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SAMES  **KREMLIN**



DES000909

User manual

Powder supply unit Version 2

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Powder supply unit

Version 2

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1. Supplementary documents

Note: This document contains links to the following operating manuals:

For the GNM 100, [see RT Nr 6102](#)

For the "Mach-Jet Gun" spray gun, [see RT Nr 6336](#)

For the "Auto Mach-Jet" atomizer, [see RT Nr 6366](#)

See the supplier's documentation for the filtration box

See the supplier's documentation for explosion venting

See the supplier's documentation for

recommendations on reducing the explosion hazard

See the supplier's documentation for the ΔP control module

See the supplier's documentation for the motor fan unit

See the supplier's documentation for the DPI sequencer

For the PVV Easycolor coating booth, [see RT Nr 6187](#)

For the reclaiming assembly, [see RT Nr 6188](#)

For the PVV Easycolor facility, [see RT Nr 6224](#)

For the CS 127 powder pump, [see RT Nr 6368](#)

2. Safety

2.1. Safety rules

This equipment can be dangerous unless the safety rules given in this manual are scrupulously observed during its operation. The operator must understand the residual risks involved in the use of this equipment ([see § 2.2 page 6](#)).

- 1 The powder supply unit, and the plunger carriage in particular, must be electrically connected to the electrical power grounding system.
- 2 All conductive structures located within or near the work area must be connected to the electrical power grounding system.
- 3 All grinding or welding of metal products performed within a radius of 5 metres of the booth is prohibited unless the following safety measures are observed :
 - The powder supply unit must be protected by a tarpaulin made of non-flammable material (or fire resistant material).
 - Someone equipped with a fire extinguisher must monitor the powder supply unit area during the work.
- 4 The powder supply unit must not support any load other than that of the equipment originally intended for installation on or around the booth. The structure of the powder supply unit is self-supporting. The powder supply unit is not meant to support the weight of an operator working on its roof, the weight of a part of the building or any other load.
- 5 The powder supply unit must be installed by SAMES. If the powder supply unit is to be modified in any way, it is essential to follow the recommendations provided by SAMES.
- 6 The ground surface on which the powder supply unit rests must have a strength greater than 400 kN / m².
- 7 The temperature of the walls of the powder supply unit must not exceed 40° C. The ambient temperature or the temperature of any heat source near the walls must not exceed 40° C.
- 8 Do not allow any corrosive products or objects which may damage its surface to come in contact with the powder supply unit.

2.2. Residual risks

For risks related to the powder coating facility, [see RT Nr 6224](#).

Risks	Degree of risk	Exposure frequency and length	Methods used to limit damage
Noise hazard (for noise level data sheet, see RT Nr 6224).	Minor	All operators working at the facility	Use personal protection methods (helmet, etc.)
Risk of inhalation of noxious fumes and dust	Minor	The operator assigned to cleaning the unit during the cleaning stage	Use a protective mask during cleaning operations
Fall hazard during work on the upper part of the powder supply unit	Serious	During each service operation on an upper part of the unit (about 1 per month)	Use a safe means of working at the height in question
Risk of a body part being crushed by the cylinder	Serious	All operators working at the facility	The cylinder controls should be placed away from the cylinder and operators should receive prior training

3. Description

3.1. General description

The powder supply unit is a ventilated enclosure which provides :

- 1 Powder supply for sprayers and spray guns (a maximum of 24)
- 2 Automatic cleaning :
 - of the powder pumps
 - of the powder supply hoses
 - of the inside of the sprayers and spray guns
 - of the powder reclaiming hose and the sieving system (on the PVV Easy-color facility)

When used with the PVV facility, it is controlled by the PLC located on the front of the electrical cabinet.

As an option, the powder supply unit can operate autonomously.

With this option, it is controlled from the keyboard located at the front of the electro-pneumatic cabinet.

The PLC's monitor guides the operator and tracks his actions in real time.

It keeps the operator informed about the operating status of the powder supply unit (errors, cleaning stages, operations to be performed, etc.).

3.2. Supply unit equipment

The powder supply unit is equipped with the following safety devices and equipment :

- Emergency stop push buttons on the front of the electrical cabinet and of powder supply unit.
- Powder level detector for powder remaining in the container
- Presence detector for the containers (box or tank) on the vibrating base
- Quick disconnect locking system for the powder reclaiming hose in cleaning position
- Compressed air gun for cleaning the unit
- 2 fluorescent tubes for unit lighting
- Pushbutton "Descent of plunger carriage"

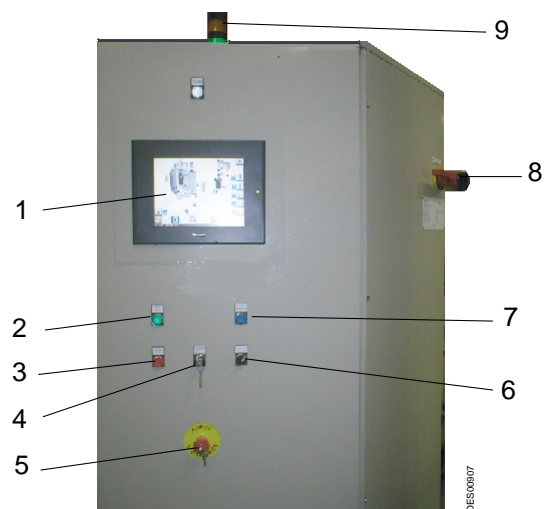
Electrical cabinet equipment (excluding PVV equipment) :

- Open door detector which prevents the unit from being started if the cabinet door is open
- Main switch on the back side, opposite the read-out display
- Compressed air inlet valve

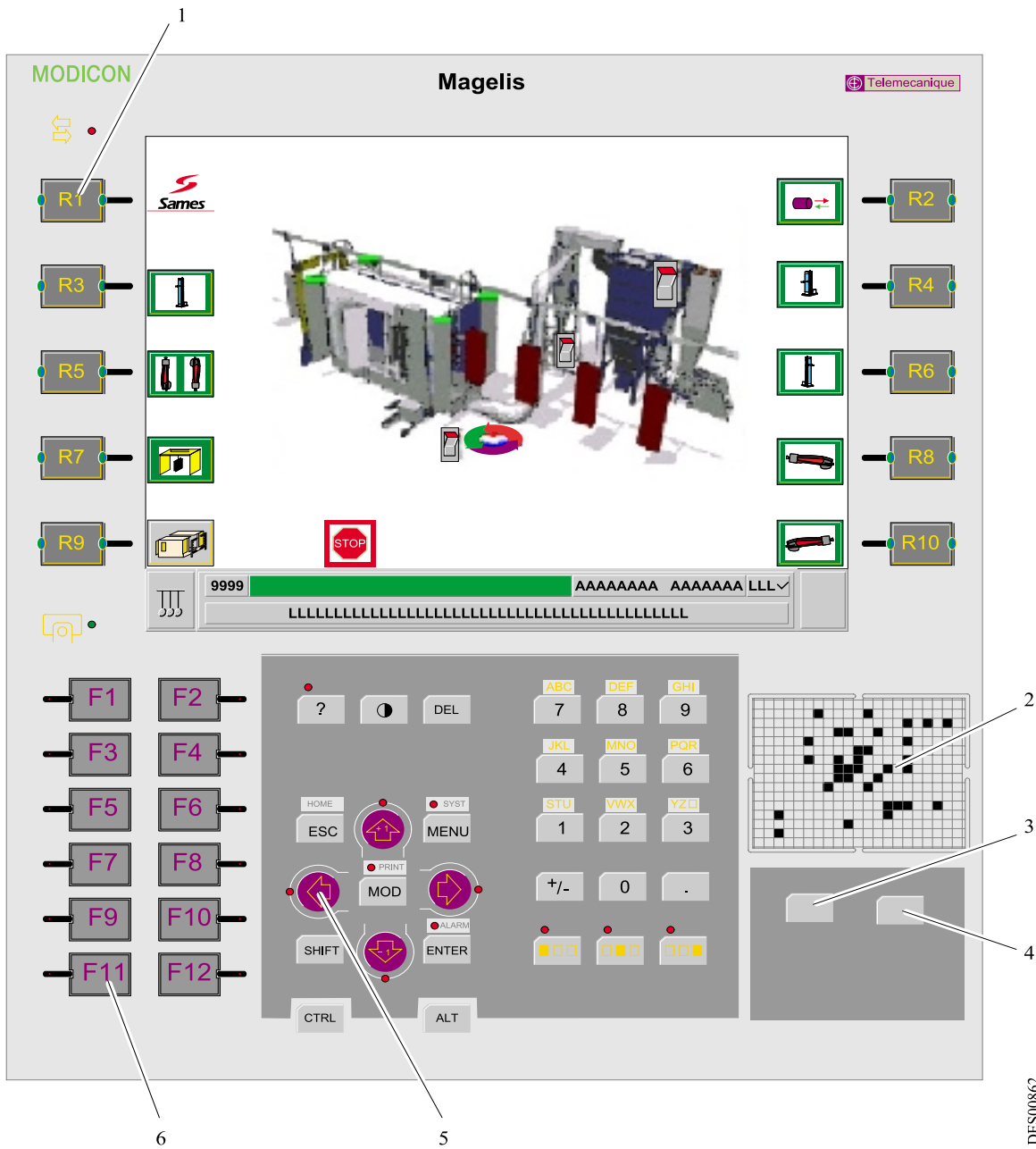
3.3. Operating controls

3.3.1. The cabinet

1	PLC
2	START push button
3	SHUTDOWN push button
4	Booth access key
5	Emergency stop
6	Booth lighting switch
7	Error reset button
8	Main switch
9	Power-on indicator



3.3.2. The operating terminal



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1	Page access keys and related icons	4	Right button
2	Mouse	5	Navigation arrows
3	Left button	6	Function keys

3.4. Description of operation

3.4.1. Powder coating stage

During the powder coating stage, the ventilation system prevents powder from escaping from the powder supply unit. The powder container can be a box type container or a fluidized tank from which the powder pumps aspire the powder to supply the sprayers and/or spray guns.

If a box container is used, a locking device maintains it in the powder coating position and the vibrator attached to the vibrating table starts vibrating so that the powder level in the container is evened out.

- The plunger cylinder lowers the plunger carriage into the container until powder is detected by the level detector. The level detector allows the height of the powder pump in the container to be adjusted in real time so that the powder supply rate remains constant. When the plunger cylinder reaches the bottom of the container (i.e., when the low level sensor detects the cylinder rod), the powder container must be refilled or replaced
- Automatic refilling (optional) : at the start, the plunger cylinder is in the raised position in the container. When the plunger cylinder reaches the lowest position, the container is automatically refilled. Automatic refilling is performed by 2 powder pumps which are immersed in a powder barrel placed on a separate vibrating table or on other mean.
- The electro-pneumatic cabinet supplies the powder pumps with compressed air so that the powder can be conveyed to the sprayers and/or spray guns. The reclaimed powder and the new powder (with the automatic refill option) are conveyed to the powder supply unit container by the reclaiming hose and the new powder supply hose. These hoses are housed in the reclaiming box in order to prevent any powder from escaping from the powder supply unit.

3.4.2. Cleaning stage

The powder supply unit must be cleaned using the PLC before each colour change or before a prolonged production shut-down. Instructions and information are displayed to guide the operator.

Cleaning of the powder supply unit includes 2 stages:

- Automatic blow-through of the powder conveyance circuits (supply hoses and the reclaiming hose) (average duration: 3 minutes).
- Manual cleaning of the exterior surfaces of the components with the air gun (powder tubes, powder pump, hoses, plunger carriage, reclaiming box and vibrating table (average time: 4 minutes).

The cleaning system's three main components are:

- The plunger cylinder which allows the powder pumps to be raised (so that the powder container can be removed) then lowered and connected to the cleaning distribution connector.
- The distribution connector which distributes compressed air for cleaning into all the powder pump tubes, allowing the inside of all the powder supply circuits to be cleaned, including:
 - the powder pumps,
 - the venturis,
 - the hoses,
 - the powder conduit and nozzle.
- The reclaiming hose coupler allows the reclaiming hose to be cleaned by the injection of compressed air.

3.4.3. Unclogging stage

Air suction is provided by the motor-fan unit. The powder fumes which result from cleaning the exterior surfaces of the various components are filtered by the filter cartridges. The filtered air is drawn back through the motor-fan unit and discharged onto the premises.

The powder caught by the filter cartridges is gradually deposited on their exterior surfaces. To maintain sufficient ventilation, they must be cleaned periodically. This cleaning operation is performed by pneumatic backblowing of the filter cartridges. The pressure drop (ΔP) across the filter cartridges is measured by the U-tube manometer located on the side of the power supply unit. This pressure drop (ΔP) must always be less than 110 mm WG (Water Gauge) to provide proper ventilation for the powder supply unit. The filter cartridges must therefore be unclogged when ΔP is greater than 80 mm WG (Water Gauge).

During the unclogging stage, air is injected through the filter cartridges in the opposite direction from the ventilation airflow (backblowing). The backblow air is stored in a pressurized air reservoir at between 4 and 5 bar and is released through the filter cartridges by solenoid air valves. The opening of the solenoid air valves is controlled by the PLC at the option of the operator when ventilation seems to be insufficient. The powder which is recovered in the powder supply unit hopper must then be disposed of.

3.5. Specifications

3.5.1. Electrical specifications

3.5.1.1. Powder supply unit control cabinet

Voltage	3-phase 400 V \pm 10%
Power	5.5 kVA, 50 Hz

3.5.1.2. Vibrator

Classify protection	Eex e II
Classification	group II, categorie 2D
Supply voltage	230 V/400 V 3-phase + ground
Frequency	50/60 Hz
Wattage	94 W
Protection index	IP 66 - 7
Insulation class	F
Weight	12,8 kg

3.5.1.3. Fan motor

Type	B5 Ex II - 3D 125°C
Power	1.1 kW - 3000 rpm - 50 Hz
Protection index	IP 55
Supply voltage	230 V / 400 V 3-phase + ground
Weight	35 kg

3.5.2. Pneumatics specifications

3.5.2.1. Powder supply unit

Max. input pressure	10 bar (150 psi)
Min. input pressure for a flow rate of 17 m ₀ ³ / h	4 bar (60 psi)
Maximum compressed air consumption	17 m ₀ ³ / h.

3.5.2.2. Compressed air supply specifications in accordance with the NF ISO 8573-1 standard:

Max. input pressure	10 bar (150 psi)
Min. input pressure for a flow rate of 17 m ₀ ³ / h	4 bar (60 psi)
Max. compressed air consumption	17 m ₀ ³ / h
Compressed air specifications	NF ISO 8573-1
Dew point	Class 4 or +3° C (37°)
Maximum particle size of solid pollutants	Class 3 or 5 microns
Maximum concentration in solid pollutants	Class 3 or 5 mg / m ₀ ³ :
Maximum concentration in oil	Class1 or 0,01 mg / m ₀ ³ :

m₀³: values given for a temperature of 0° C (32°F) at atmospheric pressure (1013 mbar).

3.5.2.3. Powder supply unit control cabinet

Min. pressure	6 bar
Max. pressure	10 bar
Compressed air consumption	< 160 m ³ / h. (*)
Cabinet input connector	3 / 4"

3.5.2.4. Fan

Suction airflow (when $\Delta P = 65$ mm WG* across filter cartridges)	2500 m ³ / hr.
---	---------------------------

* Water Gauge

3.5.3. Weight and overall dimensions

3.5.3.1. Powder supply unit

Weight (excl. electrical cabinet)	550 kg
Width	1600 mm
Depth	1800 mm
Height	2600 mm

3.5.4. Equipement dimensions

3.5.4.1. Filter cartridges

Number	2
Width	1000 mm
Diameter	325 mm
Filter surface	64 m ² (32 m ² per cartridge)

3.5.4.2. Plunger cylinder

Stroke	200 kg
--------	--------

3.5.4.3. Fluidisation tank - large model

Length	800 mm
Width	595 mm
Height	415 mm
Live storage	160 L

3.5.4.4. Fluidisation tank - middle model

Length	620 mm
Width	595 mm
Height	415 mm
Live storage	120 L

3.5.4.5. Fluidisation tank - small model

Minimum length	425 mm
Minimum width	595 mm
Maximum height	415 mm
Live storage	90 L

3.5.4.6. Box container (from powder supplier)

Length	380 mm
Width	280 mm
Height	400 mm
Live storage (depending on container)	40 to 50 L

3.5.4.7. Maximum number of powder pumps

For box container	14
For fluidisation tank	24

3.5.5. Noise level

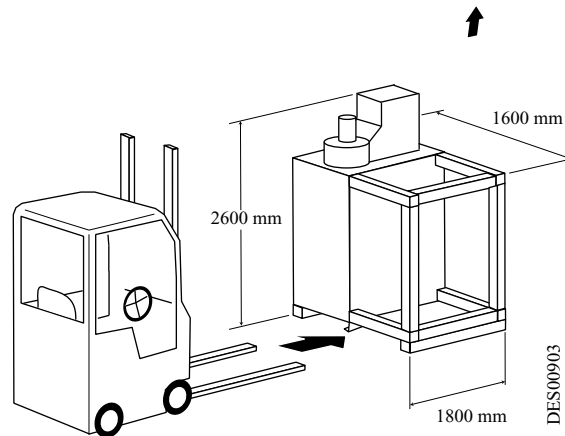
The sound pressure level measured in front of the powder supply unit at the operator's station is less than 89.5 dB(A); refer to the work station noise level data sheet in the powder coating facility manual ([see RT Nr 6224](#)).

3.5.6. Dust discharge

Regardless of the particle size of the powder used, the supply unit's filter cartridges guarantee a powder concentration in the discharge air of less than 3 mg / m₀³ of air .

3.5.7. Lifting the powder supply unit

To move the powder supply unit, use a lifting device with sufficient rated capacity (a pallet jack or lift truck). Carefully observe the positions given in the diagram below when handling the supply unit.



4. Start-up and adjustments

Air pressures

Cylinder main air supply	4.5 bar min.
Pneumatic locking of cylinder B	2.5 bar
Pneumatic unlocking of cylinder	3 to 5 bar
Fluidisation of the powder in the container (box or tank) for information	1 bar
Backblow air pressure for filter cartridge unclogging	4 to 5 bar maxi
Cleaning air pressure	5 to 6 bar

4.1. Vibrator

For use with box type powder containers



WARNING : The vibration intensity adjustment must be exactly the same on both sides of the vibrator.

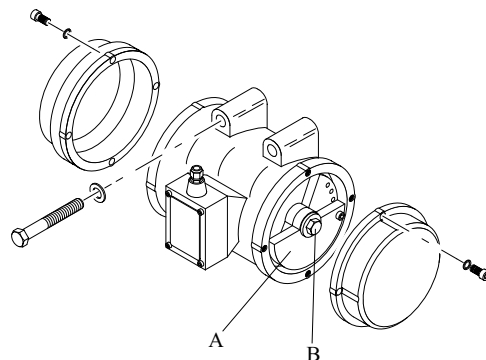
The vibrator is located on the suction side of the vibrating table. The vibrator should be adjusted to the minimum out of balance required to obtain a perfectly horizontal bed.

The minimum out of balance is obtained when the eleven half disks are positioned on either side of the vibrator shaft. Initial adjustment recommended by SAMES Technologies.

Adjustment procedure:

- 1 Disconnect the electric power from the vibrator.
- 2 Remove the vibrator from the vibrating table.
- 3 Remove the housings from both sides of the vibrator.
- 4 Unscrew the screw (B).
- 5 Turn over five flyweight out of eleven on each side of the vibrator.
- 6 Re-tighten the screw (B).
- 7 Perform the same procedure to adjust the other side of the vibrator by taking care to obtain the same orientation as the first side (unbalance on the same side).
- 8 Re-install the housings, then re-install the vibrator on the vibrating table.

A	Flyweight
B	Mounting bolt



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4.2. Adjusting the plunger cylinder limiter

This adjustment is to be made by SAMES.



WARNING : Before starting up the powder supply unit- version 2 for the first time, tighten the limiter to the maximum so that the cylinder operates at the minimum speed.

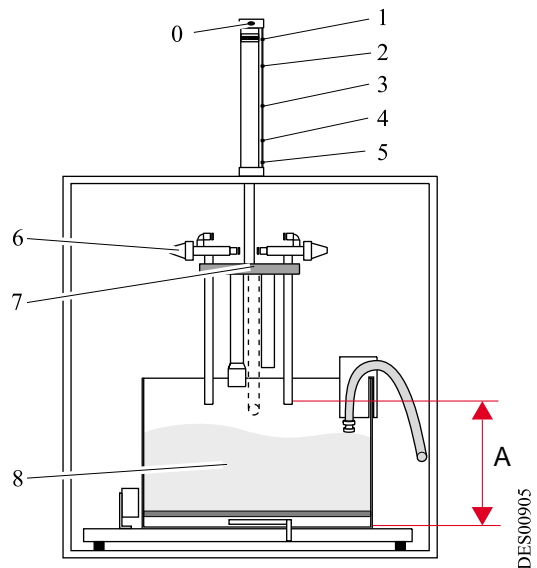
Speed of descent: 40 mm / sec (+ ou - 0,5 mm / s).

Adjustment procedure:

- 1 Unscrew the adjustment locknut.
- 2 Start up the powder supply unit.
- 3 Screw the limiter screw all the way in.
- 4 Gradually unscrew the adjustment screw while moving the cylinder up and down until the indicated speed of descent is obtained.
- 5 Re-install the adjustment locknut.

4.3. Stroke end sensors

0	Reference position
1	Raised position (cylinder retracted to the maximum) Distance (0) - (1) = 20 mm A = 467 mm
2	Raised container position Distance (0) - (2) = 190 mm
3	Lowered container position (box type) Distance (0) - (3) = 340 mm A = 52 mm
4	Lowered container position Distance (0) - (4) = 340 mm A = 81 mm
5	Cleaning position Distance (0) - (5) = 420 mm Sealing at 6 bar
6	CS 127 powder pump
7	Plunger carriage
8	Powder container



View of the powder supply unit

4.4. Powder level detector

This adjustment is made by SAMES during the initial operation procedure.

Adjustment procedure

- 1 Screw on clockwise the adjustment screw placed at the back of the sensor up to obtain a constant detection; it must not be in contact with the powder. Then, unscrew it anti-clockwise and by a few degrees so that there is no more detection.
- 2 Then make sure that this adjustment suits the fluidised powder (if possible with a plugging powder). If the detection is still constant, carry out again the operation: without any contact with the fluidised powder, screw on clockwise the adjustment screw up to obtain no more detection.
- 3 Carry out again this operation up to obtain a reliable detection.

4.5. Container presence detector

His adjustment is made by SAMES during the initial operation procedure. The adjustment of the container presence detector should not be too sensitive to avoid detection of unwanted components (plunger tubes during cleaning operation, for example).

Adjustment procedure :

- 1 With the powder pumps in the raised position, activate the container presence detector control and place the container correctly on the vibrating table, i.e., beneath the powder pumps and up against the thrust plates.
- 2 Adjust the position of the presence detector so that it is positioned about 10 mm from the container.
- 3 Adjust the sensitivity using the screw located behind the presence detector until it detects the container.
- 4 The adjustment is correct if the container is in place and the presence detector is activated.
- 5 The adjustment is incorrect if the container is in place and the presence detector is not activated.

4.6. Container locking cylinder limiters



WARNING : Before starting up the powder supply unit- version 2 for the first time, screw the limiter all the way in so that the cylinder operates at the minimum speed.

This adjustment is to be made by SAMES.

Adjust the limiters according to the procedure ([see § 4.2 page 16](#)) so as to obtain a locking and unlocking time between 2 and 4 s.

4.7. Fan motor power supply

This connection is to be made by SAMES.

Refer to the main electrical wiring diagram when connecting the motor fan power supply.



WARNING : Make sure the motor's direction of rotation matches the direction of rotation indicated by the arrow affixed to the top of the motor fan unit.

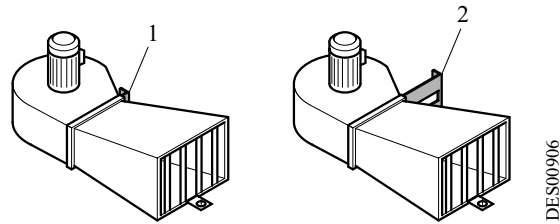
4.8. Power supply for solenoid air valves

This connection is to be made by SAMES.

Connect the power supply cords for the solenoid air valves to the supply unit electrical cabinet (refer to the main wiring diagram).

4.9. Filter cartridges

The following operations should be carried out at the time of the initial start-up of the unit and each time a filter cartridge is replaced :



- 1 Move the shutter (V) completely into its housing.
- 2 Read the pressure drop across the filter cartridges (ΔP) on the U-tube manometer.
- 3 When ΔP reaches 60 mm WG (Water Gauge), completely remove the shutter (Use the shutter for each filter cartridge replacement).

When new filter cartridges are put into operation, the sound pressure level is slightly greater than the value measured when the filters are clogged (the sound level depends on the fan load).

5. Method of operation

5.1. Controlling the powder supply unit

5.1.1. Starting the unit

The circuit breaker switch located on the right-hand side of the main cabinet must be engaged and the main air valve must be open.

Press the ON push button. When the green indicator lamp illuminates, the unit's components are supplied with electrical power and with air, and are ready for operation.

5.1.2. Shutting down the unit

The unit is put in SHUTDOWN mode from the PLC. Press the red push button. The green indicator lamp remains illuminated for several seconds, then the unit is shut down as follows :

- Spraying and reciprocator movements are shut down
- Time out, then powder reclaiming (powder sieving and conveyance) is shut down
- Ventilation time out followed by shutdown of ventilation
- Electrical power is cut out by relay

For the operation of the entire PVV powder coating facility, [see RT Nr 6224](#).

5.1.3. Using the PLC


5.1.3.1. Selecting the operating mode

The booth's operating mode can be changed on each of the main sieve pages.


To activate or change an operating mode:


- Using the mouse, point at the icon for the current mode and click the left button.
- The LED's located on the up/down navigational arrows start to blink. Press on one of the arrows to call up the icon for the desired mode.
- Then confirm your choice using the **ENTER** key.

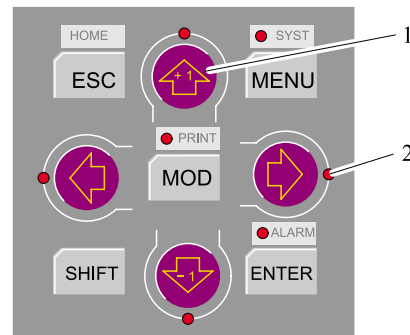
1	Navigation arrows
2	LED's for navigation keys

 **SHUTDOWN mode:** Active when a red band appears around the symbol.

 **USER ADJUSTMENT mode:** Active when a blue band appears around the symbol.

 **AUTOMATIC mode:** Active when a green band appears around the symbol.

 **CLEANING mode:** Active when a yellow band appears around the symbol.



DES00864

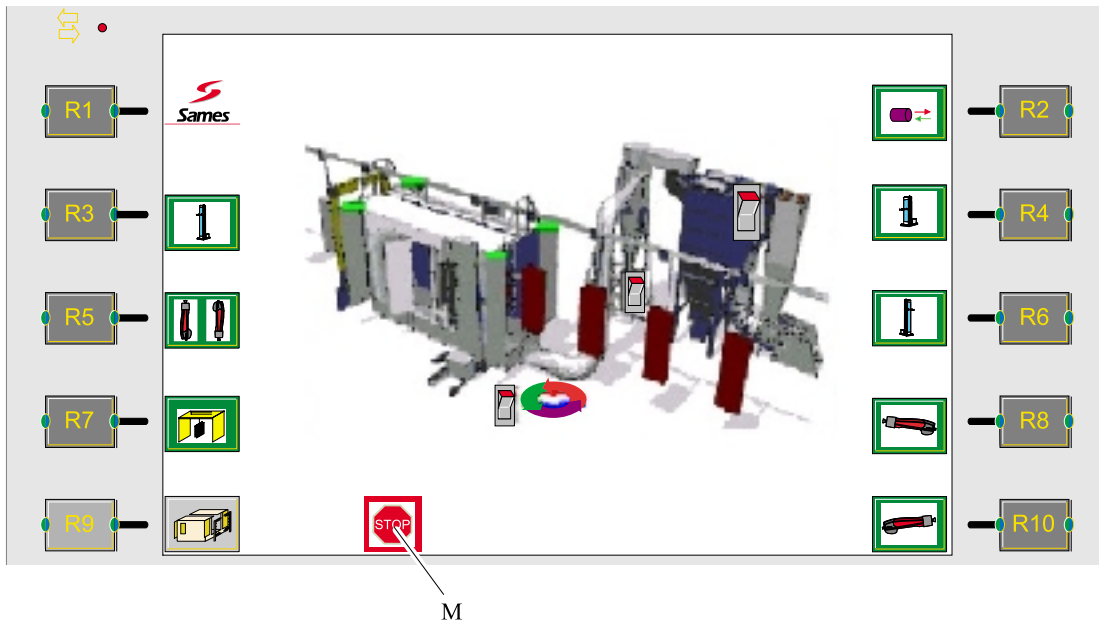
The (R) function keys allow the page to be changed when the symbol is on a colour background.

Symbol background colours:

- When the background colour is green :
 - There is nothing to report on that page
- When the background colour is red:
 - An error is being reported on that page
- When the background colour is grey:
 - The page is currently being displayed
- When the background colour is mauve :
 - There is a reset on that page

5.1.3.2. Accessing the powder supply unit sieve page

Press the R7 key to display the control page for the Powder Supply Unit

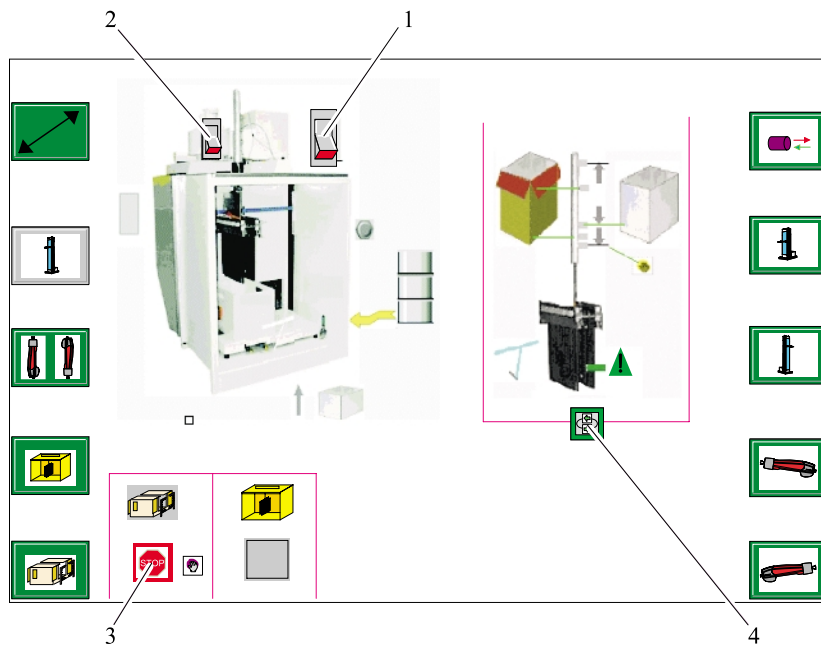


DES00870

R1	Page is password protected
R3	Go to one-axis reciprocators sieve page
R5	Go to stationary upper and lower sprayers sieve page
R7	Go to powder supply unit sieve page
R9	Page not accessible (currently being displayed)
M	Access to operating mode
Go to parts detectors sieve page	R2
Go to right reciprocator sieve page	R4
Go to left reciprocator sieve page	R6
Go to RH sprayers sieve page	R8
Go to LH sprayers sieve page	R10

**Use the mouse to move the cursor to the various fields accessible to the operator.
Use the left button to confirm the cursor position on the page.**

5.1.3.3. Accessing the supply unit control page



1	Power up unit
2	Start ventilation
3	Booth operating mode
4	Supply unit cylinders operating mode

To power up the powder supply unit:

- Place the cursor on the switch (1)
- Use the **ENTER** key to confirm your choice

Ventilation is automatically started when the power supply unit is powered up.

Ventilation shutdown or start-up can be controlled by switch (2).

Control procedure for a component on this page:

- Place the cursor on the component to be controlled using the mouse
- Confirm your choice by clicking the left button
- Press the navigational arrows with the blinking LED's to choose the component to activate (the colour green activates the component)
- Use the **ENTER** key to confirm your choice

The supply unit has two available options:

- Selection of powder container:
 - Box type container
 - Fluidised tank
- Automatic feeding of new powder can be selected with the fluidised tank option.

DES00887

5.1.3.4. Control of cylinders

Plunger cylinder movements can be controlled manually for the following positions:

- raised
- lowered in tank
- lowered for cleaning
- Place the cursor on the grey arrow corresponding to the desired position
- Confirm using the **ENTER** key (the background changes to green)

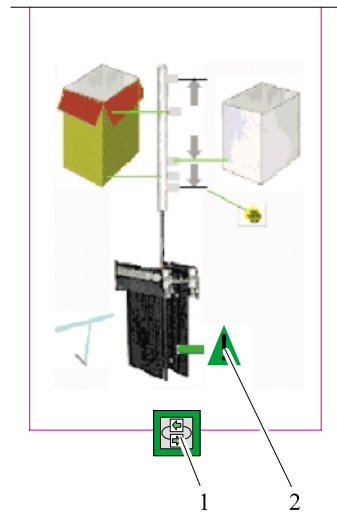
To lower the cylinder into the cleaning position, you must hold down the descent authorisation button (at the top right of the frame).

Releasing the button interrupts the descent.

The lock cylinder can be controlled manually (locked, unlocked). Proceed as follows:

- Place the cursor on the cylinder icon
- Use the **ENTER** key to confirm your choice


1	Choice of cylinder operating mode: automatic or manual
2	Activation (green) or deactivation (yellow) of the powder level detector



DES00888

5.1.3.5. Installing a container

To position or replace a container:

- Point with the mouse to the arrow for this symbol: , select the arrow by clicking on it with the left mouse button; then change it to green using the up and down navigational arrows and validate using the **ENTER** key, (Powder coating and reclaiming are shut down).
- Shut down the supply unit. The venturi cylinder will be raised if it was in the lowered position. If the cylinder is not in the raised position, raise it using the supply unit's USER ADJUSTMENT mode.
- Confirm using the **ENTER** key
- Put in place the container (tank or box).
- When the container is in place, press the F3 key to activate:
 - 1 The vibrating table
 - 2 Fluidisation
 - 3 Lowering of the plunger cylinder



DES00892

- 1 During a container change or during the cleaning cycle, this box displays the number of the function key which the operator must press to continue the cycle.

5.1.3.6. New powder feed supply

When the powder level detector signals a lack of powder, the plunger cylinder is automatically lowered into the container to a level set beforehand by SAMES.

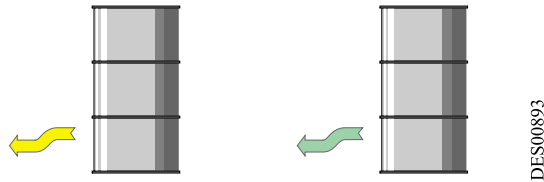
Operator controlled supply

Periodically check the powder level in the container.

When the powder level reaches the bottom of the container, the supply unit must be supplied with new powder - that is, a new container must be installed ([see § 5.1.3.5 page 22](#)).

When making a colour change, you must first run the facility's cleaning cycle ([see § 5.3 page 24](#)).

Automatic feeding (fluidised tank option)



Automatic powder feeding is selected by changing the yellow arrow to green.

If the powder level is not sufficient after the first time out, automatic feeding is restarted.

If the plunger cylinder reaches the bottom-of-container position, the container and the new powder barrel are empty. The PLC then displays the OUT OF POWDER error. A new barrel must be installed and the facility must be restarted.

5.1.4. Errors

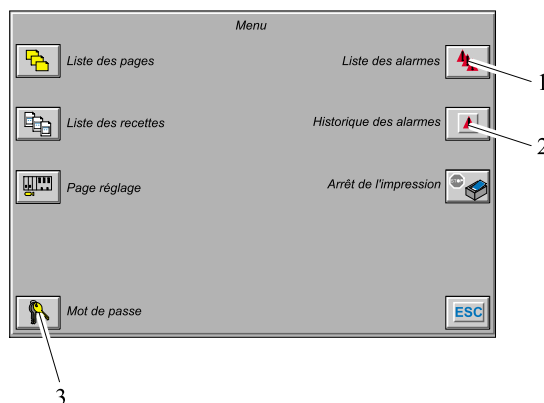
Errors are displayed by their mnemonics on all sieve pages.

1	Error description
2	Date and time error appeared
3	Error warning: None = no alarm Blinking red = alarm is present



5.1.5. Viewing error history

This page is accessible using the (MENU) key.



- 1 Date and time of current and reset errors
- 2 Alarm history
- 3 Writing of password for access to some pages

5.2. Powder coating stage

- 1 Start the PLC, then the supply unit's motor-fan unit.
- 2 Install the powder container in the powder coating position, i.e., abutting the presence detector and on the bottom of the powder supply unit.
- 3 Start up the powder supply unit. The plunger cylinder is automatically lowered into the container (for the box container, the box is locked into place and the vibrator is automatically started before the plunger cylinder is lowered).
- 4 Put the reclaiming box in place and be sure that it doesn't interfere with the lowering of the powder pumps. Lock the reclaiming hose (and the new powder supply hose, if needed) in the reclaiming box.
- 5 Activate one of the two operating modes which allow powder coating: USER ADJUSTMENT or AUTOMATIC mode.
- 6 The 4 sliding doors must be in the "open" position.
- 7 The motor-fan unit which provides the booth with ventilation must be operational.
- 8 The sieving system must be lodged up against the cyclone separator ([see RT Nr 6188](#)) and reclaiming must be operational.
- 9 The facility's PLC must not detect any errors.
- 10 Starting the powder coating operation
 - In AUTOMATIC mode, powder coating is interlocked with the presence of a part in front of the sprayers.
 - In USER ADJUSTMENT mode, activate the reciprocators to position them inside the booth, then start powder coating by activating the desired sprayers ([see RT Nr 6224](#)).

Note: in both operating modes, the plunger cylinder is lowered only until the level detector detects powder and is then stopped.

5.3. Cleaning stage

The chronological sequence of the entire cleaning cycle is diagrammed (following page) to allow you to visualize the operation of the facility during the cleaning stage. All of the steps to be carried out are displayed on the sieve at the appropriate time.

The sequence of steps is as follows:

- 1 Preliminary steps:
 - Change to cleaning mode ([see RT Nr 6224](#))
 - Close the 4 sliding doors
 - Confirm cleaning mode
- 2 Steps performed by the PLC:
 - Powder reclaiming continues to operate.
 - The plunger-carriage is raised to the raised end-of-stroke position.
 - The vibrator stops.
- 3 Knock on each powder pump to get back most of the powder accumulated inside the powder pumps.
- 4 Move the container to the side, away from the operating area of the plunger tubes.
- 5 Confirm the step on the PLC by pressing the requested function key.
- 6 Press and hold the push button located on the top right of the supply unit frame to lower the plunger carriage until the plunger tubes are touching the distribution connector gaskets.
- 7 Make sure the venturis are properly clamped, then confirm the start-up of the automatic cleaning operation.
- 8 Steps performed by the PLC : When the powder pump cleaning valves are opened sequentially (one per distribution connector), the compressed air contained in the cleaning air tank escapes and cleans
 - the powder pumps,
 - the venturis,
 - the hoses,
 - the powder conduit and the nozzle.

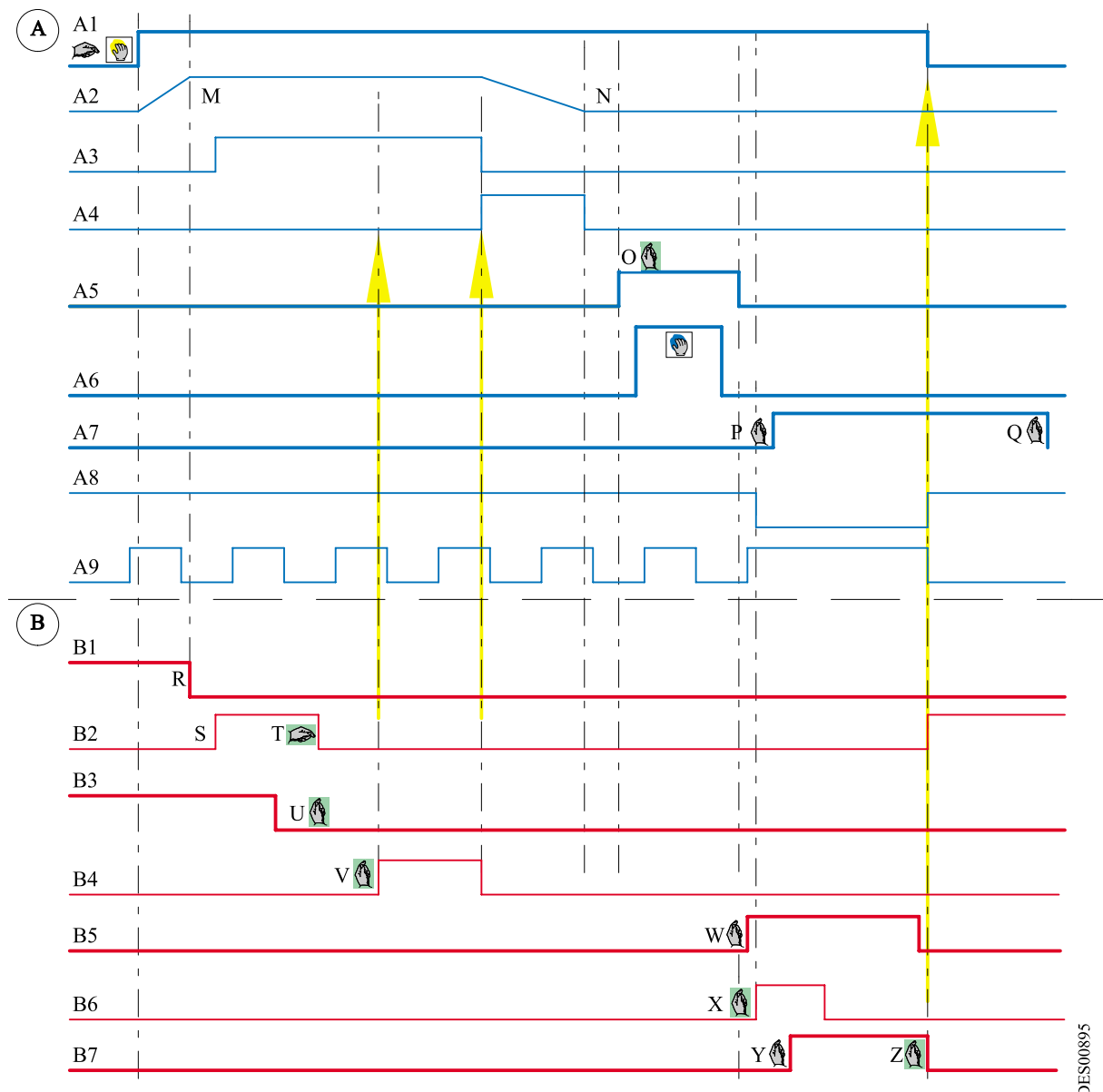
- 9 During the automatic cleaning operation, clean the outside surfaces of the components of the powder supply unit using the manual air gun.
- 10 Step performed by the PLC: Powder reclaiming is stopped
- 11 Connect the reclaiming hose to its cleaning coupler and confirm this step on the PLC.
- 12 Step performed by the PLC : When the cleaning valve is opened, the compressed air contained in the cleaning tank escapes and cleans the powder reclaiming hose.

Note: The number of times the backblowing operation is performed can be adjusted from the PLC.



Chronological diagram of the cleaning cycle

The chronological diagram below indicates the beginning and the time length of each stage of the colour change cycle. A description of each step is given in the table on the next page.

(A = a step involving the BOOTH in blue, B = a step involving the POWDER SUPPLY UNIT in red.)
Thin lines = automatic operation, Thick lines: = manual operation



DES00895

	Confirmation on the PLC or using the key
	Manual step

Ref.	Description
A	Step involving the BOOTH
A1	Reciprocator motions
A2	Opening of trigger releases
A3	Cleaning of sprayer exteriors
A4	Booth access authorization
A5	Cleaning the booth
A6	Cleaning the sieving system
A7	Cleaning the reclaiming hose
A8	Reclaiming status
A9	Operation of the conveyance valves
Ref.	Operating status
M	Reciprocators in inside position
N	Reciprocators in outside position
O	Use of booth access key
P	Sieving system in open position
Q	Sieving system in closed position

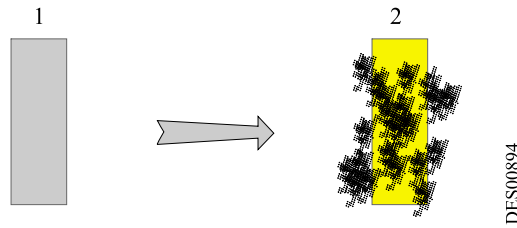
Ref.	Description
B	Step involving the POWDER SUPPLY UNIT
B1	Control of powder supply unit
B2	Plunger motions
B3	Moving the container
B4	Cleaning of the powder circuits (Powder pumps, hoses, sprayers / spray guns)
B5	Hook up reclaiming hose
B6	Cleaning the reclaiming hose
B7	Cleaning the powder supply unit
Ref.	Operating status
R	Powder supply unit shut down
S	Raise plunger cylinder
T	Lower plunger cylinder
U	Container moved
V	Cleaning in progress
W	Hook up reclaiming hose
X	Cleaning in progress
Y	Beginning of cleaning
Z	End of cleaning

5.4. Unclogging stage



WARNING : Unclogging (backblowing) of the filter cartridges should be performed only during a production shutdown to eliminate the risk of contaminating the powder in the container.

- 1 Preliminary steps :
 - Change to the SHUTDOWN mode ([see RT Nr 6224](#)).
 - Start up the ventilation system.
 - Remove the powder container.
- 2 Activate the backblow impulses to clean the filter cartridges by changing the colour of the filter cartridge symbol on the PLC from grey to yellow, if $\Delta P > 110$ mm WG . Stop when the pressure drop reading (ΔP) on the U-tube manometer is less than 60 mm WG.



1	Filter cartridge in operating mode
2	Filter cartridge in backblowing mode

6. Maintenance



WARNING : Before undertaking any service operation on the powder coating booth, the electrical and pneumatic power supplies must be cut off.

6.1. Preventive maintenance

Compressed air or a slightly damp rag should be used for all cleaning operations.

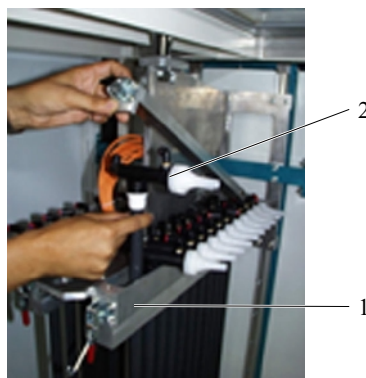
The degree of soiling and wear on the equipment by the powder depends on the type of powder used. The service interval indicated in the chart is therefore only an estimated recommendation.

Frequency cleaning	Action
Every 40 hours of operation	Dismantle the CS 127 powder pumps as indicated below: Clean the various components using the compressed air gun: the plunger tube, the venturi nozzle (dismantle using the removal tool, see § 7 page 31), the porous washer (see RT Nr 6368).
Once a month	Clean the rails and plunger carriage bearings using compressed air and with a rag
Once a month	If a vibrating base is used, check the condition of the rubber blocks on the vibrating base. Replace them if necessary.
Once a month	Check the condition of the flat gaskets located on the distribution connectors under the tank base. Replace them if necessary.

Removal and re-installation of the **CS 127** powder pumps

- Remove the container and position the plunger carriage in the middle position.
- Shut down the powder supply unit.
- Unhook the retaining fasteners for the **CS 127** powder pumps.
- Locate and disconnect the supply hoses for the **CS 127** powder pumps.
- Remove the **CS 127** powder pumps.
- Follow this procedure in reverse order to re-install the **CS 127** powder pumps.

For the fan, refer to the manufacturer's documentation included with the main facility's documentation.



DES00908

1	Powder pump support bracket
2	CS 127 powder pump

6.2. Corrective maintenance

6.2.1. Filter cartridge replacement

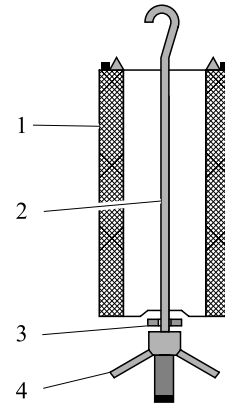
The filter cartridges must be replaced when unclogging (set to the maximum setting) is unable to reduce ΔP below 70 mm WG (Water Gauge). The maximum unclog setting (backblowing) is as follows:

- Opening of the unclogging valves every two seconds
- Unclogging pressure - 5 bar maxi

Removal

- 1 Open the side doors of the powder supply unit.
- 2 Unscrew the spindle.
- 3 Remove the pin from the clevis mounting on the filtration cabinet by lifting the assembly, which will allow you to pull out the cartridge.

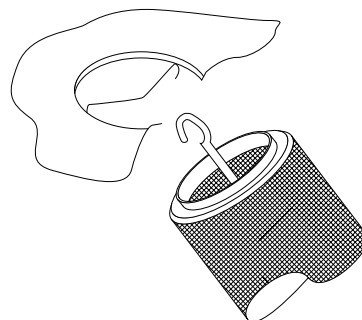
1	Filter cartridge
2	Pin
3	Seal washer
4	Closing spindle



DES00863

Installation

- Slide the support stem into the cartridge through the upper opening (the gasket side). The threaded part of the support stem passes through the bottom of the cartridge.
- Install the seal washer.
- Screw the spindle onto the pin (a few turns are enough).
- The hook at the top of the stem should be installed on the clevis pin located at the top of the filtration cabinet.
- Tighten the spindle, resting the cartridge on the seals until it is locked into place.



DES00825

6.2.2. Plunger cylinder

If the powder pump support plate is removed, it is essential to apply a "lock tight" product to the fastener threading.

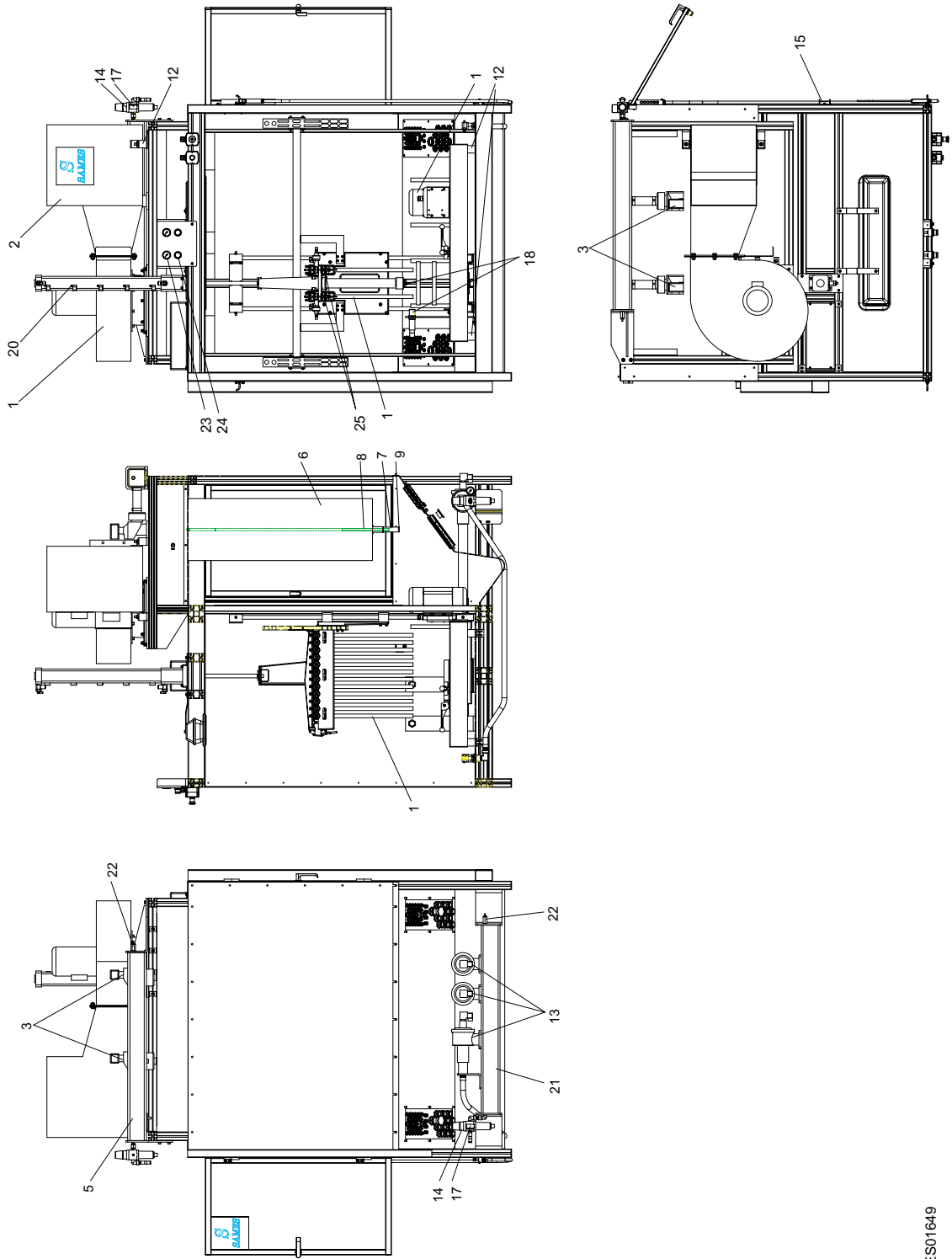
6.2.3. Troubleshooting

Problem	Probable cause	Solution
Insufficient airflow	Filter cartridges excessively clogged	Unclog using max. pressure setting (5 bar) and max. valve opening frequency (every 2 sec.)
		Replace the filter cartridges if unclogging on max. settings is not sufficient
Insufficient airflow and $\Delta P < 30$ mm WG*	The direction of rotation of the fan is reversed	Check the fan motor's electrical connection
Release of powder through the stack	Filter cartridge incorrectly installed	Re-install the filter cartridge correctly see § 6.2.1 page 29
	Filter cartridge in poor condition	Replace the damaged filter cartridge see § 6.2.1 page 29
	Filter cartridge seal in poor condition	Replace the filter cartridge seal see § 6.2.1 page 29
Sprayer does not spray powder	Powder container empty	Replace or refill the powder container
	The powder pump is plugged up	Dismantle the powder pump and clean it with compressed air
	The GNM100 is not on	Switch on GNM 100 or check its connection
The plunger carriage does not reach the raised position	Lift cylinder air pressure is too weak	Increase the air pressure using the pressure regulator (in the cabinet)
	Guide bushing is jammed	Clean, remove all traces of powder see § 6.1 page 28

* Water Gauge

For any service operation on a powder supply unit component (slideways, cylinder, fan, etc.), you should request the installation and/or removal procedures for those components from SAMES.

7. Spare parts



DES01649

For spare parts for the CS 127, [see RT Nr 6368](#)

Item	Part number	Description	Qty	Sales unit
1	900000093AT	Fan	1	1
2	1105155	Fan silencer	1	1
3	220000031AT	110 V Solenoid valve	2	1
4	F2SSIL014	Exhaust silencer	3	1
5	1203893	Unclogging air tank	1	1
6	753550	Filter cartridge - Width: 1000 mm	2	1
7	429867	Filter cartridge axle	2	1
8	735889	Spindle	2	1
9	F6NPLR610	Plug	2	1
10	see RT Nr 6368	CS 127 powder pump	24	1
11	K3VELE019AT	Vibrator 94 W – 3-phases	1	1
12	Q4BPGS054	Rubber blocks	6	1
13	220000032AT	110 V solenoid valve	3	1
14	R4DFCM047	3/8"regulator with filter and manometer	2	1
15	R7MCDL091	U-tube manometer	1	1
16	1308304	Venturi nozzle removal tool	1	1
17	R7MCAD122	Manometer.D: 40, 0 -10 bar	2	1
18	110000111AT	Capacitive sensor	3	1
19	1405215	Flat gasket	24	1
20	180000016AT	Sensor, cylinder stroke	5	1
21	1203903	Lower tank	1	1
22	F1SSRL020	Safety valve	2	1
23	R7MCAD061	Manometer 0 -10 bar	2	1
24	R4DREG029	Regulator	2	1
25	Q1FFER343	Grasshopper hook	2	1