

INSTRUCTIONS—PARTS LIST



307-712

Rev P
Supersedes N

This manual contains **IMPORTANT
WARNINGS AND INSTRUCTIONS**
READ AND RETAIN FOR REFERENCE

Model PRO 5000™

AUTOMATIC MID-RANGE ELECTROSTATIC AIR SPRAY GUN

7 bar (100 psi) MAXIMUM WORKING AIR PRESSURE

Part Number 218-745, Series B

With 1.2 mm (0.047 in.) spray nozzle and part no. 218-996 air cap assembly

U.S. Patent No. 4,290,091; 4,219,865; 4,462,061; 4,497,447; 4,660,774; 4,554,622

U.K. Patent No. 2,140,327B; 2,142,559B; 2,147,158; 2,191,423

Patented 1986, 1987 Canada

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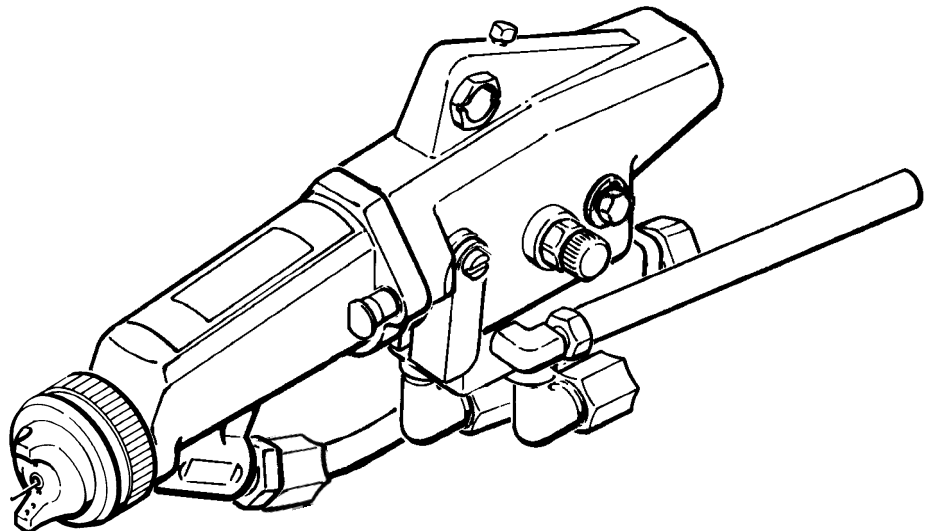
French Patent No. 84 07942; 84 10234

Italian Patent No. 1,111,380

Japanese Patent No. 86. 07416



Approved



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TABLE OF CONTENTS

Terms	3	Electrical Tests	
Safety Warnings	4, 5	Test Gun Resistance	16
How The Electrostatic Air Spray Gun Works	5	Test Power Supply Resistance	16
		Test Resistor Stud Resistance	17
Installation		Service	
Typical Installation	6	Gun Disassembly	18
Warning Signs	6	Electrode Replacement	18
Ventilate the Spray Booth	6	Resistor Stud Replacement	19
Mount the Gun	7	Barrel Removal	20
Connect the Air Line	7	Fluid Needle Packing Replacement	20
Connect the Fluid Line	7	Power Cartridge Replacement	22
Check the Electrical Grounding	8	Turbine Alternator Removal	23
Installing Optional Remote Fan Air Adapter	8	Fan Air Valve Replacement	23
		Piston Removal and Repair	24
Operation		Disc Regulator O-Ring Replacement	25
Operating Checklist	9	Muffler Replacement	25
Filter the Fluid	9	Parts Drawing	26
Spraying Operation	9	Parts List	27
Selecting a Fluid Nozzle and Air Cap	9	Kits	28
Adjust the Spray Pattern	10	Technical Data	29
		How To Order Replacement Parts	29
Maintenance		Accessories	30, 31
Daily Care and Cleaning	11	Warranty	Back Cover
Flush the Spray Gun	11		
To Clean or Change Air Cap and Fluid Nozzle	12		
Spray Pattern Troubleshooting Chart	13		
Gun Operation Troubleshooting Chart	14		
Electrical Troubleshooting Chart	15		

TERMS

WARNING: Alerts user to avoid or correct conditions that could cause bodily harm.

CAUTION: Alerts user to avoid or correct conditions that could cause damage to or destruction of equipment.

NOTE: Identifies essential procedures or helpful information.

PRESSURE RELIEF PROCEDURE: A safety procedure for relieving air and fluid pressure in the system.

FOR YOUR SAFETY: Alerts user to read the additional safety warnings on the page indicated.

SAFETY WARNINGS

SERIOUS BODILY INJURY, EXPLOSION, FIRE, OR ELECTRIC SHOCK CAN OCCUR IF THE PRECAUTIONS BELOW ARE NOT FOLLOWED.

READ AND UNDERSTAND ALL INSTRUCTION MANUALS, TAGS, AND WARNING LABELS BEFORE OPERATING EQUIPMENT.

ELECTROSTATIC EQUIPMENT SHALL ONLY BE USED BY TRAINED, QUALIFIED PERSONNEL WHO SHALL BE FULLY CONVERSANT WITH THE REQUIREMENTS STATED WITHIN THIS INSTRUCTION MANUAL.

EQUIPMENT MISUSE HAZARD

General Safety

Any misuse of the spray equipment or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in serious bodily injury, fire, explosion or property damage.

NEVER point the spray gun at anyone or at any part of the body. NEVER put hand or fingers over the fluid nozzle.

ALWAYS follow the **Pressure Relief Procedure**, at right, before cleaning or removing the fluid nozzle or servicing any system equipment.

NEVER try to stop or deflect leaks with your hand or body.

NEVER alter or modify any part of this equipment; doing so could cause it to malfunction.

CHECK all spray equipment regularly and repair or replace worn or damaged parts immediately.

System Pressure

This gun has a maximum working air and fluid pressure of 7 bar (100 psi). Never exceed the maximum working pressure of the gun or any other component or accessory used in the system.

Fluid Compatibility

BE SURE all fluids and solvents used are chemically compatible with the "Wetted Parts" shown in the **TECHNICAL DATA**. Always read the fluid and solvent manufacturer's literature before using the fluid or solvent in this gun.

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including splashing in the eyes or on the skin, injury from moving parts or electric shock, always follow this procedure when shutting off the system, when checking or servicing any part of the spray system, when installing, cleaning or changing fluid nozzles, and whenever you stop spraying.

1. Turn off all the air to the gun except the cylinder (actuating) air.
2. Turn off the fluid supply to the gun.
3. Actuate the gun into a *grounded* metal waste container to relieve fluid pressure.
4. Open the pump drain valve, having a waste container ready to catch the drainage.
5. Leave the pump drain valve open until you are ready to spray again.

HAZARDOUS FLUID HAZARD

Improper handling of hazardous fluids or inhaling vapors can cause extremely serious bodily injury, even death, due to splashing in the eyes, ingestion, inhalation, or bodily contamination.

Be sure you know what fluid you are pumping and its specific hazards. Observe all precautions when handling known or potentially hazardous fluids, including, but not limited to, the following.

1. Store hazardous fluids in approved containers.

2. Dispose of any waste fluid according to all Local, State and Federal regulations pertaining to the disposal of hazardous wastes.
3. Read and follow the fluid and solvent manufacturer's literature regarding the use of protective clothing and equipment such as eye protection, respiratory protection, and gloves.
4. Provide for the safe piping and disposal of all exhaust air.
5. Provide proper ventilation in accordance with accepted industry standards and governmental regulations. Refer to **Ventilate the Spray Booth**, on page 6.

HOSE SAFETY

TIGHTEN all fluid connections securely before each use.

NEVER use a damaged hose. Before each use, check the entire hose for cuts, leaks, abrasion, bulging cover, or damage or movement of the hose couplings. If any of these conditions exist, replace the hose immediately.

HANDLE AND ROUTE HOSES CAREFULLY. Do not pull on hoses to move equipment. Do not use fluids or solvents which are not compatible with the inner tube and cover of the hose.

FIRE OR EXPLOSION HAZARD

To reduce the risk of fire, explosion, or electric shock, which may result from electrical discharge, it is essential that:

- All parts of the electrostatic system are properly grounded.
- All personnel in or close to the spray area are properly grounded.
- All electrically conductive objects or devices in the spray area, including paint containers, wash cans and tools, are properly grounded.

When operating the electrostatic device, any ungrounded objects in the spray area (such as people, containers, tools, etc.) can become electrically charged. Arcing may occur if these objects then come in contact or close to ground. Arcing of sufficient energy levels can ignite the fluid being sprayed, fumes from solvents, dust particles, and other flammable substances. This can cause a fire or explosion and result in serious bodily injury and property damage.

Static electricity can also be generated by the flow of fluid through the pump, hose, gun, and nozzle, but it is dissipated through proper grounding as described in **Grounding** below.

If you experience any arcing or feel even a slight shock, **STOP SPRAYING IMMEDIATELY**. Check for proper grounding of the entire system. Be sure you have corrected the problem before starting to spray again.

Grounding

The following are *minimum* requirements for grounding a basic electrostatic system. Your system may include other equipment or objects which must also be grounded. Always check your local electrical code for detailed grounding instructions. Be sure your system is connected to a true earth ground.

1. *Pump*: ground by using a ground wire and clamp as described in your separate pump instruction manual.
2. *Air compressors and hydraulic power supplies*: ground according to the manufacturer's recommendations.
3. *Electrostatic Spray Gun*: obtain grounding through connection to a properly grounded air supply hose. Use only the Graco Electrically Conductive Air Supply Hose; see **ACCESSORIES** section to order. Connect the air hose ground wire to a true earth ground.
4. *Object being sprayed*: keep the work piece hangers clean and grounded at all times. Contact points must be sharp points or knife edges.
5. *All electrically conductive objects or devices* in the spray area, including paint containers and wash cans, must be properly grounded.

6. *All persons entering the spray area*: shoes must have conductive soles, such as leather, or personal grounding straps must be worn. Rubber or plastic soles are not conductive.
7. *The floor of the spray area* must be electrically conductive and grounded. Do not cover the floor with cardboard or any non-conductive material which would interrupt grounding continuity.
8. *Flammable liquids* in the spray area must be kept in approved, grounded containers. Do not store more than the quantity needed for one shift.
9. *All solvent pails*: use only grounded metal pails, which are conductive. Do not place the pail on any non-conductive surface, such as cardboard or paper, which would interrupt grounding continuity.
10. *All air and fluid lines and electric cables* must be properly grounded.

Flushing and Cleaning Safety

To reduce the risk of static sparking or splashing, always follow the **Pressure Relief Procedure** on page 4.

Be sure the turbine air (electrostatics) is OFF before flushing or cleaning any part of the spray system.

Use the lowest possible pressure to flush. Trigger the gun into a grounded metal waste container.

To flush or purge equipment, ALWAYS use solvents with a flash point equal to or greater than that of the fluid being sprayed.

To clean the exterior of the equipment, ALWAYS use solvents with a flash point of higher than 38° C (100° F).

ALWAYS remove all solvent from the system before reactivating the spray gun.

Use only non-sparking tools to clean residue from the booth and hangers.

Ventilate the Spray Booth

To prevent hazardous concentrations of toxic and/or flammable vapors, spray only in a properly ventilated spray booth.

NEVER operate the spray gun unless the ventilating fans are operating.

Check and follow all National, State and Local codes regarding air exhaust velocity requirements. Check and follow all local safety and fire codes and OSHA standard 1910-107(b)(5)(i).

IMPORTANT

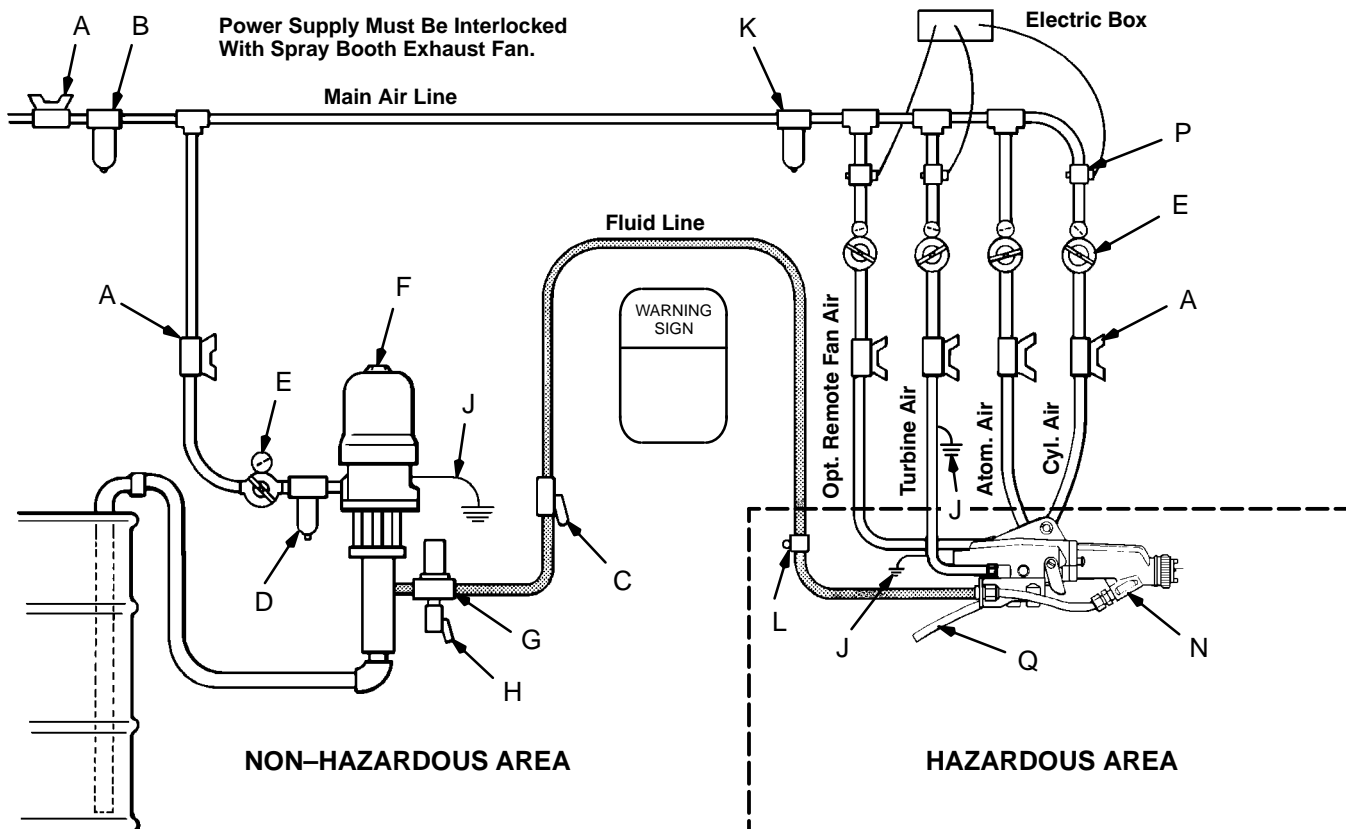
United States Government safety standards have been adopted under the Occupational Safety and Health Act. These standards—particularly the General Standards, Part 1910.107 and any other appropriate regulations—should be consulted in connection with the installation, operation, and maintenance of electrostatic spray painting equipment.

HOW THE ELECTROSTATIC AIR SPRAY GUN WORKS

The air hose supplies air to the spray gun. Part of the air operates the turbine and the rest of the air atomizes the fluid being sprayed. The turbine generates power, which is converted by the power cartridge, to supply high voltage current to the gun's ionizing electrode.

The pump supplies fluid to the hose and gun, where the fluid is electrostatically charged as it passes the electrode. The charged fluid is attracted to the grounded workpiece, wrapping around and evenly coating all surfaces.

TYPICAL INSTALLATION



KEY			
A	Air Supply Shut-off Valve (bleed-type)	F	Pump
B	Air & Water Separator	G	Fluid Filter
C	Ball Valve	H	Drain Valve
D	Air Line Lubricator	J	Pump Ground Wire
E	Air Regulator	K	Air Filter (40 micron)
		L	Fluid Regulator
		N	ES Automatic Gun
		P	Normally Closed, 3-Way Air Solenoid Valve or 3-Way Manual Valve
		Q	Exhaust Hose

The Typical Installation shown above is only a guide for selecting and installing electrostatic air spray systems. It is not an actual system design. The particular type and size system for your operation must be custom designed for your needs. For assistance in designing a system, contact your Graco representative.

WARNING

Installing and servicing this equipment requires access to parts which may cause electric shock or other serious bodily injury if work is not performed properly. **Do not install or service this equipment unless you are trained and qualified.**

Be sure your installation complies with National, State and Local codes for the installation of electrical apparatus in a Class 1, Group D, Divisions 1 and 2 Hazardous Location.

Warning Signs

A warning sign in English and one in Spanish is supplied with the gun. Mount warning signs in the spray area where they can easily be seen and read by all operators. This sign is also available in French and German. See the **ACCESSORIES** section to order.

Ventilate the Spray Booth

WARNING

To prevent hazardous concentrations of toxic and/or flammable vapors, spray only in a properly ventilated spray booth. **Never operate the spray gun unless ventilation fans are operating.** The air supply to the gun must be electrically interlocked with the ventilators to prevent operation of the power supply unless ventilating fans are running.

Check and follow all of the National, State and Local codes regarding air exhaust velocity requirements.

Check and follow all local safety and fire codes and OSHA standard 1910-107(b)(5)(i).

NOTE: High velocity air exhaust will decrease the operating efficiency of the electrostatic system. The minimum allowable air exhaust velocity is 19 linear meters/minute (60 ft/min).

INSTALLATION

Mount the Gun

Mount the gun on a stationary support or on a reciprocating arm. The mounting rod must be *properly grounded*.

Mount the gun so the front of the gun is 254 to 300 mm (10 to 12 in.) from the work piece.

Connect the Air Line (Refer to the Typical Installation Drawing)

WARNING

To reduce the risk of electric shock or other serious bodily injury, the air supply hose must be electrically connected to a true earth ground. **Use Only Graco Electrically Conductive Air Supply Hose.** This hose, and the gun, have special threads which prevent using any other type of hose with the gun. See the **ACCESSORIES** section to order the hose.

1. Install an air line filter (K) and an air and water separator (B) on the main air line to ensure a dry, clean air supply to the gun. Dirt and moisture can ruin the appearance of your finished workpiece and can cause the gun to malfunction.
2. Install an air line lubricator (D) close to the pump air inlet.
3. Install a normally closed, 3-way air solenoid (P) or manual valve on the turbine, cylinder and remote fan air supply lines. (*The remote fan line is optional.*)
4. Install a bleed-type air regulator (E) on the pump, turbine, atomizing, cylinder, and remote fan (*optional*) air supply lines to control air pressure to the pump and gun.
5. Install a bleed-type air shutoff valve (A) on the main air line, the pump line, and each gun air supply line to shut off air to the pump and gun.

WARNING

The *bleed-type air shutoff valve (A)* is required in your system to relieve air trapped between this valve and the pump after the air regulator is closed. Trapped air can cause the pump to cycle unexpectedly, which could result in serious bodily injury, including splashing in the eyes or on the skin and injury from moving parts.

6. Connect the cylinder air line to the gun's cylinder air inlet (marked **CYL**).
7. Connect the atomizing air line to the gun's atomizing air inlet (marked **ATOM**).
8. Connect the turbine air supply line to the gun's air inlet (marked **ES**). *The gun air inlet fitting has a left hand thread.* Connect the air supply hose ground wire to a true earth ground.
9. A remote fan air adapter is available to control the fan air at the control booth. See **Installing the Optional Remote Fan Air Adapter**, on page 8.

Connect the Fluid Line (Refer to the Typical Installation Drawing)

1. Before connecting the fluid line, blow it out with air and flush it with solvent. Use solvent which is compatible with the fluid to be sprayed.
2. Install a fluid regulator (L) on the fluid line to control fluid pressure to the gun.
3. Install a fluid filter (G) and drain valve (H) at the pump outlet.

WARNING

The *fluid drain valve (H)* is required in your system to assist in relieving fluid pressure in the displacement pump, hose and gun; triggering the gun to relieve pressure may not be sufficient. Install a drain valve close to pump's fluid outlet. The drain valve reduces the risk of property damage or serious bodily injury, including splashing in the eyes or on skin and contamination from hazardous fluids.

4. Connect the fluid line to the gun fluid inlet.

CAUTION

Do not use metal fittings at the gun barrel. For circulation systems, use plastic fittings.

Check the Electrical Grounding

WARNING

Proper electrical grounding of every part of your system is essential. For your safety, read the warning section, **FIRE OR EXPLOSION HAZARD**, on page 5. Ground the system as explained there. Then check your system as explained below.

1. Shut off all air lines to the gun.
2. Shut off the fluid supply to the gun.
3. Have a qualified electrician check the electrical grounding continuity of the spray gun and air hose.
 - a. With the electrically conductive air hose (BB) connected and properly grounded, use a megohmmeter (AA) (shown in **ACCESSORIES** section) to measure the resistance between the gun body (Y) and a true earth ground (Z). Use an applied voltage of 500 volts *minimum* to 1000 volts *maximum*. See Fig 1.
 - b. If the resistance is greater than 2 megohms, check the tightness of the ground connections, and be sure the air supply hose ground wire is connected to a true earth ground. If the resistance is still greater than 2 megohms, replace the air supply hose.

Installing Optional Remote Fan Air Adapter

NOTE: See **ACCESSORIES** to order the Remote Fan Air Adapter 181-053 and 90° Elbow 108-234.

1. Place a wrench on the flats of the valve housing (55) and remove the fan air valve assembly from the gun body (1). See Fig 20, page 23.

KEY

- Y Turbine Air Inlet
- Z True Earth Ground
- AA Ohmmeter
- BB Grounded Air Hose

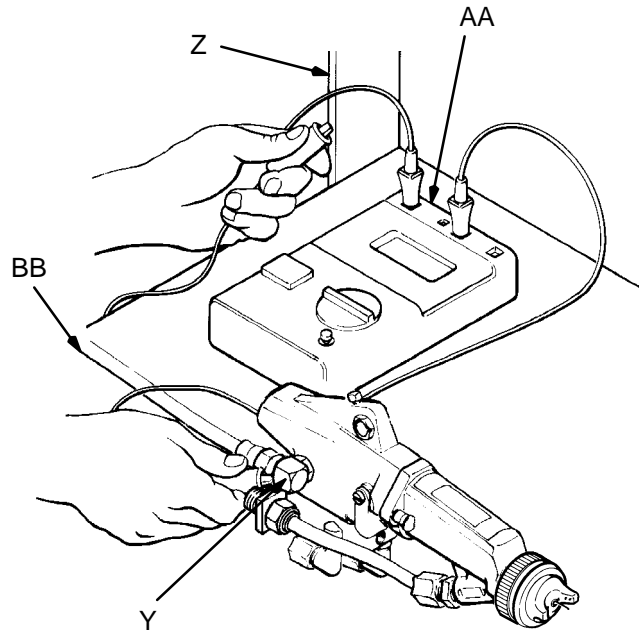


Fig 1

2. Apply PTFE tape to the threads of the remote fan air adapter (part no. 181-053) and install it in the gun body (1). Torque the adapter to 1.1–1.4 N•m (10–12 in-lb).
3. Install the 90° elbow (part no. 108-234) in the adapter.
4. Install the remote fan air line, solenoid valve, air regulator and shut-off valve as instructed in **Connect the Air Lines**, on page 7.

OPERATION

WARNING

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including splashing in the eyes or on the skin, injury from moving parts or electric shock, always follow this procedure when shutting off the system, when checking or servicing any part of the spray system, when installing, cleaning or changing fluid nozzles, and whenever you stop spraying.

1. Turn off all the air to the gun except the cylinder (actuating) air.

2. Turn off the fluid supply to the gun.
3. Trigger the gun into a *grounded* metal waste container to relieve fluid pressure.
4. Engage the gun safety latch.
5. Open the pump drain valve, having a waste container ready to catch the drainage.
6. Leave the pump drain valve open until you are ready to spray again.

Operating Checklist

Check the following list daily, before starting to operate the system, to help ensure you of safe, efficient operation.

- 1. Be sure all operators are properly trained to safely operate an automatic air spray system.
- 2. Be sure all operators are trained how to properly and completely relieve system pressure.
- 3. Be sure the system is thoroughly grounded. See **FIRE OR EXPLOSION HAZARD**, page 5, and **Check the Electrical Grounding**, page 8.
- 4. Be sure the operator and all persons entering the spray area are properly grounded by wearing shoes with conductive soles or personal grounding straps.
- 5. Be sure ventilation fans are operating properly.
- 6. Be sure the work piece hangers are clean and grounded. Contact points must be sharp points or knife edges.
- 7. Be sure all refuse is removed from the spray booth.
- 8. Be sure all flammable liquids in the spray booth are in approved, grounded containers.
- 9. Be sure all conductive objects within 6 m (20 ft) of the gun are electrically grounded and the floor of the spray area is electrically conductive and grounded.

Filter the Fluid

Filter the fluid to remove coarse particles and sediment which could clog the spray nozzle.

Spraying Operation

This gun has a built-in lead and lag operation. The gun begins emitting air before the fluid is discharged. When you release the trigger, the fluid stops before the air flow stops. This helps prevent fluid build-up on the air cap.

Adjust the system's control device, if it is automatic, so the gun starts spraying just before meeting the work piece, and stops as soon as the work piece has passed.

When spraying, the ES indicator lights (BB) should glow, indicating the electrostatic charge. See Fig 4.

Selecting a Fluid Nozzle and Air Cap

WARNING

To reduce the risk of serious bodily injury, including splashing in the eyes or on the skin or electric shock, always follow the **Pressure Relief Procedure**, above, before installing, or removing the fluid nozzle/air cap assembly.

This gun is supplied with fluid nozzle 181–299 and air cap 180–739. See Instruction Manual 307–803 for air cap consumption and fluid nozzle flow rate information.

The fluid output and pattern shape depends on the fluid nozzle size, fluid viscosity, and fluid pressure. If your application requires a different nozzle and air cap combination, use manual 307–803 to select the appropriate fluid nozzle and air cap.

To install a different fluid nozzle and air cap, see **To Clean or Change Air Cap and Fluid Nozzle**, page 12.

Adjust the Spray Pattern

Follow the steps below to establish the correct fluid flow and air flow. **DO NOT** turn the turbine air on yet.

1. Adjust the fluid flow for the appropriate flow rate by using the fluid pressure regulator installed in the fluid line. Check the fluid nozzle chart in manual 307–803 for the appropriate flow rate for the air cap. Start with the lowest rate shown and increase it until you get the desired flow rate.
2. For fine adjustment of how much fluid is sprayed, tighten or loosen the trigger adjusting nut (24). See Fig 4. Turn the nut *out to reduce* the amount of fluid sprayed or turn it *in to increase* the amount.
3. Close the fan adjusting knob (56) by turning it fully *clockwise*.
4. Use an air pressure regulator to adjust the degree of atomization. Always use the lowest air pressure possible for the most efficiency.
5. Use the *fan adjusting knob* to change the shape of the spray pattern. Turn the knob *counterclockwise* for a wide pattern and *clockwise* for a solid, round pattern. When increasing to a wide, flat pattern, it may be necessary to increase the supply of fluid to the gun to maintain the same amount of coverage over a large area.
6. First, complete all the checks under the **Operating Checklist** on page 9. Then turn the turbine air on. When spraying, the *ES indicator light* (51) should glow, indicating the electrostatic charge.

NOTE: Provide a 3.1 bar (45 psi) clean, dry, regulated air supply to the gun to ensure full voltage from the power supply. The gun may be operated at lower turbine air pressure, but may lose some electrostatic effect. Do not operate the turbine at an air pressure greater than 3.1 bar (45 psi) as there is no benefit and turbine life will be reduced.

NOTE: A remote fan air adapter is available to control the fan air at the control booth. See **ACCESSORIES**.

See the **Spray Pattern Troubleshooting Chart** on page 13 to correct spray pattern problems.

KEY

- 24 Trigger Adjusting Nut
- 51 ES Indicator Light
- 56 Fan Adjusting Knob

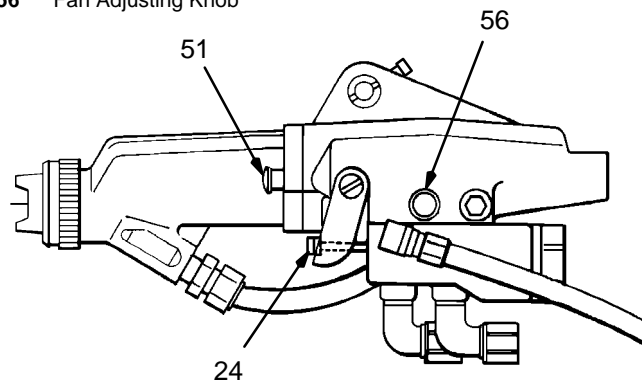


Fig 4

Daily Care and Cleaning

CAUTION

Clean all parts with a non-conductive solvent, compatible with the fluid being sprayed. Conductive solvents can cause the gun to malfunction.

Do not use any cleaning method which may allow solvent into the gun air passages. Solvent left in the gun passages could result in a poor quality paint finish and may draw current and reduce the electrostatic effect. Point the gun down while cleaning to prevent dirty solvent from running back into the air passages. **NEVER IMMERSER THE GUN IN SOLVENT.**

WARNING

For your safety, always follow the **Pressure Relief Procedure Warning** on page 9 when shutting off the system, when you stop spraying, and before checking, servicing, installing, cleaning or changing any part in the system.

1. Clean the fluid and air line filters daily.
2. Check all of the work hangers for build-up of material; clean them, if necessary.
3. All loose or ungrounded objects must be removed from the spray booth.
4. Clean the outside of the gun daily with a soft cloth dampened in a compatible solvent.

5. Flush the spray gun before changing fluids or colors and whenever you are done operating the gun. See **Flush the Spray Gun**.
6. Check the electrode wire. Straighten if bent, and replace if broken or damaged. See **Electrode Replacement**.
7. Clean the air cap and spray nozzle daily, minimum; some applications require more frequent cleaning. Replace the spray nozzle and air cap if they are damaged. See **To Clean or Change Air Cap and Fluid Nozzle**.

Flush the Spray Gun

WARNING

To reduce the risk of fire or explosion and serious bodily injury, the turbine air (electrostatics) must be off before flushing.

1. Follow the **Pressure Relief Procedure Warning** on page 9.
2. Disconnect and plug the fluid line.
3. Connect the solvent supply to the gun.
4. Flush the gun with solvent until it is clean.
5. Follow the **Pressure Relief Procedure Warning**, then disconnect the solvent supply.
6. Reconnect the fluid supply line.
8. Actuate the gun until it is clear of solvent.

To Clean or Change Air Cap and Fluid Nozzle

CAUTION

Do not use metal tools to clean the air cap holes as this may scratch them, and make sure the electrode wire is not damaged. Scratches in the air cap holes or a damaged electrode wire can distort the spray pattern.

Equipment needed:

- Soft bristle brush (supplied).
- Fluid nozzle wrench (supplied).
- Solvent compatible with fluid being sprayed.

Procedure:

1. Follow the **Pressure Relief Procedure Warning** on page 9.
2. Remove the air cap assembly (BB). See Fig 6.
3. Turn the locking pin (81) to the unlocked position.
4. Squeeze the gun trigger and remove the fluid nozzle (15) with the fluid nozzle wrench (66g) supplied. Make sure the front of the gun is pointed down. See Fig 6.
5. Use the soft bristle brush (66a) supplied and solvent to clean the air cap, fluid nozzle, and front part of the gun.
6. Squeeze the gun trigger and screw the fluid nozzle back into the gun. Tighten the nozzle securely with the wrench (66g) supplied. Torque the fluid nozzle to 1.1–1.4 N•m (10–12 in–lb). See Fig 6. Turn the locking pin to the locked position.
7. Carefully reinstall the air cap assembly. Avoid bending the electrode (CC).
8. Tighten the retaining nut so it is snug. If the nut is tight enough, you will feel resistance when turning the air cap. If too tight, the spray pattern will be distorted.

KEY

- 15 Fluid Nozzle
- BB Air Cap Assembly
- 81 Locking Pin

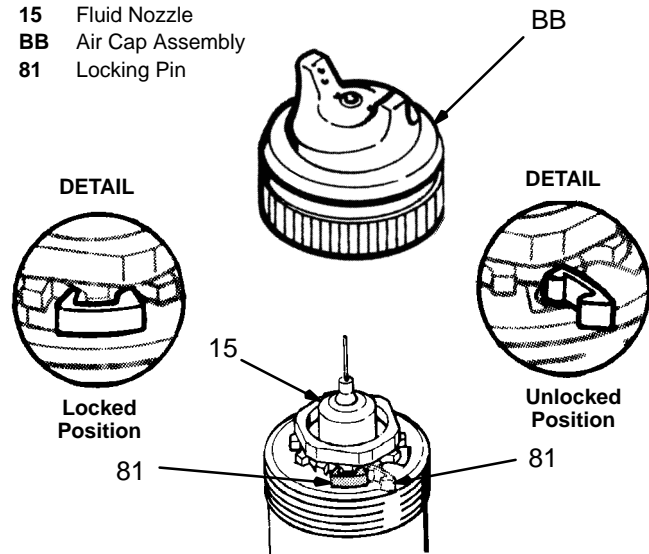


Fig 5

KEY

- CC Electrode
- 15 Fluid Nozzle
- 16 Air Cap Assembly
- 66g Wrench

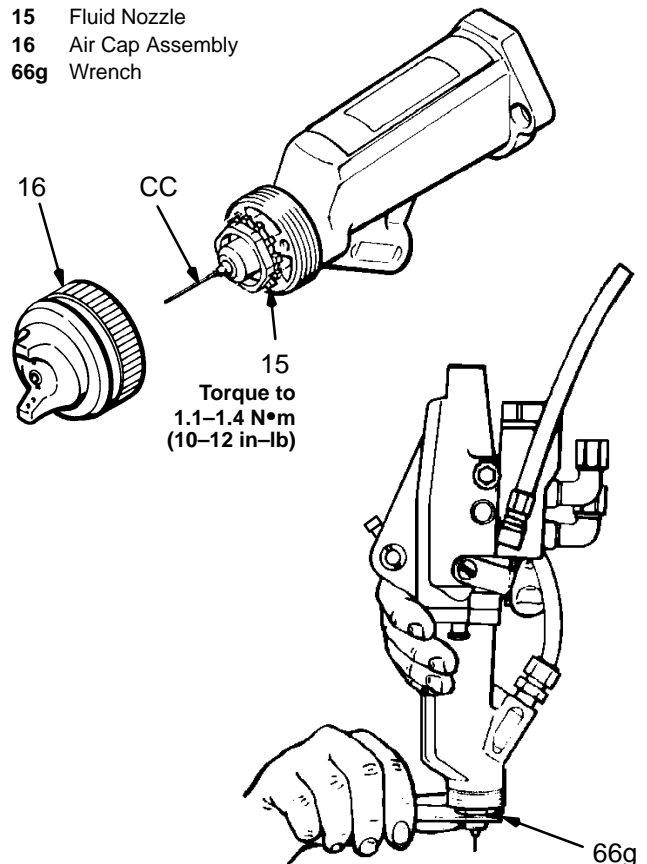


Fig 6

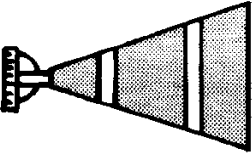
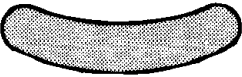


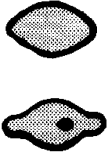
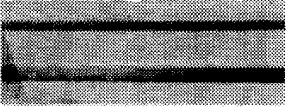
SPRAY PATTERN TROUBLESHOOTING CHART

WARNING

Installing and servicing this equipment requires access to parts which may cause electric shock or other serious bodily injury if the work is not performed properly. Do not install or service this equipment unless you are trained and qualified.

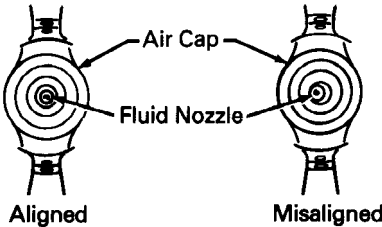
To reduce the risk of serious bodily injury, including splashing fluid or solvent in the eyes or on the skin, always follow the **Pressure Relief Procedure Warning** on page 9 before checking, adjusting, cleaning or repairing the gun or any part of the system. Disconnect the fluid hose from the gun.

NOTE: Check all possible remedies in the Troubleshooting Charts before disassembling the gun.

PROBLEM: IMPROPER SPRAY PATTERN	CAUSE	SOLUTION
Fluttering or spitting spray 	Insufficient fluid supply. Loose fluid nozzle or damaged fluid nozzle taper seat. Dirt between fluid nozzle, taper seat and body. Loose or cracked coupler at fluid inlet. Loose fluid tube in cup or tank.	Adjust fluid regulator or fill fluid tank. Tighten or replace fluid nozzle See page 12. Clean. See page 12. Tighten or repair. Tighten.
	Fluid build-up on air cap; partially clogged horn holes. Full air pressure from clean horn hole forces fan pattern toward clogged end. Damaged fluid nozzle or air cap holes.	Clean with soft implement or submerge in suitable solvent and wipe clean. See page 12. Replace damaged part. See page 12.
	Fluid build-up on the perimeter of fluid nozzle orifice, or partially clogged fluid nozzle orifice.	Remove obstruction. Never use wire or hard instruments. See page 12.
	Too high atomization air pressure. Fluid too thin. Not enough fluid pressure.	Reduce air pressure or adjust air adjusting valve. Regulate fluid viscosity. Increase fluid pressure.
	Low atomization air pressure. Fluid too thick. Too much fluid.	Increase air pressure. Regulate fluid viscosity. Reduce fluid flow. Reduce fluid pressure on pressure feed guns and/or adjust fluid adjusting screw until proper pattern is obtained.
Streaks 	Last coat of fluid applied too wet. Too much air pressure. Insufficient air pressure. Non-uniform spray pattern.	Apply drier finish with multiple strokes. Use least air pressure necessary. Increase air pressure. Clean or replace air cap. See page 12.

NOTE: Some improper patterns are caused by the improper balance between air and fluid.

GUN OPERATION TROUBLESHOOTING CHART

PROBLEM	CAUSE	SOLUTION
Leakage from fluid packing nut.	Worn needle packing.	Replace packing assembly. See page 20.
Air leakage from front of gun.	Air valve not seating properly. Air stem packing too tight.	Clean, service. See page 24. Loosen packing. See page 24.
Fluid leakage from front of gun.	Electrode worn or damaged. Worn fluid seat. Fluid packing too tight. Loose fluid nozzle. Cylinder air to gun not completely shut off.	Replace electrode. See page 18. Replace fluid nozzle and/or electrode. See page 18. Adjust packing screw. See page 20. Tighten fluid nozzle. See page 12. Adjust screw.
"Orange Peel" finish.	Insufficient air pressure. Fluid poorly mixed or filtered. Improper thinner being used.	Increase, use least air pressure needed for good results. Remix or refilter fluid. Use proper thinner.
Excessive spray fog.	Too much air pressure. Fluid thinned too much.	Reduce, use least air pressure needed for good results. Properly thin fluid.
No fluid sprays from gun.	Fluid low. Damaged air cap. Dirty or clogged fluid nozzle. Damaged fluid nozzle. Air Valve not actuating. Damaged fluid needle	Check, add if necessary. Replace air cap. See page 12. Clean fluid nozzle. See page 12. Check, replace fluid nozzle. See page 12. Check cylinder air, fluid needle packing, and needle. Replace parts as necessary. See page 21. Replace. See page 20.
Equipment covered with fluid.	Exhaust air flow insufficient or not directed properly. Improper distance between gun and work piece.	Check for proper CFM, check baffles and direction of air flow. Adjust distance to 203–305 mm (8–12 in.).
Dirty air cap.	Misalignment between air cap and fluid nozzle. <div style="text-align: center;">  </div>	Remove and clean air cap and fluid nozzle as described on page 12, then reinstall them.

ELECTRICAL TROUBLESHOOTING CHART

PROBLEM	CAUSE	SOLUTION
Poor wrap-around.	<p>*Turbine alternator not operating.</p> <p>Improper distance between gun and workpiece.</p> <p>Parts poorly grounded.</p> <p>High booth exhaust velocity.</p> <p>Atomizing air pressure too high.</p> <p>Fluid pressure too high.</p> <p>Fluid viscosity.</p> <p>Fluid resistivity too low.</p> <p>Faulty gun resistance.</p> <p>Faulty resistor stud resistance.</p> <p>Faulty power supply resistance.</p> <p>Faulty electrode.</p> <p>*Faulty turbine alternator.</p>	<p>Check air supply to turbine. Check for dirt or moisture in turbine. See page 23.</p> <p>Adjust spraying distance to 203–305 mm (8–12 in.).</p> <p>Clean hangers, check for proper ground on conveyer or track.</p> <p>Reduce within code limits.</p> <p>Reduce air pressure.</p> <p>Reduce fluid pressure.</p> <p>Check supplier for proper fluid for electrostatic spray.</p> <p>Check fluid resistivity with paint meter and probe.</p> <p>Check gun resistance. See page 16.</p> <p>Check resistor stud resistance. See page 17.</p> <p>Check power supply resistance. See page 16.</p> <p>Replace electrode. See page 18.</p> <p>Be sure plug is in place on back of turbine alternator housing. Remove and test turbine alternator. See page 23.</p>
Operator gets mild shock.	<p>Operator not properly grounded or is in contact with ungrounded object.</p> <p>Gun not properly grounded.</p>	<p>Be sure floor is properly grounded. Wear shoes with conductive soles or wear personal grounding straps. Be sure operator is not in contact with or carrying any metallic items which could build up electrical charge.</p> <p>See Check the Electrical Grounding, page 8. Be sure Graco electrically conductive air supply hose is being used and is properly grounded.</p>
Operator gets mild shock when touching work piece.	Work piece not properly grounded.	Clean work piece hangers. Check for proper ground on conveyor or track.

**ES indicator light not on when gun is triggered.*

ELECTRICAL TESTS

The performance of the spray gun is directly affected by the condition of the electrical components contained inside the gun. The electrical tests below can be used to determine the condition of the power supply (5) and the resistor stud (17) as well as the continuity of the electrical path between the components.

Use megohmmeter 218–979 (see **ACCESSORIES**) and an applied voltage of 500 volts to complete these electrical tests. Connect the leads as shown.

WARNING

To reduce the risk of sparking, which could cause fire or explosion and result in serious bodily injury, **DO NOT** use the megohmmeter in the hazardous area. Remove the gun from the hazardous area before testing it.

Test Gun Resistance

NOTE: Check the resistance with the gun triggered and untriggered.

Measure the resistance between the end of the electrode (14) and the gun air inlet adapter (86). See Fig 7. The resistance should be between 115 to 152 megohms. If the resistance is outside the specified range, go to the next test. If the resistance is correct, refer to the **Electrical Troubleshooting Chart** on page 15 for other possible causes of poor performance.

Test Power Supply Resistance

Remove the power cartridge (2) from the gun body (1). See **Power Cartridge Replacement**.

Remove the turbine alternator (2a) from the power supply (5). See **Turbine Alternator Removal**.

Measure the resistance from the center prong (EE) in the power supply to the contact spring (5c) on the other end of the power supply. See Fig 8.

The resistance should be 95 to 122 megohms. If the resistance is outside the specified range, the power supply is defective and must be replaced. If the resistance of the power supply is correct, proceed to the next test.

If you still have problems, refer to the **Electrical Troubleshooting Chart** for other possible causes of poor performance, or contact the nearest authorized service agency.

KEY

- A Megohmmeter
- 1 Gun Body
- 14 Electrode
- 86 Air Inlet Adapter

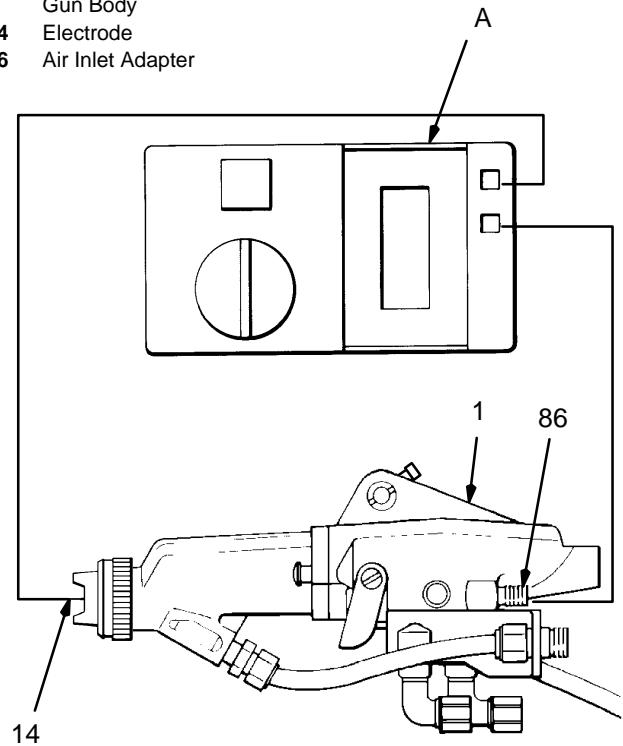


Fig 7

KEY

- A Megohmmeter
- EE Connector Prong
- 2a Turbine Alternator
- 5 Power Supply
- 5c Contact Spring

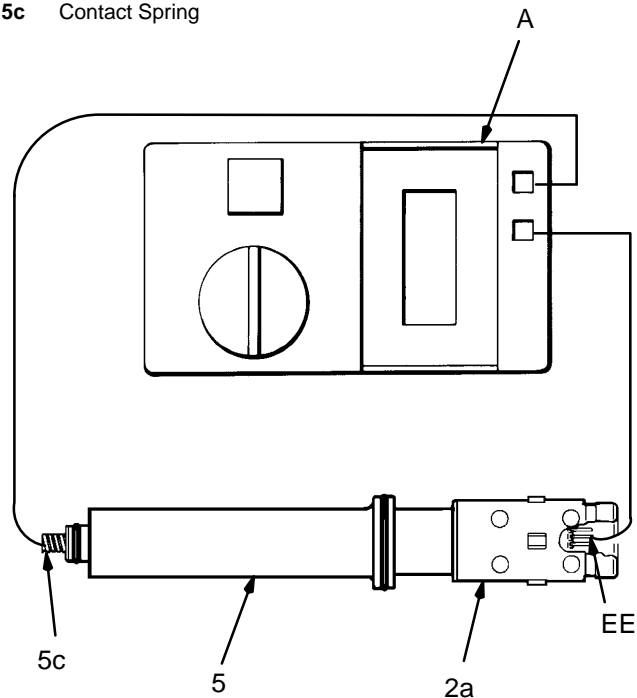


Fig 8

ELECTRICAL TESTS

Test Resistor Stud Resistance

Insert a conductive rod (FF) into the gun barrel (removed for the power supply test) and against the metal contact (GG) in the front of the barrel. See Fig 9.

Measure the resistance between the conductive rod (FF) and the gun electrode (14). The resistance should be 20 to 30 megohms. If the resistance is correct, refer to the **Electrical Troubleshooting Chart** for other possible causes of poor performance, or contact the nearest authorized service agency.

If the resistance is outside the specified range, remove the electrode (14). See **Electrode Replacement**. Measure the resistance between the conductive rod (FF) and the resistor in the inside diameter of resistor stud (17).

The resistance should be 20 to 30 megohms. If the resistance is correct, the electrode wire is defective and must be replaced. See **Electrode Replacement**. If the resistance is outside the specified range, the resistor is defective and the resistor stud (17) must be replaced. See **Resistor Stud Replacement**.

If you still have problems, refer to the **Electrical Troubleshooting Chart** for other possible causes of poor performance, or contact the nearest authorized service agency.

KEY

- A Megohmmeter
- FF Conductive Rod
- GG Metal Contact
- 14 Electrode
- 20 Gun Barrel

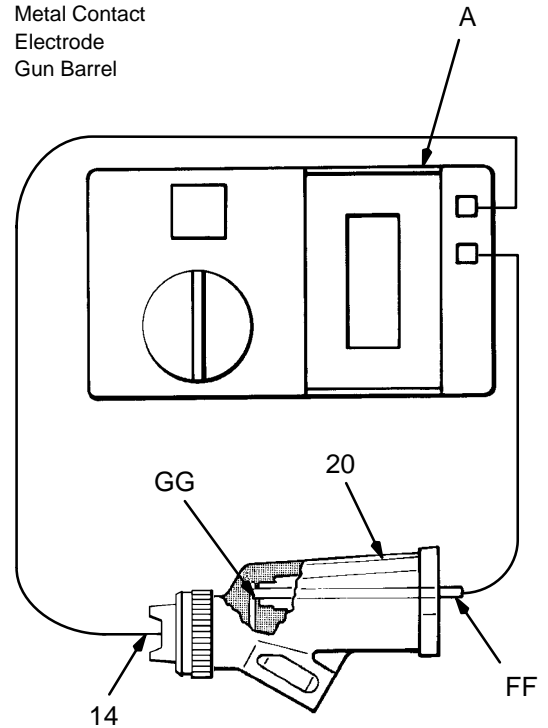


Fig 9

Gun Disassembly

WARNING

Installing and servicing this equipment requires access to parts which may cause electric shock or other serious bodily injury if the work is not performed properly. Do not install or service this equipment unless you are trained and qualified.

Follow the **Pressure Relief Procedure Warning**, page 9, before servicing the gun or any part of the system. Disconnect the fluid hose from the gun.

NOTE: Check all possible remedies in the **Troubleshooting Charts** before disassembling the gun.

CAUTION

If the plastic parts of the gun must be held securely, ALWAYS clamp them in padded vice jaws to prevent damage to the parts.

ALWAYS lubricate o-rings and seals with petroleum jelly.

ALWAYS remove gun from worksite for service or repair. Service or repair area must be clean.

Flush the gun as described under **Flush the Spray Gun**. Follow the **Pressure Relief Procedure Warning** on page 9. Disconnect the air and fluid line from the gun.

Gun Assembly Note

Whenever you are tightening plastic parts where there is no torque specified in the instructions, tighten the parts finger-tight and then retighten with a wrench 1/4 to 1/2 turn.

Electrode Replacement

1. Remove the air cap assembly and fluid nozzle as described in **To Clean or Change Air Cap and Fluid Nozzle**.

2. Unscrew and remove the electrode (14) with the wrench (66c) supplied. See Fig 10. If the needle shaft assembly (9) turns while trying to loosen the electrode, hold the needle shaft assembly nut with a small wrench.
3. Install the new electrode (14) with the wrench (66c). Do not over tighten.

CAUTION

To avoid damaging the plastic threads, be very careful when installing the electrode.

4. Reinstall fluid nozzle and air cap assembly as described in **To Clean or Change Air Cap and Fluid Nozzle**.

KEY

- 9 Fluid Needle Shaft Assembly
66c Wrench

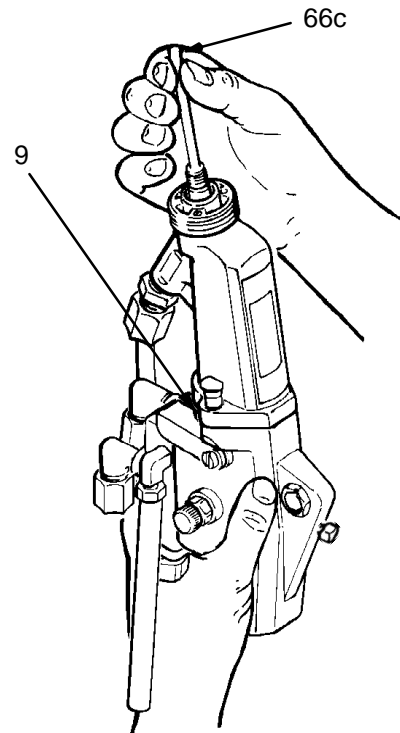


Fig 10

Resistor Stud Replacement

WARNING

Old/New Style Resistor Stud and Electrode

To reduce the risk of sparking, which could cause fire or explosion, BE SURE the electrode and stud you install are black. The old style electrode and stud in the Series A Guns were white. DO NOT mix old style parts with new style parts.

1. Remove the air cap assembly and fluid nozzle as described in **To Clean or Change Air Cap and Fluid Nozzle**.
2. Remove the electrode as described in **Electrode Replacement**.
3. Using the wrench (59h) supplied, unscrew and remove the resistor stud (17) with the o-ring (18) and washer (12). See Fig 11.

To install the resistor stud:

1. Lubricate the o-ring (18) with petroleum jelly and install it on the resistor stud (17).
2. Install the washer (12) in the gun barrel.

3. Using the wrench supplied, install the resistor stud in the front of the gun barrel. Tighten until snug.
4. Install the electrode as described in **Electrode Replacement**.
5. Install the fluid nozzle and air cap assembly as described in **To Clean or Change Air Cap and Fluid Nozzle**.

KEY

- 12 Washer
- 17 Resistor Stud
- 18 O-Ring

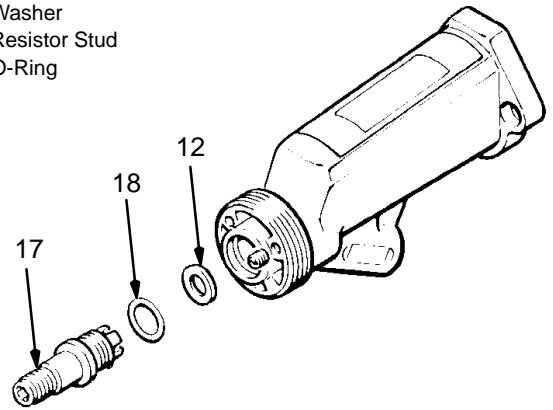


Fig 11

Barrel Removal

1. Unscrew the nut (34) at the gun's fluid inlet adapter (35). See the **PARTS DRAWING**.
2. Pull the fluid tube (31) out of the fluid adapter (35).
3. Remove the trigger by removing the screws and spacers from the gun.
4. Remove the ES indicator lights from the socket head cap screws (52).
5. Using the wrench (66f) supplied, loosen and remove the two socket head cap screws (52) from the gun. See Fig 12.
6. Hold the gun body with one hand and pull straight up to remove the gun barrel (20). See Fig 13.

KEY

- 31 Fluid Tube
- 52 Cap Screw
- 66f Wrench

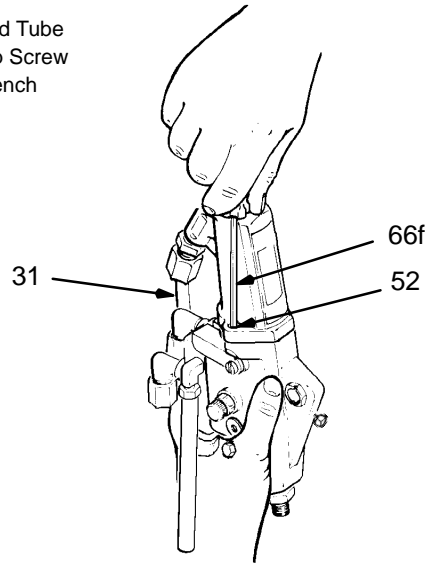


Fig 12

CAUTION

To avoid damaging the power cartridge, always pull the gun barrel straight away. If necessary, gently move the gun barrel from side to side to free it from the gun body.

NOTE: The gasket (6) should be left in the gun body if the gasket is not to be replaced.

To install the barrel (20), follow the procedure below:

1. Be sure the gasket (6) is in place. Replace if damaged. Place the barrel over the power cartridge (2) and onto the gun body. See Fig 13.
2. Install the two socket head cap screws (52) and tighten with the wrench (66f). See Fig 12.
3. Snap the ES indicator lights in place over the socket head cap screws (52).
4. Insert the fluid tube (31) into the gun's fluid inlet adapter (35) and tighten the nut (34).
5. Install the trigger with the screws and spacers. Test the gun resistance as instructed on page 16.

KEY

- 2 Power Cartridge
- 6 Gasket
- 20 Gun Barrel

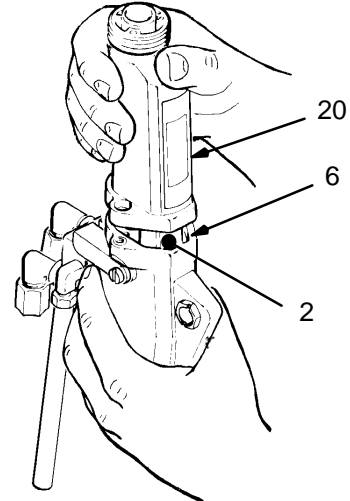


Fig 13

Fluid Needle Packing Replacement

1. Remove the air cap assembly and fluid nozzle as described in **To Clean or Change Air Cap and Fluid Nozzle**.
2. Remove the electrode as described under **Electrode Replacement**.
3. Remove the gun barrel as described under **Barrel Removal**.
4. Unscrew the packing nut (9e) using the wrench (66b) supplied. See Fig 14.

KEY

- 9e Packing Nut
- 66b Wrench

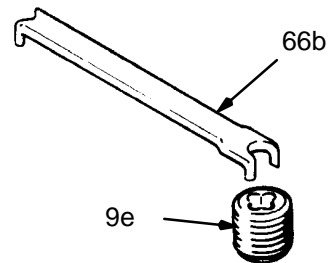


Fig 14

SERVICE

- Carefully remove the fluid needle assembly (9) from the rear part of the gun barrel (20). See Fig 15. If the packing assembly (9a) or insulator (9g) are still in the barrel, insert the packing removal rod (66d) into the front of the barrel to gently push them out. Refer to Fig 16.

NOTE: If the insulator (9g) is removed, be sure to install it so the insulator end with holes is facing the packing assembly (9a).

- Wipe the internal surfaces of the barrel clean with a soft brush or cloth.

CAUTION

Clean all parts in non-conductive solvent compatible with the fluid being used, such as xylol or mineral spirits. Use of conductive solvents can cause the gun to malfunction.

- Remove the packing assembly (9a) from the needle (9b).

NOTE: If the position of the adjusting nut (9c) is changed, install the adjusting nut to the approximate dimension shown in Fig 15. (Final adjustment will be made in step 15.) If the spring (9f) was removed, reinstall it over the nut (9d).

- Install the new packing assembly (9a).

CAUTION

Carefully screw needle (9b) into new packing assembly (9a) to avoid damaging the seals.

- Test the drag on the fluid needle. It should be approximately 2.5 to 3 lbs (use a small spring scale to measure). If the adjustment is out of tolerance, tighten or loosen the adjusting screw on the packing assembly (9a) slightly and retest. Continue to adjust until the tolerance is correct.

- Install the entire fluid needle assembly (9) into the gun barrel, from the back of the barrel.

- Firmly tighten the packing nut (9e) down until it bottoms.

CAUTION

When checking the fluid needle movement, DO NOT move the needle out of the gun barrel more than 6.35 mm (1/4 in.) to avoid pulling the needle out of the packing area and damaging the packings.

- Install the barrel as described under **Barrel Removal**.

- Install the electrode as described under **Electrode Replacement**.

- Install the air cap assembly and fluid nozzle as described in **To Clean or Change Air Cap and Fluid Nozzle**.

- Trigger the gun to check the needle adjustment. The air should come fully on before the fluid comes on. Adjust the needle adjusting nut (9c) until the proper lead and lag is achieved.

If the fluid comes on too soon, remove the trigger and back the needle adjusting nut (9c) out (away from the barrel) slightly.

If the fluid comes on too late, tighten the needle adjusting nut (9c) slightly (turn towards barrel).

After adjustment is complete, tighten the locking nut (9d) against the adjusting nut (9c).

KEY

- 9 Fluid Needle Assembly
- 9c Needle Adjusting Nut
- 20 Gun Barrel

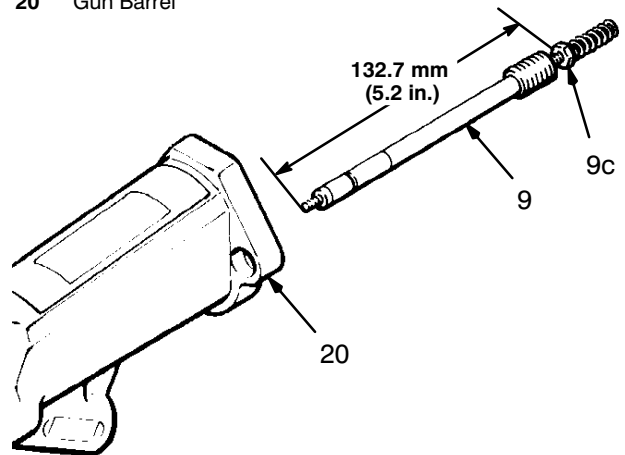


Fig 15

KEY

- 9 Fluid Needle Assembly
- 9a Needle Packing Assembly
- 9b Fluid Needle
- 9c Adjusting Nut
- 9d Locking Nut
- 9e Packing Nut
- 9f Spring
- 9g Insulator

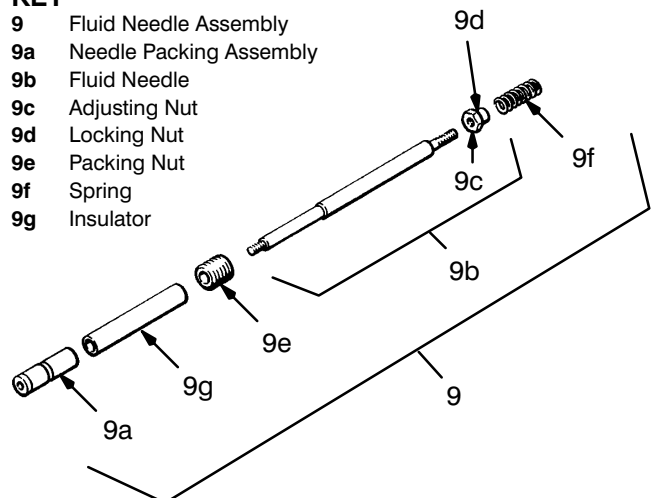


Fig 16

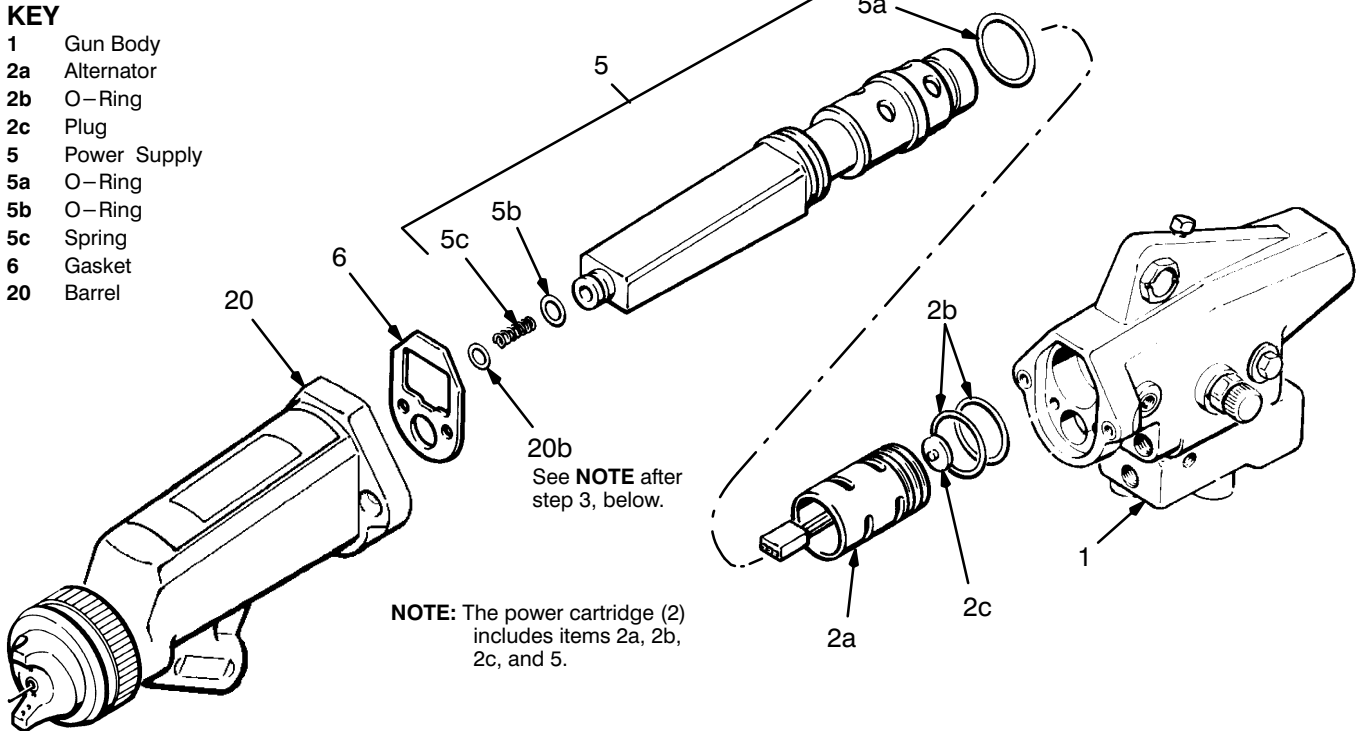


Fig 17

Power Cartridge Replacement

1. Remove the barrel as described under **Barrel Removal**.
2. Remove the gasket (6) from the gun body (1). See Fig 17.

CAUTION

The power cartridge is fragile. Be careful when handling it to avoid damage.

3. Grasp the power cartridge with your hand. With a gentle side to side motion, pull it free from the gun body (1). Then pull the power cartridge straight out of the body.

CAUTION

DO NOT use solvents to clean the power cartridge cavity in the gun body (1). Solvent will damage electrical components contained in the power cartridge.

Inspect the power cartridge cavity in the gun body for dirt or moisture. Clean out the cavity with a clean, dry rag if necessary.

Lightly lubricate the o-rings (2b, 5a, 5b) on the new power cartridge with petroleum jelly. All the o-rings and the compression spring (5c) must be in place or the gun will malfunction.

NOTE: The cushion (20b) is part of the gun barrel and should never need to be removed. If it is removed, push the cushion in, adhesive side toward the barrel, with a rod until it is securely adhered in the barrel. **DO NOT** use the power supply (5) to press the cushion into the barrel as it will not adhere properly.

4. Insert the new power cartridge in the gun body (1).

NOTE: See Fig 18 for proper alignment of the power cartridge (2) in the gun body (1).

5. Install the gasket (6) in the gun body (1).
6. Install the barrel on the gun body as described under **Barrel Removal**.

KEY

- 1 Gun Body
- 2 Power Cartridge

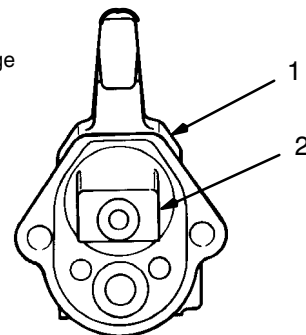


Fig 18

Turbine Alternator Removal

1. Remove power cartridge from the gun body as described under **Power Cartridge Replacement**.
2. Carefully twist the turbine alternator (2a) *counterclockwise* and pull it off the power supply (5) until just disengaged from the coupling. Then continue to slowly pull the turbine alternator away from the power supply, disconnecting the 3-wire connector (HH). See Fig 19.
3. Using an ohmmeter, test the coil in the turbine alternator (2a). Measure the resistance between the two outer terminals of the 3-wire connector (HH). The resistance should be 3 to 5 ohms. If the reading varies from this value, replace the alternator.
4. Measure the resistance between each outer terminal of the 3-wire connector (HH) and the turbine alternator housing. The resistance should be infinite. If the resistance is not infinite, replace the alternator.
5. Partially connect the 3-wire connector (HH) onto the prongs inside the power supply (5). See Fig 19. Using a small screwdriver, push the connector onto the prongs until seated.
6. Slide the turbine alternator (2a) onto the power supply, being sure to align the coupling between the power supply and the turbine alternator housing. Then twist the turbine alternator *clockwise* to lock the coupling.
7. Install the power cartridge in the gun body as described under **Power Cartridge Replacement**.

KEY

- HH 3-wire Connector
 2a Alternator
 5 Power Supply

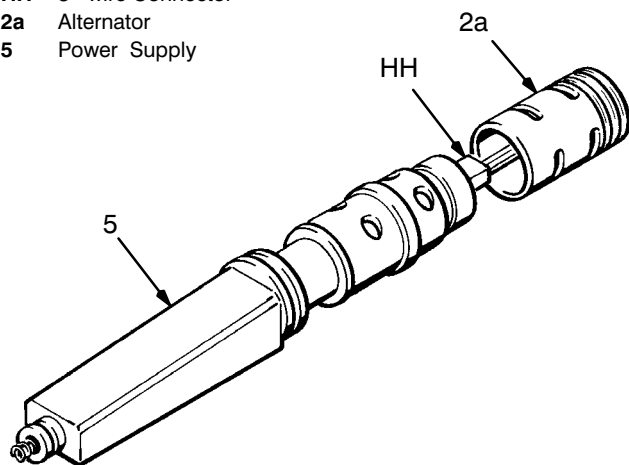


Fig 19

Fan Air Valve Replacement

1. Place a wrench on the flats of the valve housing (55) and remove it from the gun body (1). See Fig 20.
2. Remove the retaining ring (46).
3. Rotate the air adjusting screw (56) *counterclockwise* until it is disengaged from the valve housing threads. Pull the adjusting screw out of the valve housing (55).
4. Clean all the parts and inspect them for wear or damage. If replacing the seal (47), unscrew it *clockwise* and remove it from the adjusting screw.
5. Apply medium grade thread sealant to the small threads on the end of the adjusting screw (56) and install a new seal (left hand thread).
6. When reassembling the fan air valve, lubricate the o-ring (54) and the adjusting screw threads with petroleum jelly.
7. After the retaining ring (46) is installed on the adjusting screw (56), back the adjusting screw out of the valve housing (55) until it bottoms out against the retaining ring.
8. Apply Teflon® paste to the threads of the valve housing (55) and install it in the gun body (1). Torque the housing to 1.1 – 1.4 N•m (10 – 12 in-lb).

KEY

- 1 Gun Body
 46 Retaining Ring
 47 Valve Seal
 54 O-Ring
 55 Valve Housing
 56 Adjusting Screw

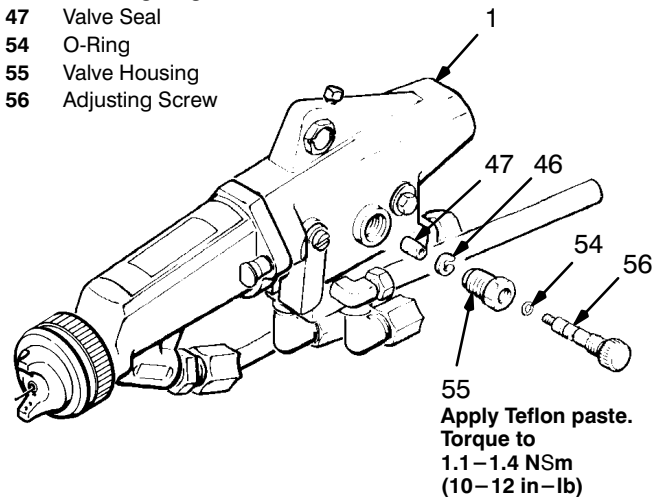


Fig 20

Piston Removal and Repair

1. To disconnect the fluid hose (31) from the cover plate (41), screw the nut (34) off the adapter (35). See Fig 21.
2. Note the position of the trigger adjusting nut (24) for reinstallation, then screw it off the piston shaft.
3. Remove the screws (61) and lock washers (82) from the cover plate (41). Remove the cover plate (41), spring (38), and retainer cap (74).
4. Unscrew and remove the air valve guide (26) and needle packing (27) from the gun body (1),
5. Push on the end of the piston shaft, and remove the piston assembly.

NOTE: *DO NOT* remove the u-cup packing (37) from the piston shaft except to replace it as removal will damage this packing.

6. Clean and inspect parts for wear or damage. Replace parts as needed.
7. When reassembling the piston assembly, lubricate the o-rings (30 & 79) and the u-cup packing (42) on the piston with petroleum jelly. Pack the spring (38) with petroleum jelly. Apply Teflon tape to the air valve guide (26).

8. Install the new packing (27) and guide (26) in the gun body (1); screw the guide in loosely.

NOTE: *DO NOT* fully tighten the guide (26) yet. The guide must be loose to avoid damaging the packing (27) when pushing the piston shaft through the guide.

9. *If replacing the u-cup packing (37)*, slide it onto the piston (42) so the lips of the packing will face towards the front of the gun when the piston is installed. Then install the buna-n o-ring (30) and Viton® o-ring (79) on the piston.
10. Install the piston assembly into the gun body (1), being careful not to damage the piston's lip seal.
11. Install the retainer cap (74) into the cover plate (41).
12. Install the cover plate (41), spring (38), and retainer cap (74) with the screws (61) and lock washers (82).
13. Actuate the trigger and tighten the air valve guide (26) with a wrench.
14. Screw the trigger adjusting nut (24) onto the piston shaft to its previously noted position.
15. Connect the fluid hose (31) to the adapter (35).

KEY

1	Gun Body	34	Nut	42	Piston
24	Trigger Adjusting Nut	35	Adapter	61	Screws
26	Air Valve Guide	37	U-Cup Packing	74	Retainer Cap
27	Needle Packing	38	Spring	79	Viton O-Ring
30	Buna-n O-Ring	41	Cover Plate	82	Lock Washers
31	Fluid Tube				

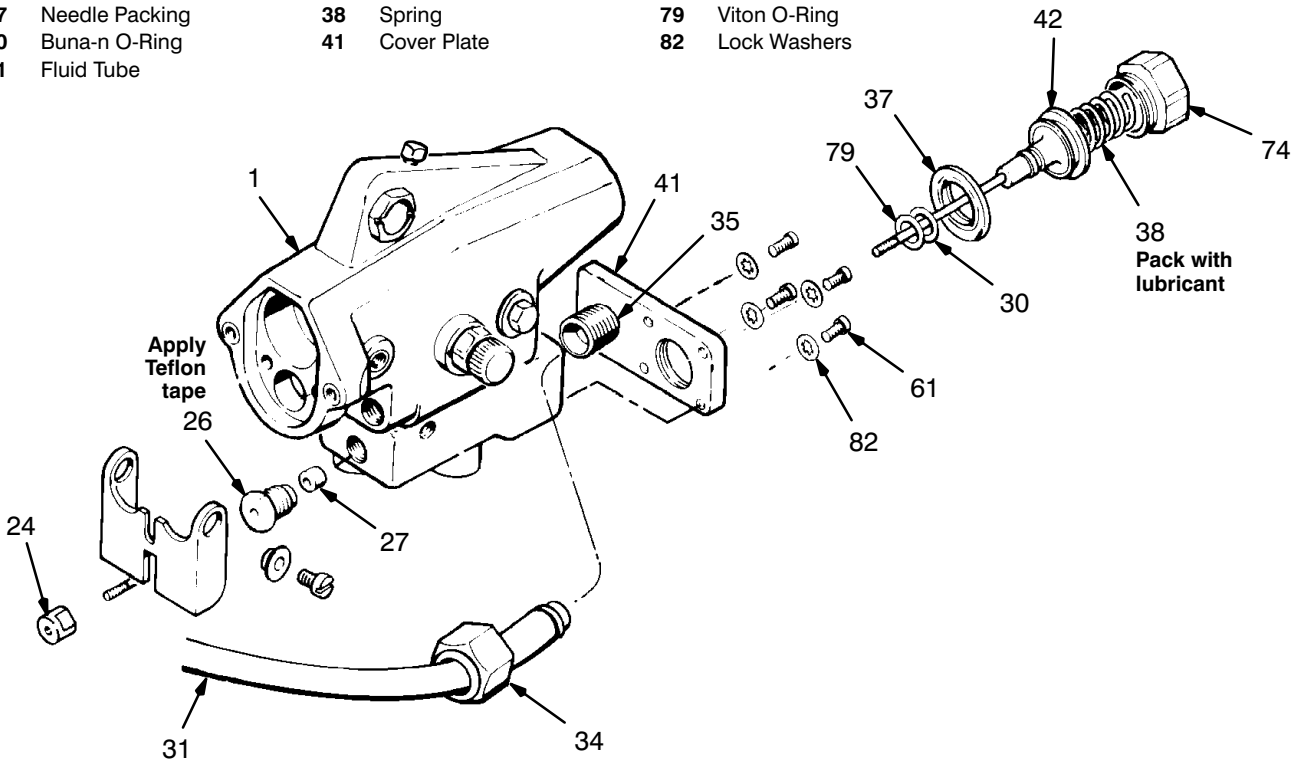


Fig 21

Disc Regulator O-Ring Replacement

1. Unscrew the turbine air line from the adapter (86). See Fig 22.
2. Remove the cap screw (90) and washer (89) from the gun body (1).
3. Pull the adapter (86), with the air valve (88), out of the gun body.
4. Unscrew the adapter (86) from the air valve (88), and remove the disk regulator (3).
5. Clean and inspect parts for wear or damage and replace if necessary.
6. Clean and inspect the two o-rings (87) and one o-ring (85) on the air valve. Replace if necessary. Lubricate the o-rings with petroleum jelly.
7. Install the disc regulator (3) into the air valve (88) so its beveled surface faces into the gun.
8. Screw the adapter (86) into the air valve (88), and install the air valve into the gun body (1).
9. Screw the cap screw (90), with the washer (89), into the gun body (1).
10. Screw the turbine air line onto the adapter (67).

KEY

1	Gun Body	87	O-Ring
3	Regulator Disk	88	Air Valve
85	O-Ring	89	Washer
86	Adapter	90	Cap Screw

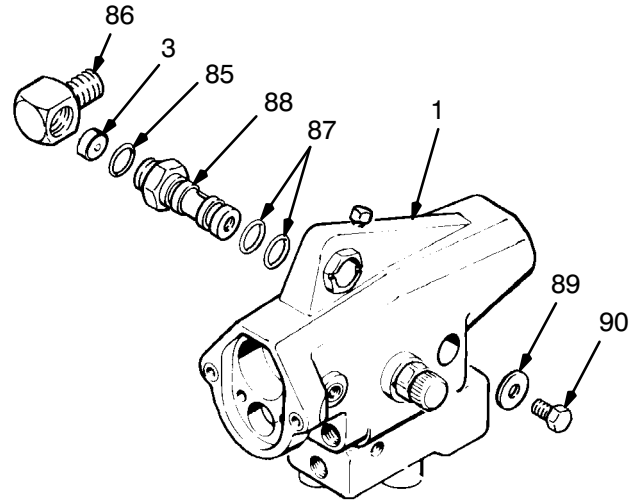


Fig 22

KEY

1	Gun Body
76	Muffler
77	Elbow
78	Tube

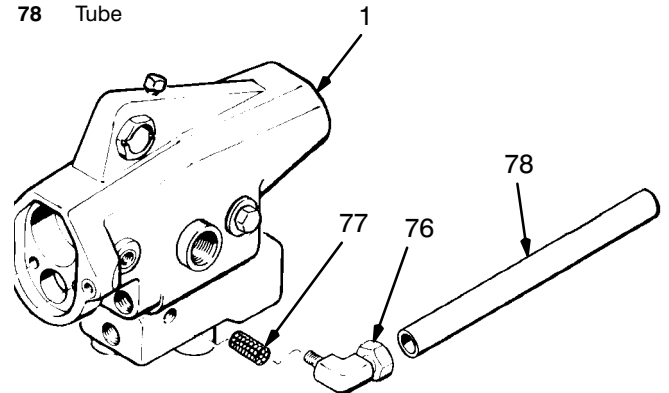
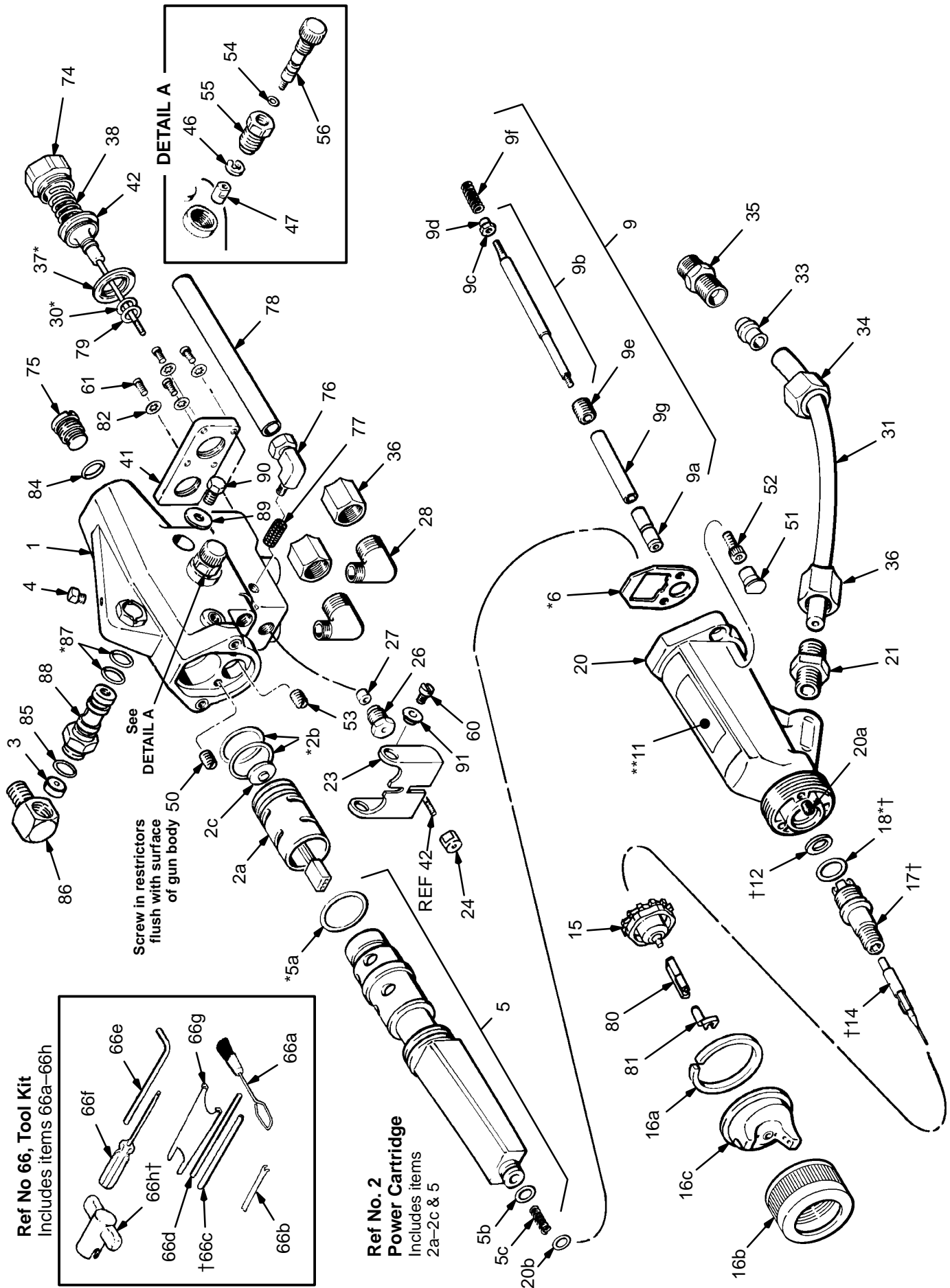


Fig 23

Muffler Replacement

1. Remove the fan air valve assembly as instructed in **Fan Air Valve Replacement**.
2. Remove the elbow (76) with the tube (78) from the gun body (1). See Fig 23.
3. With a hook, remove the muffler (77) from the gun body and replace with a new muffler.
4. Install the elbow (76) in the gun body.
5. Install the fan air valve assembly as instructed in **Fan Air Valve Replacement**.

PARTS DRAWING



PARTS LIST

REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
1	218-744	BODY, gun	1	36	107-208	NUT, ferrule; 5/8-20 UN-2B	3
2	218-111	POWER CARTRIDGE	1	37*	181-039	PACKING, u-cup; UHMW polyethylene	1
		Includes items 2a & 5	1	38	108-221	SPRING, compression	1
2a	217-591	.ALTERNATOR, turbine	1	41	180-924	PLATE, cover	1
		Includes items 2b & 2c	1	42	218-989	PISTON, shaft	1
2b*	107-106	..O-RING; buna-N	2	46	105-681	RING, retaining, external	1
2c	180-070	..PLUG	1	47	181-383	SEAL, valve	1
3*	107-107	REGULATOR, disc	1	50	180-235	RESTRICTOR (color coded black)	1
4	110-916	SCREW; 1/4-20	1	51	218-179	LIGHT, indicator, ES	2
5	218-041	.POWER SUPPLY, ES, 75 KV	1	52	107-100	SCREW, cap, socket hd;	2
		Includes items 5a, 5b & 5c	1			M5 x 0.8 x 12	2
5a*	177-156	..O-RING; Viton	1	53	179-994	RESTRICTOR (color coded white)	1
5b*	106-555	..O-RING; fluorocarbon	1	54*	105-666	O-RING; ethylene-propylene	1
5c	178-504	..SPRING, compression	1	55	181-382	HOUSING, valve	1
6*	179-387	GASKET, housing	1	56	181-381	SCREW, adjusting	1
9	222-256	FLUID NEEDLE ASSY; Includes	1	60	107-400	SCREW, trigger	2
		items 9a-9g	1	61	100-205	SCREW, mach, pnh; 6-32	4
9a	222-255	.PACKING ASSY, needle	1	62	180-060	SIGN, warning, English (not shown)	1
9b	222-013	.NEEDLE, fluid; Includes items 9c & 9d	1	65	180-063	SIGN, warning, Spanish (not shown); See ACCESSORIES to order French or German	1
9c	183-749	..NUT, adjusting	1				1
9d	183-750	..NUT, locking	1	66	220-388	KIT, tool; Includes items 66a-66h	1
9e	176-936	.NUT, packing	1	66a	105-749	.BRUSH, cleaning	1
9f	105-673	.SPRING, compression	1	66b	177-732	.WRENCH, packing nut	1
9g	179-388	.INSULATOR, needle	1	66c†	177-007	.WRENCH, needle	1
11**	179-790	LABEL, warning	1	66d	179-803	.ROD, packing removal	1
12†	181-825	WASHER	1	66e	107-158	.WRENCH, resistor stud	1
14†	181-824	ELECTRODE (color coded black)	1	66f	107-460	.WRENCH, barrel	1
15	181-299	NOZZLE, fluid; 1.2 mm (0.047") (See manual 307-803 for other available fluid nozzles)	1	66g	177-004	.WRENCH, fluid nozzle	1
			1	66h†	183-107	TOOL, resistor stud	1
16	218-996	AIR CAP ASSEMBLY	1	74	181-178	CAP, retainer, spring	1
		Includes items 16a, 16b & 16c	1	75	181-599	PLUG; 3/8-18 npsm	1
16a	176-930	.RING, retaining	1	76	181-594	ELBOW, male, 905	1
16b	176-968	.NUT, retaining	1	77	181-223	MUFFLER	1
16c	180-739	.AIR CAP (See manual 307-803 for other available air caps)	1	78	054-134	TUBE, polyethylene	178 mm
17†	220-923	STUD, resistor (color coded black)	1	79	108-298	O-RING; Viton	1
	105-667	O-RING; Viton; standard	1	80	181-302	HOUSING, pin	1
18*†		(color coded green)	1	81	181-303	PIN, locking	1
	108-045	O-RING, polyethylene; optional (color coded white)	1	82	108-340	LOCKWASHER, internal	4
20	179-412	BARREL, gun; Includes item 20a & 20b	1	84	104-282	O-RING; buna-N	1
20a	176-921	.PLUG; M3 x 0.5 x 6	1	85	105-796	O-RING; Viton	1
20b	186-127	.CUSHION	1	86	181-598	ADAPTER; 1/4-18 npsm, LH	1
21	107-207	FITTING, male	1	87*	103-648	O-RING; Viton	2
23	180-928	TRIGGER	1	88	181-597	VALVE, air	1
24	180-927	NUT, adjusting, trigger	1	89	102-782	WASHER, plain	1
26	176-941	GUIDE, valve, air	1	90	105-408	SCREW, cap, hex hd; M6 x 10 long	1
27*	106-901	PACKING, needle;PTFE	1	91	177-128	SPACER	2
28	108-173	ELBOW, male	1				
30*	156-454	O-RING; buna-N	1				
31	181-179	TUBE, fluid	1				
32**	179-791	TAG, warning (not shown)	1				
33	178-131	COLLAR	1				
34	106-262	NUT, tube, flareless	1				
35	181-384	ADAPTER, fluid	1				

*Included in Repair Kit 218-967.

**Extra warning tags and labels are supplied at no charge.

† Included in Repair Kit 220-391. Read and follow the Old/New Style Resistor Stud and Electrode Warning, at left.

See HOW TO ORDER REPLACEMENT PARTS on page 29.

WARNING

Old/New Style Resistor Stud and Electrode

To reduce the risk of sparking, which could cause fire or explosion, BE SURE the electrode and stud you install are black. The old style electrode and stud in the Series A Guns were white. DO NOT mix old style parts with new style parts.

WARNING

When servicing use only genuine Graco replacement parts. Use of other parts or any alteration or modification of this equipment could cause it to malfunction, which could result in serious injury, fire, explosion, or property damage.

KITS

Repair Kits must be purchased separately.
Use only **GENUINE GRACO PARTS AND ACCESSORIES**.

WARNING

When servicing use only genuine Graco replacement parts. Use of other parts or any alteration or modification of this equipment could result in serious injury, fire, explosion, or property damage.

NOTE: The Ref. Nos. shown in the kits below correspond to the reference numbers used in the parts list on page 27. For the best results, use all the parts in the kit, even if the old parts still look good.

Spray Gun Repair Kit 218–967

Includes:

Ref No.	Part No.	Description	Qty
2b	107–106	O-RING, buna-n	2
3	107–107	REGULATOR, disc	1
5a	177–156	O-RING, Viton	1
5b	106–555	O-RING, Viton	1
6	179–387	GASKET, housing	1
18	105–667	O-RING, Viton	1
27	106–901	PACKING, needle, PTFE	1
30	156–454	O-RING, buna-n	2
37	181–039	PACKING, u-cup, UHMWPE	1
54	105–666	O-RING, ethylene-propylene	1
87	103–648	O-RING, Viton	2

Resistor Stud and Electrode Kit 220–391

Includes:

Ref No.	Part No.	Description	Qty
12	181–825	WASHER	1
14	181–824	ELECTRODE (color coded black)	1
17	220–923	STUD, resistor (color coded black)	1
18	105–667	O-RING, Viton	1
66c	177–007	WRENCH, needle	1
66h	183–107	TOOL, resistor stud	1

TECHNICAL DATA

Weight 0.87 Kg (1.90 lb)
 Gun Length 310 mm (12.25 in.)
 Maximum Working Pressure 7 bar (100 psi)
 Air Pressure Operating Range . . . 0–7 bar (0–100 psi)
 Fluid Pressure Operating Range . . 0–7 bar (0–100 psi)
 Voltage Operating Range 0–75 KV
 Paint Resistivity Range 7 megohm cms to infinity
 Air Inlet
 Turbine 1/4 npsm(m) L.H.
 Atomizing & Cylinder 1/4 npt(m)
 Fluid Inlet 3/8 npsm(m)
 Wetted Parts Stainless Steel, Polyethylene,
 Nylon, Acetal, Viton[®],
 Delrin[®]

Viton[®] and Delrin[®] are registered trademarks of the DuPont Co.

HOW TO ORDER REPLACEMENT PARTS

1. To be sure you receive the correct replacement parts, kits or accessories, always give all of the information requested in the chart below.
2. Check the parts list to identify the correct part number; do not use the ref. no. when ordering.
3. Order all parts from nearest Graco distributor.

6 digit Part Number	Qty	Part Description

SERVICE INFORMATION

Listed below by assembly changed are OLD and NEW parts.

Assembly Changed	Status	Ref No.	Part No.	Name
218-745	OLD	4	100-664	Screw
Spray Gun	NEW	4	110-916	Screw

ACCESSORIES

Accessories must be purchased separately.
Use only **GENUINE GRACO PARTS AND ACCESSORIES**.

WARNING

NEVER operate your equipment at a working pressure rating that is higher than the lowest rated component in your system. Lower rated components may not be able to withstand the pressure developed by the pump and may rupture, causing serious bodily injury or property damage.

The accessories in the box, below, are approved by Factory Mutual.

WARNING SIGNS

Available from Graco at no extra charge.
Must be ordered separately.

180-060	Warning Sign (English)
180-061	Warning Sign (French)
180-062	Warning Sign (German)
180-063	Warning Sign (Spanish)

GROUNDING AIR SUPPLY HOSE

7 bar (100 psi) MAXIMUM WORKING PRESSURE
6.35 mm (0.25 in.) ID, 1/4 npsm(fbe)

220-444	1.2 m (4 ft)
218-100	5 m (15 ft)
218-101	8 m (25 ft)
218-102	11 m (36 ft)
218-103	15 m (50 ft)
220-119	23 m (75 ft)
220-120	30.5 m (100 ft)

FLUID HOSE ASSEMBLIES (Nylon)

35 bar (500 psi) MAXIMUM WORKING PRESSURE
6.35 mm (0.25 in.) ID, 3/8 npsm(fbe)

216-076	8 m (25 ft)
216-077	15 m (50 ft)
216-078	23 m (75 ft)
216-079	30 m (100 ft)
216-080	46 m (150 ft)

FLUID HOSE ASSEMBLIES (Nylon)

14 bar (225 psi) MAXIMUM WORKING PRESSURE
6.35 mm (0.25 in.) ID, 3/8 npsm(fbe)

215-637	8 m (25 ft)
215-638	15 m (50 ft)
215-639	75 ft (23 m)
215-640	100 ft (30.5 m)
215-641	150 ft (46 m)

ACCESSORIES

The accessories below and on page 31 have not been tested by Factory Mutual.

AIR LINE ACCESSORIES

GROUNDING AIR SUPPLY HOSE

7 bar (100 psi) MAXIMUM WORKING PRESSURE
8 mm (0.315 in.) ID; 1/4 npsm(fbe);

Color coded gray; More flexible than black hose

223-068	1.2 m (4 ft)
223-069	5 m (15 ft)
223-070	8 m (25 ft)
223-071	11 m (36 ft)
223-072	15 m (50 ft)
223-073	23 m (75 ft)
223-074	30.5 m (100 ft)

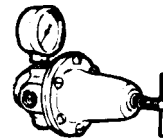
AIR HOSE ADAPTER 185-493

For connecting two or more air supply hoses together.
1/4 npt(m) x 1/4 npsm(m) left-hand thread.

3-WAY AIR VALVE 722-502

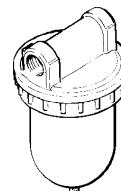
HIGH VOLUME AIR REGULATOR 206-199

0-9 bar (0-125 psi) Regulated Pressure
14 bar (200 psi) Steel Pressure Gauge
1/2 npt(f) inlet and outlet



AIR FILTER & MOISTURE SEPARATOR 106-148

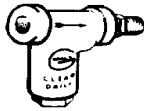
17.5 bar (250 psi) MAXIMUM WORKING PRESSURE
For cleaning and drying air in air spray system.
20 micron element, 5 oz. bowl capacity,
3/8 npt(f) inlet and outlet



ACCESSORIES

FILTER (AIR OR PAINT) 202-271

52 bar (750 psi) **MAXIMUM WORKING PRESSURE**
With 250 micron (60 mesh) element,
3/8 npt(f) inlet, 3/8 npt(m) outlet



SPRAY SYSTEM ACCESSORIES

ELECTROSTATIC SYSTEM 231-035

Includes items:

- 218-745** Automatic Electrostatic Air Spray Gun
- 218-101** Grounded Air Supply Hose (See page 30 for description)
- 216-076** Fluid Hose (See page 30 for description)
- 106-148** Air Filter (See page 30 for description)

ELECTROSTATIC SYSTEM 231-036

Includes items:

- 218-745** Automatic Electrostatic Air Spray Gun
- 218-103** Grounded Air Supply Hose (See and page 30 for description)
- 216-077** Fluid Hose (See page 30 for description)
- 106-148** Air Filter (See page 30 for description)

ISOLATION STAND

Required for isolating the fluid supply from the ground when spraying conductive water-base fluid.

- 728-650** Isolation Stand; 15 gal (57 liter) maximum
- 727-212** Isolation Stand; 55 gal (209 liter) maximum
- 905-576** Same as 727-212 but includes bleed resistor

WATER BASE PACKING KIT 220-014

For converting packings to handle water base fluids.

NOTE: The installation of this kit will void the CSA and FM approval on the PRO4000 Gun.

GUN MOUNTING ACCESSORIES

UNIVERSAL GUN MOUNTING ROD 590-236

RECIPROCATING GUN MNTG. BRACKET 725-973

Note: All safety barriers and interlocks are to be supplied by the customer.

STATIONARY GUN MOUNTING STAND 722-562

STATIONARY GUN MOUNTING BRACKET 724-344

MISCELLANEOUS ACCESSORIES

REMOTE FAN AIR ADAPTER 181-053

To control fan pattern from the control booth. 1/8-27 npt(f).

Must also order: 108-234 90° Elbow; 1/8 npt(m)

REMOTE SWITCH & SIGNAL LIGHT 728-386



CONTROL PANEL 218-394

For one or two gun operation. Includes cabinet mounted air regulator, air filter, three-way triggering valve and air atomizing gauge.

PAINT RESISTANCE METER 722-886

Used with 722-860 Paint Probe to measure resistance of paint. **Not for use in Hazardous areas.**

PAINT PROBE 722-860

Used with 722-886 Paint Resistance Meter to measure resistance of paint. **Not for use in Hazardous areas.**

MEGOHMMETER 218-979

500 Volt output; 0.01-2000 megohms

THE GRACO WARRANTY AND DISCLAIMERS

WARRANTY

Graco warrants all equipment manufactured by it and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. As purchaser's sole remedy for breach of this warranty, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment proven defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for, any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility with Graco equipment of structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor and transportation.

DISCLAIMERS AND LIMITATIONS

THE TERMS OF THIS WARRANTY CONSTITUTE PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND ARE IN LIEU OF ANY OTHER WARRANTIES (EXPRESS OR IMPLIED), INCLUDING WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY NON-CONTRACTUAL LIABILITIES, INCLUDING PRODUCT LIABILITIES, BASED ON NEGLIGENCE OR STRICT LIABILITY. EVERY FORM OF LIABILITY FOR DIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSS IS EXPRESSLY EXCLUDED AND DENIED. IN NO CASE SHALL GRACO'S LIABILITY EXCEED THE AMOUNT OF THE PURCHASE PRICE. ANY ACTION FOR BREACH OF WARRANTY MUST BE BROUGHT WITHIN TWO (2) YEARS OF THE DATE OF SALE.

EQUIPMENT NOT COVERED BY GRACO WARRANTY

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO ACCESSORIES, EQUIPMENT, MATERIALS, OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motor, switches, hose, etc.) are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

IMPORTANT PHONE NUMBERS

TO PLACE AN ORDER, contact your Graco distributor, or call this number to identify the distributor closest to you: **1-800-328-0211 Toll Free**

FOR TECHNICAL ASSISTANCE, service repair information or assistance regarding the application of Graco equipment: **1-800-543-0339 Toll Free**

Factory Branches: Atlanta, Chicago, Dallas, Detroit, Los Angeles, West Caldwell (N.J.)

Subsidiary and Affiliate Companies: Canada; England; Switzerland; France; Germany; Hong Kong; Japan

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