





User manual

ISOCUBE Isolating cabinet

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Index revision : A

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Our company organises training courses providing the indispensable know-how for the installation and maintenance of our equipment all year long.

A catalogue is available on request. Select the training programme, type of learning method and skills you need from our range, to meet your production targets.

These training courses can be organised on the premises of your company or at the training centre located at our head office in Meylan.

Training service: Tel.: 33 (0)4 76 41 60 04 E-mail: formation-client@sames-kremlin.com

The symbol _____ means Warning important point.

SAMES KREMLIN SAS has drafted this operating manual in French and mandated English, German, Spanish, Italian and Portuguese translations.

The company declares reservations on all translations and refuses any liability with respect to these translated documents.

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1. Health and safety instructions

- This document contains links to the following operation manuals:
 - see RT Nr 6442 for the 100 kV short-circuiter.
 - see RT Nr 6440 for the installation guide for flammable conductor paint antenna.
 - See leaflet ref: 573 303 050 for the stirrer (option).

1.1. Marking



1.2. Simplified analysis of the potential sources of electric shocks

When non-flammable products (defined in standard NF EN 50348 appendix A) are used, the inflammation risk is by definition zero. However, these products contain large quantities of water which quickly store enough quantities of energy to cause electric shocks.

That is why the ISOCUBE insulating cabinet is equipped with systems to prevent this type of risk.

Potential source of elec- tric shock	Measures	Means applied
Voluntary or involuntary contact with the pump or the paint drum	Automatic earthing of all parts under HV if the door is opened	Time to implementation of security measures of less than 2 sec
Voluntary or involuntary contact with the sprayer	Limitation of the length of the product hose to 18 m max and the capacity of the product drum to maximum 60 l.	60I max for all the contain- ers which must be con- ductors and connected to the equipotential connec- tion (supplied)
	Prohibition of spraying of prod- ucts with a resistivity below 1000 Ω .cm.	
Incorrect earthing	The equipment must be earthed by means of at least 2 points: its electrical supply and a dedi- cated wire (supplied)	The operator must periodi- cally check the quality of the earthing outlets

1.3. Precautions during use

All operators must familiarise themselves with and understand the information in this document before using the **ISOCUBE** equipment. This information points out situations that can cause serious damage and indicates the precautions to be taken to avoid them.



WARNING : Before using the ISOCUBE equipment, be sure that all operators:

- have received preliminary training from **SAMES KREMLIN**, or from the distributors they have certified for this purpose.
- have read and understood the User Manual as well as all the rules for installation and use listed below.

It is the workshop manager's responsibility to ensure and check that all operators have read and understood the user manuals for peripheral electrical devices present within the spraying perimeter.

1.4. Warnings



WARNING : This equipment may be hazardous if it is not used, disassembled and reassembled in accordance with the rules indicated in this manual and in any applicable European Standard or national safety regulations.



WARNING : The good working order of this equipment is only under warranty provided that original spare parts distributed by **SAMES KREMLIN** are used. Only the components and accessories distributed by **SAMES KREMLIN** contained in this user manual may be used.



ARNING : This equipment is intended to spray non-flammable liquids.



WARNING : This equipment can only be integrated into spraying devices that are imperatively certified and marked in accordance with standard NF EN50348.

1.5. Installation rules

• The ISOCUBE insulating cabinet gun has been designed to operate within a 2nd-degree pollution environment, as defined according to standards IEC 60664-1 and IEC 61010-1:2010.

2nd-degree pollution: under normal use conditions, only non-conductive type pollution arises. On a temporary basis, conduction caused by condensation may arise.

- The ISOCUBE insulating cabinet must be installed indoors; outdoor installation is strictly prohibited.
- The electrostatic projection equipment can only be used in designated projection spots in accordance with Standard EN 16985 or under equivalent ventilation conditions.
- This equipment must not be used in a cab or an application room for solvent-based paints, flammable liquids or ones which form explosive atmospheres.
- The use of this equipment in a work area for the application of electrostatic flammable products or ones which form explosive atmospheres is dangerous.
- Install the isolating cabinet away from any explosive zone.
- Servo-control the isolating cabinet to the "on" position of the booth's suction fan.
- Connect the generator to the installation's earth terminal and to the electro-pneumatic box.
- The product supply system and the sprayer must be connected directly to the high voltage.
- The container of the spray product must be electrically conductive (metal) and be connected to the circuit by the alligator clip.
- Connect all metal parts of the installation (paint pumps, containers, stools, spin coaters, etc., which positioned within three meters of the sprayer to the ground.
- Keep the spray zone clean and free of all unnecessary components.
- There must be an antistatic floor (unclad concrete flooring or a metal grating) in the spraying area. Never cover the floor with an insulating covering. In potentially explosive locations, the floor assemblies must be antistatic, in accordance with Standard EN 61340-4-1.
- The use inside the booth of an uncovered flame, any incandescent object, a device or object capable of generating sparks other than the sprayer is strictly prohibited.
- It is also prohibited to store in the vicinity of the booth or in front of the doors flammable products or containers in which such products had been stored.
- The jars and cans containing paint or solvent must be systematically closed after use.
- Inside an explosive zone, it is prohibited to use electrical or non-electrical equipment that has not been certified, like electrical extension cables, surge protector power bars, switches, etc.

1.6. Rules of use

- Verify the extraction ventilation system efficiency on a daily basis.
- Once a week, verify the adequate operations of the ventilation system servo controls.
- Correctly ground all metal parts of the booth, along with the parts to be painted. The resistance relative to the ground must be less than or equal to $1M\Omega$ (for a 500-V voltage measurement). This resistance must be regularly checked and, in any case, at least once a week.
- Ensure that anyone entering the spray zone is wearing the antistatic shoes in accordance with standards EN 61340-4-3 and ISO 20344. The measured insulation resistance must not exceed 100M $\!\Omega$
- The protective clothing intended to be worn, including gloves, must be compliant with Standard EN 1149-5. The measured insulation resistance must not exceed $100M\Omega$
- Using personal protective equipment will limit the risks from contact and/or inhalation of toxic products, gases, steam, mist and dust which may be created by the use of the equipment. The operator must following the coating product manufacturer's recommendations.

- The device can only be operated if it is in perfect condition. Any damaged equipment must be immediately removed from active service and repaired. Worn parts must be immediately replaced.
- Closely follow use guidelines for the paints and solvents being applied (e.g. wear a mask).
- Close and purge both the air and paint inlet prior to any extended equipment downtime.
- Before any cleaning or maintenance operation, discharge the equipment to earth (the discharge is done automatically if the door is open).
- Verify the good working order of the paint hose prior to any equipment start-up.

1.7. Maintenance rules

- Regularly maintain and repair the electrostatic projection equipment according to the instructions contained in this user's manual.
- Only use metal containers to hold the cleaning liquids and connect to ground according to a safe procedure.
- Before any maintenance procedure:
 - 1 Power down the generator.
 - 2 Dump the paint circuit.
 - 3 Verify that the air and paint circuits are no longer pressurised.
 - 4 All energy sources must be locked out.
- Clean the equipment either in their dedicated spots with mechanical ventilation or by using cleaning liquids with a flash point at least 15°C higher than ambient temperature.
- Use non-flammable cleaning products.



WARNING : It is strictly prohibited to use solvents derived from halogenated hydrocarbons as well as products containing these solvents in the presence of aluminium or zinc. Failure to comply with these guidelines exposes the user to the risks of explosion.

2. Description

This equipment is designed to be used in a water-based or water-thinnable hydrosoluble paint or varnish application system. The liquids sprayed must be non-flammable and conductive to electricity.

To apply paints of this type electrostatically, the most simple and most effective way is to place the liquid under high voltage, and electrically isolate the paint supply system.

The ISOCUBE isolating cabinet (Rep. 1) consists of:

- An electro-pneumatic box (Rep.2).
- A 100kV short-circuiter (Rep. 3) located on the top of the cabinet,
- A stirrer (option).

And enables the integration of:

- A generator,
- An external emergency stop,
- Two sprayers operating automatically, fixed on supports or guided by reciprocating systems and each equipped with an 18 m product hose,
- A pneumatic piston pump to supply the two sprayers.

The ISOCUBE cabinet is equipped with safety systems that protect the operator against electrical shocks, by blocking access to the parts under high voltage. It is also equipped with a general air valve that can be padlocked (Rep. 4).



2.1. Overview front face



Rep.	Designation
1	Main switch (lockable)
2	On / off button (green)
3	Air supply pressure
4	Pressure flow regulator
5	Pressure pump power supply
6	Stirring supply pressure
7	Emergency stop
8	Voltage presence white LED indicator

3. Characteristics

ootprint (W x H x P) 1100 x 1640 x 650			
Mass	140 Kg		
Maximum operating altitude	2,000 m		
Min/max ambient temperature	5°C - 40°C		
Maximum relative humidity of 80% for temperatures of up to 31°C, then linear decrease until 50% relative humidity at 40°C	Maximum of 80% without condensation		
Operating voltage	100 kV maximum		
Maximum current	500 µA max.		
Electrical power supply: - Voltage - Frequency - Max. power consumption (50 VA power supply module + generator)	Europe version 230 V ± 10% 50 -60 Hz 200 VA	CSA Version 110∨ ± 10% 50 -60 Hz 200 ∨A	
Voltage surge	Category II overvoltage according to standard IEC 61010-1:2010		
Compressed air pressure	7 bars (101 psi) ±0.5 bars		
Max. air flow	Depends directly on the typ flow	be of pump and the product	
Product viscosity	Depends on the product us	sed	
Max. product flow	According to the viscosity of product (*) and according	and the thixotropy of the to the pump	
Products	Non-flammable paints with a resistivity that must be between 1kΩ.cm and 250 kΩ.cm. (**). WARNING : Not appropriate and also dangerous for the solvent-based paints, resistive liquids and flamma- ble liquids that form explosive atmospheres.		

(*) - The measurement of the viscosity of a water-soluble paint using a consistometric cup leads to very significant errors. In effect, these paints are thixotropic: their viscosity decreases with the intensity of agitation and with the time for which they are stirred. At rest, these paints are highly viscous substances; in contrast, in movement, they become not very viscous substances. The viscosities shown are indicative for paint stirred just before being measured with a cup. (**) - Any other use is prohibited

3.1. Characteristics of the compressed air

Required characteristics of the compressed air supply according to Standard NF ISO 8573-1

Characteristics	Value
Maximum dew point at 6 bar (87 psi)	Category 4, i.e. +3°C (37° F)
Maximum particle size distribution of the solid pollutants	Category 3 i.e. 5 mm
Maximum oil concentration	Category 1, i.e. 0.01mg / m ₀ ³ *
Maximum concentration of solid pollutants	5 mg / m ₀ ³ *

(*): The values are given for a temperature of 20°C (68°F) at atmospheric pressure.

4. Use

4.1. Transport and Handling

The ISOCUBE insulating cabinet is delivered in a case that can be handled using a forklift truck or pallet truck.

Once out of its packaging, the cabinet is handled using the forklift truck or the pallet truck, but also using straps through the four holes on the sides of the cabinet.



4.2. Installation

- The ISOCUBE isolating cabinet must be installed and used outside of any explosive area.
- The emergency stop must be free to access in order to facilitate any manoeuvres.
- Ensure the correct earth connection of the parts to be painted (open electrical connection of the electrical earthfeeder, cleanliness of the metal suspension hooks).
- Be sure to maintain this good connection the whole time. Ensure that the suspension hooks are frequently stripped.
- The elements of the ISOCUBE cabinet (electro-pneumatic box, security systems) are delivered connected.
- Connections of the cabinet:
 - Connect the earth of the cabinet using the earth wire fitted with a terminal.
 - Connect the compressed air inlet hose (customer supplied) (3/8" BSP female, Ø 8 interior, length 10 m maximum) to the supply valve.
 - Connect the AC power cord to the electrically adapted network (the supply voltage is indicated on the nameplate located on the cabinet).

Note: the ymbol means "Caution Possibility of electric shock".

4.3. Equipment to be connected by the user



WARNING : The connection of the equipment to the ISOCUBE cabinet by the user must conform to standard NF EN 50348.

4.3.1. Generator connection

Electro-pneumatic box



Cable gland at the rear of the box

Power supply cable Ge connection ne

Generator cable connection

X1 terminal

- Step 1: Run the power supply cable for the generator through a 1st cable gland, then connect it to terminals X1.3 and X1.4
- Step 2: Run the generator cable through a second cable gland, then connect it to terminals X1.5 and X1.6
- 4.3.2. Connection of the cabinet to the installation's general safety loop

X2 terminal Bridge

- Step 1: Run the general safety loop cable through one of the cable glands at the rear of the box.
- **Step 2:** Replace the bridge between terminals X2.1 and X2.2 by connecting a general safety loop dry contact.



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4.3.3. Connection of a pump

• Step 1: Attach the pump to the plate provided for the purpose at the bottom of the cabinet.



• Step 2: Connect the compressed air hose to the quick coupler D:10.



Pump air supply

- 4.3.4. Connection of the sprayer(s)
 - Connect the two painting hoses via the two cable glands provided for this purpose. If a single sprayer is connected, the second cable gland is replaced by a plug.



- 4.3.5. Connection of the product regulator
 - A product regulator control may be connected to the "TR3" quick coupler D:4 at the back of the electro-pneumatic box.



TR3 Quick coupler

- 4.3.6. Connection of the high voltage
 - Step 1: Run the generator's high voltage cable through the cable gland in the top left.
 - Step 2: Connect the generator's high voltage cable to the body of the pump at the link for all the equipotential links.
 - Step 3: Connect the high voltage cable present in the Isocube cabinet from the short-circuiter to the body of the pump at the link for all the equipotential links.
 - **Step 4:** Connect the paint points to the pump body at the link for all the equipotential links using an equipotential wire and the alligator clamp provided.



HV cable short-circuiter

HV cable generator



4.4. Installation of the stirrer (option)

• Step 1: Attach the stirrer to the edge of the product drum or on the edge of the receptacle.

• Step 2: Connect the black equipotential wire to the body of the pump at the link for all the equipotential links.





HV cable short-circuiter

Ventilation



• Step 3: Connect the compressed air hose to the quick coupler D: 8 in the top left of the cabinet.

Location Pump air supply Stirrer connection HV cable generator

4.5. Start-up

WARNING : The complete start-up is done by "double clicking" the green button.



The first press triggers the compressed air supply available for the pump and the regulator and the ventilation of the cabinet.

This makes it possible fill, flush and/or dump the product circuit quickly, and this action is functional even if the door is open or unlocked.

The second press triggers the electricity supply for the generator and the compressed air supply for the short-circuiter and the stirrer. The ISOCUBE is then ready to operate. If the door is left open or not locked, this second press has no effect.

4.5.1. Placement of the paint drum

- Place the paint drum on the receptacle in the isolating cabinet, covered in its cover. It is important to put the cover on to avoid the hose coming out under the effect of the pressure of the product.
- Make sure that there is no product dripping onto the receptacle for the drum.

4.5.2. Ventilation **Check the internal ventilation**:

- Power up the ISOCUBE cabinet. Press the green button once. Open the door.
- Place a finger on the ventilation outlet in the top left of the cabinet. A slight breath of air must be perceived (pressure 0.1 bar +0.1 -0).

Booth ventilation: see § 1.5 page 6 paragraph 3.



Ventilation

4.6. Work on the inside of the isolating cabinet

You only have to unlock and open the door, and all energies are cut with the exception of the compressed air which supplies power to the pump, the regulator and the cabinet ventilation. All of the parts taken to high voltage are earthed in 0.8 secs. Complete discharge occurs after 2 secs with a good quality earth link.

The product circuit (pump and regulator) remains under pressure and powered, which allows you to perform the dumping and rinsing operations.

To restart, lock the door and then press (single-click) on the green button.

4.7. Emergency stop

The emergency stop switches off all the energies. However, residual pressure may remain in the product circuit (between the pump outlet and the sprayer).

After disarmament of the emergency stop, a double-click must be done on the green button to restart.

When the cabinet is connected to the general installation safety loop, the installation's emergency stop becomes active for the whole installation.

The electro-pneumatic box's emergency stop is only active for the spraying (high voltage + pump).

4.8. Shutting down the cabinet

Turn the knob of the disconnector 90° anti-clockwise. Close the air supply valve.

5. Cleaning

Before any operation on the insulating cabinet, refer to the Health and Safety instructions (<u>see § 1.4</u> page 5).



- The ISOCUBE equipment cleaning operations must conform to standard NF EN 50348.
- Before any maintenance operations, discharge the equipment to the earth (by opening the door of the ISOCUBE), disconnect the AC power cord, dump the product from the hoses (cut off the air supply and dump the air).

5.1. Ongoing maintenance

- It is very important to maintain the ISOCUBE In a perfect state of cleanliness (without dripping product).
- Operate in a well ventilated and explosive-proof area, with the generator out of service. Dry the cleaned areas well before restarting.
- The interior of the cabinet is designed to remain dry and clean. If a fluid leak occurs, clean it up. Search for the causes of the leak and repair them.
- Regularly check the earth connection of all of the booth's mechanical parts and the parts to be painted. The earth resistance must be lower than or equal to 1 M Ω (500 V measurement voltage).
- Operate with a multimeter in the ohmmeter position between the earth terminal of the ISOCUBE and the earth terminal of the electrical socket on the power cord. The value must not exceed 2 Ω .

5.1.1. Insulating cabinet

The use of a low or high pressure water spray is prohibited (except for the receptacle see § 5.1.1.3 page 21).

Clean with water or with a non-aggressive, non-greasy, non-flammable solvent. Do not use butyl-glycol.

5.1.1.1. External part except electro-pneumatic strip

- Clean with a cloth soaked in water or non-aggressive, non-greasy and non-flammable solvent. Do not use butyl-glycol.
- Dry the non-accessible parts (door hinges for example) with a dry cloth and/or compressed air under moderate pressure (max. 2 bars - 30 psi).

5.1.1.2. Internal part

- Clean with a cloth soaked in water or non-aggressive, non-greasy and non-flammable solvent. Do not use butyl-glycol.
- Dry very carefully with compressed air, particularly in difficult to access or inaccessible areas with a cloth. Finish drying the large surfaces with a perfectly dry cloth.
- Pay specify attention to drying the following points:
 - The interior surface and the door frame, including and especially the metal frame.
 - The bottom of the cabinet and over a height of at least 300 mm to 400 mm.
 - The receptacle

5.1.1.3. Receptacle

- The receptacle may be cleaned when it is outside the cabinet using a pressurised water spray (max. 130 bar, temperature 40°C).
 If using a rotating nozzle, make sure you do not damage the surface of the equipment, which would make it increasingly difficult to clean over time.
- Dry very carefully with compressed air on all the surfaces, particularly the edges and cavities.
- 5.1.2. Electro-pneumatic strip
 - Clean with a cloth soaked in water. If there is heavy dirt, the front and the windows of the air pressure indicators may be cleaned with a cloth soaked in water or non-aggressive, non-greasy and non-flammable solvent. Do not use butyl-glycol.

In this case, make sure that the solvent does not come into contact with the electric buttons and lights, or with the pressure regulator buttons or with the front panel's metal sheet.

• Dry by wiping with a dry cloth. While compressed air is not prohibited, it must only be used at moderate pressure (max. 2 bars - 30 psi) on this part of the cabinet.

6. Maintenance

Detail	Preven- tive measure	Correc- tion	Dura- tion	Frequency			
Short circuiter 100 kV							
see RT Nr 6442							
Replacement of the electro-pneu- matic box fuse*		Х	5 mn	-			

* Fuse characteristics: 10*38 500V 4A class gG.

7. Common malfunctions and repairs

Symptoms	Possible causes	Troubleshooting
	More the product in the tank.	Fill it.
The spray product does not come out, or does it in jerks.	Bad adjustment of the "pump air" pressure of the regulator.	Adjust the pressure of the feed with the dedicated pressure regulator.
]	Viscosity of the coating prod- uct too high.	Dilute it.
The pump will not start	Lack of air supply	Check the air supply to the pump
The generator does not deliver high-voltage.	Door open	Close the door, press the green button
A lot of current will flow through the generator, or	Leakage or soiling in the compartment of the tank and the pump.	Remove the causes of the leak, clean and dry the dirty parts.
it disconnects.	Short circuiter defective.	Check its operation, then repair and replace it if necessary.
Noise from jerky air dump- ing when the equipment is pressurised.	Air pressure of network too high.	Adjust it to 7.5 bar maximum.
The operator feels electric shocks when he removes the tank from the ISOCUBE	Sensor for closure of the door defective.	Check the action of the sen- sor on the short circuiter. Replace it if necessary.
cabinet.	Short circuiter defective.	Check its operation; repair or replace it if necessary.
Incorrect operation of the	Pneumatic motor is defective	Repair or replace if necessary
stirring (option)/supply sys- tem for the sprayer.	Pressure regulator at zero or defective	Increase the pressure Replace if defective.

8. Spare parts

8.1. ISOCUBE Europe version - 220 V



Rep.	Reference	Designation	Qua ntity	Unit of sale	Spare parts level (*)
	910027658	ISOCUBE	1	1	-
1	-	ISOCUBE cabinet equipped (see § 8.3 page 25)	1	-	-
2	-	Electro-pneumatic box	1	-	-
	Not represented				
3	149220760	Stirrer (<u>see § 8.4 page 27</u>)	Option	1	2

(*) Level 1: Standard preventive maintenance

Level 2: Corrective maintenance.

Level 3: Exceptional maintenance.

8.2. ISOCUBE US-CSA version - 110 V



Rep.	Reference	Designation	Qua ntity	Unit of sale	Spare parts level (*)
	910028401	ISOCUBE	1	1	-
1	-	ISOCUBE cabinet equipped (see § 8.3 page 25)	1	-	-
2	-	Electro-pneumatic box	1	-	-
Not represented					
3	149220760	Stirrer (<u>see § 8.4 page 27</u>)	Option	1	2

(*) Level 1: Standard preventive maintenance

Level 2: Corrective maintenance.

Level 3: Exceptional maintenance.

8.3. ISOCUBE cabinet equipped



Rep.	Reference	Designation	Qua ntity	Unit of sale	Spare parts level (*)
	-	ISOCUBE cabinet equipped	1	-	-
1	X9SVSY335	Chc M10x50 nylon screw containing fibre- glass	8	1	1
2	X9SEHU010	H M10 nylon nut containing fibreglass	12	1	3
3	110002606	Safety switch	1	1	3
4	X9SVCB121	C M 4x16 nylon screw containing fibreglass	4	1	1
5	110001738	Alligator clip 20A	1	1	3
6	110002187AT	Cable gland	1	1	3
7	910019962	Short circuiter 100 kV (<u>see RT Nr 6442</u>)	1	1	3
8	110000110AT	Cable gland	2	1	3
9	F6RLQF193	Ringed socket	1	1	3
10	900015128	Isolating terminal enclosure	1	1	3
11	F1RBTU073	Ball valve	1	1	3
		Not represented			
	U1CBBT117	Polyamide hose D: 2.7/4	2.5	m	3
	U1CBBT001	Polyamide hose D: 4/6	1.5	m	3
	U1GLBT142	Polyurethane hose D: 5.5/8	1	m	3
	U1GLBT133	Polyurethane hose D: 7/10	2.5	m	3
	910027659	HV cable 100 kV	1	1	2
	842635	Ground cable (length: 5m)	1	1	3

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

Level 3: Exceptional maintenance.

8.4. Fitted stirrer (option)



Rep.	Reference	Designation	Qu anti ty	Unit of sale	Level Spare parts (*)
	149220760	Fitted stirrer	-	1	2
1	539280102	Blue polyurethane hose D.:6x8	1	m	3
2	049220700	Stirrer <u>(see leaflet Ref.: 573 303 050</u>)	1	1	3
3	552486	Female/female sleeve	1	1	2
4	905120904	Straight coupler	1	1	3
5	149220750	ISOCUBE stirrer bracket	1	1	3
6	E4CSPR085	Pre-isolated terminal	2	1	3
7	E2AAMB007	Black wire 6mm ²	1	1	3

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

Level 3: Exceptional maintenance.