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User manual

Auto Mach-Jet and CRN 457 control module

AUTO/MACH-JET

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The French version is deemed the official text and Sames will not be liable for the translations into other languages.

Auto Mach-Jet and CRN 457 control module

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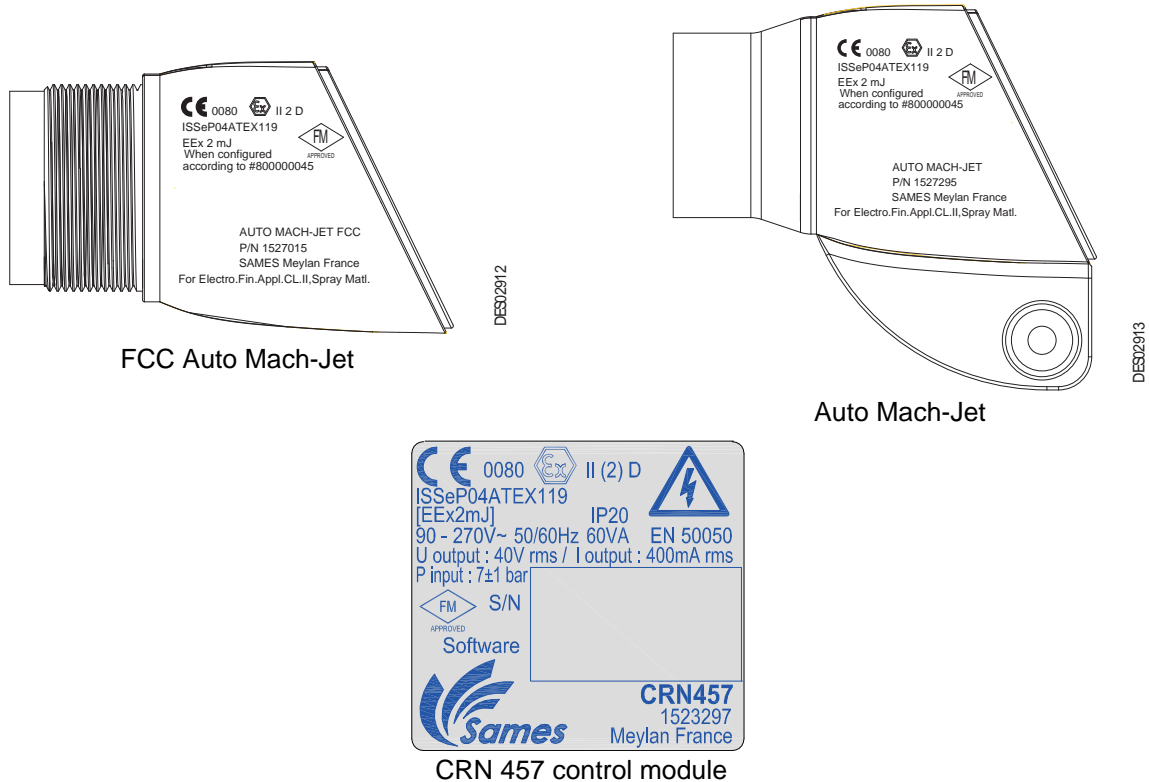
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1. Regulations, Safety Regulations and Guarantee

1.1. Regulations

The "Auto Mach-Jet" has type "A" rating in accordance with standard EN50177 and the chapters concerned of EN50050.

Spray gun marking and CRN 457 control module marking:



1.2. Safety Regulations

This equipment may be dangerous if it is not used in compliance with the security regulations specified in this manual.

- The CRN 457 electro-pneumatic control module must never be installed where there is a risk of explosion.
- The electrostatic paint spraying equipment must only be used by qualified personnel fully informed of rules no. 1 to 12 as follows:

- 1 A warning notice written in a language understood by the operator, summarising safety regulations nos. 2 to 9, section 1.2 of this manual, must be placed in a clearly visible position close to the powder-spraying booth.
- 2 Shoes intended for operator use must be anti-static and comply with the ISO 2251 publication. If gloves are used, only anti-static gloves or gloves ensuring grounding of the operator may be worn.
- 3 The floor in the area in which the operator works must be anti-static (ordinary bare concrete floors are anti-static).

- 4 Powder spraying must be carried out in front of a ventilated booth designed for the purpose. Start-up of the CRN 457 must be interlocked with operation of the ventilation system.
- 5 Skin-contact with or inhalation of products used with this equipment may be dangerous for personnel (cf. Safety sheets for products used).
- 6 All conducting structures such as floors, walls of powder-spraying booths, ceilings, barriers, parts to be painted, powder distribution tank, etc., that are inside or near the work station and the earth terminal on the electro-pneumatic control module must be electrically connected to the ground system protecting the electrical power supply.
- 7 Parts to be painted must have a resistance in relation to the ground system that is less than or equal to 1 MΩ
- 8 Powder-spraying equipment must be maintained regularly according to the manufacturer's instructions. Repairs must be carried out in strict compliance with these instructions.
- 9 Before cleaning the spray gun or carrying out any other work in the spraying area, the high-voltage power supply must be switched off in such a way that it can not be switched back on.
- 10 Only SAMES original spare parts guarantee operating safety of the equipment.
- 11 Ambient Temperature-range for use 0 and 40°C.
- 12 Switch off the electrical supply of the CRN 457 module before connecting the atomizer. Before disconnecting the atomizer, extinguish, switch off the power supply of the CRN 457 (if not, a malfunction can occur).



WARNING : This equipment is intended for spraying powder paint only.

1.3. Guarantee



Guarantee label

During the CRN 457 control module guarantee period, it is strictly forbidden to remove, attempt to remove or cut the label (located under module) on pain of loss of guarantee.

2. Presentation

The “**Auto Mach-Jet**” spray gun is an automatic spray gun intended for powder paint spraying. An ionizing electrode located at the end of the spray gun is held at a higher negative electrical potential. Due to the higher electrical field at the end of this electrode, it creates negative gas ions. These ions are used to charge the powderpaint by bombardment during its journey from the end of the spray gun to the part to be painted, which is itself grounded.

The “**Auto Mach-Jet**” spray gun is connected to a “**CRN 457**” control module that controls both the high-voltage and the powder flow rate of the spray gun to which it is connected. These two indissociable elements constitute a powder-coating device.

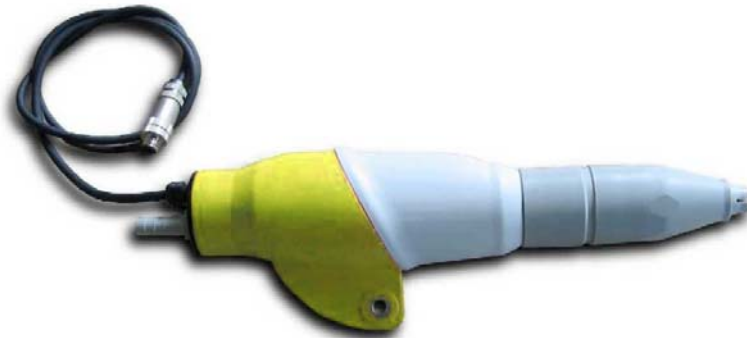
Pre-programmed voltage and current settings are adjustable from the control module.

There are two types of “**Auto Mach-Jet**” spray gun:

- The **FCC “Auto Mach-Jet”** which is used in a PVV booth.
- The standard “**Auto Mach-Jet**” which is used in all other cases.



FCC Auto Mach-Jet

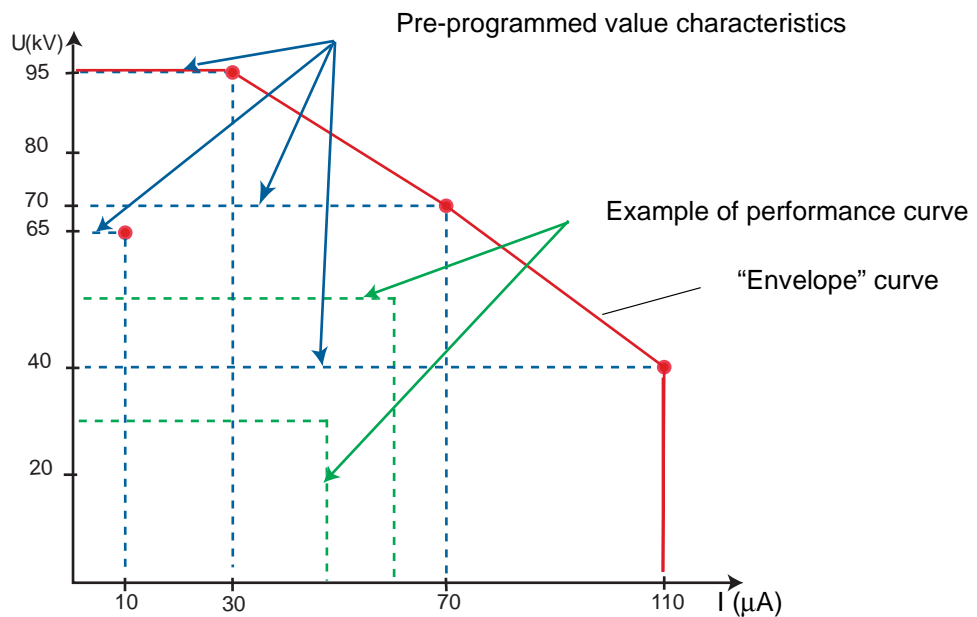


Auto Mach-Jet

3. Characteristics

3.1. General characteristics

Auto Mach-Jet Spray Gun	
Using Ambient Temperature-range for use	0° to 40° C
Maximum output voltage	95 kV (+5 kV, -10 kV)
Maximum output current	110 μ A (+ or - 10 μ A)
Supply pressure	7 bar +/- 1 bar
Maximum powder flow rate	24 kg/hr
Weight of spray gun (with cable and connector)	0.85 kg
CRN 457 control module	
Power-supply voltage	90 to 270V AC
Frequency	50 -60 Hz
Maximum power	60 VA
Maximum output voltage	40V effective (rms)
Maximum output current	400 mA effective (rms)
Maximum air flow rate (injection and dilution)	6 m ₀ ³ /h



DE02914

3.2. Compressed air quality

Required characteristics for compressed-air supply according to standard NF ISO 8573-1:

Maximum dew point at 6 bar (87 psi)	Class 4, i.e. +3°C (37°F)
Maximum particle-size of solid pollutants	Class 3, i.e. 5 µm
Maximum oil concentration	Class 1, i.e. 0.01 mg/m ³ *
Maximum concentration of solid pollutants	Class 3, i.e. 5 mg/m ³ *

*: Values are given for a temperature of 20°C (68°F) at an atmospheric pressure of 1,013 mbar.



WARNING : Non-compliance with these characteristics may result in incorrect operation of the “CRN 457” control module.



WARNING : A 5µm filter must be installed upstream of the “CRN 457” control module compressed-air supply system. The size of this filter depends on the size of the installation. Sames Technologies advises to use a filter like the one indicated in section [\(see § 10.7.1 page 45\)](#).

If any damage on the equipment happens because of a polluted air, the warranty could be not applied.

4. Operation

The **Auto Mach-Jet** spray gun is connected to the **CRN 457** control module.

This module provides the low-voltage high-frequency power supply required for operation of the spray gun's high-voltage current generator.

The CRN 457 control module may operate in either local or remote mode:

- **In local mode:** The operator has access to various screens.
The CRN 457 control module includes the facilities for adjusting, displaying and monitoring the high-voltage current of the spray gun.
Methods for modifying or adjusting settings are described in the following chapters.
Note: if a PLC is connected to the CRN 457 control module, the operator has 10 seconds to take control of local mode on display of screen "A". Every minute, a key (any key) must be pressed in screen "A" in order to maintain local mode.
- **In remote mode:** the operator can only view the various parameters.
The CRN 457 control module is monitored using an RS 485 serial link integrated into the PLC link connector.

On first use, the control module recognizes whether it is connected to an automatic spray gun. For this reason, it is important that the operator should check that there is a strap between pins S and M on the PLC connector on front of module ([see § 4.3 page 12](#)).

It is possible to return to the original "factory" setting at any time by holding down buttons "1" and "2" simultaneously during mains start-up (start/stop switch located at the back of the control module).

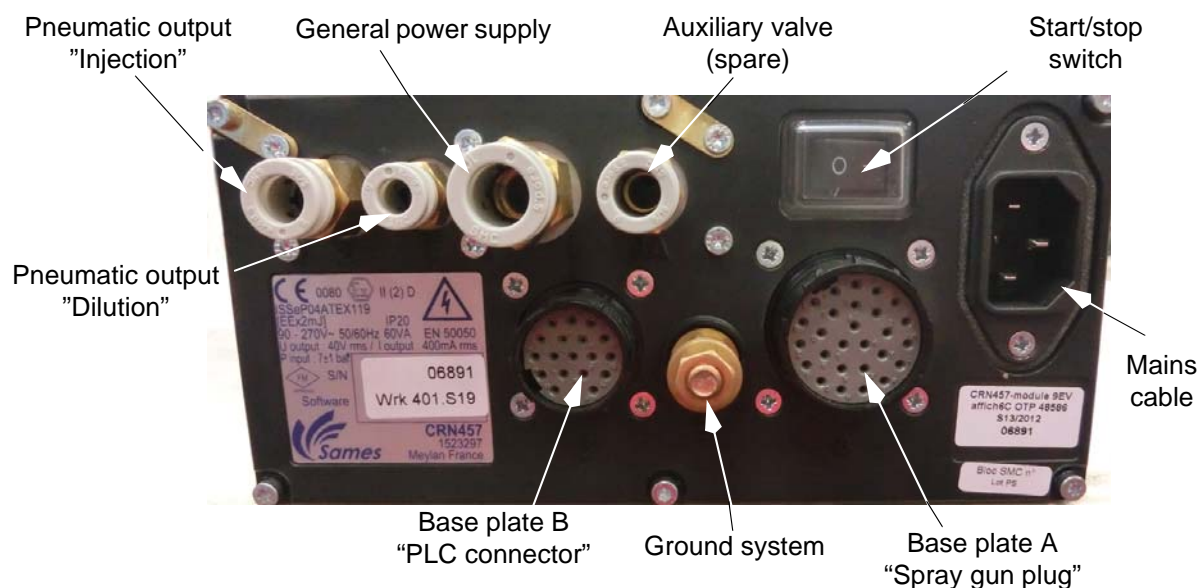
Also on first use, the following parameters must be entered.

Parameters	Factory value	Minimum	Maximum
Remote mode - Slave index	1	1	99
Remote mode - Communication speed	9600 baud	1200 baud	38,400 baud
Auxiliary EV action synchronised with the trigger	0	0	1

The communication speed is selected from the following list: 1,200, 2,400, 4,800, 9,600, 14,400, 18,200 and 38,400 baud.



4.1. CRN 457 connections



Connecting spray gun plug

Pins	Name	Color
K	Shield	Metal shield
M	Current measurement	White
N	High voltage unit power supply	Green
P	High voltage unit power supply	Brown
U	CRN 457 power supply ground	Yellow
L	Bridging with V	-
V	Bridging with L	-

4.2. Spray gun connections

Item	Name	Color
1	High voltage unit power supply	Brown
2	Current measurement	White
3	High voltage unit power supply	Green
4	CRN 457 power supply ground	Yellow
5	Shield	Metal shield

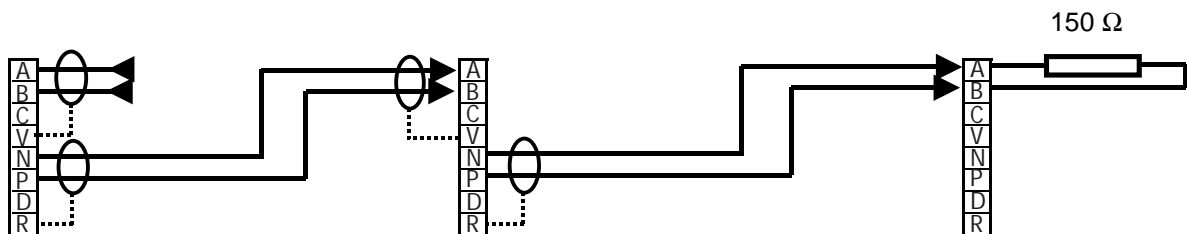
Note: A specific tool is necessary to dismantle the spray gun plug ([see § 10.7.1 page 45](#)).

4.3. PLC plug connections

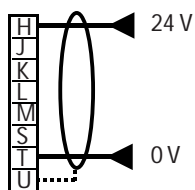
Pins	Name	Correspondance
A	A in	Serial Link input
B	B in	
C	0V in	
V	Shield (in)	
N	A out	Serial Link output
P	B out	
D	0V out	
R	Shield (out)	
E	Common	Fault relay (0.5A/24V)
F	NF	
G	NO	
M	Bridging with S	Recognition Shunt for the Auto Mach Jet(except if the software-version is higher than 2.07)
S	Bridging with M	
H	24V PLC	PLC link
T	0V PLC	
U	PLC shield	

Connection of a serial link (example with 3 CRN 457 software version > 2.07)

Sames Technologies imposes using of a shielded cable(P/N: 110000029)
The 150 Ω (± 5%) resistance is adapted to this cable



Connection of a 24V trigger (if the serial link is not used) with cable (P/N: 910000092)



DES03472



WARNING : In order to comply with current EMC standards, the PLC connection cable has to be equipped with a general shield linked to the U prong of the 19-prong connector.
At the other end of the cable, the shield has to be either linked to the cabinet ground or to the PLC ground.

5. Description of the control module

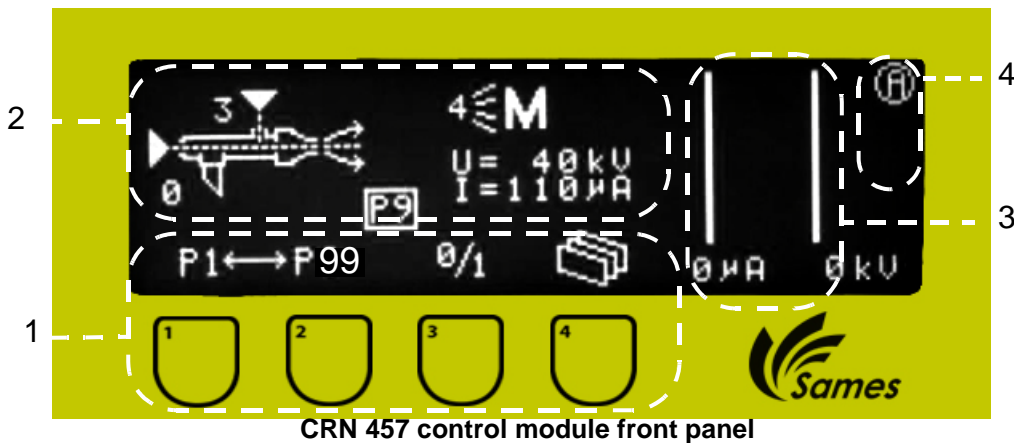
The function of the automatic spray gun is to spray powder charged electrically by a high-voltage unit built into the spray gun that delivers up to 95kV and 110 μ A.

5.1. Functions available from control module



WARNING : All access to the various parameters on the various screens are only possible in local mode.

The control module displays use parameters and their settings, which can be changed using the four buttons on the front panel.



Six different menus can be accessed by the operator:

- **A:** choosing function tables and selection/deselection of the spray gun.
- **B:** adjusting injection and dilution air and selection of pre-set characteristics (U/I).
- **C:** manual adjustment (voltage/current).
- **D:** history of faults encountered (accessible only if a fault is recorded).
- **E:** screen adjustment (contrast, etc.).
- **G:** computer link view.


Area 1: The front panel of the module has four buttons.

A graphic icon located above each button indicates the button's purpose.

Area 2: This display area indicates parameter status.

For example: for screen **A**, the injection air (powder flow rate) is at 0, the dilution air is at 3. The function table used is P9. The pre-programmed characteristics are those of metallic powder application (M).

Area 3: The bar graph located in this area shows the instant voltage and current values in graphic and digital form.

Area 4: A screen entitled "Main" appears on start-up. It is identified by an icon located at the top right-hand side of the screen. .



If this logo appears under [A], in area 4, it indicates that the operator has deselected the spray gun via button 3.



If this logo appears in area 4, it indicates that the generator has shut down because of a fault ([see § 6.7.1 page 22](#)).



When the trigger is pressed, this logo flashes (the arrow indicates presence of high voltage at the bottom of area 4).



Alarme information "Temperature too high".

5.2. Summary

- Selection of function tables is only possible if the high voltage is switched off.
- Powder flow rate is adjustable:
 - from the control module.
 - from the PLC.
- The operator can always return to the factory parameters by switching off the control module and switching it on again while holding down buttons 1 and 2



6. Use of the different control module menus

6.1. CRN 457 initialisation screen

This is the first screen displayed on start-up of CRN 457.



Pressing buttons 1 and 2 simultaneously (until appearance of the logo) enables the device to restart with factory parameters. The operator is thus in a first start-up situation ([see § 5.2 page 14](#)).



6.2. Start-up screen: Screen G

At first start-up, the operator must enter this data. By default, the factory parameters are validated. They can always be viewed but can only be changed at first start-up or during a restart with factory parameters.



On this screen, you can choose to switch high voltage and powder over:

- by powering an electrical input (0 - 24V), or
- directly on the keyboard (button number 3, screen A), in this case the 24V power is no more necessary.

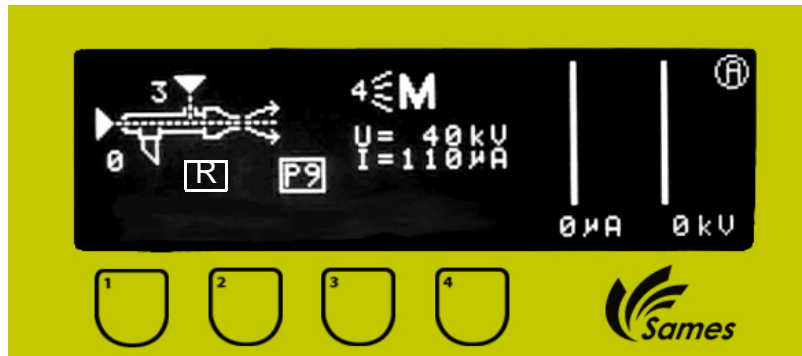
Auxiliary EV: 0 Auxiliary valve unused

Auxiliary EV: 1 Auxiliary valve used and activated when HV is requested.

HT Keyboard: 0 means that the switch is started by 0 - 24V electrical input.

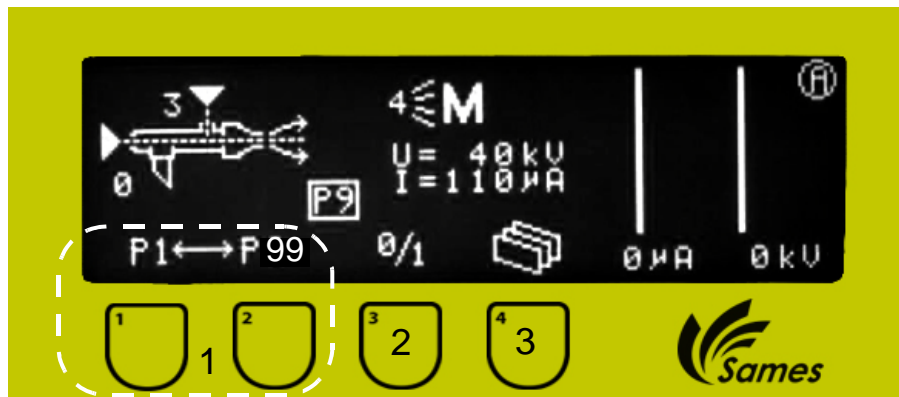
HT Keyboard: 1 means that the trigger is controlled from the key board (key n° 3 from A screen).

6.3. Screen displayed in remote mode



6.4. Main screen "A"

This screen is used to display the operation of the spray gun. The operator can use the keyboard to choose the required function table.



[1]: This area is used to choose the required function table.

There are 99 different tables (from 1 to 99). It is possible to change the settings of each table individually.

Since V4.03 version, the selected table is saved for the next startup of the CRN 457 module
Previously, the P1 function table was always displayed on screen.

[3]: This button is used to switch to the next menu.



If the trigger is pressed:

- it is impossible to change the table.
- it is possible to select or deselect the spray gun.
- it is possible to switch to Screen "B".

The changes are validated:

- If no parameter changes have been made for 1 s.
- By pressing the trigger.
- By changing screen.

[2]: This button is used for selection or deselection of spray gun if "HT keyboard = 0".

Pressing this button displays or not this icon on the left of the screen. In the presence of 24V, there will be or not high voltage.



If "HT Keyboard = 1", selection or deselection of the high voltage (ON/OFF) is possible directly on the keyboard, independently of the supply of the 24V.

6.5. Screen “B”

It is used to adjust the injection and dilution air and to select the pre-set characteristics (U/I).

Dilution air is used to avoid spray pulses. This adjustment also acts on powder spray speed. The injection air is used to adjust powder flow rate.



[1]: This area is used to adjust the injection and dilution air and to select the pre-set characteristics (U/I).

The operator can select the flow rate (injection air) from thirty-two possible rates (from 0 (zero flow rate) to 31) and adjust the dilution air from eight different settings (from 0 to 7).

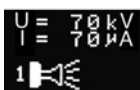


DES02499 **Reducing the dilution air:**
slower spray and risk of pulsing.



DES02500 **Increasing the dilution air:**
faster spray and less pulsing.

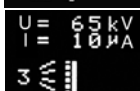
Pressing the buttons above also displays the following logos in a loop.



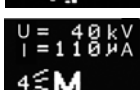
Use of round spray nozzles.



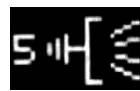
Use of fan spray nozzles.



“Over-powder-coating” application.



Metallic powder application.



Use of fan spray nozzles with a counter electrode

[2]: This button is used to place the flashing cursor at the parameter to be modified: injection air, dilution air, or selection of pre-set characteristics (U/I).



[3]: This button is used to switch to the next menu.



The changes are validated:

- If no parameter changes have been made for 1 s.
- By pressing the trigger.
- By changing screen.

If no action is taken, the display switches automatically to screen “A” after one minute. Screen “A” appears immediately if the trigger is pressed.

Use of a round spray nozzle

Application using a round spray nozzle improves charging of particles. It gives a better wraparound effect and has better transfer efficiency. The spray is very homogenous both on complex parts and simple parts.

Use of fan spray nozzles

Application using a fan spray nozzle gives better covering and very high performance on flat parts. Powder-covering of cavities is facilitated. The spray is very penetrating and homogenous both on complex and simple parts.

Application in “over-powder-covering” mode adapted with round or fan spray nozzles

This application may require an adjustment of settings in the case of a very thick first coat of powder with appearance of “eyes” and large craters. The current may be progressively reduced (see voltage/current adjustments) until correct application is obtained (5 μ A minimum).

It is used for applying thick coats (> 100 μ m) and for parts with low conductivity (glass, wood, etc.).

Metallic powder application adapted with round or fan spray nozzle

This application can be optimised if the powder is “coated,” the voltage can be increased to improve application performance.

Use of fan spray nozzles with a counter electrode

The use of the counter electrode improves the appearance of the coating in the case of application of certain powders.

6.6. Screen “C”

It is used to modify the voltage and current settings of the characteristic selected in menus A and B.



[1]: Voltage or current can be modified in this area.



The voltage or current value decreases when the flashing cursor is opposite the parameter to be modified.



The voltage or current value increases when the flashing cursor is opposite the parameter to be modified.

When these values have been modified, the hand logo appears next to U and/or I. It is possible to return to the original value, if this is done, the hand logo disappears.



[3]: This button is used to switch to the next menu.

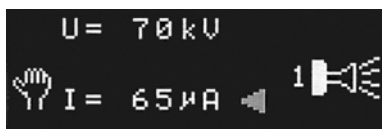


The changes are validated:

- If no parameter changes have been made for 1 s.
- By pressing the trigger.
- By changing screen.

If no action is taken, the display switches automatically to screen “A” after one minute. Screen “A” appears immediately if the trigger is pressed.

[2]: This button pinpoints the parameter (U or I) to be modified.

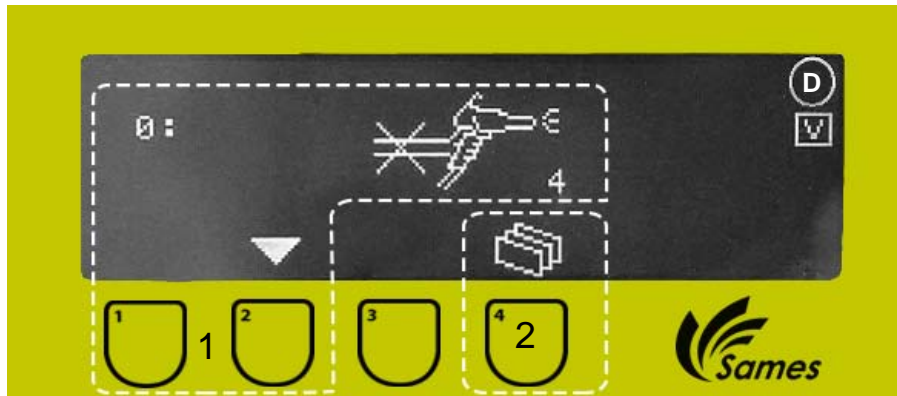


If U is to be increased, I decreases automatically if positioned on the envelope curve of the characteristic ([see § 3.1 page 8](#)) and vice-versa.

Note: this type of U/I change will be applied to all the function tables that use this single characteristic.

6.7. Screen “D”

This screen is used to display the history of faults encountered.



DES02496

[1]: The history of the most recent faults can be displayed in this area. The last fault with its index (4, in this case) appears on the screen. The fault's age index is indicated on the left-hand side of the screen: 0.



Display of faults from oldest to most recent.



Display of faults from most recent to oldest.

[2]: This button is used to switch to the next menu.



The changes are validated:

- If no parameter changes have been made for 1 s.
- By pressing the trigger.
- By changing screen.

If no action is taken, the display switches automatically to screen “A” after one minute. Screen “A” appears immediately if the trigger is pressed.




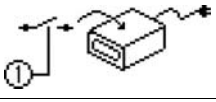





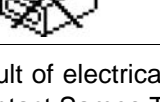
If no faults are detected, the operator can not access screen “D.”

The last 96 faults are recorded; the 97th alters the list and deletes the 96th, which is the preceding fault.

When a fault occurs, the high-voltage and powder supplies are disabled. A specific screen enables identification of the fault and its number.

The operator confirms its recognition by validating with button “4.”

6.7.1. Fault list

Fault number	Icon	Comment
1		"CRN 457" general fault
3		"CRN 457" temperature excessive
4		High-voltage action forbidden
5		"CRN 457" general fault
6		"CRN 457" general fault
7		"CRN 457" general fault
8		"CRN 457" general fault
9		Short-circuit on electrode
10 to 18		Solenoid valve index Vi (V1 to V8), Vx: Auxiliary solenoid valve
19		"CRN 457" configuration fault

Faults 1, 5, 6, 7 and 8 are the result of electrical power problems. Switch the control module off then back on, if the problem persists, contact Sames Technologies.

Fault 3 is caused by excessive temperature inside the control module. Whether the control module should reach a too excessive temperature, an "alarm" message would be displayed on the screen. So as not to disrupt production, the control module keeps working. The operator has to make the temperature decrease (make sure, as well, that the temperature of the compressed air is inferior to 40°C).

Fault 4 appears when the trigger is engaged on start-up of the spray gun. The spray gun is rearmed by releasing the trigger and pressing it again.

Fault 9 appears when there is a short-circuit on the electrode. The projector is rearmed by activating the ON/OFF button of the CRN 457. Systematically, check the wiring of the projector.

Faults 10 to 18 are detected when electrical power-supply faults occur on the different solenoid valves; if a fault of this nature occurs: contact Sames Technologies.

Fault 19 appears when the CRN 457 changed configuration since its powering:

- The strap of the automatic mode is detected while the CRN 457 started in manual mode .
- The strap of the automatic mode is not any more detected while the CRN 457 started in automatic mode.

6.8. Screen “E”

This is used to adjust the screen.



[1]: The screen contrast can be modified in this area. Pressing the buttons corresponds to:



Reducing contrast, the screen becomes increasingly brighter.



Increasing contrast; the screen becomes increasingly darker.

[3]: This button is used to switch to the next menu.



The changes are validated:

- If no parameter changes have been made for 1 s.
- By pressing the trigger.
- By changing screen.

If no action is taken, the display switches automatically to screen “A” after one minute. Screen “A” appears immediately if the trigger is pressed.

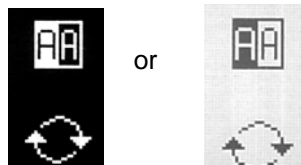
[2]: This area is used to reverse the screen colour.



Pressing this button reverses the display in a loop:

- Either the graphics are white on a black background.
- Or the graphics are black on an white background.

This appears on the screen:



6.9. Screen "G"

At this stage, it is only used to view the configuration parameters.



[1]: This button is used to switch to the next menu.

If no action is taken, the display switches automatically after one minute to screen "A".

Screen "A" appears immediately if the trigger is pressed.



7. Maintenance



WARNING : Switch off the electrical supply of the CRN 457 module before connecting the atomizer. Before disconnecting the atomizer, extinguish, switch off the power supply of the CRN 457 (if not, a malfunction can occur).

7.1. Removing the FCC Auto Mach-Jet spray gun from its support arm

- Disconnect the powder supply hose by unclipping the quick connector.
- Unscrew the electrical connector.
- Pull out the plug then pass the cable and the powder hose through the slots of the plug.
- Unscrew the spray gun from its support.

7.2. Removing the Auto Mach-Jet spray gun from its support arm

- Disconnect the powder supply hose by unclipping the quick connector.
- Unscrew the electrical connector.
- Unscrew the Nylstop nut and remove the washers (fixing spray gun to support arm).



WARNING : When fixing the spray gun to its support arm, ensure that the correct order is followed in mounting the washers: first the fan washer then the nylon washer ([see § 10.1.2 page 35](#) items 13 and 14).

7.3. Deflector and standard nozzle

7.3.1. Disassembly

Deflector

- To disassemble the deflector, simply pull it, it is not necessary to remove the nozzle nut.

Nozzle

- Remove deflector.
- Unscrew the nozzle nut manually.
- Remove nozzle.

Nozzle extension (replacing seal)

- Unscrew the M5 x 25 screws, maintaining pressure on the central section located inside the nozzle extension.
- Take out this central section.
- Remove the seal, using a small screwdriver

7.3.2. Assembly

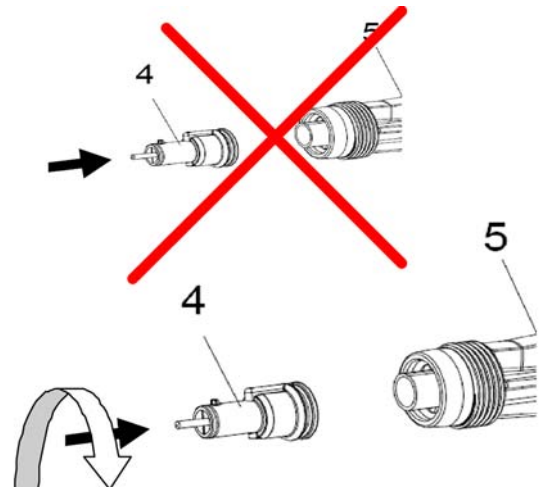
Proceed in reverse order having first checked and cleaned the different components. Replace them if necessary.

Nozzle

- Clean the electrical connection located in the barrel.



- Turn and push the nozzle (4) inside the tip of the barrel (5).



Nozzle extension

- Place the seal onto the central section.
- Use the positioning pins to position the central section in the extension and tighten the assembly using the M5 x 25 nylon screw.

7.4. Adjustable nozzle

7.4.1. Disassembly

(see § 10.6.3 page 44)

- Unscrew the adjustable nozzle assembly from the spray gun by unscrewing the “nozzle adjustment mounting nut”.
- Unscrew the nozzle nut.
- Pull in line with the “fan spray nozzle body” fitted with the electrode.
- Take the electrode out of the body by pushing the fixing cramps inwards in pairs.
- Unscrew the “upper body” while holding the lower body still.
- Take the “lower body” out of the “nozzle adjustment mounting nut”.

7.4.2. Reassembly

- Check the condition of the various components, clean them using compressed air and replace them if necessary.
- Insert the fitted “lower body” via the rear of the “nozzle adjustment mounting nut”.
- Hold the “lower body” in place and screw in the “upper body”.
- Insert the electrode into the nozzle body, until stop is reached.
- Put the nozzle body in place and screw in using the nut.

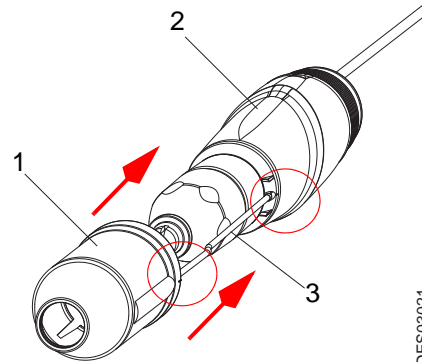
7.5. Counter electrode

7.5.1. Disassembly

- Pull in line with the counter electrode, taking care not to lose the cable.

7.5.2. Assembly

- Check the condition of the various components (counter electrode cable and seals). Replace them if necessary. If replacing seals, position them correctly in the two grooves provided for this purpose, ensuring that the seals are not inverted or transposed.
- Position the cable (item 3) in the counter electrode (item 2) and insert it into its housing on the spray gun (item 1).
- Install the counter electrode on the projector and push hard.



DES03021



WARNING : When the counter electrode is not used a plug ([see § 10.1.2 page 35](#) item 6) is put into the body in the cable housing.

7.6. Powder pipe

7.6.1. Disassembly

- Start unscrewing the powder pipe using a 19-mm ring wrench and then continue manually.



WARNING : This wrench is required, otherwise there is a risk of damaging the material of the powder pipe.

- Remove the powder pipe from the spray gun.

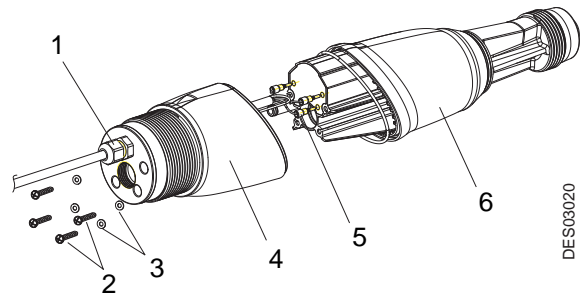
7.6.2. Assembly

- Clean the interior of the powder pipe with compressed air.
- Check the state of the seals and the powder pipe. Replace them if necessary.
- Install the pipe in the spray gun, it locates automatically, then push it in until it stops.
- Tighten manually then continue tightening using the 19-mm ring wrench.

7.7. Gun assembly

7.7.1. Disassembly

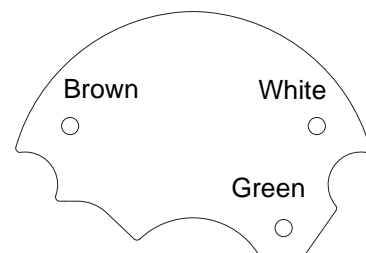
- Follow powder pipe disassembly procedure ([see § 7.6 page 28](#)).
- Unscrew the stuffing box (item 1) in order to be able to give some slack to the high voltage cable.
- Unscrew the four screws (item 2) located at the rear of the spray gun using a Philips PH1-tip screwdriver and remove the washers (item 3).
- Gently withdraw the gun assembly (item 6) from the rear body (item 4). Be careful not to pull out the three gun connection wires.
- Unscrew the three screws (item 5) manually to disconnect the gun (item 6).



WARNING : When unscrewing the screws (item 2), it is possible that the washers (item 3) may remain in place. Loosen them using a 3mm (max.) diameter screwdriver and take them out by pushing them from the inside of the rear body. Change these washers each time the screws are removed.

7.7.2. Assembly

- Clean the gun, replace it if necessary. Change the gun seal making sure to position it correctly in the gun groove.
- Connect the three power-supply wires, following the wiring diagram (see illustration). Check alignment of the three contacts. Fully tighten manually without forcing.
- Fit the rear body to the gun pulling the low-voltage cable carefully outwards. Check the position of the wires to avoid possible pinching by the rear body. Push until stop is reached.



WARNING : To guarantee correct sealing each time the gun is disassembled, change the O-ring systematically ([see § 10.2 page 39](#) item 2).

- Tighten these screws using a torque screwdriver to a torque of 1.5 Nm.
- Tighten the stuffing box to a torque of 3.5 Nm.

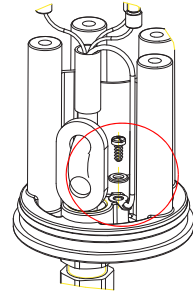
7.8. Rear body and plug and cable assembly

7.8.1. Disassembly

- Follow the procedure described above ([see § 7.7.1 page 29](#)).
- Use your thumb to push on the housing of a screw inside the rear body in order to take out the plug and cable assembly.
- Unscrew the ground wire fixing screw from the outside in order to disconnect the ground wire and to fully detach the plug assembly from the rear body.

7.8.2. Reassembly

- Check the condition of the seal and the spring located on the plug and cable assembly ([see § 10.4 page 40](#) item 1 and 2). Replace them if necessary.
- Pass the low-voltage cable through the rear body.
- Connect the ground wire to the screw located on the plug assembly (see illustration).
- Install the plug and cable assembly into the rear body and push it until it reaches the stop.
- Connect the three screws.
- Then follow the procedure described above ([see § 7.7.2 page 29](#)).



DES03019


8. Cleaning/Maintenance



WARNING : All cleaning operations must be done only with depressurized compressed air with a 2,5 bar maximum pressure, a cloth or possibly a brush. Never use water or solvents to clean equipment.

Fouling and wear of the Auto Mach Jet spray gun caused by the passage of powder vary according to operating conditions and the type of powder used.

For this reason, the maintenance frequency indicated here is given as a guide only. With a little experience of using SAMES equipment, the user will be able to draw up his own maintenance schedule. Nevertheless, as an initial guide, the following maintenance programme is recommended:

Frequency	Action
Before starting work	Check the safety regulations. see § 1 page 5.
Every 8 hours	Switch off the high-voltage power supply, disassemble and clean the nozzle and the electrode using compressed air. Make sure that there is no accumulation of powder on the electrode. Clean the powder ducts by blowing compressed air.
Between 40 and 60 hours of work	Clean the spray-gun nozzle and the deflector leaving them to soak in methyl-isobutyl-ketone (MIBK).*
 WARNING : * MIBK solvent is toxic and flammable.	

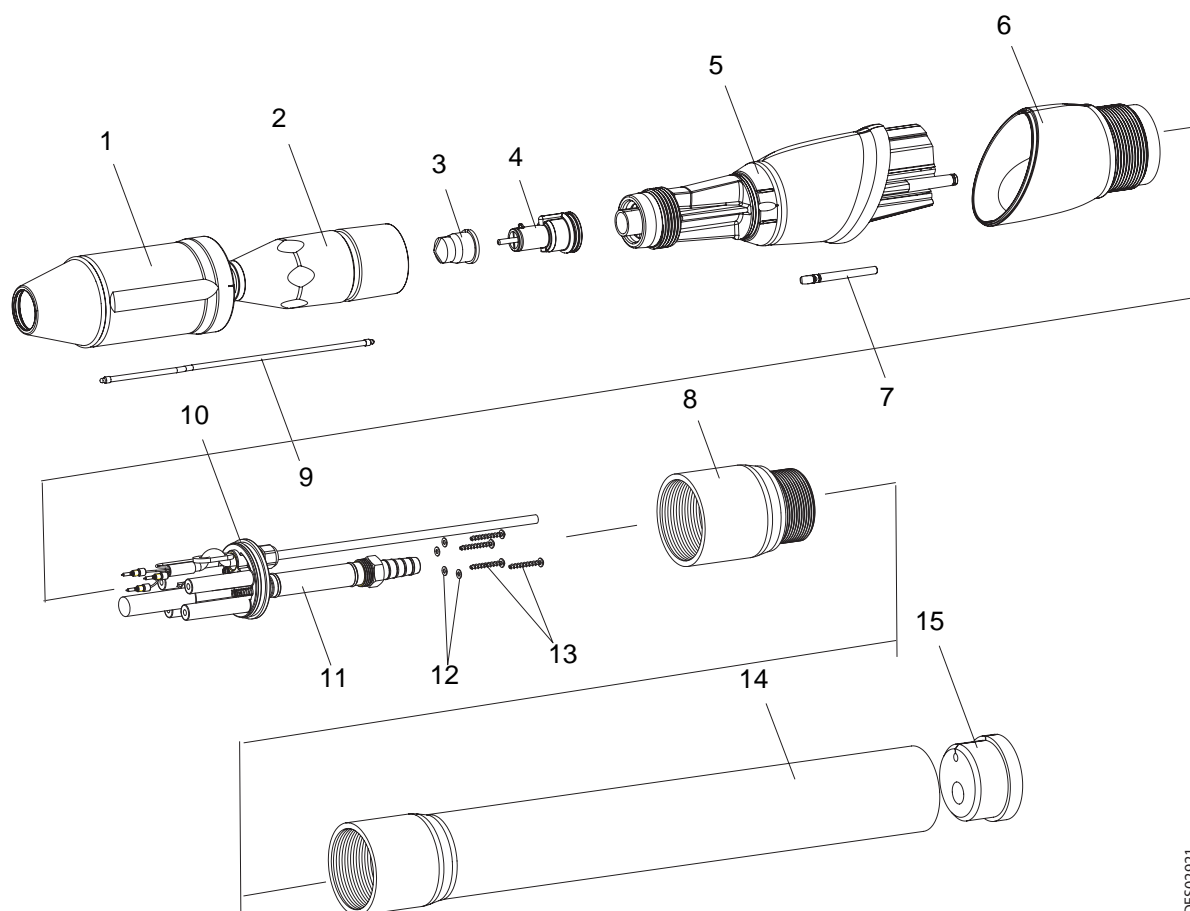
9. Troubleshooting

Symptoms	Probable causes	Remedies
The powder does not come out	Incorrect installation	Check that the spray gun installation and connections comply with the instructions in the "Safety Regulations" chapters (see § 1 page 5).
	The spray gun is incorrectly set	Follow the instructions for making adjustments.
	Insufficient air flow rate supplied by the compressed air circuit.	Check the circuit.
	The powder-carrying hose is obstructed	Clean the powder-carrying hose using compressed air.
Powder does not adhere to the part to be painted	The part is not correctly grounded.	Ensure that the electrical resistance of the parts in relation to the ground system is less than 1MΩ.
	The ionization electrode is covered in hardened paint or soiling.	Switch off the high-voltage power supply, then clean the electrode and ensure that the current delivered is less than 30 μA for fan spray nozzles.
	The voltage is not sufficiently high.	Increase the voltage, but ensure that the current does not exceed 30 μA for fan spray nozzles.
Abnormally high current consumption	Ground wire too close to the spray gun electrode.	Move the ground wire further away.

10. Spare parts list

10.1. "Auto Mach-Jet" spray guns

10.1.1. "Auto Mach-Jet" FCC



DES02921

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1527318	FCC “Auto Mach-Jet”	1	1	3
	1527015	FCC “Auto Mach-Jet” spray gun	1	Not sold	-
1	1527017	Counter electrode assembly (see § 10.5 page 41)	option	1	3
2	1204263	Nozzle nut	1	1	3
3	1315957	Standard fan spray deflector (see § 10.6.1 page 42)	1	1	1
4	1525492	Fan spray nozzle assembly (see § 10.6.1 page 42)	1	1	1
5	1527002	Gun assembly (see § 10.2 page 39)	1	1	3
6	1527019	FCC rear body assembly	1	1	3
7	1314763	Counter electrode plug	1	1	3
8	900007106	Tube for grounding	1	1	3
9	1527023	Counter electrode cable assembly (included in item 1)	1	1	2
10	1527001	Plug and cable assembly (see § 10.4 page 40)	1	1	3
11	1527018	Powder pipe assembly (see § 10.3 page 39)	1	1	1
12	J4BRND039	Fibre seal	4	1	1
13	X3GJBP092	Screw PT KA35x25 WN1411 galvanised steel, cross-head	4	1	3
14	1411605	Support arm Diameter: 60 mm	1	1	3
15	1315630	Arm plug Diameter: 60 mm	1	1	3
	1527351	Auto Mach Jet and CRN linking cable, Lg: 30 m	1	1	3
	U1FGBA034	Hose EVA 12 mm grey	15 m	50 m	2
	Q6VRUB001	Black velcro strip	1 m	m	3

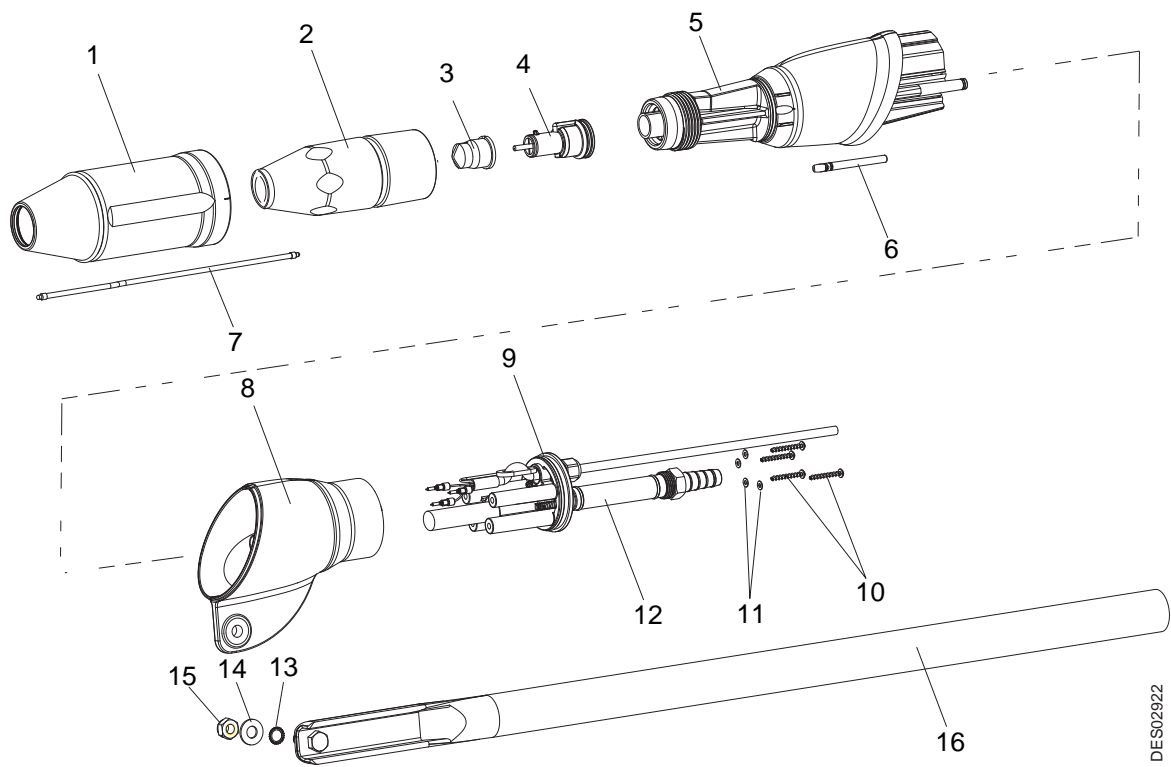
(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

10.1.2. "Auto Mach-Jet" - cable 18 m



DES02922

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1527340	"Auto Mach-Jet" - cable 18 m	1	1	3
	1527295	"Auto Mach-Jet" spray gun	1	Not sold	-
1	1527017	Counter electrode assembly (see § 10.5 page 41)	option	1	3
2	1204263	Nozzle nut	1	1	3
3	1315957	Standard fan spray deflector (see § 10.6.1 page 42)	1	1	1
4	1525492	Fan spray nozzle assembly (see § 10.6.1 page 42)	1	1	1
5	1527002	Gun assembly (see § 10.2 page 39)	1	1	3
6	1314763	Counter electrode plug	1	1	1
7	1527023	Counter electrode cable assembly (included in item 1)	1	1	2
8	1527070	Rear body assembly	1	1	3
9	1527001	Plug and cable assembly (see § 10.4 page 40)	1	1	3
10	X3GJBP092	Screw PT KA35x25 WN1411 galvanised steel, cross-head	4	1	3
11	J4BRND039	Fibre seal	4	1	1
12	1527018	Powder pipe assembly (see § 10.3 page 39)	1	1	1
13	X2BDVX008	Fan washer AZ 8 DE galvanised steel	1	1	3
14	X9NDMM008	M8 nylon washer	1	1	3
15	X2BEHS008	M8 U galvanised Nylstop nut	1	1	3
16	1527291	Arm Diameter: 30mm (including items 13,14,15)	1	1	3
	91000082	Auto Mach Jet and CRN linking cable, Lg: 18 m	1	1	3
	130001030	Hose PEO 11 mm green	12 m	50 m	2

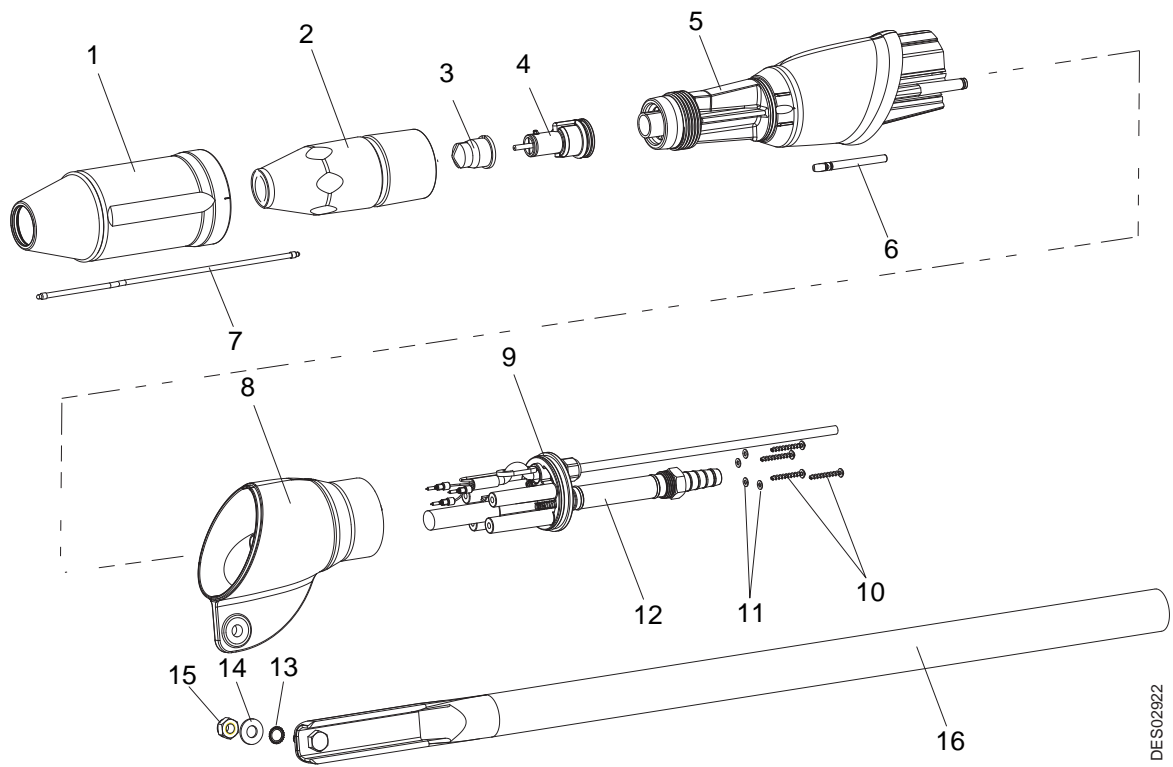
(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

10.1.3. "Auto Mach-Jet" - cable 30 m



DES02922

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	910000100	"Auto Mach-Jet" - cable 30 m	1	1	3
	1527295	"Auto Mach-Jet" spray gun	1	Not sold	-
1	1527017	Counter electrode assembly (see § 10.5 page 41)	option	1	3
2	1204263	Nozzle nut	1	1	3
3	1315957	Standard fan spray deflector (see § 10.6.1 page 42)	1	1	1
4	1525492	Fan spray nozzle assembly (see § 10.6.1 page 42)	1	1	1
5	1527002	Gun assembly (see § 10.2 page 39)	1	1	3
6	1314763	Counter electrode plug	1	1	1
7	1527023	Counter electrode cable assembly (included in item 1)	1	1	2
8	1527070	Rear body assembly	1	1	3
9	1527001	Plug and cable assembly (see § 10.4 page 40)	1	1	3
10	X3GJBP092	Screw PT KA35x25 WN1411 galvanised steel, cross-head	4	1	3
11	J4BRND039	Fibre seal	4	1	1
12	1527018	Powder pipe assembly (see § 10.3 page 39)	1	1	1
13	X2BDVX008	Fan washer AZ 8 DE galvanised steel	1	1	3
14	X9NDMM008	M8 nylon washer	1	1	3
15	X2BEHS008	M8 U galvanised Nylstop nut	1	1	3
16	1527291	Arm Diameter: 30mm (including items 13,14,15)	1	1	3
	1527351	Auto Mach Jet and CRN linking cable, Lg: 30 m	1	1	3
	130001030	Hose PEO 11 mm green	12 m	50 m	2

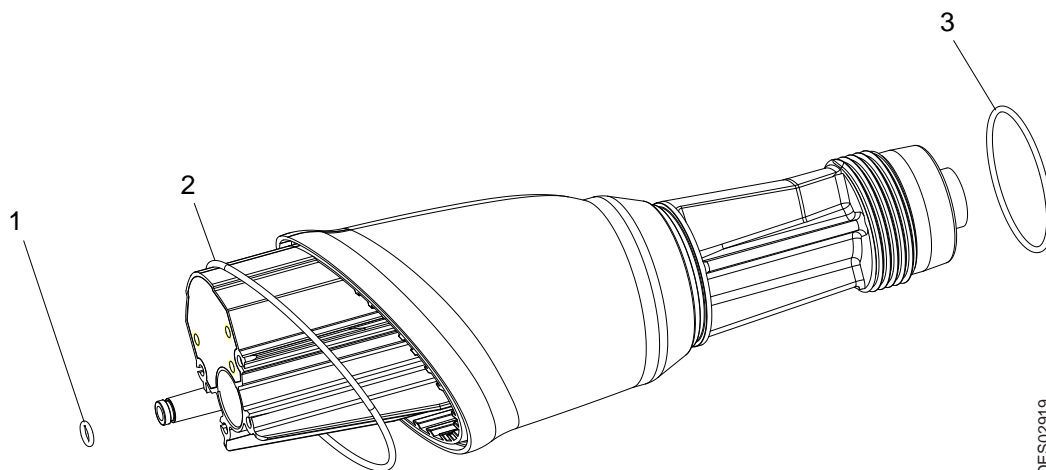
(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

10.2. Gun assembly

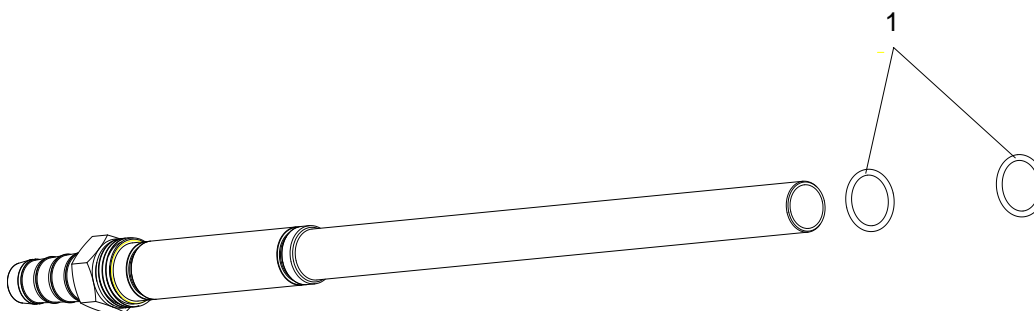


DES02919

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1527002	Gun assembly	1	1	3
1	J2CTPC054	O-ring – EPDM purple	1	2	1
2	J2CTPB432	O-ring - EPDM purple	1	1	1
3	J2CTPC416	O-ring – EPDM purple	1	1	1

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

10.3. Powder pipe assembly

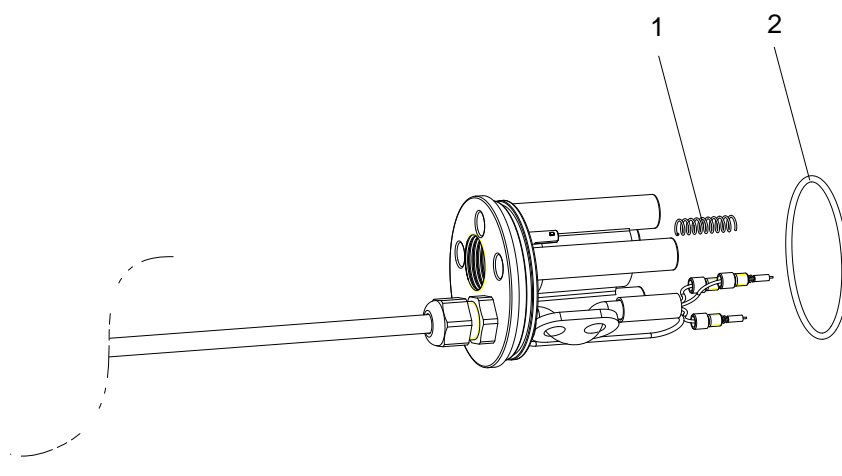


DES02918

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1527018	Powder pipe assembly	1	1	1
1	J2CTPB166	O-ring - PB 701	2	1	1

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

10.4. Plug and cable assembly



DES02923

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1527001	Plug and cable assembly	1	1	3
1	Q2HRDC166	Spring	1	1	1
2	J2CTPB457	O-ring - PB 701	1	1	1

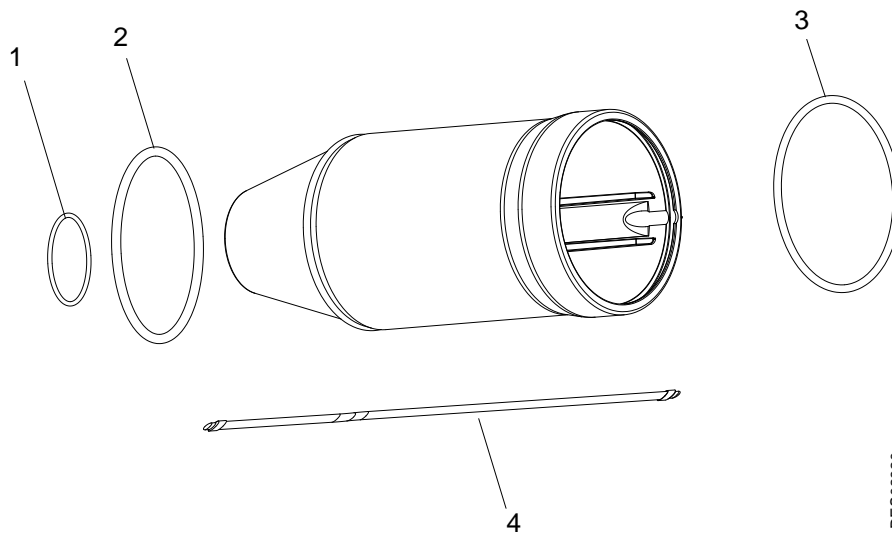
(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

10.5. Counter electrode assembly



Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1527017	Counter electrode assembly	1	1	3
1	J2CTPB324	O-ring - PB 701	1	1	1
2	1412251	Counter electrode conductor seal	1	1	1
3	1412252	Counter electrode insulating seal	1	1	1
4	1527023	Counter electrode cable assembly	1	1	2

(*)

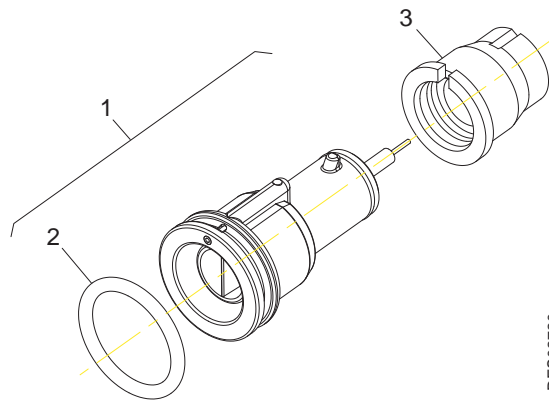
Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

10.6. Nozzles

10.6.1. Fan spray nozzle



Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
1	1525492	Fan spray nozzle assembly without deflector	1	1	1
2	1412250	Conductor O-ring (included in item 1)	1	1	1
3	1313519	Medium fan spray deflector (white)	Option	1	1
	1311409	Narrow fan spray deflector (light grey)	Option	1	1
	1311793	Wide fan spray deflector (red)	Option	1	1
	1315957	Standard fan spray deflector (yellow)	1	1	1

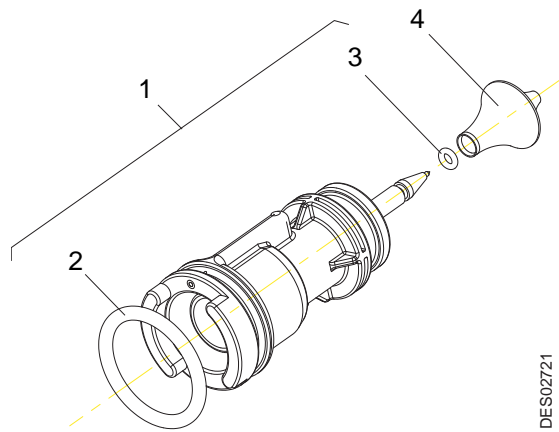
(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

10.6.2. Round spray nozzle



Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
1	1525493	Round spray nozzle without deflector	1	1	1
2	1412250	Conductor O-ring (included in item 1)	1	1	1
3	J2CTPC020	O-ring - PC 851 (included in item 1)	1	1	1
4	1409259	Round spray deflector, Dia.: 16 mm (white)	1	1	1
	900008026	HD Round spray deflector, Dia.: 16 mm (grey)	Option	1	1
	1411500	Round spray deflector, Dia.: 12 mm (white)	Option	1	1
	1409260	Round spray deflector, Dia.: 20 mm (white)	Option	1	1
	900008027	HD Round spray deflector, Dia.: 20 mm (blue)	Option	1	1
	1411993	Round spray deflector, Dia.: 25 mm (white)	Option	1	1

(*)

Level 1: Standard preventive maintenance

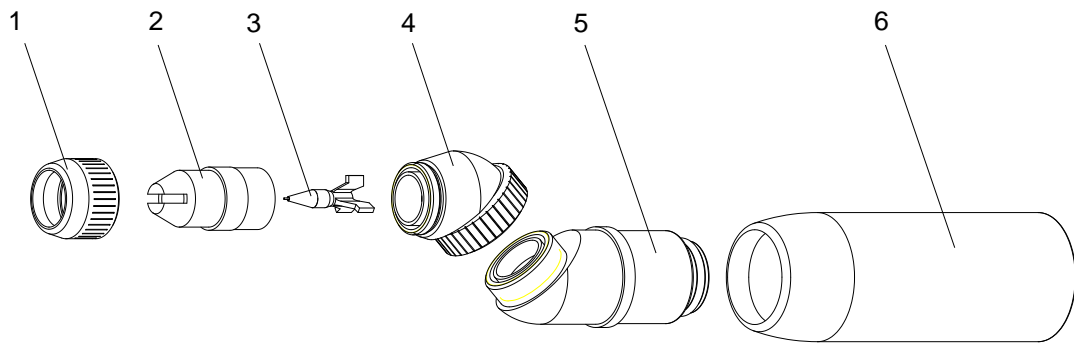
Level 2: Corrective maintenance

Level 3: Exceptional maintenance.



WARNING : The deflectors high durability (HD) are recommended when powder more abrasive is used.

10.6.3. Adjustable nozzle



DES03018

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1527292	Adjustable fan spray nozzle	1	1	3
1	1309357	Nozzle nut	1	1	1
2	1309358	Fan spray nozzle body	1	1	1
3	1412255	Adjustable nozzle and electrode assembly	1	1	1
4	1412257	Upper body assembly	1	1	3
5	1412256	Lower body assembly	1	1	3
6	1315266	Nozzle adjustment mounting nut	1	1	3

(*)

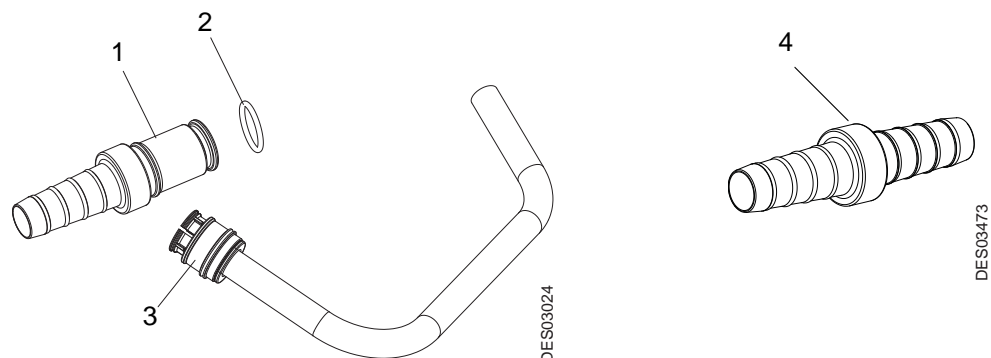
Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

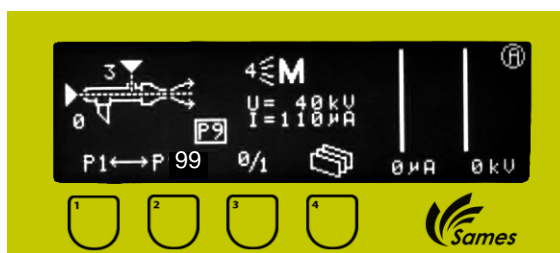
Level 3: Exceptional maintenance.

10.7. Extra equipment

10.7.1. Common elements



Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1527393	Powder hose quick disconnection union	1	1	3
1	1315559	Hose end quick connector	1	1	3
2	J2CTCN022	O-ring	1	10	1
3	1411501	Powder connector assembly	1	1	1
4	1315394	Dual Powder hose fitting	1	1	2



Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1523297	CRN 457 control module	1	1	3
	1526284	Front of CRN 2/cabinet (see § 10.7.1.1 page 47)	1	1	3
	1526286	Front of CRN 1/cabinet (see § 10.7.1.2 page 47)	1	1	3

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	910000092	CRN 457 / PLC trigger cable	1	1	3
	E4PTFS572	Male PLC plug, 19 contacts	1	1	3
	E4PTFD574	Crimp contact	18	1	3
	110000029	Cable	1	1	3
		Plug specific tools			
	W6EDEM089	Removal tool, sprayer plug	-	1	-
	W6EDEM090	Removal tool, PLC plug	-	1	-

Manual flush filter

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	R4DFCM199	Manual flush filter	1	1	3
	F6RLCS204	Male union	2	1	2
	R4DACC200	Filter cartridge	-	1	1
	X3AVSY119	Screw Chc M4 x12 steel 8/8 zinc plated	2	1	3
	X2BDMU004	Washer M4 U zinc plated steel	2	1	3

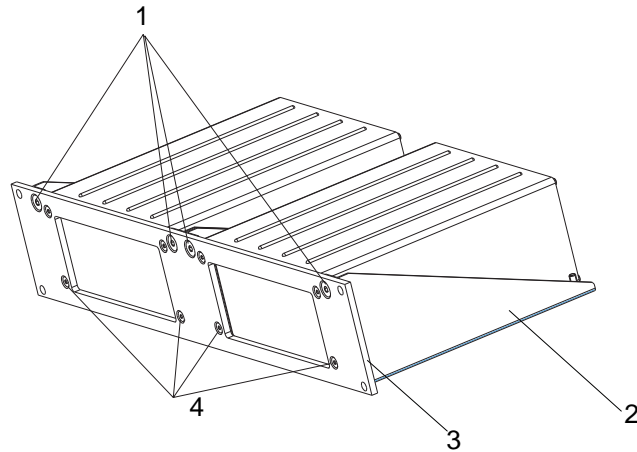
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Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

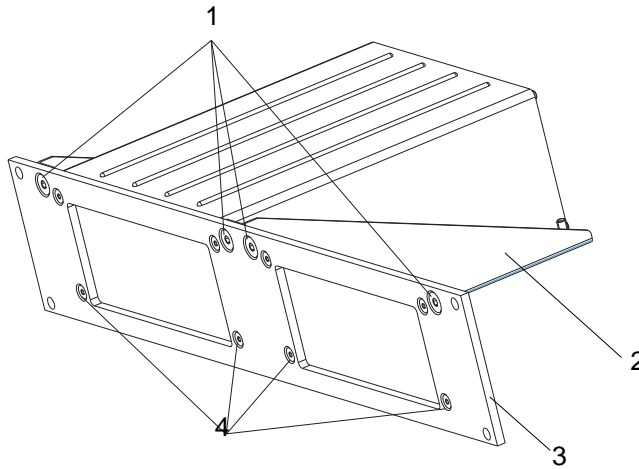
10.7.1.1. Front of CRN 2/cabinet



DES03266

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1526284	Front of CRN457 2/cabinet	1	1	3
1	250000078	Screw F/90 HC M6 x 12 zinc plated	4	1	3
2	900004933	Rear support CRN 457	2	1	3
3	900005007	Front of CRN457 2/cabinet	1	1	3
4	X3GJFP118	Screw PT F/90 KA40X10 WN1413 zinc plated	8	1	3

10.7.1.2. Front of CRN 1/cabinet

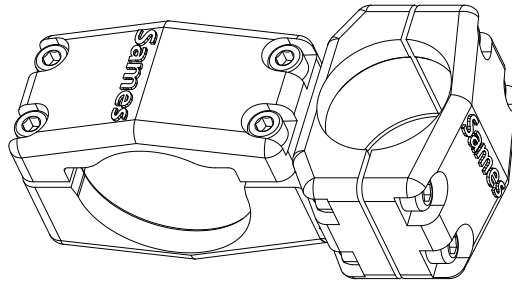


DES03267

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1526286	Front of CRN 1/cabinet	1	1	3
1	250000078	Screw F/90 HC M6 x 12 zinc plated	4	1	3
2	900004933	Rear support CRN 457	2	1	3
3	900005007	Front of CRN457 2/cabinet	1	1	3
4	X3GJFP118	Screw PT F/90 KA40X10 WN1413 zinc plated	8	1	3

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

10.7.2. Items for "FCC Auto Mach-Jet"



DES03022

Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	1204441	Orthogonal fixing nut 50/60	1	1	-

(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

10.7.3. Items for "Auto Mach-Jet"



Item	P/N	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	749805	Orthogonal fixing nut 50/30	1	1	-

(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance.

11. "FM Approved" Configurations

Guns		HV generator molding	Spray nozzle				Cable length				Option				
Model/N	P/N Drawing	PIN 1527002	JR				JP				Extended Nozzle 150 mm PIN 1526297	Extended Nozzle 250 mm PIN 1526298	Counter Electrode PIN 1527017	Adjustable nozzle PIN 1527292	Electro-pneumatic control module CRN 457 PIN 1523297
			12 mm	16 mm	20 mm	25 mm	6 M	12 M	Cable extension PIN 910000082 18 M	Cable extension PIN 1527351 30 M					
Auto Mach-Jet	1527295	×	×	×	×	×			×	×			×	×	×
Auto Mach-Jet FCC	1527015								×						

DES03277

Référence Auto Mach-Jet Auto Mach-Jet P/N:	Référence Auto Mach-Jet FCC FCC Auto Mach-Jet P/N:
18 M -----> 1527340	-
30 M -----> 910000100	30 M -----> 1527318

Références des Equipements de Pulvérisation / Spraying pattern P/N equipment:

	JR12	JR16	JR20	JR25
Buse / Nozzle	1525493	1525493	1525493	1525493
Déflecteur / Deflector	1411500	1409259	1409260	1411993

	JP étroit / narrow	JP medium / medium	JP large / large	JP Standard / standard
Buse / Nozzle	1525492	1525492	1525492	1525492
Déflecteur / Deflector	1311409	1313519	1311793	1315957