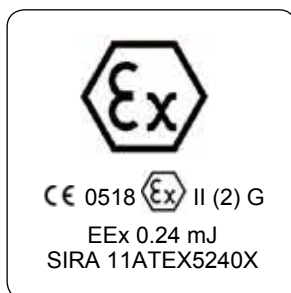
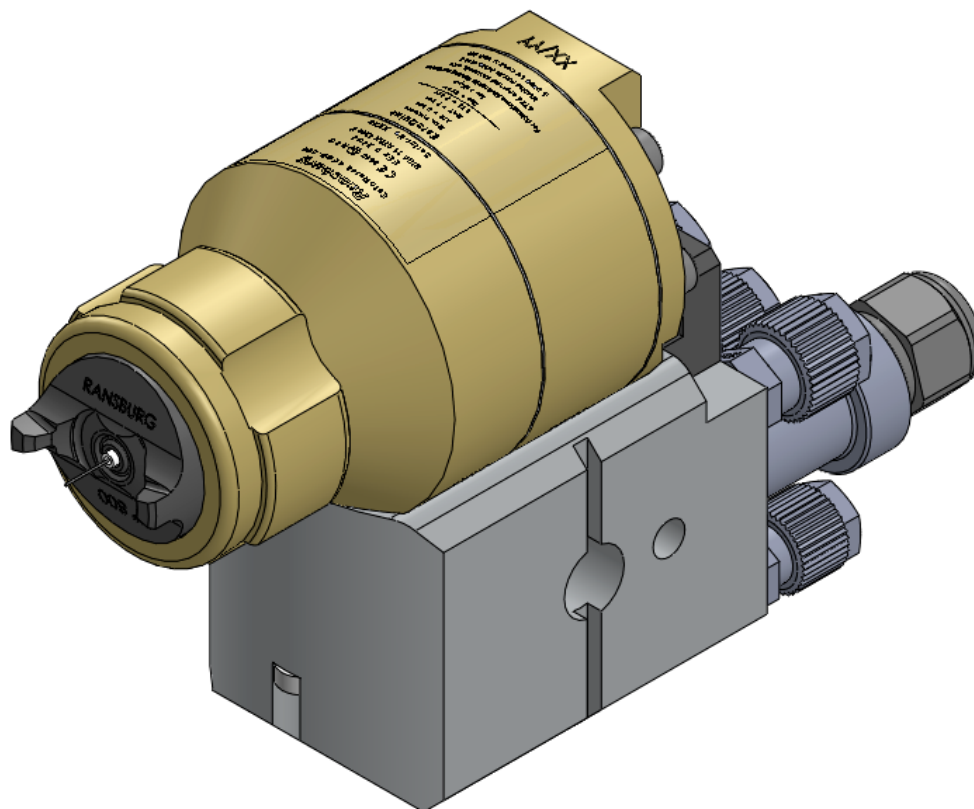


# Ransburg EstaQuick AEMD-600 Automatic Applicator



Model: AEMD-600

**IMPORTANT:** Before using this equipment, carefully read SAFETY PRECAUTIONS, starting on page 5, and all instructions in this manual. Keep this Service Manual for future reference.

## About this Manual

- This service manual applies exclusively to the electrostatic automatic applicator EstaQuick AEMD-600 for the application of solvent-based paints.
- The information in this document is intended only to indicate the components and their working relationship in typical use. These are not installation instructions. Each installation is unique and should be directed by a RANSBURG representative.
- This manual provides information for the service and maintenance of this RANSBURG electrostatic equipment at a typical installation configuration. While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment.
- 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 trouble-shooting.
- Please conduct the specified tests and checks before requesting service assistance, and have this manual in hand for ready reference when requesting such assistance. We recommend that maintenance and operating personnel who are familiar with the service problem be authorized to contact us when service is required.

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# SAFETY

## SAFETY PRECAUTIONS

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

### **WARNING**

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

### **CAUTION**

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

### **NOTE**

A **NOTE** is information relevant to the procedure in progress.

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


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

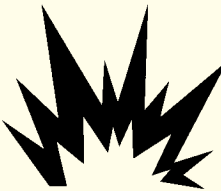

### **WARNING**


- The user **MUST** read and be familiar with the Safety Section in this manual and the Ransburg safety literature therein identified.
- This equipment is intended to be used by trained personnel **ONLY**.
- This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as **NFPA-33 AND EN 50176 SAFETY STANDARDS, LATEST EDITION**, or applicable country safety standards, prior to installing, operating, and/or servicing this equipment.




### **WARNING**

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

<p><b>AREA</b> Tells where hazards may occur.</p>	<p><b>HAZARD</b> Tells what the hazard is.</p>	<p><b>SAFEGUARDS</b> Tells how to avoid the hazard.</p>
<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 or Controller shutdown indicates a problem in the system requiring correction.</p>	<p>Fire extinguishing equipment must be present in the spray area and tested periodically.</p> <p>Spray areas must be kept clean to prevent the accumulation of combustible residues.</p> <p>Smoking must never be allowed in the spray area.</p> <p>The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance.</p> <p>Spray booth ventilation must be kept at the rates required by NFPA-33, OSHA, country, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents.</p> <p>Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times.</p> <p>Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed.</p> <p>Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled.</p> <p>The paint process and equipment should be set up and operated in accordance with NFPA-33, NEC, OSHA, local, country, and European Health and Safety Norms.</p>

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

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

<p><b>AREA</b> Tells where hazards may occur.</p>	<p><b>HAZARD</b> Tells what the hazard is.</p>	<p><b>SAFEGUARDS</b> Tells how to avoid the hazard.</p>
<p><b>Electrical Equipment</b></p> 	<p><b>Electrical Discharge</b></p> <p>High voltage equipment is utilized in the process. Arcing in the vicinity of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance.</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 shut-down 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>Unless specifically approved for use in hazardous locations, the power supply, control cabinet, and all other electrical equipment must be located outside Class I or II, Division 1 and 2 hazardous areas in accordance with NFPA-33 and EN 50176.</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>
<p><b>Toxic Substances</b></p> 	<p><b>Chemical Hazard</b></p> <p>Certain materials may be harmful if inhaled, or if there is contact with the skin.</p>	<p>Follow the requirements of the Safety Data Sheet supplied by coating material manufacturer.</p> <p>Adequate exhaust must be provided to keep the air free of accumulations of toxic materials.</p> <p>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.</p>
<p><b>Spray Area</b></p> 	<p><b>Explosion Hazard — Incompatible Materials</b></p> <p>Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1,-Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.</p>	<p>Spray applicators require that aluminum inlet fittings be replaced with stainless steel.</p> <p>Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your coating supplier. Any other type of solvent may be used with aluminum equipment.</p>



## EUROPEAN ATEX DIRECTIVE 94/9/EC, ANNEX II, 1.0.6

The following instructions apply to equipment covered by certificate number Sira 11ATEX5240X:

1. The equipment may be used with flammable gases and vapors with apparatus groups II and with temperature class T6.
2. The equipment is only certified for use in ambient temperatures in the range +0°C to +40°C and should not be used outside this range.
3. Installation shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-14:1997.
4. Inspection and maintenance of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-17.
5. Repair of this equipment shall be carried out by suitable trained personnel in accordance with the applicable code of practice e.g. EN 60079-19.
6. Putting into service, use, assembling, and adjustment of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.

Refer to the "Table of Contents" of this service manual:

- a. Installation
  - b. Operation
  - c. Maintenance
  - d. Parts Identification
7. Components to be incorporated into or used as replacement parts of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.
  8. The certification of this equipment relies upon the following materials used in its construction:

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised.

Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

Suitable precautions: e.g. regular checks as part of routine inspections or establishing from the material's data sheets that it is resistant to specific chemicals.

Refer to "Specifications" in the "Introduction" section:

- a. All fluid passages contain stainless steel, nylon fittings or chemically compatible resins.
  - b. High voltage cascade is encapsulated with a solvent resistant epoxy.
9. A recapitulation of the certification marking is detailed in the "ATEX" section, on the next page, drawing numbers: 79846-00 and 79852-00.
  10. The characteristics of the equipment shall be detailed e.g. electrical, pressure, and voltage parameters.

**The manufacturer should note that, on being put into service, the equipment must be accompanied by a translation of the instructions in the language or languages of the country in which the equipment is to be used and by the instructions in the original language.**

## ESTAQUICK AEMD-600 ATEX PRODUCT MARKING DEFINITIONS

### NOTE

► ATEX APPROVAL with the Power Source 9060 LOW VOLTAGE CONTROL UNIT KIT is only use for the Electrostatic Automatic Applicator AEMD-600 incl. Machine Mounted Adapter AEMD-4500-6.



Ex Certificate Number: Sira 11ATEX5240X

Sira = Notified Body performing EC-type examination

11 = Year of certification

ATEX = Reference to ATEX Directive

5 = Protection Concept Code (code 5 is titled Encapsulation)

240 = Document serial number

X = Special conditions for safe use apply

The applicator AEMD-600 Shall only be used with Air- & Fluid hoses that meet Safety requirements.

### Product Marking



Ex = Specific marking of explosive protection

II = Equipment Group hazardous area characteristics

2 = Equipment Category

G = Type of explosive atmosphere (gases, vapors, or mists)

EEX0.24mJ = The EstaQuick AEMD-600 applicator is suitable for use in automatic spraying installations complying with EN 50 050 as they are a Type A class with a discharge energy limit of 0.24mJ.

# INTRODUCTION

## TESTS

An automatic (stationary) spray installation for electrostatic spraying of coating materials must be tested by an expert prior to initial start-up.

Method, scope, and frequency of tests have to be determined by the user based on the individual production requirements and local conditions. In the individual case the professional trade association may require a written proof in form of a test book, report, or similar.

Ensure that electrostatic spraying systems and installations and accessory parts be checked by an expert for safe operation whenever necessary, but at least once a year. This examination must be documented in writing.

The following checks must be carried out by a qualified electrician:

- Keep ready access to appropriate fire extinguishing equipment. Check fire extinguishing equipment regularly, at least every 2 years. All personnel must be adequately trained with fire extinguishing equipment.
- Keep ready an actual warning schedule showing the type of alarm and the triggering function (manually / automatically).

TESTS		
Description	Test Cycle	
	Daily	Weekly
Drawing-off air conveyance for efficiency	X	
Proper functioning of protection against over-current	X	
Protection against exceeded discharge energy		X
Protection against ignition of flammable cleaning materials		X
Efficiency of protection measurements against direct touch		X
Efficiency of grounding measurements	X	
Isolation of all live installation components above 1kV		X
Locking device, passing protection		X

**NOTE:** A qualified electrician is a person who has specialist training, knowledge, and experience as well as knowledge of the relevant rules and who can recognize and judge possible hazards of the works involved. (See § 2 Par. 3 UVV VBG 4). Furthermore a qualified electrician must have the following qualifications: Specialist training and knowledge of explosion protection, electrostatic process technology, knowledge of local conditions, knowledge of the electric installation, and knowledge of the load of electric installation.

## SPECIFICATIONS

<b>Atomization:</b>	Conventional air atomizing 0 to 9 bar
<b>Fluid Pressure:</b>	0 to 7 bar
<b>Cylinder Air Pressure:</b>	7 bar
<b>Tip Voltage:</b>	max. 90 kV DC voltage
<b>Current Max.:</b>	120 $\mu$ A
<b>Voltage Input:</b>	220V at 50/60Hz
<b>Gun Weight:</b>	245 g
<b>Dimensions:</b>	125 x 46 x 56 mm
<b>Material:</b>	PEEK / POM / Stainless Steel

## DESIGN

### Different Models

The EstaQuick is available in different versions. These differ from different tips respectively different fluid feed versions. Please see the Tip and Air Cap Selection Chart for selection of fluid tips and air caps. The selection of the correct atomizer depends on the desired finish quality, the geometry of parts, and the paint viscosity. For this reason a test should be carried out with different fluid tips and fluid feed versions.

#### NOTE

- For more information, please see "AUTOMATIC APPLICATOR ESTAQUICK AEMD-600 SELECTION CHART" in the back section of this manual.

# INSTALLATION

## CONNECTION OF ESTAQUICK AEMD-600 TO ADAPTER AEMD-4500-6

Insert the EstaQuick AEMD-600 with the locking device into the designated place by a turn of 45° to its later position. Push the gun body onto the adapter whereby the resistance of the spring must be surmounted. Turn the gun clockwise by 45° in its position until it locks into the adapter.



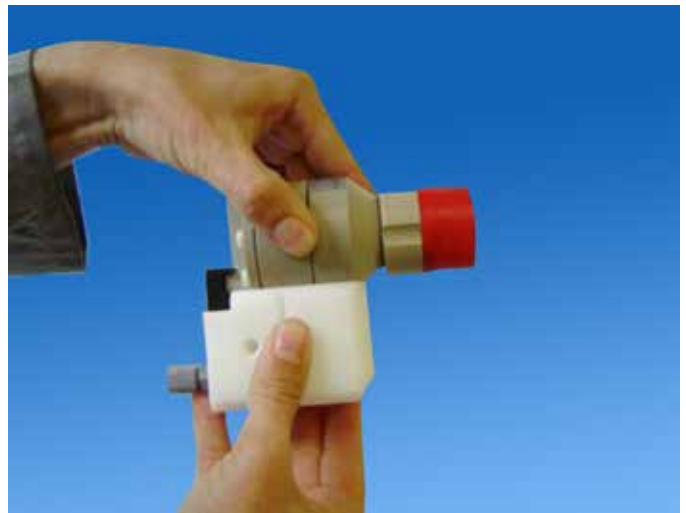
1. Position the gun by 45° to the adapter



2. Insert the locking device into the seat



3. Push the gun downward against the spring force until it bottoms on the adapter



4. Click the gun into the rear locking device until it sits straight

## SCREWED CONNECTION OF ESTAQUICK AEMD-600-FIX TO ADAPTER AEMD-4500-6-FIX

In case of screwed connection insert the gun with the locking device into the designated place by a turn of 45° to its later position. Push the gun body against the spring force onto the adapter. Turn the gun clockwise by 45° in its position and fix it with the two screws in the front and back.



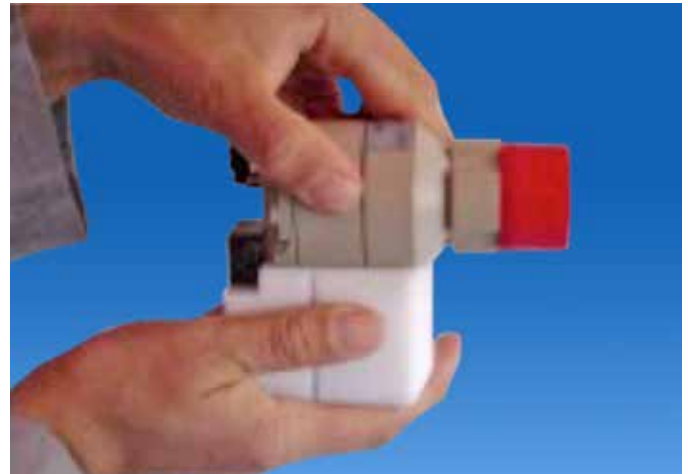
1. Position the gun by 45° to the adapter.



2. Insert the locking device into the seat.



3. Push the gun downward against the spring force until it bottoms on the adapter.



4. Click the gun into the rear locking device until it sits straight.



5. Fix the gun at the back with screw.



6. Fix the gun at the front with the screw.

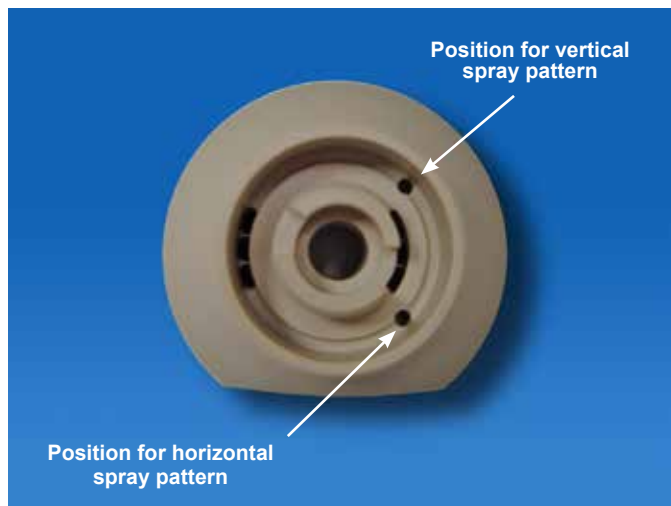
# MAINTENANCE

## NOTE

- Before installing the gun apply a light coat of grease to the O rings to prevent from shearing off.

## SPRAY PATTERN ADJUSTMENT

The spray pattern of the atomizer is adjustable from round pattern to flat pattern. By increasing the air supply (atomizing air) the pattern becomes wider, by reducing the air supply (atomizing air) it becomes more narrow. Carry out tests in order to find the desired values. In order to change-over the atomizer spray pattern from horizontal to vertical, reposition the baffle in the spray head. There are two position bores in the spray head (see picture).



## NOTE

- For optimum finish quality always operate with clean, dry, and filtered air.

## DISTANCE OF GUN TO WORK PIECE

To achieve optimum finish quality, position the gun approximately 15 to 30 cm from the work piece.

## PREVENTIVE MAINTENANCE

### Maintenance Schedule

For longer service life of the gun and for safe use of the spray installation this maintenance schedule must be followed:

### Several Times Daily

- Turn off the high voltage.
- Check the air cap, spray tip, and electrode for paint residues. Clean as often as necessary with a soft brush and a suitable solvent and blow dry.
- Clean all insulated surfaces of the installation. Remove paint residues from the gun exterior, the high voltage cable, and the air and fluid hoses with a solvent wetted cloth.
- Make sure the solvent is non-polar.
- Make sure that solvent has a flash temperature below temperature in booth.

### Daily (At the Begin of Each Shift)

- Either remove or ground all loose or non-grounded objects within 6 meters of the operating range of the gun.
- Check whether the atomizer head and the gun electrode are clean and not damaged.

**NOTE**

- Never remove the fluid tip if there is still fluid in the gun, otherwise fluid can enter the air passages. In order to remove the fluid tip / air cap hold the gun downward. Clogged air passages will cause improper atomization and might lead to short-circuit. If the air passages are clogged with conductive fluid, this will lead to increased current output and low operating voltage, and might finally damage the electrical components.
- For maintenance of the atomizer please refer to the chapter "Cleaning of the Atomizer".

**⚠ CAUTION**

- In order to change the fluid tip, pressure must be applied to the needle.

**During Operating Interruption  
(and at the End of Each Shift)**

1. Turn off the high voltage.
2. Turn off material supply.
3. Turn off atomizing air and cylinder air.
4. Clean gun, cable, and hoses with a solvent wetted cloth. Use suitable solvent only.
5. Empty the fluid lines and leave solvent in the non-pressurized lines. (See the chapter „Flushing Procedure“).

**⚠ WARNING**

- For a short operating interruption (shorter than the respective pot-life of the fluid) it might not be necessary to flush the lines, depending on the coating material being used. If the solid particles of the fluid deposit slowly, the lines may not require flushing so quickly after an operating interruption as it would be the case with quickly depositing solid particles.
- The necessity for flushing depends on the coating material and on the time of the operating interruption.
- Metallic paints and primer will need more frequent flushing than some other paints.

**Weekly**

- Check the complete system for damage, leakage, and paint residues.
- Clean the atomizer unit.

**NOTE**

- If quickly depositing material is being sprayed and the lines are not flushed frequently enough, the fluid passages of the gun and the lines may get clogged, resulting in more time consuming maintenance and repair.

**CLEANING PROCEDURES****Cleaning the Atomizer**

For regular cleaning procedures the following tools are needed:

- Suitable solvent
- Grounded solvent supply
- A brush with soft bristles
- Some pipe-cleaners

For safe and trouble-free operation keep the exterior surface of the gun clean and free of paint residues and dirt. This is to prevent high voltage loss to ground and reduction of the electrostatic effect. Contamination at the opening of the air cap will cause a reduction of atomizing quality. Clean the air cap as often as necessary with a soft brush and solvent in order to obtain optimum atomization.

**⚠ WARNING**

- Never wrap the gun into plastic film. A surface charging can be built up at the plastic material and might discharge to the next grounded object. This reduces the capacity of the gun which might lead to damaging the components. Ransburg will not be liable for any damages caused by wrapping the gun into plastic film. To protect the gun use the gun protection (AGMD-400).



## Cleaning the Air Cap

To clean the air cap the following steps have to be performed:

1. Turn off the high voltage.
2. Turn off the material supply.
3. Clean the removed parts with a soft brush and suitable solvent.



### WARNING

➤ Never use metal tools or metal brushes. For cleaning purposes never use any object that is harder than the plastic parts. If it is impossible to remove paint residues with a cloth or with a brush, the parts may be soaked in solvent, but only as long until the residues can be removed! Never soak the gun body, hoses, or the high voltage cable in solvent!

## Flushing Process

1. Turn off the high voltage.
2. Turn off the material supply.
3. Turn off atomizing and fan control air.
4. Connect solvent supply to the gun.
5. Flush the system with solvent until clean solvent escapes.
6. Remove the solvent supply.
7. Activate the gun until there is no solvent left. After finishing these steps the gun will be ready for color change, storage, or maintenance.



## TROUBLESHOOTING GUIDE

General Problem	Possible Cause	Solution
<b>FAULTY SPRAY PATTERN</b>		
<b>Asymmetric Shape</b>	Air hose of the remote air supply to air valve obstructed or damaged.	Clean, replace or repair.
	Air channel and/or air inlet obstructed.	Blow out or clean.
<b>Unclean left or right side pattern</b>	Air cap damaged or obstructed.	Replace or clean.
<b>Very uneven or deformed spray pattern</b>	Wrong air cap / fluid tip combination.	Select the correct combination.
	Air and fluid not synchronized.	Check the programming sequence.
<b>INSUFFICIENT SUPPLY</b>		
<b>Atomizing Air</b>	Air channel in gun or in air line obstructed.	Blow out.
	Pressure too low.	Increase air pressure.
<b>Fluid Output</b>	Fluid tip obstructed or damaged.	Flush or replace.
	Fluid channels in gun or fluid line obstructed.	Flush.
	Not enough travel of fluid valve needle.	Lubricate piston and needle packing.
	Fluid pressure too low.	Increase fluid pressure.
	Fluid filter obstructed.	Clean or replace.
	Fluid valve or fluid regulator obstructed.	Clean.
<b>LEAKAGES</b>		
<b>Air escapes</b>	Air valve cap loose or damaged.	Tighten.
<b>Fluid leakage at rear part of the gun</b>	Packing, piston, needle or electrode damaged.	Replace faulty components.
<b>Fluid leakage between gun and adapter</b>	O-Rings AGMD-93 damaged or missing.	Insert O-Rings
	Locking device does not seal properly.	Tighten cap screw AEMD-2130.
	Insulating surface between head, head bracket, and end plate is not even.	Loosen 6 screws, align parts and tighten screws.
<b>Fluid leakage at fluid tip</b>	Fluid tip too loose.	Engage fluid tip.
	Needle and tips do not close properly.	Replace damaged components.
	Retaining ring loose.	Tighten retaining ring.
<b>Continuous leakage at fluid tip</b>	Seat of fluid tip worn or damaged.	Replace fluid tip.
	Needle / electrode worn or damaged.	Replace faulty part.
	Fluid tip not engaged.	Engage fluid tip.
	Needle does not close (cylinder air line not depressurized)	Check valve.

(Continued on next page)

 **TROUBLESHOOTING GUIDE (Cont.)**

General Problem	Possible Cause	Solution
<b>ELECTRICAL PROBLEMS</b>		
<b>Wrap Back</b>	Insufficient grounding of the work piece.	Check and correct.
	Insufficient booth ventilation.	Check and correct.
	Too much atomizing air.	Reduce pressure.
<b>Insufficient or No High Voltage</b>	Faulty high voltage connections.	Check and connect to adapter and high voltage transformer.
	Line passage between transformer and electrode interrupted.	Check and correct.
	Insufficient or no grounding.	Check and correct.
	Faulty pressure switch.	Replace.
	High voltage cable damaged.	Replace.
	High voltage transformer damaged.	Please see Service Manual for the high voltage transformer.
	Check fuse.	Check.
Is the voltage turned on? Is the atomizing air turned on? Is the gun activated? Is the paint too conductive?	Check.	
<b>High Make Impulse</b>	Paint in the air channels.	Clean air channels with soft brush.
	Paint in the rear part of the gun.	See Leakages.

## SERVICE

### NOTE

- Only use genuine spare parts when servicing the EstaQuick.

### CAUTION

- All personnel should read and understand this Service Manual prior to starting maintenance and service.

### Disassembling the Gun from the Adapter

### WARNING

- When servicing the gun always turn off and ground the high voltage, turn off the material supply, and relieve pressure from the material supply.

### Preparations

To take off the gun from the adapter the following steps have to be followed:

1. Turn off high voltage.
2. Turn off material supply.
3. Turn off atomizing air and cylinder air.
4. Clean gun, cable, and hoses with a solvent wetted cloth. Use suitable solvent only.
5. Empty the fluid lines and leave solvent in the non-pressurized lines.

### WARNING

- Prior to cleaning or color change turn off the high voltage and the supply voltage to the high voltage transformer.

### Removal of the EstaQuick AEMD-600

Activate the spring pad at the adapter, at the same time the spring pad will be pushed into the gun and the gun body can now be turned out of the adapter. Turn the gun body by 45° counter-clockwise. The gun can now be pulled off upward and the spare gun can be connected.



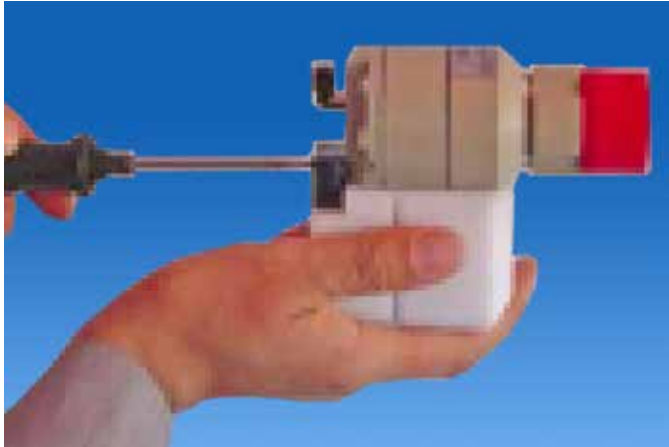
1. Push in the spring pad at the adapter.



2. Turn gun by 45° counter-clockwise and pull off upward.

## Removal of the EstaQuick AEMD-600-FIX

Remove the two screws that fix the gun on the adapter. The gun body can now be turned out of the adapter. Turn the gun body by 45° counter-clockwise. The gun can now be pulled off upward and the spare gun can be connected.



1. Remove the two screws in front and back.



2. Turn gun by 45° counter-clockwise and pull off upward.

## Disassembling the EstaQuick AEMD-600

For disassembly and assembly please refer to Parts Lists and Exploded View in this Service Manual.

### NOTE

- Disassembly and assembly of parts must only be carried out by adequately trained personnel. Works must be carried out on a clean and flat supporting surface.

### Necessary Tools

- Test adapter
- Screw driver
- Tip wrench (AEMD-101)
- Allen screw wrench (SW 6)
- Ring spanner (SW 3)
- Multimeter
- Calliper gauge

### Grease and Bonding Agent

- AGMD-010: for needle, needle packing and piston.
- Electrostatic Grease (Order No.59972-00): for O-Rings, packing, and hollow spaces.
- LOCTITE 243 (screw locking “medium strength”)
- LOCTITE 222 (screw locking “low strength”)

### NOTE

- Needle, needle packing and piston must only be lubricated with grease AGMD-010. Any other grease can lead to gun failure (needle packing and piston might swell if improper grease is being used).

Once the gun has been disconnected from the adapter and has been replaced by a spare gun, the spraying operation can be continued, and the disconnected gun can be serviced at a suitable place.

**For disassembly the following steps have to be followed:**

1. Connect the gun to be serviced onto a test adapter. Apply cylinder air with 6 bar pressure to the needle, this retracts the needle toward the springs and relieves the tip.

**⚠ CAUTION**

➤ In order to protect the gun head from damages it is important that pressure air (min. 6 bar) is applied to the cylinder air during the disassembly of the air cap and tip.

2. Loosen the retaining ring and remove the air cap.
3. Only exchange the tip by hand or use the tip wrench AEMD-101. It can be loosened by a light pressure and a 1/4-turn counter clockwise. (See Pictures).



1. Apply pressure of 6 bar to the gun.



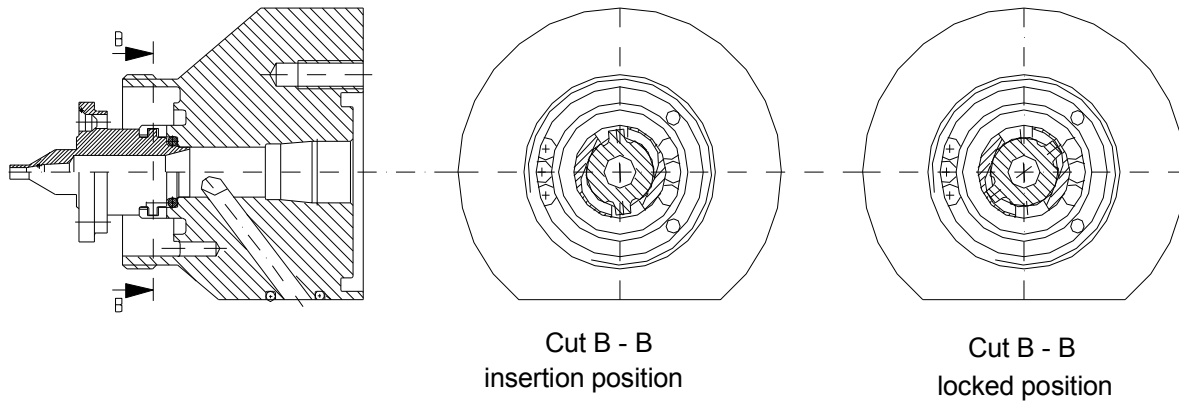
2. Disassembly with tip wrench AEMD-101.



3 Disassembly with fingers.



3. **DO NOT USE** pliers or other tools.

**NOTE**

► The fluid needle is glued into the spring bolt with LOCTITE 243. The two parts become one permanent assembly.

**NOTE**

► The contact wire will remain in the head.

4. Remove the baffle and the O-Rings.
5. Relieve pressure from the test adapter and remove the gun.
6. Loosen the electrode from the needle.
7. Firmly hold gun head and head bracket and carefully and evenly loosen the 6 connecting screws. Remove the end plate from the head bracket.
8. Remove the pressure springs, the spring bolt / fluid needle assembly and the piston. Remove the washer for the end plate.
9. Disconnect the gun head from the head bracket. Remove the contact lock.

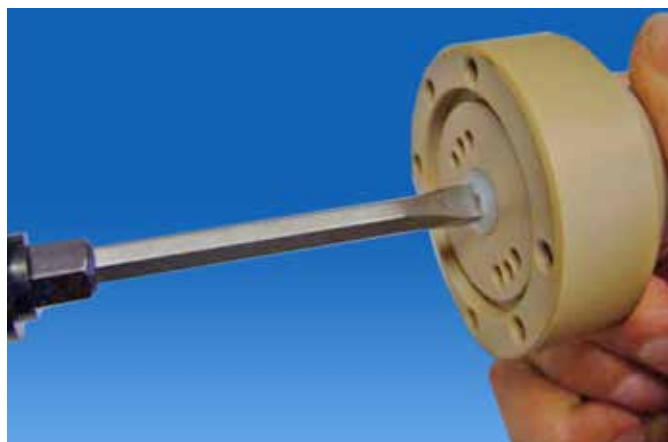
10. Remove the washer and both O-Rings.
11. The needle packing must be exchanged at each disassembly. It will be destroyed at disassembly (see picture).



1. Insert screw driver.



2. Force flat blade screw driver with light blows of the hammer into needle packing.



3. Unscrew faulty needle packing.

12. The locking device and the cap screw will remain in the head.

### NOTE

- An electrical contact must exist between cap screw and contact wire. Check continuity with a multimeter.

## Cleaning and Examination of Gun Parts

After disassembly clean the gun parts at first and then check for proper condition.

### Cleaning of Parts

### NOTE

- The kind of contamination of the gun parts might give an indication of the gun failure mode.

For regular cleaning procedures the following tools are needed:

- Suitable solvent
- Grounded solvent supply
- A brush with soft bristles
- Some pipe-cleaners

Clean the contaminated gun parts with a soft brush and suitable solvent and blow dry. Clean the air and fluid bores with a solvent soaked pipe-cleaner.

### NOTE

- Do not soak the gun parts in solvent but wipe them clean with a brush or a solvent dampened cloth.

For safe and trouble-free operation keep the exterior surface of the gun clean and free of paint residues and dirt. This is to prevent current leakage to ground and reduction of the electrostatic effect. Contamination at the opening of the air cap will cause a reduction of atomizing quality. Clean the air cap as often as necessary with a soft brush and solvent in order to obtain optimum atomization.



### 10.3.2 Examination of Parts

Prior to assembly of the gun all gun parts must be checked. Faulty components must be replaced.

**⚠ CAUTION**

➤ Never install faulty components into the gun and only use genuine Ransburg spare parts!

### Assembly of the EstaQuick AEMD-600

This describes the assembly of a gun with new parts. For the renewed assembly of a gun, some parts will remain and will not have to be assembled again.

#### Preparation of the Assembly “Head”

1. Screw the needle packing into the head by use of an Allen screw wrench (SW 6), take care not to close the fluid bore in the head. The correct position allows full diameter of the fluid bore to be clear.



1. Correctly Assembled: The needle packing sits below the fluid bore

2. Insert the contact wire into the bores and secure with light blows of the hammer.



2. Insert contact wire



3. Secure contact wire with light blows of the hammer

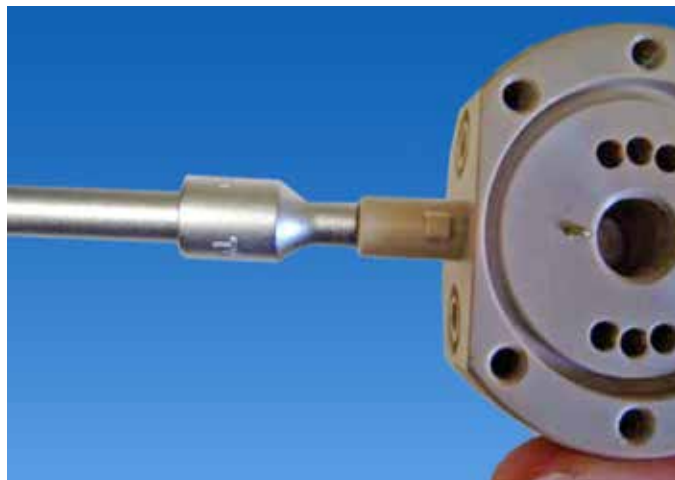
3. Insert the locking device into its place in the head and tighten with cap screw. Check the electrical continuity between cap screw and contact wire with the multimeter.



4. Insert locking device



5. Screw in cap screw.



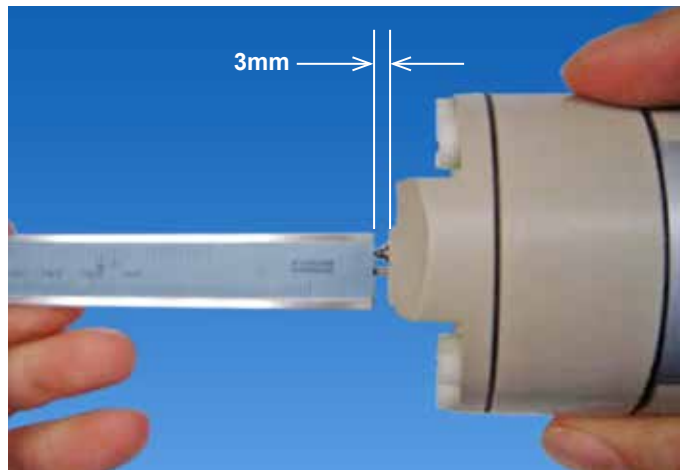
6. Tighten cap screw



7. Check the electrical contact between wire and cap screw

### Preparation of the Assembly “End Plate”

4. Screw the spring pad into the end plate, so that the ball shows for 3mm.



8. Screw in cap screw

5. Secure the adjusted spring pad with the set screw.

### Preparation of the Assembly “Head Bracket”

6. Lubricate the running surface of the piston in the head bracket and the two running surfaces of the piston with grease AGMD-010.

- 7. Press the piston into the head bracket.
- 8. Lubricate the washers for head and endplate with electrostatic grease.

- 9. Insert the greased washers into the respective groove in the head bracket.

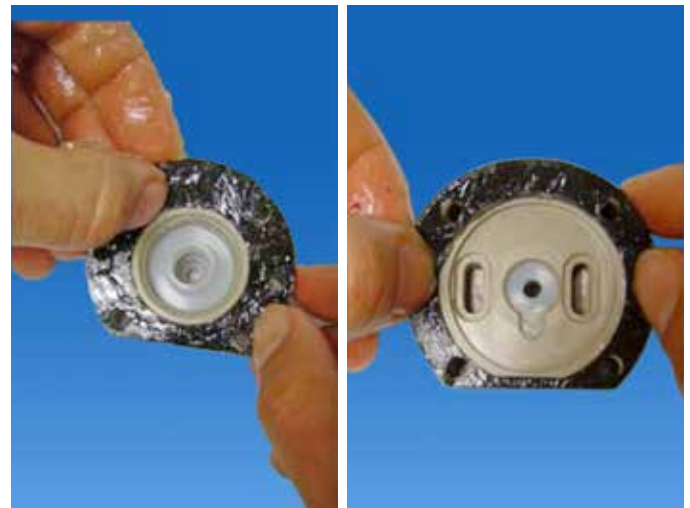


9. Grease running surface of the piston in the Head bracket

12. Lubricating the washers.



10. Grease running surface of the piston.



13. Inserting the washers.



11. Press in the piston.



14. Insert the O-Rings.

10. The needle shaft will be glued into the spring bolt with Loctite 243 medium strength.

### Final Assembly of the EstaQuick AEMD-600

11. Insert the contact lock into the needle packing of the head.
12. Place the head bracket onto the head.

#### NOTE

- The head bracket has a pocket into which the contact lock has to be inserted.

13. Push the needle shaft / spring bolt unit into the bore of the piston until you feel resistance.
14. Place the two pressure springs onto the spring bolt.
15. Insert the 6 screws into the designed bores in the end plate.
16. Position the end plate with the screws onto the head bracket.
17. Push the end plate downward, with sufficient force to press the needle into the needle packing.
18. Lightly and evenly tighten the 6 screws crosswise.
19. Check the levelness of the sealing surface of the head, of the head bracket, and of the end plate with a calliper gauge or an flat edge. Then firmly tighten screws.
20. Screw the electrode with LOCTITE 222 (screw locking "low strength") onto the needle shaft and tighten by hand.
21. Click the gun onto the test adapter and apply cylinder air of 6 bar.



15. Push end plate downward

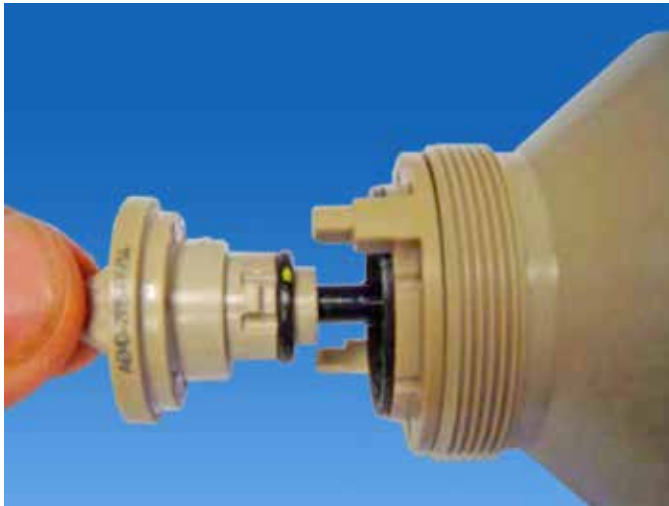


16. Check for levelness with the calliper gauge

22. Insert the baffle into the head. Hereby it has to be decided whether a horizontal or vertical spray pattern is wanted, see (Spray Pattern Adjustment).
23. Lubricate the disc washer with electrostatic grease and install it onto the baffle.
24. Lubricate the O-Ring with electrostatic grease and install it into its place in the tip.



17. Insert disc washer with tapered side into the groove of the baffle.



18. Insert tip with lubricated O-Ring into the gun.

**NOTE**

➤ For longer service life the O-Rings must always be lubricated. Never use faulty O-Rings.

25. Insert the tip with the guide pin into the bayonet of the head. Push it downward with light strength and fix it to the head by a ¼ turn clockwise.

**NOTE**

➤ The bayonet is only designed for attaching the tip and not for sealing. Only after the gun has been equipped with air cap and retaining ring, the tip is sealed to the head.

**⚠ WARNING**

➤ Prior to each assembly of the tip into the head, the seat of the electrode must be checked.

26. Install the air cap onto the gun, take care that the horns of the baffle engage into the slots of the air cap.
27. Screw on the retaining ring. Check the position of the air cap, before tightening. Then tighten retaining ring by hand.



19. Insert the slots of the air cap into the horns of the baffle.

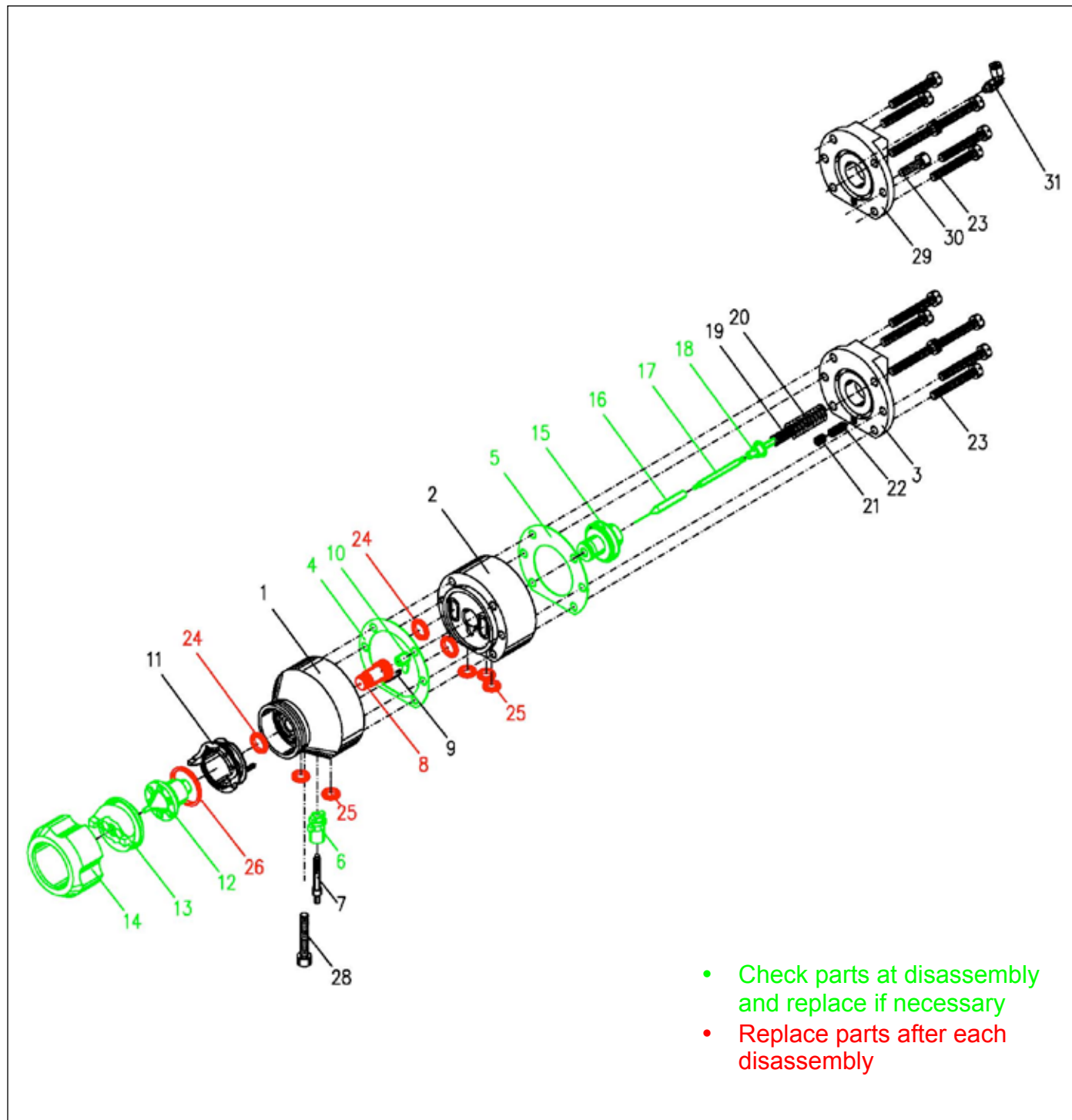


20. Check the position of the air cap while screwing the retaining ring on.

28. Put the protective cap on the retaining ring to protect air cap and electrode.

# PARTS IDENTIFICATION

Please have the Parts Lists in hand for ready reference of part numbers when ordering parts.



- Check parts at disassembly and replace if necessary
- Replace parts after each disassembly

EstaQuick AEMD-600

## ELECTROSTATIC AUTOMATIC APPLICATOR ESTAQUICK AEMD-600 - PARTS LIST

Position	Description	Qty	Part No.
1	Gun Head	1	AEMD-2196
or	Gun Head for Circulating	(1)	AEMD-2196-U
2	Head Bracket	1	AEMD-2220
3	End Plate	1	AEMD-2242
4	Washer For Head	1	AEMD-2216
5	Washer for End Plate	1	AEMD-2218
6	Locking Device	1	AEMD-2244
7	Cap Screw	1	AEMD-2130
8	Needle Packing	1	AGMD-405-1
9	Contact Wire	1	AEMD-2240
10	Contact Lock	1	AEMD-2241
11	Baffle	1	AEMD-2033
12	Tip	1	See Chart 11.3
13	Air Cap	1	See Chart 11.4
14	Retaining Ring	1	AEMD-2368
15	Piston	1	AGMD-243-1
16	Electrode and Resistor	1	70430-01
17	Needle Shaft	1	AEMD-2420
18	Spring Bolt	1	AEMD-2219
19	Pressure Spring	1	AGMD-110
20	Pressure Spring	1	AGMD-111
21	Set Screw	1	AGMD-116
22	Spring Pad	1	AGMD-115
23	Pan Head Screw	6	AEMD-2131
24	O-Ring	3	See Chart 11.5
25	O-Ring	5	See Chart 11.5
26	Disc Washer	1	AEMD-2065
27	Protective Cap (not shown)	1	7331-03
28	OPTION: Screw	1	AEMD-2131
29	OPTION: End Plate	1	AEMD-2242-1
30	OPTION: Screw	1	DIN84M5X16PAG
31	OPTION: Vent connection (Connected only with End Plate AEMD-2242-1)	1	ESTA-408-4

**Note:** Pos. 28 – 30: Option for Electrostatic Automatic Applicator AEMD-600.....-800-FIX.  
Screw Coupling with Machine Mounted Adapter AEMD-4500-6-FIX.

### TIP SELECTION CHART

Pos	Description	Tip Size (mm)	Part No.	Air Cap	Viscosity (sDIN4)	Fluid Flow (ml/min)	Spray Pattern (mm)
12	Tip with bore 0.8mm	0,8	AEMD-2915-G	AEMD-800C	18-35	250	355
	Tip with bore 1.1mm	1,1	AEMD-2915-FX	AEMD-800C	18-40	350	355
	Tip with bore 1.4mm	1,4	AEMD-2915-FF	AEMD-800C	18-50	350	355
	Tip with bore 1.6mm	1,6	AEMD-2915-FW	AEMD-800C	18-50	up to 700	355
	Round Pattern Tip	A=6,31 mm <sup>2</sup>	AEMD-2941	AEMD-850	-	-	-
	Round Pattern Tip	A=7,22 mm	AEMD-2951	AEMD-850	-	-	-

### AIR CAP SELECTION CHART

Pos.	Description	Part No.
13	Air Cap for Tip AEMD-2915	AEMD-800c
	Air Cap for Round Pattern Tip AEMD-2941 and AEMD-2951	AEMD-850

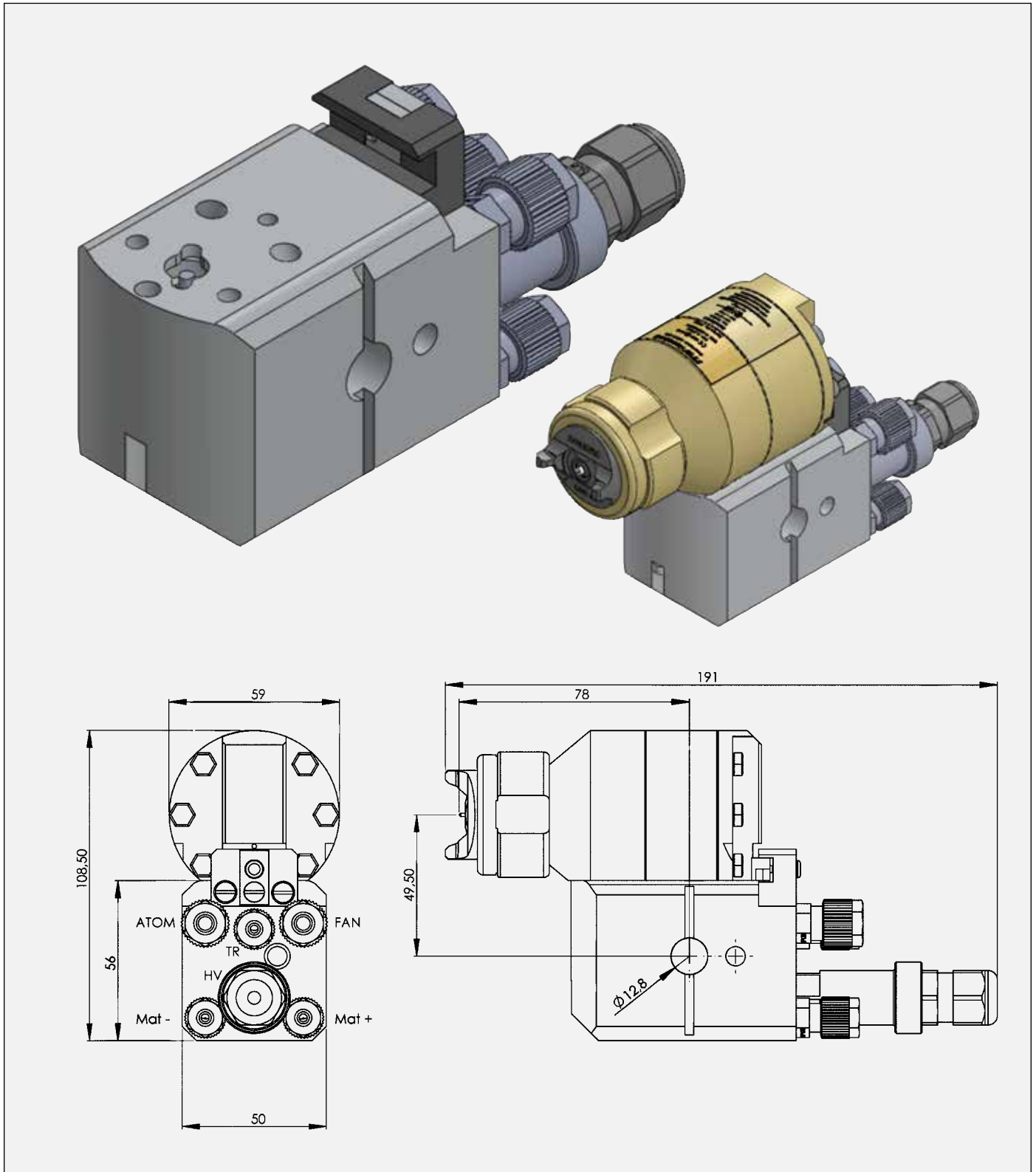
### O-RING SELECTION CHART

Pos.	Description	Part No.
24	Standard O-Ring (Viton EX)	AGMD-121
	Option O-Ring for aggressive Solvent components, with Aromat, Esters and Ketones	AGMD-121-C
25	Standard O-Ring (Viton EX) (5 parts per pack)	AGMD-93-K5
	Option O-Ring for aggressive Solvent components, with Aromat, Esters and Ketones	AGMD-095

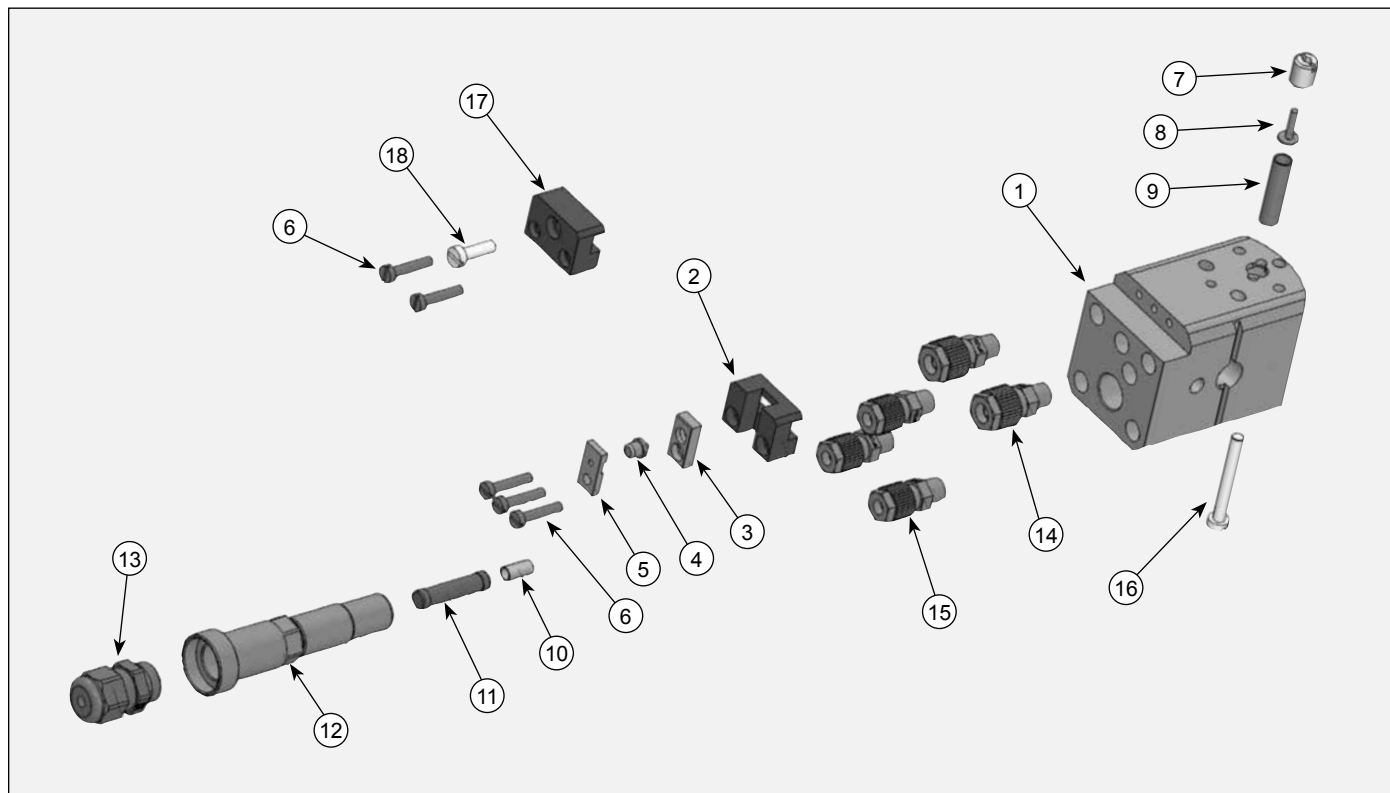


AUTOMATIC APPLICATOR ESTAQUICK AEMD-600 SELECTION CHART					
Description		Tip Size (mm)	Tip Size Part No.	Air Cap Part No.	Machine Mounted Adaptor Part No.
Quick Disconnection	AEMD-600-G-800	0,8	AEMD-2915-G	AEMD-800C	AEMD-4500-6
	AEMD-600-FX-800	1,1	AEMD-2915-FX		
	AEMD-600-FF-800	1,4	AEMD-2915-FF		
	AEMD-600-FW-800	1,6	AEMD-2915-FW		
	AEMD-600-2941-850	A=6,31 mm <sup>2</sup>	AEMD-2941	AEMD-850	
	AEMD-600-2951-850	A=7,22 mm <sup>2</sup>	AEMD-2951		
Quick Disconnection Circulation U	AEMD-600UG-800	0,8	AEMD-2915-G	AEMD-800C	AEMD-4500-6
	AEMD-600UFX-800	1,1	AEMD-2915-FX		
	AEMD-600UFF-800	1,4	AEMD-2915-FF		
	AEMD-600UFW-800	1,6	AEMD-2915-FW		
	AEMD-600U2941-850	A=6,31 mm <sup>2</sup>	AEMD-2941	AEMD-850	
	AEMD-600U2951-850	A=7,22 mm	AEMD-2951		
Fixed	AEMD-600-G-800-FIX	0,8	AEMD-2915-G	AEMD-800C	AEMD-4500-6-FIX
	AEMD-600-FX-800-FIX	1,1	AEMD-2915-FX		
	AEMD-600-FF-800-FIX	1,4	AEMD-2915-FF		
	AEMD-600-FW-800-FIX	1,6	AEMD-2915-FW		
	AEMD-600-2941-850-FI	A=6,31 mm <sup>2</sup>	AEMD-2941	AEMD-850	
	AEMD-600-2951-850-FI	A=7,22 mm <sup>2</sup>	AEMD-2951		
Fixed Circulation U	AEMD-600UG-800-FIX	0,8	AEMD-2915-G	AEMD-800C	AEMD-4500-6-FIX
	AEMD-600UFX-800-FIX	1,1	AEMD-2915-FX		
	AEMD-600UFF-800-FIX	1,4	AEMD-2915-FF		
	AEMD-600UFW-800-FIX	1,6	AEMD-2915-FW		
	AEMD-600U2941-850-FI	A=6,31 mm <sup>2</sup>	AEMD-2941	AEMD-850	
	AEMD-600U2951-850-FI	A=7,22 mm	AEMD-2951		

## MACHINE MOUNTED ADAPTER



Machine Mounted Adapter AEMD-4500-6 for Electrostatic Automatic Gun AEMD-600

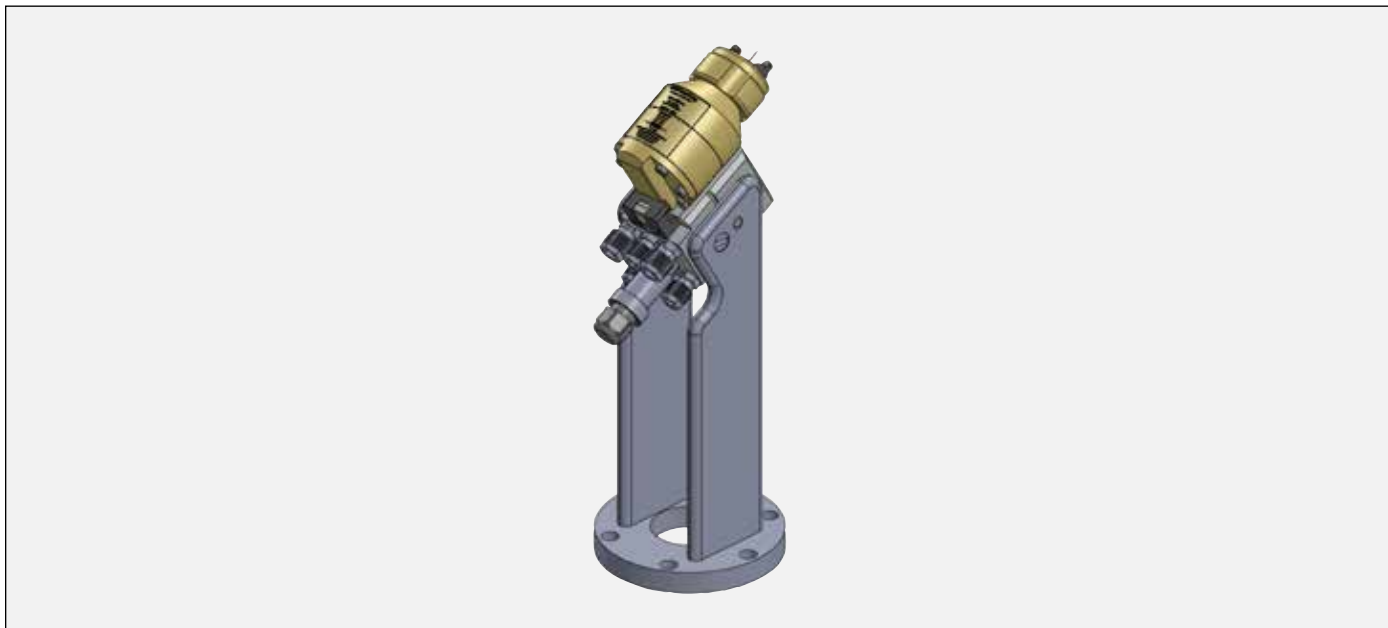


Machine Mounted Adapter AEMD-4500-6

**MACHINE MOUNTED ADAPTER AEMD-4500-6 - PARTS LIST**

Pos.	Description		
1	Base plate	1	AEMD-4501-6
2	Plate	1	AEMD-4102
3	Pressure plate	1	AEMD-4346
4	Pressure plate	1	AEMD-4247
5	Holding plate	1	AEMD-4246
6	Screw	2	AEMD-4129
7	Guide piece	1	AEMD-4502-1
8	Contact piston	1	AEMD-4503
9	Pressure spring	1	AEMD-2108
10	Pressure spring	1	AGMD-114
11	Resistor (60MΩ)	1	AEMD-4216
12	Cable gland	1	AEMD-4217
13	Strain relief	1	ST-M16x1,5
14	Hose fitting for 8mm (atom & fan)	2	AEMD-4134
15	Hose fitting for 6mm (needle pressure, paint in & out)	3	AEMD-4135
16	OPTION: Screw	1	AEMD-2131
17	OPTION: Plate	1	AEMD-4102-1
18	OPTION: Screw	1	DIN84M5X16PA

**Note:** Pos. 16 – 18: Option for Machine Mounted Adapter AEMD-4500-6-FIX. Screw Coupling with Electrostatic Automatic Applicator AEMD-600.....-800-FIX.



**BRACKET FOR MACHINE MOUNTED ADAPTER AEMD-4500-6  
HOLLOW WRIST ROBOT**

Pos.	Description	Qty	Part No.
1	Bracket (Applicator and Machine Mounted Adapter are not included)	1	AEMD-4250



**ROBOT ADAPTER**

No.	Description	Qty	Part No.
1	Adapter ABB 5400, 580	1	AEMD-4260
2	Adapter ABB 5400 Enhanced Wrist	1	AEMD-4261
3	Adapter B&M LZ2000	1	AEMD-4263
4	Adapter Fanuc P-145/155	1	AEMD-4264
5	Adapter Fanuc P-200/250	1	AEMD-4265
7	Adapter Kawasaki KF192	1	AEMD-4266
8	Adapter Motoman EPX2850	1	AEMD-4267
9	Adapter Motoman EPX2900	1	AEMD-4268

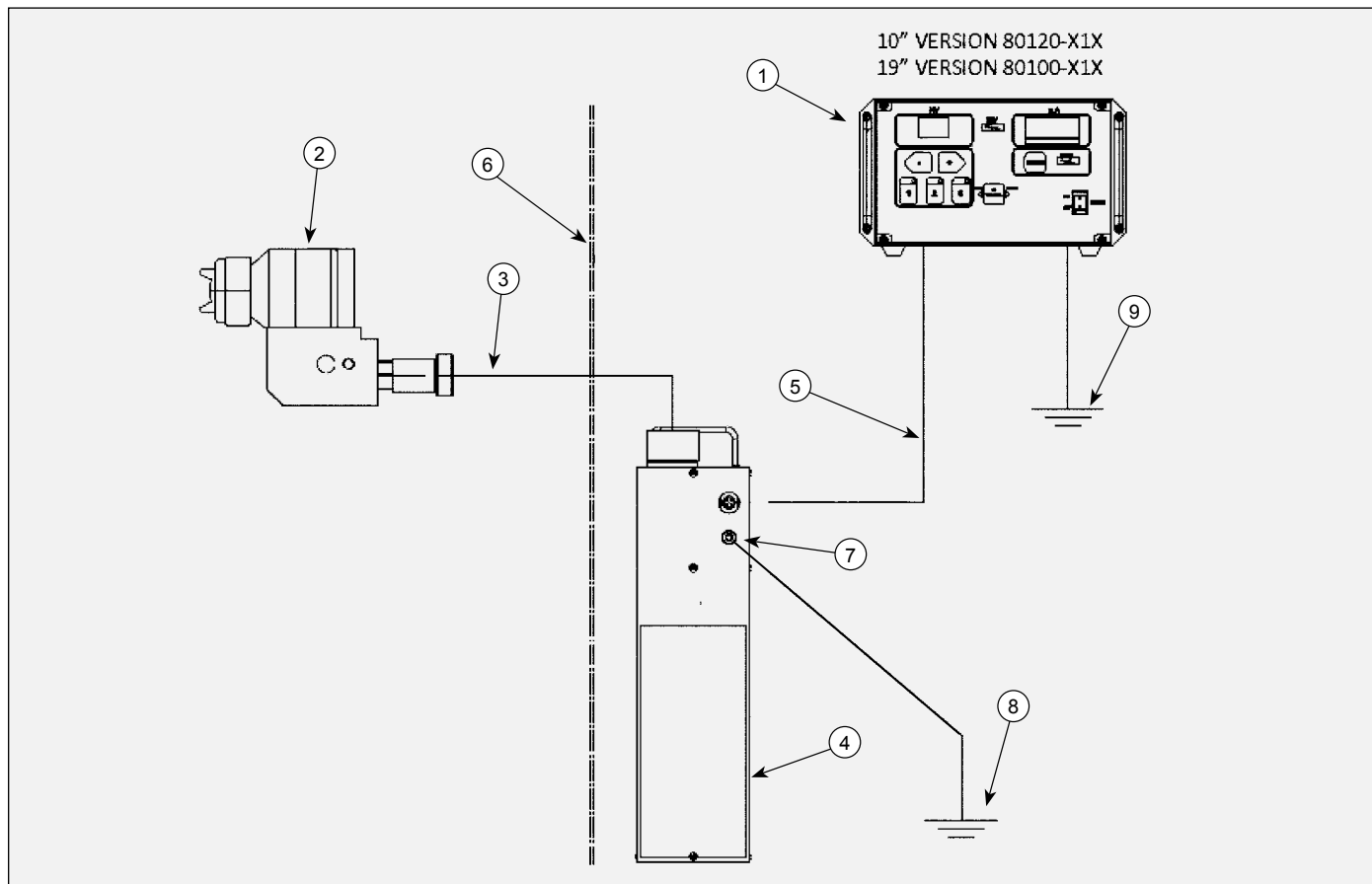
## INSTALLATION LOW VOLTAGE CONTROL UNIT

**⚠ CAUTION**

➤ CE/ATEX APPROVAL WITH THIS POWER SOURCE IS ONLY FOR THE ELECTROSTATIC AUTOMATIC APPLICATOR AEMD-600 INCL. MACHINE MOUNTED ADAPTER AEMD-4500-6

**⚠ CAUTION**

➤ Installation of Low Voltage Control Unit (See service manual CP-13 - 01).



9060 Low Voltage Control Unit

INSTALLATION LOW VOLTAGE CONTROL UNIT	
Pos.	Description
1	9060 Low Voltage Unit
2	AEMD-600 (ATEX approved)
3	A10560-XXD High Voltage Cable
4	80104-01 External Cascade
5	79338-XX Low Voltage Cable
6	Booth Wall
7	Cascade Ground Connection
8	Cascade Separate True Earth Ground
9	Control Unit Separate True Earth Ground

**80143-ABC - PARTS LIST**

Qty	Part No.	Description
1	Table A	9060 Low Voltage Control Unit
1	Table B	High Voltage Cable Assembly
1	Table C	Low Voltage Cable Assembly
1	80104-01	External Cascade 100kV

**TABLE A - 9060 LOW VOLTAGE CONTROL UNIT**

"A" Dash No.	Description	A
-1	110 / 120V USA 10" Rack	80120-311
-2	220 / 240V Europe 10" Rack	80120-312
-3	220 / 240V China 10" Rack	80120-313
-4	110 / 120V USA 19" Box	80100-311
-5	220 / 240V Europe 19" Box	80100-312
-6	220 / 240V China 19" Box	80100-313

**TABLE B - HIGH VOLTAGE CABLE**

"B" Dash No.	Description	B
-1	High Voltage Cable-15` (5m)	A10560-15D
-2	High Voltage Cable-25` (8m)	A10560-25D
-3	High Voltage Cable-50` (15m)	A10560-50D
-4	High Voltage Cable-75` (22,5m)	A10560-75D

**TABLE C - LOW VOLTAGE CABLE**

"C" Dash No.	Description	C
-1	Low Voltage Cable- 10m	79338-10
-2	Low Voltage Cable- 15m	79338-15

**For ordering use 80143-ABC as indicated by Tables:**

- A Designates the 9060 Cascade Control Unit
- B Designates the High Voltage Cable Length
- C Designates the Low Voltage Cables Length

## WARRANTY POLICY

This product is covered by Carlisle Fluid Technologies materials and workmanship limited warranty. The use of any parts or accessories, from a source other than Carlisle Fluid Technologies, will void all warranties. For specific warranty information please contact Carlisle Fluid Technologies.

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<b>Japan</b>	Tel: +81 45 785 6421 Fax: +81 45 785 6517	
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