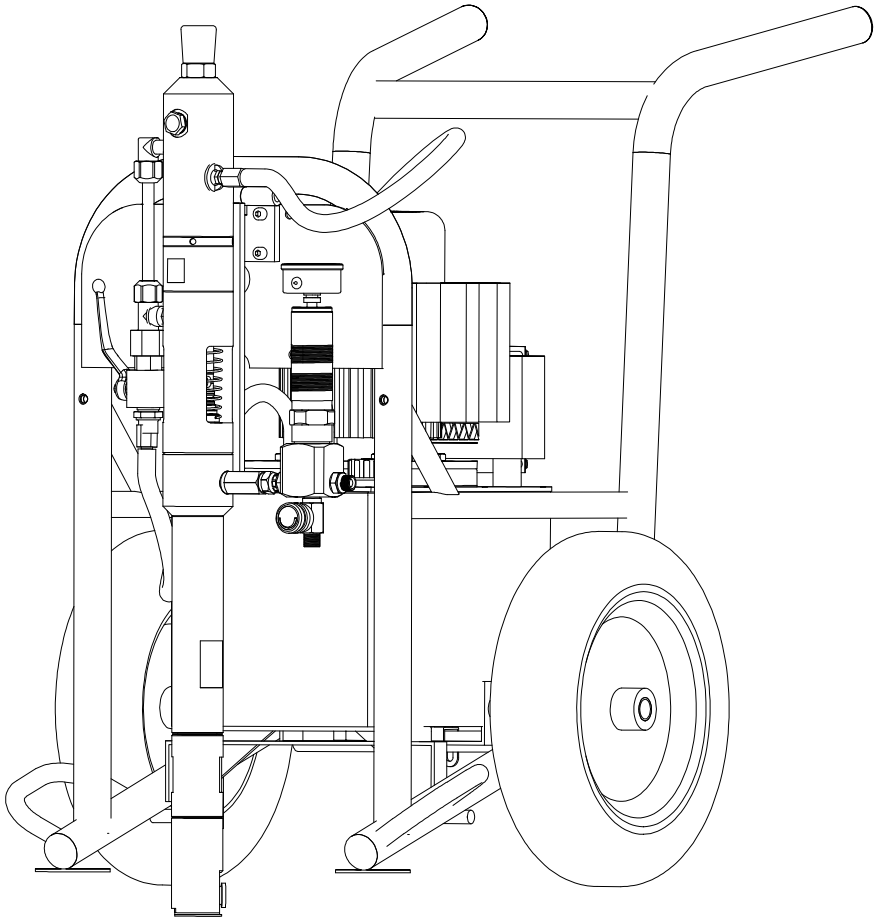
Electric Hydraulic Piston Pump

Mod.

MASPRA HP-41



WARNING!!! Read all instructions carefully before assembling components and operating sprayer. Incorrect procedure could result in damage to the unit, severe personal injury and/or property damage. When spraying flammable materials, sprayer must be placed at least 20 feet from target in a well-ventilated area. Vapours can be ignited by static discharge or electrical sparks and result in severe personal injury. Airless sprayers generate high fluid pressure. Improper use could result in an injection injury.

MASPRA
MASTER SPRAY

CE

INDEX

1. Description of symbols

The signs and symbols used in this manual have the following meaning:

NOTE
marks a section of text which is especially relevant to safety. Special attention should be paid to this section and its contents strictly observed.

WARNING
marks a situation which could be dangerous. If not observed,death or very serious injury could result. Warning concerning electrostatic charging when spraying in metal containers. Take care to ground the spray gun through contact with the container in order to prevent a major static discharge.

INJECTION HAZARD
marks a situation, where pressure is in the system. Do not point the gun at anyone or any part of the body

DANGER OF EXPLOSION
marks a situation, where there is danger of explosion. Observation of this information is absolutely essential.

USE BREATHING PROTECTION
For health reasons, it is very important to pay attention to this warning.

WEAR PROTECTIVE GLOVES
To prevent burns, wear protective gloves with lower arm protection.
Observation of this information is essential.

WEAR PROTECTIVE FOOTWEAR
To prevent burns, wear protective footwear
Observation of this information is essential.

WEAR HEARDEFENDER
To prevent hearing from being damaged by noice.
Observation of this information is essential.

2. Safety Precautions

WARNING!

1. **Injection hazard:** Injection hazard: Airless Painting Equipment can cause serious injury if the spray penetrates the skin. Do not point the gun at anyone or any part of the body. The tip guard provides some protection against accidental injection injuries, but is mostly awarning device. Never put your hand, fingers or body over the spray tip. Gloves and clothing do not necessarily offer any protection either. Keep the gun trigger safety lever in locked postion when not spraying. Always have the tip guard in place while spraying. In case of penetration seek medical aid immediately!
   Note to physician: Injection into skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected into the blood stream. Consultation with a plastic surgeon or reconstructive hand surgeon may be advisable. Be prepared to tell the doctor what fluid was injected.
2. This system is capable of producing 220 Bar (3200 PSI). To avoid rupture and injury, do not operate this pump with components rated less than 220 bar (3200 PSI) working pressure (including but not limited to spray guns, hose and hose connections).
3. Do not spray paints or other inflammable fluids indoors which have a flash point below 21 degree C, 70 degree F. Keep spray area well ventilated. Before spraying, turn off all pilot lights and open flames.
4. Wear a respirator which is approved for the product being sprayed 
5. Do not use halogenated hydrocarbon solvents in this system; it contains aluminium parts and may explode. Cleaning agents, coatings, paints, and adhesives may contain halogenated hydrocarbon solvents. Don’t take chances, consult your material supplier to be sure.
   (ex:methylene chloride and 1,1,1 - Trichlorethane)
6. Caution: When a flammable liquid is sprayed there maybe danger of fire or explosion especially in a closed area.
7. Caution: Arcing parts. Keep the pump at least 5 mt away from explosive vapors.
8. Caution: Static electricity can be developed by airless spraying. Ground unit and object to be sprayed. On electric units, unit power cord must be connected to a grounded outlet. Use only three wire extension cords.Static explosion can occur with ungrounded unit.
9. Flush system with spray tip removed. Always use lowest pressure possible.
10. Always follow safety precautions and warnings printed on paint container.
11. Only use spray guns and hoses supplied by us. User assumes all risk and liability when using spray guns or hoses not complying with minimum specification.
12. Inspect hoses before each use. Never use a damaged hose. High pressure in hoses with wear, leaks or splits may cause the hose to rupture and cause serious personal injury. Never try to stop or deflect leaks with any part of your body.
13. Use extreme caution when cleaning spray tip guard. DO NOT try to wipe off build up around the spray tip before following shut down procedure. Follow the Shutdown Procedure, then follow the spray tip manufacturer’s instructions for removing and cleaning the spray tip.
14. Never attempt to change spray tip or leave the unit unattended without first shutting off pump, releasing fluidpressure, and locking the trigger safety lock.
15. For your own safety, it is essential to wear personal protective equipment when using the equipment. 
16. Do not pull on hoses to move equipment, DO NOT kink or bend the hose sharply.
17. Keep children or anyone not familiar with airless spray systems away from equipment and work area.

18. Conductive metal containers must be used when flushing flammable fluids through the system. Always flush at low pressure with spray tip removed. A metal partof the spray gun must be held firmly against the grounded metal pail when flushing or relieving pressure from the gun.
19. Trigger guard helps reduce the risk of accidentally triggering the gun if dropped or bumped. Do not use a spray gun without a trigger guard.

S A F E T Y P R E C A U T I O N S

20. Shut Down Procedure Always follow Shut Down Procedure before starting any troubleshooting, servicing or cleaning.
    1) Engage the trigger safety lock in the locked position. Test the trigger safety lock to ensure the lock is working properly.
    2) Turn the On/Off switch to the Off position.
    3) Unplug the electrical cord on the sprayer.
    4) Open the dump valve to relieve pressure. Leave open until ready to spray or test or clean.
    5) Remove the spray tip.
    6) Disengage the trigger safety lock.
    7) Trigger the gun into a metal pail to relieve any remaining pressure. A metal part of the spray gun should be held firmly against the grounded metal pail when relieving the pressure from the gun. (A grounded metal pail is not required for non-flammables such as latex.)
    8) Reset the trigger safety lock to locked position.

***** Warning *****

This unit is provided with a thermally protected Reset. If an overload occurs, the thermally protected automatic reset disconnects the
motor from the power supply.

- Always disconnect motor from power supply before working on equipment.
- When thermally protected reset disconnects the motor from the power supply, relieve pressure by turning priming valve to “prime”.
- Turn ON-OFF switch to OFF.

Caution: The cause of the overload should be corrected before restarting.
Important: Read and understand these special safety precautions before operating the unit.
Electrical requirements
If an extension cord is used, make sure it is a 3 conductor type (hasgrounding wire) and is CSA approved. Also make sure that its wire size (AWG) is thick enough to carry the amperage your machine requires. The chart below will show the minimum recommended AWG for specific lengths. See next page for pump specifications.
Remember: keep the motor clean and dry. Paint acts as an insulator and will cause overheating and/or motor damage

Cord Lenght	**Motor Amperage Rating**															
	0-5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
7,5 mt	16	16	16	16	16	16	14	14	14	12	12	12	12	12	12	12
15 mt	16	16	16	16	16	16	14	14	14	12	12	12	12	12	12	12
22,5 mt	16	16	16	16	16	16	14	14	14	12	12	12	12	12	12	12
30 mt	16	16	16	14	14	14	14	14	12	12	12	12	12	12	12	12
37,5 mt	16	16	14	14	14	12	12	12	12	12	12	12	12	12	12	12
45 mt	16	14	14	14	12	12	12	12	12	12	12	12	12	12	12	12
Minimum recommended AWG																

3. Introduction

INTRODUCTION:
We appreciate your decision to purchase a high quality professional paint spraying system and believe you will find it to be the best sprayer you ever owned.
Your MASPRA hydraulc airless piston pump is capable of spraying a wide variety of latex, oil-based and alkyd paints, as well as stains, preservatives, fire-proofing, water-proofing, ready-mix plaster and other many architectural coatings. The material you are spraying will have a direct effect on the amount of pressure required for the optimum pattern and coverage to be obtained.
We recommend that before actually beginning your job, you carefully read this manual and practice with the sprayer until you feel comfortable using it.
PUMP TYPE:
These units are HYDRAULIC PISTON PUMPS.
Ruggedly built hydraulic parts keep maintenance to a minimum. All paint valves are made of tungsten carbide for extra long abrasion resistance. The advantages of this type of pump is:
- Accurate spray pattern with minimal overspray
- Minimal or no thinning of paint products
- A direct suction, ideal for spraying heavy materials
- Variable pressure from 0 to 220 bar
- Various nozzles are available for slow to fast spraying
- Compact and portable
- Quiet running and low power consumption
- Steady spraying pressure
- no fan fluctuations
- Compact paint pump
- Quick cleaning

HOW HYDRAULIC PISTON PUMPS OPERATE:
Hydraulic airless piston pump works on the hydraulic movement.
Hydraulic airless piston pump have an hydraulic board which pumps continuously hydraulic oil from hydraulic board to the reverse body of pumping part; the hydraulic oil drives the movement of the piston.
The hydraulic pressure is adjusted by a regulating valve operated by a knob.
The slow movement of the double effect piston produces the suction of a liquid along suction section and at the same time its compression.
The high pressure push the suctioned liquid along the high pressure hose up to the spray gun. Triggering the gun trigger the liquid is atomized.
The results are minimal power draw, excellent trigger paint pressure response, no fan fluctuations, and minimal all-around wear!

4. Technical Specification

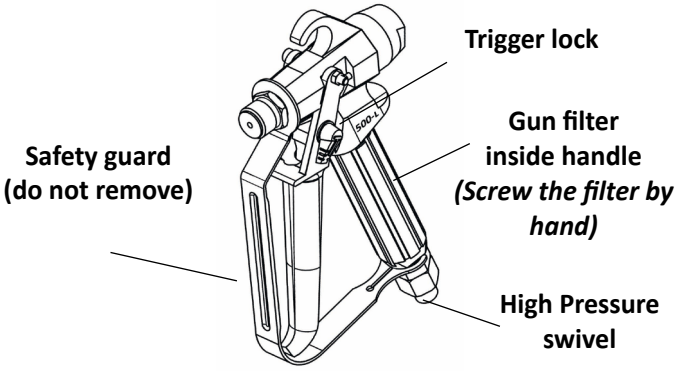
		HP-41
Motor		230 Volt / 50 HZ
Variant		380 Volt/50 Hz
Power		3 HP
Max. Free Flow Delivery	l/min	6,5
Max. tip size	1 gun	0.041”
	2 guns	0.021”
	3 guns	- - -
Max. Working pressure (bar)		220
Weight	Kg.	96

Capability: All conventional coatings, ie: latex, stain, lacquer, varnish, ink, primer, preservatives and many other architectural coatings such as block fillers and some elastomerics and glues.

5. Pump Components

SPRAY GUN

The spray gun is designed specifically for airless spraying. Since there is no compressed air to atomize the paint, atomization is accomplished by forcing the paint at a very high pressure through a very small hole . Because of this high pressure, the spray tip and gun valve are made of tungsten carbide for maximum wear resistance.
The gun body is made of forged alloy and anodized for chemical resistance. As a safety feature, the spray gun can be locked with the trigger safety lever when you are not spraying. Be sure to read all warnings concerning the high pressures of airless spraying on page 4 - 5



WARNING: INJECTION HAZARD POSSIBLE. DO NOT SPRAY WITHOUT TIP IN PLACE. ALWAYS ENGAGE TRIGGER LOCK BEFORE REMOVING, REPLACING OR CLEANING TIP. NEVER TRY TO CLEAN THE TIP WITH YOUR FINGERS.

To disengage your trigger lock: Your spray gun is shipped from the factory with the trigger lock in the engaged position (horizontal). To disengage, turn the trigger lock down until it is in a vertical position. To engage the trigger lock, turn it back to a horizontal position.

PRESSURE CONTROL VALVE:

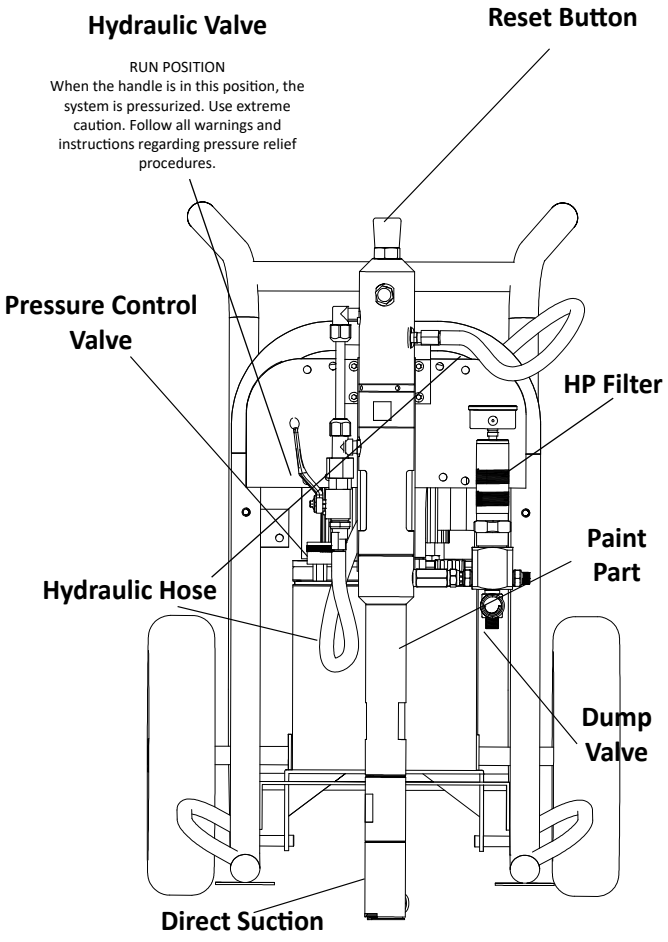
The manually operated pressure control knob is on the side of the hydraulic pump. When the knob is turned clockwise, oil pressure is increased. When the knob is turned counterclockwise, oil pressure is reduced. The pressure control knob regulates the pressure on the diaphragm up to 220 BAR.
Always reduce the pressure (turn knob all the way counterclockwise) when cleaning or when switching the position of the dump valve. Running the pump in the prime position with the pressure knob turned fully counterclockwise will eliminate any air in the system. A small amount of air here will cause low working pressure or cause the pump not to prime.

PAINT PUMP:

The paint pump is a cylinder connected to the hydraulic reverse section. The paint cylinder is composed by a piston, upper & lower packing, outlet valve and inlet valve. These valves regulate the flow of the paint through the pump during priming and spraying. The inlet and outlet valves are made of tungsten carbide to provide maximum life with abrasive paints. Upper & lower packings regulate the movement of piston along the pump cylinder. They are made of leather and polypropilene.

DUMP VALVE:

The dump valve is located on the side of the paint pump. When turned to “open” it circulates paint to vent the air trapped in the paint pump out the return hose. It will continue to recirculate the paint until the knob is manually turned to the “close” position. When the dump valve is turned to “close”, flow is shut off through the return hose and is routed to the paint hose for spraying.The dump valve also serves to relieve pressure on the system during shutdown and cleanup. The pressure is relieved by turning the prime valve to “dump”.



6. Setting up of unit for Airless Spraying

PROCEDURE

1. Remove all system components from the box for assembly.
2. Remove all protective caps from inlet and outlet connections of pump.
3. Immerge pumping housing into paint pail or connect a flexible suction hose.

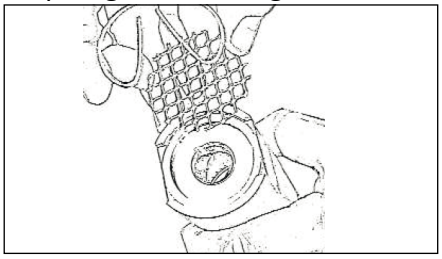
OPTION:

How to connect flexible suction hose:

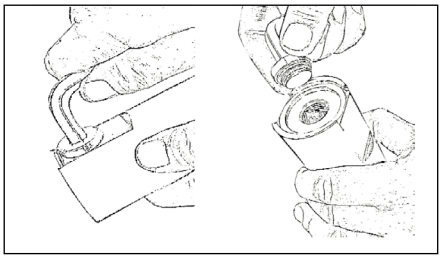
a. Pull the lever placed behind the pumping housing and lift the pumping housing in horizontal position

b. Disassemble the suction body from the pumping housing for a easy work.

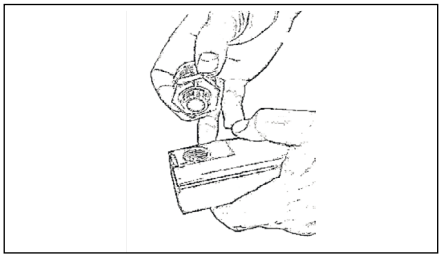
c. Remove from the bottom of suction body the stop ring and filtering disc.



d. Unscrew the lateral plug with a hexagonal wrench and assemble the unscrewed plug at the bottom of suction body.



e. Connect the suction nipple on the lateral inlet. Tighten securely.



f. Connect the flexible suction hose and immerge it into paint pail.

4. Attach return hose or return tube to the dump valve.
5. Connect high pressure airless paint hose to pump outlet. Tighten.
6. Attach the tip assembly to the spray gun.
7. Connect the paint hose to the swivel connection of the spray gun. Tighten. Ensure the gun handle is securely hand tightened to the gun.
8. Double check all connections, the unit is now ready for flushing. Note: The pump contains a preservative oil when you receive it, that may drip from the various connections when the protective caps are removed.

7. How to select tip and proper filter

Tip and filter table with specifications concerning capacity at different pressures (lt. minute) with water.
Notice: For each tip size please choose between the following fan corners:

NOZZLES		CAPACITY MEASURED IN LT/MIN. AT FOLLOWING PRESSURES:				SUGGESTED FILTER
Inches (mm)	**Spray corner**	**35 Bar**	**70 Bar**	**105 Bar**	**140 Bar**	
0,007 (0,18)	20 °	0,10	0,14	0,17	0,19	
0,007 (0,18)	40 °	0,10	0,14	0,17	0,19	
0,007 (0,18)	60 °	0,10	0,14	0,17	0,19	
0,009 (0,23)	20 °	0,14	0,20	0,25	0,29	
0,009 (0,23)	40 °	0,14	0,20	0,25	0,29	
0,009 (0,23)	60 °	0,14	0,20	0,25	0,29	**200 Mesh**
0,011 (0,28)	20 °	0,22	0,3	0,38	0,45	
0,011 (0,28)	40 °	0,22	0,3	0,38	0,45	
0,011 (0,28)	60 °	0,22	0,3	0,38	0,45	
0,013 (0,33)	20 °	0,34	0,45	0,56	0,64	
0,013 (0,33)	40 °	0,34	0,45	0,56	0,64	
0,013 (0,33)	60 °	0,34	0,45	0,56	0,64	
0,015 (0,38)	20 °	0,45	0,60	0,75	0,85	
0,015 (0,38)	40 °	0,45	0,60	0,75	0,85	
0,015 (0,38)	60 °	0,45	0,60	0,75	0,85	**150 Mesh**
0,018 (0,44)	20 °	0,65	0,88	1,10	1,26	
0,018 (0,44)	40 °	0,65	0,88	1,10	1,26	
0,018 (0,44)	60 °	0,65	0,88	1,10	1,26	**100 Mesh**
0,021 (0,53)	20 °	0,90	1,25	1,55	1,75	
0,021 (0,53)	40 °	0,90	1,25	1,55	1,75	
0,021 (0,53)	60 °	0,90	1,25	1,55	1,75	
0,023 (0,58)	20 °	1,05	1,52	1,85	2,15	
0,023 (0,58)	40 °	1,05	1,52	1,85	2,15	
0,023 (0,58)	60 °	1,05	1,52	1,85	2,15	
0,026 (0,66)	20 °	1,30	1,98	2,30	2,73	
0,026 (0,66)	40 °	1,30	1,98	2,30	2,73	
0,026 (0,66)	60 °	1,30	1,98	2,30	2,73	
0,031 (0,79)	20 °	2,00	2,80	3,45	4,15	
0,031 (0,79)	40 °	2,00	2,80	3,45	4,15	
0,031 (0,79)	60 °	2,00	2,80	3,45	4,15	**50 Mesh**
0,036 (0,91)	20 °	2,65	3,50	3,82	4,55	
0,036 (0,91)	40 °	2,65	3,50	3,82	4,55	
0,036 (0,91)	60 °	2,65	3,50	3,82	4,55	**not reccomended**

8. Startup procedures

Whenever the pump is to be used, it must be prepared for the type of paint to be used. This requires the unit to be flushed out with an appropriate solvent (water for latex, mineral spirits for oil base, etc.). Incorrect flushing can cause gumming of the valves and priming problems.

Unit priming and fluishing

1. Check that all hoses, gun handle and tip connections (or injection lance) are tight.
2. Place trigger lock in “LOCK” position. Connect the air compression hose to the pressure regulating valve fixed on the air motor. Switch on the compressor, adjust the air pressure at about 2 bar.
3. Place dump valve into open or “PRIME” position.
4. Place suction/return tube in correct solvent, or add about one liter of solvent to hopper.
5. Unit will begin pumping and solvent will flow from return tube. Prime for 30 seconds with hopperunits, 2 minutes for suction units. If it will not prime, see “inspecting inlet valve.”
6. Turn pressure control back to MINIMUM. Close dump valve.
7. Increase pressure to 1/6 of turn. This allows to have a low pressure, ideal for cleaning procedures.
8. Turn pressure control to minimum and open dump valve to release pressure.
9. For suction units, lift both hoses above the level of solvent and turn up pressure two turns to pump out solvent from pump. With hopper units, place return hose into empty solvent container, turn up pressure two turns and allow pump to empty hopper.
10. Disconnect air compressed hose and turn pressure control to minimum. Unit is now flushed out.

Priming Unit in Paint

Follow same procedure as steps 1 - 8 of “Priming and Flushing”, but instead using paint. Then continue with the remaining steps as outlined below.

11. Remove tip from gun. Unlock trigger. Aim gun into solvent pail and hold trigger open until solvent flow changes to paint. Release and lock trigger. Re-install tip.
12. Before to work with the unit, test spray pattern on cardboard. Increase or decrease pressure as required for best pattern.

Streaks:
Tip is too small, or paint is too thick

Heavy tailing:
Pressure is too low, or tip is too large. (some tailing is normal)

Even fan:
Correct tip and pressure adjustment.(some tailing is normal)

9. Hints for Airless Sprayer

WARNING: DO NOT BEGIN SPRAYING BEFORE READING THIS SECTION AND ALL PREVIOUS SAFETY INFORMATION.

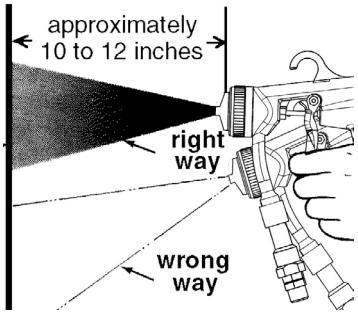
Painting and Tip Selection

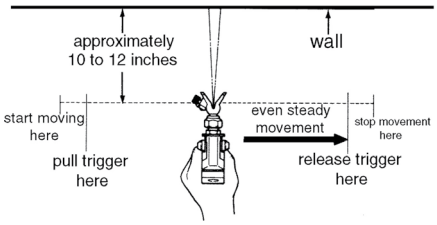
Correct adjustment of pressure and proper tip selection are crucial to the best spray pattern....

1. In any situation, the lowest pressure that gives an adequate spray pattern is the best pressure to use. It will give maximum pump and tip life and produce minimum overspray.
2. Typically, thicker materials require larger tips and higher pressures than thinner paints do. Some very thick paints may require slight thinning (5-10%) depending upon pump and tip size and application. Generally, thinning is performed when a good spray pattern cannot be obtained with an appropriate tip size at maximum pressure.

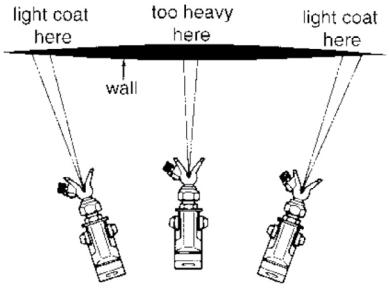
Spray Painting Method

1. Keep the gun perpendicular to the surface. Always hold the gun perpendicular to the surface with the tip approximately 12" from the surface. If held at an angle (up and down or side to side) paint will build up unevenly and leave the work splotchy.
2. Move with a smooth arm stroke. Move the gun at a steady even pace while keeping the gun perpendicular to the surface. Do not move the gun by flexing your wrist. Fanning the gun will cause excessive overspray and uneven coverage





Proper way to trigger spray gun



Result of flexing wrist while spraying

3. **Start moving the gun before triggering.** To get smooth overlap and prevent initial paint buildup, start our stroke movement before pulling the trigger. At the end of the stroke release the trigger before stopping. *NOTE*: To assure uniform paint coverage, overlap each stroke by 40% - 50%.

4. **Intermittent use.** If you are spraying and decide to stop for several minutes, lock the spray gun trigger and submerge the tip in a container of the appropriate solvent. This will prevent paint from hardening in the tiny spray opening and clogging the tip. Be sure to release the pressure by opening dump valve and turn off pump.

10. Helpful hints for trouble free painting

Sprayer
1. Flush before each use with a solvent that is correct for the paint you will be spraying. ie: Water for latex paints.
2. Clean unit well after each use. A clean unit works better and lasts longer.
3. Flush with mineral spirits when storing the unit for more than 3 or 4 days.

Paint:
1. Prepare paint according to manufacturer's recommendations.
2. Remove all skins on paint.
3. Stir paint thoroughly.
4. Strain paint through a fine mesh strainer bag to avoid clogging of pump and filters.

Spray Tips:
1. Use minimum pressure that gives a good spray pattern to reduce tip and pump wear and cut down overspray.
2. Replace tips before they become too worn. Worn tips waste paint and overwork the sprayer.

Filters:
1. Clean the filters after each use of sprayer.
2. Use correct filter for the tip size and paint type. See tip chart.

Paint Hose:
1. INSPECT THE HOSE PERIODICALLY. DO NOT USE KINKED, WORN OR DAMAGED HOSE. SEE WARNINGS ON PAGES 3 & 4!
2. Use only hose that is designed for the high pressures of airless units. Minimum working pressure of 240 bar. Be sure it is grounded, static dissipating type hose.
3. Protect both the paint hose and the electric cord from vehicle traffic and sharp cutting edges or objects.
4. For best performance, ask for the maximum hose length. This maximum will largely depend on tip size and thickness of paint.

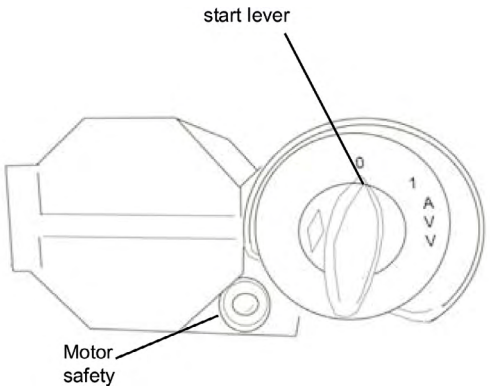
HYDRAULIC OIL:
1. Check oil regularly. If level is reduced, fill up with hydraulic oil.
2. Use only proper hydraulic oil (Type ESSO NUTO H46)

ELECTRICAL:
1. Always ensure the unit is plugged into a grounded outlet providing 220 volt, 16 amp (minimum).
2. Start unit with pressure control turned to minimum setting and with dump valve open and pressure relieved. If this is not done, the circuit breaker on unit may trip.
3. If circuit breaker trips, turn unit off, relieve pressure and disconnect from electrical outlet. Determine cause of overload before attempting to use unit.

EXTENSION CORD:
1. Use only three wire, grounded type extension cord, EU approved.
2. Use correct wire size of extension cord for correct operation. See chart on page 5

ELECTRIC MOTOR

Electric motors are in Class H. They are equipped with:
- A safety start (AVV) to use when in the building sites there are problems with low tension.
IMPORTANT: Keep lever to AVV position only for few second (just enought the time to allow the motor to switch ON) after that bring start Level to 1 position
- A safety button, which has to be used when motor stops and the standand start of the pump is not enought to switch ON motor.



11. Cleaning instructions

As with all spray equipment, your sprayer must be cleaned properly or it will not operate properly. Clogged valves and filters are the most common
causes of problems. If followed, these guidelines will insure trouble free performance from your sprayer.

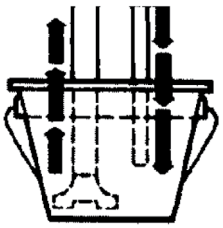
CAUTION: Clean with water if latex is used. Clean with paint thinners for oil based paints. Both water and paint thinner will be referred to as “solvent” from here on in.

CLEAN-UP:
To get the best use and longest life from your sprayer, it is very important to clean it out properly. The procedure is simple and is very similar to the flushing procedure performed earlier. Cleaning and flushing would also be required when changing color, or type of paint, ie: latex changing to oil base.

1. Lock gun trigger, turn pressure control to minimum, open dump valve to release all system pressure.
2. Turn tip to halfway position and remove from gun. (if so equipped).
3. For suction models, lift both suction and return hose above the level of paint in the pail and turn pressure about two turns. Allow unit to pump out paint. (For hopper models, place return hose into paint container and turn up pressure about two turns. Allow unit to pump out remaining paint in the hopper. Place return tube back into hopper).

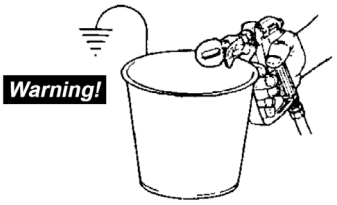
Pump fluid out

4. Place suction/return hose into pail with proper solvent to flush out paint and allow unit to prime in the solvent. Clean the outside of metal suction tube. (For hopper units, add about one liter of solvent into the hopper and allow unit to prime. While unit is priming, wipe or brush inside of hopper to dissolve paint).



Clean pump with suitable solvent

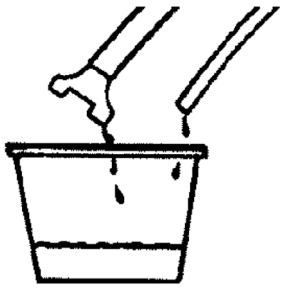
5. Turn pressure control to minimum and close dump valve.
6. Unlock trigger, and with spray tip still removed and starting with minimum pressure, aim gun into paint container and hold trigger open until paint flow stops and solvent flow just begins. Release trigger. Aim gun into solvent pail/hopper and circulate solvent for about two minutes. To reduce splashing, direct the fluid stream along inside of bucket at a side angle and well above the fluid level (or submerge the tip in the solvent). Release trigger. Point spray gun into an empty waste bucket and spray at least 1 liter of fluid into it.



Pump until clean solvent appears

Warning: conductive metal containers must be used when flushing flammable fluids through the system. Always flush at low pressure with spray tip removed.
A metal part of the spray gun must be held firmly against the grounded metal pail when flushing or relieving pressure from the gun.

7. Pump solvent out by lifting both suction and return hose out of the solvent. Turn pressure control to minimum and open dump valve to release system pressure and turn motor off. Lock trigger and clean spray tip before installing back onto gun.

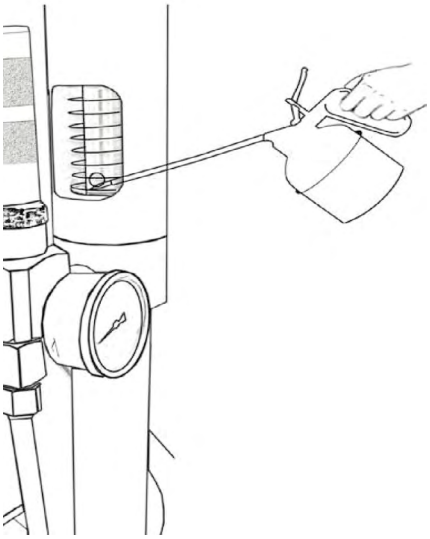


8. Follow above steps 1-7 using clean solvent to completely flush unit. You may at this time, if you wish, blow compressed air into the tip (dump valve open and motor off) to push the solvent all the way out the return hose.
9. If changing paint types, ie: latex (water base) to oil base, you would have to flush unit with clean mineral spirits using above steps 1-7. This would prepare the pump for the oil base paint. Water would have to be used as a last flush if changing from oil base paints to latex.

11. Cleaning instructions

10. Ensure pressure control is turned to minimum and all pressure is released. Open dump valve. Turn pump OFF.
11. Unthread gun handle from gun body to access gun filter. Remove filter and brush clean with appropriate solvent.
    Inspect filter for pin holes, plugging, or other damage. Replace if required. Re-install with "double lip" end pointing up into gun. Lightly grease handle threads (petroleum jelly, auto grease) and re-install firm hand tight. Brush exterior of gun clean.
12. Remove intake screen on metal suction tube or hopper and brush clean, re-install.

13. Storing unit for more than 3 days. If unit was cleaned with an oily paint thinner, the unit is now ready for storage (follow step 14). If unit was cleaned with water or a strong thinner (ie. lacquer thinner) pump mineral spirits through the entire system by repeating step 8.
    If it is not available, drain all the solvent out of the hose, gun, and pump. (Tungsten carbide parts in the valves will corrode if left in water for long periods of time). With the pump running in the prime mode, place a few drops of light oil in the packing (see the picture below).



Oil packing before storing

14. Coil up electrical cord and spray hose, inspecting both for signs of damage. Suggested minimum coil size for 1/4" paint hose is 18 inches.

DO NOT COIL PAINT HOSE TOO TIGHTLY. THIS MAY CAUSE KINKS, WHICH WEAKEN THE HOSE. A PAINT HOSE WITH KINKS OR OTHER DAMAGE SHOULD BE CONSIDERED UNSAFE AND BE REPLACED IMMEDIATELY.

WARNING: DO NOT CLEAN THE SPRAY GUN UNLESS THE PRESSURE HAS BEEN RELEASED FROM THE SYSTEM. SEE PAGES 3 - 5 FOR FURTHER PRECAUTIONS.

12. Maintenance & Service

PAINT HOSE:
Periodically inspect the paint hose. If the hose is kinked, cut, or worn, it must be replaced . It cannot be repaired. A hose bursting at 220 bar (3200 psi) can cause significant damage to property AND cause a serious injury if the spray injects the skin. Replace with a grounded or conductive airless paint hose that is rated for at least 220 bar (3200 psi) working pressure.

DUMP VALVE:
If the dump valve is not properly cleaned after each use, It will wear prematurely. When worn, the paint will flow through the return hose while the valve is turned to“spray”. Spraying pressure will progressively drop as the valve continues to wear. A new valve (or repair kit) should be installed immediately to prevent over working the unit.
Hint... to get maximum use out of the dump valve:
a. Always reduce pressure before turning the handle.

PRESSURE CONTROL VALVE:
The pressure control valve is preset at the factory for your safety and is not adjustable except by an authorized service centre. The valve is easily replaced and should be carefully thighten. The pump should be beld after installation.

CLEANING THE COOLING FAN:
Whenever the cooling fan and fan cover become built up with dust, they should be cleaned. This will prevent overheating of the motor and pump.

1. Turn unit OFF, unplug from electrical outlet. Ensure dump valve is OPEN and pressure is relieved.
2. Using phillips screwdriver, remove the four fan cover screws and lift fan cover off motor.
3. Scrape fan blades and fan cover clean. Use wire brush to clean buildup off of motor.
4. Re-install fan cover and the screws.

SPRAY GUN:
The filter should be cleaned or replaced after each use to minimize tip clogging problems. If the gun valve becomes worn and begins to leak, it should be replaced. See page 9 for overhaul details.

SPRAY TIP:
The spray tip is one of the most important elements in producing a quality spray job. It requires periodic replacement (every 200-800 ltr) to maintain performance and to prevent overworking the pump

LOWER PACKINGS:
No regular service required.
The lower packings of these units are mobile, i.e. they moves together with the piston. The lower packing are self-adjusted by the lower conical spring. Wear can be manifested through a drop of pressure. Attention: first be sure that the tip is not worn; this can cause a drop in spraying pressure as well.

UPPER PACKINGS:
Lubricate daily with oil.
The upper packings are self-adjusted by the upper conical spring. Wear can be manifested through a loss of material from the upper part of central body.

IMPORTANT NOTE: Both packings are included in the upper & lower packing kit, and should be changed together for best reliability and performance.

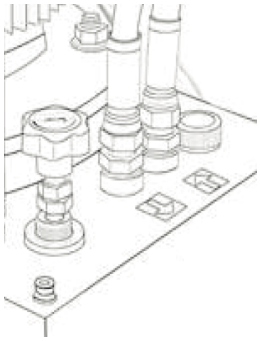
INLET AND OUTLET VALVES:
The inlet and outlet valves are wearing parts. The rate of wear depends on the type and quality of paint you use. Average life expectancy is about 2000 ltr.
A simple way to determinate the wear of the valves is:

1. With the unit ON and in “spraying position”, pull the trigger.
2. During the upper stroke of the piston, release the trigger. If the piston movement do not stop, but it continues up to the end of its stroke, it means that the outlet valve have wear.
3. Viceversa, During the lower stroke of the piston, release the trigger. If the piston movement do not stop, but it continues up to the end of its stroke, it means that the inet valve have wear.

12. Maintenance & Service

HYDRAULIC SYSTEM

1. The hydraulic fluid have to be at the middle of the indicator, which is on the back of the pump. If it is low, add only Hydraulic oil for aeronautic (ex. ESSO NUTO H46). Never add or change hydraulic fluid except in a clean dust free area. Contamination of the hydraulic fluid will shorten Hydraulic Pump life and may void warranty.



2. Change the hydraulic fluid every 12 months. Drain old fluid from tank and fill with 3 gallons (14 lt.)of Hydraulic oil. Start operation of the system at just enough pressure to operate the fluid pump. Run the system at this low pressure for at least 5 minutes.
   This removes air from the system. Check the fluid level after this procedure.
3. The Hydraulic Pump should not be serviced in the field. If service on the Hydraulic Pump is required, it must be returned to an authorized service center

GENERAL FLUID PUMP MAINTENANCE

If the paint pump is going to be out of service for an extended period of time, it is recommended that following cleanup a kerosene and oil mixture be introduced as a preservative. Packings may tend to dry out from lack of use. This is particularly true of the upper packing set for which upper packing lubricant, Lubrisolv, is recommended in normal usage. Do not substitute water or paint solvent for Lubrisolv. Ordinary oil may contaminate the paint material and is not recommended.

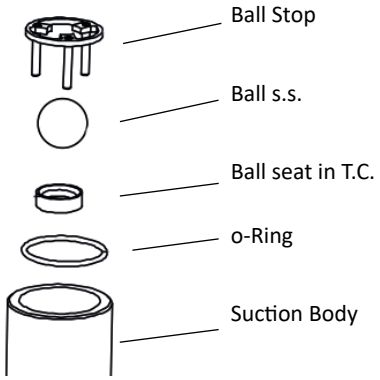
If the paint pump has been out of service for an extended period of time, it may be necessary to prime the suction by pouring some of the paint solvent into the inlet siphon tube to restart. It is extremely important that the threads on the inlet siphon hose coupling are properly sealed. Any air leakage will produce erratic operation of pump and may damage the system.The up and the down strokes should be approximately equal in time. That is, one should not be faster than the other. A fast up or down stroke may indicate air in the system or malfunctioning valve or seats. See the Troubleshooting Guide.

MAIN INSTRUCTION

Hydraulic pumps should receive routine servicing after approximately 1.000 hours of use or earlier if there is excessive leakage from the top packing, or if the pump strokes become faster on one stroke or the other. The use of Lubrisolv is recommended as an upper packing lubricant. Do not substitute oil, water, or solvent for an upper packing lubricant.

INLET VALVE

1. Disconnect the pump and put it in horizontal position. (see page 5)
2. Unscrew with the proper wrench, the suction body complete with suction valve.

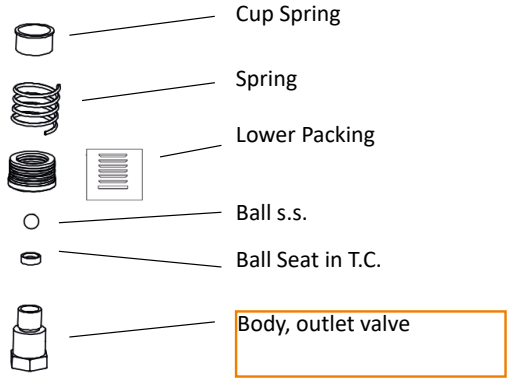


3. Remove ball stop.
4. Remove ball.
5. Clean and check all parts. Check that all parts in hard chrome does not have scratch, dents or wear. Replace them if necessary.
6. Check the valve seat and replace it if damaged or weared. Attention: Ball seat is pressed in the suction body and it requires care to be removed. Use a tool to remove valve seat and replace it with a new one. Press it into the suction body, and fix it using Locktite.
7. Replace O-ring if necessary.

12. Maintenance & Service

OUTLET VALVE & LOWER PACKING

1. Disconnect the pump and put it in horizontal position.
2. Unscrew with the proper wrench and remove, the suction block complete with suction valve.
3. Unscrew with the proper wrench and remove, the material cylinder.
4. Unscrew with the proper wrench and remove, the paint part spacer.
5. On the bottom of piston, unscrew with the proper wrench and remove the outlet valve together with lower packing, spring and cup spring.

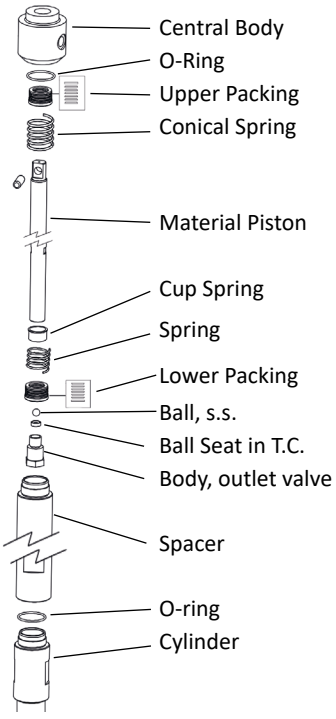


Outlet valve components

6. Remove cup spring and spring. Replace it if necessary.
7. Remove one by one the packing, the ball and ball seat from outlet valve body.
8. Clean and check all parts. Check that all parts in hard chrome does not have scratch, dents or wear. Replace them if necessary.
9. From outlet valve body, remove the ball seat and replace it, if necessary.
   ATTENTION: Ball seat must be pressed in the outlet valve body and fixed with Locktite.
10. Insert a new ball in stainless steel.
11. Grease and fit one by one, on oulet valve body, the new lower packings, keeping attention to maintain the V toward.
12. Insert spring and cup spring on outlet valve body.
13. Screw with the proper wrench the outlet valve body complete with lower packing, spring and cup spring to the piston.
14. Screw with a proper wrench paint part spacer, the material cylinder and at last the suction block complete.

UPPER PACKING

1. Disconnect the pump and put it in horizontal position.
2. Unscrew with the proper wrench and remove, the suction block complete with suction valve.
3. Unscrew with the proper wrench and remove, the material cylinder.
4. Unscrew with the proper wrench and remove, the paint part spacer.
5. Remove the conical spring.
6. Lift the safety spring and stop ring. With a tool remove the pin which join the piston to the oleodynamic shaft
7. Remove the piston complete.
8. With a hooked tool, remove one by one the upper packing from middle pumping housing. Check packing and replace if necessary.
9. Grease and fit one by one the new upper packing on the piston, keeping attention to maintain the toward. Attention: be sure to fit the upper packing up to the end of stroke in the central body
10. Insert the piston complete to the oleodynamic shaft.
11. Lift the safety spring and insert pin in its place. Place the stop ring
12. Screw with a proper wrench conical spring, paint part spacer, the material cylinder and at last the suction block complete.



13. Troubleshooting

Provided you have followed the instructions, the sprayer will operate efficiently and give trouble-free service. Should any unexpected problem arise you can, in most cases, remedy the problem by following the chart below. If you find that you cannot correct the problem, then take the sprayer to your nearest authorized service agency. Many of the "causes" listed are unlikely to happen. However, all are included in an attempt to cover every possibility.

IT IS ABSOLUTELY ESSENTIAL FOR TROUBLE-FREE OPERATION THAT YOUR AIRLESS SPRAYER BE KEPT CLEAN AND FREE OF RESIDUAL PAINT BUILD-UP ON THE INTERNAL PARTS. IT MUST BE CLEANED AND LUBRICATED AFTER EVERY USE.

PROBLEMS	CAUSES	REMEDIS
Poor spray pattern and / or tails at top and bottom of the spray pattern.	a. Worn or incorrect tip and/or insufficient atomization. b. Hose size or length is too small or too long. c. Dirty filter.	Be sure tip is not worn. Increase pressure. Lower viscosity. Reduce surface tension by increasing hose size to minimize pressure drop through hose and/or reduce hose lengths.
Gun drips or throws a drop at the beginning or end of the spray pattern.	a. Needle or diffuser are worn. b. Increase spring tension.	a. Replace if necessary. b. Turn adjusting screw on back of gun clockwise to increase tension or use the green HP spring.
Spray tip stops up frequently.	a. Particles too large for spray tip are passing filter and/or gun screen.	a. Use 100 mesh gun screen, instead of 50 mesh, for small spray tips. Use 100 mesh screen in pump filter. Strain paint.
Spray pattern changes with pump cycle.	a Restrictions in the fluid system. b. Valves are worn	a. Check gun and pump filter screens. Always clean screens before they load UP. b. Replace.
Irregular flow of material. One stroke faster than the other.	a. Packings are worn or valve balls are not seating. b. Restriction in suction system.	a. Replace. b. Check suction hose assembly to be sure no air is entering, then recheck all threaded fittings for leakage. See Troubleshooting - Fluid Section for additional service information.
Gun does not spray any fluid.	a. Suction hose leak. b. No paint. c. Plugged foot valve. d. Plugged filters or tip. e. Ball check valve stuck open.	a. Inspect for siphon hose leak. b. Check fluid supply. c. Remove, clean, inspect foot valve. d. Clean filters or tip. e. Clean and inspect pump ball check valve.

13. Troubleshooting - Spray patterns

PROBLEMS	CAUSES	REMEDIS
TAILS 	a. Inadequate fluid delivery. b. Fluid not atomizing correctly.	a. Increase fluid pressure. Change to smaller tip orifice size. Reduce fluid viscosity. Reduce hose lenght b. Clean gun and filter(s). Reduce number of guns using pump.
HOUR GLASS 	a. Inadequate fluid delivery.	a. Increase fluid pressure. Change to smaller tip orifice size. Reduce fluid viscosity. Reduce hose lenght
DISTORTED 	a. Plugged or worn nozzle tip.	a. Clean or replace nozzle tip.
PATTERN EXPANDING & CONTRACTING (SURGE) 	a Suction leak. b. Pulsating fluid delivery.	a. Inspect for siphon hose leak. b. Change to a smaller tip orifice size. Install pulsation dampener in system to drain existing one. Reduce numer of guns using pump. Remove restrictions in system, clean tip screen if filter is used.
ROUND PATTERN 	a. Worn tip. b. Fluid too heavy for tip.	a. Replace tip. b. Increase pressure. Thin material. Change nozzle tip.

13. Troubleshooting - Hydraulic section

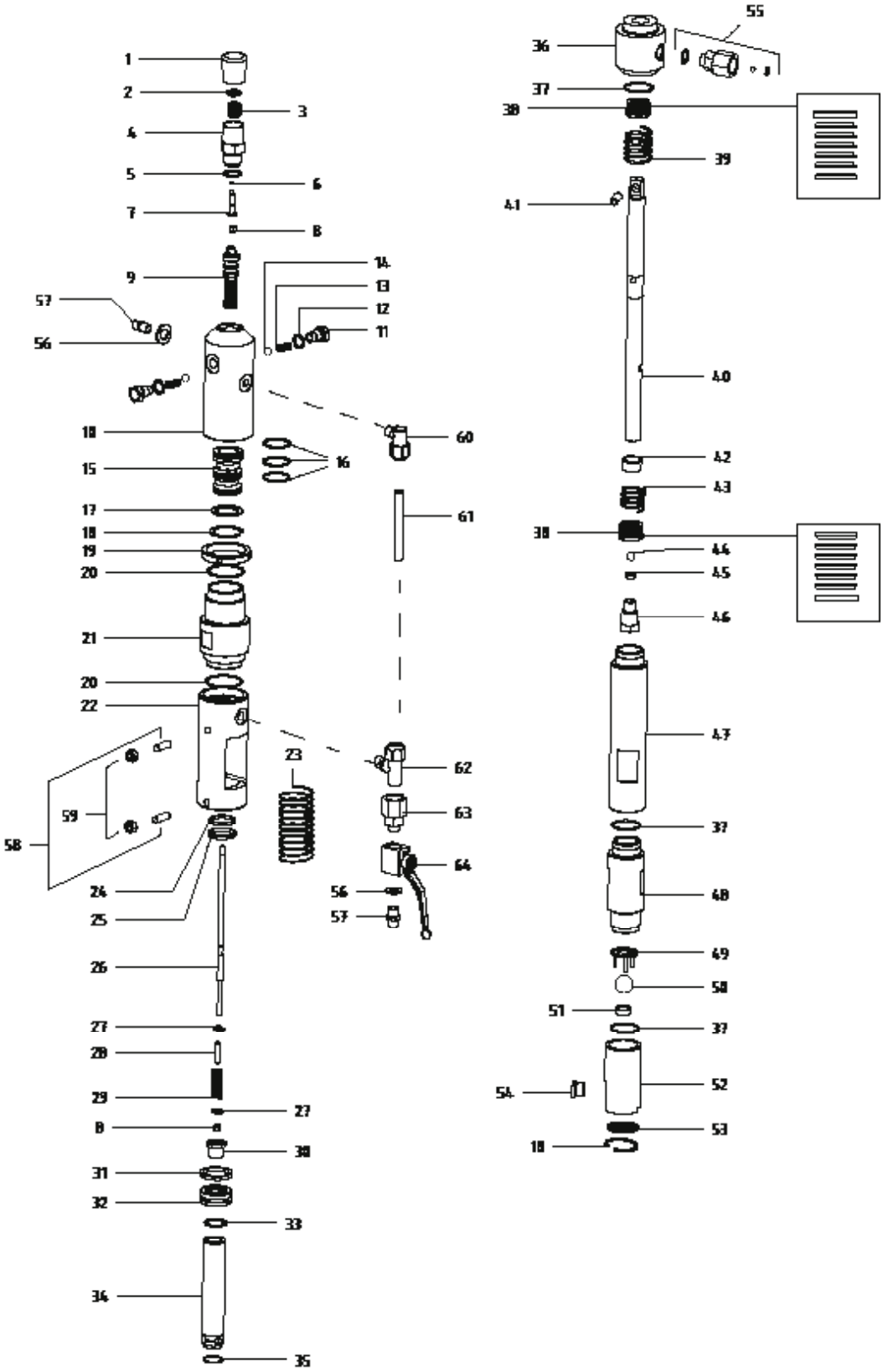
PROBLEMS	CAUSES	REMEDIS
Oil motor stalls at bottom. (No unusual heat problems.)	a. Inversion valve is blocked	a. Push the reset valve
Oil motor stalls at top. (No unusual heat problems.)	a. Inversion valve is blocked b. Broken spring retainer (valve rod assembly) c. Broken spring on valve rod. d. Air in hydraulic motor. e. Air in fluid pump.	a. Push the reset valve b. Replace valve rod assembly. c. Replace valve rod assembly. d. Reset Valve. Purge Air, generally accomplished by low pressure cycling of motor/pump assembly for 5 -10 minutes. Check for causes of air introduction. - Loose fittings in tank. - Loose fittings on hydraulic pump. - Loose hose connections. - Low oil in reservoir. e. Stall at top can occur randomly when fluid pump picks up air. Reset valve. Avoid air in the fluid pump.
Low pressure (okay oft down strode sluggish on up stroke - high heat) Note: Engine labors on upstroke. Idles back at stall on down stroke	a. Blown piston seal b. Cracked piston	a. Before dismantling oil motor, start machine. With pump cycling under pressure, touch the hydraulic cylinder and the head to see if cylinder or head gets hotter. This will help determine if piston seal is blown or piston nut is broken. If heat is on the head, check the O-rings on spool valve. b. Dismantle oil motor and check piston seals cylinder bore and piston nut. Pay special attention to piston nut. It can be cracked and not show externally
Low pressure (both strokes - high heat) Note: Engine labors at stall on both strokes.	a Blown center O-rings on spool valve. b. Bad hydraulic pump.	a. Before dismantling oil motor, start machine. With pump cycling under pressure, touch the head to see if the head becomes hotter. This will help determine if center O-ring is blown on spool valve. If hot, remove valve and replace O-rings. b. Replace hydraulic pump.

13. Troubleshooting - Fluid Section

PROBLEMS	CAUSES	REMEDIS
Pump delivers on upstroke only or goes up slowly and down fast. (Commonly called downstroke dive.)	a. Lower foot valve ball is not seating due to trash or wear. b. Material too viscous to suction. c. Air leaking in on suction hose side or damaged suction hose. Suction hose may be too small for heavy material.	a. Remove inlet valve assembly. Clean and inspect. Test inlet valve by filling with water; if ball fails to seal the seat, replace ball. b. Thin material- contact manufacturer for proper thinning procedures. c. Tighten all connections between pump and paint container. If damaged, replace. Switch to larger diameter suction set.
Pump delivers on down stroke only or goes up fast and down slowly.	a. Upper ball is not seating due to trash or wear. b. Lower packing set is worn	a. Check upper seat and ball with water. If ball fails to seal seat, replace. b. Replace packing set if worn.
Pump moves up and down fast, not delivering material.	a. Material container is empty or material is too thick to flow through suction hose. b. Bottom ball stuck to inlet valve seat. c. Suction hose is kinked or loose.	a. Refill with new material. If too thick, remove suction hose and immerse pump or add thinner to material. Change to bigger suction set. Open dump valve to remove air and restart pump. b. Remove inlet valve. Clean ball and seat. c. Straighten.
Pump moves up and down slowly when spray gun is shut off.	a Loose connections bleed valve is open partially or bleed valve is worn. Lower packing set is worn b. Upper and/or lower ball not seating	a. Check all connections between pump and gun. Tighten as necessary If material is flowing from bleed hose, close bleed valve or replace if necessary. Should none of above be evident, replace lower packing. b. Reseat balls by cleaning
Not enough fluid pressure at gun.	a Spray tip is worn. b. Outlet filter or gun filter is clogged. c. Low voltage and/or inadequate amperage. d. Hose size or length is too small or too long.	a. Replace. b. Clean or replace filter. c. Check electrical service. Correct as required d. Increase hose size to minimize pressure drop through hose and/or reduce hose lengths
Pump chatters on up or down stroke.	a Solvent has caused upper packing to swell.	a. Replace packings

Model: **HP-41** Last update: **05/2024**

Part no.: SPAREPARTS LIST



Model: **HP-41** Last update: **05/2024**

Part no.: SPAREPARTS LIST

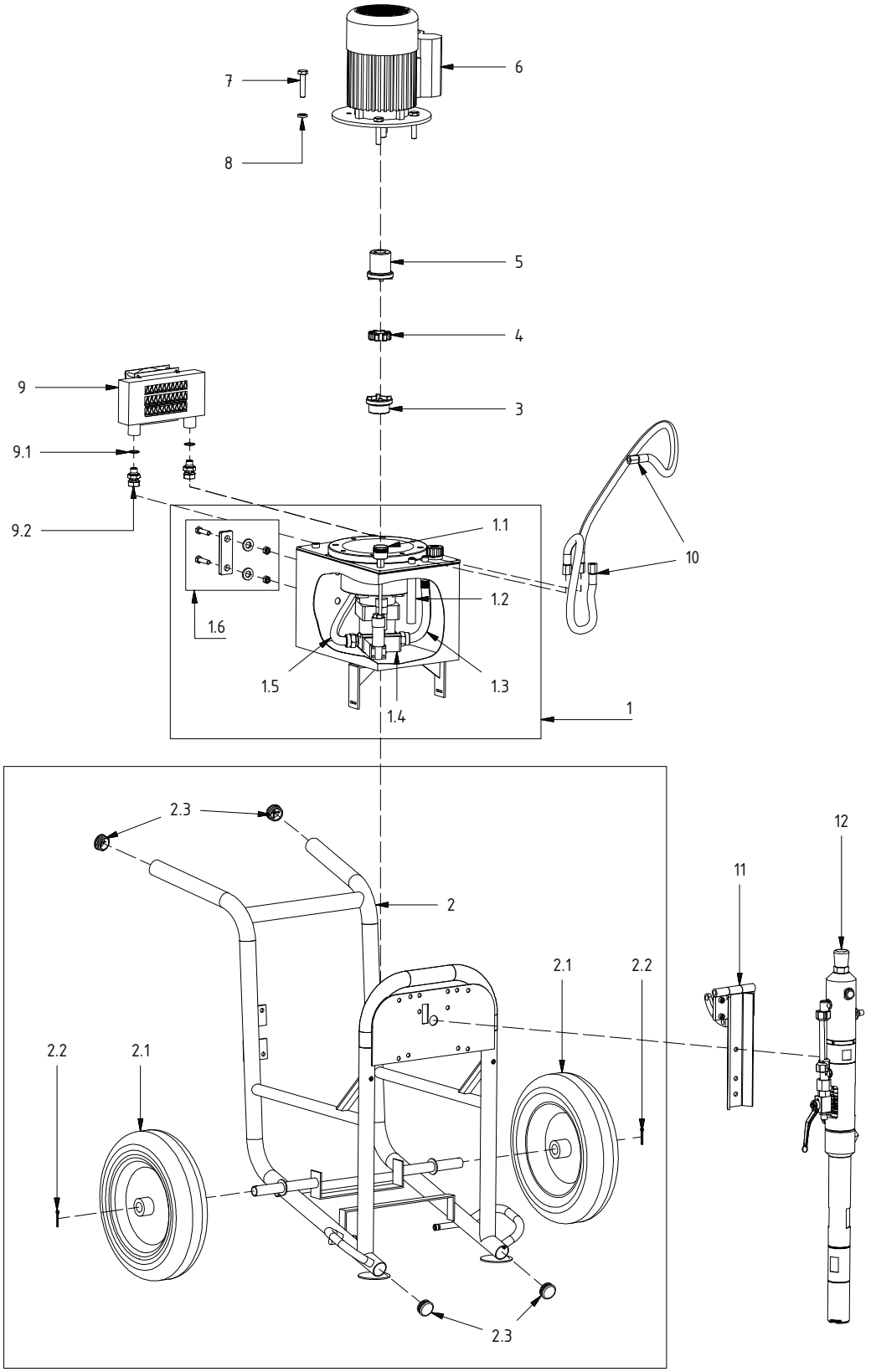
Pumping part HP-41

Pos.	Ref.	Description	Q.ty
1	MA-HP41#1	Plug	1
2	MA-HP41#2	Reset Nut	1
3	MA-HP41#3	Spring	1
4	MA-HP41#4	Release Body	1
5	MA-HP41#5	O-Ring	1
6	MA-HP41#6	O-Ring	1
7	MA-HP41#7	Reset Pin	1
8	MA-HP41#8	Self-Locking Nut	2
9	MA-HP41#9	Mobile Fuse	1
10	MA-HP41#10	Reversal Body	1
11	MA-HP41#11	Tracer Point	2
12	MA-HP41#12	Copper Gasket	2
13	MA-HP41#13	Spring, Tracer Point	2
14	MA-HP41#14	Ball, Tracer Point	2
15	MA-HP41#15	Piston Sleeve, Fuse	1
16	MA-HP41#16	Or Seal	3
17	MA-HP41#17	Washer	1
18	MA-HP41#18	Seeger S.S.	2
19	MA-HP41#19	Fixing Ring Nut	1
20	MA-HP41#20	O-Ring	2
21	MA-HP41#21	Oleodynamic Cylinder	1
22	MA-HP41#22	Pumping Housing Double	1
23	MA-HP41#23	Safety Spring	1
24	MA-HP41#24	Static Scraper	1
25	MA-HP41#25	Dust Cover	1
26	MA-HP41#26	Valve Rod	1
27	MA-HP41#27	Washer	2
28	MA-HP41#28	Spring Guide	1
29	MA-HP41#29	Spring	1
30	MA-HP41#30	Nut	1
31	MA-HP41#31	Plunger Scraper	1
32	MA-HP41#32	Scraper Piston	1
33	MA-HP41#33	O-Ring	1
34	MA-HP41#34	Oleodynamic Shaft	1
35	MA-HP41#35	Stop Ring	1
36	MA-HP41#36	Pumping Housing Central	1
37	MA-HP41#37	O-Ring	2
38	MA-HP41#38	Upper & Lower Packing	2
39	MA-HP41#39	Spring , Upper Packing	1
40	MA-HP41#40	Material Piston	1
41	MA-HP41#41	Pin	1
42	MA-HP41#42	Cup Spring	1
43	MA-HP41#43	Spring	1
44	MA-HP41#44	Ball d.11, S.S.	1
45	MA-HP41#45	Seat	1
46	MA-HP41#46	Compression Valve Body	1
47	MA-HP41#47	Spacer, Paint Part	1
48	MA-HP41#48	Product Cylinder	1
49	MA-HP41#49	Ball Stop Complete	1
50	MA-HP41#50	Ball d.25 IN S.S	1
51	MA-HP41#51	Seat	1
52	MA-HP41#52	Suction Body	1
53	MA-HP41#53	Filtering Disc	1
54	MA-HP41#54	Plug 1/2" S.S.	1
55	MA-HP41#55	Non-Backflow Valve Nipple	1
56	MA-HP41#56	Copper Gasket	2
57	MA-HP41#57	Nipple MM3/8"	2
58	MA-HP41#58	Fixing Screw	2
59	MA-HP41#59	Fixing Nut	2
60	MA-HP41#60	Nipple	1
61	MA-HP41#61	Oil Hose	1
62	MA-HP41#62	"T" Fitting 3/8"	1
63	MA-HP41#63	Nipple 3/8 FF	1
64	MA-HP41#64	Faucet HP MM3/8"	1

Spare parts suggested:

1)	MA-HP41#PK	Upper And Lower Packings Set (38 X2)
2)	MA-HP41#CVK	Compression Valve Kit (44-45-46)
3)	MA-HP41#SUK	Suction Valve Kit (50-51-52)

Model: **HP-41** Last update: **05/2024**
Part no.: SPAREPARTS LIST



Model: **HP-41** Last update: **05/2024**

Part no.: SPAREPARTS LIST

HYDRAULIC PART & TROLLEY			
Pos.	**Ref.**	**Description**	**Q.tà**
1	**MA-HP41-B#1**	**Trolley Kit HP-41**	**1**
1.1	MA-HP41-B#1.1	Cotter Pin	2
1.2	MA-HP41-B#1.2	Wheel	2
1.3	MA-HP41-B#1.3	Bolt	3
1.4	MA-HP41-B#1.4	Self-Blocking Nut	3
1.5	MA-HP41-B#1.5	Universal Trolley, body	1
1.6	MA-HP41-B#1.6	Split Pin	2
1.7	MA-HP41-B#1.7	Handle, Universal Trolley	1
1.8	MA-HP41-B#1.8	Tools Box	1
1.9	MA-HP41-B#1.9	Bolt	2
1.10	MA-HP41-B#1.10	Nut	2
2	**MA-HP41-B#2**	**Hydraulic Box**	**1**
2.1	MA-HP41-B#2.1	Tube	1
2.2	MA-HP41-B#2.2	Hydraulic box	1
2.3	MA-HP41-B#2.3	Connecting Hose	1
2.4	MA-HP41-B#2.4	Connecting Hose	1
2.5	MA-HP41-B#2.5	Pressure Regulating Valve	1
2.6	MA-HP41-B#2.6	Oil Level	1
3	**MA-HP41-B#3**	**Trolley, cpl.**	**1**
3.1	MA-HP41-B#3.1	Copper Gasket	2
3.2	MA-HP41-B#3.2	Adapter HP - M1/2" - F1/2"	2
4	MA-HP41-B#4	Half-joint Pump	1
5	MA-HP41-B#5	Elastic Coupling	1
6	MA-HP41-B#6	Half-joint Motor	1
7	MA-HP41-B#7	Electric Motor HP 3 - 230V /50 Hz	1
8	MA-HP41-B#8	Nut	4
9	MA-HP41-B#9	Washer	4
10	MA-HP41-B#10	Schnoor Washer	4
11	MA-HP41-B#11	Bolt	4
12	MA-HP41-B#12	Connecting Hose	2
13	**MA-HP41-B#13**	**Pump Support Kit HP-41**	**1**
13.1	MA-HP41-B#13.1	Pump Support	1
13.2	MA-HP41-B#13.2	Nut	2
13.3	MA-HP41-B#13.3	Bolt	2
13.4	MA-HP41-B#13.4	Pump Support	1
14	**MA-HP41-B#14**	**Pumping Housing HP-41**	**1**

WARRANTY

We appliance on this product a period of guarantee of 12 months from the date written on the invoice, unless otherwise stated in writing. The warranty covers all manufacturing faults and material defects. Replacements and repair operations are covered only if carried out by our company and at our servicing shops.
The faulty parts must be sent CARRIAGE FREE.
Once the components have been repaired they will be sent CARRIAGE PAID to the customer.
The warranty does not cover our company personnel aid during installation or dismantling operations. If for practical purposes one of our employee is sent to the premises, a charge will be made for the time plus extra for travelling and expenses.
Our warranty does not cover direct or indirect damage, to people or property, caused by our appliances and it does not cover repair operations carried out by the owner or by a third party.
The following are not covered by our warranty:

- failure caused by incorrect use or assembly.
- failure caused by external agents.
- failure caused by lack of maintenance or negligence.

WARRANTY FORFEITURE:

If the form attached below is not filled out and returned.
In case of delayed payment or other contract defaults.
All repair operations carried out under warranty do not interrupt its duration.
Whenever changes or repairs are carried out on our machinery without prior authorization.
Whenever the unit seems tampered with, dismantled or previously repaired in unauthorized servicing shops.
Whenever the serial number is damaged or removed.
When the damage is caused by improper use or functioning, or if the machine falls, is bumped or by other causes of malfunctioning not due to normal working conditions

GEMINI GmbH
Rheinstrasse 7
DE-88046 Friedrichshafen

+49 7541 98156-15

+49 7541 98156-25

info@gemini-airless.de

www.gemini-airless.de