DES02166

User manual

PPH 405 B with disk

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PPH 405 B DISK

To provide maximum safety for persons using the system, please take full note of the precautions and warnings.

WARNING : Precaution warnings contain information that will help to keep the system in optimum working condition. Failure to comply with warnings may lead to incorrect paint flow and damage to the equipment.

WARNING : SAFETY: Safety instructions contain information concerning human safety.

Failure to observe these instructions may result in serious or even fatal injury. In all situations where SAMES equipment is operated, safety instructions must be carefully followed.
- The PPH 405 must only be started up once it is correctly mounted.
- Before starting up always remove objects such as tools, rags, etc. within reach of the disk.
- Do not drop the atomizer during dismantling/assembly. Take suitable precautions (rubber gloves, help from another person, etc.).
- Check that the rotary atomizer is secure before restarting after a fitting procedure. Check the fitting of the turbine very carefully.

WARNING : Always comply with the following instructions:

- Wear safety goggles while cleaning the disk.
- All forms of fire, smoking, and sources of sparks are forbidden close to the equipment.
- Connect a cable to the ground connection.
- Comply with all local, state and national regulations covering the use and application of this equipment.

WARNING : SAFETY
- Do not stop the disk by hand or with any other object.
- Before working on the PPH 405, check that the turbine has stopped completely. Check that nobody can start up the turbine while work is carried out on it.
- Do not dismantle the turbine until all fluid and air supplies have been depressurized and isolated from pressurizing systems.
- The high voltage must be grounded and locked to prevent any reconnection.

1. Health and Safety Instructions

1.1. Precautions

- Before carrying out any cleaning on atomizers or other work in the spraying area, the control module power supply from the high-voltage generator (UHT) must be switched off and the atomizer HV circuit discharged to the ground.
- Only metal containers can be used for cleaning liquids and they must have a reliable ground connection.
- SAMES atomizers and high-voltage electrostatic generators are designed to minimize this risk. Although the HV electrode is the only accessible part, the atomizing head must be isolated from any other grounded part by at least 2.5 mm per kV.

In addition, a careful check must be made to ensure that any conducting or semi-conducting part inside the spraying enclosure, unless it is a part that normally operates under high voltage, 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 and gloves to avoid this risk.

Finally, for the same reasons, the spraying area must have an anti-static floor, such as bare concrete, metal duckboard, etc.

WARNING : The laws in force concerning the atomizing of paints and flammable liquids must be strictly complied with.

Always switch off the control module power supply before disconnecting the low voltage cable of the high voltage unit.

Always check that the high-voltage unit (UHT) is connected before restarting the control module.

1.2. Important Recommendations

This subchapter contains information that all operators must know and understand before using the PPH 405. This information highlights situations that could result in serious damage and indicates the precautions that should be taken to avoid them.

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 entering the circuits of the PPH 405.

1.2.1. High Voltage

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

1.2.2. Vibrations

If the PPH 405 vibrates more than usual, the cause is generally unbalanced rotating parts. There may be deposits of dry paint on the disk or it may be physically damaged by dry paint. If these situations arise, it is essential to correct them. Excessive unbalance may damage the turbine resulting in failure to operate.

WARNING : The guarantee does not cover damage caused by unbalance of the rotating parts.

1.2.3. Seals

Use the seals recommended in this manual. For solvent-based products, seals in contact with the product must be perfluorinated seals resistant to swelling or chemical attack. The PPH 405 is only guaranteed to operate correctly if it is used with seals whose size and material conform to this manual.

1.2.4. Mechanical Problems

The guarantee does not cover damage to the PPH 405 if the mechanical problem is due to the external environment (for example: a robot movement resulting in impact between the atomizer and the part).

1.3. Guarantee

Under the guarantee, which applies only to the buyer, SAMES 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 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 or a SAMES control system modified by a third party without written permission from an authorized SAMES technical agent,
- accidents such as: Collision with external objects, or similar events,
- flooding, earthquakes, fire or similar events,
- inadequately filtered bearing air (solid particles more than 5 microns in diameter),
- inadequately filtered paint and solvent,
- use of seals not complying with SAMES recommendations,
- starting up rotating parts that are unbalanced (dry paint on disk or damaged disk),
- pollution of air circuits by fluids or substances other than air.

SAMES atomizer PPH 405 is covered by a one-year guarantee for use in two 8-hour shifts under normal operating conditions.

By concession, the guarantee is extended to 2500 hours on the air turbine of the PPH 405. The guarantee does not apply to wearing parts such as atomizing disks, 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 be held responsible for physical injury or intangible damage, damage to brand image and loss of production resulting directly from its products.

2. General Description

The PPH 405 B is a device designed to be used for automatic electrostatic paint facilities in which:

- atomization is both centrifugal and electrostatic,
- deposition is electrostatic.

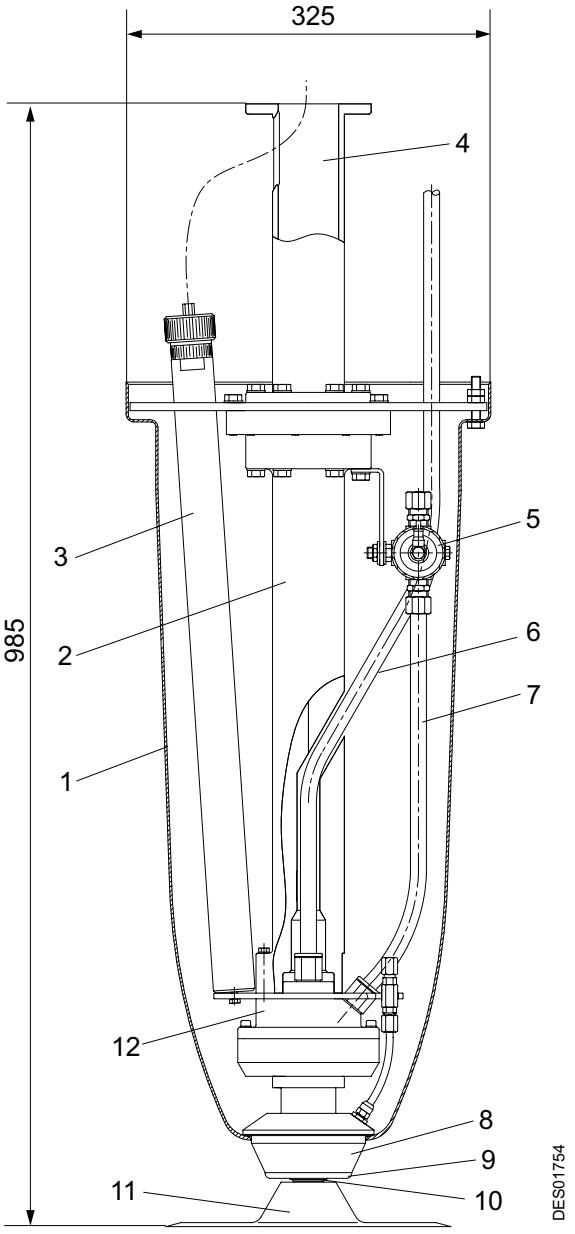
The PPH 405 B is always installed in the vertical axis. The part support conveyor moves around a circle concentric to the DISK axis.

The PPH 405 B contains the following elements:

1	Insulating protective cover
2	Insulating support
3	Protective electrical resistor: this optional item can be mounted between the generator cable and the atomizer.
4	Metal sleeve used to secure the PPH 405 B to its support.
5	Air regulator
6	Air supply for turbine braking
7	Air supply for turbine rotation
8	Paint injection flange
9	Ring-shaped air ejector, also known as the shaping air shroud
10	Pneumatic seal to protect the ball bearings
11	Atomizing disk
12	Air turbine motor
-	Cable connecting the electrostatic generator to the atomizing disk

As an option, the PPH 405 B can be fitted with pneumovalves that interrupt the product to be atomized.

-	Diameter 325 mm
-	6 holes, dia. 7 mm on a port dia. 83 mm



3. Characteristics

3.1. Mechanical Data

Atomizer height	985 mm
Atomizer diameter	325 mm
Weight with cover not including pneu-movalve	10 kg
Weight of the turbine alone	2.150 kg

The atomizer is secured to the support by 6 holes, dia. 7 mm, on a port 83 mm in diameter.

Maximum rotation speed

Disks	No load	Loaded - Maximum flow rate 500 cc
150 mm	28,000 rpm	21,000 rpm
250 mm	15,000 rpm	7,000 rpm

3.2. Electrical Data

Maximum voltage	100 kV

3.3. Pneumatic Data

The pressure of the turbine drive air must not exceed 6 bar. The shaping air shroud consumption must be added to this, i.e.:

Pressure (bar)	Air flow rate (Nm3/h)
0,5	7
1	13
1,5	19
2	25

3.3.1. Compressed Air Quality

- Dew point at 7 bar relative pressure: 2˚C (-10 ˚C at atmospheric pressure).
- The air must contain no more than 0.01 mg/Nm3 of oil.
- Any impurities must be no more than 5 microns in diameter and their concentration must not exceed 5 mg/Nm3.

*** : the values are given for a temperature of 20° C (68 °F and atmospheric pressure.**

If it is not already installed at the plant, an air dehydration should be fitted, with an oil filter at the outlet.

3.3.2. Paint Quality

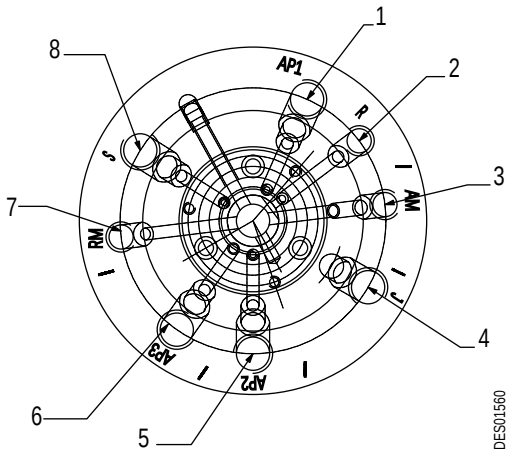
The paint resistivity should preferably be less than 500 MΩ.cm and its viscosity must not exceed 90 to 120 seconds, AFNOR cup 4. Transfer efficiency is better at lower resistivity levels.

3.3.3. Working Distance

The working distance must never be less than 20 cm.

4. Diagrams

The following diagram shows injection flange connections:



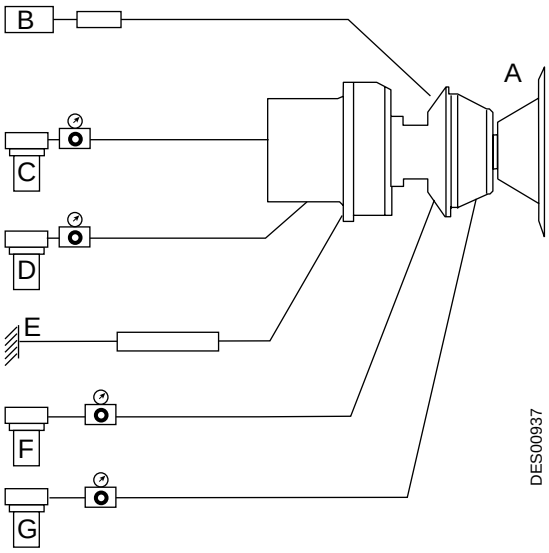
Item		Description
1	AP1	Paint 1 supply
2	R	Pneumatical seal - 1/8” - 4 x 6
3	AM	Microphone IN - 1/8” - 4 x 6
4	J	Shaping air - 1/4” - 8 x 10
5	AP2	Paint 2 supply, plug * option : straight union
6	AP3	Paint 3 supply, plug * option : straight union
7	RM	Microphone return - 1/8” - 4 x 6
8	S	Solvent - 1/4” - 6 x 8

Nota: * this plug can be replaced by a straight union when a second or a third color are used.

5. Operation

5.1. Operating Principle

When the turbine is fed with compressed air from circuit (C) it drives the rotation of the atomizing disk at a speed that increases in proportion to the air supply pressure. The air supply pressure is adjusted by means of a pressure relief valve or pneumatic amplifier. The faster the rotation of the disk, the finer the particles of atomized paint.



Circuit (D) feeds air to the turbine braking system.

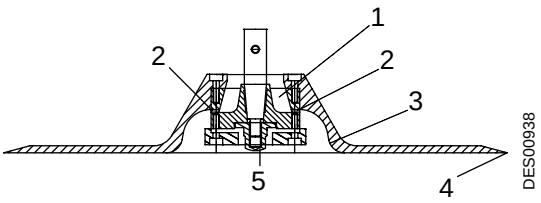
Circuit (B) feeds product to the atomizing disk (A) from the outlet of a pneumatic amplifier fed by a proportional valve or volumetric pump.

The electrical circuit (E) generates a high DC voltage in the atomizer which assists atomization of the product and transfers an electrical charge to the atomized particles, establishing the electrical forces required for electrostatic transfer of the product.

Air circuit (G) supplying the shaping air shroud is used to control stability of the paint spray.

Circuit (F) supplies air to the pneumatic seal, which prevents paint from seeping into the ball bearings.
The disk operates in the following manner:

The product is injected into the cavity (1). The centrifugal force exerted on it drives it through the holes (2) on the surface (3) of the disk. It then reaches the edge (4) where it is atomized.
The nut (5) secures the disk to the tapered end-piece of the turbine shaft and can be removed to extract the disk from the end-piece.

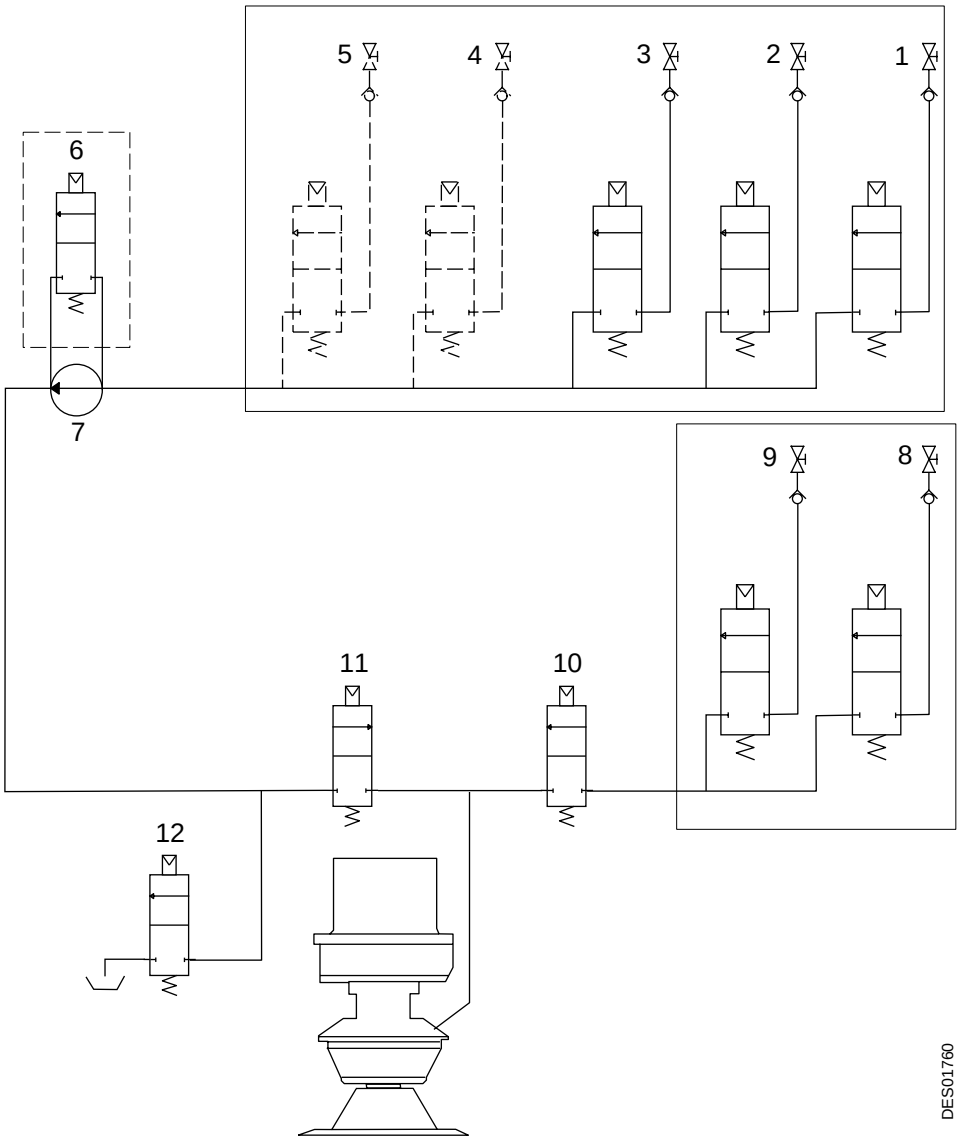


WARNING : Note: This disk is balanced in our factory and must never, for any reason, be disassembled.

5.2. Functional Diagram

5.2.1. Pump Without Paint Recirculation

WARNING : The equipment described in this chapter is delivered to order.

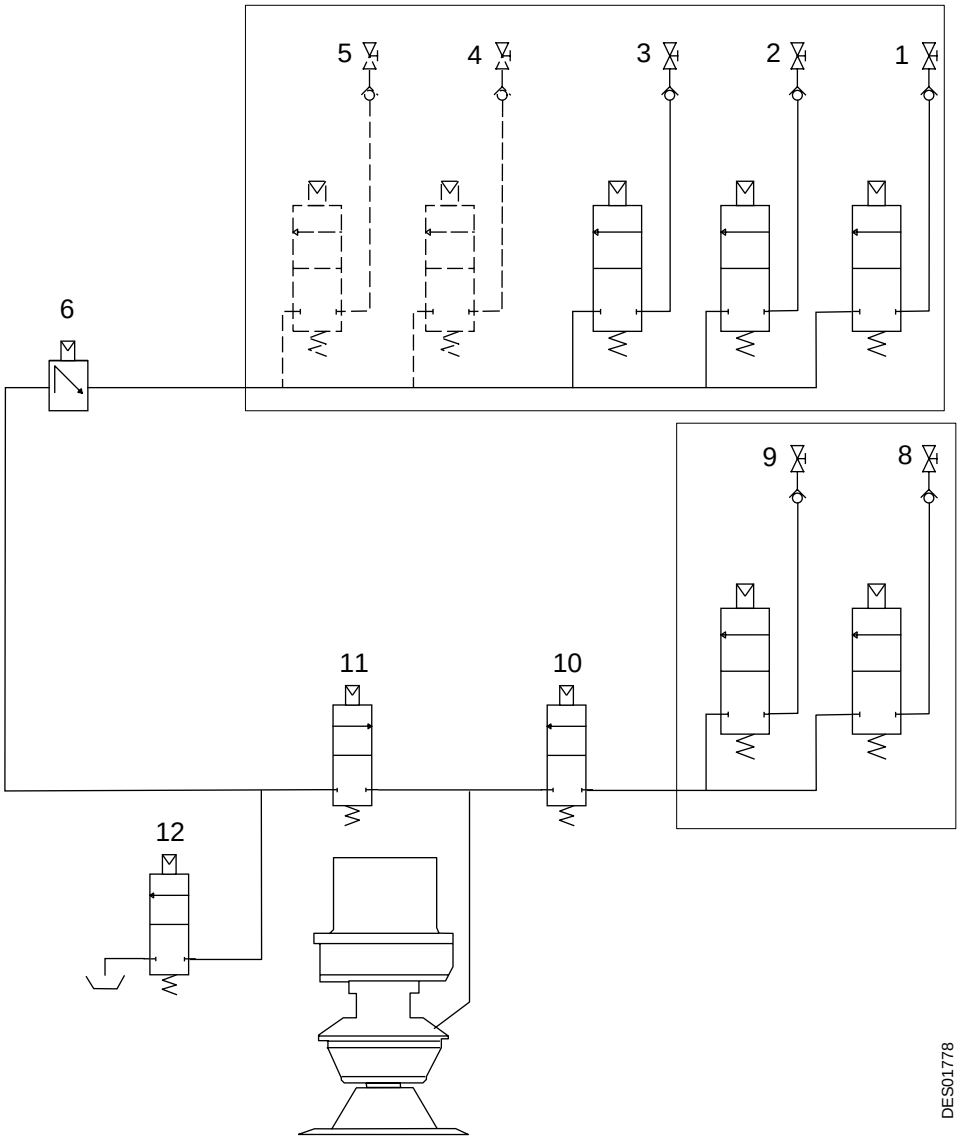


1	Rinsing air	7	Pump
2	Rinsing solvent	8	Air
3	Paint 1	9	Solvent
4	Paint 2 (optional)	10	Rinsing valve
5	Paint 3 (optional)	11	Atomizing valve
6	Pump shunt valve	12	Dump valve

To stop atomization, switch off the pump. Then close the atomizing valve.

5.2.2. Regulator Without Paint Recirculation

WARNING : The equipment described in this chapter is delivered to order.

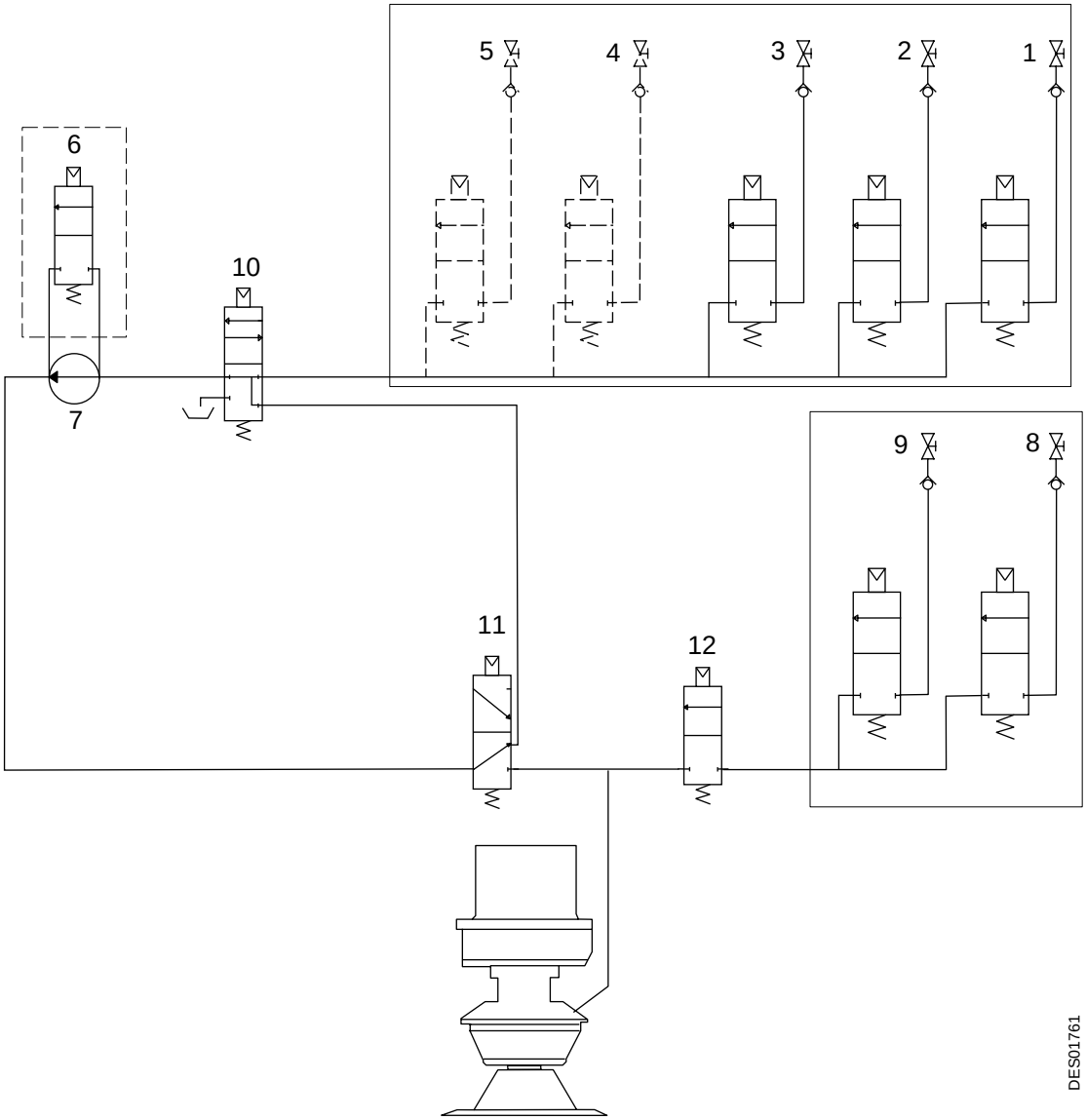


1	Rinsing air	8	Air
2	Rinsing solvent	9	Solvent
3	Paint 1	10	Rinsing valve
4	Paint 2 (optional)	11	Atomizing valve
5	Paint 3 (optional)	12	Flush valve
6	Regulator		

To stop atomization, switch off the regulator. Then close the atomizing valve.

5.2.3. Pump with Paint Recirculation

WARNING : The equipment described in this chapter is delivered to order.



1	Rinsing solvent	7	Pump shunt valve
2	Rinsing air	8	Pump
3	Paint 1	9	Air
4	Paint 2 (optional)	10	Dump/recirculation valve
5	Paint 3 (optional)	11	Atomizing valve
6	Pump shunt valve	12	Rinsing valve

6. Tools

P/N	Description	Qty	Unit of sale
W6CVTC030	Allen wrench for 1.5-mm hex. socket screw	1	1
W6CVTC006	Allen wrench for 2-mm hex. socket screw	1	1
W6TRND029	FOP screwdriver, dia. 3x125	1	1
H1GMIN017	Tube of vaseline	1	1

7. Installation

7.1. Unpacking

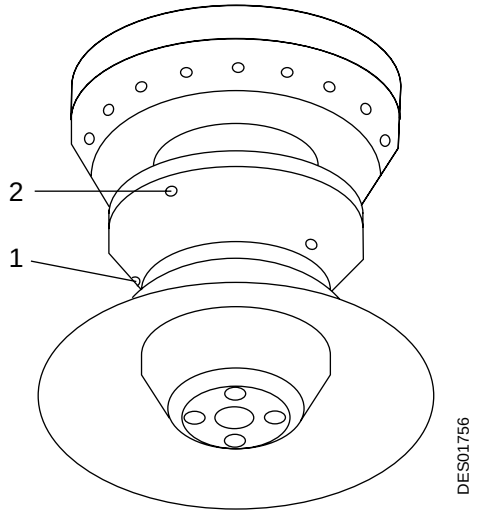
Take great care not to damage the equipment during unpacking. If the turbine shaft or atomizing disk receive any blows, the disk will not operate correctly.

7.2. Working Position

The PPH 405 B must always operate vertically with its atomizing disk turned either downwards or upwards.

The disk is delivered with two hexagonal socket screws in the injection flange. Before first startup of the facility, remove:

- screw (1) closest to the atomizing disk if the disk is operated in the downward position.
- screw (2) furthest from the atomizing disk if the disk is operated in the upward position.



7.3. Startup

Check that the atomizing disk is clean and correctly fitted on the turbine and that nobody is close to the disk.

The startup procedure is as follows:

- Switch on the pneumatic seal air supply,
- Start up turbine rotation,
- Switch on the shaping air,
- Switch on the high voltage,
- Open the paint supply.

For short breaks (less than 10 minutes) and for paints requiring a relatively long time in the drying oven:

- switch off the product supply,
- switch off the high voltage,
- switch off the shaping air supply,
- switch off the turbine.

To restart after a short break carry out the operations above in reverse order:

- start up turbine rotation,
- switch on the shaping air,
- switch on the high voltage,
- open the paint supply.

For long stoppages (at the end of a shift for example) or for quick-drying products:

- switch off the product supply,
- switch off the high voltage,
- rinsing the atomizing disk via the rinsing circuit or the product supply circuit,
- switch off turbine rotation.
- switch off the shaping air supply,
- clean the atomizer thoroughly using a fine brush and solvent,
- switch off the air supply to the pneumatic seal.

8. Adjustments

With the atomizer switched on, the turbine rotation speed is adjusted by varying the air supply pressure until the required result is achieved. The rotation speed increases with the pressure.
Note that:

- atomization becomes finer as the rotation speed increases,
- if the paint tends to be dry on reaching the object, the rotation speed must be reduced.

Depending on the part, the voltage is normally between 80 and 100 kV.
Shaping air pressure must only exceed 1.5 bar on exceptional occasions to avoid unnecessary paint loss.
The air pressure used for the pneumatic seal is 1 bar.

8.1. Choosing the Disk Diameter

Disk	Product	Remarks:
dia. 250 mm with holes	All types	- Standard disk - Provides good penetration on concave parts. - Slow rotation speed
dia. 150 mm with holes	Single-compo-nent	- High rotation speed for finer atomization - Product drying (*)
dia 150 mm with slots	Bi-component	- High rotation speed for finer atomization - Product drying (*) - Easier cleaning

*** : the products used must be suitable for the application and rotation speed.**

8.2. Paint Flow Rate - Injection Screw

Injection screw assemblies are available in various diameters. The atomizer is delivered with a dia. 1.5 mm injection screw. Depending on the required paint flow and product viscosity, a suitable injector can be fitted on the paint inlet at the bell cup to adjust the circuit pressure drop and set the operating range of the paint regulator or volumetric pump. If possible, work in the middle of the range.

9. Maintenance

9.1. Cleaning

At the end of each shift, clean:

- the atomizing disk using a rinsing product and fine brush,
- if necessary, the cover, using a cloth soaked in a rinsing product then wrung slightly,
- the shaping air shroud using a rinsing product and fine brush.

We recommend fitting a disposable wrapping of transparent, flexible polyethylene two to three millimeters thick around the support at the start of a shift. It can be discarded at the end of the shift.

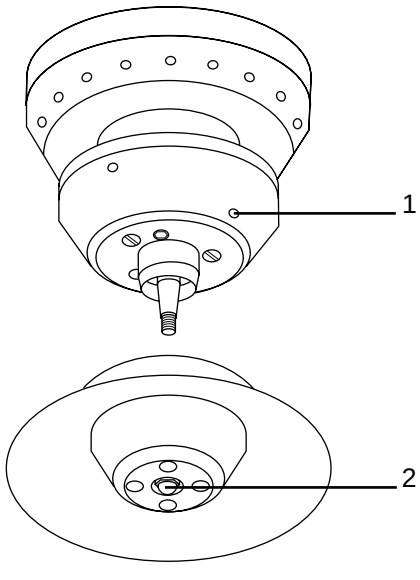
WARNING : Only remove the disk from the turbine if it is absolutely necessary.

9.2. Removing the Atomizing Disk from the Turbine

1 After total shutdown of the turbine, the disk must be immobilized by slotting the dia 3 mm screwdriver (1) supplied with the equipment into the hole in the injection flange until it penetrates into the hole that crosses the disk drive shaft.
2 Next use a 10 mm angled socket wrench to unscrew the nut securing the disk (2).
3 Disengage the disk.

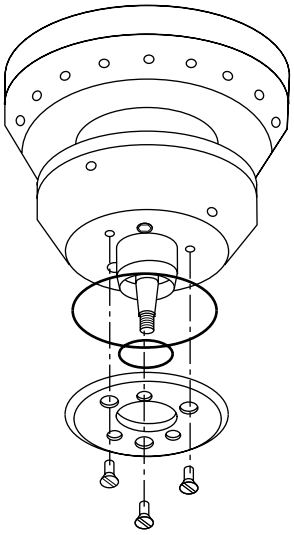
When refitting the turbine disk, carry out the operations in reverse order having first cleaned the two tapered bearings (shaft and disk) very thoroughly.

WARNING : Make sure there is no paint on these bearings (see § 5.1 page 12).



9.3. Removing the Shaping Air Shroud

1 Disengage the disk.
2 Remove the three countersunk-head screws.
3 Remove the shaping air shroud and seals.



WARNING : Do not unscrew the hexagonal socket screws.

When reassembling do not forget the seals. Replace them if necessary.

9.4. Removing the Paint Injection Flange

1 Disengage the disk.
2 Remove the screws securing the protective cover.
3 Remove the cover.
4 Remove the shaping air shroud and seals.
5 Disconnect all hoses from the injection flange.
6 Unscrew the three hexagonal socket screws.
7 Remove the flange.

When reassembling do not forget the seals. Replace them if necessary.

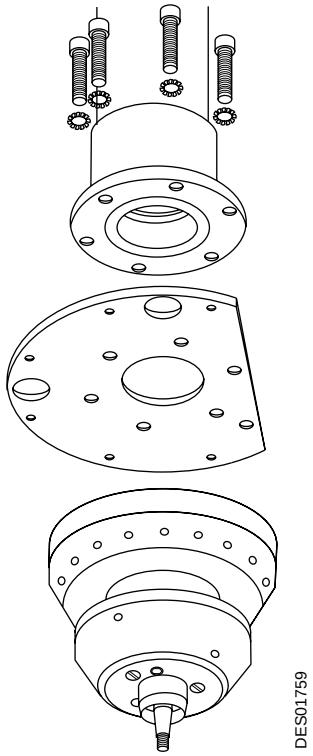
9.5. Disengaging the Turbine

The following procedure includes dismantling of the injection flange and shaping air shroud:

1 Disengage the disk.
2 Remove the screws securing the protective cover.
3 Remove the cover.
4 Remove the shaping air shroud and seals.
5 Disconnect all hoses from the injection flange.
6 Remove the injection flange.
7 Remove the 6 screws securing the flange to the support.
8 Disengage the turbine from the support to gain access to the braking circuit unions.

Make sure there is sufficient hose length to disengage the turbine.

9 Disconnect the unions on the braking and rotation circuit.



The turbine can be removed without dismantling the injection flange and shaping air shroud.

When reassembling do not forget the seals. Replace them if necessary.

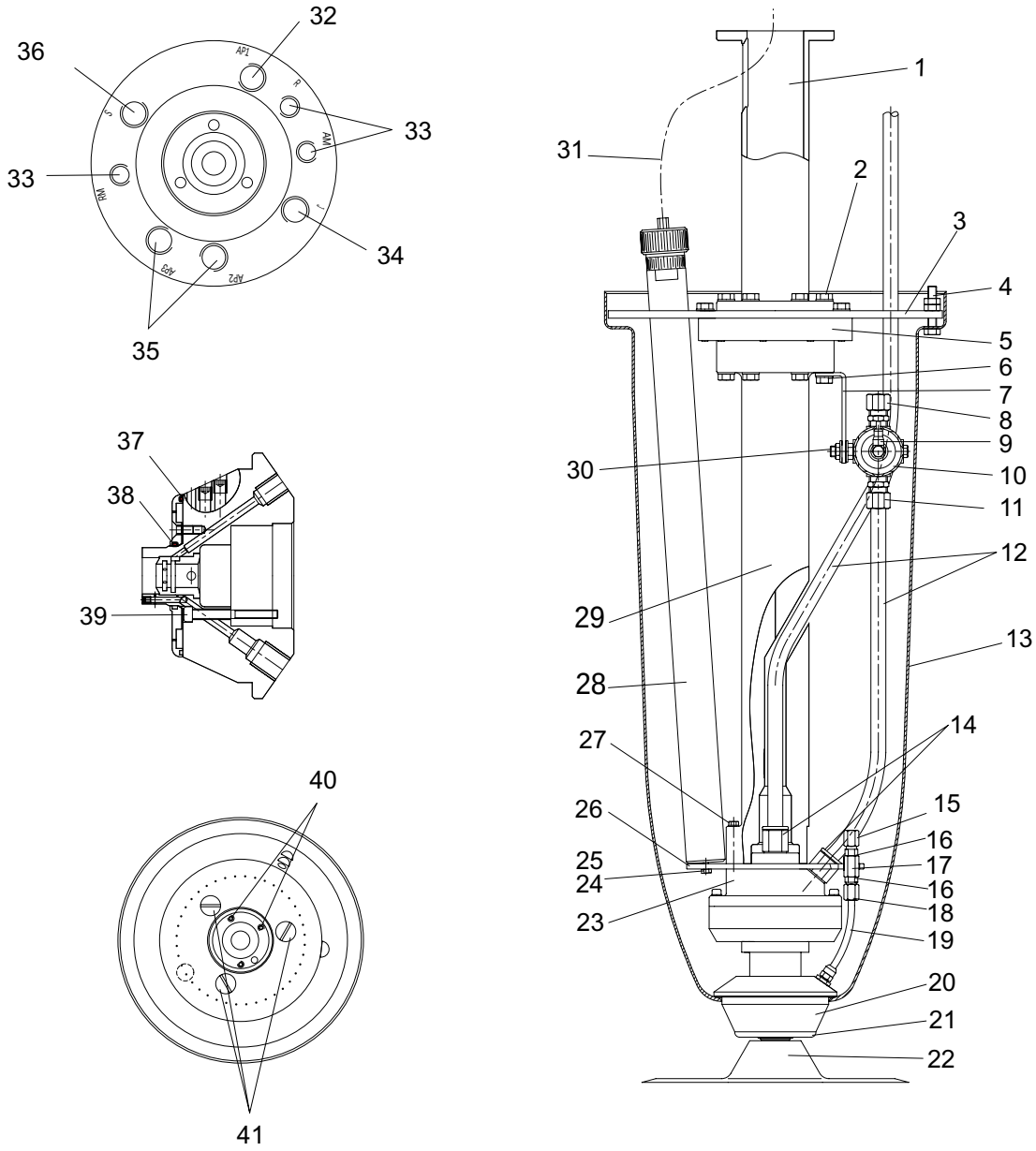
WARNING : No parts other than those mentioned must be removed. If any other parts are removed the turbine will fail to operate and will have to be returned to the factory without being covered by the guarantee.

10. Troubleshooting Guide

Symptoms	Probable causes	Remedies
Excessive DISK vibration and considerable noise.	Mechanical damage to the atomizing disk (caused by blows for example).	Replace the faulty disk immediately, otherwise the turbine will quickly be damaged.
	One of the parts of the atomizing disk removed by mistake.	Replace the atomizing disk immediately, otherwise the turbine will quickly be damaged.
	Ball bearings faulty.	Carry out standard replacement of the turbine.
	Mistaken removal of a part only to be removed by the supplier.	
	Excessive soiling (internal or external) of the atomizing disk.	Disassemble the turbine disk, soak it in solvent and clean it thoroughly with a fine brush and air puffer.
The disk does not rotate.	Solid foreign matter between the turbine shaft and the part forming the pneumatic seal.	Remove the flange. Clean with air puffer.
Product supply hose split.	Product feed to injection flange blocked.	Remove the injection flange, soak it in solvent and unblock the injection holes using piano wire.
Electrical puncture in product supply hose.	The product to be atomized has resistivity of less than 1 MΩ.cm and the DISK is fitted with a dia. 4 x 6 Rilsan product hose.	Replace the Rilsan product hose with a dia. 4 x 16 polyethylene hose.
Paint is dry when it arrives on the parts.	Object too far from atomizer.	If possible, bring object closer to atomizer.
	Diluent too light. Paint not suitable for application with high-speed atomizer.	Contact the product manufacturer.
	Disk rotation speed too great.	Decrease pressure of turbine supply air.
No wraparound effect and low transfer efficiency.	Generator short-circuited by product with resistivity of less than 1 MΩ.cm used with product tank and pumps connected to the ground.	Ask the product manufacturer to increase the resistivity of his product. Ask SAMES to install an insulated pump and tank.
	Product to be applied has resistivity greater than 500 MΩ.cm.	Ask the product manufacturer to decrease the resistivity of his product.
	Generator failure.	Return the generator to SAMES.
Inadequate paint flow.	Paint viscosity too high.	Reduce the viscosity with suitable diluent.
	Paint supply hose too small in diameter or too long.	Fit a dia. 8 x 10 hose and reduce the length if possible.

11. Spare Parts

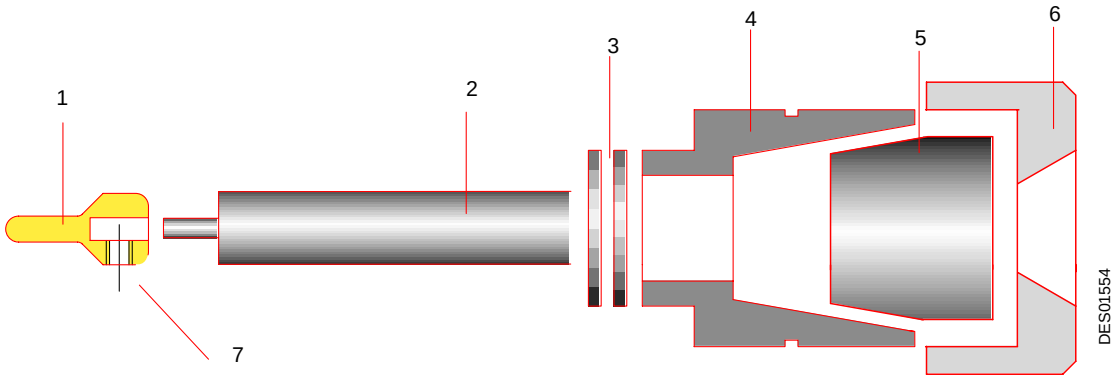
11.1. Atomizer



Item	Part number	Description	Qty	Unit of sale
	1502281	**PPH 405B atomizer, with disc D: 250 mm**	**1**	**1**
1	434435	Fastening flange	1	1
2	X2BVHA284	Screw, H M8x25, zinc-plated	9	10
	X2BDVX008	Fan washer, dia. 8 mm	15	10
3	434441	Cover plate	1	1
4	X9NVHA289	Screw, H M8 x 50 nylon	3	10
	X9NEHU008	Nut, H M8 nylon	6	10
5	422391	Fastening plate	1	1
6	X2BHA290	Screw, H M8x55, zinc-plated	6	10
7	1410430	Fixing bracket	1	1
8	F6RLUQ366	Male union	1	1
9	F6RLCS265	Male connector	1	1
10	R4DREG040	Regulator	1	1
11	F6RLUS201	Male union	1	1
12	U1CBBT006	Hose rilsan blue D:11 / 14	m	m
13	411771	Insulating cover	1	1
14	F6RLUS204	Male union	2	1
15	745232	Machined union	1	1
16	J3TTCN009	O-ring - PTFE	2	5
17	449945	Female sleeve	1	1
18	1410505	Union , stainless steel	1	1
19	U1CBBS001	Hose rilsan incolore D:4 / 6	m	m
20	**419278**	**Injection flange**	**1**	**1**
21	423915	Shaping air shroud, PPH 405	1	1
22	453475	Disk, dia. 250 mm	1	1
	453652	Disk, dia. 150 mm	1	1
	456174	Disk, dia 150 mm with slots	1	1
23	**1502280**	**PPH 405 B turbine**	**1**	**1**
24	X2BVHA223	Screw H M 6 x 16	1	10
25	X2BVDX006	Self-locking washer, dia. 6	6	10
26	1300700	Accessory support	1	1
27	X2BVHA232	Screw, H M 4 x 50, zinc-plated	5	10
28	**204690**	**High-voltage rod assembly** see § 11.2 page 25	**1**	**1**
29	1200583	Insulating support	1	1
30	R4DREX041	Adaptator	1	1
31	E2DAVD100	High voltage cable	1	1
32	F6RPUK396	Union	3	1
33	F6RLUF223	Union	3	1
34	F6RLUF704	Union	1	1
35	F6RLBH004	Plug , 1/4" 4/6 (option union)	2	1
36	449476	Union	1	1
37	J2FTCF440	O-ring - viton	1	1
38	J2FTCF054	O-ring - viton	1	1
39	X3AVSY127	Screw CHC M 4 x 40 steel	3	10
40	X2BVFP118	Screw F/90 M 4 / 10 steel	3	10

Item	Part number	Description	Qty	Unit of sale
41	448713	Injection screw on paint supply 1 - D: 1,5	1	1
	448715	Injection screw on S solvent - D: 8	1	1

11.2. High voltage connection



Item	Part number	Description	Qty	Unit of sale
1	449521	Banana plug D: 4	1	1
2	E2DAVD100	High voltage cable	1	1
3	324699	Sealing washer	2	5
4	323019	Stuffing box housing	1	1
5	449832	Grip	1	1
6	323020	Tightening nut	1	1
7	X3ASSN116	Screw HC M 4 x 6	1	10