INSA Trading GMBH

Instruction Manual

Smartcoat System Type 5800

This manual is supplied by INSA Trading GmbH, Switzerland

TELEPHONE 214-477-1344 **www.eicgroupusa.com**

FAX 972-317-6889

PO BOX 294488, LEWISVILLE, TX 75029

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1 Foreword

Thank you for purchasing an INSA Smartcoat System. It is a very efficient system and offers many features to help you apply powder to the most difficult parts. In order to receive the most from your equipment, please take a moment to become acquainted with the different functions, as described in this manual.

Please note that INSA Trading GMBH or its representative can take no responsibilty if the equipment is used outside its specification, or for uses other than those described in this manual.

2 Version Information

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Version of the document	2
Date of last modification	2003-07-16

3 Safety-regulations concerning Electrostatic Powder Coating

1.The equipment can be dangerous when not used in accordance with the requirements of the following standards:

- EN 50 050 (resp. VDE 0745 chapter 100)
- EN 50 053 (resp. VDE 0745 chapter 102)
- Instructions for electrostatic powder coating ZH 1/444

2.All electrostatically conductive parts within a reach of 5 m from the spray area have to be grounded.

3.The floor of the room containing the spray area has to be electrostatically conductive.

4.The personnel should wear shoes with electrostatically conductive soles.

5.The personnel must handle the gun either with bare hands or with electrostatically conductive gloves.

6.The grounding wire (green/yellow) is connected to the ground screw on the back of the electrostatic manual powder coating module.

7.The ground wire must have a solid metallic connection to your ground used with the booth, the recovery system and the conveyor chain as well as the objects to be coated.

8.The electric cables as well as the powder hoses leading to the gun have to be handled in such a way that they are protected against mechanical damage.

9.Only after the recovery system has been put into operation may the powdercoating unit be switched on.

10.Electric wires as well as powder hoses have to be checked and cleaned at least daily.

11.The grounding of all the electrostatically conductive parts and equipment within the reach of 5 m from the spray area should be checked at least once a week.

12. The control module must be switched off when cleaning the gun or when changing nozzles or extensions.

4 Components of the System

A Smartcoat System consists of two separate components, which are both described in this documentation

- A Manual Powdercoating Gun Type 801
- A control drawer type 5800 (either with a hopper, with a vibraton table or with no accessories, as a 'Powderset')

Please familiarize yourself with the System before use.

5 The Manual Gun Type 801

5.1 Introduction

The manual powder gun MG801 with the integrated high voltage generator is designed to apply electrostatically chargeable powder on grounded work-pieces. The gun is designed with state of the art of technology. The parts are assembled in a simple manner which guarantees easy maintenance and repair. The gun produces high voltage and it is therefore absolutely necessary to read the instruction manual carefully before starting to operate.

The guns are built in accordance with the CE-regulations and in combination with the electronic control board ECB, tested in conformity with the EN-50 050/54 regulation.

Important

The manual gun MG801 and the electronic control board ECB have been controlled according to the EN 50 050 as components of a configuration, they can only be used in this combination. Any change or manipulation of the components will automatically void the warranty. Use only original spare parts, to maintain the warranty.

5.2 Generation of high voltage

Illustration 1 Basic operation of the gun

The powder gun with the integrated high voltage generator (Pos.1 in Illustration 1 above) is supplied from the central drawer by the cable (pos.2) with low voltage of 16 kHz frequency. This voltage is transformed to high AC voltage and afterwards multiplied up to 110 kV at the electrode (pos.3). The powder hose is connected to the hose connector (pos.4).

When the gun trigger (Pos. 5) is pressed, the solenoid valve will activate (for compressed air) along with the voltage supply to the gun. The grounding plate (Pos. 6) at the handle will ensure the operator is not charged.

5.3 Selection of the voltage level

The basic adjustment of the voltage can be done at the control drawer type 5800. The setting depends on several factors such as the type of powder used, the desired thickness of the film and the workpiece range.

For this reason, the values in the table below should be seen as a rough guide or a starting point. Please note that the setting of the coating mode can also influence results.

Voltage	***Typical Application***
80 - 100 kV	Large flat parts, film thickness less than 50 micron
60 - 80 kV	General application
40 - 60 kV	Profile coating
50 kV	Application of metallic powder

5.4 The use of different muzzles

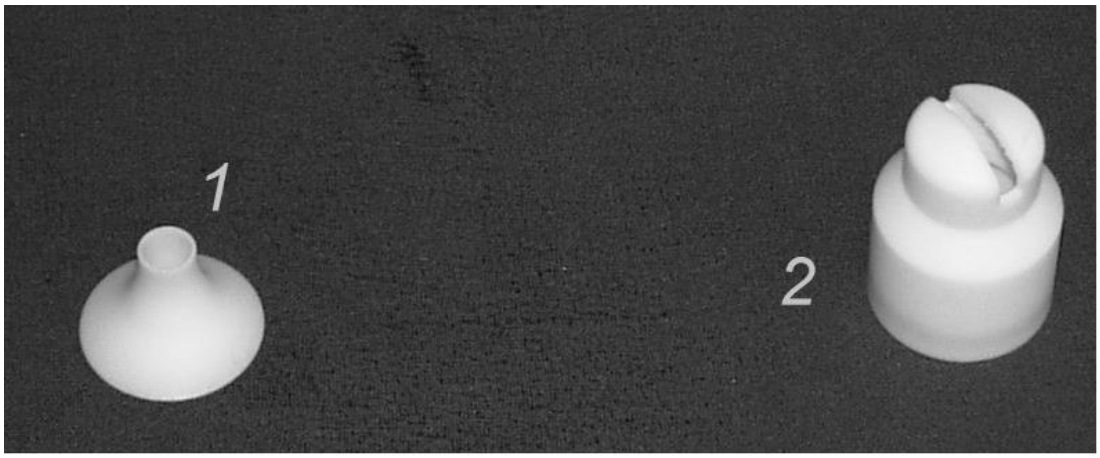

Illustration 2 Different types of muzzles available

There are two different types of muzzles available to adapt the powder output cloud. Position 1 in Illustration 3 shows a deflector muzzle.. Position 2 shows a flat spray muzzle.

5.4.1 Function of a deflector muzzle

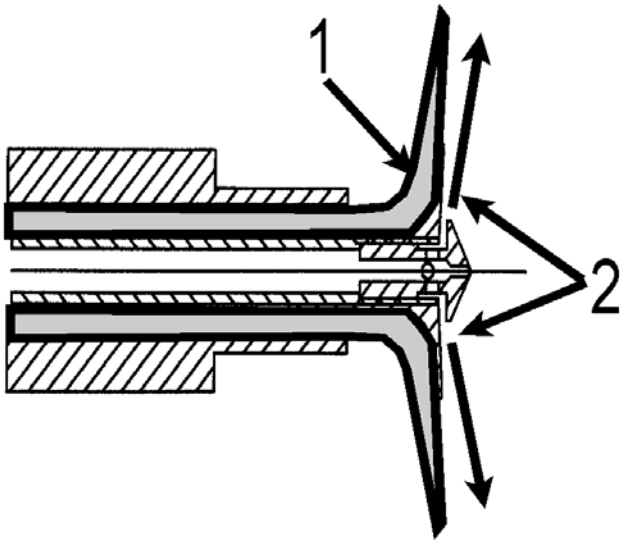

Illustration 3 Function of a deflector muzzle

Position 1 in Illustration 3 shows the powder flow. The deflector cleaning air keeps powder from building up on the the deflector (Pos. 2)

5.4.2 Function of a flat spray muzzle

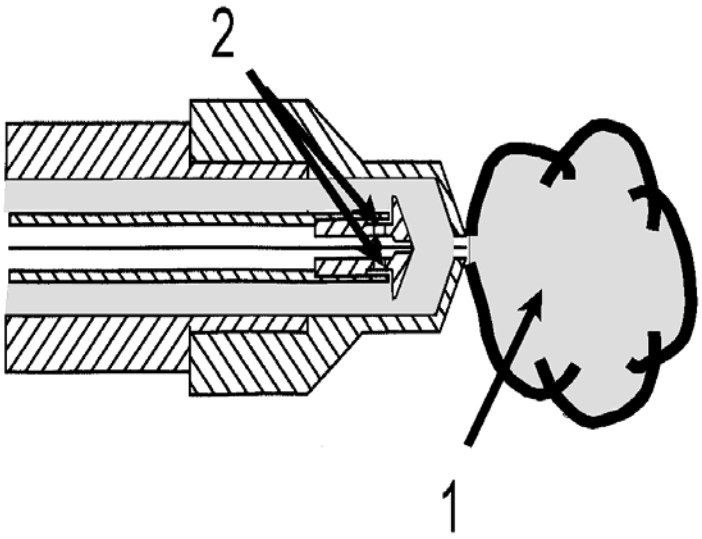

Illustration 4 Function of a flat spray muzzle

As can be seen in Illustration 4, the powder exits through the slot of the fan spray muzzle and creates a flat cloud (Pos. 1). The speed at the exit can be adjusted through the pressure of the cleaning air (Pos. 2).

5.5 The components of the MG800

5.5.2 Muzzles and wearable parts

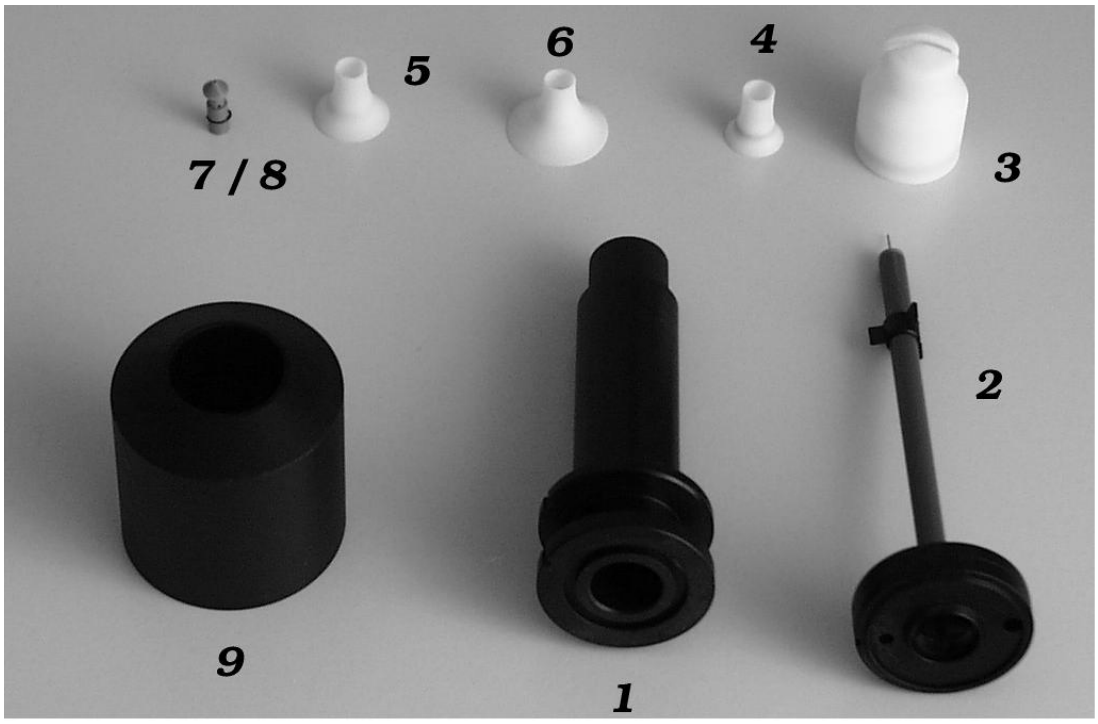

Illustration 5 Overview of the muzzles and other wearable parts

Different muzzles are available to be used with the manual gun MG801. Please refer to Illustration 5, and to the table on the following page to determine which of them fits your application best.

Pos.	***Order No.***	***Description***
1	*200.104.01*	*Muzzle 100 mm*
2	*200.101.01*	*Electrode holder 110mm*
3	*200.106.01*	*Flatspray nozzle*
4	*200.110.01*	*Deflector dia 13mm*
5	*200.111.01*	*Deflector dia 18 mm*
6	*200.112.01*	*Deflector dia 24 mm*
7	*200.102.01*	*Air deflector dia 6mm*
8	*200.102.02*	*Air deflector dia10mm*
9	200.105.01	Union nut

Wear Parts are printed in *italic type*

5.5.3 Parts of the manual Gun MG850

Please consult Illustration 6 and the table on the following page.

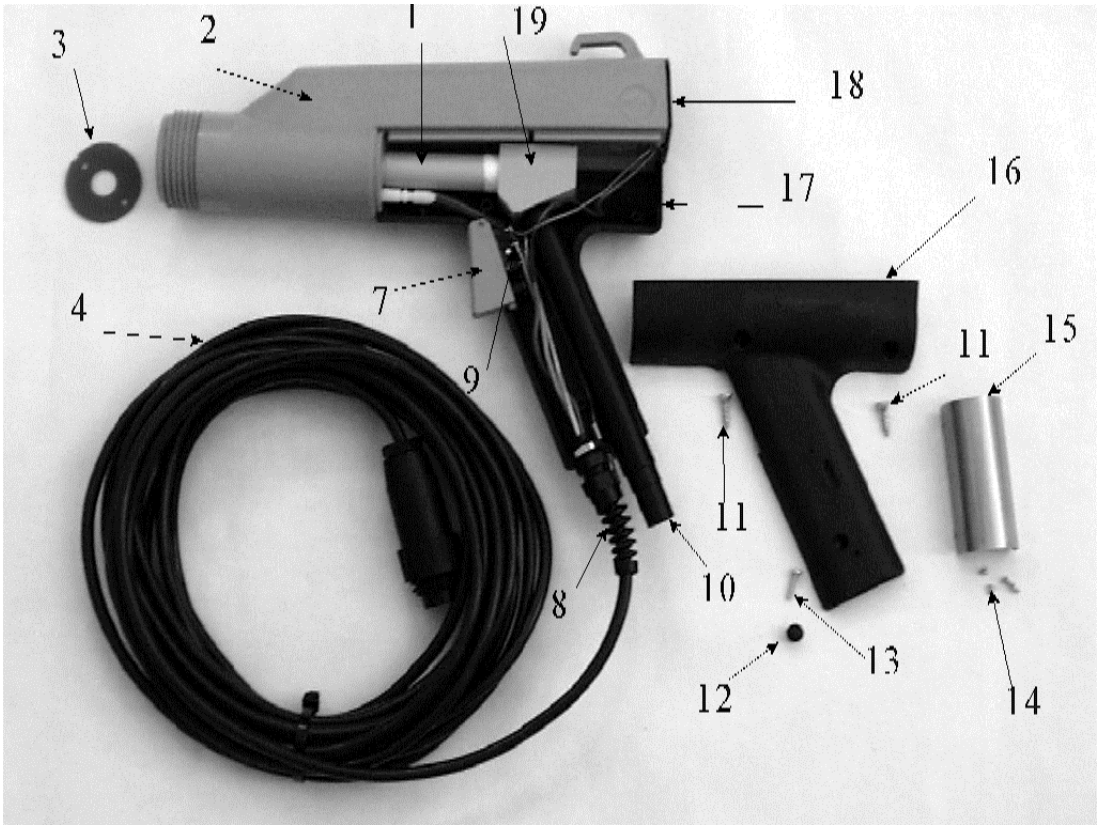

Illustration 6 Overview of a disassembled MG801

Pos.	***Order.No.***	***Description***
1	200.051.01	Powder tube
2	201.001.01	HT-Generator green negative
	201.001.02	HT-Generator red positive
	201.001.03	HT-Generator grey 9Vnegative
3	*200.100.01*	*Rubber-sealing*
4	200.001.01	Guncable with plug to drawer
7	200.058.01	Gun trigger
8	200.059.01	Cable clamp
9	200.060.01	Gun switch
10	200.061.01	Powder tube with hose connector
11	200.062.01	Handle screw
12	200.063.01	Plastic cap
13	200.064.01	Handle screw
14	200.065.01	Screw for coverplate
15	200.066.01	Coverplate
16	200.067.01	Upper handle body
17	200.068.01	Lower handle body
18	201.002.01	Coverplate for cascade
19	200.069.02	Powder diverter

Wearing Parts are printed in *italic type*

Technical data of the manual gun type MG801

Input voltage:	10,5 V_{eff}
Frequency:	17 kHz
Output Voltage:	110 kV -10 %
Max. Output current:	140 µA
Polarity:	negative
Licence:	EN 50 050
Examination No:	BVS 97.D.2048

6 The Control Unit Type 5800

Illustration 7 Image of the Control Unit Type 5800

The control Unit Type 5800 ('SmartCoat') is availabe in three varations, which are:

- as a Powderset, Control Unit only
- mounted on a stand, with a hopper
- mounted on a stand, with a box vibrator, allowing for fast color change

All three systems share the common features, and will be described in the coming pages of the manual. The pictures used in the following pages will be of the powderset showing only the controller.

6.1 First time Installation

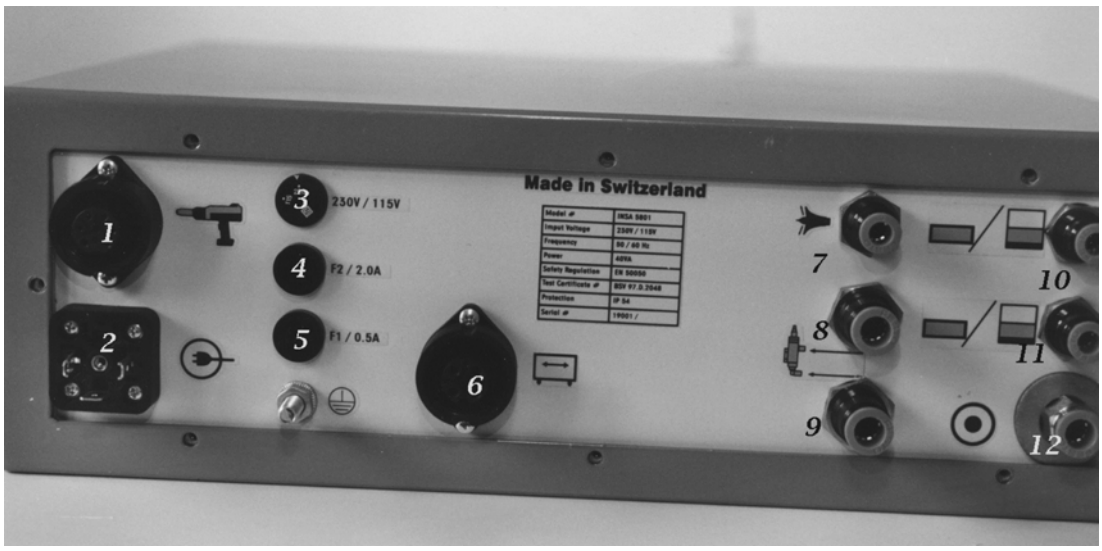

Illustration 8 The connectors at the back of the unit

Illustration 9 Connections at the bottom of the gun

1.Connect the pneumatic inlet to plug Number 12 (in Illustration 8).

1.Connect the pneumatic outlet (Pos. 8 and 9) to the injector

2.Connect the outet (Pos 7) to the bottom of the gun handle (Pos. 2 in Illustration 9) for deflector cleaning.

3.- If you have a box vibrator unit, connect the vibration table to Pos. 6 in Illustration 8.

- If you have a hopper unit, connect the fluidization to either Pos. 10 or Pos. 11 (one position has constant air to hopper the other has air to hopper only when trigger is pulled) in Illustration 8.

4.The gun will get its power supply from the plug shown in Pos. 1 of Illustration 8.

5.Adjust the voltage selector (Pos. 3 in Illustration 8) to your single phase voltage (220volt or 110 volt).

6.The main power supply needs to be connected to Pos. 2 shown in Illustration 8.

6.2 Day to day operation

Once installed, the Type 5800 Control Unit is easy to operate. Please refer to the Illustration below, and the sections on the following pages.

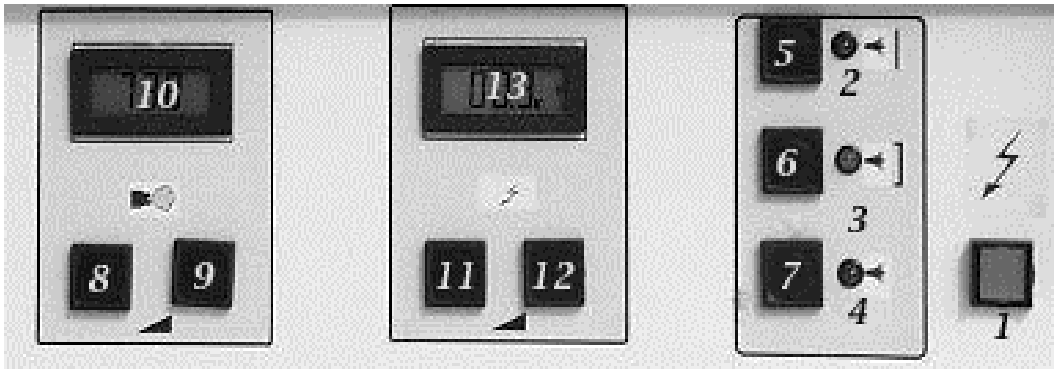

Illustration 10 The controls of the 5800 Series

6.2.1Using the Preset Programs

The INSA Smartcoat Series has a set of 3 preset programs that can be activated using the buttons 5 ,6 and 7 of Illustration 12. The unit is able to remember its last setting. When it is switched on using the main switch (Pos. 1 of Illustration 10), one of the lights (Pos. 2, 3 or 4) will indicate its current coating mode. If no mode has been selected, none of the lights will be lit. In that case select a coating mode from the ones described below.

Please note
To get reproducible results, one of the three programs should be selected before coating. For this reason, one of the three LEDs, 2, 3 or 4 should always be lit.

6.2.2 The three different coating modes

The Smartcoat Series unit offers three different coating modes which will influence the parameters of the electrostatic field. Depending on the situation (shape of the workpiece, different powders), one of the programs will better suit the situation.

General Purpose Program

This program is selected using button 7 of Illustration 10. When it is active, the LED in Position 4 of the Illustration will be lit. We recommend using this program when you have workpieces of different shapes, or when no other program will yield better results

Program for Flat Parts

This program can be activated by pushing button No 5 of Illustration 10. The LED in Pos. 3 in the illustration will illuminate when it is active. This program will keep the voltage very stable, resulting in an uniform film of up to 60 µm and high transfer efficiency.

Program for Profile Coating

The program mode for profile coating should be used to coat profiles. It will optimise the voltage for the coating of difficult corners. The LED No. 2 of Illustration 10 on page 23 will show it as active. It can be chosen by pushing button No. 5 of the Illustration 10.

6.2.3 Finetuning Powder output

After the selection of a program, the powder output can be adjusted using the buttons (Pos. 8 and 9 of Illustration 10). The readout (Pos. 10) will show the percentage of powder output based on the pressure set at the incoming regulator assembly located on the stand and directly below the control module with hopper and box vibrator units. The regulator assembly is included with the powder set and must be mounted in a desired customer location.

Set the incoming regulator at 2 bars (30 PSI) to begin. Using the buttons on the control module, set the powder output so that the readout will show 20-100 (percent), the lower the powder output percentage you will notice that the velocity of the powder increases and the amount of powder decreases. As the powder percentage increases the powder output will increase and the velocity will slow. Once you find the percentage of powder output and the corresponding pattern, then increase or decrease the air pressure at the incoming regulator assembly to increase or decrease the powder output.

6.2.4 Finetuning the Voltage

Once a program has been selected, the Voltage can be set at the control. The readout (Pos. 13 in Illustration 10) will show the currently selected voltage in kV. Using the buttons below the readout (Pos. 11 and 12 in the Illustration), the voltage should be set to the optimum value for the application. You can use the table given in section 5.3 to find some general values to start with.

6.3 Parts list

6.3.1 The Front Panel

Please refer to the Table and the Illustration 11 below.

Illustration 11 Replacement parts of the 5800 front panel

Pos.	***Reference No.***	***Description***
1	800.001.01	Main (ON/OFF) Switch
2	800.002.01	Illuminating LED
3	800.003.01	Push button
4	800.004.01	Digital Readout

6.3.2 Parts located at the back

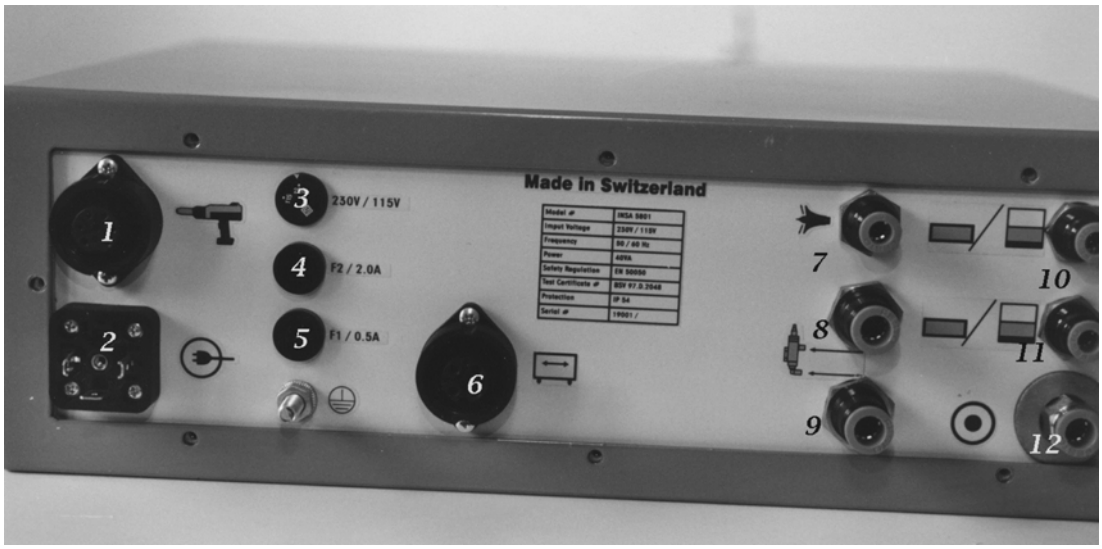

Illustration 12 Rear view of the 5800 Series unit

Pos.	***Reference No.***	***Description***
1	800.010.01	Connector for gun, 7 pin
2	800.011.01	Connector for main supply
3	800.012.01	Voltage selector
4	800.013.01	Fuse holder / Fuse 2 A
5	800.014.01	Fuse holder / Fuse 0,5A
6	800.015.01	Connector for Boxvibrator
7	800.016.01	Hose connector 6/4mm
8	800.017.01	Hose connector 8/6mm
9		
10	800.016.01	Hose connector 6/4mm
11		
12	800.018.01	Main air connector

6.3.3 Internal Parts

Please refer to the figure below and the table on the next page.

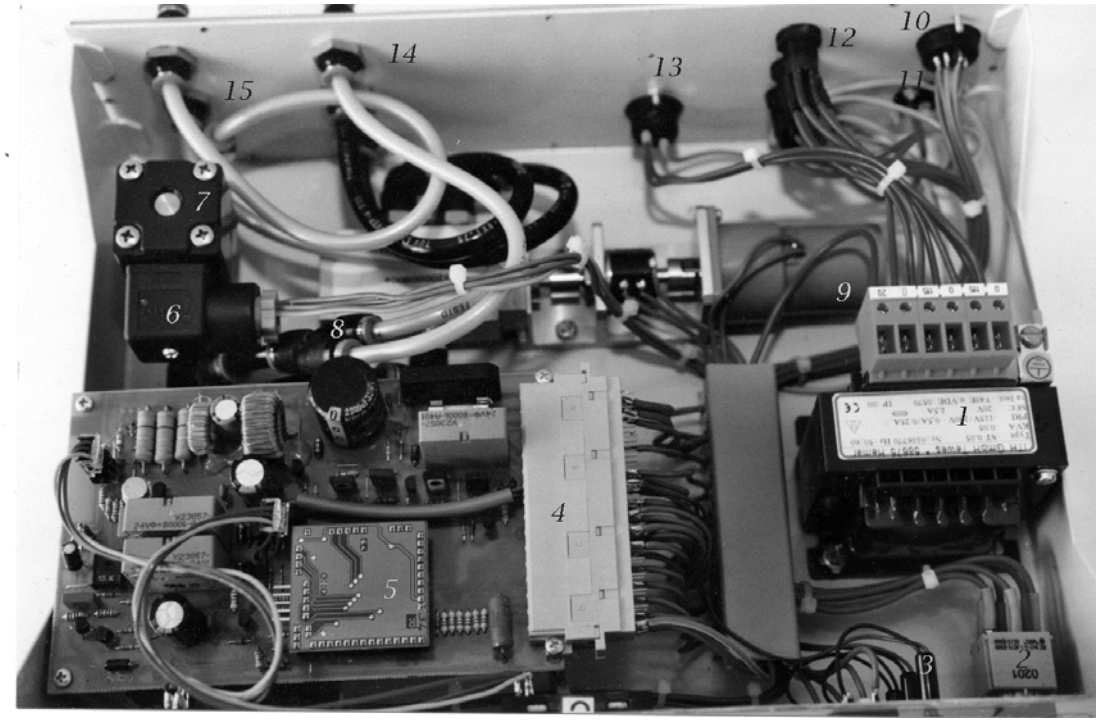

Illustration 13 Internal parts of the 5800 Series Unit

Pos.	***Order No.***	***Description***
1	800.020.01	Transformer
2	800.001.01	Main switch
3	800.002.01	Led lamp
4	800.021.01	Electronic board ECB 220
5	800.022.01	Microprocessor
6	800.023.01	Plug for magnetic valve
7	800.024.01	Magnetic valve
8	800.025.01	Pneumatic connector
9	800.026.01	Motor powderflow regulator
10	800.010.01	Connector for gun
11	800.011.01	Connector for main supply
12	800.012.01	Voltage selector
13	800.015.01	Plug for Virator table
14	800.017.01	Hose connector 8/6mm
15		

7 Maintenance

7.1 Generalities

Regular maintenance of the system is necessary in order to assure uniform results. It will also prolong the lifetime of the components of your system.

Please take note of the following points before doing any maintenance work

- Before disassembling the gun, the control drawer has to be switched off.
- The gun plug has to be disconnected.
- The compressed air used for cleaning the gun must be free of oil and water.
- It will only be necessary to take off the front gun muzzle assembly. Further disassembly is unnecessary, the rest of the gun contains no user-serviceable parts.

7.2 Daily Check

- Clean the outside of the gun.
- Remove the union nut
- Remove the muzzle including the electrode holder and clean it.
- Pull out the electrode holder and clean it carefully
- The gun must be cleaned with compressed air at the powder hose connector, following the direction of the powder flow.
- The thread of the gun barrel as well as the inside must to be cleaned with compressed air.
- Clean the powder hose
- Re-assemble the gun and connect it with t0 drawer.

Please Note

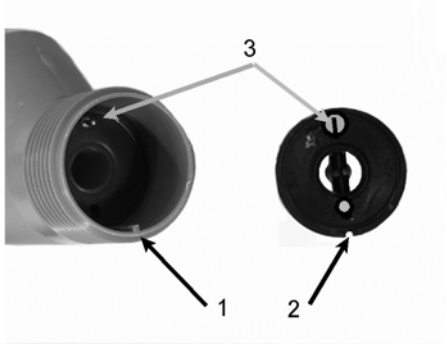

Illustration 14 Electrode holder position at gun reassembly

- When reassembling the electrode holder and the muzzle it must be ascertained that the groove in the electrode holder (pos.2) and the muzzle correspond with the guide (pos.1) in the gun.
- The contact hole in the electrode holder must be free of powder to assure a good electrical contact. This prolongs the life of the electrodeholder and gives the best coating performance.

7.3 Weekly check

- clean the injector
- change the insert sleeve, if necessary replace (wear part)
- clean the gun with compressed air
- disassemble and clean the gun carefully
- exchange the deflectors if necessary (wear part)
- exchange the muzzle if necessary (wear part)
- disassemble the injector completely and clean all parts. Change the insert sleeve (wear part), and check hose connector (wear part) replace if necessary

Please Note

Other than the muzzle assembly, the gun contains no other user servicable parts.

8 Troubleshooting

Caution

Before opening the casing, switch off the electrical voltage and disconnect the electric cable.

Failure	*Causes of failure*	*How to fix them*
No voltage supply	- main supply not connected - broken cable - input fuse defect	- connect it -replace it -replace it
No light on main switch	- lamp defect	- replace it
No high tension	- ECB defect -cascade defect -gun switch defect -cable broken	-replace it -replace it -replace it -replace it
Powder poorly charged	- no high tension - electrode covered with powder - parts not grounded - faulty cascade	- follow above mentioned advice - clean it - connect to ground - replace it
No powder flow	- examine the input pressure - defect magnetic valve - ECB 110 defect	 - Replace it - Replace it

Failure	***Causes of failure***	***How to fix them***
Insufficient coating in the corners	- Powder output speed too fast - voltage too high	- reduce air pressure and adjust output % higher - reduce it