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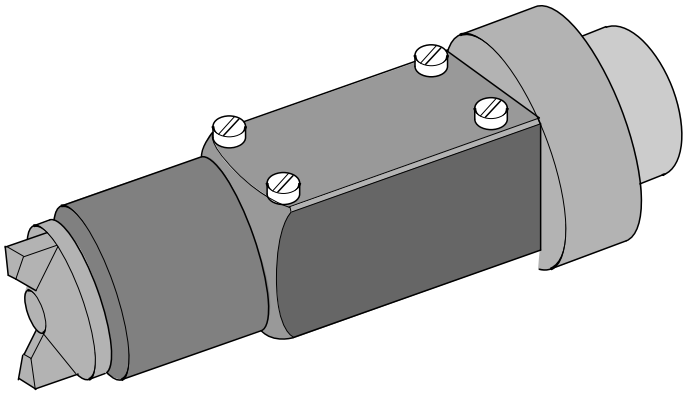

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User manual

TRP 500
Spray gun

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Trainings with the aim of getting the necessary know-how to use and for the maintenance of your equipment can be organised all along the year.
A catalog is available upon request. Among the different training programmes proposed, you will be able to find the training which corresponds the best to your needs and production purposes. These trainings can be organised in your premises or in our training center based in our headquarters in Meylan.

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SAS Sames Technologies operating manuals are written in French and translated into English, German, Spanish, Italian and Portuguese.
The French version is deemed the official text and Sames will not be liable for the translations into other languages.

TRP 500
Spray gun

WARNING : This document contains links to the following user manuals:
see RT Nr 6180 for the **TRP 500** calculation and adjustment manual.
see RT Nr 6407 for the **AP 1000** resistivohmmeter.

1. Health and Safety Instructions

1.1. Precautions for Use

This document contains information that all operators should be aware of and understand before using the **TRP 500** . This information highlights situations that could result in serious damage and indicates the precautions that should be taken to avoid them.

1.2. Warnings

WARNING : Safety may be jeopardized if this equipment is not operated, disassembled and reassembled in compliance with the instructions given in this manual and in any European Standard or national safety regulations in force.

WARNING : Equipment performance is only guaranteed if original spare parts distributed by SAMES Technologies are used.

WARNING : Using metallic nozzles and caps in electrostatic configuration influences the zone of unauthorized spraying which is stipulated in the user manual of the several sprayers equipped with TRP 500.

WARNING :

This equipment has to be used only within areas designed for spraying with respect to EN 50176, EN 50177, EN 50223, or with similar ventilation conditions. The equipment has to be used only within ventilated in order to reduce risks for the health of the operators, fire or explosion. The efficiency of the extraction ventilation system has to be daily checked.

Within explosive atmospheres produced by the spraying process, only appropriate explosion-proof electrical equipment has to be used.

Before carrying out any cleaning or general work on atomizers in the spraying area, the high voltage generator must be switched off and the atomizer HV circuit discharged to the ground.

The pressurised coating product or the pressurised air must not be directed towards people or animals.

Appropriate measures have to be taken to avoid, during periods when the equipment is not used and/or when the equipment is broken, the presence of potential energy (liquid or air pressure or electric) inside the equipment.

Using individual protection equipment will limit the risks of contact and/or inhalation of toxic product, gas, vapours, fog or dusts that can be produced while using the equipment. The user has to follow the coating product manufacturer's recommendations.

Electrostatic spraying equipment must be serviced regularly in accordance with the information and instructions given by SAMES Technologies.

Cleaning operations must be carried out either in authorised areas equipped with a mechanical ventilation system, or using cleaning liquids with a flash point at least 5 °C higher than room temperature.

Only metal containers can be used for cleaning liquids and they must have a reliable ground connection.

Inside the booth it is forbidden to use a naked flame, glowing object or a device likely to produce sparks.

It is also forbidden to store inflammable products, or vessels that have contained them, close to the booth.

The surrounding area must be kept clear and clean.

A careful check must be made to ensure that any conducting or semi-conducting part closer than 2.5 m to the atomizer is correctly grounded.

If it is not, electrical charges capable of causing sparks could build up on it. Operating personnel must wear anti-static shoes (according to Standards EN 61340-4-3 and ISO 20334) and gloves (according to Standard EN 1149-5) to avoid this risk.
The resistance of contact will always have to be lower than 100 MΩ.

All metal parts of the booth and parts to be painted must be correctly grounded. Ground resistance must be less than or equal to 1 MΩ (minimum measurement voltage 500 V). This must be checked regularly.

Grounding is mandatory for all the conductive envelops of the electrical equipments and for all the conductive components within explosive atmospheres by conductive connection with the ground terminal.

Finally, for the same reasons, the spraying area must have an anti-static floor, such as concrete, metal duckboard, etc.
It is essential to provide sufficient ventilation in the spraying booths to avoid the build up of inflammable vapors.

The effectiveness of the overcurrent protection (di/dt) must be checked every day. This check must be carried out in an area **with no explosive atmosphere** by placing a ground device near the electrode of the atomizer when the atomizer is switched on (the operator must be connected to ground): the control module must switch to the fault state.

Additional equipment has to be placed outside the dangerous area and its starting device has to be servo-controlled to the running mode of the booth aspiration fan. The correct working of the servo-control has to be checked once a week.

A warning board has to be placed in full view close to the sparing area.

1.3. Important Recommendations

1.3.1. Compressed Air Quality

The air must be filtered to a level that will guarantee a long life time and prevent any pollution during painting.

The filter must be installed as close as possible to the facility. The filter cartridges must be changed regularly to ensure that the air is clean.

The inside of hoses supplying air to the atomizer and the ports of the quick-disconnect plate must be clean and free of any traces of paint, solvent or other foreign matter.

WARNING : The guarantee does not cover damage caused by foreign matter such as paint, solvent or other substances entering the air circuits of the TRP 500.

1.3.2. Product Quality

The paint must be filtered to prevent any damage to the spray gun.

The maximum permissible particle size in the atomizer is 200 µm.

1.3.3. High Voltage

Disable the high voltage if the **TRP 500** is not operated for a prolonged period (conveyor shutdown, no objects to be painted, slack periods, etc.) to prevent ionization of the air

1.3.4. O-ring Seals

Use the seals recommended in this manual. For solvent-based products, seals in contact with the product must be chemically inert seals resistant to swelling or chemical attack. The **TRP 500** is only guaranteed to operate correctly if it is used with seals whose size and material conform to this manual.

1.3.5. Ventilation

Do not begin applying paint with the **TRP 500** before starting up the ventilation system in the spraying booth. If the ventilation is cut, toxic substances such as organic solvents or ozone may remain in the spraying booth, resulting in a risk of fire, poisoning or irritation.

1.3.6. Residual pressure

Before all maintenance or repair operations, remove paint and solvent from the atomizer, switch off the high voltage power supply and cut the paint, solvent and air supplies, then release residual pressure in each supply system. Residual pressure may leadto component damage and expose personnel to serious injuries. Paint or solvent dispersion may also lead topoisoning or irritation.

1.3.7. Safety devices

During installation of the **TRP 500**, it is important to set up safety devices enabling high voltage power, paint, solvent and air supplies to be cut immediatly if there is a problem.

- Detection of control system faults.
- Detection of high voltage surges. (with the SAMES high voltage generator).
- Detection of air pressure drops.
- Detection of ventilation failure.
- Detection of fire.
- Detection of human presence.

Failure to install safety devices could result in a risk of fire, expose the personnel to serious injury and damage the equipment.

1.3.8. Mechanical crash

The warranty does not apply to damages resulting from operator / process error: for example in case of a robot crash or collision.

1.3.9. Ambient Temperature

The sprayer is designed to work normally under room temperature between 0°C and + 40°C.

In order to optimise application quality, it is advised to work under room temperature between + 15°C and + 28°C.
The storage temperature will never exceed +60°C.

1.3.10. Specific maintenance provisions

The access of the booth, near the atomizer in operation, will have to be proscribed and controlled by safety devices (see § 1.3.7 page 9) which will have to stop the equipment in case of intrusion of people in the area.
Nevertheless, for maintenance operation, these safety devices will have to be arranged in order to allow certain operations and checks (only for persons trained and entitled by Sames Technologies).

1.4. Guarantee

Under the guarantee, which applies only to the buyer, **SAMES Technologies** agrees to repair operating faults resulting from a design fault, materials or manufacture, under the conditions set out below.

The guarantee claim must define, in writing, the exact nature of the fault concerned.
The **SAMES Technologies** guarantee only covers equipment that has been serviced and cleaned according to standard procedures and our own instructions, that has been fitted with parts approved by SAMES or that has not been modified by the customer..

More precisely, the guarantee does not cover damage resulting from:

- the customer's negligence or inattentiveness,
- incorrect use,
- failure to follow the procedure,
- use of a control system not designed by SAMES Technologies or a SAMES Technologies control system modified by a third party without written permission from an authorized SAMES Technologies technical agent,
- accidents such as: collision with external objects, or similar events,
- flooding, earthquake, fire or similar events,
- inadequately filtered bearing air (solid particles more than 5 µm in diameter),
- inadequately filtered paint and solvent,
- use of seals not complying with SAMES Technologies recommendations,
- pollution of air circuits by fluids or substances other than air.

SAMES Technologies spray gun type **TRP 500** is covered by a one-year guarantee for use in two 8-hour shifts under normal operating conditions.

The guarantee does not apply to wearing parts such as diaphragms, seals, etc.

The guarantee will take effect from the date of the first startup or of the provisional acceptance report.

Under no circumstances, either in the context of this guarantee or in other contexts, will **SAMES Technologies** be held responsible for physical injury or intangible damage, damage to brand image and loss of production resulting directly from its products.

2. General

2.1. Description

2.1.1. **TRP 500 spray gun**

- The TRP 500 spraying head may be equipped to produce a round spray or fan spray.
- To produce a fan spray, the head has three air inlets:
  - the trigger air, for starting or stopping atomization,
  - the atomizing air for atomizing the paint,
  - the fan air, for adjusting the size of the paint spray.

Atomizing air and fan air are used simultaneously to produce a fan spray.

- To produce a round spray, the head also has three air inlets:
  - the trigger air,
  - the directional air, for atomizing and obtaining a narrow, highly penetrating spray.
  - the vortex air, also used for atomizing and obtaining a large spray with wraparound effect.

A round spray can be obtained using only directional air, only vortex air or the two simultaneously.

- For a round spray or fan spray, the two spraying air inlets can be adjusted independently, allowing the paint spray characteristics (atomizing fineness, pattern size, wraparound effect) to be easily and accurately adjusted during remote operation. If necessary, the atomizer operating characteristics (trigger air for interrupting atomization, pressure of the two types of spraying air) can be managed via a PLC.
- The atomizing head also has a paint inlet and high voltage connector.
- The basic parts of an atomizer are a body fitted with an atomizing nozzle at one end and a system for starting or stopping atomization at the other end. Four screws secure it to the manifold, providing a seal for the air and paint supplies and the high-voltage electrical connection.
- The system for starting or stopping the atomizer consists of a piston comprising:
  - a central air valve controlling the flow of atomizing air (fan spray) or directional air (round spray),
  - an external air valve, for the flow of fan air (fan spray) or vortex, air (round spray).
  - a paint valve (needle) to control the paint flow.

These three valves are opened by the quick-action piston (diaphragm or piston types), in a sequence that prevents atomizing faults (coarse atomizing) on start-up.
They are closed by 3 springs in a sequence that prevents other faults (splashing or soiling of the head) when atomizing is stopped.

- The fan spray nozzle (P) exists in two versions:
  - an option with a plastic paint injector and a high-voltage electrode, for maximum safety (lowest possible storage of electrical power),
  - an option with metallic paint injector, providing consistent atomizing quality over time (wear resistant).
- The nozzle for round spray (R) exists in four calibers:
  - caliber 8, standard,
  - caliber 6, 12, 20 as options.
- Each atomization nozzle is fitted with a spraying air cap kept in place by a nut. Behind the nozzle there is a removable port in the atomizer body, available in different sizes according to the type of paint supply and operating paint flow rate.
- The connection between the high-voltage input and the electrode (or metallic injector) is provided by a series of contact springs and electrical damping resistors, reducing the risk of electrical arcing between the atomizing head and the part to be painted.
- O-rings are used to seal the atomizer body.
- Three lip seals in the body of the gun provide a seal between the paint and the spraying air.

2.2. Operating principle

2.2.1. Spray gun

Idle mode: as the paint and spraying air are under pressure and the pilot trigger pressure is nil, the three springs force the three valves to stay closed: the paint and spraying air cannot flow.

When atomization is started up: the pilot trigger air pressure is generated. The control piston draws back the piston of the atomizing air (or directional air) valve, which draws back the piston of the fan air (or vortex air) valve, which in turn draws back the paint needle: the three valves are open, the paint and spraying air flow in the order described.

When atomizing is stopped: the closing sequence of the three valves is the reverse of the start-up sequence

Electrostatic operation: for electrostatic painting of an electrically conductive object (metallic or wooden) connected to the ground potential, the paint droplets must be electrically charged. They are then driven by the air flow and electrical field whose force lines are directed towards the object to be painted. The paint is charged by creating a high voltage charge in the paint injector on the atomizing head. For the round spray, this injector is normally metallic. For maximum protection against the fire risk, a plastic version fitted with an electrode is available. For the round spray, the plastic injector is fitted with a pointed ionizing electrode. The atomizing head (paint injector) is electrically connected to a high voltage generator via a suitable cable.

The advantages of electrostatic paint application are:

- very high transfer efficiency (ratio between the paint actually applied to the part and the paint used for the operation): it is at least double the ratio obtained by conventional application. Using the round spray it may be as high as 90 %. As a result, electrostatic application provides a saving in the quantities of paint required a given production. Over a period, it contributes to environmental protection by reducing discharges of solvents, slurries, etc.
- it reduces soiling of the paint booth. This is a consequence of increased transfer efficiency : nearly all the paint mist generated by the atomizing head is deposited by attraction to the part to be painted. Paint booth maintenance is therefore reduced.
- the wraparound effect is enhanced. This is the most striking aspect of electrostatic application: the entire surface of the object to be painted attracts the mist of electrically charged droplets. As a result, when the front of a part is painted, some of the back of the part is painted at the same time. A light application on the front is therefore sufficient to paint the whole of the part completely. This phenomenon is particularly effective using the round spray on tubular parts (up to a diameter of 200 mm) or on meshed parts. This results in a reduction in paint consumption, operating time and the number of atomizers used for painting a part.
- evenness of the paint coat (consistent thickness over the painted surface). This is a result of the electrostatic wraparound effect. It produces a more reliable painted surface, enhancing anti-corrosion protection and producing a consistent and even finish.
- an excellent finish. The paint is atomized by the effect of compressed air in the spraying air cap and also the effect of the electrostatic charge. If the paint has a suitable resistivity level, the high voltage tends to produce finer particles than those produced by atomizing without high voltage. The film and gloss of objects painted in electrostatic mode are much better than those obtained by non-electrostatic application.
- the charge transferred to the paint flowing in contact with the high-voltage electrode or metallic injector: the electrode transfers electrical charges to the paint,

- ion bombardment: when the droplets leave the nozzle, their path between the atomizer and the part to be painted takes them through air ionized by the high-voltage electrode or metallic injector.

Air ions become attached to the droplets and transfer their electrical charge.

The paint droplets are charged in two different ways:

The variation in potential created between the part to be painted (set to ground potential) and the high-voltage electrode or metallic injector, establishes an electrical field.

The electrically-charged paint droplets caught in an electrical field are subjected to an electrical force

directed at the entire outer surface of the part.
All other things being equal, the transfer efficiency and electrostatic wraparound effect increase in proportion to the strength of the electric field (obtained by increasing the high voltage value and/or reducing the distance of the atomizer from the part) and the reduction of spraying air pressure. Transfer efficiency and wraparound are better with a round spray than with a fan spray.

2.2.2. Filling the paint circuit

The paint arrives under pressure on the spring side of the dump valve. The valve remains closed until the air in its trigger circuit is pressurized. When this air is pressurized, the valve opens and the paint flows into the dump hose.

2.2.3. Dumping the equipment

A color-changing block must be installed close to the spraying head. It has an inlet for each color, an air inlet, a solvent inlet and an outlet to the spraying head. To change color or to stop the facility, the following operations must be carried out:

- stop spraying the current color by switching off the pilot trigger,
- switch off the high voltage generator,
- close the pneumovalve controlling the color being used on the color-changing block,
- trigger the dump valve,
- send spurts of air and solvent by triggering the air and solvent pneumovalves of the rinsing block in alternation, in order to clean the hose between the rinsing block and the atomizer. The length of each spurt depends on the diameter and length of the hose between the rinsing block and the atomizer,
- stop the dump valve air and start the needle trigger air for two seconds: the atomizer seat holder, needle and nozzle are rinsed,
- stop the needle trigger air and start the dump valve trigger air,
- close the solvent pneumovalve. Drying air is then sent through the hose. The length of each burst of drying air depends on the diameter and length of the hose between the rinsing block and the spray gun,
- when the outlet hose is dry, close the air pneumovalve.

2.3. Technical Data

2.3.1. Paint circuit

- Maximum pressure: 6 bar
- Viscosity: 5 to 68 seconds, AFNOR cup 4, 14 to 60 seconds FORD cup 4.
- Maximum resistivity 500 MΩ.cm (see § 2.3.3 page 14 and see § 3.1.1 page 15).
- Flash point: avoid products with a flash point of less than 21°C.
- Response time between switching on and arrival of paint at the nozzle: approx. 25 ms (rough guide only).
- Response time between switching off and paint no longer arriving at the nozzle: approx. 30 ms (rough guide only).

2.3.2. Air circuit

- Maximum trigger air pressure for the needle, dump valve and spraying air: 6 bar.
- Normal trigger air pressure for the needle and dump valve 5 bar.
- Maximum spraying air flow: approx. 30 Nm^3/h per atomizing head (depending on the paint flow rate and viscosity, size of the paint pattern, type of air cap and injector, type of paint).
- Air quality:
  - Dew point at 6 bar relative pressure: -17 °C (-40 °C at atmospheric pressure).
  - The air must contain no more than 0.01 mg/Nm^3 of oil.
  - Any impurities must be no more than 5 microns in diameter and their concentration must not exceed 5 mg/Nm^3.

2.3.3. High voltage and paint resistivity

- Maximum voltage 100 kV.
- Normal operating voltage 90 kV.
- Average operating current: 20 to 70 µA (depending primarily on electrical leakage of the paint circuit, the operating voltage and the distance from the part).

The electrical charge of the paint droplets depends primarily on the resistivity of the paint. If this resistivity is too low (1 to 5 MΩ.cm), wraparound is excellent but there is a high level of back spray to the atomizer or objects set to ground potential (atomizer stand, booth, robot, etc.), especially at high voltage levels (80 to 100 kV).
If the resistivity is very high (greater than 500 MΩ.cm), wraparound is poor, especially at lower voltages (40 to 50 kV).
The **SAMES AP 1000** resistivohmmeter (see RT Nr 6407) is a "field" device used to measure the resistivity of solvent-based paints within the range 0.5 to 1000 MΩ.cm.

3. Installing the spray gun

3.1. Installation

The following precautions need to be taken when installing the atomizer:

3.1.1. Estimating the power consumption the equipment

Choice of high voltage generator: the following factors determine the electrical current consumed:

- charging the paint droplets: the electrical charge required is a few µA per gram of paint,
- air ionization by paint injector: the charge current is roughly 10 to 40µA, depending above all on the high voltage level, the distance between the atomizer and the part and the paint flow rate,
- by electrical losses of the paint circuit: the paint circuit consumes a non-negligible current (see RT Nr 6180), which may be sufficient to disturb the operation of the facility.

Using the information given in Appendix 1, it is easy to estimate the total current delivered by the high voltage generator and therefore choose a suitably sized model.

To obtain maximum reliability and repeatability for paint application, the total current delivered by the generator should not exceed 0.75 times its maximum current.

Total current = paint circuit leakage current + 40 (µA).

The paragraphs below provide practical information that will help you to limit the paint circuit leakage current to this level.

- Paints with low resistivity

For paints with low resistivity (between 1 and 5 MΩ.cm), such as metallic paints with conductive diluents (ketones, alcohols, polyols, etc.), the length and diameter of the paint hose must be carefully chosen: as far as possible (see § 3.1.4 page 16), to minimize the leakage current in the paint circuit, a small-diameter hose (4 x 8 for example), more than 5 m long, should be chosen.
As these paints take an electrical charge easily, the high voltage level can be reduced to between 40 and 60 kV without any significant loss of transfer efficiency.

- Waterborne paints

Waterborne paints have very low resistivity of around a few kΩ.cm.
Two possibilities exist: electrically isolate the paint supply (container, pressurized tank), the paint hose (by using a very thick hose) and color-changing block. All the safety devices required to protect the operator from electrical shocks must be fitted. Contact us. Use a paint supply system specially designed for waterborne paints.

3.1.2. Working distance

The working distance is the distance between the paint injector on the atomizing head and the part to be painted. This distance can be between 150 and 350 mm for fan spray and round spray. However, optimum distances for coverage and transfer efficiency are between 200 and 300 mm. Generally, a working distance of 250 mm is adopted.
The working distance has a strong influence on the current delivered by the generator: the ratio between the operating voltage and working distance determines the average strength of the electrical field between the atomizer and the part. The value of the average electrical field and the geometry of the part to be painted influence air ionization at the injector, and therefore the current delivered by the generator. In some cases, the normal working distance (250 mm) must be increased to avoid paint overloads on the edges of the part to be painted (see § 4.3.3 page 21).

3.1.3. Atomizer environment

- see § 1 page 5 Regulations and Standards
- Set up the equipment so that:
  - the part to be painted is closest to the atomizer injector (working distance - see § 3.1.2 page 15),
  - the metal parts of the facility electrically connected to the ground potential (sheet metal booth, water wash, conveyor, robot, etc.) are at a greater distance from the atomizer injector. To avoid soiling, these parts must be placed at a distance from the injector at least twice as great as the distance between the injector and the part to be painted.

3.1.4. Pressure Drops in the Paint Hose

There may be a considerable pressure drop (P) produced by the friction of the paint flow in the atomizer supply hose, which may cause some items, such as the pressurized tank and pressure regulator, to operate incorrectly.
The method for calculating pressure drop in a paint hose is provided (see RT Nr 6180). A suitable paint hose in terms of pressure drop and current leakage must be chosen using the criteria given (see RT Nr 6180).

3.1.5. Choice of restrictor

3.1.5.1. Introduction

The choice of the restrictor fitted to the **TRP 500** spraying head must be made carefully according to the situation.

- The paint supply is provided in any standard manner, and the calculated supply pressure P (Pt + (Pp), (see RT Nr 6180) is too high.
- This means that the pressure drop in the paint circuit is too great. One way of reducing it is to increase the restrictor diameter. A list of optional restrictor diameters is available - see § 8.4.6 page 40. In this case, choose the widest diameter (dia. 3 mm) and recalculate P to check its suitability.
- A circulator is used for the paint supply. The paint flow is regulated by a pressure regulator and suitable restrictor.
- The paint supply cannot be set to a constant flow rate (for example, if a pressurized tank is used), or if the atomizer is used with a reciprocating machine. In these cases, a paint pressure regulator must be used.

3.1.5.2. Restrictor calculation

The restrictor is fitted to the body of the **TRP 500** spray gun head.

The atomizer restrictor must be correctly sized to obtain the correct operating range for the regulator (1 to 4 bar trigger pressure, giving 1 to 4 paint pressure at the regulator outlet).

The calculation of the restrictor diameter and choice of the standard restrictors are provided (see RT Nr 6180).

3.1.6. Diamètre des tuyaux d'air

The pilot trigger hose of the **TRP 500** atomizer head is normally a Rilsan 2.7 x 4. This is also the case for the pilot trigger hose of the SAMES paint pressure regulator. If there is a large distance (more than 10 m) between the atomizer and the trigger solenoid valve and very fast response times on opening and closing the needle are required, the Rilsan dia. 2.7 x 4 should be replaced by a dia. 4 x 6.

The air hoses must be must be correctly sized for the atomization air flows required at the atomizer head. As fan spray heads use more air than round spray heads (roughly twice as much air for the same paint flow rate), we shall deal with the least favorable case of a fan spray facility. The approximate maximum pressures and flow rates available at the fan spray air cap must be (see RT Nr 6180):

- Maximum atomizing air pressure: approx. 4.3 bar.
- Maximum atomizing air flow: approx. 25 N m^3/h.
- Maximum fan air pressure: approx. 3.4 bar.
- Maximum fan air flow: approx. 20 N m^3/h.

If a 6-bar compressed air source is available under dynamic conditions (air flow), the maximum hose lengths connecting the atomizer to the air source must be:

- Air hose with inner dia. 10 80 m
- Air hose with inner dia. 8 30 m
- Air hose with inner dia. 6 6 m

Ne jamais dépasser ces valeurs. Prévoir des longueurs plus courtes si la pression d'air comprimé disponible en régime dynamique est inférieure à 6 bar.

3.1.7. Protecting hoses and cables

- Measures must be taken to ensure that the hoses and high voltage cable are not pinched, crushed, folded or cut. If necessary, these measures should also apply to the low voltage supply cable of the high voltage unit. Such measures include the use of cable runs with suitable radius of curvature, raised above the floor to avoid trampling and contact with paints and solvents.
- If the atomizer is used with a reciprocating machine, the hoses and high voltage cable must be long enough to prevent stretching and pulling out. If necessary, use a cable reel.
- It is recommended to put a paint- and solvent-resistant wrapping around hoses and the high voltage cable (and also the low voltage cable if necessary) at places where they could come into contact with these products and to make the facility easier to clean. This resistant wrapping could be non-antistatic polyethylene film for example.

4. Startup - operation - adjustments

4.1. Startup

- Install the equipment according to the paint supply system used
- Follow the installation rules carefully - see § 3.1 page 15
- Check the technical characteristics - see § 2.3 page 14.
- The spray gun is ready to operate

4.2. Operation

WARNING : Before starting any work on the atomizer, do not forget to discharge any electrical buildup in the installation by connecting it to the network electrical ground.

4.2.1. Filling the paint circuit
see § 2.2.2 page 13.

4.2.2. Paint flow adjustment
Trigger the atomizer paint valve (the needle). Place a calibrated sampling tube at the paint injector outlet and calculate the paint flow rate by measuring the volume that flows in a given time.
If necessary, set the paint flow rate to the required value by adjusting the flow rate setting device (depending on the setup, this may be the tank pressure, regulator trigger pressure, paint pressure release valve, gear pump rotation speed, etc.).

4.2.3. Adjusting the atomization air pressure
Atomizing with a round spray see RT Nr 6180.
Atomizing with a fan spray see RT Nr 6180.

4.2.4. Spraying
Start up the high voltage generator at the required voltage.
Start up the spray gun reciprocating robot or machine if they are to be used.
Trigger the spray gun needle to start spraying

4.2.5. Stopping spraying
Switch off the spray gun pilot trigger air.
Switch off the high voltage generator.

4.2.6. Color change
Dump the equipment - see § 2.2.3 page 13.
Fill the paint circuit (see § 2.2.3 page 13) with the new color, selected on the color-change block.
If necessary, readjust the paint flow rate (see § 4.2.2 page 18).
If necessary, readjust the atomization air pressure (see RT Nr 6180). Start up atomization of the new color.

4.2.7. Daily shutdown
Shut down spraying - see § 4.2.5 page 18.
If a two-component paint is being used, flush the equipment (see § 2.2.3 page 13).

4.2.8. Long shutdown (more than one day)
Dump the installation - see § 2.2.3 page 13.

4.3. Adjustments

4.3.1. Fan spray atomization

Fan spray atomization is used to obtain and excellent finish (film, gloss) generally on large, flat parts or parts with cavities where maximum penetration is required.
Maximum electrostatic wraparound cannot be obtained by fan spray atomization.
To obtain a fan spray, the atomizer must be fitted with a nozzle and fan spray air cap. In the standard version, the fan spray TRP 500is fitted with an air cap, ref. 436939 and a nozzle, ref. 439058. Other air caps and nozzles are available as options.
The effects of the different types of spraying air are as follows:

- atomizing air: provides a fine atomization and projects the mist well clear of the air cap, avoiding soiling,
- fan air: determines the pattern length (wide or narrow pattern).

In addition, both types of spraying air, especially the atomizing air, also have the function of carrying the paint droplets to the part to be painted, and making it penetrate in the cavities.
The two spraying air circuits are independent, being directed into two different chambers of the air cap separated by a seal. The two types of air are always used simultaneously.
Information required for adjusting fan spray air see RT Nr 6180 .

4.3.2. Round spray atomization

Round spray atomization is used to obtain maximum electrostatic wraparound on surfaces of average or small dimensions (for example parts with rotational symmetry such as pipes, tubes, perforated or meshed parts). Round spray atomization can be as fine as fan spray atomization. However, the paint does not penetrate into the cavities so well with a round spray.
For wide-diameter patterns (dia. 30 to 35 cm), with the same paint flow rate and atomization fineness, consumption of atomization air with the round spray varies, according to the situation, between 50 and 100% of the air consumption required by the fan spray to achieve the same results.

For small-diameter patterns (dia. 9 to 15 cm), with the same paint flow rate and atomization fineness, consumption of atomization air with the round spray varies, according to the situation, between 50 and 110 % of the air consumption required by the fan spray.
As a general rule, round spray atomizing consumes less air than fan spray atomization.
To obtain a round spray, the atomizer must be fitted with an air cap and round spray air injector.
In the standard version, the round spray **TRP 500** is fitted with a caliber 8 air cap, ref. 430540 and a caliber 8 injector, ref. 455235.

Other air caps and injectors are available as options (see § 8.4.5 page 39).

For electrostatic application, the paint pattern is a full circle for caliber 6, 8 and 12. For caliber 20, the maximum pattern is very wide and the droplets are spread in a crown shape (the spray is almost hollow).

For electrostatic application, the pattern is hollow if the atomizing distance is less than 100 mm, but full beyond this distance.

The two types of air produce the following atomization characteristics:

- vortex air: atomizes in such a way that on leaving the paint injector the spray has a high speed rotation tangential to the axis of the atomizer head/part to be painted, and a low speed along this axis.

- directional air: atomizes in such a way that on leaving the paint injector the spray has a high-speed flow along the axis of the atomizer head/part to be painted.

Both types of spraying air, especially the directional air, also have the function of carrying the paint droplets to the part to be painted, and making it penetrate in the cavities..
Unlike fan spray atomization, the two spraying air circuits come together in a single chamber of the air cap.

Again, unlike fan spray atomization, the two types of spraying air can be used individually or in combination.

Situations where directional and vortex air is used

- Vortex air alone: used to obtain wide-diameter patterns with maximum wraparound on the part to be painted. The air flow is very low. It is recommended for tubular, perforated or meshed parts.
- Directional air alone: used to obtain small-diameter patterns with maximum penetration. The air flow is quite low. It is recommended for retouching and reaching into cavities or recesses that are difficult to access.
- Combination of vortex air and directional air: used to obtain patterns with a diameter somewhere between the maximum diameter (vortex air alone) and the minimum diameter (directional air alone), with a compromise between the wraparound effect and the penetration effect.

Result required		**Directional air alone**	**Vortex air alone**	**Direct. air + vortex air**
Pattern size	Wraparound effect			
Small	Low	X		
Average	Average			X
Wide	Strong		X	

The optimum spraying air settings can be found more easily with round spray than with fan spray. The table provided (see RT Nr 6180) is an aid to spraying air adjustment in the two extreme cases.

4.3.3. Edge overload

Parts with edges, cutouts or angles, create considerable variations in the electrical field: it is much stronger than the average electrical field (see § 2.2.1 page 12) between the atomizer and the flat sections of the part. As the electrostatic force on a paint droplet is proportional to the local electrical field of the place where it is located, the paint is attracted more strongly to the edges of the part, especially if the paint is of low resistivity. This phenomenon is known as edge overload.
There are three possible solutions for reducing edge overload:

- decrease the high voltage value, which will have the effect of decreasing the electrical field around the edges of the part to be painted and decreasing the electrical charge conveyed by the paint droplets when they leave the atomizer,

- increase the distance between the atomizer and the part to be painted, which has the major effect of decreasing the electrical field around the edges of the part (for example, increase from 250 to 320 mm),

- if the resistivity of the paint is low (solvent-based paint with resistivity between 1 and 20 MΩ.cm), work if possible with a paint of higher resistivity (for example, change from 1 to 20 MΩ.cm). This has the effect of decreasing the electrical charge conveyed by the paint droplets when the leave the atomizer.

To increase the resistivity of a paint, use insulating solvents rather than conducting solvents. Contact your paint supplier.

Remarks :

- For solvent-based paints, edge overload can be remedied by solutions 1, 2 and 3 applied individually, or as a combination of two or three solutions.
- For waterborne paints, edge overload can only be remedied by solutions 1 and 2 applied individually, or by a combination of the two solutions.

4.3.4. Faraday cage effect

The Faraday cage phenomenon may occur around cavities in the part to be painted. The effect is more pronounced with more tightly closed or deeper cavities. Where it occurs, no paint will be transferred to the cavity walls and there will be excess paint on the cavity rim (if the rim has edges or a small radius of curvature).

This phenomenon is caused by the fact that in a Faraday cage (a conducting surface set at zero potential, i.e. ground potential), there is no electrical field. There is little or no attraction of electrically charged droplets by the inner walls of the cavities. However, they are attracted to the cavity rim by the edge overload effect.
Parts with cavities must be painted using an air cap-nozzle combination with good penetration characteristics, i.e. one which consumes a lot of spraying air. It is also possible to increase spraying air pressure locally, when the atomizer passes in front of these cavities. Do not increase the paint flow rate as this increases the risk of edge overload or running on non-concave sections.

5. Maintenance - disassembly - reassembly

5.1. General maintenance

- The service life of wearing parts depends primarily on the quality of paint used and the atomizer operating conditions. Tests carried out under "standard" utilization conditions set the "standard" service life at around 2 million needle actuations.
- The main wearing parts are the following:
  - the seal packing assembly
  - the atomizer diaphragm
  - the dump valve diaphragm
  - the needle
  - the regulator diaphragm
  - the air cap
  - the paint injector fitted on the nozzle

WARNING : Electrostatic paint atomizers contain some items made of synthetic resin whose chemical resistance to certain organic solvents or diluents is limited. These spray guns must be installed, used and maintained with more care than metallic spray guns. Under no circumstances must they be cleaned with aggressive agents (chlorinated solvents, acids or alkalis) or with sharp tools.

Electrostatic atomizing may produce back-spray onto the atomizer and equipment behind the atomizer. They should be protected before use by wrapping them in thin, flexible polyethylene film (not PVC). Do not use "anti-static" plastic films, which conduct electricity and would short-circuit the high voltage. A thin coat of dielectric grease (type vaseline) applied before wrapping the parts will make the film easier to remove.

Using cleaning solvents

If a solvent or diluent is used to clean an electrostatic atomizer, never soak the atomizer or its components (e.g. nozzle, seals, body, etc). SAMES recommends the use of a fine brush or cloth moistened with cleaning liquid.

Solvents of a highly polar nature (such as ketones, polyols, alcohols) are extremely good conductors and should be avoided because of the possibility of short-circuits Use insulating solvents (resistivity greater than 100 MΩ.cm) such as xylene, toluene and white spirits.

Solvents and diluents used for cleaning must have a flash point greater than the ambient temperature.

Use compressed air to dry thoroughly surfaces moistened with cleaning liquid and apply an insulating coat of vaseline on rubbing parts (needle) and parts subjected to high voltage (quick-disconnect plate between the manifold and the atomizer body, resistor, insulators, etc.).

Before starting any work, check that:

- the high voltage generator is switched off (disconnected if possible) and that the facility is electrically discharged (by connecting to a ground connection),
- there is no pressure in the paint hose and the paint supply has been stopped,
- the paint circuit is rinsed (manifold and dump) using an insulating, non-aggressive solvent then flushed with compressed air,
- there is no pressure in the air pipes (spraying air, pilot trigger air, pilot dump air and possibly the regulator trigger air).

5.2. Disassembling

5.2.1. Disassembling the spray gun

see § 8.1 page 29 and see § 8.1.1 page 31.

- Remove the outer insulator (31), its o-ring (34), the inner insulator (32).
- Unscrew the rear nut (24) and remove the rear cover (23).
- Remove the piston spring (57).
- Remove the piston assembly (22).
- Use tool 747336 to remove the seal housing ring (21). Take care not to lose the seal (20).
- Unscrew the air cap nut (28) (fan spray) or (39) (round spray) and rinse the spraying air cap (27) (fan spray) or (38) (round spray), and the swivel ring (26) (for a fan spray with swivel ring).
- Unscrew the nozzle nut (25) from the spray gun body (1).
- Remove the nozzle (37) (fan spray) or (36) (round spray), checking that the 2 O-rings (16A) remain in place.
- Use tool 745560 to remove the seal packing assembly (18).
- Remove the restrictor (17) and its rear seal (16-B).

5.2.2. Disassembling the fan spray injector

- Position the fan spray nozzle (37) on the tool. (see § 8.4.1 page 36)
- Tighten the nozzle nut (25) on the tool so that the nozzle is held flush against the tool.
- Drive out the fan spray (49) by tightening the butterfly nut.
- Retrieve the spring electrode (51).
- The needle housing (50) cannot normally be disassembled.

5.2.3. Disassembling the round spray injector

- Using a flat wrench (suitable size for the injector caliber), disassemble the round spray injector (53) to (56) (depending on caliber) Do not lose the electrode spring (58).
- Screw the injector into the tool. Drive out the diffuser (59) by screwing the butterfly nut on the tool.
- The needle housing (50) cannot normally be disassembled.

5.2.4. Disassembling the piston assembly

- **Diaphragm version**: Unscrew the diaphragm support (44) from the check valve and remove the diaphragm (45). (see § 8.1.1 page 31)
  Piston version: Unscrew the rear nut (24) and remove the rear cover (23). (see § 8.2 page 32).
- Remove the needle spring (43) and the needle (40). (see § 8.1.1 page 31) or (see § 8.2.1 page 34)
- If necessary, detach the atomizing air trigger valve (42) from the fan air trigger valve (47) by removing the ring (48). Take care not to lose the spring (46) or damage the O-rings (41).

5.3. Reassembly

Before starting reassembly, soiled parts must be cleaned using non-aggressive, insulating solvent. If it is necessary to use an aggressive, conducting solvent (such as methyl ethyl ketone), contact should be as short as possible and must be followed by drying with compressed air.

5.3.1. Reassembling the piston assembly
see § 8.1.1 page 31.

- Carry out the disassembly operations in reverse order.
- Check that the diaphragm (45) faces the right direction: the white side must be facing the support (44).

5.3.2. Reassembling the seal packing assembly and restrictor

- Fit the assembly (18) in the gun body, making sure that the O-ring (30) is fitted on the nozzle side.
- The restrictor (17) must be sandwiched between two O-rings (16A) and (16B).

5.3.3. Reassembling the fan spray injector
see § 8.4.1 page 36.

- Place the electrode spring (51) in the body of the nozzle (37) and use tool 741869 to refit the injector (49). Fitting is correct when the injector cone is in the same plane as the nozzle body cone.

Note: an optional tool is available for fitting the injector perfectly concentric to the cap bearing on the nozzle (see § 8.5 page 42).

5.3.4. Reassembling the round spray nozzle
see § 8.4.5 page 39.

- Place the electrode spring (58) in the nozzle body (36).
- Place the diffuser (59) in the opening of the tool of the required caliber (for example the tool for a caliber 8 diffuser), with the channels facing outwards.
- Insert the diffuser (59) in front of the injector. Fitting is correct when the front surface of the diffuser and injector are in the same plane, and when the diffuser channels are inside the injector and cannot be seen.
- For caliber 20, fitting is correct when the round opening between the diffuser and the injector is approx. 0.2 mm.
  For this adjustment:
  - push the diffuser fully home in the injector,
  - screw the injector into the tool and, by turning the butterfly nut, draw out the diffuser until the round opening is around 0.2 mm. Atomization is improved by reducing the diameter of this hole. However, this hole must not be smaller than the largest paint pigments and it must not restrict the paint flow.

5.3.5. Reassembling the TRP 500

- Check that the seals (16A) are fitted (see § 5.3.2 page 24).
- Fit the nozzle (37) (fan spray) or (36) (round spray) to the body (19) and secure it with the nozzle nut (25). A pin extending from the nozzle ensures that the rotation direction is correct and also provides electrical continuity. This pin should be positioned opposite the high voltage input.
- For fan spray only, fit a suitable swivel ring (26) between the body and the air cap (27).
- Secure the air cap (27) (fan spray) or (38) (round spray) with the air cap nut (28) (fan spray) or (39) (round spray).
- Fit the piston assembly (22) in the body.
- Place the check valve spring (57) at the rear of the body.
- Fit the rear cap (23) and secure it with the rear nut (24).
- Fit the resistor (15) (TRP 501) or (15B) (TRP 502) and the insulators (31), (32) having first applied a coat of dielectric grease.
- Fit the O-ring (34), having first applied a coat of dielectric grease.

6. Troubleshooting guide

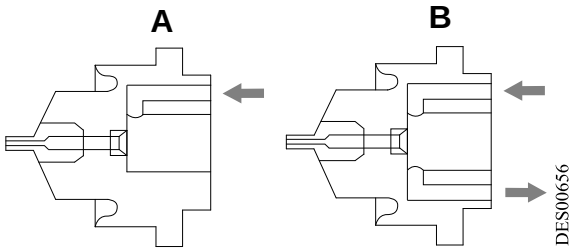
6.1. Problems concerning the spray gun

Symptoms	Possible Causes	Remedies
Paint leaks at the paint injector	a) The needle and/or needle housing are damaged.	a) Replace the needle housing and/or the needle.
	b) The paint contains solid particles.	b) Use a finer paint filter.
	c) Seal packing assembly (745103) is faulty.	c) Replace the seal packing assembly.
Paint leaks between the atomizer and manifold.	a) O-ring J3STKL011 or J3STKL005 is faulty.	a) Replace it.
	b) Spray gun securing screws X9NVCB232 are not sufficiently tightened.	b) Tighten them.
	c) The paint pressure is too high.	c) Fit a wider restrictor, reduce the paint pressure.
Paint leaks in the air cap	a) The nozzle is not tightened sufficiently.	a) Tighten nozzle nut 744539.
	b) Seal packing assembly 745103 is faulty.	b) Replace it.
	c) The two J3STKL002 o-rings are damaged.	c) Replace them.
Air leaks from the rear of the atomizer when the needle is triggered.	Diaphragm 744545 is not tight enough or is damaged.	Tighten it slightly or replace it.
Air leaks from the air cap when the needle is not triggered.	a) The air contains solid particles.	a) Filtrer l'air.
	b) The air valves are damaged.	b) Replace check valves 732936 and/or 540953.
	c) The air valve O-rings are fouled and block the valves.	c) Replace the two J3STKL011 o-rings and seal J3STKL030.
Air leaks between the atomizer and the manifold.	a) Securing screws X9NVCB232 are not tightened sufficiently.	a) Tighten them.
	b) O-rings J2FTCF018 are damaged.	b) Replace the three J2FTCF018 o-rings.

Symptoms	Possible Causes	Remedies
Sparks at the injector.	The resistor is missing, soiled or damaged.	Clean the nozzle and body thoroughly. Fit a resistor thickly coated with dielectric grease.
Sparks between the spray gun and the block.	a) The resistor is missing, soiled or damaged.	a) Fit a new resistor, thickly coated with dielectric grease.
	b) The insulators are damaged, soiled or missing.	b) Clean the insulators thoroughly and/or replace them. Apply a thick coat of vaseline.
Poor spraying	a) The injector and/or air cap are soiled or worn.	a) Clean or replace.
	b) The nozzle is not tightened sufficiently (air/paint mix).	b) Tighten nozzle nut 744539.
	c) Spraying air pressure too low.	c) Increase spraying air pressure.
	d) Paint flow rate is too high.	d) Reduce the paint flow rate.
	e) Viscosity too high.	e) Reduce the viscosity.
The atomizer operates in spurts.	The needle is soiled.	Clean it. Apply a thin layer of vaseline on the needle.
The needle does not open.	a) The pilot trigger pressure is too low.	a) Increase it.
	b)The diaphragm is damaged.	b) Replace it.
Poor wraparound, high voltage present, no current delivered.	a) The paint resistivity is too high.	a) Contact paint manufacturer. Reduce the resistivity using a polar agent or conductive solvent.
	b) The high voltage generator is switched off or damaged.	b) Switch on the generator or have it repaired.
Poor wraparound, high current, low high voltage.	Paint resistivity is too low and short-circuits the high voltage.	Contact paint manufacturer for different solvents and diluents.
No wraparound. Maximum current. No high voltage.	Paint used is metallic or too conductive and short-circuits the high voltage.	Contact SAMES and the paint manufacturer. Reduce the high voltage.
The paint flow rate is too low, despite the regulator being fully open.	Paint circuit pressure drop is too high.	a) Fit a restrictor with a wider diameter see § 8.4.6 page 40).
		b) Reduce the viscosity.

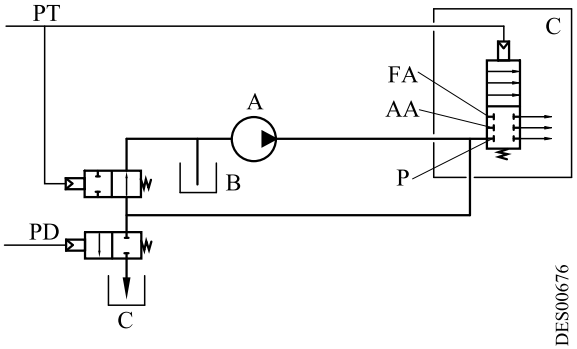
7. Additional standard items

7.1. Dual-circuit nozzles



A	Single circuit
B	Dual circuit

Fitting the dual-circuit nozzle



A	Pump
B	Paint tank
C	Dump

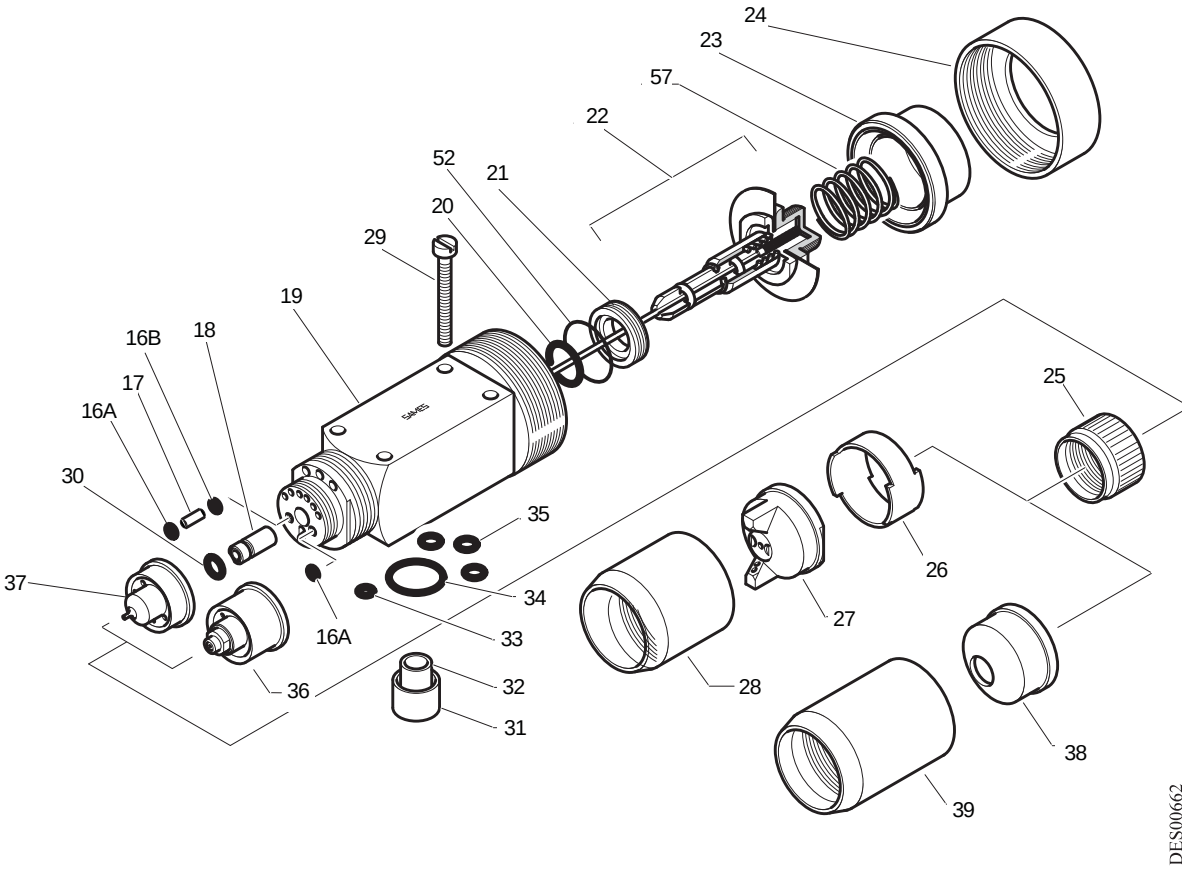
Advantages of the dual-circuit nozzle:

- when the color is changed, the paint circuit is rinsed through to the needle tip,
- the nozzle allows paint circulation if a gear pump is fitted in the configuration shown above.

8. Spare Parts

8.1. TRP 500 Spray Guns with diaphragm

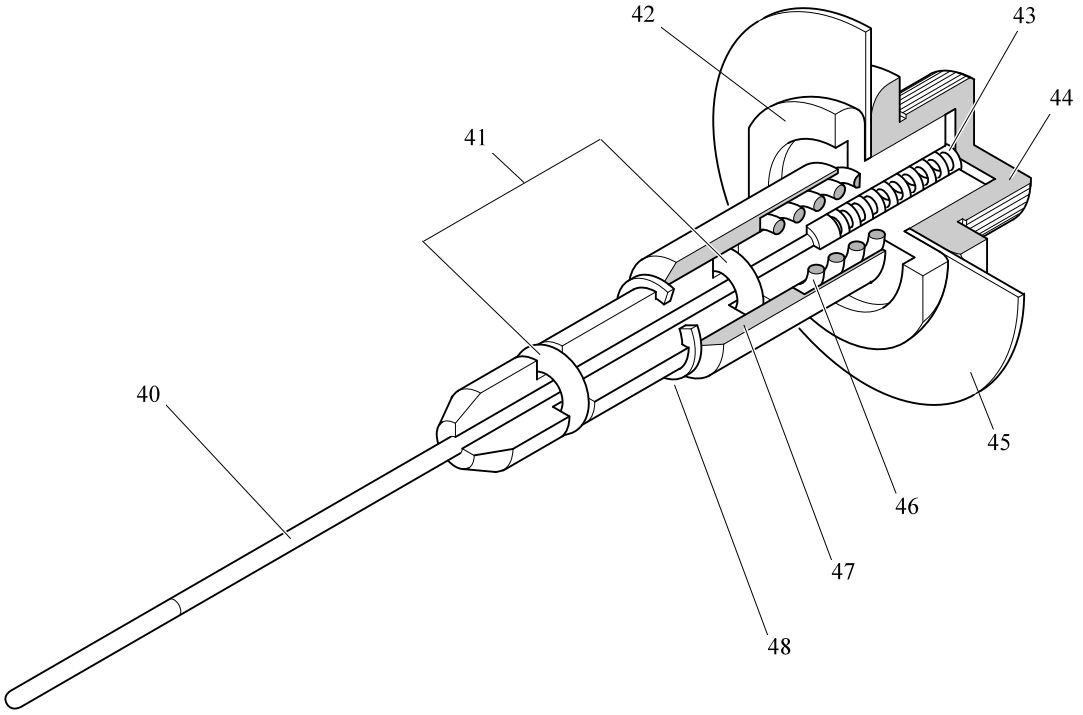
Part number	Description	Restrictor	Injector	Air cap
752991	**TRP 500** round spray	1,2	Ø 8	430540
752992		1,2	Ø 12	430179
752949	**TRP 500** fan spray single circuit	1,4	1,5 x 2,6	436939



Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
16	J3STKL002	O-ring - chemically inert	3	1	1
17	see § 8.4.6 page 40	Restrictor	1	1	1
18	745529	Seal packing assembly with o-ring	1	1	1
19	852455	TRP 500 body assembly	1	1	3
20	J3STKL030	O-ring - chemically inert	1	1	1
21	1405867	Seal housing ring	1	1	3
22	**732001**	**Piston assembly**	**1**	**1**	**2**
23	744530	Rear cover	1	1	3
24	744533	Rear nut	1	1	3
25	744539	Nozzle nut	1	1	2
26	see § 8.4.7 page 41	Swivel ring	Option	1	1
27*	436939	Fan spray air cap	1	1	1
28	745066	Fan spray air cap nut	1	1	3
29	X9SVCB232	Plastic screw M6 x 50	4	1	1
30	J3STKL005	O-ring - chemically inert	1	1	1
31	449707	Outer sleeve insulator	1	1	1
32	449706	Inner sleeve insulator	1	1	1
32‘	740532	Resistor - 10 M gun to manifold	1	1	3
33	J3STKL011	O-ring - chemically inert (single circuit nozzle)	1	1	1
33	J3STKL005	O-ring - chemically inert (dual circuit nozzle)	1	1	1
34	J2FTCF051	O-ring - viton	1	2	1
35	J2FTCF018	O-ring - viton	3	2	1
36	752983	Round spray nozzle, all types without injector	1	1	1
37	439058	RS nozzle, single circuit with injector dia. 1.5 - 2.6	1	1	1
38	430540	Round spray air cap, caliber 8	1	1	1
39	749982	Round spray air cap nut	1	1	3
52	J3STKL981	O-ring - chemically inert	1	1	1
57	749992	Piston spring under rear cover	1	1	2

(*)
Level 1: Standard preventive maintenance.
Level 2: Corrective maintenance.
Level 3: Exceptional maintenance.

8.1.1. Piston assemblies



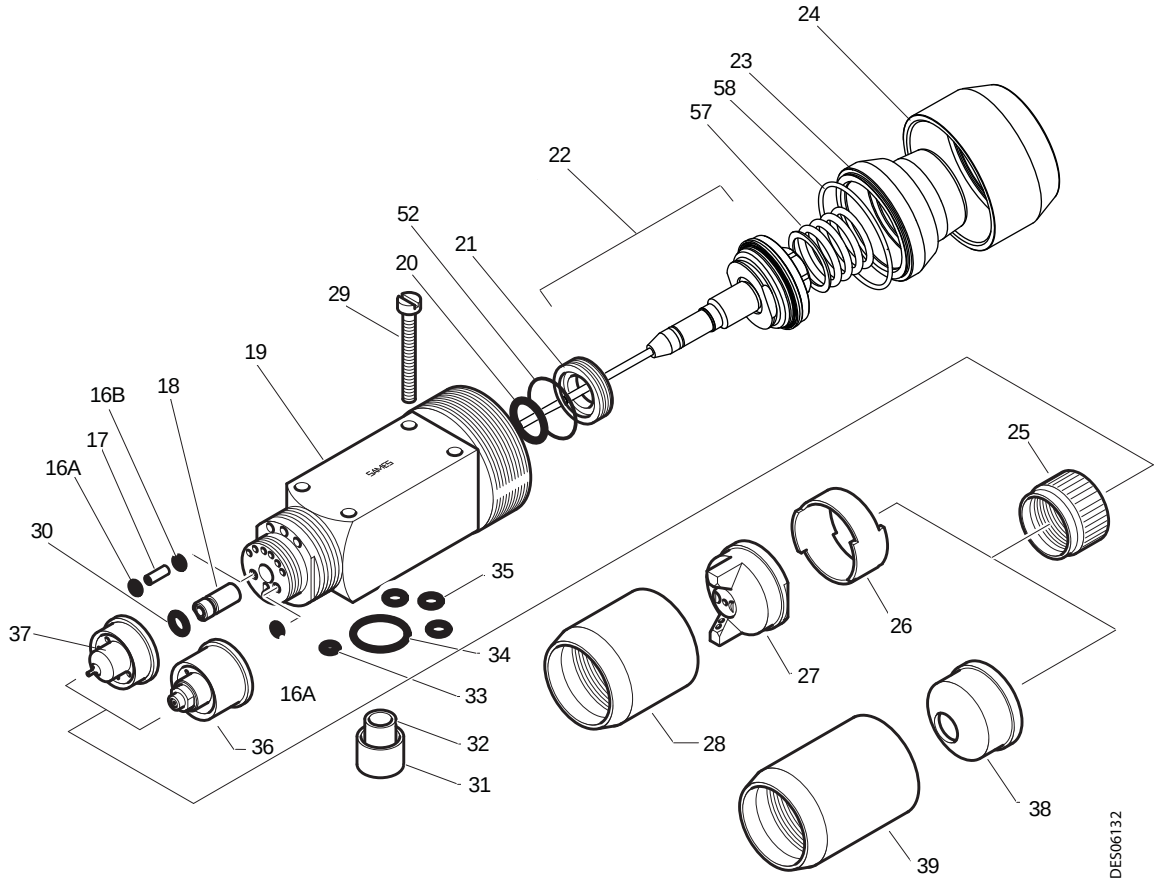
Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
	732001	**Piston assembly**	**1**	**1**	**3**
40	439063	Needle	1	1	1
41	J3STKL011	O-ring - chemically inert	2	1	1
42	732936	Outer air piston	1	1	3
43	746109	Needle spring	1	1	3
44	540947	Diaphragm support	1	1	3
45	744545	Diaphragm	1	5	1
46	540990	Piston spring	1	1	3
47	540953	Inner air piston	1	1	3
48	542274	Circlip	1	1	3

Option

Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
	910001292	**Piston assembly with leak**	**Option**	1	3
40	439063	Needle	1	1	1
41	J3STKL011	O-ring - chemically inert	2	1	1
42	1315691	Outer air piston with leak	1	1	3
43	746109	Needle spring	1	1	3
44	540947	Diaphragm support	1	1	3
45	744545	Diaphragm	1	5	1
46	540990	Piston spring	1	1	3
47	1412153	Inner air piston	1	1	3
48	542274	Circlip	1	1	3

8.2. TRP 500 Spray Guns with piston

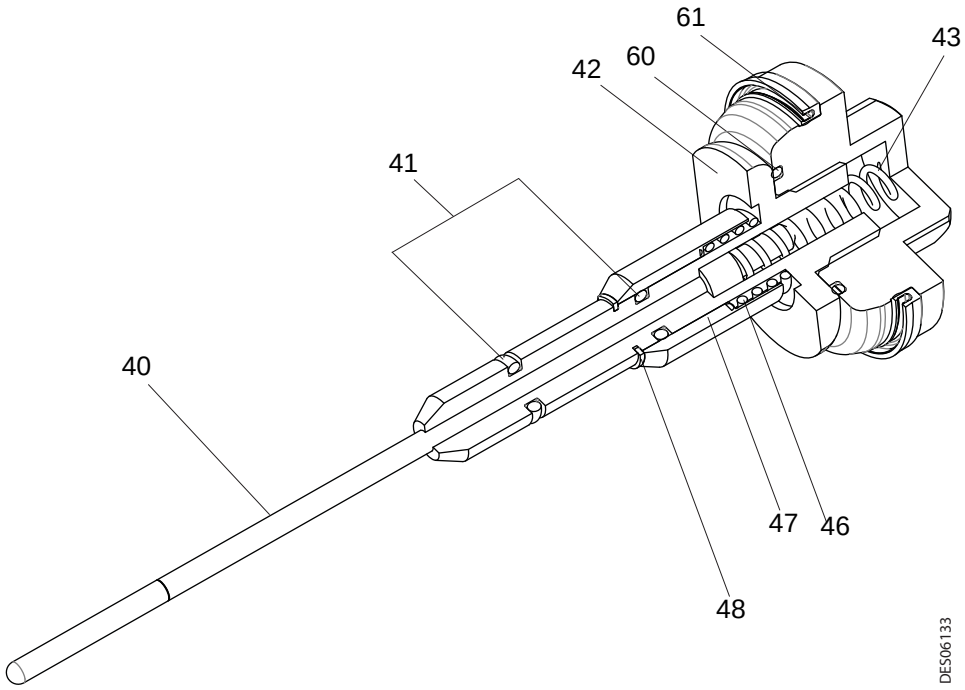
Part number	Description	Restrictor	Injector	Air cap
910019848	**TRP 500** round spray	1,2	Ø 8	430540
910019850		1,2	Ø 12	430179
910019688	**TRP 500** fan spray single circuit	1,4	1,5 x 2,6	436939



Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
16	J3STKL002	O-ring - chemically inert	3	1	1
17	see § 8.4.6 page 40	Restrictor	1	1	1
18	745529	Seal packing assembly with o-ring	1	1	1
19	852455	TRP 500 body assembly	1	1	3
20	J3STKL030	O-ring - chemically inert	1	1	1
21	1405867	Seal housing ring	1	1	3
22	**910019438**	**Piston assembly**	**1**	**1**	**2**
23	900012099	Rear cover	1	1	3
24	900012098	Rear nut	1	1	3
25	744539	Nozzle nut	1	1	2
26	see § 8.4.7 page 41	Swivel ring	Option	1	1
27*	436939	Fan spray air cap	1	1	1
28	745066	Fan spray air cap nut	1	1	3
29	X9SVCB232	Plastic screw M6 x 50	4	1	1
30	J3STKL005	O-ring - chemically inert	1	1	1
31	449707	Outer sleeve insulator	1	1	1
32	449706	Inner sleeve insulator	1	1	1
32‘	740532	Resistor - 10 M gun to manifold	1	1	3
33	J3STKL011	O-ring - chemically inert (single circuit nozzle)	1	1	1
33	J3STKL005	O-ring - chemically inert (dual circuit nozzle)	1	1	1
34	J2FTCF051	O-ring - viton	1	2	1
35	J2FTCF018	O-ring - viton	3	2	1
36	752983	Round spray nozzle, all types without injector	1	1	1
37	439058	RS nozzle, single circuit with injector dia. 1.5 - 2.6	1	1	1
38	430540	Round spray air cap, caliber 8	1	1	1
39	749982	Round spray air cap nut	1	1	3
52	J3STKL981	O-ring - chemically inert	1	1	1
57	749992	Piston spring under rear cover	1	1	2
58	J2FENV420	O-ring FEP -viton	1	1	1

(*)
Level 1: Standard preventive maintenance.
Level 2: Corrective maintenance.
Level 3: Exceptional maintenance.

8.2.1. Piston assemblies



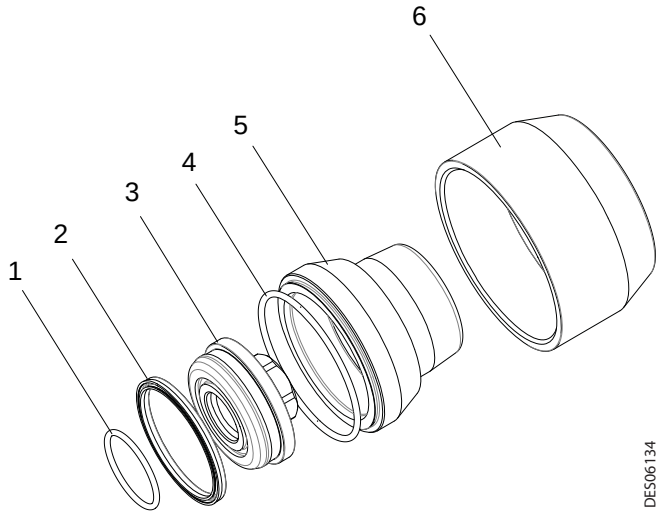
Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
	910019438	**Piston assembly**	**1**	**1**	3
40	439063	Needle	1	1	1
41	J3STKL011	O-ring - chemically inert	2	1	1
42	732936	Outer air piston	1	1	3
43	746109	Needle spring	1	1	3
46	540990	Piston spring	1	1	3
47	540953	Inner air piston	1	1	3
48	542274	Circlip	1	1	3
60	J2FENV288	O-ring FEP-viton	1	1	1
61	160000174	Lip seal	1	1	1

Option

Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
	910019439	**Piston assembly with leak**	**Option**	1	3
40	439063	Needle	1	1	1
41	J3STKL011	O-ring - chemically inert	2	1	1
42	1315691	Outer air piston with leak	1	1	3
43	746109	Needle spring	1	1	3
46	540990	Piston spring	1	1	3
47	1412153	Inner air piston	1	1	3
48	542274	Circlip	1	1	3
60	J2FENV288	O-ring FEP-viton	1	1	1
61	160000174	Lip seal	1	1	1

8.3. Transformation of a TRP 500 with diaphragm in a TRP 500 with piston

8.3.1. TRP 500 piston kit



Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
	910019437	**TRP 500 piston kit**	**1**	**1**	**3**
1	J2FENV288	O-ring - FEP viton	1	1	1
2	160000174	Lip seal	1	1	1
3	-	TRP 500 piston	1	Not sale	-
4	J2FENV420	O-ring - FEP viton	1	1	1
5	900012099	TRP 500 rear cover	1	1	3
6	900012098	Rear nut	1	1	3

8.3.2. Transformation procedure

Disassembling:

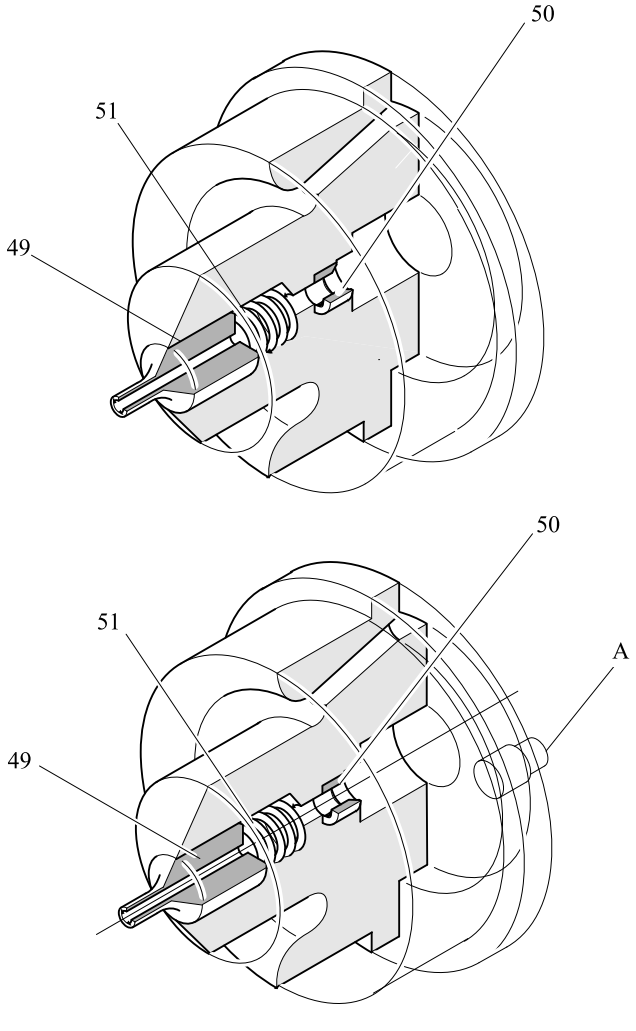
- Unscrew the rear nut (see § 8.1 page 29 item 24) and remove the rear cover (see § 8.1 page 29 item 23).
- Remove the spring (see § 8.1 page 29 item 57).
- Withdraw the piston assembly (see § 8.1.1 page 31 item 22).
- Unscrew the diaphragmsupport (see § 8.1.1 page 31 item 44).
- Remove the diaphragm (see § 8.1.1 page 31 item 45).

Assembling:

- Put the piston kit against the piston assembly (see § 8.1.1 page 31) and screw.
- Install the assembly in the body of TRP 500.
- Put the spring back in place (see § 8.2 page 32 item 57).
- Install the rear cover (5) and screw the rear nut (6).

8.4. Common to the two types of TRP 500

8.4.1. Fan spray nozzles



Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
-	**439058**	Fan spray nozzle, single circuit, standard Injector dia. 1.5 x 2.6	**1**	**1**	1
-	755287	Fan spray nozzle, single circuit, option Injector, stainless steel, dia. 1.2 x 2.6	Option	1	1
-	730355	Fan spray nozzle, single circuit, option Injector, stainless steel, dia. 1.1 x 2.6	Option	1	1
-	752056	Fan spray nozzle, double circuit, option Injector, stainless steel, dia. 1.1 x 2.6	Option	1	1
-	752055	Fan spray nozzle, double circuit, option Injector, stainless steel, dia. 1.5 x 2.6	Option	1	1
49	743982	Injector dia. 1.5 x 2.6	1	5	1
50	449669	High voltage spring	1	1	1
51	-	Needle housing	-	-	-
A	-	Positioning pin	-	-	-

8.4.2. Optional fan spray air caps

Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
1	733957	Brass fan spray air cap (identical to 436939)	1	1	1
1	436939	Plastic fan spray air cap - black	Stan dard	1	1
1	438775	Plastic fan spray air cap TRP 500 - black	1	1	1
1	422513	Plastic fan spray air cap TRP 500 - black	1	1	1
1	1410353	Plastic fan spray air cap (identical to 422513)- Orange	1	1	1
1	1410354	Plastic fan spray air cap (identical to 422513)- White	1	1	1
1	420155	Plastic fan spray air cap TRP 500 - black	1	1	1

8.4.3. Fan spray air caps for pressure check (option)
These air caps are designed for pressure checking and not for atomizing.

Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
1	437257	Brass fan spray air cap (identical to 436939)	1	1	3

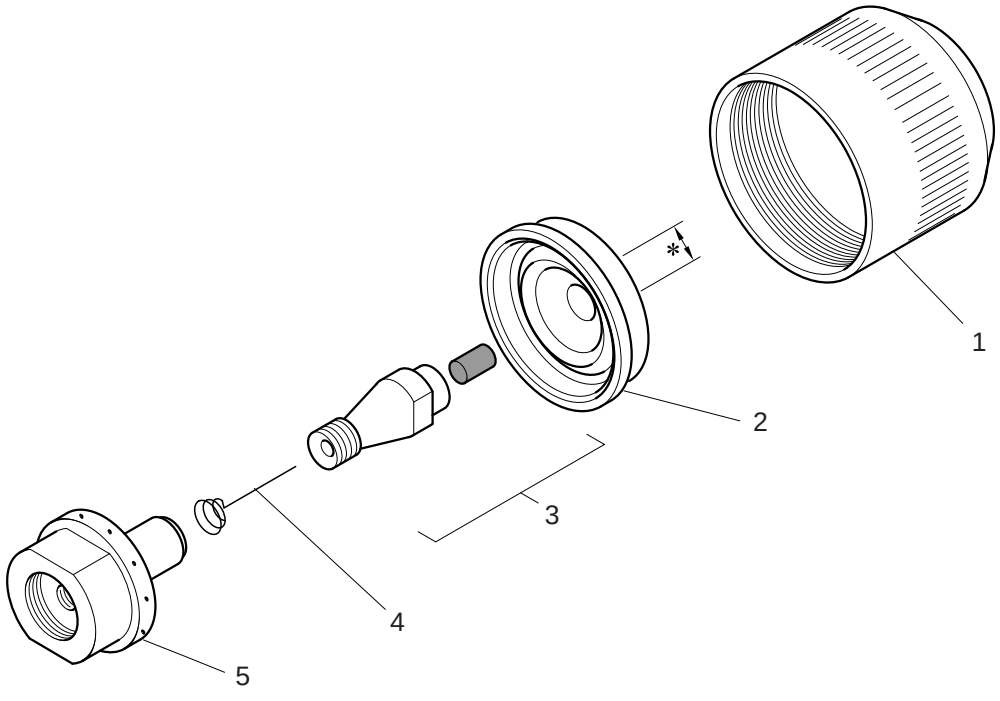
(*)
Level 1: Standard preventive maintenance.
Level 2: Corrective maintenance.
Level 3: Exceptional maintenance.

8.4.4. Optional fan spray injectors

Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
49	747156	Injector, stainless steel, dia. 1.5 x 2.6	On request	1	1
	542789	Injector, stainless steel, dia. 1.2 x 2.6		1	1
	545881	Plastic injectors + electrode dia. 2 x 2.5		1	1
	446028	Electrode	1	5	1

(*)
Level 1: Standard preventive maintenance.
Level 2: Corrective maintenance.
Level 3: Exceptional maintenance.

8.4.5. Round spray nozzles and air caps

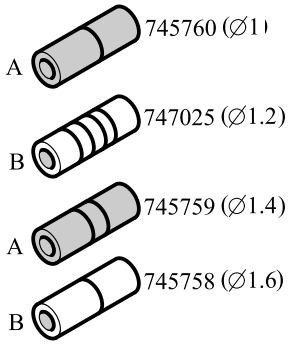


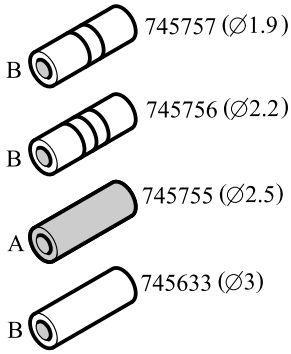
Item	Part number	Description	Qty	Unit of sale	Spare Part Level (*)
1	749982	Round spray air cap nut	1	1	3
2	430804*	Round spray air cap, caliber 6 for wood finish	1	1	3
	430540*	Round spray air cap, caliber 8 for wood finish	1	1	3
	430179*	Round spray air cap, caliber 12 for wood finish	1	1	3
	430719*	Round spray air cap, caliber 20 for wood finish	1	1	3
3	455234 *	Injector cal. 6	1	5	1
	-	Diffuser Cal. 6	-	-	-
	455235 *	Injector cal. 8	1	5	1
	-	Diffuser Cal. 8	-	-	-
	455236 *	Injector cal. 12	1	5	1
	-	Diffuser Cal. 12	-	-	-
	455237 *	Injector cal. 20	1	5	1
	-	Diffuser Cal. 20	-	-	-
4	448110	Spring electrode	1	10	1
5	752983	Round spray nozzle	1	1	1

*** The caliber is the approximate diameter in mm of the end section of the nozzle and the central hole of the air cap.**
Parts marked with * are the main wearing parts.
(for nozzles or injectors, depending on utilization).

8.4.6. Restrictors
For use of restrictors, see § 3.1.5 page 16.
Standard restrictor: dia. 1.4

List of restrictors delivered as options;





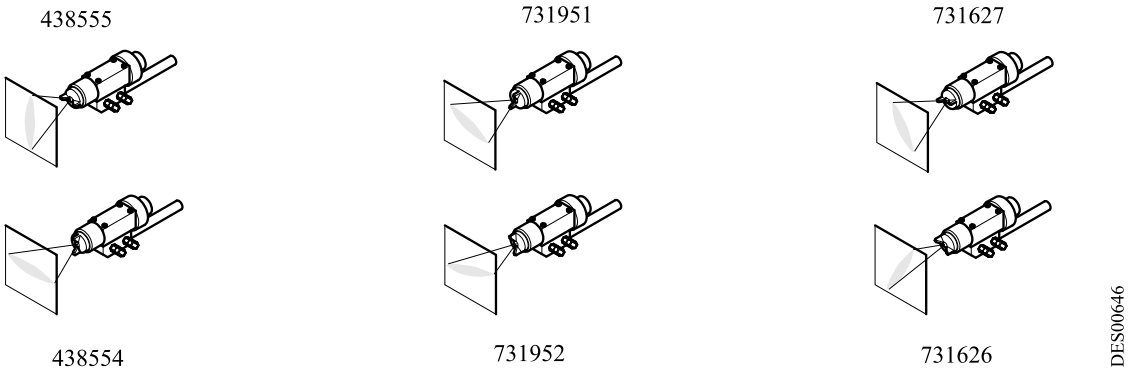
DES00684

	A		Black		B	White	
1	745760	Ø 1	1 groove	2	747025	4 grooves	Ø 1,2
3	745759	Ø 1,4	2 grooves	4	745758	1 groove	Ø 1,6
7	745755	Ø 2,5	0 groove	5	745757	2 grooves	Ø 1,9
				6	745756	3 grooves	Ø 2,2
				8	745633	0 groove	Ø 3

8.4.7. Swivel rings

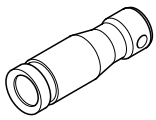
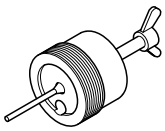
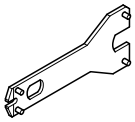
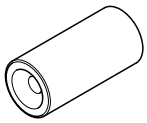
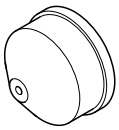
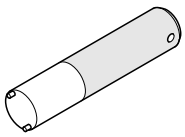
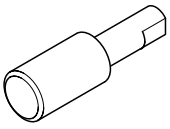
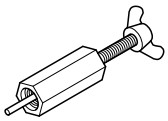
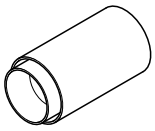
Swivel rings are used to tilt the fan spray. The angle of tilt is given with respect to the perpendicular axis of the quick-disconnect plate. They are used when 2 atomizers are placed very close together to avoid interference between the sprays.

Check that the required air cap can be fitted to the swivel ring (there should be 2 positioning pins at the rear of the air cap).



	Ref.	Angle of tilt
1	438555	90 °
2	731951	105 ° to right
3	731627	15 ° to right
4	438554	0°
5	731952	105° to left
6	731626	15° to left

8.5. Special tools

Part number		Use
745560	 DES00664	Seal ring extractor
745563	 DES00672	Fan spray injector extractor
741015	 DES00659	Universal tool for pressure regulator
446027	 DES00670	Fan spray injector placing tool
741869	 DES00657	Fan spray injector placing tool, for fitting on nozzle
747336	 DES00658	Seal ring placing tool
003008	 DES00671	Caliber 8 diffuser placing tool
744056	 DES00673	Round spray diffuser removal tool.
444239 003008 003009 003010	 DES00559	Diffuser placing tool, round spray, dia. 6, dia. 8 dia. 12 dia. 20
		Dielectric grease