Single Purge / No Regulator /  
For Highly Resistive Materials (Clear Coat)
- 6 = Dual Purge / No Regulator /  
For Highly Resistive Material (Clear Coat)

**Atomization Technology**

- 0 = Conventional Spray
- 1 = HVLP Spray

<b>EVOLVER 202 TUBING BUNDLE ASSEMBLY (ENGLISH)</b>	
79106 - A	BB C D E F
<p><b>Tubing Bundle Length</b></p> <p>0 = Air Tubing (Not Included)                      1 = 15 Ft. Long Tubing Assembly                      2 = 30 Ft. Long Tubing Assembly</p> <p><b>Low Voltage Cable Length</b></p> <p>00 = No Cable                      01 = 25 Ft. Low Voltage, Non-Junction                      02 = 40 Ft. Low Voltage, Non-Junction                      03 = 50 Ft. Low Voltage, Non-Junction                      04 = 75 Ft. Low Voltage, Non-Junction                      05 = 100 Ft. Low Voltage, Non-Junction                      06 = 15 Ft. Robot to JB / 15 Ft. JB to MicroPak                      07 = 15 Ft. Robot to JB / 40 Ft. JB to MicroPak                      08 = 15 Ft. Robot to JB / 60 Ft. JB to MicroPak                      09 = 15 Ft. Robot to JB / 75 Ft. JB to MicroPak                      10 = 25 Ft. Robot to JB / 25 Ft. JB to MicroPak                      11 = 25 Ft. Robot to JB / 50 Ft. JB to MicroPak                      12 = 25 Ft. Robot to JB / 75 Ft. JB to MicroPak                      13 = 40 Ft. Robot to JB / 15 Ft. JB to MicroPak                      14 = 40 Ft. Robot to JB / 25 Ft. JB to MicroPak                      15 = 40 Ft. Robot to JB / 40 Ft. JB to MicroPak                      16 = 40 Ft. Robot to JB / 60 Ft. JB to MicroPak                      31 = 25 Ft. Low Voltage, Non-Junction, Evolver MicroPak                      32 = 50 Ft. Low Voltage, Non-Junction, Evolver MicroPak                      33 = 75 Ft. Low Voltage, Non-Junction, Evolver MicroPak                      34 = 100 Ft. Low Voltage, Non-Junction, Evolver MicroPak                      35 = 15 Ft. Robot to JB / 15 Ft. JB to Evolver MicroPak                      36 = 15 Ft. Robot to JB / 40 Ft. JB to Evolver MicroPak                      37 = 15 Ft. Robot to JB / 60 Ft. JB to Evolver MicroPak                      38 = 15 Ft. Robot to JB / 75 Ft. JB to Evolver MicroPak                      39 = 25 Ft. Robot to JB / 25 Ft. JB to Evolver MicroPak                      40 = 25 Ft. Robot to JB / 50 Ft. JB to Evolver MicroPak                      41 = 25 Ft. Robot to JB / 75 Ft. JB to Evolver MicroPak</p> <p><b>Fiber Optic Cable Length</b></p> <p>0 = Fiber Optic Cable Not Included                      1 = 15 Ft. Long Fiber Optic Cable                      2 = 25 Ft. Long Fiber Optic Cable                      3 = 50 Ft. Long Fiber Optic Cable                      4 = 75 Ft. Long Fiber Optic Cable                      5 = 100 Ft. Long Fiber Optic Cable                      6 = 40 Ft. Long Fiber Optic Cable</p>	<p><b>Part #2 Supply Line - Dump Line #2</b></p> <p>0 = None                      1 = Paint Line, 1/4" OD X .170" ID, PFA Teflon                      - Dump Line, 3/8" OD X .250" ID, PFA Teflon                      2 = Paint Line, 3/8" OD X .250" ID, PFA Teflon                      - Dump Line, 3/8" OD X .250" ID, PFA Teflon                      3 = Paint Line, 5/16" OD X .188" ID, PFA Teflon - Dump Line, 3/8" OD X .250" ID, PFA Teflon</p> <p><b>Paint #1, Dump Line #1</b></p> <p>1 = Paint Line, 1/4" OD X .170" ID, PFA Teflon                      - Dump Line, 3/8" OD X .250" ID, PFA Teflon                      2 = Paint Line, 3/8" OD X .250" ID, PFA Teflon                      - Dump Line, 3/8" OD X .250" ID, PFA Teflon                      3 = Paint Line, 5/16" OD X .188" ID, PFA Teflon - Dump Line, 3/8" OD X .250" ID, PFA Teflon</p> <p><b>Robot Adapter</b></p> <p>0 = Adapter (Not Included)                      1 = Adapter (Fanuc)                      2 = Adapter (ABB)                      3 = Adapter (Fanuc-P200)                      4 = Adapter (KAWASAKI-KE610L)                      5 = Adapter (MOTOMAN-PX2850)                      6 = Adapter (MOTOMAN-PX2900)                      7 = Adapter (B &amp; M LZ2000)</p>

**EVOLVER 202 TUBING BUNDLE ASSEMBLY (METRIC)**
**A10892 - A BB C D E F**
**Tubing Bundle Length**

- 0 = Air Tubing (Not Included)
- 1 = 4 /12m (15 Ft.) Long Tubing Assembly
- 2 = 9m (30 Ft.) Long Tubing Assembly

**Low Voltage Cable Length**

- 0 0 = No Cable
- 01 = 25 Ft. Low Voltage, Non-Junction
- 02 = 40 Ft. Low Voltage, Non-Junction
- 03 = 50 Ft. Low Voltage, Non-Junction
- 04 = 75 Ft. Low Voltage, Non-Junction
- 05 = 100 Ft. Low Voltage, Non-Junction
- 06 = 15 Ft. Robot to JB / 15 Ft. JB to MicroPak
- 07 = 15 Ft. Robot to JB / 40 Ft. JB to MicroPak
- 08 = 15 Ft. Robot to JB / 60 Ft. JB to MicroPak
- 09 = 15 Ft. Robot to JB / 75 Ft. JB to MicroPak
- 10 = 25 Ft. Robot to JB / 25 Ft. JB to MicroPak
- 11 = 25 Ft. Robot to JB / 50 Ft. JB to MicroPak
- 12 = 25 Ft. Robot to JB / 75 Ft. JB to MicroPak
- 13 = 40 Ft. Robot to JB / 15 Ft. JB to MicroPak
- 14 = 40 Ft. Robot to JB / 25 Ft. JB to MicroPak
- 15 = 40 Ft. Robot to JB / 40 Ft. JB to MicroPak
- 16 = 40 Ft. Robot to JB / 60 Ft. JB to MicroPak
- 31 = 25 Ft. Low Voltage, Non-Junction, Evolver MicroPak
- 32 = 50 Ft. Low Voltage, Non-Junction, Evolver MicroPak
- 33 = 75 Ft. Low Voltage, Non-Junction, Evolver MicroPak
- 34 = 100 Ft. Low Voltage, Non-Junction, Evolver MicroPak
- 35 = 15 Ft. Robot to JB / 15 Ft. JB to Evolver MicroPak
- 36 = 15 Ft. Robot to JB / 40 Ft. JB to Evolver MicroPak
- 37 = 15 Ft. Robot to JB / 60 Ft. JB to Evolver MicroPak
- 38 = 15 Ft. Robot to JB / 75 Ft. JB to Evolver MicroPak
- 39 = 25 Ft. Robot to JB / 25 Ft. JB to Evolver MicroPak
- 40 = 25 Ft. Robot to JB / 50 Ft. JB to Evolver MicroPak
- 41 = 25 Ft. Robot to JB / 75 Ft. JB to Evolver MicroPak

**Part #2 Supply Line - Dump Line #2**

- 0 = None
- 1 = Paint Line, 6mm OD X 4mm ID, PFA Teflon / Dump Line, 10mm OD X 8mm ID, PFA Teflon
- 2 = Paint Line, 8mm OD X 6mm ID, PFA Teflon / Dump Line, 10mm OD X 8mm ID, PFA Teflon
- 3 = Paint Line, 10mm OD X 8mm ID, PFA Teflon / Dump Line, 10mm OD X 8mm ID, PFA Teflon

**Paint #1, Dump Line #1**

- 1 = Paint Line, 6mm OD X 4mm ID, PFA Teflon / Dump Line, 10mm OD X .8mm ID, PFA Teflon
- 2 = Paint Line, 8mm OD X 6mm ID, PFA Teflon / Dump Line, 10mm OD X 8mm ID, PFA Teflon
- 3 = Paint Line, 10mm OD X 8mm ID, PFA Teflon / Dump Line, 10mm OD X 8mm ID, PFA Teflon

**Robot Adapter**

- 0 = Adapter (Not Included)
- 1 = Adapter (Fanuc)
- 2 = Adapter (ABB)
- 3 = Adapter (Fanuc-P200)
- 4 = Adapter (KAWASAKI-KE610L)
- 5 = Adapter (MOTOMAN-PX2850)
- 6 = Adapter (MOTOMAN-PX2900)
- 7 = Adapter (B & M LZ2000)

**Fiber Optic Cable Length**

- 0 = Fiber Optic Cable Not Included
- 1 = 15 Ft. Long Fiber Optic Cable
- 2 = 25 Ft. Long Fiber Optic Cable
- 3 = 50 Ft. Long Fiber Optic Cable
- 4 = 75 Ft. Long Fiber Optic Cable
- 5 = 100 Ft. Long Fiber Optic Cable
- 6 = 40 Ft. Long Fiber Optic Cable

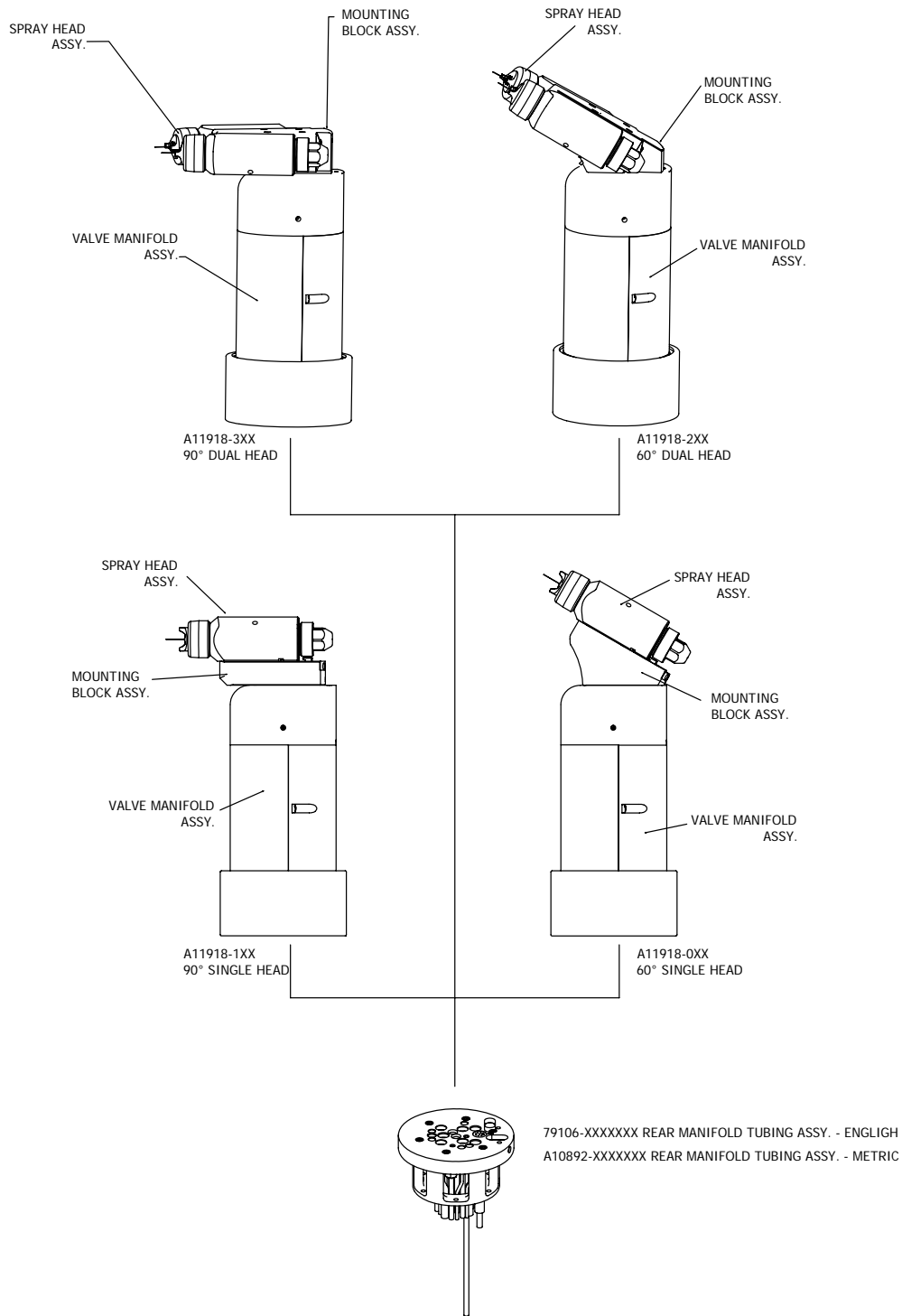


Figure 1: Evolver 202 Solventborne Robotic Atomizer Applicators



## FEATURES

The features of the Evolver 202 Series Applicators include:

- Quick disconnect spray head
- High quality ITW Ransburg air cap and fluid nozzle
- Dual fluid supply passages
- Dual fluid dump valves are located adjacent to the fluid passages
- Single purge with integrated fluid regulator option
- Field proven high voltage system
- Dual start, dual pitch air cap retaining ring
- Quick disconnect robot mount plate
- Quick color change capability with integrated solvent valve
- Clean interior design with split shroud
- Internal fan and atomization air control valve, with a mechanically timed trigger sequence
- Color coded air and trigger actuation lines
- Quick Change to a RMA-202 bell applicator

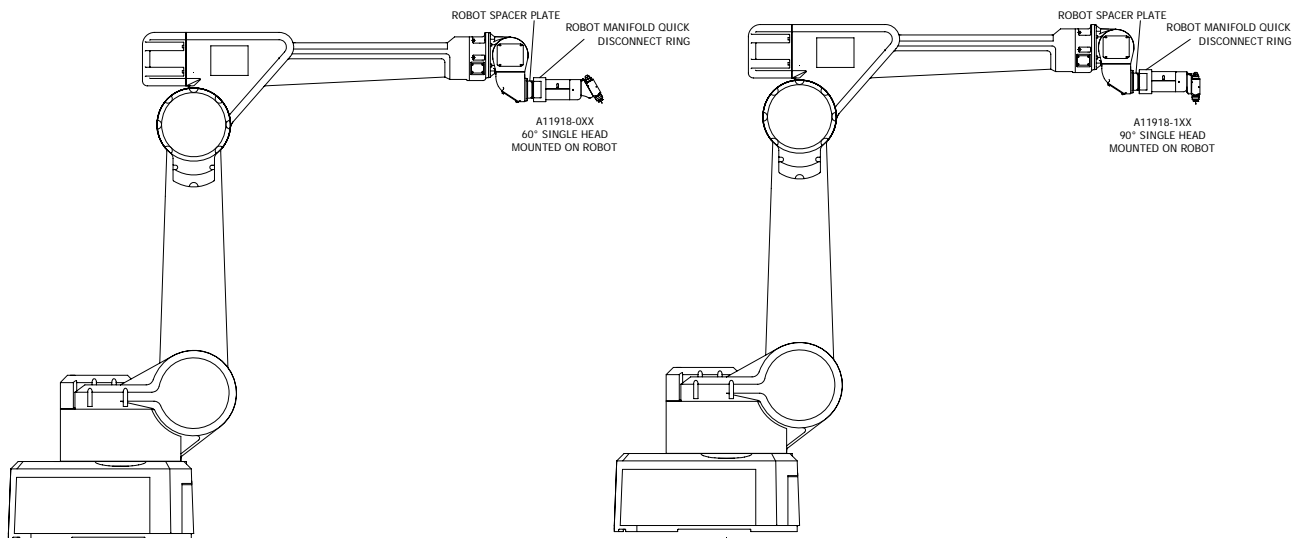


Figure 2: Typical Robotic Applicator Mounting

# A11918-XXX EVOLVER SPRAY APPLICATOR ASSEMBLY

The spray applicator assembly is designed to connect to hollow wrist robots. A low voltage control cable is supplied with the tubing bundle to connect the cascade to the MicroPak power supply.

## Tool Center-Point

Figure 3 shows the tool center-point information for the four applicators. For dual head applicators, the tool center-point is based upon the convergence point. For the single head applicators it is based upon a 10" target distance. The Tool Center-Point Comparisons Table compares the tool center-points of several automatic spray applicators.

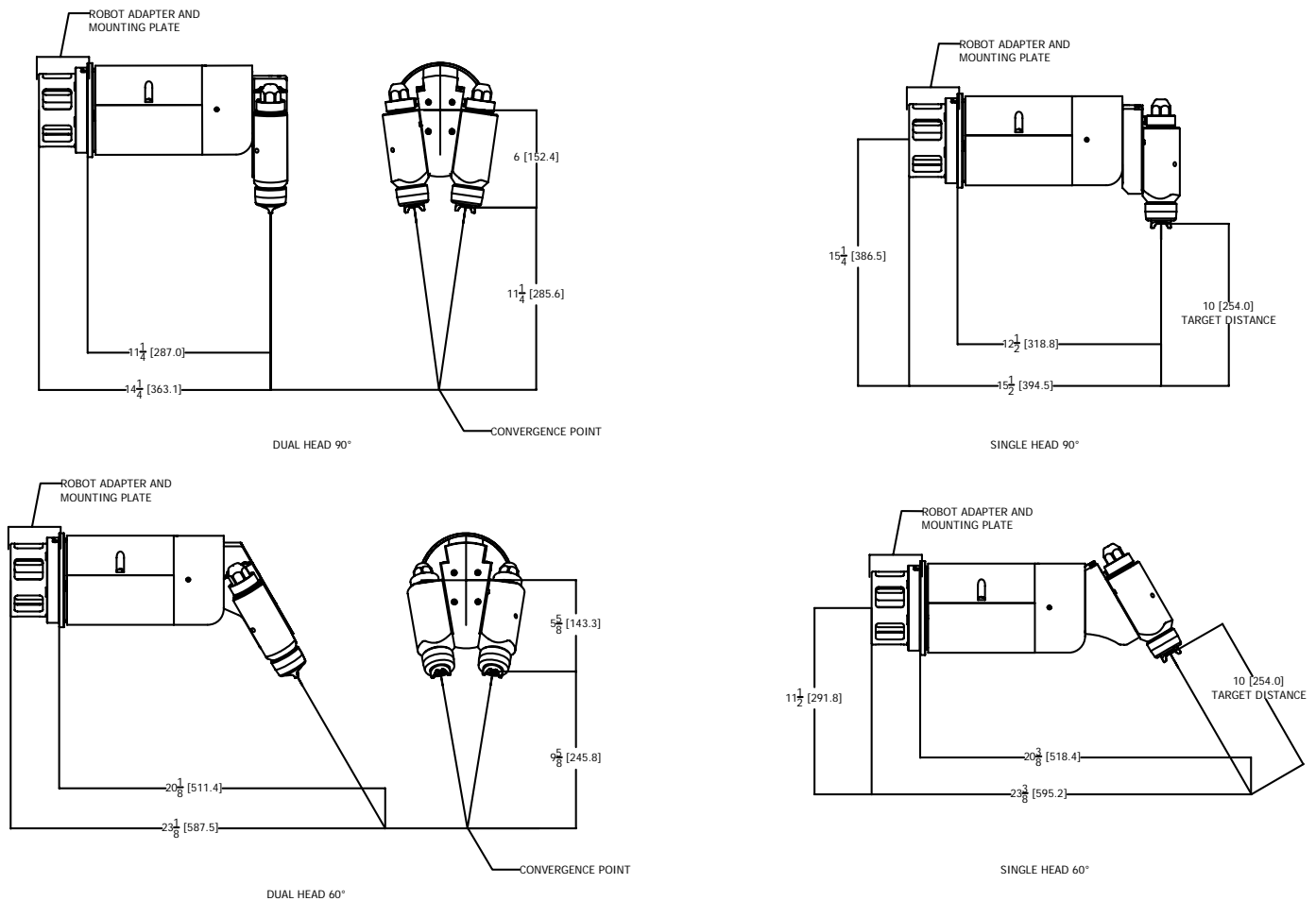


Figure 3: Tool Center-Point

TOOL CENTER-POINT COMPARISONS TABLE					
Single 90°			Single 60°		
EFM	X	Y	EFM	X	Y
76482-02 - Single 90°	13.0	14.0	76480-02 - Single 60°	19.9	11.5
EMF	X	Y	EMF	X	Y
EMF-504 - Single 90°	13.0	14.0	EMF-502 - Single 60°	17.4	11.6
EVOLVER 202	X	Y	EVOLVER 202	X	Y
Single 90° Applicator Only	12.5	15.3	Single 60° Applicator Only	20.4	11.5
Single 90° Applicator, Robot Plate, Robot Adapter	15.5	15.3	Single 60° Applicator, Robot Plate, Robot Adapter	23.4	11.5
EVOLVER	X	Y	EVOLVER	X	Y
Single 90°	13.3	15.4	Single 60°	21.2	11.8
Dual 90°			Dual 60°		
EFM	X	Y	EFM	X	Y
76482-02 - Dual 90°	11.1	15.5	76482-02 - Dual 60°	19.6	15.1
EMF	X	Y	EMF	X	Y
EMFD-504 - Dual 90°	11.3	15.4	EMFD-502 - Dual 60°	19.6	15.1
EVOLVER 202	X	Y	EVOLVER 202	X	Y
Dual 90° Applicator Only	11.3	17.3	Dual 60° Applicator Only	20.1	15.3
Dual 90° Applicator, Robot Plate, Robot Adapter	14.3	17.3	Dual 60° Applicator, Robot Plate, Robot Adapter	23.1	15.3
EVOLVER	X	Y	EVOLVER	X	Y
Dual 90°	12.1	17.6	Dual 60°	21.8	17.6

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# INSTALLATION

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## EVOLVER 202 ROBOTIC ATOMIZER INSTALLATION

This information is intended **ONLY** to indicate the general installation parameters of this product and, where applicable, its working relationship to other ITW Ransburg system components in typical use. Each installation is unique and should be directed by an authorized ITW Ransburg representative or conducted from the ITW Ransburg installation drawings provided for your particular installation.

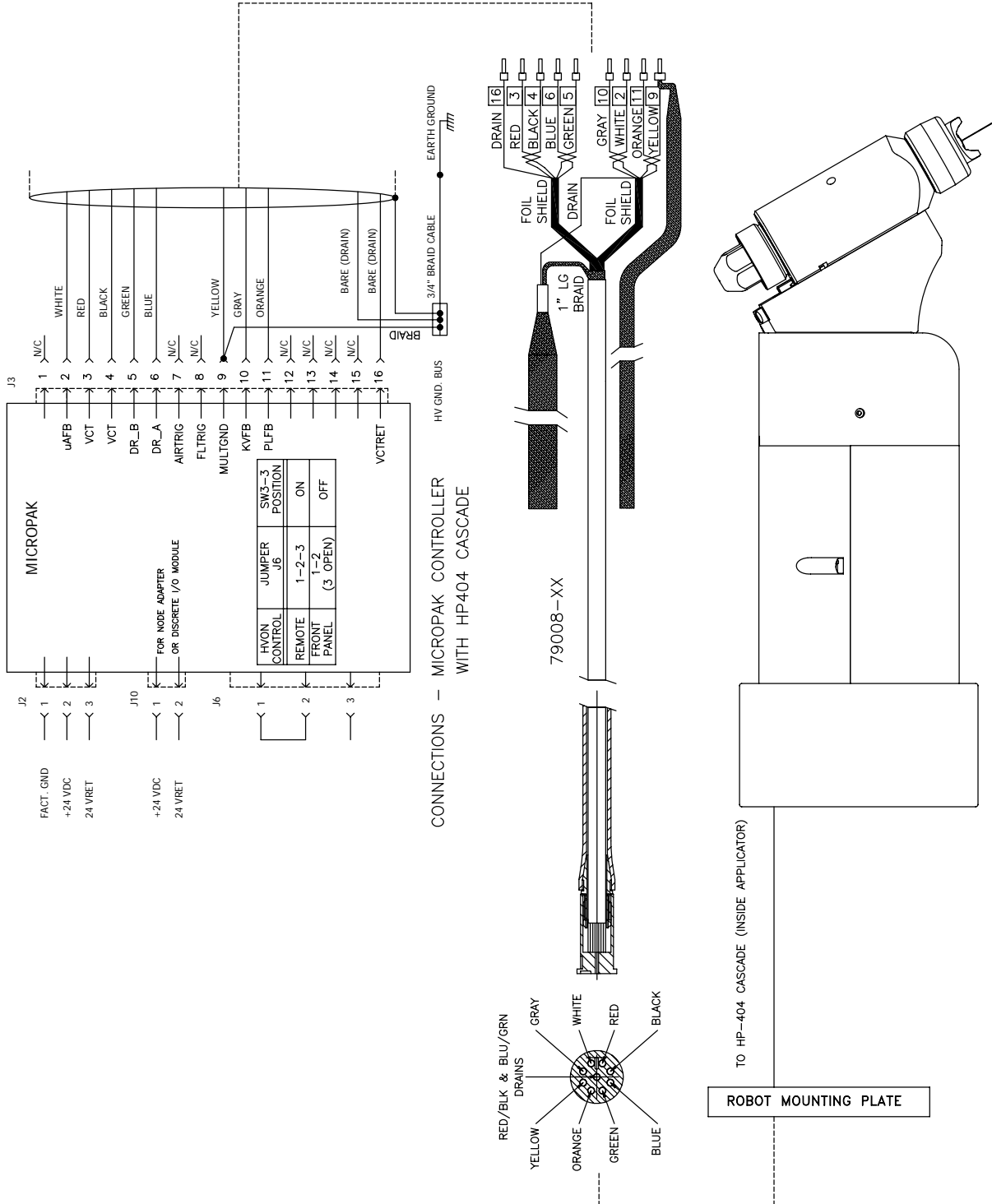
## POWER SUPPLY ASSEMBLY

Refer to the most current Power Supply Unit manuals for complete information regarding power supply installation.

- MicroPak Control Unit (LECU5004)  
(for non-FM installations)
- Stand-alone control/power supply unit (A10406) (for FM installations)
- MicroPak Control Unit (LECU5004-31)  
(for FM installations)

### WARNING

- ▶ The power supply **MUST** be located outside the **HAZARDOUS** area (Reference OSHA, NFPA-33, and your insurance company requirements.)
- ▶ User should be aware of, and adhere to, all local fire codes and ordinances.
- ▶ The user **MUST** provide a properly fused disconnect between the power source and the power supply which complies with appropriate codes.
- ▶ Fluid supply must be grounded per NFPA-33.



**Figure 4: Low Voltage Cable Connections**

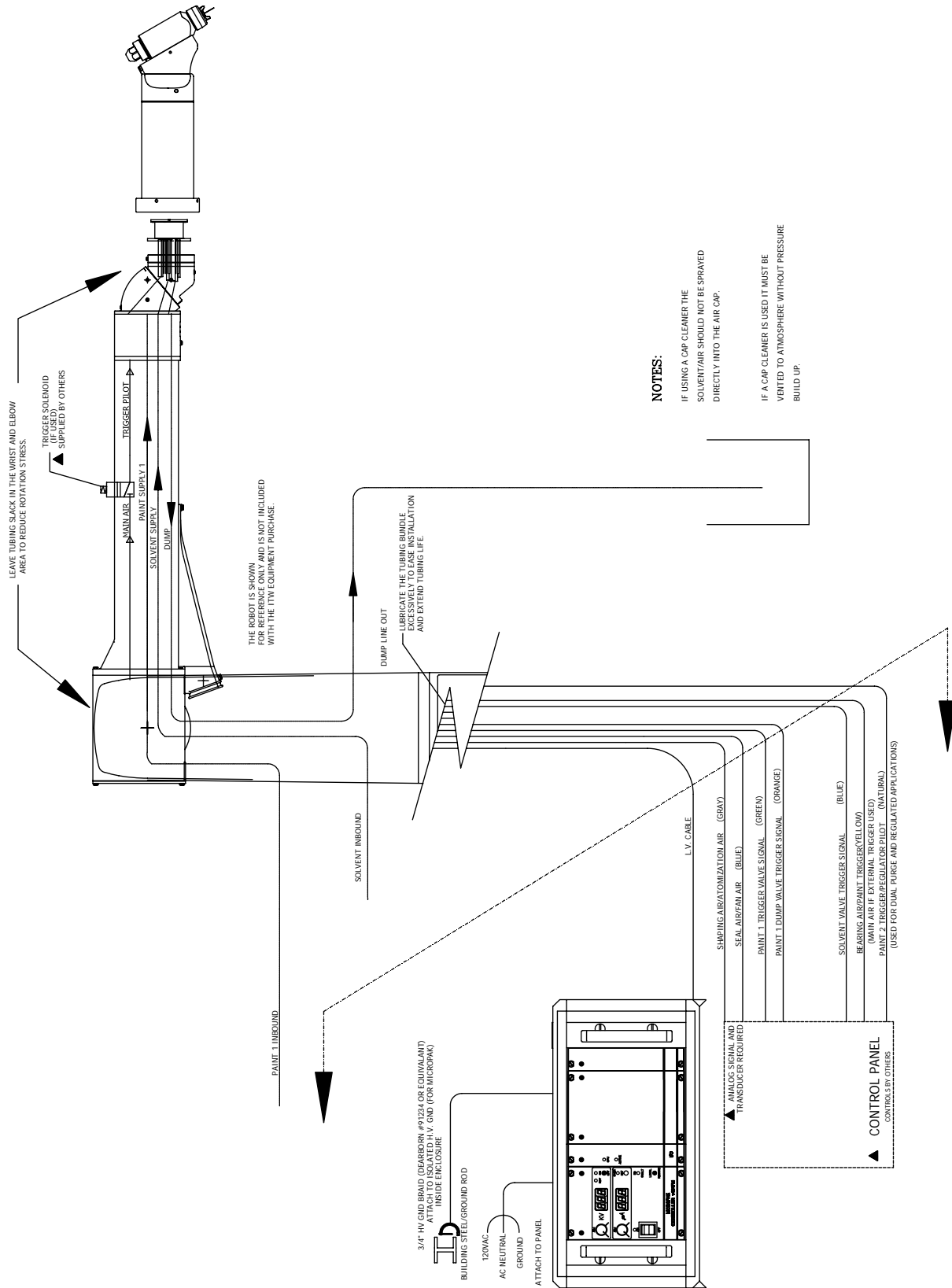


Figure 5: Evolver Spray Applicator Air and Fluid Layout

## APPLICATOR AND MANIFOLD ASSEMBLY (See Figures 4, 5, and 6)

The tubing, hose, and low voltage cable come bundled from the factory. Pull the bundle through the robot spacer plate and robot wrist carefully to prevent any cuts on the cable or hoses. Use the six (6) socket head cap screws (76566-24C) included with the rear manifold tubing assembly to attach the rear manifold assembly (79106 or A10892) to the robot spacer plate (see Table 1).

Connect each signal line as required per "Signal Identification Tables (English and Metric) Tubing Bundles" in the "Installation" section.

### Robot Spacer Plate

The robot spacer plate is included with the robot manifold assembly to increase life of the tubing bundle. The extra spacing it provides increases the bend radius of the tubes and decreases the hose or cable stress at the connector.

There is only one way the spacer plate may be assembled to the mounting plate. The spacer plate has an alignment pin that may only engage in one hole position in the robot mount plate. This provides the final position to top dead center of the robot.

Six robot spacer plates shown in Table 1 are available for this product.

<b>TABLE 1 - SPACER PLATES</b>	
<b>Part #</b>	<b>Description</b>
79107-00	ABB Robots
78983-00	Fanuc P155, 145 Robots
79131-00	Fanuc P200 Robot
A10847-00	Adapter (Kawasaki-KE610L)
A10848-00	Adapter (Motoman-PX2850)
A10849-00	Adapter (Motoman-PX2900)
A10851-00	Adapter (B & M-LZ2000)

## LOW VOLTAGE CABLE INSTALLATIONS

For installations utilizing the LECU5004-XX MicroPak power supply, connect the low voltage cable (79008-XX) from the robot manifold assembly to the LECU5004-XX MicroPak controller or junction box. If connecting to a junction box, use a junction cable (77062-XX) to make the connection from the junction box to the LECU5004-XX MicroPak. Make connections as shown in Figure 4.

For installations utilizing the A10406-XX Evolver MicroPak power supply, connect the low voltage cable (A11353-XX or A11356-XX) from the robot manifold assembly or junction box to the receptacle on the rear of the A10406-XX power supply. To maintain FM Approval, this cable must be secured to the stress relief bar on the rear of the power supply. (See A10406-XX Evolver MicroPak Power Supply manual for further information on connecting the low voltage cable.)

### NOTE


- ▶ If the length of the fan or atomization air lines exceeds 30 ft. (10m), the lines must be upsized to 1/2" ID (12mm for metric).

### NOTE


- ▶ For the dipswitch settings for the Evolver 202, reference the current MicroPak service manual.

### NOTE


- ▶ Leave 12-24 inches (.30m-.61m) of extra length on all lines to prevent extreme tension being applied to these lines during robot movement. This increases tubing bundle life.

 **CAUTION**

► Do not exceed 100' combined length of the low voltage cables.

 **WARNING**

► Install and route the hoses and cable so that they are **NOT** exposed to temperatures in excess of 120° F. Ensure that all hose and cable bends are **NOT LESS THAN** a 6 inch (15cm) radius and are not subjected to more than 360° of torsional twist. Failure to comply with these parameters could cause equipment malfunctions that might create **HAZARDOUS CONDITIONS!**

 **WARNING**

► If a non-explosion proof junction box/terminal strip is used, it must be located outside the hazardous area.

## NOTES



**SIGNAL IDENTIFICATION TABLE (ENGLISH)**

Abbr.	Description	Color	Tubing Material	Tubing Size
B.A/P.T	Bearing Air (Paint Trigger)	Yellow	Nylon	1/4" OD X .170" ID
B.A	Bearing Air Return	Yellow	Nylon	1/4" OD X .170" ID
BRK	Brake Air	Orange	Nylon	1/4" OD X .170" ID
DL1	Dump Line #1	Natural	Teflon	3/8" OD X 1/4" ID
DL2	Dump Line #2	Natural	Teflon	3/8" OD X 1/4" ID
F.O.	Fiber Optic Cable	Natural	Polyethylene	1/4" OD (Jacket)
LV	Low Voltage Cable	Black	N/A	N/A
P1.IN	Paint #1 In	Natural	Teflon	<b>See Tubing Bundle Assy. Chart</b>
P1T	Paint #1 Trigger	Green	Nylon	5/32" OD X .106" ID
P1D	Paint #1 Dump	Silver	Nylon	5/32" OD X .106" ID
P2.IN	Paint #2 In	Natural	Teflon	<b>See Tubing Bundle Assy. Chart</b>
P2T	Paint #2 Trigger	Natural	Nylon	5/32" OD X .106" ID
P2D	Paint #2 Dump	Black	Nylon	5/32" OD X .106" ID
S.A/A.A	Shaping Air (Atomizer Air)	Gray	Nylon	3/8" OD X .275" ID
S.IN	Solvent In	Natural	Teflon	1/4" OD X .125" ID
SL.A/F.A	Seal Air (Fan Air)	Blue	Nylon	3/8" OD X .275" ID
ST	Solvent Trigger Signal	Blue	Nylon	5/32" OD X .106" ID
T.A	Turbine Air	Green	Nylon	3/8" OD X .275" ID

**SIGNAL IDENTIFICATION TABLE (METRIC)**

Abbr.	Description	Color	Tubing Material	Tubing Size
B.A/P.T	Bearing Air (Paint Trigger)	Yellow	Nylon	6mm OD X 4mm ID
B.A	Bearing Air Return	Yellow	Nylon	4mm OD X 2mm ID
BRK	Brake Air	Orange	Nylon	6mm OD X 4mm ID
DL1	Dump Line #1	Natural	Teflon	10mm OD X 8mm ID
F.O.	Fiber Optic Cable	Natural	Polyethylene	1/4" OD (jacket)
LV	Low Voltage Cable	Black	N/A	N/A
P1.IN	Paint #1 In	Natural	Teflon	<b>See Tubing Bundle Assy. Chart</b>
P1T	Paint #1 Trigger	Green	Nylon	5/32" OD X .106" ID
P1D	Paint #1 Dump	Silver	Nylon	5/32" OD X .106" ID
P2.IN	Paint #2 In	Natural	Teflon	<b>See Tubing Bundle Assy. Chart</b>
P2T	Paint #2 Trigger	Natural	Nylon	5/32" OD X .106" ID
P2D	Paint #2 Dump	Black	Nylon	5/32" OD X .106" ID
S.A/A.A	Shaping Air (Atomizer Air)	Silver	Nylon	10mm OD X 8mm ID
S.IN	Solvent In	Natural	Teflon	6mm OD X 4mm ID
SL.A/F.A	Seal Air (Fan Air)	Blue	Nylon	8mm OD X 6mm ID
ST	Solvent Trigger Signal	Blue	Nylon	5/32" OD X .106" ID
T.A	Turbine Air	Green	Nylon	10mm OD X 8mm ID
DL2	Dump Line #2	Natural	Teflon	10mm OD X 8mm ID

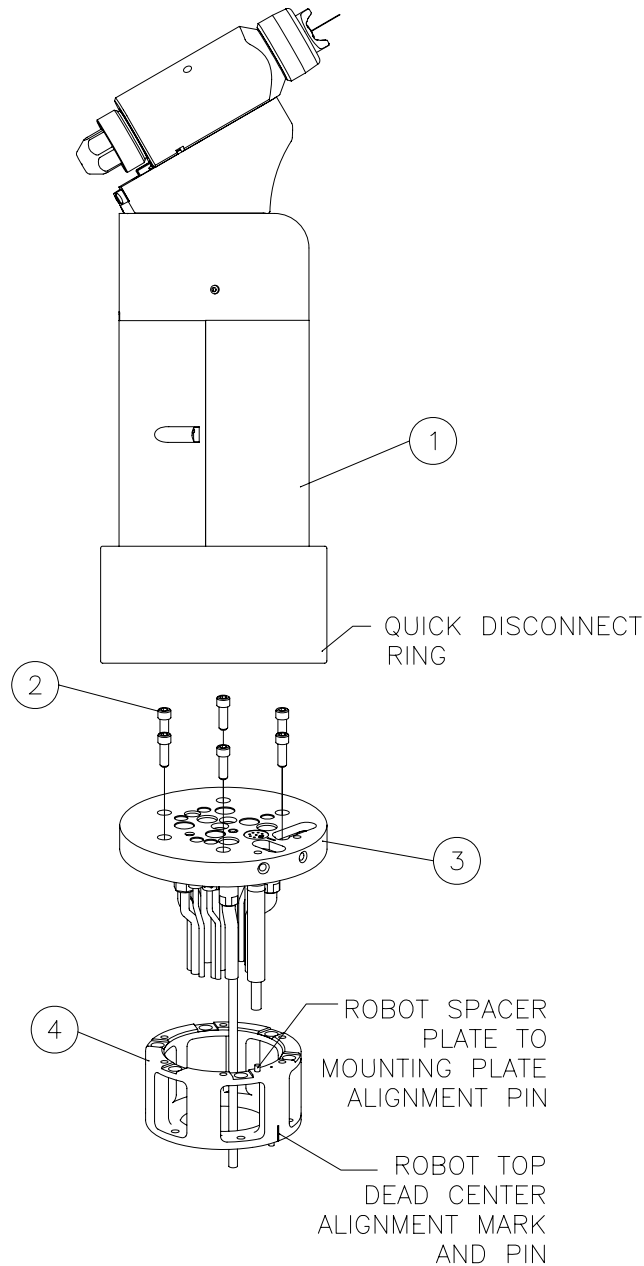


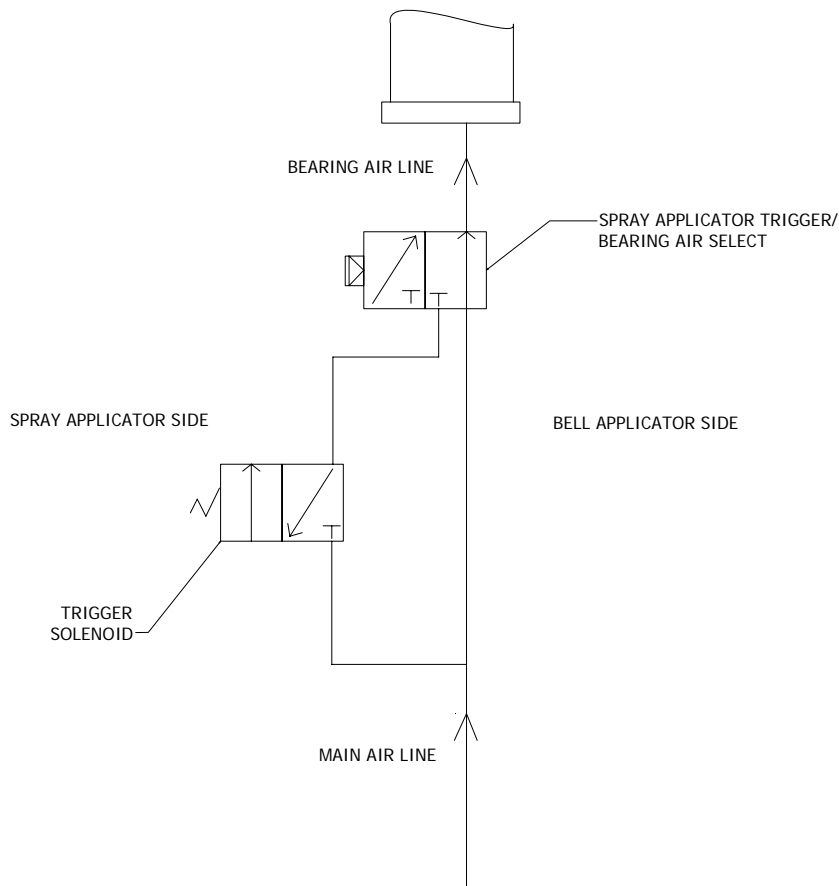
Figure 6: Applicator and Manifold Assembly

<b>APPLICATOR AND MANIFOLD ASSEMBLY - PARTS LIST (Figure 6)</b>			
<b>Item #</b>	<b>Part #</b>	<b>Description</b>	<b>Qty</b>
1	A11918-XXX	Evolver 202 Spray Applicator Assembly	1
2	76566-32C	Socket Head Cap Screws, 1/4-20 X 1" Long	6
3	79106-XXXXXXX	Rear Manifold Tubing Assembly (English)	1
	A10892-XXXXXXX	Rear Manifold Tubing Assembly (Metric)	
4	<b>See Table 1</b>	Spacer Plates	1

## SPRAY / BELL APPLICATOR TRIGGERING

If you are currently using an RMA-202 bell applicator system and want to add the Evolver 202 spray applicator system to spray using the same tubing bundle, a simple conversion must be made in order to allow for switching between spray and bell applicators. Figure 7 shows the recommended system that should be placed in the bearing air line between the main air input and the robot manifold plate. It is suggested that this circuit be placed on the robot arm. This system should also be used when the user is implementing the Evolver 202 spray applicator system and plans to use RMA-202 bell applicators as well.

In Figure 7, the trigger solenoid must be an electronically activated, normally closed valve with exhaust, or a 3-way valve, with 100 psi max., 24VDC. Typically this solenoid already exists in the robot arm and can be used in this circuit. The spray applicator trigger/bearing air select valve must be a pneumatically activated, normally open solenoid. A suggested solenoid is ITW P/N 11678-01. An additional solenoid must be used to activate the P1T (Paint 1 Trigger) or P2T (Paint 2 Trigger) valves. If any of these solenoids are located inside a hazardous area, they must be explosion proof.



**Figure 7: Conversion Schematic**

# OPERATION

## SPRAY APPLICATOR CONTROLS

### Atomization Air (SA/AA) / Fan Air (SL.A/F.A)

The atomization and fan air are turned on by the trigger line and are controlled by an internal air valve located in the applicator head. During normal operation with applicator triggered off, there is a slight bleed of air through the atomization port.

#### Atomizing Air

Adjustments are made through the robot PLC or a manually adjustable air regulator. The lowest air pressure required to break up the paint should be used. Lower atomizing air pressures result in less overspray and increased transfer efficiency.

#### Fan Air

Adjusting the fan air increases or decreases the size of the spray pattern. Increasing pressure increases pattern size. Pattern adjustment should be made to suit the size and shape of the object being painted. This adjustment is made through the robot PLC or a manually adjustable air regulator.

Air cap atomization and fan pressures should be set and recorded using an air cap test kit. This provides a consistent measurement, so initial settings may be duplicated at any time. (See "Accessories" in the "Parts Identification" section.)

## HVLP SPRAY

The Evolver 202 HVLP models, when properly set-up, are designed to provide maximum transfer efficiency by limiting air cap pressures to 10 psi (0.7 bar) (in the U.S., this complies with rules issued by SCAQMD and other air quality authorities). Air cap pressures should be measured with an optional air cap test kit. (See "Accessories" in the "Parts Identification" section.)

NOTE
------

<p>► For HVLP operation (max. 10 psi, 0.7 bar cap pressure), <b>DO NOT</b> exceed the air inlet pressure, which was read at the gun base before the tubing manifolds, given as follows:</p>
---

PSI	(Bar)	CAP #
42	(2.9)	48-1
42	(2.9)	481-1

## FLUID VALVE CONTROLS

### Trigger, Dump, and Solvent (See Figure 8)

The fluid valves in the Evolver 202 are actuated by an air signal. The air pressure must exceed 70 psi (4.8 bar) to assure proper actuation of the valve. Applying air to the valve actuator turns on the fluid flow for that valve.

The paint valve controls the paint flow to the applicator. When actuated, paint flows through the valve to the coiled fluid tube and into the spray head.

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 valve since the paint valve is intended to cause the fluid to flow to the applicator head at the prescribed input pressure.

The solvent valve controls the flow of cleaning solvent to the applicator. When actuated, solvent flows through the fluid tube and into the spray head. The solvent valve is not triggered at the same time as the paint trigger valve to prevent solvent from flowing backward into the paint line.

## DUAL PURGE SPRAYING

The Evolver 202 applicator system has optional dual purge capability. This means the applicator can continue to spray paint, at voltage, while side "B" or "Paint 2" is being flushed or cleaned. The solvent valve opens and cleans from the coiled fluid tube and up through the head and out the nozzle. A second color is then loaded through the "B" side. Side "A" is then color changed through the "A" side feed lines to the applicator and valve ports, while the waste from side "A" is exited through the dump lines. To operate in the dual purge mode, **two (2) separate color valve systems or ITW MCV2 Dual Purge must be installed.**

When the target part is finished and a color change is desired, ensure voltage is turned off.

**! WARNING**

- ▶ Failure to turn voltage OFF during color change sequence when solvent is flowing through the fluid nozzle, could cause a fire or explosion.

When the cleaning cycle with solvent is complete, an air purge for several seconds is recommended to clean and dry the ID of the dump line hose.

### Paint Viscosity

The applicator is capable of atomizing paint of most any desired viscosity. It is recommended to keep the material viscosity as low as possible. This allows spraying at lower fan and atomization air pressures which result in less overspray and higher transfer efficiency.

**! WARNING**

- ▶ Most paints and solvents, including those listed in "Polar & Non-Polar Solvents Chart" in the "Maintenance" section, are toxic to a certain degree and flammable or combustible. Use them only in a well ventilated atmosphere. Use protective equipment as required in the Material Safety Data Sheet supplied with the substance.

### Fluid Flow Rate

Fluid flow is adjusted through the robot PLC by varying the pilot pressure to either an exterior or the on-board fluid regulator within the spray applicator. Fluid pressures from the circulating system may exceed the maximum fluid pressure rating of the Evolver 202 applicator. Because of these high fluid pressures, a manual step-down fluid regulator must be used.

### Applicator Trigger Control Air

The Evolver applicators require a minimum of 70 psig trigger control air pressure to ensure proper operation of the applicator piston.

### Electrostatic Voltage

Under no load conditions, the maximum voltage limit for these spray applicators is 100 kV. Some painting operations may require different voltage settings to obtain optimum transfer efficiencies. If Faraday cage areas are predominant on the item being painted, a lower voltage setting would aid in coating these areas.

When not spraying, it is recommended to set back voltage to 30-40 kV or off between target parts.

**NOTE**

- ▶ If a 0 kV command is sent to the MicroPak, a feedback fault will occur.

Sometimes, depending upon target carrier spacing, higher setback voltages may be required. The ramp-up time for the HP-404 cascade (0-100 kV) is approximately 3 seconds.

The MicroPak voltage ramp-down works at a rate of 33 kV/sec.

## Target Distance

The distance between the applicator tip and the article being painted should be 10-14 inches (.25m-.36m) for a single head applicator and at or near the convergence point for dual head applicator. Excessive distance causes a waste of coating material and wrap back (paint particles being deposited on the applicator body or the robot arm). At close distances the voltage at the tip of the applicator will be reduced, which decreases the charging effect of the applicator.

**⚠ WARNING**

- ▶ If target distance is less than 8 inches (.20m), an arc could occur.

**⚠ WARNING**

- ▶ If a bell applicator is being used, and needs to be switched to a spray applicator, the bell applicator must have all voltage and air turned off, and the bell cup completely spun-down before the change-out can occur.

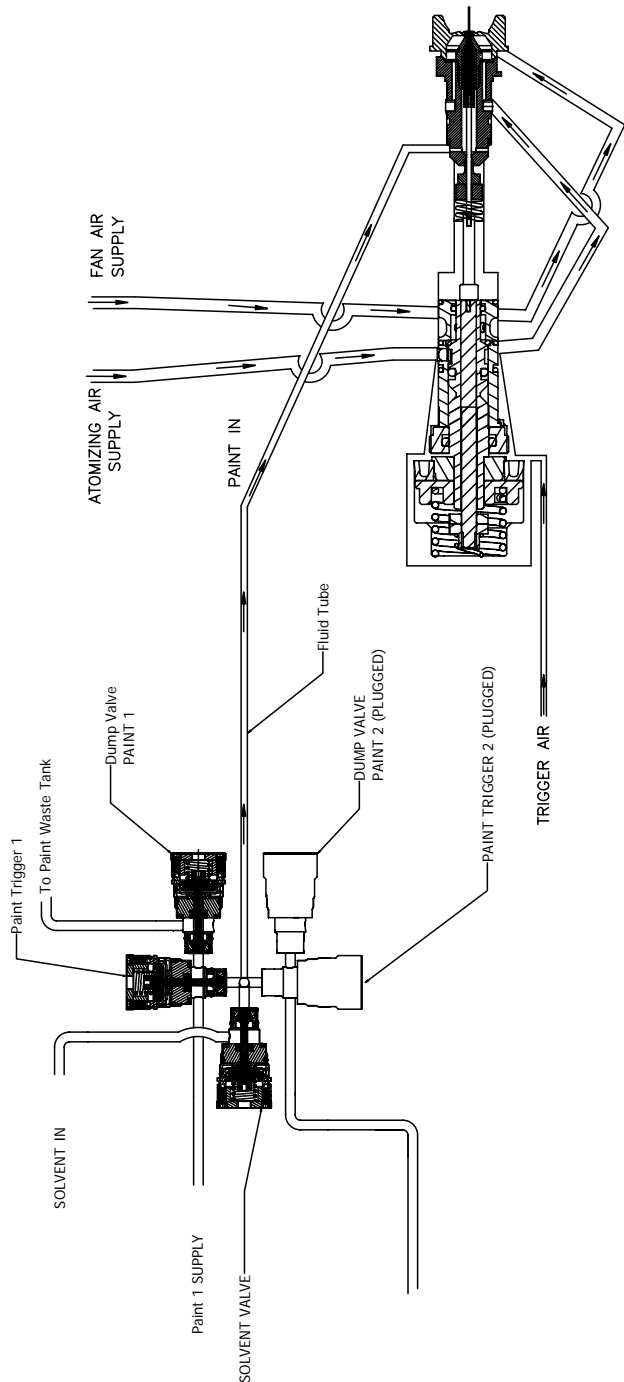
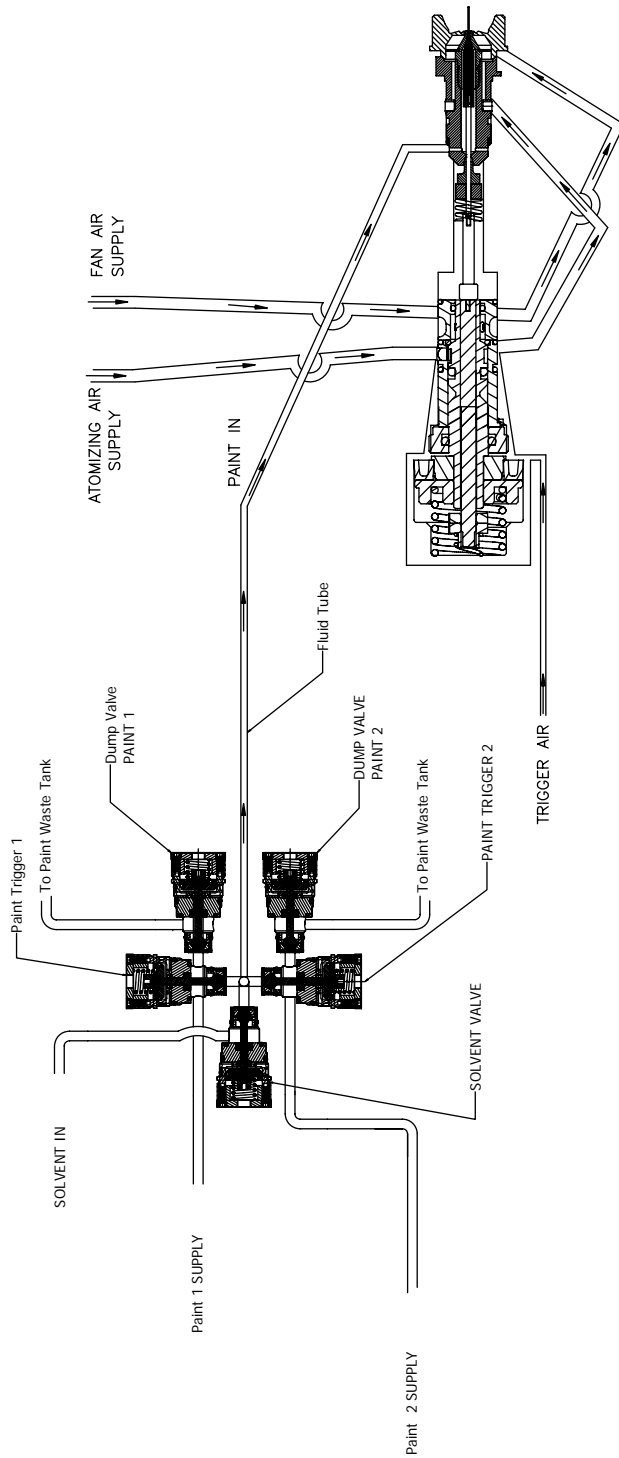
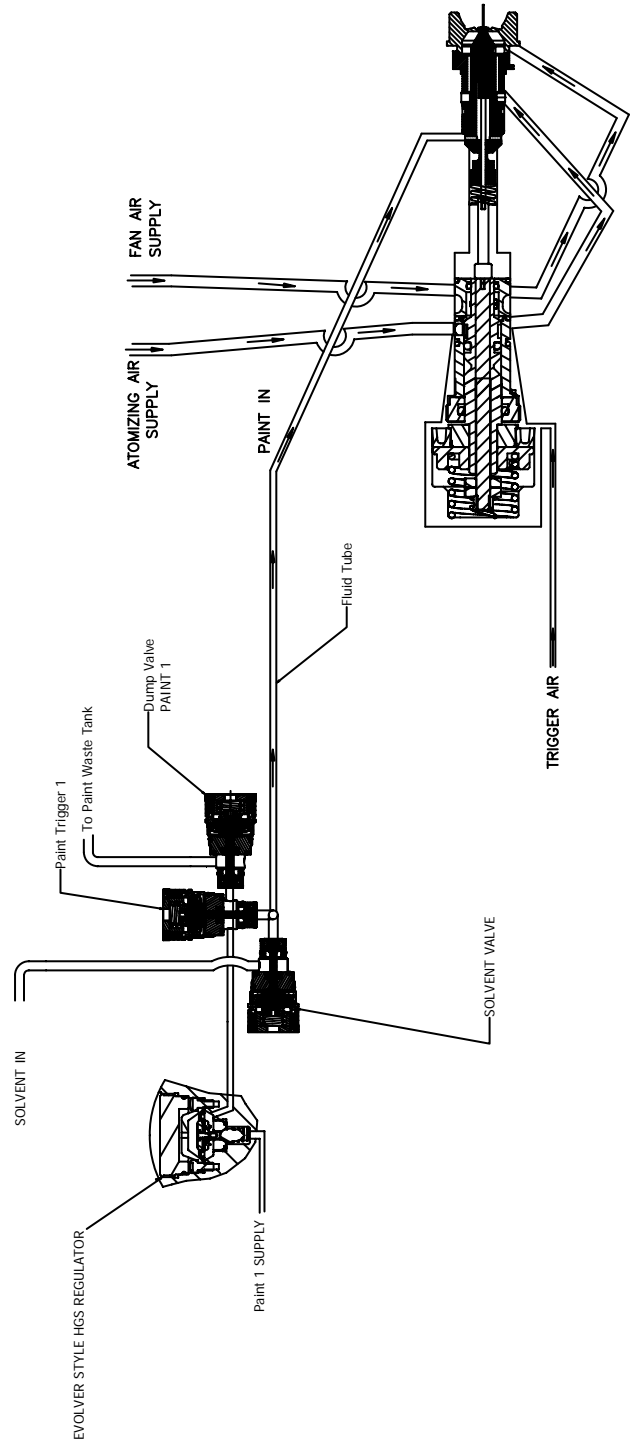


Figure 8a: Single Purge Air and Fluid Passage Schematic



**Figure 8b: Dual Purge Air and Fluid Passage Schematic**



**Figure 8c: Single Purge Regulator Air and Fluid Passage Schematic**

# MAINTENANCE

Good maintenance is essential to safe and productive operation. Schedules should be established by the user, based on the following general information and observations of the initial production requirements. The ITW Ransburg maintenance and safety information should be made available to each operator.

Normal fire protection measures are necessary, including proper storage of paints and solvents and the proper disposal of waste. Ready access to appropriate fire extinguishing equipment is required. For details, consult the appropriate NFPA safety information and/or applicable country safety standard.

## WARNING

- ▶ An electrical discharge or spark may create an electrical and/or fire hazard during maintenance. Do not clean or service the spray applicator with the power supply on. Verify that the power supply has been locked out and tagged out per OSHA and/or your applicable country safety codes.
- ▶ Unexpected robot movement can be hazardous. Do not adjust or repair the spray applicator when the robot is operating or waiting to start. The robot must be locked out and tagged out per OSHA and/or your applicable country safety codes.
- ▶ Solvents used for equipment flushing must have flash point ratings equal to or greater than the flash point rating of the coating material. Solvents used for general cleaning must have flash point ratings higher than 100°F (37.8°C).
- ▶ Never remove spray applicator head from assembly while under pressure.

## ROUTINE MAINTENANCE SCHEDULE

Follow these maintenance steps to extend the life of the spray applicator and ensure efficient operation:

### Several Times Daily

1. Turn the MicroPak control unit **OFF!** Follow "Lockout/Tagout Procedures".
2. Inspect the fluid nozzle, air cap, and electrode wire for paint accumulation. Clean as frequently as necessary. See "Procedures" in the "Maintenance" section.

## WARNING

- ▶ Take precautions to see that skin is not punctured by sharp electrode.

## CAUTION

- ▶ Do not bend the applicator electrode while wiping. Never immerse the applicator in solvents. This will cause damage to the electrical components.

### Daily (Or at Shift Start)

1. Turn the MicroPak control unit **OFF** and:
  - Check within 20' (6.1 meters) of the point of operation (of the applicator) and remove or ground **ALL** loose or ungrounded containers.
  - Inspect workholders for accumulated coating materials (remove such accumulations if present). Ensure resistance to ground from work holder is less than 1 megohm.
  - Check that the nozzle assembly is clean and undamaged. Ensure air caps are clean and undamaged.



2. Turn the MicroPak control unit **ON!** Energize high voltage.

### **Shut-Down (Or at Shift End)**

1. Turn the MicroPak control unit OFF.
2. Flush the lines and allow the solvent to remain in the lines. See "Procedures" in the "Maintenance" section.
3. Wipe the applicator (including the air cap) and robot wrist with a cloth and a suitable, clean non-polar solvent.


### **Weekly**

1. Check the entire system for damage, leaks, and paint accumulation.
2. Clean the atomizer assembly.
3. Conduct a current output test. See "Procedures" in the "Maintenance" section.


## **PROCEDURES**

### **Applicator Cleaning/Service (See Figure 9a and 9b)**

1. Flush the paint supply line and the applicator paint passages using a solvent which is compatible with the material being sprayed. Continue to flush until all traces of paint are gone.
2. Turn off the solvent supply, actuate paint push-out air at color changer, and trigger the applicator and P1T or P2T. Allow all of the fluid to drain from the spray applicator fluid passages.
3. Clean the exterior surfaces of the spray applicator with a solvent soaked rag. As long as the applicator is intact, a **polar** solvent may be used for all cleaning, however, after cleaning, wipe off all surfaces with a **non-polar** solvent to reduce conductive residue on the applicator's surface. (See "Polar & Non-Polar Solvents Chart" in the "Maintenance" section regarding proper solvent selection.)

 <b>CAUTION</b>
<p>► Failure to use a non-polar solvent may cause a decrease in voltage at the tip of the applicator. This will significantly decrease transfer efficiency.</p>


4. Remove end cap [1]. Removing the end cap releases tension on all internal spray head components. Remove needle spring [2] and valve spring [3], which are loose after removing the end cap.

 <b>CAUTION</b>
<p>► Never attempt to clean the air cap holes with a wire or other metal object. Doing so may damage the air cap, resulting in distortion of the spray pattern.</p>

5. Remove the air cap retainer [36] and air cap [35]. Soak in a non-polar solvent if necessary. If paint remains in the air cap holes, clean with a toothpick or similar soft wood object. Air caps are best cleaned in an ultrasonic cleaner.

6. Remove the air cap locator [33] and fluid tip [34]. Clean using a non-polar solvent.

7. Tightly grip the plastic needle [6] and unscrew counter-clockwise to remove the front electrode needle assembly. A short piece of H-2339 tubing (1/4" OD x 0.175" ID) pressed over the front needle will assist in unscrewing the assembly. If required, use needle nose pliers with masking tape or duct tape. Carefully clean with a non-polar solvent. Replace any parts that show signs of wear or damage.

 <b>CAUTION</b>
<p>► If using needle nose pliers to unscrew the front needle, be very careful. Do not grip on the tapered sealing surface. If the pliers slip, they could damage the tapered sealing surface of the needle.</p>

<b>POLAR AND NON-POLAR SOLVENTS</b>		
<b>Non-Conductive (Non-Polar)</b>	<b>Moderately Conductive</b>	<b>Extremely Conductive (Polar)</b>
Amyl Acetate Methyl Amyl Acetate Toluene Xylene High Flash Naptha Mineral Spirits	Methyl Isobutyl Ketone Ethyl Acetate Methyl Ethyl Ketone Butyl Carbitol	Methanol Carbitol Diacetone Butyl Alcohol Acetone Butyl Cellosolve

8. Remove fluid nozzle [32] by unscrewing counter-clockwise. Inspect o-ring [30] and all passages for build up or damage. Clean or replace as necessary. Lubricate and reinsert o-ring into applicator barrel and reinstall fluid nozzle. Torque fluid nozzle to 25 lbs·in (2.82 Nm).

**NOTE**

- ▶ There should be a small gap between the fluid nozzle and the applicator barrel after tightening.

9. After cleaning, insert the electrode assembly [31] back into the spray head assembly. Apply Loctite #222, low strength (purple) thread-locker, to the threads of the electrode assembly before reassembly.

**NOTE**

- ▶ The fluid tip [34] should always be installed and tightened before installing the needle and valve springs.

**⚠ CAUTION**

- ▶ After tightening the fluid tip, always check to see if the proper gap (1/16") between the needle nuts and air valve stem occur, before installing the needle and valve springs back into the head.

10. Screw fluid tip [34] back into place. Hand tighten first, then with a small wrench, tighten an additional 30 degrees.

11. Replace air cap locator [33], air cap [35], and air cap retainer [36].

12. Apply a thin film of petroleum jelly to valve and needle springs [2] and [3]. Install the springs back into the end cap and the spray head assembly.

13. Screw end cap [1] back on.

**Current Output Test**

1. Clean and blow out all fluid passages with non-conductive solvent.

2. Remove from robot and perform bench test using a spare tubing bundle.

3. Turn the control unit power **ON**.

4. Activate high voltage and slowly approach the applicator electrode with ground hook or wire.

5. Monitor the current output on MicroPak. Current should rise as ground approaches. At approximately 85 microamperes, the MicroPak will shut off. The **OVERCURRENT** indicator should come on.

The spray head can be removed from assembly as shown in Figure 9a for cleaning and service.

**NOTES**

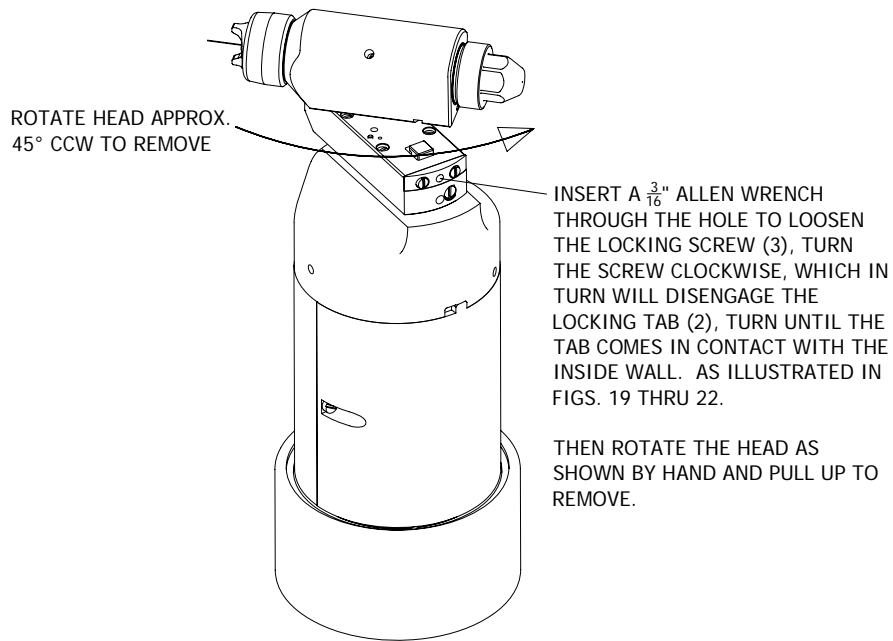


Figure 9a: Spray Head Removal

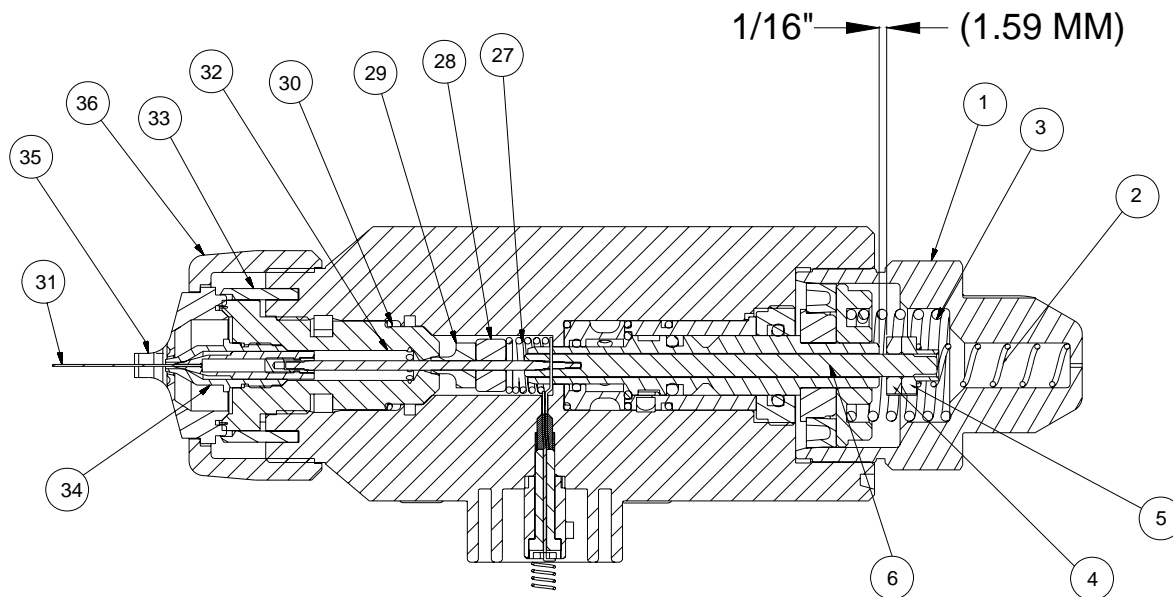


Figure 9b: Spray Head Assembly

<b>SPRAY HEAD REMOVAL / ASSEMBLY - PARTS LIST (Figure 9b)</b>			
<b>Item #</b>	<b>Part #</b>	<b>Description</b>	<b>Qty</b>
1	79148-00	End Cap, Spray Head	1
2	17615-00	Spring, Compression	1
3	9334-00	Spring, Valve Return	1
4	7733-07	Jam Nut	1
5	76199-00	Rear Adjusting Nut	1
6	79151-00	Assembly, Needle Shaft	1
27	RME-38	Return Spring, Piston	1
28	EMF-7	Seal, Washer	1
29	RME-32	Seal	1
30	79001-01	O-Ring, Solvent Proof	1
31	70430-01	Electrode, High Wear	1
32	EMF-195	Nozzle, Fluid Hole	1
33	EMF-192	Locator, Air Cap	1
34	79140-02	Fluid Tip, .055" (1.4mm) Diameter	1
35	79153-65R-1	Air Cap, Pined	1
36	79154-00	Retaining Ring, Tapered	1

**NOTE**

► Ensure that the fan and atomization air are on and flowing prior to triggering the fluid. Insure air before fluid adjustment is correct. Failure to follow this sequence will cause spits and defects on the part being painted.

## SERVICE

Because we want to provide our users with the most up-to-date technology possible, we are constantly seeking to improve products. If a change in product configuration occurs after it is on the market, we will implement that technology in future production and, if practical, make it available to current users. The following service information is based on standard specifications and procedures for this product. If you find some minor deviations between this information and your equipment because of design or manufacturing changes, contact your ITW Ransburg representative to resolve the difference.

**⚠ WARNING**

- ▶ An electrical discharge or spark may create an electrical and/or fire hazard during maintenance. Do not service the spray applicator with the power supply on. Verify that the power supply on/off switch has been turned off.
- ▶ Unexpected robot movement can be hazardous. Do not adjust or repair the spray applicator when the robot is operating or waiting to start. The robot must be locked out and tagged out per OSHA prior to removing the applicator from the robot manifold assembly.

Before performing any work on the spray applicator, always flush the fluid passages, blow dry with pushout air, and wipe the spray applicator clean. Refer to "Applicator Cleaning" in the "Maintenance" section for instructions on how to properly clean the spray applicator. Depressurize all fluid and air passages before removing the applicator from its manifold. Always work in a clear, clean space to minimize part loss and damage.

**⚠ CAUTION**

- ▶ As the spray head is removed from the valve manifold assembly, a certain amount of residual fluid may be present. Care must be taken not to allow this fluid to drain into the high voltage terminal rings or air passages.

**⚠ WARNING**

- ▶ Eye protection should be worn while servicing gun.

## SPRAY HEAD ASSEMBLY

**NOTE**


- ▶ Disassemble the spray head only enough to remove and replace defective parts. For instance, if only replacing the front electrode it is not necessary to remove the fluid nozzle.

**NOTE**

- ▶ At assembly, apply a small amount of dielectric grease to grooves in spray head and valve manifold to reduce high voltage breakdown. Excessive grease will not allow spray head [3] to seat fully against mounting block assembly [8] (see Figure 11).
- ▶ To prevent damage, always lubricate the o-rings located on the underside of the spray head.

## Rear Needle Replacement (See Figure 9b)

1. Remove the air cap, fluid tip, and the fluid nozzle as described in steps 1 through 8 of the "Fluid Tip, Nozzle, and Front Needle Replacement" in the "Maintenance" section.
2. Remove the rear needle [6] and lock nuts [4] and [5] as an assembly. Pull the assembly out from the rear of the spray head.

 <b>CAUTION</b>
<p>► Fluid seal [29], seal washer [28], and seal spring [27] will come free at this point. Place hand over front end to prevent dropping parts.</p>

3. Inspect the metal portion of the rear needle [6] for excessive wear. If wear is observed (longitudinal grooves or a noticeable reduction in diameter) replace the needle. Remove the two (2) lock nuts from the rear needle and save. When ever replacing rear needle section, you must also replace the seal [29] at the same time.
4. Place the rear needle assembly back into the spray head.
5. Place seal spring [27] over the rear needle in the front end of the spray head. Hold the spray head upward as the spring will want to fall out.
6. Still holding the spray head upward, place the seal washer [28] and thread the fluid seal [29] onto the rear needle. The tapered end of the fluid seal should be pointed toward the front of the applicator.
7. Insert the lubricated o-ring [30] into the applicator head. Gently push, with small flat object, down upon its seating edge. Be careful not to push o-rings into fluid groove (see Figure 9b).
8. Reassemble fluid nozzle [32] by pushing the nozzle into the spray head and through the o-ring until the threads engage. Screw the nozzle into the spray head. Torque to 23-25 lbs•in (2.6-2.8 Nm). Plastic threads damage easily; do not over-tighten. Note the front flange of the fluid nozzle will not seat flush against the spray head.

9. Apply Loctite #222 Low Strength (purple) Threadlocker into the threads of plastic front needle [31] before assembling onto the rear needle. Be sure that the rear needle assembly is pushed all the way forward before threading on front needle.

10. Reassemble fluid tip [34]. Hand tighten first; then with a small wrench turn an additional 30°.

11. Reinstall the two (2) lock nuts [4] and [5] in the correct order on the back needle as shown making sure to maintain an 1/16" clearance (see Figure 9b).

<b>NOTE</b>
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► Ensure that the fan and atomization air are on and flowing prior to triggering the fluid. Ensure air before fluid adjustment is correct. Failure to follow this sequence will cause spits and defects on the part being painted.

12. Reassemble air cap [35] and air cap retainer [33]. The air cap rotate positioning pins must be engaged with the air cap locator holes before final tightening.

13. Apply a thin film of petroleum jelly to valve spring [3] and needle spring [2], and insert back into the end cap. Screw end cap [1] back on.

14. Lubricate all of the o-rings on the underside of the spray head with petroleum jelly, and apply a thin coat of dielectric grease to the grooves of the spray head and the valve manifold before reassembly.

15. Reattach spray head to manifold block by engaging the connection plug [24] into the mounting block cavity [3], and turn clockwise until head contacts stop pin on the block.

16. Secure with locking tab by turning screw counter-clockwise (see Figure 9a).

## Air Valve Removal

### (See Figure 10)

1. After removal of end cap and spring, the air valve can be pulled straight out the back of the head assembly.

2. Inspect and replace the u-cup [8], if necessary, by holding the air valve shaft on it's flats and loosening the piston nut [7] counter-clockwise.

3. Remove the seal carrier with seal removal tool [B].

4. Use a bent hook to reach inside the air valve bushing [14], grip slot and pull out. Use the same procedure to pull out the rear seal carrier [17].

 <b>CAUTION</b>
► Use Caution as <b>NOT TO</b> scratch or raise burrs on inside diameters of the parts.

5. Remove and replace all o-rings if necessary.

6. O-rings [12] and [18] must be installed inside their mating parts (see Figure 10).

7. The Teflon o-ring [16] should be inserted into the front of the bushing [14] and one of the o-rings [15] installed onto the outside groove before the bushing is installed.

8. Reassemble the remaining parts as shown in Figure 9 making sure that the alignment tab on the bushing [14] lines up with the align groove in the body [19].

9. Torque the seal carriage [13] to 30-35 lbs•in (4.0-4.5 Nm).

10. If the u-cup needs to be replaced, assemble on piston plate [9] and push both onto shaft, tighten securely with piston nut [7] and install in body as one assembly.

11. Assemble the remainder of the applicator head as stated earlier.

12. If the locking tab plug connection [24] needs to be replaced, first remove the electrode spring connector [23] by pulling straight out with a needle nose pliers. If removed, the spring wire should be replaced.

13. Remove socket head screw [22] and connection plug [24] from body.

14. Replace conductive compressable contact [25] if necessary.

15. Reinstall the connection plug [24] into the body, making sure the tabs on the bottom align with the notches in the body [19].

16. Insert and tighten the screw [22], making sure the tabs remain inside the notches [24] in the body.

17. Insert the spring electrode wire [23] through the hole in the screw using a needle nose pliers on the straight wire portion. Carefully rotate and push the wire through the screw hole and into the compressable contact until the spring contacts the screw head.



**NOTES**

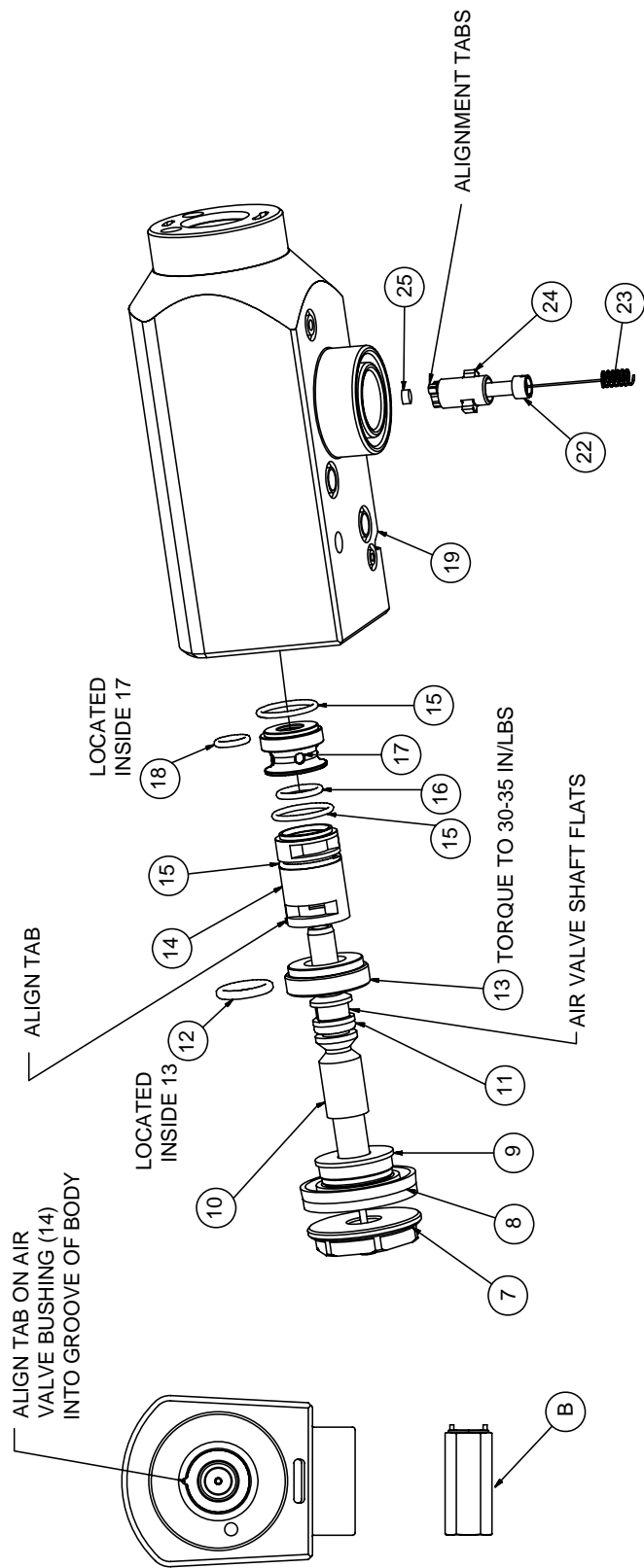


Figure 10: 79138 Evolver Applicator Head Assembly

**79138 EVOLVER APPLICATOR HEAD ASSEMBLY - PARTS LIST  
(Figure 10)**

Item #	Part #	Description	Qty
7	79147-00	Nut, Piston	1
8	7723-06	Piston, U-Cup	1
9	79145-00	Plate, Piston	1
10	79144-00	Shaft, Air Valve	1
11	79001-28	O-Ring, Solvent Proof	1
12	79001-29	O-Ring, Solvent Proof	1
13	79146-00	Seal Carrier, Rear Piston	1
14	79143-00	Bushing, Air Valve	1
15	79001-01	O-Ring, Solvent Proof	3
16	13076-13	O-Ring, Teflon	1
17	79172-00	Carrier, Rear Seal	1
18	79001-06	O-Ring, Solvent Proof	1
19	79137-00	Head, Machining	1
22	79142-00	Screw, #8-32 X .75" Long, SHCS	1
23	79171-00	Spring, Connector	1
24	79141-00	Plug, Connection	1
25	14061-09	Conductive Compressable Contact	1
B	A10400-00	Seal Carrier Tool	1

## REMOVING SPRAY APPLICATOR FROM THE REAR MANIFOLD ASSEMBLY (See Figure 11)

Anytime service is required within the applicator shroud, the applicator should be removed from the robot mounting plate assembly. After the applicator is removed from the robot, always move to a clear, clean work area to remove the applicator shroud and begin servicing.

1. Purge all fluid from the system and blow lines dry with pushout air before the applicator is removed.
2. All pressures must be removed, both air and fluid, before removing the applicator. Fluid pressure can be removed by actuating the applicator trigger with the fluid regulator open.
3. Turn off the power supply to the applicator.
4. Remove applicator from robot by turning the retaining ring counter-clockwise from the manifold robot mounting plate.
5. Remove spray head [3] (see Figure 11) as previously described in Figure 9a. (see Figure 11).

### Spray Applicator Disassembly (See Figures 12, 13, and 14)

6. Remove the four (4) screws [1] from mounting block [10] and pull the block out of the upper manifold [11] as shown in Figure 12.
7. Remove and inspect the o-rings [2, 8, and 9]. Replace if necessary (see Figure 12).
8. Remove mounting ring cover [7] by pulling straight up as shown in Figure 12.
9. Remove mounting ring [6] by pulling straight up as shown in Figure 12.

10. Loosen the two (2) screws [3] on the shroud halves. Carefully pry the shroud halves [4 and 5] apart by placing a thin blade screw driver in between them.

11. Loosen one end of the coiled fluid tube [13] by removing the nut [6] and ferrules [7 and 8] from the valve manifold [5] (see Figure 13).

12. Loosen one end of the gray rigid tube [12] by removing the nut [9] and ferreles [10 and 11] from the valve manifold [5].

13. Remove the six (6) screws [17] and the four (4) screws [14] from the bottom of the mounting plate [4] (see Figure 13). Inspect the four (4) o-rings [15] located within the screws [14] and replace if necessary.

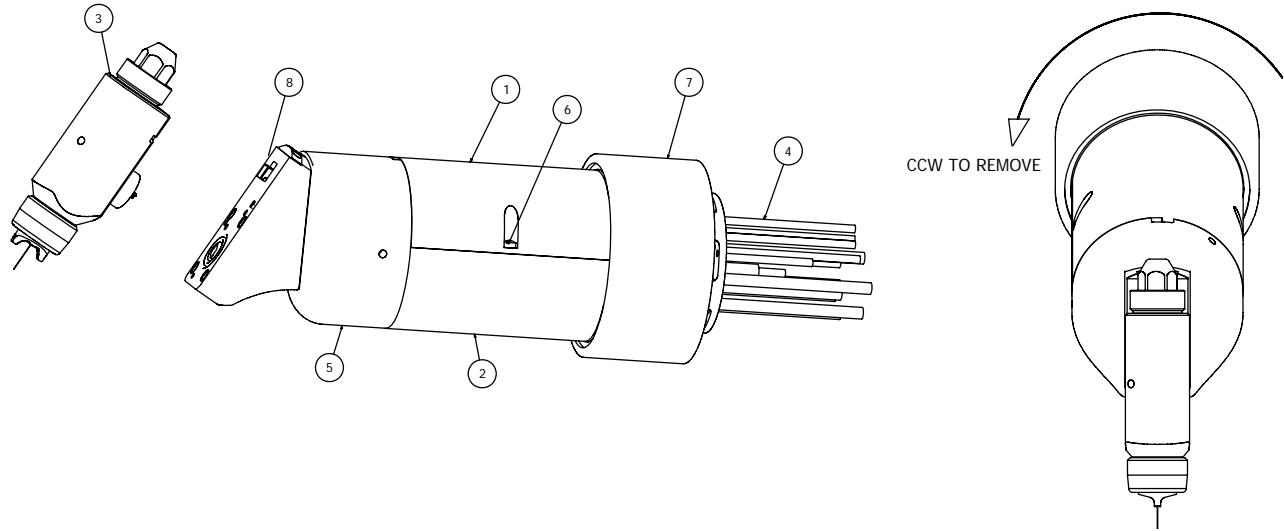
14. Carefully pull upward on the head manifold block [22] which will disengage from the bottom valve assembly block [5]. Inspect o-rings [2] on the ends of the connecting rods [1]. Replace if necessary (see Figure 13).

15. Remove the four (4) connecting rods [1] by unscrewing counter-clockwise. Remove and inspect the four (4) studs [3] and the o-rings [2] and replace if necessary.

16. Remove and inspect the coiled fluid tube by removing the tube nut [6] and ferrules [7 and 8] from the upper head manifold [22].

17. Release the cascade cable from the valve manifold by loosening the set screw [23]. Pull the cable out of the mounting plate [4], and cascade [19] out of the upper head manifold [22].

18. Reassemble in reverse order making sure to align the cascade wire plug timing mark with the timing mark on the mounting plate [4] as shown in Figure 13. Tighten set screw [23].



**Figure 11: Evolver 202 60° Single Head Applicator Assembly**

<b>EVOLVER 202 60° SINGLE HEAD APPLICATOR ASSEMBLY - PARTS LIST (Figure 11)</b>			
<b>Item #</b>	<b>Part #</b>	<b>Description</b>	<b>Qty</b>
1	77523-00	Upper Shroud, Machined RMA-101	1
2	77522-00	Lower Shroud, Machined RMA-101	1
3	79138-01	Spray Head Assembly, Conventional Spray	1
	79138-02	Spray Head Assembly, HVLP Spray	
4	79106	Tubing Bundle, RMA-202 (English)	1
	A10892	Tubing Bundle, RMA-202 (Metric)	
5	A11916	Manifold, Evolver 202	1
6	77524-00	Screw, Machined, RMA-101 Break-Away	2
7	78976-00	Mounting Ring, RMA-202	1
8	79179-00	Mounting Block Assembly	1

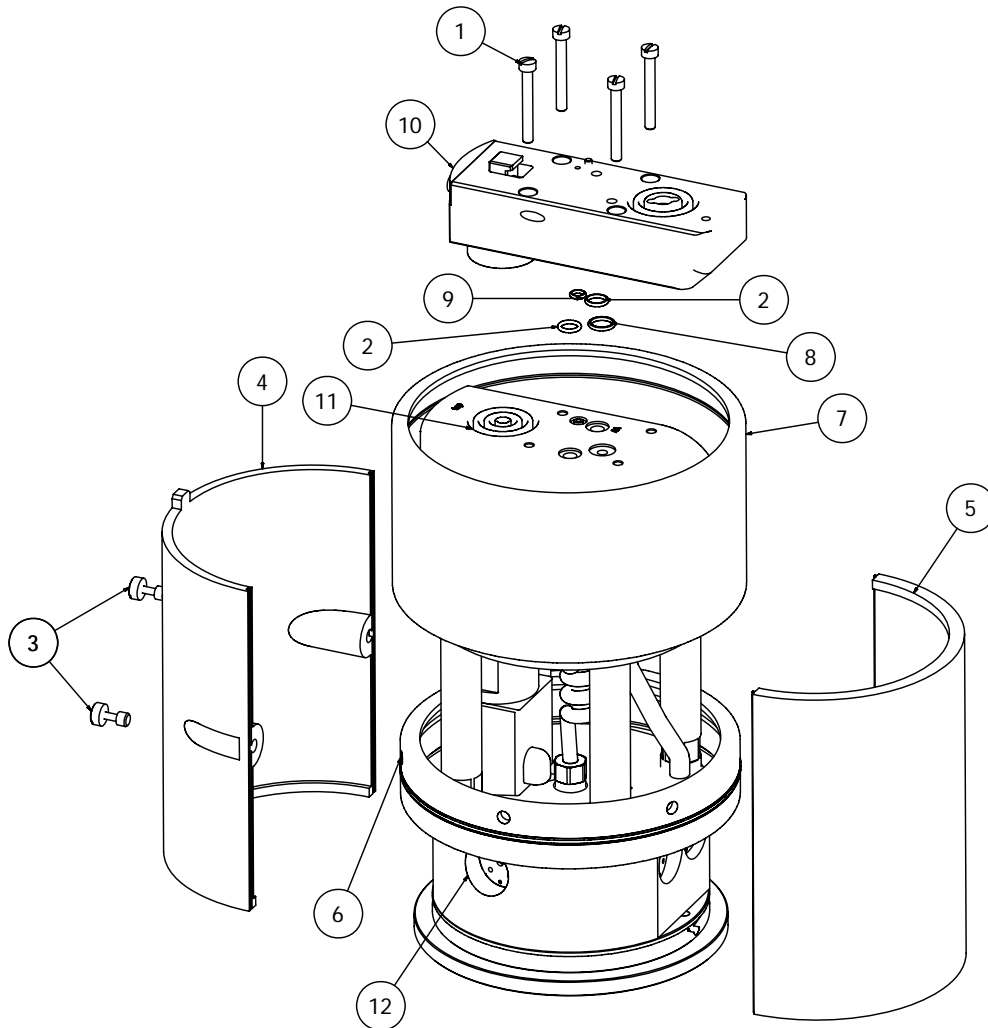
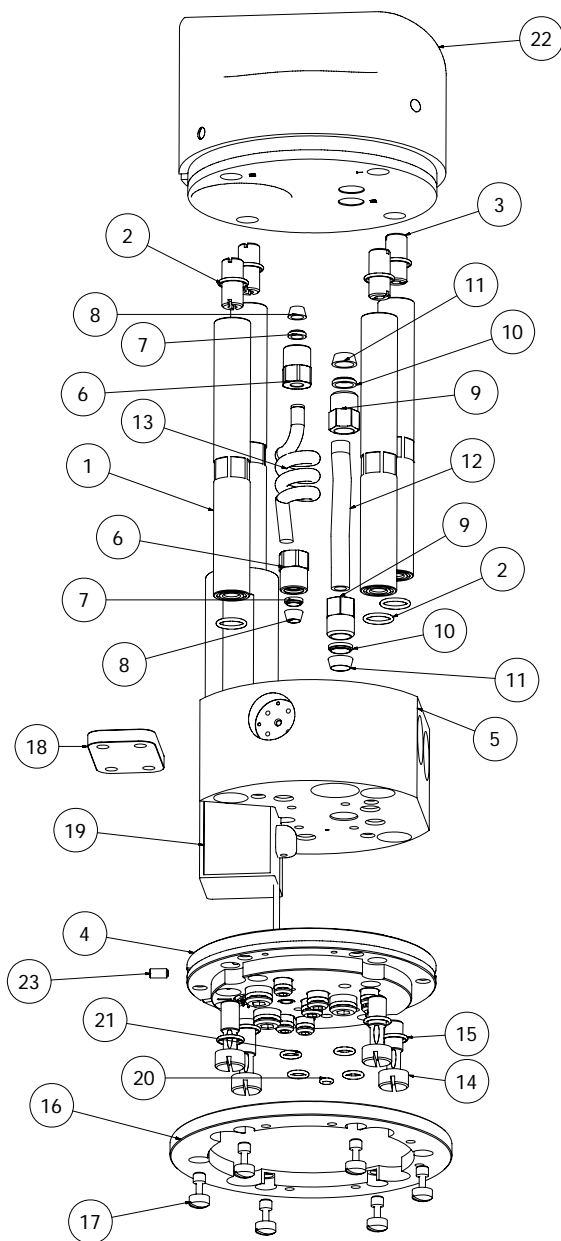


Figure 12: Mounting Block, Shroud Halves, and Retaining Ring Removal

<b>MOUNTING BLOCK, SHROUD HALVES, AND RETAINING RING REMOVAL - PARTS LIST (Figure 12)</b>			
<b>Item #</b>	<b>Part #</b>	<b>Description</b>	<b>Qty</b>
1	LSFA0027-00	Screw, Retaining #10-32 x 1.50"	4
2	79001-06	O-Ring, Solvent Proof	2
3	77524-00	Screw, Machined, RMA-101 Break-Away	2
4	77523-00	Upper Shroud, Machined, RMA-101	1
5	77522-00	Lower Shroud, Machined, RMA-101	1
6	78976-00	Mounting Ring, RMA-202	1
7	78979-00	Mounting Ring Cover, RMA-202	1
8	79001-14	O-Ring, Solvent Proof	1
9	79001-04	O-Ring, Solvent Proof	1
10	79184-00	Plate, Retention	1
11	A11916	Upper Manifold, Evolver 202	1
12	79103-XX	Valve Manifold Assembly, RMA-202	1

**NOTES**



ALIGN TIMING AS SHOWN

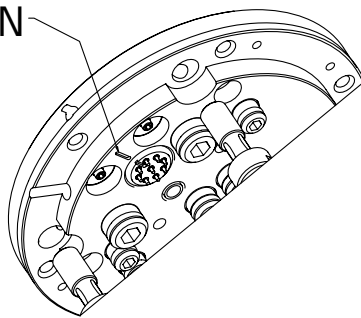


Figure 13: Disassembly of Intermediate Applicator Housing



**INTERMEDIATE APPLICATOR HOUSING - PARTS LIST (Figure 13)**

Item #	Part #	Description	Qty
1	79134-00	Connecting Rod, Machined	4
2	79001-08	O-Ring, Solvent Proof	8
3	77509-00	Threaded Stud, Machined	4
4	79105-01	Bell Plate Assembly, RMA-202	1
5	79103-00	Valve Manifold Assembly, RMA-202	1
6	78449-00	Fitting, Fluid	2
7	EMF-202-04	Ferrule, Back, 1/4" Tube	2
8	EMF-203-04	Ferrule, Front, 1/4" Tube	2
9	70591-01	Nut, Fluid Fitting, 1/4"	2
10	EMF-202-05	Ferrule, Back, 1/4" Tube	2
11	EMF-203-05	Ferrule, Front, 1/4" Tube	2
12	77538-01	Tubing, 3/8" OD X .250" ID, Polyethylene	1
13	78450-00	Tube, Coiled, 1/4" OD X 1/8" ID	1
14	77508-00	Air Bolt, Machined	4
15	79001-07	O-Ring, Solvent Proof	4
16	78992-00	Ring, Break-Away, RWA-101	1
17	77524-00	Screw, Machined, Break-Away, RMA-101	6
18	79030-00	Cascade Stop Plate	1
19	79010-01	Cascade Assembly, HP-404	1
20	79001-04	O-Ring, Solvent Proof	1
21	79001-06	O-Ring, Solvent Proof	4
22	A11916	Upper Manifold, Evolver 202	1
23	SSF-2052	Set Screw, 3/8" Lg. X #10-24	1

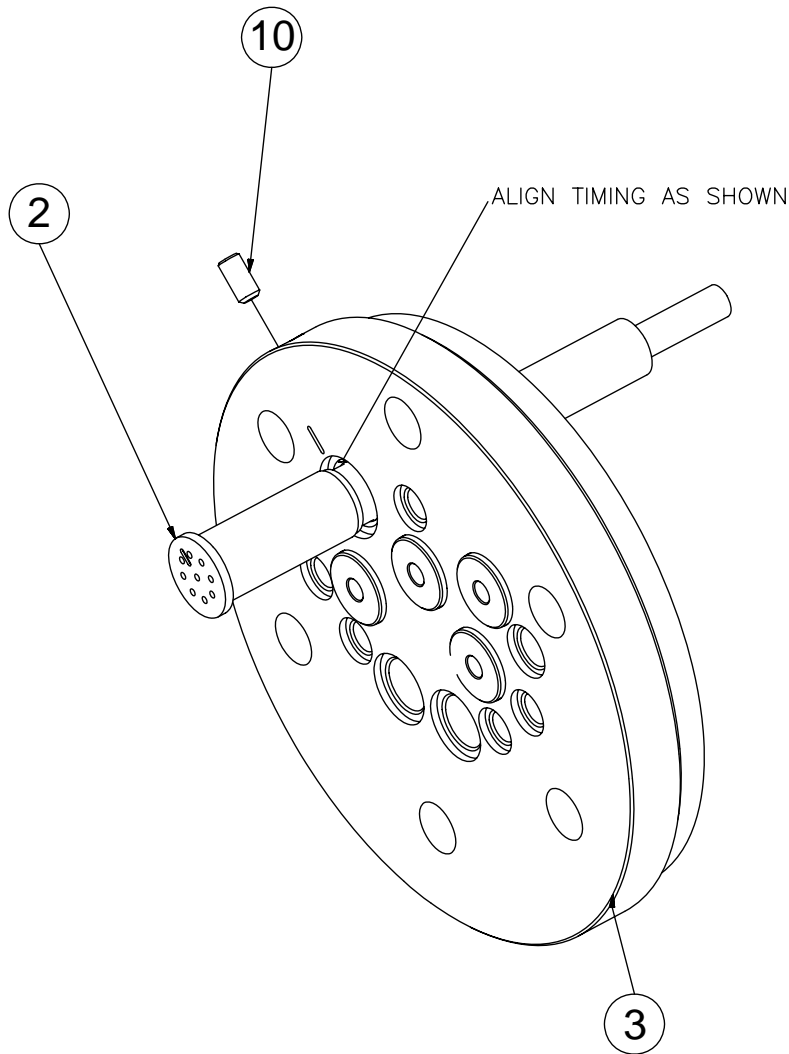


Figure 14: Low Voltage Cable Removal

<b>LOW VOLTAGE CABLE REMOVAL - PARTS LIST (Figure 14)</b>			
<b>Item #</b>	<b>Part #</b>	<b>Description</b>	<b>Qty</b>
2	79008-XX	Low Voltage Cable, One-Piece, for LECU5004-XX Power Supply	1
2	A11353-XX	Low Voltage Cable, One-Piece, for A10406-XX Power Supply	1
2	A11355-XX	Low Voltage Cable, Junction, for A10406-XX Power Supply	1
3	79155-00	Robot Mounting Plate, English Fittings	1
3	A10975-00	Robot Mounting Plate, Metric Fittings	1
10	SSF-2052	Set Screw	1

## **Low Voltage Cable Removal (Refer to Figure 14)**

1. Disconnect low voltage cable [2] from rear of power supply. For A10406-XX power supply, disconnect circular connector from receptacle on rear of power supply. For LECU5004-XX power supply, disconnect wires from connector J3 at rear of MicroPak.
2. Loosen retaining ring [6] (see Figure 12) and remove applicator from robot wrist.
3. Using 3/16" Allen wrench, remove set screw [10].
4. Remove the low voltage cable [2] by pulling through the robot arm and mounting plate.
5. To reinstall, insert power supply end of cable [2] through mounting plate [3], pull through robot arm and connect to junction box or power supply. For connections to power supply, plug connector into receptacle (A10406-XX power supply) or connect wires as shown in Figure 4 (LECU5004-XX power supply).
6. Align the timing mark of the plug on the applicator end of the cable [2] with the mark on the mounting plate [3] and tighten set screw [10].

## **NOTES**

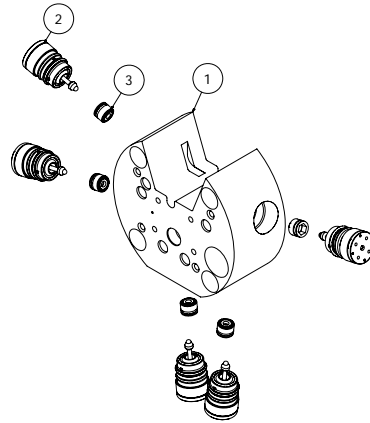


Figure 15a: 79103-00 Dual Purge Valve Manifold Disassembly

<b>79103-00 DUAL PURGE VALVE MANIFOLD - PARTS LIST (Figure 15a)</b>			
Item #	Part #	Description	Qty
1	79026-00	Valve Manifold	1
2	78949-00	Fluid Valve Assembly	5
3	77367-00	Valve Seat Assembly	5

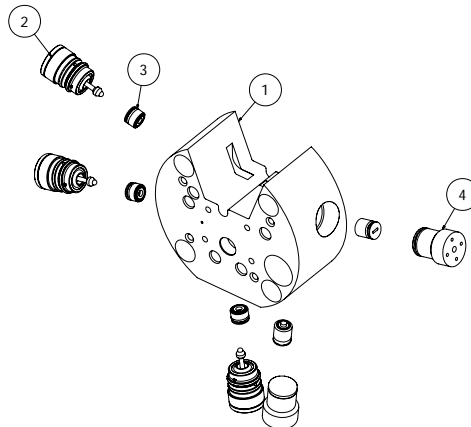


Figure 15b: 79103-01 Single Purge Valve Manifold Disassembly

<b>79103-01 SINGLE PURGE VALVE MANIFOLD - PARTS LIST (Figure 15b)</b>			
Item #	Part #	Description	Qty
1	79026-00	Valve Manifold	1
2	78949-00	Fluid Valve Assembly	3
3	77367-00	Valve Seat Assembly	3
4	77620-00	Kit, Valve Plug	2

<b>PARTS LIST BULLET DEFINITION TABLE - (Figures 15a and 15b)</b>	
	Install assemblies as shown. Apply A11545-00 Petroleum jelly to o-rings. Torque to 15-20 lbs•in (1.70-2.3 Nm) after valve is down.
	Install valve seat assemblies as shown. Apply A11545-00 Petroleum jelly to o-rings. Torque to 15-20 lbs•in (1.70-2.3 Nm)

## **REGULATOR VALVE MANIFOLD ASSEMBLY (Figure 16)**

### **Regulator Removal / Replacement**

Prior to removing the regulator and related parts from the manifold, flush the system with solvent and purge with air.

Using tool A10676-00, remove the regulator cap. Remove the six (6) stainless steel screws with a flat head screwdriver. Carefully remove the regulator bonnet. Then remove the diaphragm assembly. Next, remove the needle and seat assembly using a 3/16" Hex key.

Clean entire regulator with solvent and blow dry. Do not use any metal object to remove dried paint from any surface. Damage to the diaphragm sealing surface and the needle seat assembly will result in leaks and may permanently damage valve manifold. If regulator was disassembled because of leakage (fluid downstream of regulator), discard entire needle, seat, o-ring, and spring and replace with new.

### **Regulator Diaphragm**

Remove the screw holding the upper plate and lower plate of the assembly with a Phillips screwdriver. Pull parts apart and discard the diaphragm. Inspect the lower plate for any damage, replace if necessary. Replace the o-ring that was between the lower plate and the diaphragm.

### **Diaphragm Assembly**

Carefully place the o-ring on the lower plate, center a new diaphragm over the parts, and center the upper plate over these parts. Install the screw with a small amount of Loctite (7969-05) on the threads. Tighten together to a torque of 8-10 lbs•in (.90-1.13 Nm). Make sure that Teflon (white side of the diaphragm) faces towards the lower plate.

### **Seat Assembly Replacement**

Install the spring into the center-most cavity of the manifold. Place the pointed end of the needle onto the center of the spring. Install the o-ring into the cavity of the seat. Lightly lubricate the o-ring with A11545-00 Petroleum jelly. Secure the needle/seat assembly by screwing the seat retainer into the regulator cavity until a torque of 8-10 lbs•in (.90-1.13 Nm) is obtained. Use a 3/16" Hex key driver.

### **Replacing Diaphragm Assembly**

Install assembly with the black rubber face towards the outside and align with the screw holes in the cavity. Place the regulator bonnet over the diaphragm assembly and align with screw holes of the diaphragm assembly and cavity. Insert all six (6) stainless steel screws and tighten in an alternating 180° method. Install regulator cap and tighten to 125-135 lbs•in (14.1-15.3 Nm).

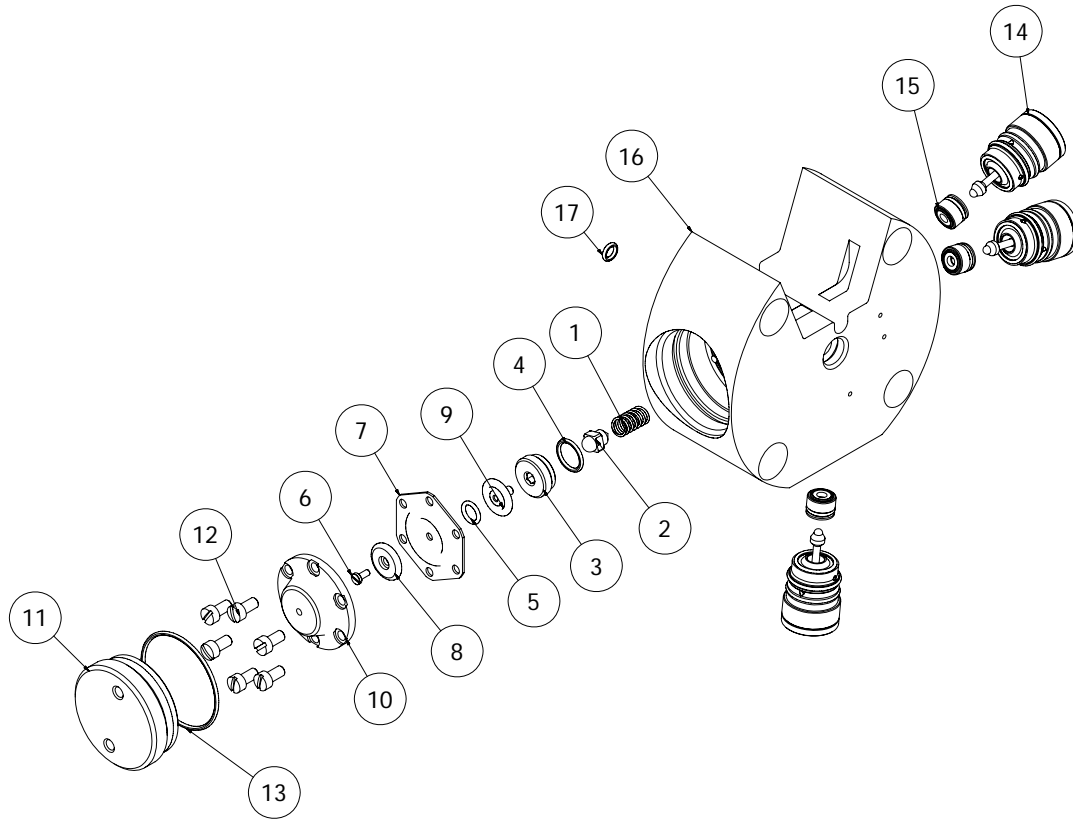


Figure 16: A10745 Fluid Regulator Assembly

<b>A10745 FLUID REGULATOR ASSEMBLY - PARTS LIST (Figure 16)</b>			
<b>Item #</b>	<b>Part #</b>	<b>Description</b>	<b>Qty</b>
1	74161-00	Spring, Regulator	1
2	77354-00	Assembly, Needle and Seat	1
3	77354-00	Assembly, Needle and Seat	1
4	79001-08	O-Ring, Solvent Proof	1
5	79001-06	O-Ring, Solvent Proof	1
6	76374-08C	Screw	1
7	79220-00	Diaphragm	1
8	79222-00	Upper Plate, Regulator	1
9	79221-00	Lower Plate, Regulator	1
10	A10741-00	Bonnet, Regulator	1
11	A10740-00	Cap, Regulator	1
12	A10746-00	Screw, Slotted Fillister Head, Stainless Steel	6
13	79001-35	O-Ring, Solvent Proof	1
14	78949-00	Fluid Valve Assembly	3
15	77367-1	Valve Seat Assembly	3
16	A10743-00	Valve Manifold, Regulator, Evolver 202	1

# TROUBLESHOOTING GUIDE

General Problem	Possible Causes	Corrective Action
<p><b>Fluid Does Not Turn On</b></p>	<ol style="list-style-type: none"> <li>1. Trigger pilot regulator has not been set to a minimum of 70 psig</li> <li>2. The green air tube possibly left disconnected during re-assembly</li> <li>3. Green tube leading from the source to the applicator mounting plate is pinched or broken</li> <li>4. Piston seal within the applicator spray head is not in place or there is an extremely tight fit between the seal and the cylinder wall</li> <li>5. P1T or P2T not actuated</li> <li>6. Paint trigger (BA/PT) not actuated</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase to 70 psig minimum.</li> <li>2. Reconnect tubing.</li> <li>3. Check the tubing for kinks or damage. Replace if worn or damaged.</li> <li>4a. Make sure that the seal is in the proper position and/or lubricate with a small amount of petroleum jelly.</li> <li>4b. O-rings left out of small Ø tie rods.</li> <li>4c. O-ring missing between mounting block and upper manifold.</li> <li>4d. O-ring missing between mounting block and replaceable head.</li> <li>5. Make sure P1T or P2T (whichever paint line is in use) is activated. Both P1T or P2T and BA/PT (paint trigger) must be activated to trigger the applicator on.</li> <li>6. Make sure paint trigger (BA/PT) is actuated. Both P1T or P2T and BA/PT must be actuated to trigger the applicator on.</li> </ol>
<p><b>No Fan or Atomization Air Pressure At the Air Cap</b></p>	<ol style="list-style-type: none"> <li>1. Low trigger pilot air pressure (70 psi min. required)</li> <li>2. Air tubes 79134-00 are not installed properly.</li> <li>3. Blue or gray 3/8" OD tube is cut or pinched</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase pressure.</li> <li>2. Reinstall and tighten as required.</li> <li>3. Examine, repair as required.</li> </ol>
<p><b>Excessive Current or Loss of High Voltage</b></p>	<ol style="list-style-type: none"> <li>1. Metallic particle alignment in coiled tube</li> <li>2. Fluid leaks inside</li> <li>3. Fluid coil pin-holed</li> <li>4. Exterior of applicator contaminated</li> </ol>	<ol style="list-style-type: none"> <li>1. Start fluid flow before turning voltage on.</li> <li>2. Repair/replace fittings and/or coiled fluid tube as required.</li> <li>3. Replace coil as required.</li> <li>4. Clean with non-polar solvent.</li> </ol>

Note: A test station to bench test the applicator off-line will speed the Troubleshooting process.

(Continued On Next Page)

## TROUBLESHOOTING GUIDE (Cont.)

General Problem	Possible Causes	Corrective Action
<b>No Electrostatics</b>	1. Cascade not functioning	1. Check low voltage cable and harness timing mark positions. Correct as required. 2. Cascade bad. Replace as required. 3. Low voltage cable connections wrong at MicroPak. 4. Low voltage cable bad. Replace as required.
<b>Low kV, High <math>\mu</math>A Output</b>	1. Exterior of applicator contaminated with conductive material	1. Replace applicator cover. 2. Clean exterior with a non-polar solvent.
<b>Low kV, Low <math>\mu</math>A Output</b>	1. Cascade failure	1. Replace as required.
<b>No Fluid Flow</b>	1. Fluid valve does not actuate  2. Clogged fluid tube  3. Bad transceiver module  4. Plugged inlet  5. Regulator (needle and seat) stuck 6. No pilot air  7. Two component valve contaminated 8. In-line mix tube clogged	1.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. 2. Remove and inspect fluid tube.  3. Replace transceiver module.  4. Flush clean  5. Remove and clean or replace  6. Check air pilot  7. Remove valve manifold and clean  8. Replace
<b>Continuous Fluid Flow</b>	1. Fluid valve open  2. Fluid valve seat damaged or worn 3. Regulator (needle and seat) dirty 4. Regulator pilot air not shut off	1 a. Remove air pilot signal. b. If still open, replace fluid valve. 2. Replace fluid valve seat.  3. Remove and clean or replace.  4. Check air supply.



## TROUBLESHOOTING GUIDE (Cont.)

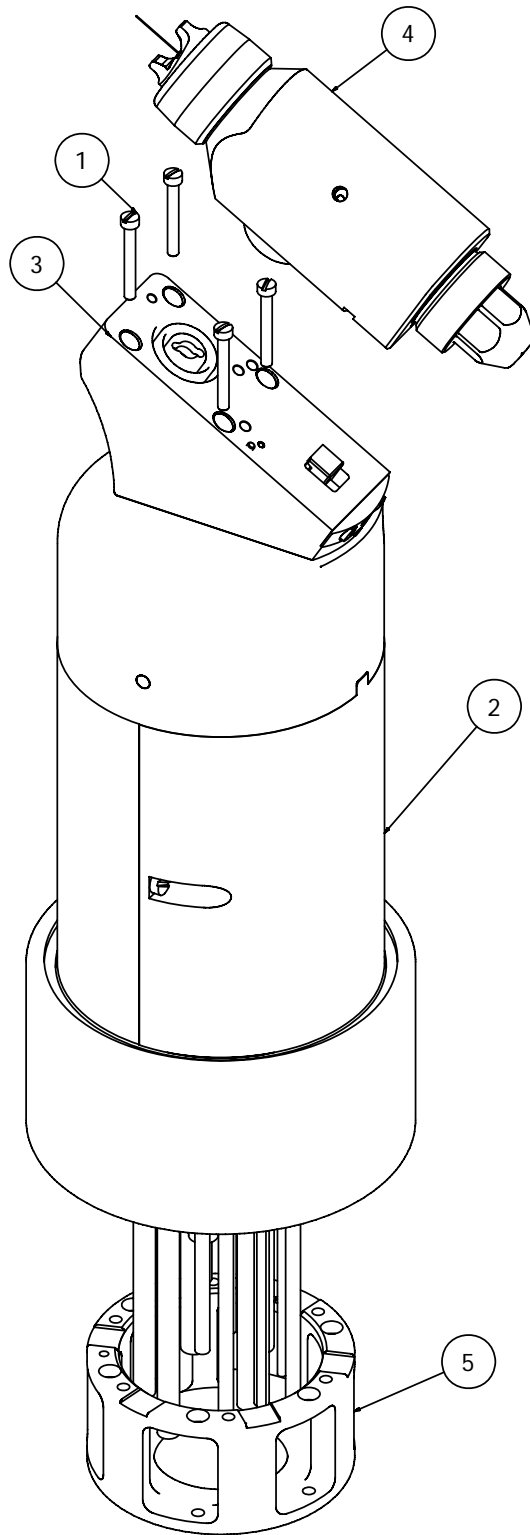
General Problem	Possible Causes	Corrective Action
<b>Uncontrollable Fluid Flow</b>	<ol style="list-style-type: none"> <li>1. Insufficient back pressure to fluid regulator</li> <li>2. Fluid regulator does not control flow (system)</li> <li>3. Diaphragm stretched from excessive air pressure</li> <li>4. Ruptured diaphragm</li> <li>5. Inconsistent air pilot supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace fluid tube with the next smaller inner diameter size.</li> <li>2. Disassemble fluid regulator and inspect for failed components (system).</li> <li>3. Rebuild regulator.</li> <li>4. Rebuild regulator.</li> <li>5. Check air source.</li> </ol>
<b>Paint Sputtering</b>	<ol style="list-style-type: none"> <li>1. Ruptured Diaphragm</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace regulator diaphragm.</li> </ol>
<b>Fluid Leakage Around Fluid Valve</b>	<ol style="list-style-type: none"> <li>1. Damaged o-ring(s) on outer diameter of valve body</li> <li>2. Damaged or worn needle seals inside valve assembly</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace o-ring.</li> <li>2. Inspect tubing coil for scratches and replace if damaged.</li> </ol>
<b>Paint Leakage (Regulator)</b>	<ol style="list-style-type: none"> <li>1. Diaphragm (screws) loose</li> <li>2. Ruptured diaphragm</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace o-ring(s).</li> <li>2. Replace valve assembly.</li> </ol>

Note: To check for fluid leaks, it is easiest to first remove the applicator from the test station and remove the shroud from the applicator. Then the applicator can be remounted to the test station. Leak detector may be used at all appropriate sources. Be certain to wipe off all residual solution using a non-conductive solvent such as Naphtha.

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# PARTS IDENTIFICATION

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**Figure 17: A11918 Spray Applicator Assembly**

**A11918 SPRAY APPLICATOR ASSEMBLY - PARTS LIST**  
 (Figure 17)

Item #	Part #	Description	Qty
1	<b>Table A - "A"</b>	Screw, #10-32, Thread	4
2	<b>Table B - "B"</b>	Manifold Assembly	1
3	<b>Table A - "C"</b>	Assembly, Mounting Block	1
4	<b>Table C - "E"</b>	Assembly, Head Robot Gun	<b>Table A - "D"</b>
5	<b>Table D - "F"</b>	Robot Adapters	1

**TABLE A**  
**HEAD CONFIGURATION**

Dash No.	Description	"A"	"C"	"D"
0	60° Single Head	LSFA0027-00	79179-00	1
1	90° Single Head	LSFA-0027-00	79180-00	1
2	60° Dual Head	79206-00	79234-00	2
3	90° Dual Head	79206-00	79224-00	2

**TABLE B**  
**MANIFOLD CONFIGURATION**

Dash No.	Description	"B"
0	Single Purge, No Regulator, for Highly Conductive Materials (Base/Clear)	A11917-01
1	Dual Purge, No Regulator, for Highly Conductive Materials (Base/Clear)	A11917-02
2	Single Purge W/Regulator	A11917-03
3	Single Purge, No Regulator, for Conductive Materials (Base/Clear)	A11917-04
4	Dual Purge, No Regulator, for Conductive Materials (Base/Clear)	A11917-05
5	Single Purge, No Regulator, for Highly Resistive Materials (Clear Coat)	A11917-06
6	Dual Purge, No Regulator, for Highly Resistive Materials (Clear Coat)	A11917-07

**TABLE C**  
**ATOMIZATION TECHNOLOGY**

Dash No.	Description	"E"
0	Conventional Spray	79138-01
1	HVLP Spray	79138-02

**TABLE D**  
**ROBOT ADAPTERS**

Dash No.	Description	"F"
0	No Adapter	----
1	"ABB" Robot Adapter	79107-00
2	"Fanuc" P-155 Robot Adapter	78983-00
3	"Fanuc" P-200 Robot Adapter	79131-00
4	Adapter (Kawasaki-KE610L)	A10847-00
5	Adapter (Motoman-PX2850)	A10848-00
6	Adapter (Motoman-PX2900)	A10849-00
7	Adapter (B & M-LZ2000)	A10851-00

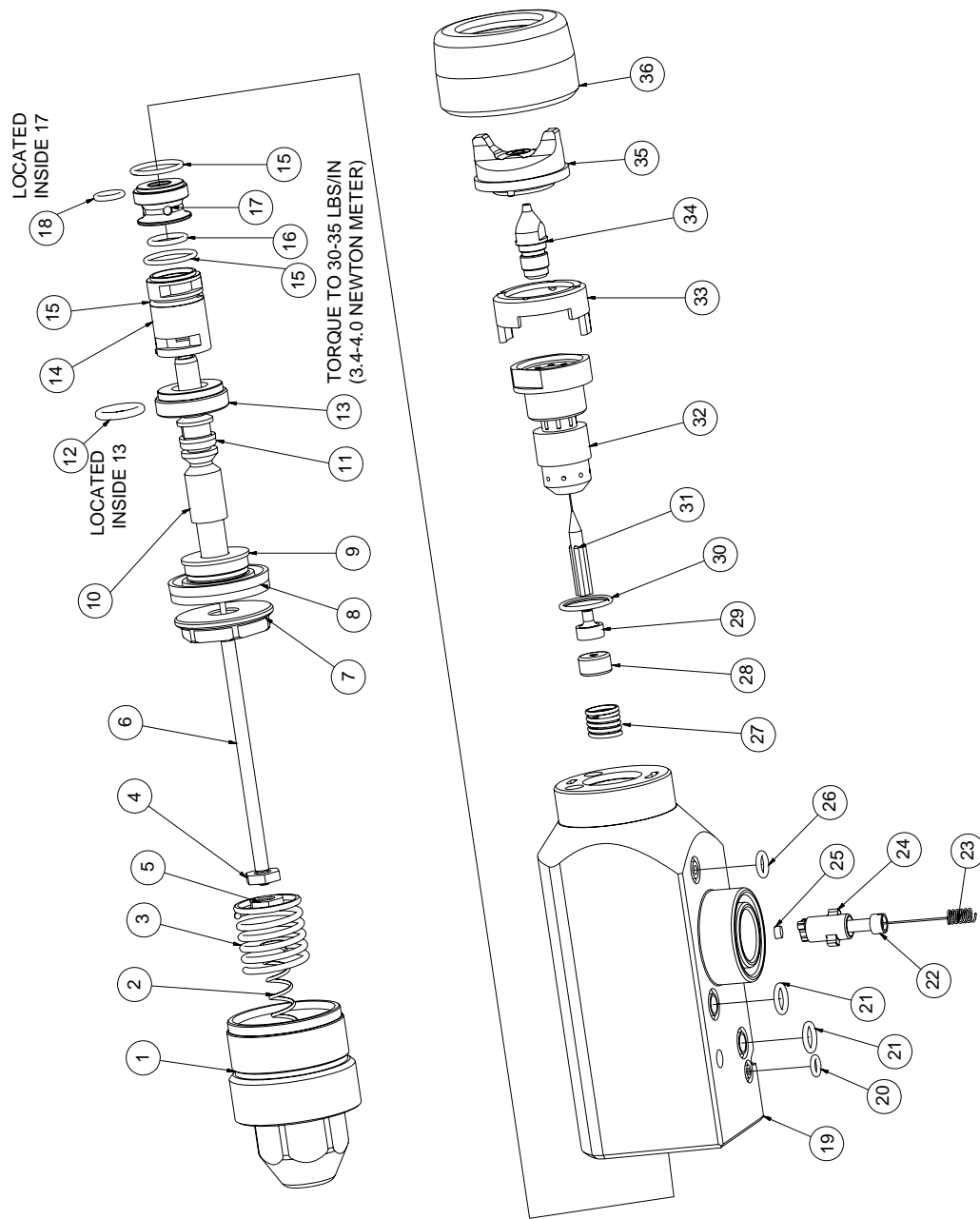


Figure 18: 79138-01 Spray Head Assembly

**79138-01 CONVENTIONAL SPRAY HEAD ASSEMBLY -  
PARTS LIST (Figure 18)**

Item #	Part #	Description	Qty
1	79148-00	End Cap, Spray Head	1
2	17615-00	Spring, Compression	1
3	9334-00	Spring, Valve Return	1
4	7733-07	Nut, Jam	1
5	76199-00	Nut, Adjustment Rear	1
6	79151-00	Assembly, Needle Shaft	1
7	79147-00	Nut, Piston	1
8	7723-06	Piston, U-Cup	1
9	79145-00	Plate, Piston	1
10	79144-00	Shaft, Air Valve	1
11	79001-28	O-Ring, Solvent Proof	1
12	79001-29	O-Ring, Solvent Proof	1
13	79146-00	Seal Carrier, Rear Piston	1
14	79143-00	Bushing, Air Valve	1
15	79001-01	O-Ring, Solvent Proof	3
16	13076-13	O-Ring, Teflon	1
17	79172-00	Carrier, Rear Seal	1
18	79001-06	O-Ring, Solvent Proof	1
19	79137-00	Head, Machining	1
20	79001-04	O-Ring, Solvent Proof	1
21	79001-06	O-Ring, Solvent Proof	2
22	79142-00	Screw, SHCS	1
23	79171-00	Spring, Connector	1
24	79141-00	Plug, Connection	1
25	14061-09	Conductive Compressable Contact	1
26	79001-05	O-Ring, Solvent Proof	1
27	RME-38	Return Spring, Piston	1
28	EMF-7	Seal, Washer	1
29	RME-32	Seal	1
30	79001-01	O-Ring, Solvent Proof	1
31	70430-01	Electrode, High Wear	1
32	EMF-195	Nozzle, Fluid Hole (8)	1
33	EMF-192	Locator, Air Cap	1
34	79140-01	Fluid Tip, .042" (1.07mm) Diameter	1
	79140-02	Fluid Tip, .055" (1.40mm) Diameter	1
	79140-03	Fluid Tip, .070" (1.78mm) Diameter	1
35	79153-65R-1	Air Cap, Certified 65R-1	1
	79196-98-1	Air Cap, Certified 98-1	1
	79197-63-1	Air Cap, Certified 63-1	1
36	79154-00	Ring, Retaining	1

**79138-02 HVLP SPRAY HEAD ASSEMBLY - PARTS LIST**  
**(Figure 18)**

Item #	Part #	Description	Qty
1	79148-00	End Cap, Spray Head	1
2	17615-00	Spring, Compression	1
3	9334-00	Spring, Valve Return	1
4	7733-07	Nut, Jam	1
5	76199-00	Nut, Adjustment Rear	1
6	79151-00	Assembly, Needle Shaft	1
7	79147-00	Nut, Piston	1
8	7723-06	Piston, U-Cup	1
9	79145-00	Plate, Piston	1
10	79144-00	Shaft, Air Valve	1
11	79001-28	O-Ring, Solvent Proof	1
12	79001-29	O-Ring, Solvent Proof	1
13	79146-00	Seal Carrier, Rear Piston	1
14	79143-00	Bushing, Air Valve	1
15	79001-01	O-Ring, Solvent Proof	3
16	13076-13	O-Ring, Teflon	1
17	79172-00	Carrier, Rear Seal	1
18	79001-06	O-Ring, Solvent Proof	1
19	79137-00	Head, Machining	1
20	79001-04	O-Ring, Solvent Proof	1
21	79001-06	O-Ring, Solvent Proof	2
22	79142-00	Screw, Shcs.	1
23	79171-00	Spring, Connector	1
24	79141-00	Plug, Connection	1
25	14061-09	Conductive Compressable Contact	1
26	79001-05	O-Ring, Solvent Proof	1
27	RME-38	Return Spring, Piston	1
28	EMF-7	Seal, Washer	1
29	RME-32	Seal	1
30	79001-01	O-Ring, Solvent Proof	1
31	70430-01	Electrode, High Wear	1
32	79183-00	Nozzle, Fluid Hole (8) (HVLP)	1
33	EMF-192	Locator, Air Cap	1
34	79182-01	Fluid Tip, .028" (.71mm) Diameter (Used with Air Cap 79186-48-1)	1
	79182-02	Fluid Tip, .042" (1.07mm) Diameter (Used with Air Cap 79186-48-1)	1
	79182-03	Fluid Tip, .055" (1.40mm) Diameter (Used with Air Cap 79186-48-1)	1
	79182-04	Fluid Tip, .070" (1.78mm) Diameter (Used with Air Cap 79186-481-1)	1
	79182-05	Fluid Tip, .086" (2.18mm) Diameter (Used with Air Cap 79186-481-1)	1
35	79185-48-1	Air Cap, Certified 48-1 (Used with 79182-01, 02, 03 Tips)	1
	79186-481-1	Air Cap, Certified 481-1 (Used with 79182-04, 05 Tips)	1
36	79154-00	Ring, Retaining	1

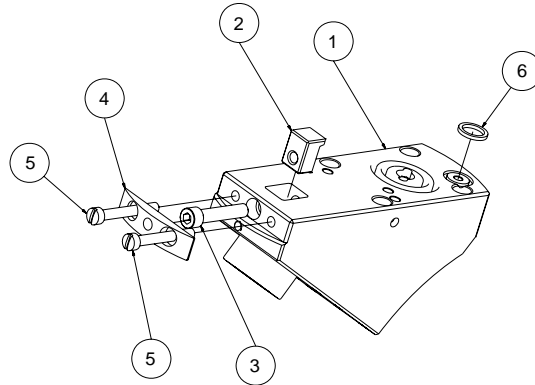


Figure 19: 79179-00 Single Head 60°

<b>79179-00 SINGLE HEAD 60° - PARTS LIST (Figure 19)</b>			
Item #	Part #	Description	Qty
1	79188-00	Assembly, Mounting Block 60° Single Head	1
2	79173-00	Block, Locking	1
3	79174-00	Screw, Nylon 1/4-20 x 1-1/4" Long	1
4	79184-00	Plate, Retention	1
5	79149-00	Screw, Retaining #10-32 x .50" Long NY	2
6	A-10612	Square Cut Ring, Solvent Proof	1

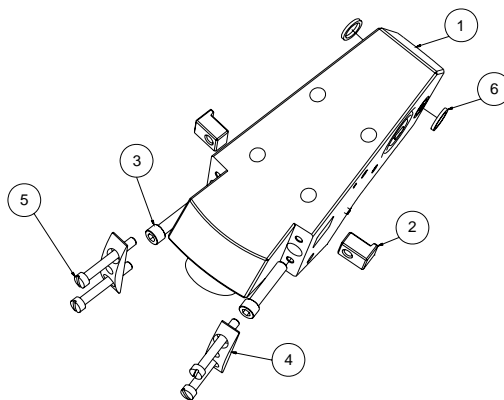


Figure 20: 79243-00 Dual Head 60°

<b>79243-00 DUAL HEAD 60° - PARTS LIST (Figure 20)</b>			
Item #	Part #	Description	Qty
1	79242-00	Assembly, 60° Block Dual Head	1
2	79173-00	Block, Locking	2
3	79174-00	Screw, Nylon 1/4-20 X 1-1/4" Long	2
4	79184-00	Plate, Retention	2
5	79149-00	Screw, Retaining #10-32 X .50" Long NY	4
6	A-10612	Square Cut Ring, Solvent Proof	2

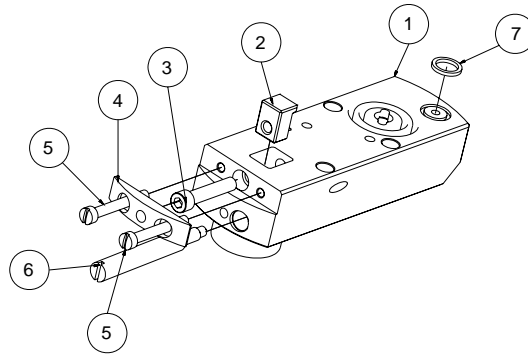


Figure 21: 79180-00 Single Head 90°

<b>79180-00 SINGLE HEAD 90° - PARTS LIST (Figure 21)</b>			
Item #	Part #	Description	Qty
1	79189-00	Assembly, Mounting Block 90° Single Head	1
2	79173-00	Block, Locking	1
3	79174-00	Screw, Nylon 1/4-20 X 1-1/4" Long	1
4	79184-00	Plate, Retention	1
5	79149-00	Screw, Retaining #10-32 X .50" Long NY	2
6	79194-00	Plug, Fluid Flush	1
7	A10612	Square Cut Ring, Solvent Proof	1

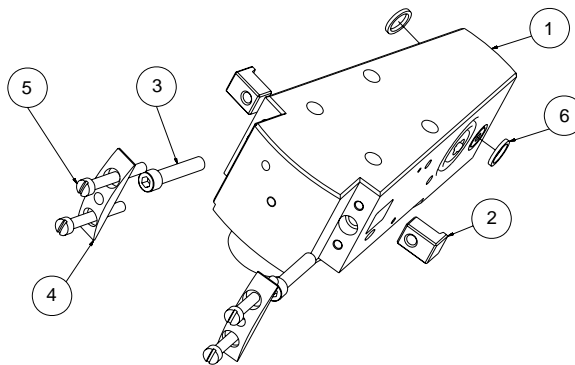


Figure 22: 79224-00 Dual Head 90°

<b>79224-00 DUAL HEAD 90° - PARTS LIST (Figure 22)</b>			
Item #	Part #	Description	Qty
1	79227-00	Assembly, Mounting Block 90° Dual Head	1
2	79173-00	Block, Locking	2
3	79174-00	Screw, Nylon 1/4-20 X 1-1/4" Long	2
4	79184-00	Plate, Retention	2
5	79149-00	Screw, Retaining #10-32 X .50" Long NY	4
6	A-10612	Square Cut Ring, Solvent Proof	2



**NOTES**

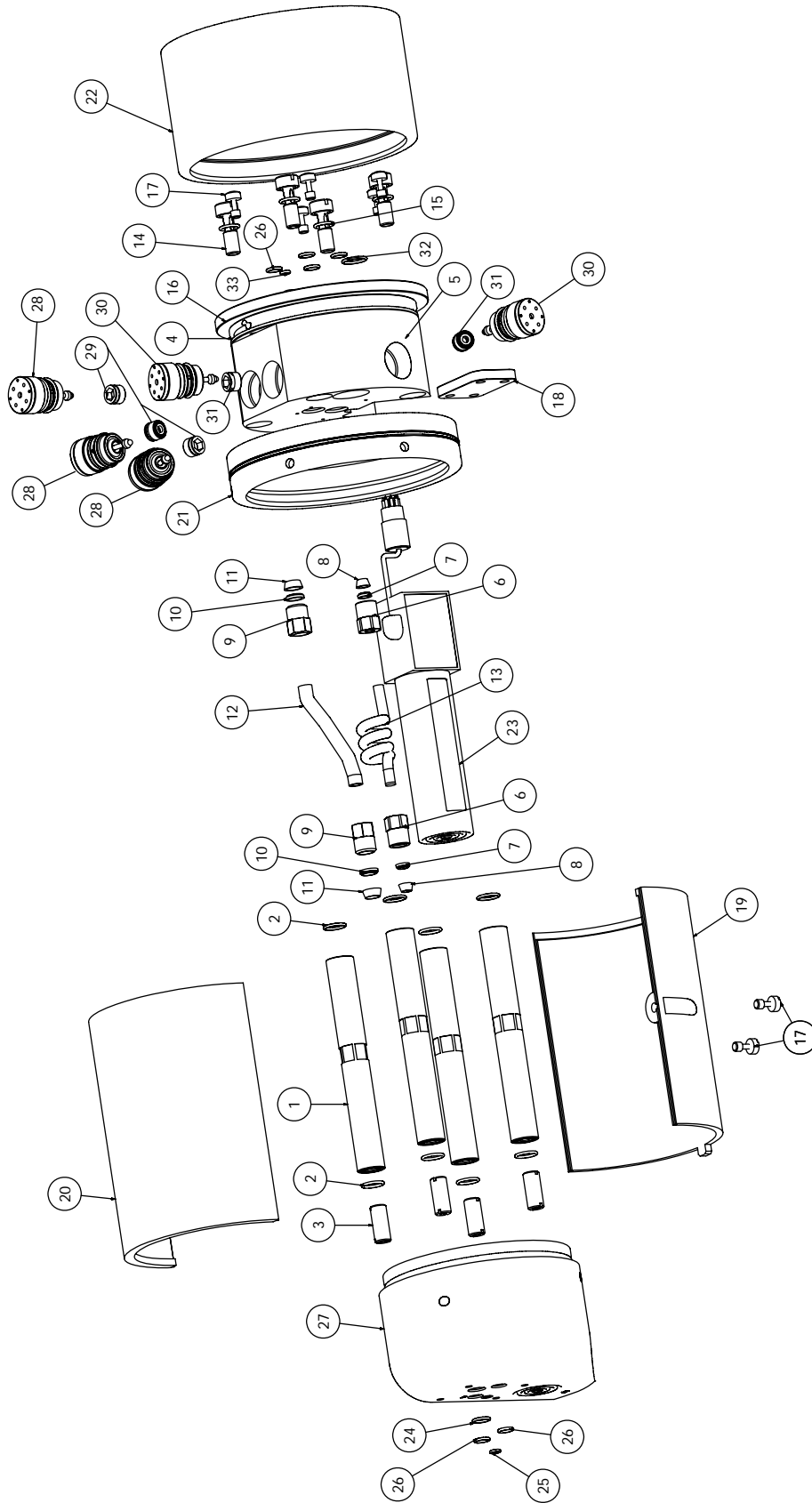






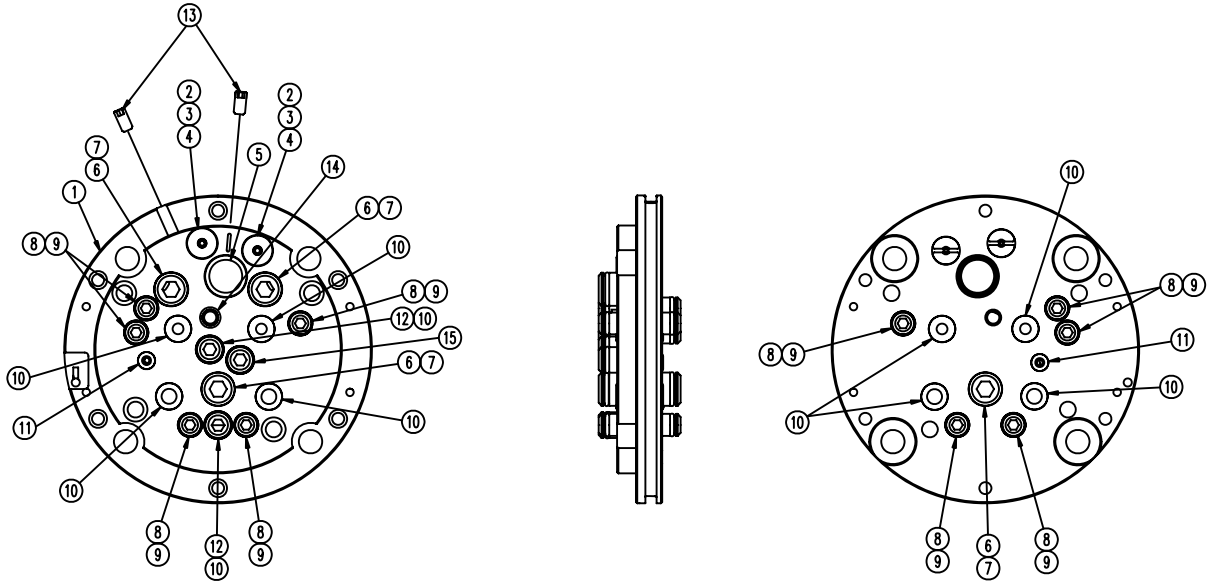
Figure 23: A11917 Manifold Assembly

<b>A11917 MANIFOLD ASSEMBLY - PARTS LIST (Figure 23)</b>			
<b>Item #</b>	<b>Part #</b>	<b>Description</b>	<b>Qty</b>
1	79134-00	Connecting Rod, Machined	4
2	79001-08	O-Ring, Solvent Proof	8
3	77509-00	Threaded Stud, Machined	4
4	79105-01	Bell Plate Assembly, RMA-202	1
5	<b>Table E - "G"</b>	Valve Manifold Assembly, RMA-202	1
6	78449-00	Fitting, Fluid	2
7	EMF-202-04	Ferrule, Back, 1/4" Tube	2
8	EMF-203-04	Ferrule, Front, 1/4" Tube	2
9	70591-01	Nut, Fluid Fitting, 1/4"	2
10	EMF-202-05	Ferrule, Back, 1/4" Tube	2
11	EMF-203-05	Ferrule, Front, 1/4" Tube	2
12	77538-01	Tubing, 3/8" OD X .250" ID, Polyethylene	1
13	78450-00	Tube, Coiled, 1/4" OD X 1/8" ID	1
14	77508-00	Air Bolt, Machined	4
15	79001-07	O-Ring, Solvent Proof	4
16	78992-00	Ring, Break-Away, RWA-101	1
17	77524-00	Screw, Machined, Break-Away, RMA-101	8
18	79030-00	Cascade Stop Plate	1
19	77523-00	Upper Shroud, Machined, RMA-101	1
20	77522-00	Lower Shroud, Machined, RMA-101	1
21	78976-00	Mounting Ring, RMA-202	1
22	78979-00	Mounting Ring Cover, RMA-202	1
23	79010-01	Assembly, Cascade, HP404	1
24	79001-14	O-Ring, Solvent Proof	1
25	79001-04	O-Ring, Solvent Proof	1
26	79001-06	O-Ring, Solvent Proof	6
27	A11916	Upper Manifold, Evolver 202	1
28	78949-00	Valve Assembly	3 
29	77367-00	Seat Assembly	3 
30	<b>Table E - "H"</b>	Valve Assembly, Plug, or Regulator Assembly	2 
31	<b>Table E - "I"</b>	Seat Assembly, Plug, or Regulator Assembly	2 
32	79001-09	O-Ring, Solvent Proof	1
33	79001-03	O-Ring, Solvent Proof	1

 Tighten to 15-25 lbs•in (1.7-2.8 Nm) torque.

<b>TABLE E MANIFOLD CONFIGURATION</b>				
<b>Item #</b>	<b>Description</b>	<b>"G"</b>	<b>"H"</b>	<b>"I"</b>
A11917-01	Single Purge, No Regulator	79026-00	Kit 77620-00	
A11917-02	Dual Purge, No Regulator	79026-00	78949-00	77367-00
A11917-03	Single Purge W/Regulator	A10742-00	<b>Table "F"</b>	

<b>TABLE F REGULATOR ASSEMBLY - SINGLE PURGE</b>		
<b>Item #</b>	<b>Description</b>	<b>Qty.</b>
74161-00	Spring, Regulator	1
77354-00	Assembly, Needle and Seat	1
79001-08	O-Ring, Solvent Proof	1
79001-06	O-Ring, Solvent Proof	1
76374-08C	Screw	1
79220-00	Diaphragm	1
79222-00	Upper Plate, Regulator	1
79221-00	Lower Plate, Regulator	1
A10741-00	Bonnet, Regulator	1
A10740-00	Cap, Regulator	1
A10746-00	Screw, Slotted Fillister Head, Stainless Steel	6
79001-35	O-Ring, Solvent Proof	1
78949-00	Fluid Valve Assembly	3
77367-1	Valve Seat Assembly	3



**Figure 24: 79105-01 Rear Plate Assembly (Un-Regulated Version)**

**79105-01 REAR PLATE ASSEMBLY (UN-REGULATED VERSION)  
PARTS LIST (Figure 24)**

Item #	Part #	Description	Qty
1	79027-00	Rear Mounting Plate, RMA-202	1
2	79034-00	Diaphragm, RMA-202	2
3	77541-00	Flat Washer, .089" ID X .149" OD, Stainless Steel	2
4	77543-00	Screw, #2-56 UNC X 1/4" Long, SHCS	2 <span style="border: 1px solid black; padding: 0 2px;">1</span>
5	79001-09	O-Ring, #2-015	1 <span style="border: 1px solid black; padding: 0 2px;">2</span>
6	77505-00	Large Air Stud, Machined	4 <span style="border: 1px solid black; padding: 0 2px;">1</span>
7	79001-07	O-Ring, #2-013	4 <span style="border: 1px solid black; padding: 0 2px;">2</span>
8	77507-00	Small Air Stud, Machined	10 <span style="border: 1px solid black; padding: 0 2px;">1</span>
9	79001-05	O-Ring, #2-010	10 <span style="border: 1px solid black; padding: 0 2px;">2</span>
10	79001-06	O-Ring, #2-011	10 <span style="border: 1px solid black; padding: 0 2px;">2</span>
11	79001-03	O-Ring, #2-007	2 <span style="border: 1px solid black; padding: 0 2px;">2</span>
12	77506-00	Medium Air Stud, Machined	2 <span style="border: 1px solid black; padding: 0 2px;">1</span>
13	SSF-2052	Set Screw, #10-24 UNC X 3/8" Long SHCS	2
14	79001-04	O-Ring, #2-008, Kalrez	1
15	79621-00	Stainless Steel Cup, PT socket Set Screw, 3/8"-24	1 <span style="border: 1px solid black; padding: 0 2px;">3</span>

**PARTS LIST BULLET DEFINITION TABLE - (Figure 24)**

- 1 Apply thread sealer 7969-10 to threads prior to assembly.
- 2 Apply a thin film of SSL-11 Petroleum jelly to o-rings before assembly
- 3 Apply thread sealer 7969-03 to threads prior to assembly.

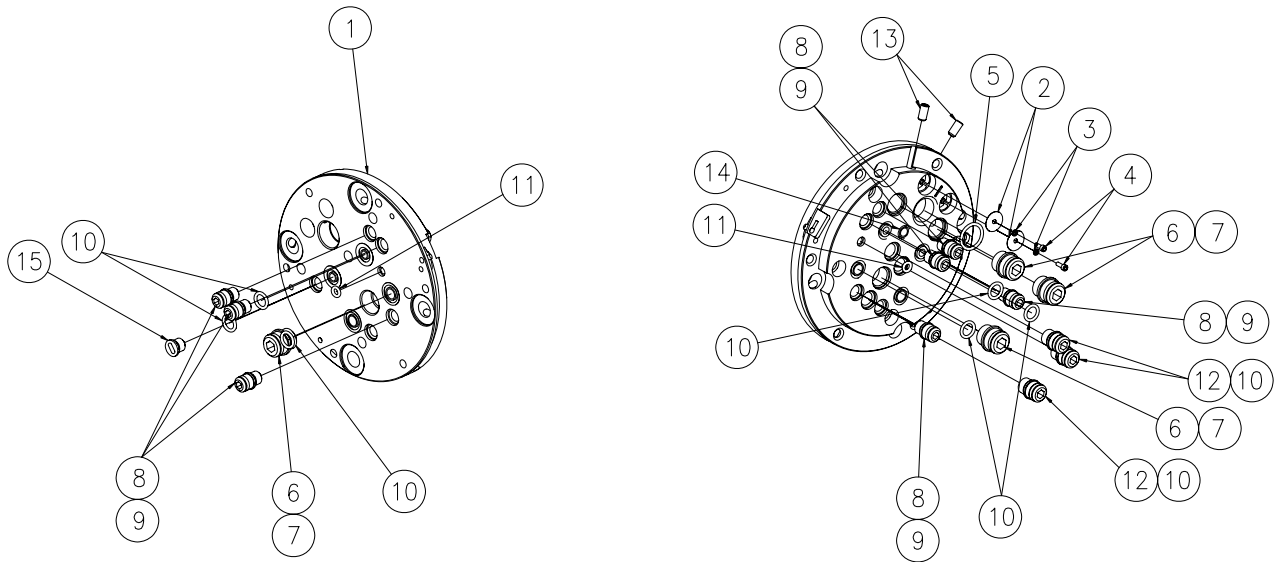


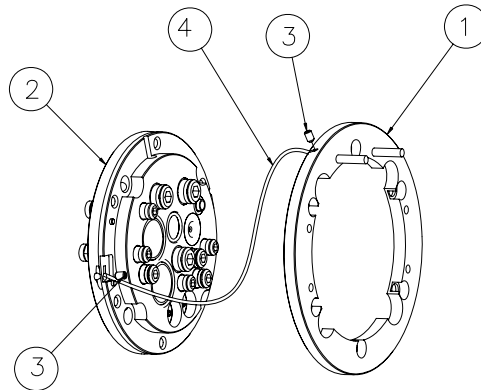
Figure 25: A10747-00 Rear Plate Assembly (Regulator Version)

**A10747-00 REAR PLATE ASSEMBLY (REGULATOR VERSION) - PARTS LIST (Figure 25)**

Item #	Part #	Description	Qty
1	79027-00	Rear Mounting Plate, RMA-202	1
2	79034-00	Diaphragm, RMA-202	2
3	77541-00	Flat Washer, .089" ID X .149" OD, Stainless Steel	2
4	77543-00	Screw, #2-56 UNC X 1/4" Long, SHCS	2 <span style="border: 1px solid black; padding: 0 2px;">1</span>
5	79001-09	O-Ring, Solvent Proof	1 <span style="border: 1px solid black; padding: 0 2px;">2</span>
6	77505-00	Large Air Stud, Machined	4 <span style="border: 1px solid black; padding: 0 2px;">1</span>
7	79001-07	O-Ring, Solvent Proof	4 <span style="border: 1px solid black; padding: 0 2px;">2</span>
8	77507-00	Small Air Stud, Machined	7 <span style="border: 1px solid black; padding: 0 2px;">1</span>
9	79001-05	O-Ring, Solvent Proof	7 <span style="border: 1px solid black; padding: 0 2px;">2</span>
10	79001-06	O-Ring, Solvent Proof	9 <span style="border: 1px solid black; padding: 0 2px;">2</span>
11	79001-03	O-Ring, Solvent Proof	2 <span style="border: 1px solid black; padding: 0 2px;">2</span>
12	77506-00	Medium Air Stud, Machined	3 <span style="border: 1px solid black; padding: 0 2px;">1</span>
13	SSF-2052	Set Screw, #10-24 UNC X 3/8" Long SHCS	2
14	79001-04	O-Ring, Solvent Proof	1 <span style="border: 1px solid black; padding: 0 2px;">2</span>
15	A10744-00	Fitting, Regulator Pilot	1 <span style="border: 1px solid black; padding: 0 2px;">1</span>

**PARTS LIST BULLET DEFINITION TABLE - (Figure 25)**

- 1 Apply thread sealer 7969-10 to threads prior to assembly.
- 2 Apply A11545-00 Petroleum jelly to o-rings.



**Figure 26: Rear Plate/Break-Away Assembly  
(Single Paint With Regulator Manifold Assembly Only)**

<b>REAR PLATE / BREAK-AWAY ASSEMBLY - PARTS LIST (Single Paint with Regulator Manifold Assembly Only) (Figure 26)</b>			
<b>Item #</b>	<b>Part #</b>	<b>Description</b>	<b>Qty</b>
1	79028-00	Ring, Break-Away	1
2	A10747-00	Bell Plate Assembly	1
3	78372-00	Set Screw, #8-32 X 1/4", Cup Point	2
4	78367-00	Steel Cable, W/Ball and Shank	1

**CAUTION**

▶ Do not over-tighten the 77544-01 [13] beyond the maximum 10 lbs•in force.

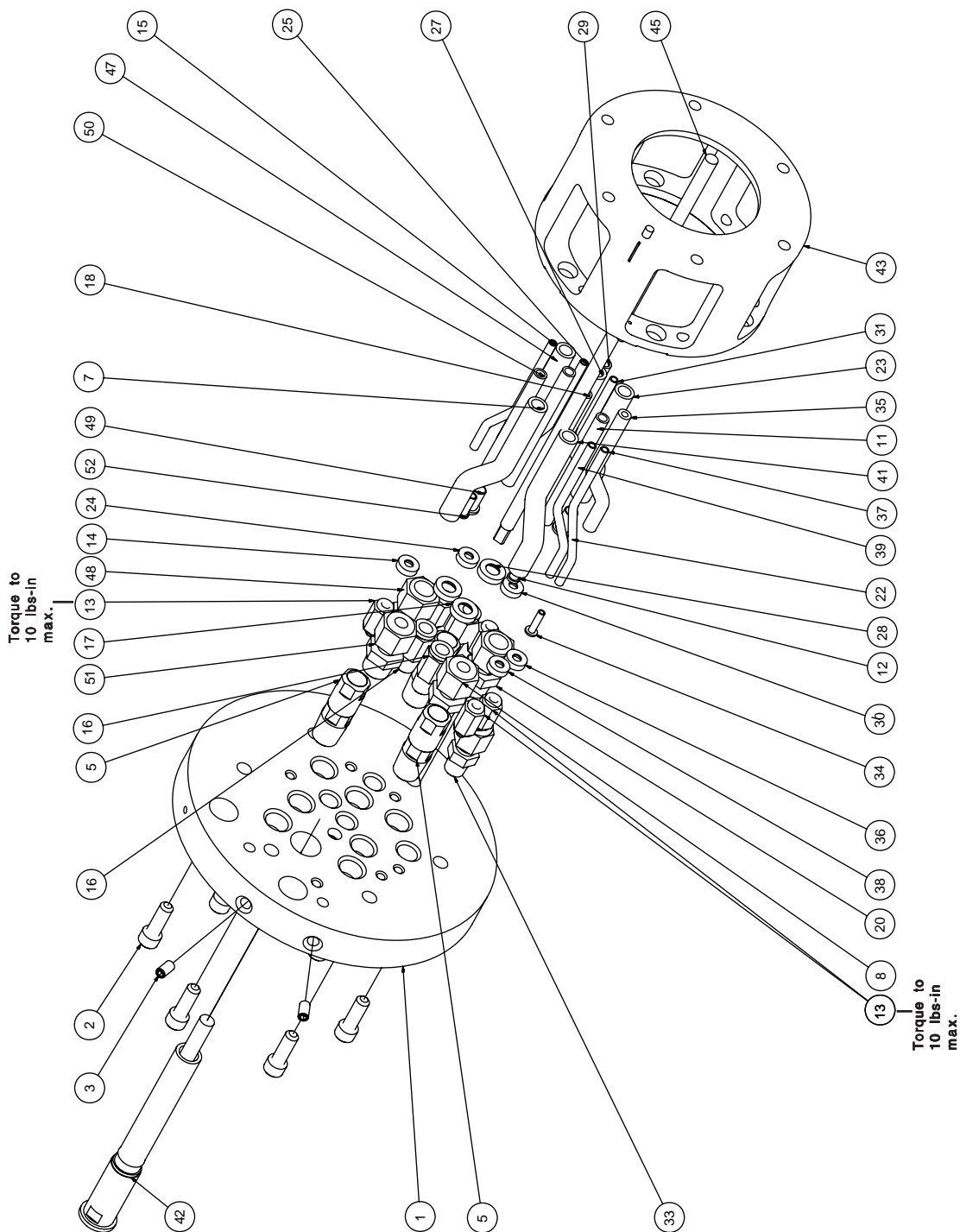


Figure 27: 79106-XXXXXXX Tubing Bundle Assembly (English)



**79106-XXXXXX TUBING BUNDLE ASSEMBLY (ENGLISH) - PARTS LIST (Figure 27)**

Item #	Part #	Description	Qty	Notes
1	79025-00	Robot Mounting Plate	1	
2	76566-24C	Screw, 1/4-20 X 3/4" Long, SHCS	6	
3	SSF-2052	Set Screw, #10-32 UNC X 3/8" Long, SHCS	2	3
4	----	----	----	
5	77947-00	Fitting Modified, 3/8" OD X 1/4" NPT	3	3
6	----	----	----	
7	A10608-03	Tubing, 3/8" OD X .275" ID, Blue, Nylon	See Table G - "H"	
8	See Table K - "N"	Male Connector, 1/4" NPT	1	3
9	----	----	----	
10	----	----	----	
11	See Table K - "P"	Paint #1 Supply Tubing, PFA, Teflon	See Table G - "H"	6
12	See Table K- "Q"	Insert, Stainless Steel Tube	1	4
13	77544-01	Male Connector, 5/32" OD X #10-32 Thd.	5	3
14	77545-04	Cap, 5/32" OD Tube, Natural Identification	1	
15	77536-05	Tubing, 5/32" OD X .106" ID, Natural, Nylon	See Table G - "H"	
16	SSP-6054	Male Connector, 1/4" OD X 1/8" NPT	3	3
17	77545-07	Cap, 5/32" OD Tube, Yellow Identification	2	
18	A10609-02	Tubing, 1/4" OD X .170" ID, Yellow, Nylon	See Table G - "J"	
19	----	----	----	
20	See Table K- "V"	Male Connector, 3/8" OD X 1/4" NPT	1	3
21	----	----	----	
22	See Table K - "T"	Insert, 3/8" OD X .250" ID Tube	1	4
23	See Table K- "S"	Tubing, 3/8" OD X .250" ID, PFA, Teflon	See Table G - "H"	6
24	77545-02	Cap, 5/32" OD Tube, Black Identification	1	
25	77536-01	Tubing, 5/32" OD X .106" ID, Black, Nylon	See Table G - "H"	
26	77545-09	Cap, 3/8" OD Tube, Gray Identification	1	
27	A10608-02	Tubing, 3/8" OD X .275" ID, Gray, Nylon	See Table G - "H"	
28	77545-06	Cap, 1/4" OD Tube, Orange Identification	1	
29	A10609-01	Tubing, 1/4" OD X .170" ID, Orange, Nylon	See Table G - "H"	
30	77545-13	Cap, 5/32" OD Tube, Orange Identification	1	
31	77536-08	Tubing, 5/32" OD X .106" ID, Orange, Nylon	See Table G - "H"	
32	----	----	----	
33	77540-04	Male Connector, 1/4" OD X 1/4" NPT	1	3
34	77539-01	Insert, 1/4" OD X .125" ID Tube	1	4
35	76698-03	Tubing, 1/4" OD X .125" ID, PFA Identification	See Table G - "H"	6
36	77545-01	Cap, 5/32" OD Tube, Blue Identification	1	
37	77536-04	Tubing, 5/32" OD X .106" ID, Blue, Nylon	See Table G - "H"	
38	77545-03	Cap, 5/32" OD Tube, Green Identification	1	
39	77536-03	Tubing, 5/32" OD X .106", Green, Nylon	See Table G - "H"	
40	----	----	----	
41	A10608-01	Tubing, 3/8" OD X .275" ID, Green, Nylon	See Table G - "H"	
42	See Table H - "K"	Low Voltage Cable	1	7
43	See Table J - "M"	Adapter	1	
44	----	----	----	
45	See Table I - "L"	Fiber Optic Cable	1	
46	See Table H - "U"	Low Voltage Cable, HP-404 Extension	1	
47	See Table L - "Z"	Dump Line #2, 3/8" OD X .250" ID, PFA, Teflon	See Table G - "H"	
48	See Table L - "AB"	Male Connector, 3/8" OD X 1/4" NPT	1	3
49	See Table L - "AA"	Insert, 3/8" OD X .250" ID Tube	1	
50	See Table L - "X"	Paint #2 Supply Tubing, PFA, Teflon	See Table G - "H"	
51	See Table L - "W"	Male Connector, 1/4" NPT	1	3
52	See Table L - "Y"	Insert, Stainless Steel Tube	1	

**PARTS LIST BULLET DEFINITION TABLE - (Figure 27)**

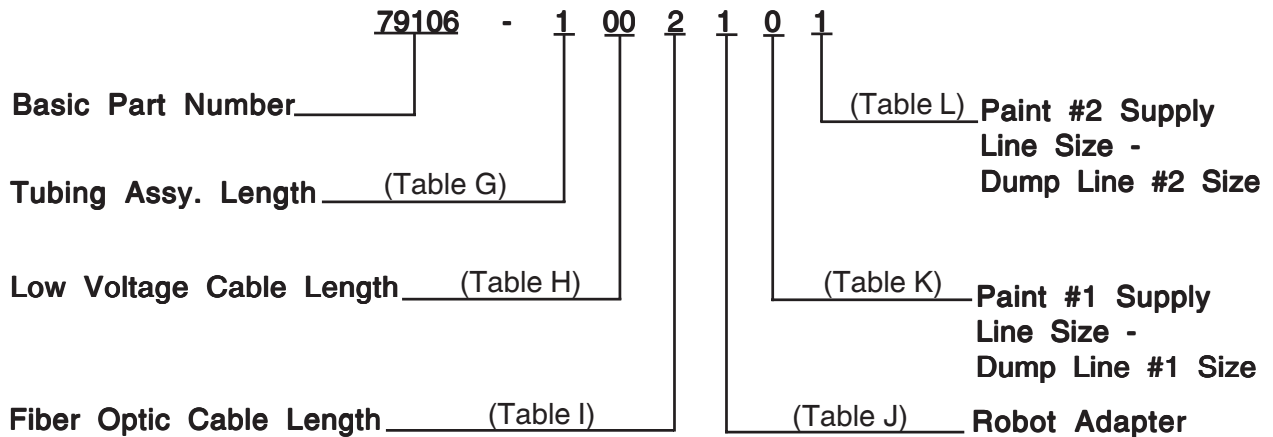
- 7 Slot in low voltage cable assembly must be aligned with slot in robot plate, as shown.
- 6 Label loose ends of fluid tubing with signal abbreviation for identification.
- 4 Install tube inserts fully into Teflon tubing before installing tubing into fitting.
- 3 Apply thread sealer 7969-10 to threads prior to assembly.

**SIGNAL IDENTIFICATION TABLE (ENGLISH)**

Abbr.	Description	Color	Tubing Material	Tubing Size
B.A/P.T	Bearing Air (Paint Trigger)	Yellow	Nylon	1/4" OD X .170" ID
B.A	Bearing Air Return	Yellow	Nylon	1/4" OD X .170" ID
BRK	Brake Air	Orange	Nylon	1/4" OD X .170" ID
DL1	Dump Line #1	Natural	Teflon	3/8" OD X 1/4" ID
F.O	Fiber Optic Cable	Natural	Polyethylene	1/4" OD (jacket)
LV	Low Voltage Cable	Black	N/A	N/A
P1.IN	Paint #1 In	Natural	Teflon	<b>See Table K</b>
P1T	Paint #1 Trigger	Green	Nylon	5/32" OD X .106" ID
P1D	Paint #1 Dump	Orange	Nylon	5/32" OD X .106" ID
P2.IN	Paint #2 In	Natural	Teflon	<b>See Table L</b>
P2T	Paint #2 Trigger	Natural	Nylon	5/32" OD X .106" ID
P2D	Paint #2 Dump	Black	Nylon	5/32" OD X .106" ID
S.A/A.A	Shaping Air (Atomizer Air)	Gray	Nylon	3/8" OD X .275" ID
S.IN	Solvent In	Natural	Teflon	1/4" OD X .125" ID
SL.A/F.A	Seal Air (Fan Air)	Blue	Nylon	3/8" OD X .275" ID
ST	Solvent Trigger Signal	Blue	Nylon	5/32" OD X .106" ID
T.A	Turbine Air	Green	Nylon	3/8" OD X .275" ID
DL2	Dump Line #2	Natural	Teflon	3/8" OD X 1/4" ID

## 79106-XXXXXXX TUBING BUNDLE ASSEMBLY MODEL IDENTIFICATION (ENGLISH)

When ordering, use 79106-ABBCDEF as indicated by Tables G thru L.  
Seven digits must follow the basic part number, for example:



<b>TABLE G TUBING ASSEMBLY LENGTH</b>			
<b>Dash No.</b>	<b>Description</b>	<b>"H" (Length)</b>	<b>"J" (Total Length)</b>
0	(Not Included)	---	---
1	15' Tubing Assembly	15 Ft.	30 ft. (2-15 Ft. Lengths)
2	30' Tubing Assembly	30 Ft.	60 ft. (2-30 Ft. Lengths)

NOTE: To allow tubes to move freely in the robot wrist and arm, remove all the black electrical tape holding tubing bundle together. This tape is for shipping purposes only. Remove any gummy residue left by tape by wiping with a mild solvent. **Do Not** use any solvent to wipe outer sheathing of low voltage cable.

**TABLE H  
LOW VOLTAGE CABLE LENGTH**

Dash No.	Description	"K" (Low Voltage Cable)	"U" (Low Voltage Cable Extension)
00	(Not Included)	----	----
01	25' Low Voltage; Non-Junction Cable	79008-25	----
02	40' Low Voltage; Non-Junction Cable	79008-40	----
03	50' Low Voltage; Non-Junction Cable	79008-50	----
04	75' Low Voltage; Non-Junction Cable	79008-75	----
05	100' Low Voltage; Non-Junction Cable	79008-100	----
06	15' Robot to JB; 15' JB to MicroPak	79008-15J	77062-15
07	15' Robot to JB; 40' JB to MicroPak	79008-15J	77062-40
08	15' Robot to JB; 60' JB to MicroPak	79008-15J	77062-60
09	15' Robot to JB; 75' JB to MicroPak	79008-15J	77062-75
10	25' Robot to JB; 25' JB to MicroPak	79008-25J	77062-25
11	25' Robot to JB; 50' JB to MicroPak	79008-25J	77062-50
12	25' Robot to JB; 75' JB to MicroPak	79008-25J	77062-75
13	40' Robot to JB; 15' JB to MicroPak	79008-40J	77062-15
14	40' Robot to JB; 25' JB to MicroPak	79008-40J	77062-25
15	40' Robot to JB; 40' JB to MicroPak	79008-40J	77062-40
16	40' Robot to JB; 60' JB to MicroPak	79008-40J	77062-60
31	25' Low Voltage, Non-Junction, Evolver MicroPak	A11353-25	----
32	50' Low Voltage; Non-Junction, Evolver MicroPak	A11353-50	----
33	75' Low Voltage; Non-Junction; Evolver MicroPak	A11353-75	----
34	100' Low Voltage; Non-Junction; Evolver MicroPak	A11353-100	----
35	15' Robot to JB; 15' JB to Evolver MicroPak	A11355-15	A11356-15
36	15' Robot to JB; 40' JB to Evolver MicroPak	A11355-15	A11356-40
37	15' Robot to JB; 60' JB to Evolver MicroPak	A11355-15	A11356-60
38	15' Robot to JB; 75' JB to Evolver MicroPak	A11355-15	A11356-75
39	25' Robot to JB; 25' JB to Evolver MicroPak	A11355-25	A11356-25
40	25' Robot to JB; 50' JB to Evolver MicroPak	A11355-25	A11356-50
41	25' Robot to JB; 75' JB to Evolver MicroPak	A11355-25	A11356-75

<b>TABLE I FIBER OPTIC LENGTH</b>		
<b>Dash No.</b>	<b>Description</b>	<b>"L"</b>
0	(Not Included)	----
1	15' Fiber Optic Cable	SMC-424-5
2	25' Fiber Optic Cable	SMC-424-6
3	50' Fiber Optic Cable	SMC-424-2
4	75' Fiber Optic Cable	SMC-424-7
5	100' Fiber Optic Cable	SMC-424-1
6	40' Fiber Optic Cable	SMC-424-8

<b>TABLE J ROBOT ADAPTER</b>		
<b>Dash No.</b>	<b>Description</b>	<b>"M"</b>
0	Adapter (Not Included)	----
1	Adapter (Fanuc P-155, P-145)	78983-00
2	Adapter (ABB 5400, 5002)	79107-00
3	Adapter (Fanuc P-200)	79131-00
4	Adapter (Kawasaki - KE610L)	A10847-00
5	Adapter (Motoman - PX2850)	A10848-00
6	Adapter (Motoman - PX2900)	A10849-00
7	Adapter (B & M - LZ2000)	A10851-00

<b>TABLE K - PAINT #1 SUPPLY LINE - DUMP LINE #1 SIZE</b>								
<b>Dash No</b>	<b>Description</b>	<b>"N" Fitting</b>	<b>"P" Tubing</b>	<b>"Q" Insert</b>	<b>Description</b>	<b>"S" Tubing</b>	<b>"T" Insert</b>	<b>"V" Fitting</b>
0	None	----	----	----	None	----	----	----
1	Paint Line, 1/4" OD x .170" ID, PFA Teflon	77540-04	76698-01	77539-02	Dump Line, 3/8" OD X .250" ID, PFA Teflon	76698-04	77539-04	77540-06
2	Paint Line, 3/8" OD x .250" ID, PFA Teflon	77540-06	76698-04	77539-04	Dump Line, 3/8" OD X .250" ID, PFA Teflon	76698-04	77539-04	77540-06
3	Paint Line, 5/16" OD x .188" ID, PFA Teflon	77540-05	76698-02	77539-03	Dump Line, 3/8" OD x .250" ID, PFA Teflon	76698-04	77539-04	77540-06

<b>TABLE L - PAINT #2 SUPPLY LINE - DUMP LINE #2 SIZE</b>								
<b>Dash No</b>	<b>Description</b>	<b>"W" Fitting</b>	<b>"X" Tubing</b>	<b>"Y" Insert</b>	<b>Description</b>	<b>"Z" Tubing</b>	<b>"AA" Insert</b>	<b>"AB" Fitting</b>
0	None	----	----	----	None	----	----	----
1	Paint Line, 1/4" OD x .170" ID, PFA Teflon	77540-04	76698-01	77539-02	Dump Line, 3/8" OD X .250" ID, PFA Teflon	76698-04	77539-04	77540-06
2	Paint Line, 3/8" OD x .250" ID, PFA Teflon	77540-06	76698-04	77539-04	Dump Line, 3/8" OD X .250" ID, PFA Teflon	76698-04	77539-04	77540-06
3	Paint Line, 5/16" OD x .188" ID, PFA Teflon	77540-05	76698-02	77539-03	Dump Line, 3/8" OD x .250" ID, PFA Teflon	76698-04	77539-04	77540-06

**CAUTION**

▶ Do not over-tighten the 77544-01 [10] beyond the maximum 10 lbs•in force.

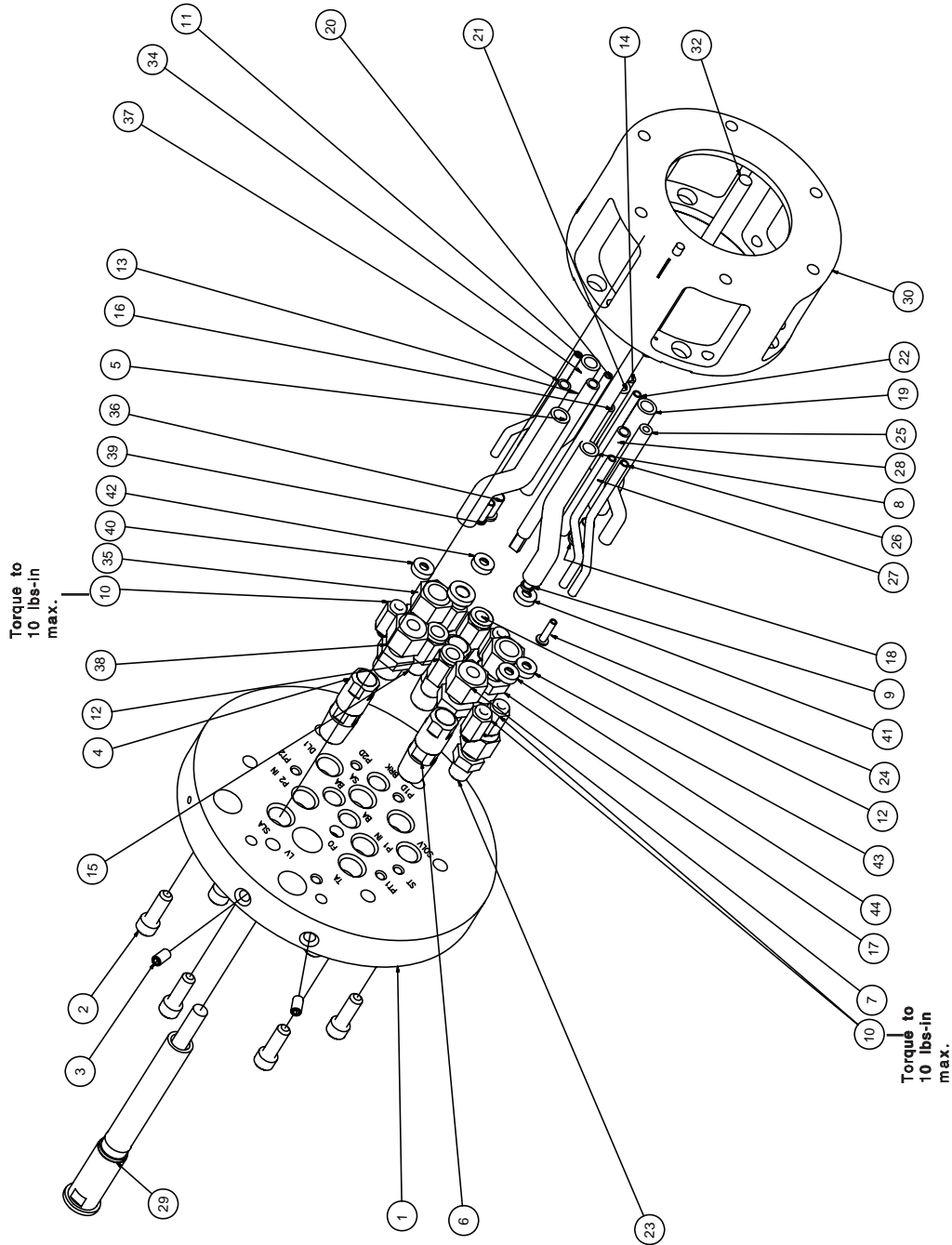


Figure 28: A10892-XXXXXXX Tubing Bundle Assembly (Metric)

**A10892-XXXXXXX TUBING BUNDLE ASSEMBLY (METRIC) - PARTS LIST (Figure 28)**

Item #	Part #	Description	Qty
1	79025-00	Robot Mounting Plate	1
2	76566-24C	Screw, 1/4-20 X 3/4" Long, SHCS	6
3	SSF-2052	Set Screw, #10-32 UNC X 3/8" Long	2
4	A10891-03	Fitting, 8mm X 1/4" NPT	1
5	A10893-07	Tubing, 8mm OD X 6mm ID, Blue, Nylon	See Table L - "H"
6	A10891-04	Fitting, 10mm X 1/4" NPT	2
7	See Table Q - "N"	Male Connector, 1/4" NPT	1
8	See Table Q - "P"	Paint #1 Supply Tubing, PFA, Teflon	See Table L - "H"
9	See Table Q - "Q"	Insert, Stainless Steel Tube	1
10	77544-01	Male Connector, 5/32" OD X #10-32 Thd.	5
11	77536-05	Tubing, 5/32" OD X .106" ID, Natural, Nylon	See Table L - "H"
12	A10891-02	Male Connector, 6mm OD X 1/8" NPT	2
13	A10840-08	Tubing, 6mm OD X 4mm ID, Yellow, Nylon	See Table L - "H"
14	A10840-09	Tubing, 6mm OD X 4mm ID, Orange, Nylon	See Table L - "H"
15	A10891-01	Male Connector, 4mm OD X 1/8" NPT	1
16	A10894-01	Tubing, 4mm OD X 2.7mm ID, Yellow, Nylon	See Table L - "H"
17	See Table Q - "V"	Male Connector, 10mm OD X 1/4" NPT	1
18	See Table Q - "T"	Insert, Stainless Steel Tube	1
19	See Table Q - "S"	Dump Line #1, 10mm OD X 8mm ID, PFA, Teflon	See Table L - "H"
20	77536-01	Tubing, 5/32" OD X .106" ID, Black, Nylon	See Table L - "H"
21	A10839-03	Tubing, 10mm OD X 8mm ID, Silver, Nylon	See Table L - "H"
22	77536-08	Tubing, 5/32" OD X .106" ID, Orange, Nylon	See Table L - "H"
23	A10890-01	Male Connector, 6mm OD X 1/4" NPT	1
24	A10895-03	Insert, 6mm OD X 4mm ID, Tube	1
25	A10841-03	Tubing, 6mm OD X 4mm ID, PFA, Teflon	See Table L - "H"
26	77536-04	Tubing, 5/32" OD X .106" ID, Blue, Nylon	See Table L - "H"
27	77536-03	Tubing, 5/32" OD X .106" ID, Green, Nylon	See Table L - "H"
28	A10839-06	Tubing, 10mm OD X 8mm ID, Green, Nylon	See Table L - "H"
29	See Table M - "K"	Low Voltage Cable	1
30	See Table P - "M"	Adapter	1
31	----	----	----
32	See Table N - "L"	Fiber Optic Cable	1
33	See Table M - "U"	Low Voltage Cable, HP-404 Extension (Not Shown)	1
34	See Table R - "Z"	Dump #2 Supply Tubing, PFA, Teflon	See Table L - "H"
35	See Table R - "AB"	Male Connector, 10mm OD X 1/4" NPT	1
36	See Table R - "AA"	Insert, Stainless Steel Tube	1
37	See Table R - "X"	Paint #2 Supply Tubing, PFA, Teflon	See Table L - "H"
38	See Table R - "W"	Male Connector, 1/4" NPT	1
39	See Table R - "Y"	Insert, Stainless Steel Tube	1
40	77545-04	Cap, 5/32" OD Tube, Natural Identification	1
41	77545-13	Cap, 5/32" OD Tube, Orange Identification	1
42	77545-02	Cap, 5/32" OD Tube, Black Identification	1
43	77545-01	Cap, 5/32" OD Tube, Blue Identification	1
44	77545-03	Cap, 5/32" OD Tube, Green Identification	1

**PARTS LIST BULLET DEFINITION TABLE - (Figure 28)**

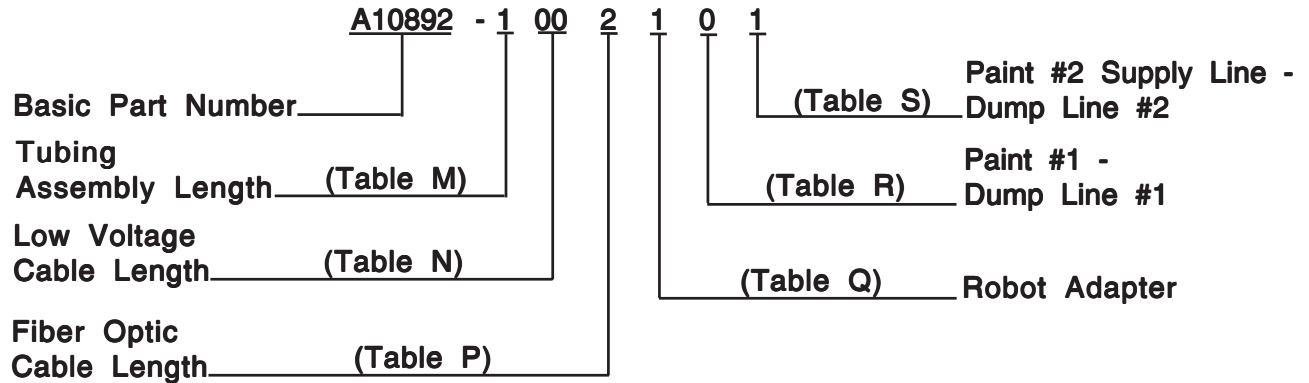
- Apply thread sealer 7969-10 to threads prior to assembly.
- Label loose ends of fluid tubing with signal abbreviation for identification.
- Install tube inserts fully into Teflon tubing before installing tubing into fitting.
- Apply thread sealer 7969-10 to threads prior to assembly.

<b>SIGNAL IDENTIFICATION TABLE (METRIC)</b>				
<b>Abbr.</b>	<b>Description</b>	<b>Color</b>	<b>Tubing Material</b>	<b>Tubing Size</b>
B.A/P.T	Bearing Air (Paint Trigger)	Yellow	Nylon	6mm OD X 4mm ID
B.A	Bearing Air Return	Yellow	Nylon	4mm OD X 2mm ID
BRK	Brake Air	Orange	Nylon	6mm OD X 4mm ID
DL1	Dump Line #1	Natural	Teflon	10mm OD X 8mm ID
F.O	Fiber Optic Cable	Natural	Polyethylene	1/4" OD (jacket)
LV	Low Voltage Cable	Black	N/A	N/A
P1.IN	Paint #1 In	Natural	Teflon	<b>See Table R</b>
P1T	Paint #1 Trigger	Green	Nylon	5/32" OD X .106" ID
P1D	Paint #1 Dump	Orange	Nylon	5/32" OD X .106" ID
P2.IN	Paint #2 In	Natural	Teflon	<b>See Table S</b>
P2T	Paint #2 Trigger	Natural	Nylon	5/32" OD X .106" ID
P2D	Paint #2 Dump	Black	Nylon	5/32" OD X .106" ID
S.A/A.A	Shaping Air (Atomizer Air)	Silver	Nylon	10mm OD X 8mm ID
S.IN	Solvent In	Natural	Teflon	6mm OD X 4mm ID
SL.A/F.A	Seal Air (Fan Air)	Blue	Nylon	8mm OD X 6mm ID
ST	Solvent Trigger Signal	Blue	Nylon	5/32" OD X .106" ID
T.A	Turbine Air	Green	Nylon	10mm OD X 8mm ID
DL2	Dump Line #2	Natural	Teflon	10mm OD X 8mm ID



## A10892-XXXXXX TUBING BUNDLE ASSEMBLY MODEL IDENTIFICATION (METRIC)

When ordering, use A10892-ABBCDEF as indicated by Tables M through S. Seven digits must follow the basic part number, for example:



<b>TABLE M TUBING ASSEMBLY LENGTH</b>		
<b>Dash No.</b>	<b>Description</b>	<b>"H"</b>
0	Air Tubing Not Included	----
1	4 1/2m Long Tubing Assembly	4.6m (15 Ft.)
2	9m Long Tubing Assembly	9.2m (30 Ft.)

**TABLE N  
LOW VOLTAGE CABLE LENGTH**

Dash No.	Description	"K" (Low Voltage Cable)	"U" (Low Voltage Cable Extension)
00	(Not Included)	----	----
01	25' Low Voltage; Non-Junction Cable	79008-25	----
02	40' Low Voltage; Non-Junction Cable	79008-40	----
03	50' Low Voltage; Non-Junction Cable	79008-50	----
04	75' Low Voltage; Non-Junction Cable	79008-75	----
05	100' Low Voltage; Non-Junction Cable	79008-100	----
06	15' Robot to JB; 15' JB to MicroPak	79008-15J	77062-15
07	15' Robot to JB; 40' JB to MicroPak	79008-15J	77062-40
08	15' Robot to JB; 60' JB to MicroPak	79008-15J	77062-60
09	15' Robot to JB; 75' JB to MicroPak	79008-15J	77062-75
10	25' Robot to JB; 25' JB to MicroPak	79008-25J	77062-25
11	25' Robot to JB; 50' JB to MicroPak	79008-25J	77062-50
12	25' Robot to JB; 75' JB to MicroPak	79008-25J	77062-75
13	40' Robot to JB; 15' JB to MicroPak	79008-40J	77062-15
14	40' Robot to JB; 25' JB to MicroPak	79008-40J	77062-25
15	40' Robot to JB; 40' JB to MicroPak	79008-40J	77062-40
16	40' Robot to JB; 60' JB to MicroPak	79008-40J	77062-60
31	25' Low Voltage; Non-Junction, Evolver MicroPak	A11353-25	----
32	50' Low Voltage; Non-Junction, Evolver MicroPak	A11353-50	----
33	75' Low Voltage; Non-Junction; Evolver MicroPak	A11353-75	----
34	100' Low Voltage; Non-Junction; Evolver MicroPak	A11353-100	----
35	15' Robot to JB; 15' JB to Evolver MicroPak	A11355-15	A11356-15
36	15' Robot to JB; 40' JB to Evolver MicroPak	A11355-15	A11356-40
37	15' Robot to JB; 60' JB to Evolver MicroPak	A11355-15	A11356-60
38	15' Robot to JB; 75' JB to Evolver MicroPak	A11355-15	A11356-75
39	25' Robot to JB; 25' JB to Evolver MicroPak	A11355-25	A11356-25
40	25' Robot to JB; 50' JB to Evolver MicroPak	A11355-25	A11356-50
41	25' Robot to JB; 75' JB to Evolver MicroPak	A11355-25	A11356-75

<b>TABLE P FIBER OPTIC CABLE LENGTH</b>		
<b>Dash No.</b>	<b>Description</b>	<b>"L"</b>
0	(Not Included)	----
1	15' Fiber Optic Cable	SMC-424-5
2	25' Fiber Optic Cable	SMC-424-6
3	50' Fiber Optic Cable	SMC-424-2
4	75' Fiber Optic Cable	SMC-424-7
5	100' Fiber Optic Cable	SMC-424-1
6	40' Fiber Optic Cable	SMC-424-8
7	120' Fiber Optic Cable	SMC-424-3

<b>TABLE Q ROBOT ADAPTER</b>		
<b>Dash No.</b>	<b>Description</b>	<b>"M" (Robot Adapter)</b>
0	Adapter (Not Included)	----
1	Adapter (Fanuc P-155, P-145)	78983-00
2	Adapter (ABB 5400, 5002)	79107-00
3	Adapter (Fanuc P-200)	79131-00
4	Adapter (Motoman - PX2900)	A10849-00
5	Adapter (Motoman - PX2850)	A10848-00
6	Adapter (Kawasaki - KE610L)	A10847-00
7	Adapter (B & M LZ2000)	A10851-00

<b>TABLE R - PAINT #1 SUPPLY LINE - DUMP LINE #1 SIZE</b>								
<b>Dash No</b>	<b>Description</b>	<b>"N" Fitting</b>	<b>"P" Tubing</b>	<b>"Q" Insert</b>	<b>Description</b>	<b>"S" Tubing</b>	<b>"T" Insert</b>	<b>"V" Fitting</b>
0	None	----	----	----	None	----	----	----
1	Paint Line, 6mm OD X .4mm ID, PFA Teflon	A10890-01	A10841-03	A10895-03	Dump Line, 10mm OD X 8mm ID, PFA Teflon	A10841-01	A10895-01	A10890-03
2	Paint Line, 8mm OD X 6mm ID, PFA Teflon	A10890-02	A10841-02	A10895-02	Dump Line, 10mm OD X 8mm ID, PFA Teflon	A10841-01	A10895-01	A10890-03
3	Paint Line, 10mm OD X 8mm ID, PFA Teflon	A10890-03	A10841-01	A10895-01	Dump Line, 10mm OD X 8mm ID, PFA Teflon	A10841-01	A10895-01	A10890-03

<b>TABLE S - PAINT #2 SUPPLY LINE - DUMP LINE #2 SIZE</b>								
<b>Dash No</b>	<b>Description</b>	<b>"W" Fitting</b>	<b>"X" Tubing</b>	<b>"Y" Insert</b>	<b>Description</b>	<b>"Z" Tubing</b>	<b>"AA" Insert</b>	<b>"AB" Fitting</b>
0	None	----	----	----	None	----	----	----
1	Paint Line, 6mm OD X .4mm ID, PFA Teflon	A10890-01	A10841-03	A10895-03	Dump Line, 10mm OD X 8mm ID, PFA Teflon	A10841-01	A10895-01	A10890-03
2	Paint Line, 8mm OD X 6mm ID, PFA Teflon	A10890-02	A10841-02	A10895-02	Dump Line, 10mm OD X 8mm ID, PFA Teflon	A10841-01	A10895-01	A10890-03
3	Paint Line, 10mm OD X 8mm ID, PFA Teflon	A10890-03	A10841-01	A10895-01	Dump Line, 10mm OD X 8mm ID, PFA Teflon	A10841-01	A10895-01	A10890-03

# A10406 OR LECU5004 MICROPAK CONTROL UNIT

## ACCESSORIES

Accessories for the Evolver 202 Solventborne spray applicators include:

(See the current "MicroPak" Service Manual supplied with the control unit for service information.)

<b>ACCESSORIES AND SERVICE KITS</b>	
<b>Part #</b>	<b>Description</b>
LSCH0009-00	Dielectric Grease (.88 oz. Tube)
76652-01	Kit for measuring high voltage. (Includes Multi-Function Meter (76634-00) and High Voltage Probe Assembly (76667-00).
76652-02	Kit for measuring short circuit current (SCI), resistance, and sprayability. Includes Multi-Function Meter (76634-00) and Test Lead Assembly. (76664-00).
76652-03	Kit for measuring paint resistivity. (Includes Multi-Function Meter (76634-00) and Paint Probe Assembly (7922-00).
76652-04	Deluxe Kit (Performs all functions listed above.) Includes Multi-Function Meter (76634-00), Paint Probe Assembly (7922-00). Test Lead Assembly (76664-00), and High Voltage Probe Assembly (76667-00).
RPM-32	Pre-Filter Replacement Element
RPM-33	Bearing Air Filter Element
75777-XX	Spray Applicator Covers
74035-XX	Test Air Cap and Gauge Assembly
73896-01	Electrode and Air Cap Protector
79203-00	Tool Kit
77620-00	Valve Plug Kit

<b>75777-XX SPRAY APPLICATOR COVERS</b>	
Part #	Description
75777-01	Single Head Spray Applicator
75777-02	Dual Head Spray Applicator
75777-03	Robot Wrist Flange

<b>74035-XX TEST AIR CAPS &amp; GAUGE ASSEMBLY</b>	
Part #	Description
74035-21	#65R-1 Test Cap
74035-22	#98-1 Test Cap
74035-23	#63-1 Test Cap
74035-24	#48-1 Test Cap
74035-25	#481-1 Test Cap

The 74035, Test Air Cap and Gauge Assembly, is designed for use with a Test Station or while the applicator is connected to the robot or reciprocator. The test air cap is comprised of two air pressure gauges, pressure gauge stand, special 74061-XX air caps, and all required tubing and fittings.

The air cap has two tapped holes for small barbed tube fittings. The fittings are located so that the gauges connected to them will measure the actual cap pressure of the atomization and pattern air. Using this test cap will assure uniform atomization and pattern quality, regardless of air supply tube lengths from one applicator to another.

**73896-01 Electrode and Air Cap Protector**

This is a plastic cylinder that fits over the air cap retainer. The protector keeps the electrode and other spray head parts from being damaged during booth cleaning and at other times when the spray applicator is not in use.

**79203-00 Tool Kit**

Provided with each applicator is a tool kit to aid in the disassembly and assembly of the applicator during servicing.

<b>79203-00 TOOL KIT</b>	
Part #	Description
A10756-00	Valve Removal Tool
A10766-00	Valve Seat Removal Tool
76772-00	Retaining Ring Spanner
A10400-00	Seal Carrier Tool

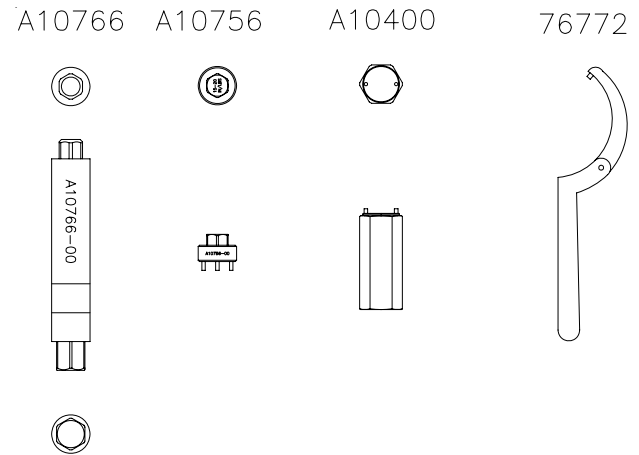


Figure 29: 79203-00 Tool Kit

**A10410-00 SPRAY HEAD O-RING KIT**

Available for purchase as a kit containing all of the o-rings used for a single Evolver 202 spray head. This kit can be purchased to replace o-rings.

<b>A10410-00 SPRAY HEAD O-RING KIT</b>		
Part #	Description	Qty
79001-04	O-Ring, Solvent Proof	1
79001-06	O-Ring, Solvent Proof	1
79001-05	O-Ring, Solvent Proof	1

### A10411-00 Spray Head Repair Kit

Available for purchase as a kit for the common spray head parts that require replacement. This kit contains parts for one applicator head.

<b>A10411 SPRAY HEAD REPAIR KIT</b>		
Part #	Description	Qty
79151-00	Needle Shaft	1
7723-06	Piston, U-Cup	1
79001-28	O-Ring, Solvent Proof	1
79001-29	O-Ring, Solvent Proof	1
13076-13	O-Ring, Teflon	1
RME-38	Spring	1
RME-32	Seal	1
79001-01	O-Ring, Solvent Proof	4
79001-04	O-Ring, Solvent Proof	1
79001-06	O-Ring, Solvent Proof	3
79001-05	O-Ring, Solvent Proof	1

### 77620-00 Valve Plug Kit

Available for purchase is a Valve Plug Kit than can be used in place of valves and seats to convert the applicator to a single purge applicator.

<b>77620-00 VALVE PLUG KIT (Optional - Use In Place Of Valve &amp; Seat)</b>		
Part #	Description	Qty
79244-00	Plug	1
77618-00	Plug Seat	1
79001-19	O-Ring, Solvent Proof	1
79001-14	O-Ring, Solvent Proof	1

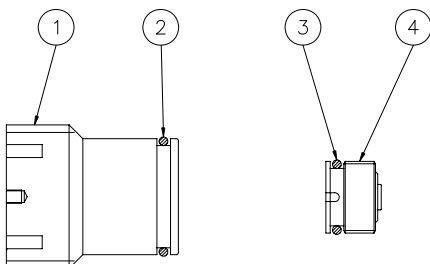


Figure 30: 77620-00 Valve Plug Assembly

### 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 Teflon fluid coils have a groove cut into them as shown (see Figure 31). Use groove cutter A11567-00 by sliding the end of the tool over the Teflon 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. Slide the fitting and ferrules onto the tube as shown. The tapered ferrule must go past the newly cut groove to properly lock into place when installed.

Tighten nuts into manifolds by hand until it stops. Using a 9/16" end-wrench, tighten 1/4-1/2 turn.

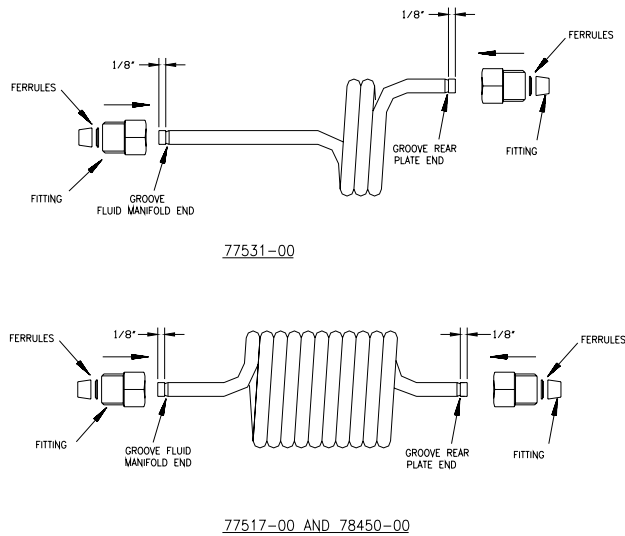


Figure 31: Fluid Coils

<b>REPAIR KITS</b>						
<b>Part #</b>	<b>Description</b>	<b>Number of Applicators</b>				<b>Notes</b>
		<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>7-8</b>	
A10407	Robot Mounting Plate O-Ring Kit	1	2	3	4	Includes: 9 ea. - 79001-05 O-Ring (Solvent Proof) 2 ea. - 79001-06 O-Ring (Solvent Proof) 2 ea. - 79001-07 O-Ring (Solvent Proof) 1 ea. - 79001-01 O-Ring (Solvent Proof)
A10408	Manifold Assembly O-Ring Kit	1	2	3	4	Includes: 2 ea. - 7554-10 O-Ring (Solvent Resistant) 4 ea. - 7554-11 O-Ring (Solvent Resistant) 4 ea. - 79001-05 O-Ring (Solvent Proof) 2 ea. - 79001-06 O-Ring (Solvent Proof) 1 ea. - 79001-04 O-Ring (Solvent Proof) 1 ea. - 79209-00 O-Ring (Solvent Resistant) 4 ea. - 7554-07 O-Ring (Solvent Resistant) 1 ea. - 79001-09 O-Ring (Solvent Proof) 1 ea. - 79001-14 O-Ring (Solvent Proof)
A10409	Regulator Repair Kit	1	2	2	3	If gun is equipped with 79208-00 Regulator and Includes: 1 ea. - 79220-00 Diaphragm 1 ea. - 74161-00 Spring 1 ea. - 77354-00 Needle & Seat 1 ea. - 79001-08 O-Ring (Solvent Proof)
A10410	Spray Head Mounting Seal O-Ring Kit	1	2	3	4	Includes: 1 ea. - 79001-04 O-Ring (Solvent Proof) 2 ea. - 79001-06 O-Ring (Solvent Proof) 1 ea. - 79001-05 O-Ring (Solvent Proof)

(Continued On Next Page)

<b>REPAIR KITS (Cont.)</b>						
<b>Part #</b>	<b>Description</b>	<b>Number of Applicators</b>				<b>Notes</b>
		<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>7-8</b>	
A10411	Spray Head Repair Kit	1	2	3	4	Includes: 1 ea. - 79151-00 Needle Shaft 1 ea. - 7723-06 Piston, U-Cup 1 ea. - 79001-28 O-Ring (Solvent Proof) 1 ea. - 79001-29 O-Ring (Solvent Proof) 3 ea. - 79001-01 O-Ring (Solvent Proof) 1 ea. - 13076-13 O-Ring (Teflon) 1 ea. - 79001-06 O-Ring (Solvent Proof) 1 ea. - RME-38 Spring 1 ea. - RME-32 Seal 1 ea. - 79001-01 O-Ring (Solvent Proof) 1 ea. - 79001-04 O-Ring (Solvent Proof) 2 ea. - 79001-06 O-Ring (Solvent Proof) 1 ea. - 79001-05 O-Ring (Solvent Proof) 2 ea. - 14061-09 Conductive Foam 1 ea. - 79171-00 Contact Spring



<b>SERVICE PARTS</b>						
<b>Part #</b>	<b>Description</b>	<b>Number of Applicators</b>				<b>Notes</b>
		<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>7-8</b>	
79138-00	Complete Head Assembly	1	2	2	3	
79153-65R-1	Air Cap	1	2	3	4	79196-98-1, 79197-63-1 (Optional Air Caps)
79140-02	Fluid Tip	1	2	3	4	01=.042,03=.070 (Optional Fluid Tips)
70430-01	Electrode	1	2	3	4	
79142-00	Screw	2	2	4	4	
79171-00	Spring, Connector	2	2	4	4	
79141-00	Plug, Connection	2	2	4	4	
14061-09	Conductive Foam	1	1	2	2	
79144-00	Shaft, Air Valve	1	1	2	2	
79143-00	Bushing, Air Valve	1	1	2	2	
79173-00	Block, Locking	2	2	4	4	
79174-00	Screw	1	1	2	2	
77367-00	Seat Assembly	1	1	2	2	

<b>LUBRICANTS AND SEALERS</b>	
<b>Part #</b>	<b>Description</b>
A11545-00	Petroleum Jelly Lubricant for all O-Rings
7969-03	Thread Sealant (Blue), Loctite 24077
7969-10	Thread Sealant (White), Loctite 59231, Teflon Paste
7969-05	Thread Sealant (Purple), Loctite 22221

<b>EVOLVER 202 RECOMMENDED SPARE PARTS (Per Applicator)</b>		
<b>Part #</b>	<b>Description</b>	<b>Qty.</b>
	<b><i>Tubing Bundle</i></b>	
77539-01	Insert, 1/4" OD X .125" ID Tube	1
77539-02	Insert, 1/4" OD X .170" ID Tube	1
77539-03	Insert, 5/16" OD X .188" ID Tube	1
77539-04	Insert, 3/8" OD X .250" ID Tube	1
76698-01	Paint Line, 1/4" OD X .170" ID, PFA, Teflon	--
76698-02	Paint Line, 5/16" OD X .188" ID, PFA, Teflon	--
76698-03	Tubing, 1/4" OD X .125" ID, PFA, Identification	--
76698-04	Paint/Dump Line, 3/8" OD X .250" ID, PFA, Teflon	--
77536-01	Tubing, 5/32" OD X .106" ID, Black, Nylon	--
77536-03	Tubing, 8/32" OD X .106" ID, Green, Nylon	--
77536-04	Tubing, 5/32" OD X .106" ID, Blue, Nylon	--
77536-05	Tubing, 5/32" OD X .106" ID, Natural, Nylon	--
77538-01	Tubing, 3/8" OD X .2506" ID, Gray, Pe	--
SSP-6054	Male Connector, 1/4" OD X 1/8" NPT (3)	0-2
77540-06	Male Connector, 3/8" OD X 1/4" NPT	0-1
77540-04	Male Connector, 1/4" OD X 1/4" NPT	0-1
77540-05	Male Connector, 5/16" OD X .188" NPT	0-1
78449-00	Fitting	0-1
70591-01	Fitting	0-1
77544-01	Male Connector, 5/32" OD X #10-32, Threaded	8-10
A10841-03	Tubing, 6mm OD X 4mm ID, PFA, Teflon	--
A10841-02	Paint Tubing, 8mm OD X 6mm ID, PFA, Teflon	--
A10841-01	Tubing, 10mm OD X 8mm ID, PFA, Teflon	--
A10839-06	Tubing, 10mm OD X 8mm ID, Green, Nylon	--
A10839-03	Tubing, 10mm OD X 8mm ID, Silver, Nylon	--
A10893-07	Tubing, 8mm OD X 6mm ID, Blue, Nylon	--
A10840-08	Tubing, 6mm OD X 4mm ID, Yellow, Nylon	--
A10840-09	Tubing, 6mm OD X 4mm ID, Orange, Nylon	--
77536-05	Tubing, 4mm OD X .106" ID, Natural, Nylon	--
77536-01	Tubing, 4mm OD X .106" ID, Black, Nylon	--
77536-08	Tubing, 4mm OD X .106" ID, Orange, Nylon	--
A10894-01	Tubing, 4mm OD X 2.7mm ID, Orange, Nylon	--
77536-04	Tubing, 4mm OD X .106" ID, Blue, Nylon	--
77536-03	Tubing, 4mm OD X .106" ID, Green, Nylon	--
A10891-04	Fitting, 10mm OD X 1/4" NPT	0-1
A10890-03	Male Connector, 10mm OD X 1/4" NPT	0-1
A10890-02	Male Connector, 8mm OD X 1/4" NPT	0-1
A10890-01	Male Connector, 6mm OD X 1/4" NPT	0-1
A10891-03	Fitting, 8mm OD X 1/4" NPT	0-1
A10891-02	Male Connector, 6mm OD X 1/8" NPT	0-1
A10891-01	Male Connector, 4mm OD X 1/8" NPT	0-1
A10895-01	Insert, 10mm OD X 8mm ID, Tube	1
A10895-02	Insert, 8mm OD X 6mm ID, Tube	1
A10895-03	Insert, 6mm OD X 4mm ID, Tube	1
79008-XX	Low Voltage Cable	1
77062-XX	Low Voltage Cable, HP 404, Extension	1
A11353-XX	Cable Assembly, Low Voltage, Evolver MicroPak	1
A11356-XX	Low Voltage Cable, HP 404, Extension, Evolver MicroPak	1

<b>EVOLVER 202 RECOMMENDED SPARE PARTS (Per Applicator) (Cont.)</b>		
<b>Part #</b>	<b>Description</b>	<b>Qty.</b>
	<b>Manifold</b>	
79010-01	Cascade Assembly, HP 404	1
77524-00	Break-Away Screw, Machined	6
EMF-203-04	Front Ferrule, 1/4" OD Tubing	2
EMF-202-04	Back Ferrule, 1/4" OD Tubing	2
EMF-203-05	Front Ferrule, 3/8" OD Tubing	2
EMF-202-05	Back Ferrule, 3/8" OD Tubing	2
79001-03	O-Ring, Solvent Proof	2
79001-04	O-Ring, Solvent Proof	2
79001-05	O-Ring, Solvent Proof	10
79001-06	O-Ring, Solvent Proof	11
79001-07	O-Ring, Solvent Proof	8
79001-08	O-Ring, Solvent Proof	10
79001-09	O-Ring, Solvent Proof	2
79034-00	Diaphragm, RMA-202	2
77541-00	Flat Washer, .089" ID X .149" OD, Stainless Steel	2
77543-00	Screw, #2-56 UNC X 1/4" Long, SHCS	2
78372-00	Set Screw, #8-32 X 1/4" Cup Point	2
76566-24C	Screw, 1/4-20 X 3/4" SHCS	4-6
SSF-2052	Set Screw, #10-32 UNC X 3/8" Long, SHCS	2
78367-00	Steel Cable W/Ball and Shank	1
77517-00	Coiled Tube, 1/4" OD X .170 ID, PFA, Conductive Materials	0-1
78450-00	Coiled Tube, 1/4" OD X .125ID, PFA, Highly Conductive Materials	0-1
77531-00	Coiled Tube, 1/4" OD X .125 ID, PFA, High Resistive Materials	0-1
A11917-XX	Complete Evolver 202	1
79173-00	Block, Locking	2
79142-00	Screw, #8-32 X .75 Lg. SHCS, Fiberglass	3
A10612-00	Ring, Square Cut	2-4
LSFA0027-00	Screw, Fillister HD, #10-32, Fiberglass	0-4
79206-00	Screw, Fillister HD, #10-32 X 2 1/4" Lg.	0-4
79174-00	Screw, 1/4-20 X 1 1/4" Lg., Nylon	2-4
79141-00	Connection Plug	1
A10756-00	Valve Removal Tool	Accessory
A10766-00	Valve Seat Removal Tool	Accessory
A10400-00	Seal Carrier Tool	Accessory
76772-00	Retaining Ring Spanner	Accessory
LSCH0009-00	Dielectric Grease	1
78949-00	Fluid Valve Assembly	3-5
77367-00	Valve Seat Assembly	3-5
A11214-00	Support Rod	1-2
77508-00	Air Bolt	2
77507-00	Air Stud, Small	2
77506-00	Air Stud, Medium	2
77505-00	Air Stud, Large	2
	<b>Applicator Head</b>	
9334-00	Spring, Valve Return	2
70430-01	Electrode, High Flex	4
79148-00	End Cap, Spray Head	3
EMF-7	Seal, Washer	4

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<b>EVOLVER 202 RECOMMENDED SPARE PARTS (Per Applicator) (Cont.)</b>		
<b>Part #</b>	<b>Description</b>	<b>Qty.</b>
	<b><i>Applicator Head (Cont.)</i></b>	
RME-32	Seal	4
79151-00	Assembly, Needle Shaft	1
79001-01	O-Ring, Solvent Proof	8
79001-04	O-Ring, Solvent Proof	2
79001-05	O-Ring, Solvent Proof	2
79001-06	O-Ring, Solvent Proof	8
79001-07	O-Ring, Solvent Proof	4
79001-08	O-Ring, Solvent Proof	4
79001-09	O-Ring, Solvent Proof	6
79001-14	O-Ring, Solvent Proof	2
79001-16	O-Ring, Solvent Proof	6
79001-28	O-Ring, Solvent Proof	2
79001-29	O-Ring, Solvent Proof	2
79001-31	O-Ring, Solvent Proof	2
79153-65R-1	Air Cap, Pinned	0-3
79185-48-1		
EMF-195	Nozzle, Fluid (8) Hole	0-3
79183-00		
79140-02	Fluid Tip, 0.055" Diameter	0-3
79182-03		
79154-00	Retaining Ring, Tapered	2
79137-00	Head, Machined, Robot Applicator	1
75777-XX	Applicator Covers	Accessory
13076-13	O-Ring, .566" OD X .426" ID, Teflon	2
79146-00	Seal, Rear Piston	1
7723-06	Piston, U-Cup	1
79138-XX	Complete Spray Head	1



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# WARRANTY POLICIES

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## LIMITED WARRANTY

ITW Ransburg will replace or repair without charge any part and/or equipment that fails within the specified time (see below) because of faulty workmanship or material, provided that the equipment has been used and maintained in accordance with ITW 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 ITW RANSBURG APPROVED PARTS VOIDS 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 WILL VOID THIS WARRANTY.**

**ITW 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. ITW 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 ITW 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.



**Service Manual Price: €40.00 (Euro)  
\$50.00 (U.S.)**

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### **Manufacturing**

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

### **Technical/Service Assistance**

Automotive Assembly and Tier I  
Industrial Systems  
Ransburg Guns  
[www.itwransburg.com](http://www.itwransburg.com)

Telephone: 800/ 626-3565    Fax: 419/ 470-2040  
Telephone: 800/ 233-3366    Fax: 419/ 470-2071  
Telephone: 800/ 233-3366    Fax: 419/ 470-2071

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

