



# User manual

## Inobox Control module

**SAMES KREMLIN SAS** - 13, Chemin de Malacher - 38240 MEYLAN - FRANCE  
Tel. 33 (0)4 76 41 60 60 - [www.sames-kremlin.com](http://www.sames-kremlin.com)

All communication or reproduction of this document, in any form whatsoever and all use or communication of its contents are forbidden without express written authorisation from **SAMES KREMLIN**.

The descriptions and characteristics mentioned in this document are subject to change without prior notice.

© **SAMES KREMLIN 2019**



**WARNING** : **SAMES KREMLIN SAS** is registered with the Ministry of Labour as a training institution.

Throughout the year, our company offers training courses in the operation and maintenance of your equipment.

A catalogue is available on request. Choose from a wide range of courses to acquire the skills or knowledge that is required to match your production requirements and objectives.

Our training courses can be delivered at your site or in the training centre at our Meylan head office.

Training department:

Tel. 33 (0)4 76 41 60 04

E-mail: [formation-client@sames-kremlin.com](mailto:formation-client@sames-kremlin.com)

**SAMES KREMLIN SAS** operating manuals are written in French and translated into English, German, Spanish, Italian and Portuguese.

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

# Inobox

## Control module

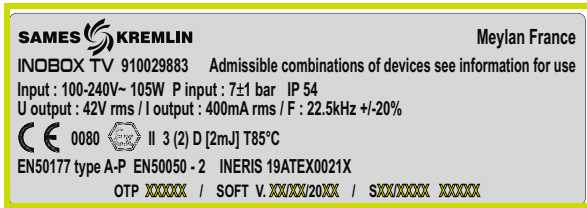
1. Health and safety instructions-----	5
1.1. Marking .....	5
1.2. Precautions for Use .....	6
1.3. Warnings .....	6
2. Introduction -----	7
3. Characteristics -----	9
3.1. Mechanical characteristics .....	9
3.2. Electrical characteristics .....	10
3.3. Air compressed quality .....	10
4. Operating principle of the Inobox -----	11
4.1. Pneumatic Connections .....	11
4.2. Electrical and Signal Connections .....	12
4.3. Starting .....	13
4.4. Functions available from the Inobox control module ...	13
5. Use of the various menus of the Inobox control module-----	14
5.1. Start screens .....	14
5.2. Screen 1: Operating Modes Screen .....	16
5.2.1. Choice of presets .....	16
5.3. Screen 1: Custom mode screen .....	17
5.4. Screen 2: Setting of electrode supply air and fluidizing air	18
5.5. Screen 3: Counter Alarm Screen .....	19
5.6. Screen 4: Cleaning screen .....	20
5.7. Screen 5: Ecran Présence Défauts .....	21
5.8. Parameter setting screens .....	22
5.8.1. Access to the parameter setting screens.....	22
5.8.2. Password Input Screen .....	22
5.8.3. Parameter setting screen 1: Equipment operating time ...	23
5.8.4. Parameter setting screen 2: Fault History Screen .....	24
5.8.5. Parameter setting screen 3: Active cleaning phase .....	25
5.8.6. Parameter setting screen 4: Parameter setting Locking /	
Unlocking setpoints .....	26
5.8.7. Parameter setting screen 5: Time Delays .....	27
5.8.8. Parameter setting screen: Contrast and Communication	
Configuration (a CAN link is used) .....	28
5.8.9. Access code modification screen for parameter setting	
screens .....	29
5.9. Standby Screen / Factory Reset screen .....	30
6. Connections -----	31
6.1. CAN Inputs / Outputs connector .....	31
6.2. Vib / Smoke connector .....	31
6.3. 100 / 240 VAC power supply connector .....	31

6.4. Low voltage connector to Inogun A projector or Inogun M spray gun .....	31
7. Cabling - Connector Inputs / Outputs -CAN-----	32
8. High voltage-----	33
8.1. Characteristics of spray gun output voltage and current	33
9. Fault management-----	34
9.1. Faults list .....	34
9.2. Actions following a fault .....	36
10. Communication with the PLC in CAN-----	37
10.1. Characteristics .....	37
10.2. Data exchange .....	37
10.2.1. From CAN to the Inobox module .....	37
10.2.2. From Inobox to a CAN module.....	39
11. Spare parts list-----	41
12. Revision index History-----	42

# 1. Health and safety instructions

## 1.1. Marking

The Inobox control module is intended to be installed in category II (according to EN 61010-1).



This marking indicates that this control module is associated equipment that can be installed in zone 22 and which contributes to the safe operation of the Inogun M or Inogun A equipment installed in EXplosible ATmosphere connected to it. The operation of the equipment is stipulated in the operating manual of the projector or spray gun.

The X sign behind the EU type examination certificate number indicates that:

- this equipment is subject to a special condition of use concerning the ambient temperature of use which must be between 0°C and 40°C.

## 1.2. Precautions for Use

This document contains information that all operators should be aware of and understand before using the Inobox control module. This information highlights situations that could result in serious damage and indicates the precautions that should be taken to avoid them. .



**WARNING :** Before any use of the Inobox control module, check that all operators:

- have previously be trained by the compagny **SAMES KREMLIN**, or by their distributors registered by them for this purpose.
- have read and understood the user manual and all rules for installation and operation, as laid out below.

**It is the responsibility of the operators' workshop manager to ensure these two points and it is also his responsibility to make sure that all operators have read and understood the user manuals for any peripheral electrical equipment present in the powdering area.**

## 1.3. Warnings



**WARNING :** This equipment can be dangerous if not used in compliance with the safety regulations.



**WARNING :** It is the customer's responsibility to verify which local fire and safety standards are applicable for use of the Inobox.

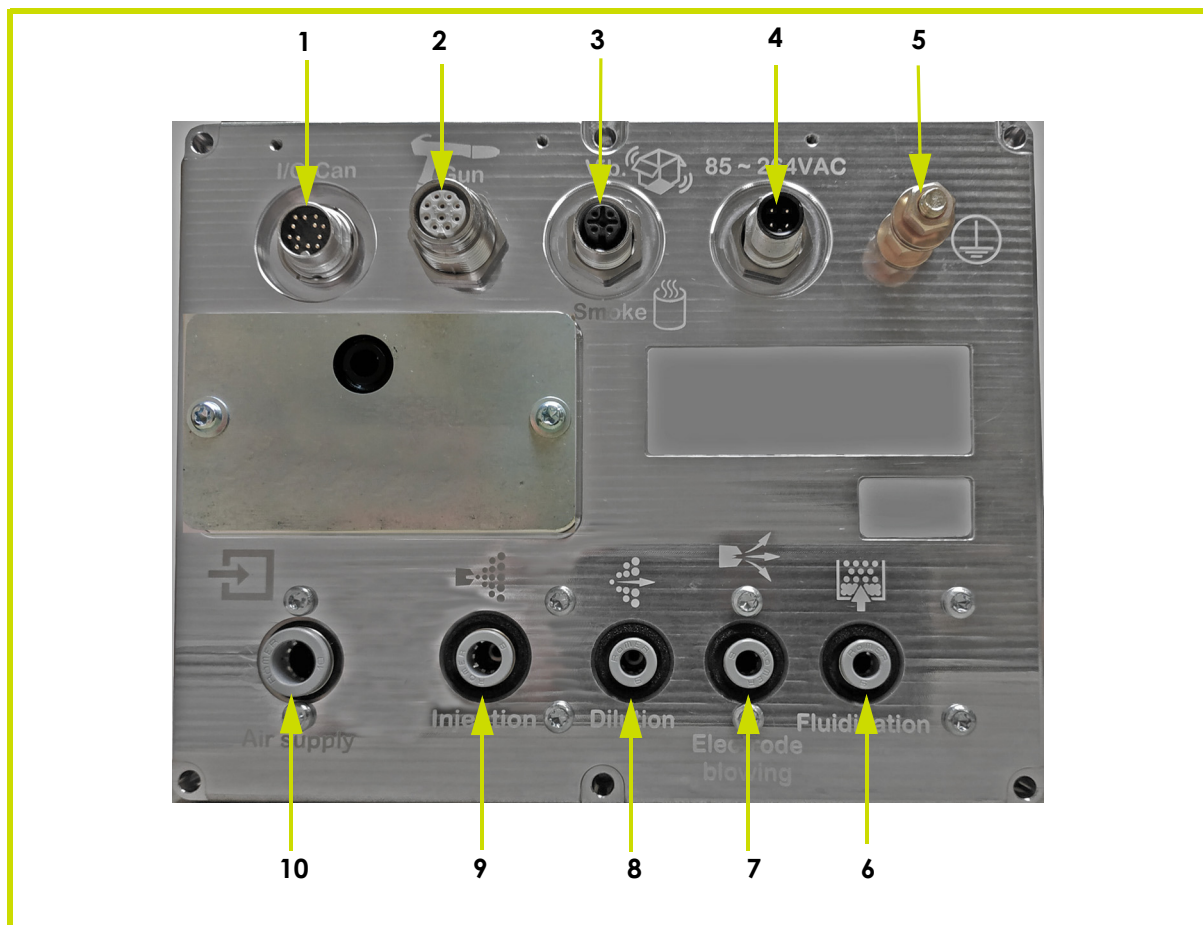


**WARNING :** This equipment may be hazardous if it is not used, disassembled and reassembled in accordance with the rules indicated in this manual and in any applicable European Standard or national safety regulations.

- The Inobox control module must not be installed outdoors.
- The ambient temperature around the Inobox control module must be no greater than 40°C.
- The Inobox module must not be altered from its original condition.
- Only **SAMES KREMLIN** spare parts, or a repair performed by the **SAMES KREMLIN** repair department, are able to ensure and guarantee the operational safety of the Inobox module.
- Turn off the electrical power supply to the Inobox module before disconnecting the connectors from the module.
- Any repairs on the Inocontroller module with the power supply still on can only be performed by personnel certified and trained for electrical repairs.



**Presentation of the Rear Panel:**



Item	Description
1	PLC connection
2	Spray gun connection
3	Vibration connection for a vibrating table
4	Power supply + 100 - 240 VAC
5	Earth connection terminal
6	Fluidization air outlet
7	Blowing air outlet
8	Dilution air outlet
9	Injection air outlet
10	Air supply

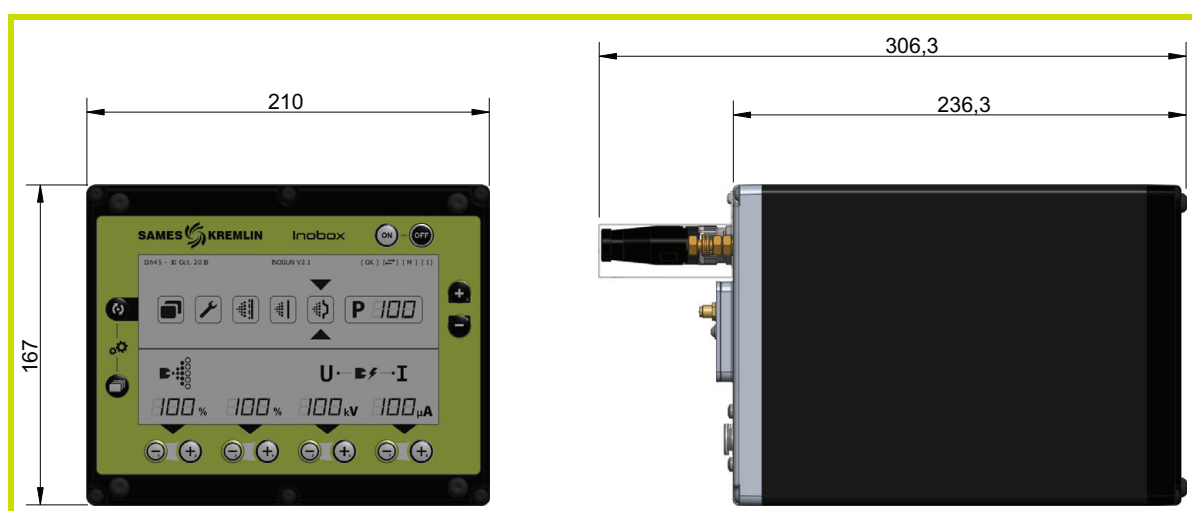


### 3. Characteristics

#### 3.1. Mechanical characteristics

Dimensions	Width 210 mm x height 167 mm x depth 236.3 mm (without connector )
Weight	3.9 kg
Protection index	IP64 - Degree of pollution: 2 <sup>(1)</sup>
Box material	Aluminium
Ground shield	Brass stud M6
Fastening mode	On cart or on rails

(1) : Level 2: Pollution either non-conducting or occasionally and temporarily conducting caused by condensation.



Ambient temperature during operations	0° C min. - 40°C max.
Maximum storage / transport temperature	70°C max.
Maximum relative humidity	93% (4 hours)
Maximum altitude	2000 m



**WARNING :** The control module must be correctly connected to the earth of the installation by a cable or metal braid with a cross-section of 6mm<sup>2</sup> or greater. The electrical earth contacts must be free of paint or any form of surface with a greater or lesser degree of insulation.

### 3.2. Electrical characteristics

Supply voltage	100 VAC to 240 VAC / 47 Hz - 63 Hz
Maximum Input Power (*)	105 W @ 240 VAC
Maximum current	0.56 A @ 230 VAC / 0.95 A @ 115 VAC
Protection circuit	Fuse 1.25A 5x20 HPC
Max. output voltage	42 V rms
Max. output current	400 mA rms
Maximum frequency (to projector)	22.5 kHz +/-20% (min. 18 kHz / max. 30 kHz)
Maximum pressure supply	7bars +/-1bar

(\*): The maximum power value is given all active functions simultaneously. (HV and Air).

### 3.3. Air compressed quality

Characteristics of compressed air supply according to the 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 <sup>3</sup> *
Maximum concentration of solid pollutants	Class 3 i.e 5 mg/m <sup>3</sup> *

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

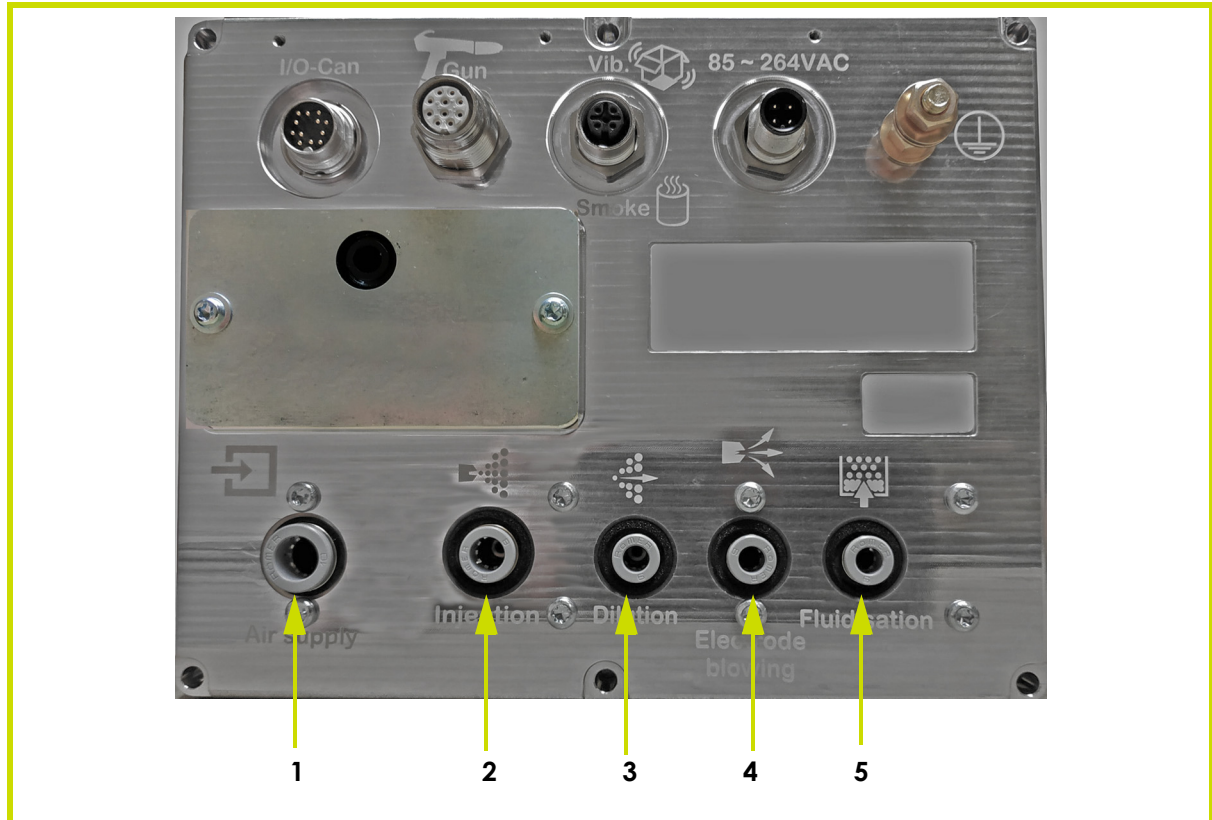


**WARNING** : Non-compliance with these characteristics may result in incorrect operation of the "Inobox" control module.

## 4. Operating principle of the Inobox

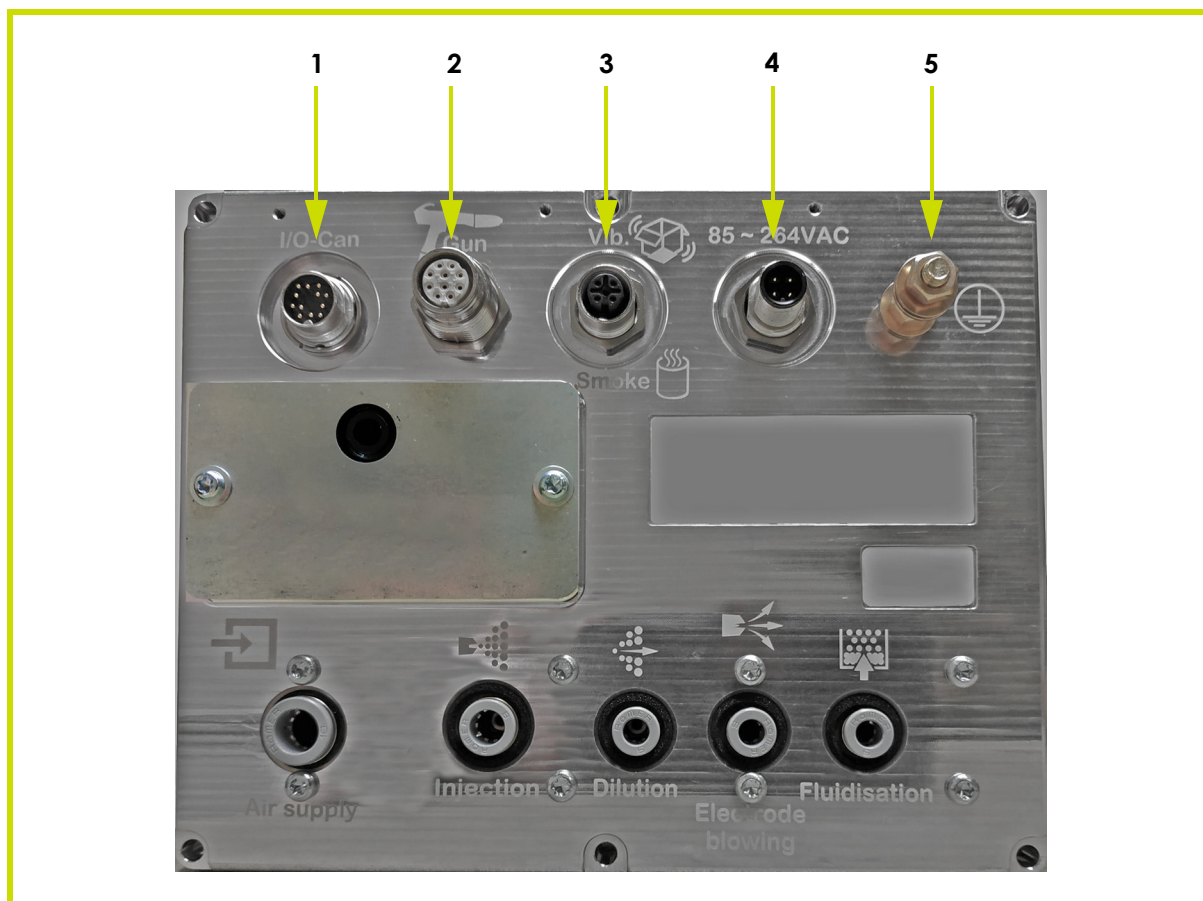
The Inobox control module manages the spraying air (injection, dilution, electrode blowing and fluidization) which allows the powder supply to the Inogun M spray gun.


### 4.1. Pneumatic Connections



Item	Icons	Description	Characteristics
1		Air supply	Hose Dia: 8/10 polyamide
2		Injection air outlet (to CS 130 powder pump)	Hose D: 6/8 polyamide
3		Dilution air outlet (to CS 130 powder pump)	Hose D: 4/6 polyamide
4		Blowing air outlet (from electrode Inogun A or M)	Hose D: 4/6 polyamide
5		Fluidisation air outlet (To the box or plunger tube on the cart)	Hose D: 4/6 polyamide


## 4.2. Electrical and Signal Connections



Item	Icons	Description	Characteristics
1	I/O- Can	Connection to a PLC	Coded female connector (12-pin)
2	Gun	Low voltage cable to spray gun or projector	Coded male connector (10-pin)
3	Vib / Smoke	Vibrator connection on vibrating table	Coded male connector (4-pin)
4	85 ~ 264 VAC	Inobox module power cable	Coded female connector (4-pin)
5		Metal cable or braid equipped with a clamp for grounding the Inobox	Section greater than or equal to 6 mm <sup>2</sup> .

### 4.3. Starting

- Connect the peripheral equipment (spray gun or projector, powder pump, PLC, vibrator, etc.) ([see § 4.2 page 12](#)).
- Connect the air and fluid supplies([see § 4.1 page 11](#)).
- Connect the mains plug to the control module ([see § 4.2 page 12](#)).

The control module can then be started by pressing the key 

The control of the Inobox module is done through the different screens or with the help of a PLC in the case of a CAN connection.

#### Remarks:


If the spray gun is not connected when the module is switched on, the control module will wait (see start screen) until a piece of equipment is connected to it.

### 4.4. Functions available from the Inobox control module

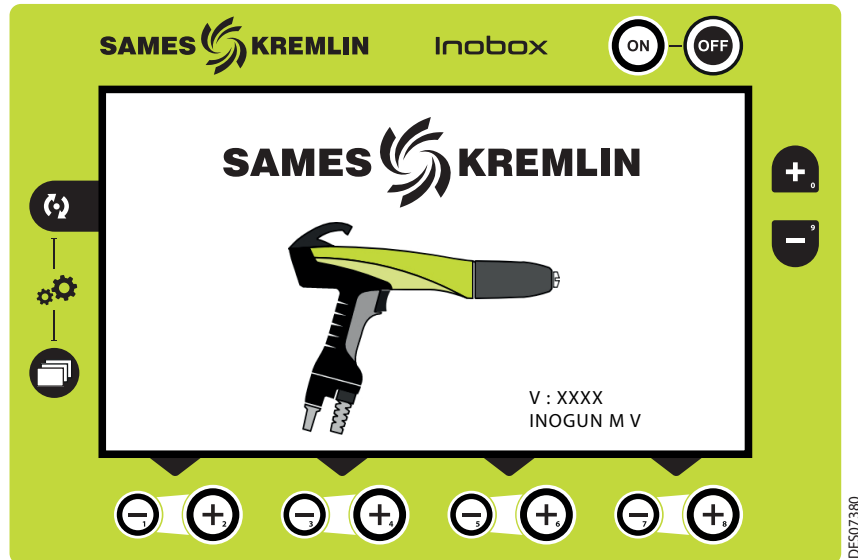
The control module allows the display of the various operating parameters (voltage, current, powder flow rate, etc.) and their settings by means of the various keys available on the front panel of the module.

## 5. Use of the various menus of the Inobox control module

### 5.1. Start screens

When the module is switched on by pressing the key , one of the following three welcome screens appears:

- The Inobox is connected to a Inogun M spray gun.



Then after a few seconds the Inobox automatically switches to the next screen.

- The Inobox is connected to a Inogun A projector.



Then after a few seconds the Inobox automatically switches to the next screen.

- The Inobox is not connected (neither to an Inogun A projector nor to a manual gun).



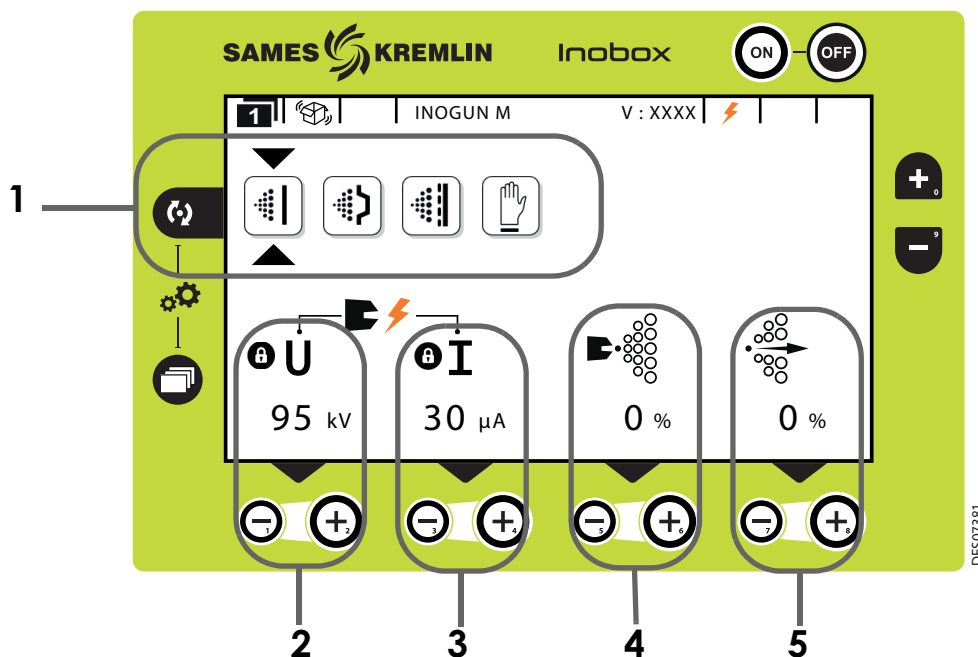
The module did not recognize the equipment to which it is connected (manual gun or automatic projector) or that no equipment is connected.

It is therefore necessary:

- 1 Switch off the module
- 2 Check connections.
- 3 Switch the module back on.

## 5.2. Screen 1: Operating Modes Screen

This screen is used to enter the various operating setvalues in the operating modes:



Area	Description
Area 1	Choice of presets, 4 modes are available
Area 2	Voltage setting ( available only in custom mode)
Area 3	Current setting ( available only in custom mode)
Area 4	Setting the injection air or powder flow rate
Area 5	Setting the dilution or transport air

### 5.2.1. Choice of presets

To select the different icons, press the key



Simple parts	Complex parts	Over-powder coating parts	Custom mode

The voltage and current values of the first 3 modes are preset, the setting is locked.

In the custom mode, the voltage and current values can be adjusted using the and keys below the value to be changed.

The injection and dilution parameters can be adjusted for each type of part using the corresponding and keys.

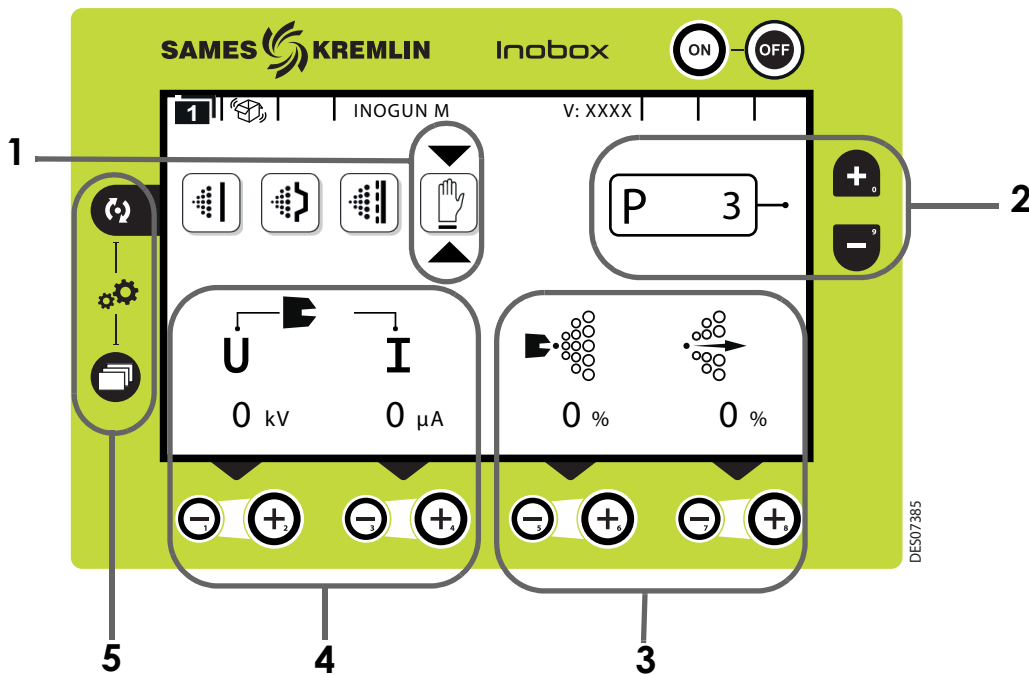


**WARNING :** When spraying is in operation with voltage at the output, the symbol flashes. The voltage and current settings can no longer be changed.



### 5.3. Screen 1: Custom mode screen

This screen allows to enter the set values for using the custom mode different from the 3 previous modes (Simple, Complex and Over-powder coating).

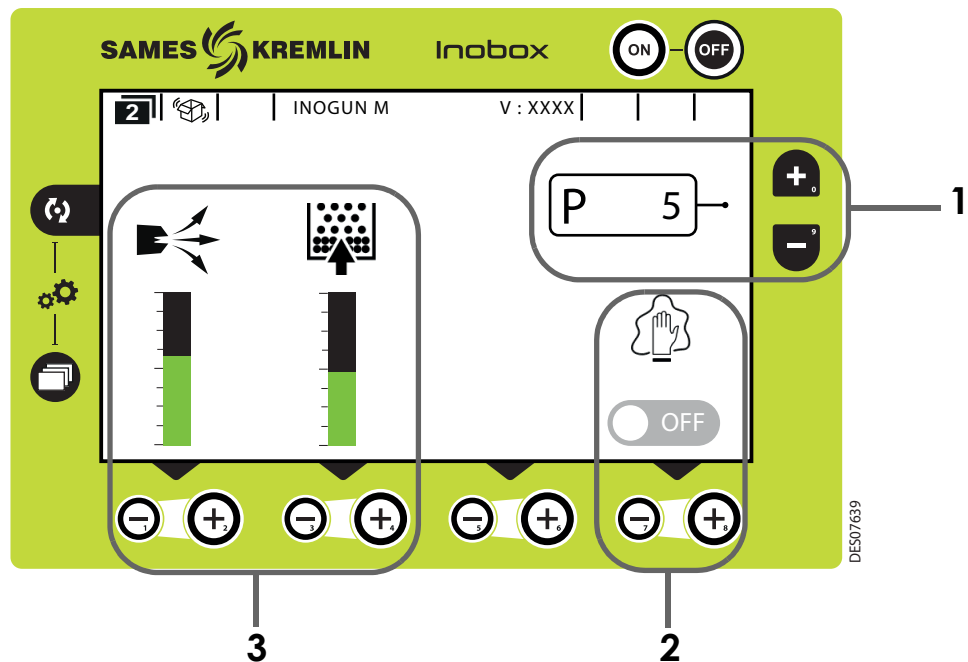





Area	Description
Area 1	Custom mode
Area 2	<p><b>Program selection:</b> 99 custom programs can be set in voltage, current, injection air and powder flow (<a href="#">see § 5.2 page 16</a>).</p> <p>The  and  keys are used to change programs</p>
Area 3	Powder flow rate and conveying air settings for each program
Area 4	Voltage and current settings for each program. Flashing: Spraying in progress with voltage at the output
Area 5	If both keys are pressed simultaneously, direct access to the parameter setting screen ( <a href="#">see § 5.8 page 22</a> )

Press the key to access the submenu of the selected mode.


#### 5.4. Screen 2: Setting of electrode supply air and fluidizing air

In the selected operating mode, the operator can set the values for electrode blow-out air and fluidizing air. He can also activate the cleaning mode.



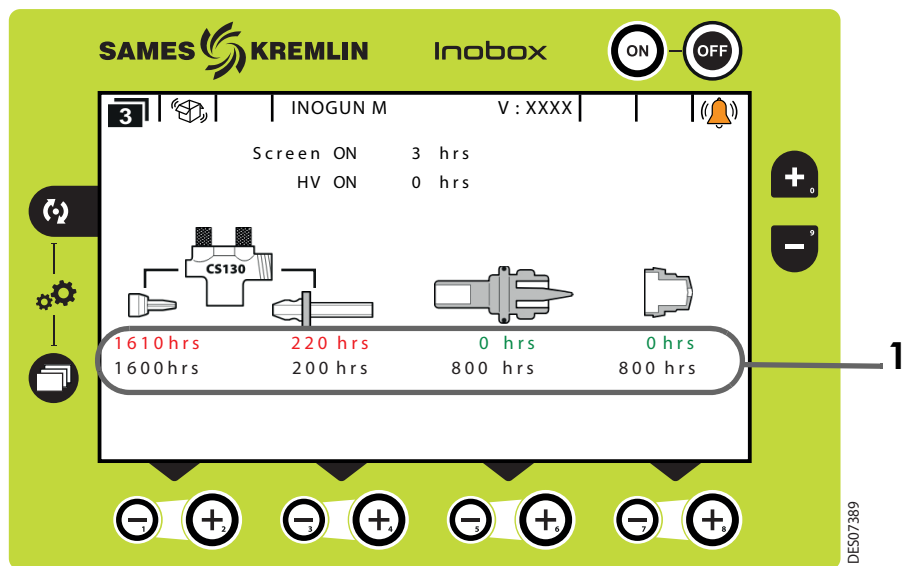
Area	Description
Area 1	For the selected custom program (*)
Area 2	To activate the cleaning mode, press the corresponding  key, screen 4 appears ( <a href="#">see § 5.6 page 20</a> )
Area 3	Setting the values for electrode blowing air and supply air fluidization using the corresponding  and  keys. The values are indicated by the green areas of the associated bar-graphs

**Note: (\*) If the selected mode was different from the custom mode, zone 1 (program selection) would not be present.**

To return to the previous screen, press the key. .

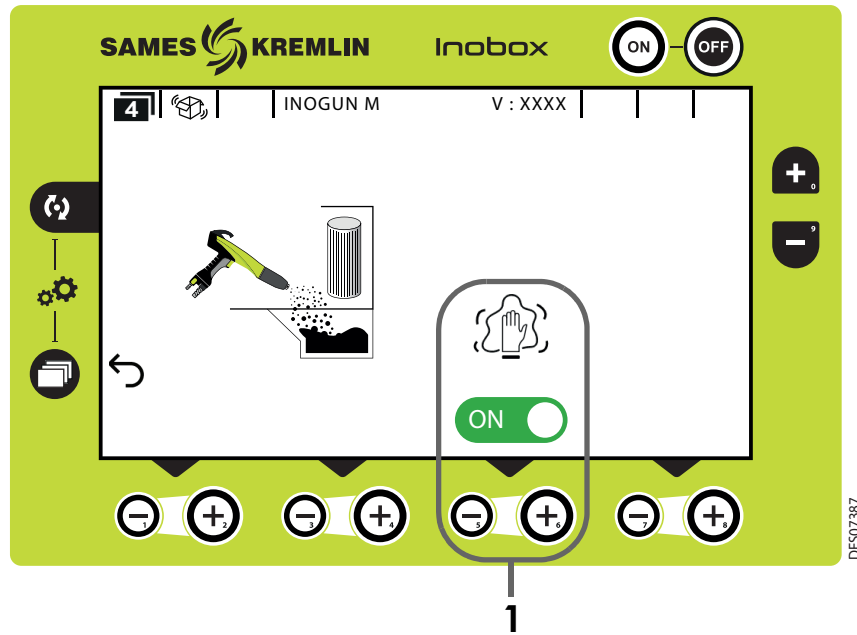
### 5.5. Screen 3: Counter Alarm Screen

This screen only appears when the operator has exceeded the recommended operating time for maintenance.






Area	Description
Area 1	1st line: operating time 2nd line: scheduled maintenance time


## 5.6. Screen 4: Cleaning screen



Area	Description
Area 1	Activating / Deactivating cleaning mode

When the cleaning mode is activated, the logo  turns green on the screen and the pictogram  is animated.


To interrupt the cleaning cycle (before the programmed stop [see § 5.8.5 page 25](#)) press the key .

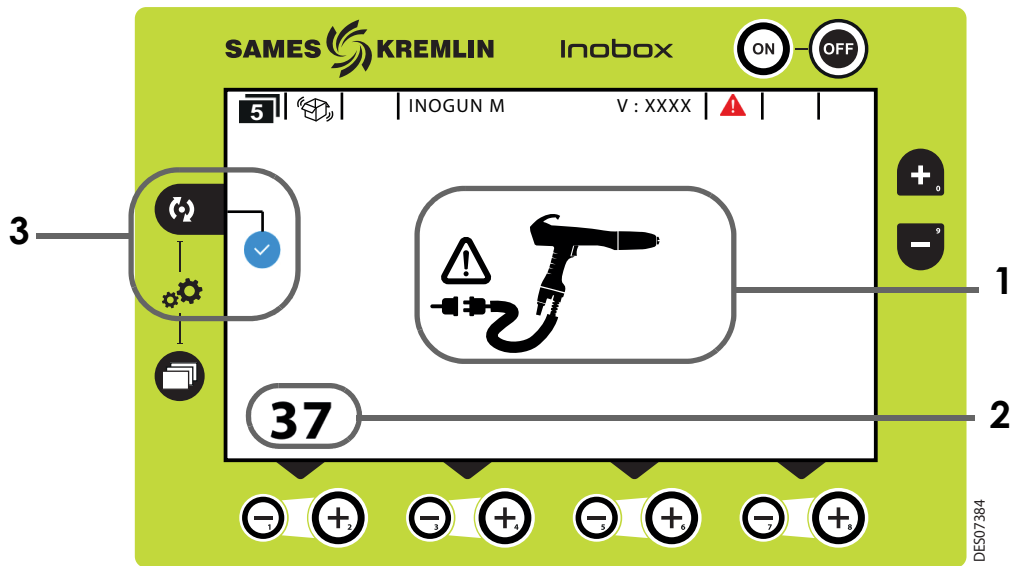
To return to the previous screen (screen 2), press the key .





**WARNING :** When cleaning, it is imperative to place the gun inside the booth.

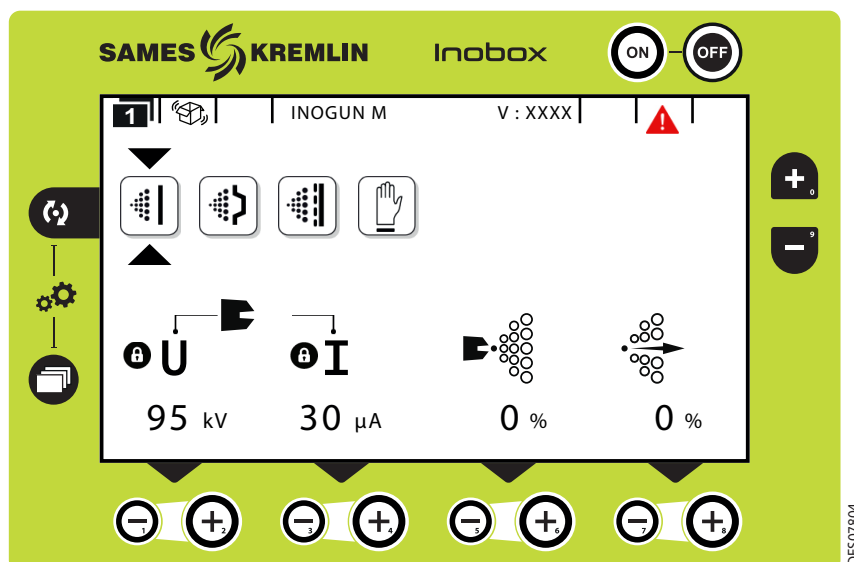
### 5.7. Screen 5: Ecran Présence Défauts

If a fault is detected, the Inobox switches to the screen below (screen 5) displaying the flashing symbol  and then the various information concerning the fault:



Area	Description
Area 1	Fault icon
Area 2	Fault number
Area 3	Visualization of the fault by the operator Press the key  to acknowledge the fault page and return to screen 1.

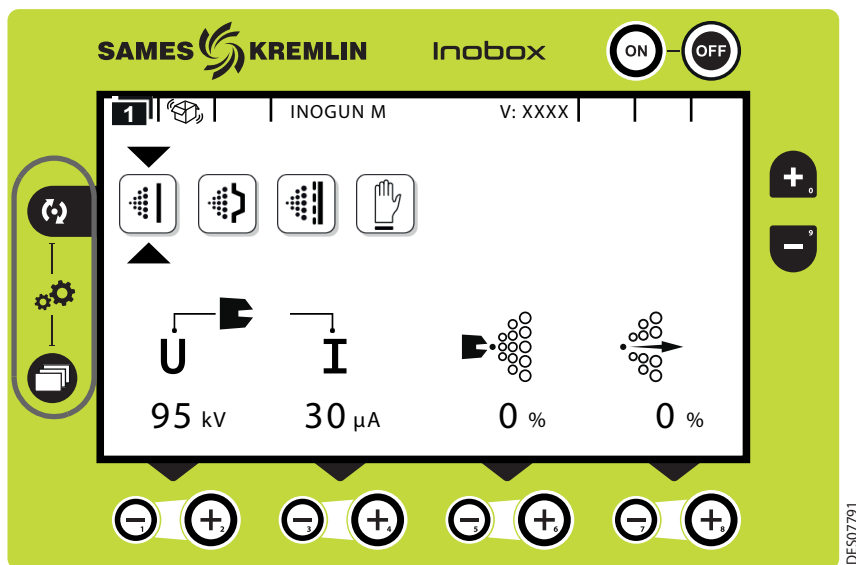
If the fault is still present after acknowledgement in screen 5, the symbol  continues to flash in screen 1.



The fault is acknowledged either by a trigger ON/OFF, or by power ON/OFF if the fault is blocking.

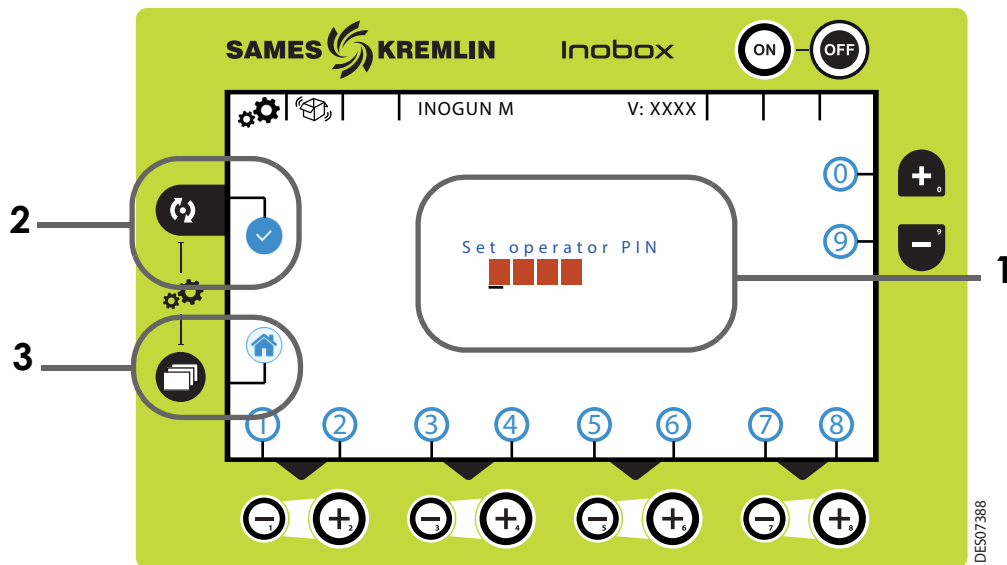
## 5.8. Parameter setting screens



### 5.8.1. Access to the parameter setting screens



Pressing the 2  and  keys simultaneously for 3 seconds will take the user to the password entry screen.

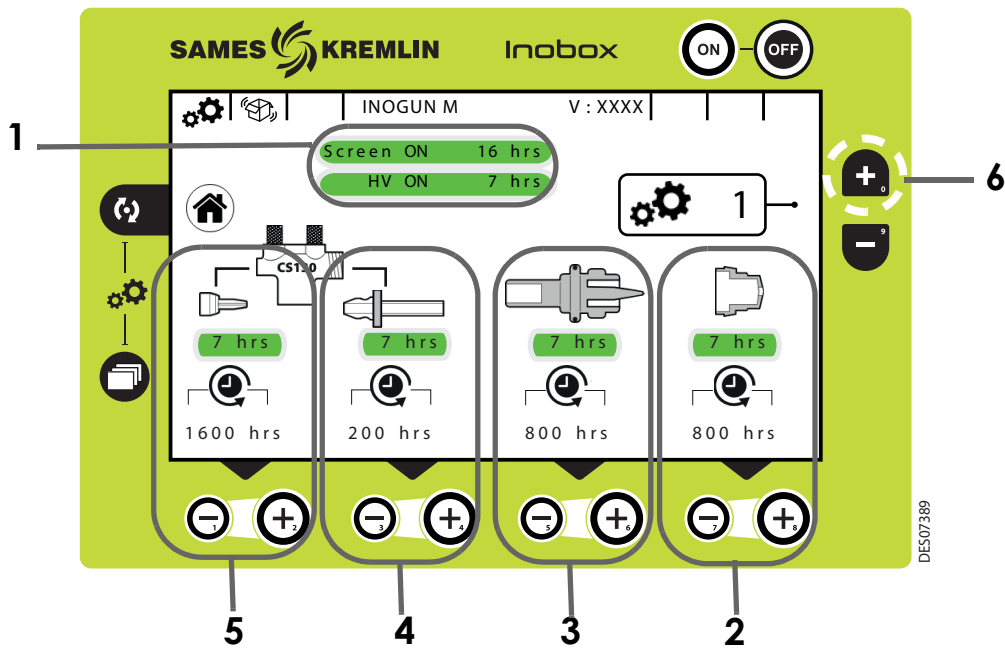
### 5.8.2. Password Input Screen



Area	Description
Area 1	4-digit access code: enter the code by pressing keys 0 to 9. The factory default password is 0000.
Area 2	Press the key  to confirm the code
Area 3	Press the key  to return to screen 1 (Mode Selection)

### 5.8.3. Parameter setting screen 1: Equipment operating time

This parameter setting screen allows to visualize the operating times of the different elements.



Area	Description
Area 1	Screen and High Voltage Power Run Time
Area 2	Deflector operating time and maintenance threshold settings Press the  and  keys to set the alarm corresponding to the desired maintenance threshold.
Area 3	Electrode support operating time and maintenance threshold setting Press the  and  keys to set the alarm corresponding to the desired maintenance threshold.
Area 4	Ejector and porous ring operating time and maintenance threshold setting Press the  and  keys to set the alarm corresponding to the desired maintenance threshold.
Area 5	CS 130 pump injector operating time and maintenance threshold setting. Press the  and  keys to set the alarm corresponding to the desired maintenance threshold.

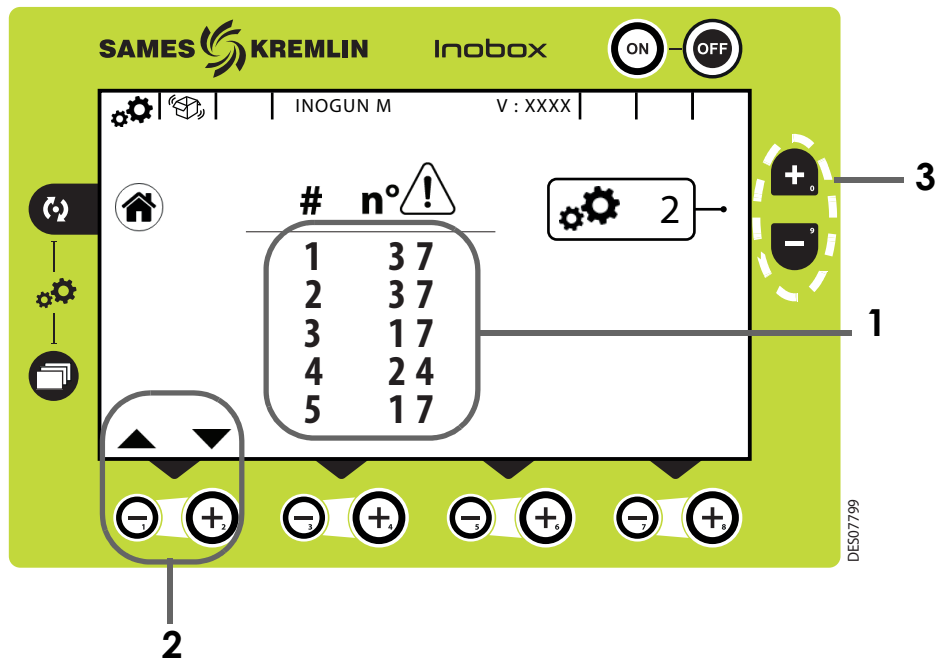
**Note:** Simultaneously pressing the and keys resets the maintenance counter of the corresponding item to zero.

Press the key to return to the screen 1 for operating mode selection.

To access the following parameter setting screen "Fault History Screen", press the key (Area 6).

#### 5.8.4. Parameter setting screen 2: Fault History Screen

This screen displays the history of faults that have occurred from the most recent to the oldest.



Area	Description
<b>Area 1</b>	Numbering of faults that have occurred and fault number. ( <a href="#">see § 9.1 page 34</a> )
<b>Area 2</b>	Press the  key to display the following 5 faults in the list Press the  key to go back

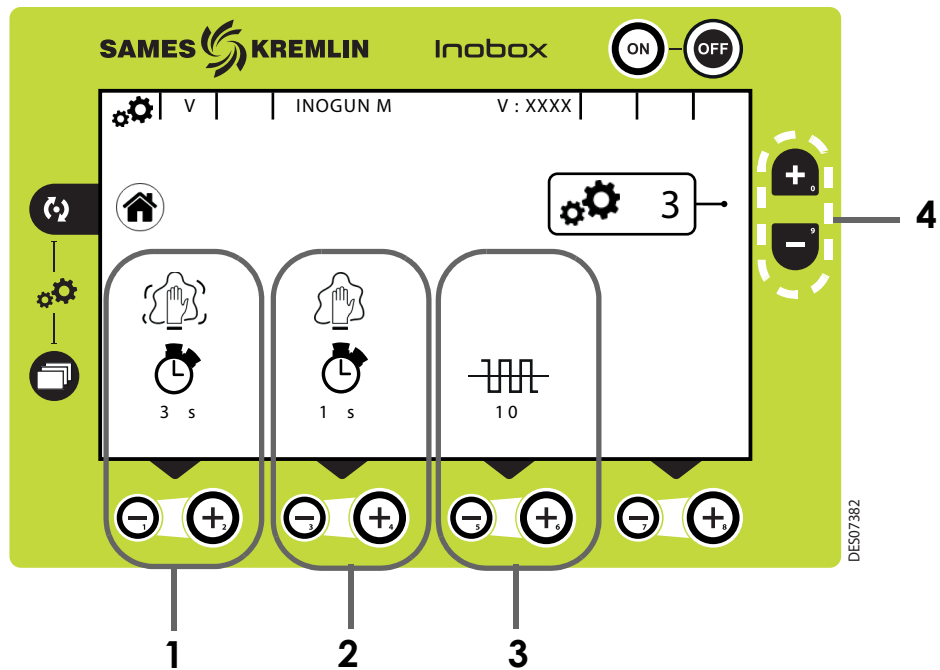
Press the key to return to the screen 1 for operating mode selection.

Press the key (Area 3) to access the following setting screen "Active Cleaning Phase"

or press the key to return to the screen 1 for operating mode selection.



5.8.5. Parameter setting screen 3: Active cleaning phase



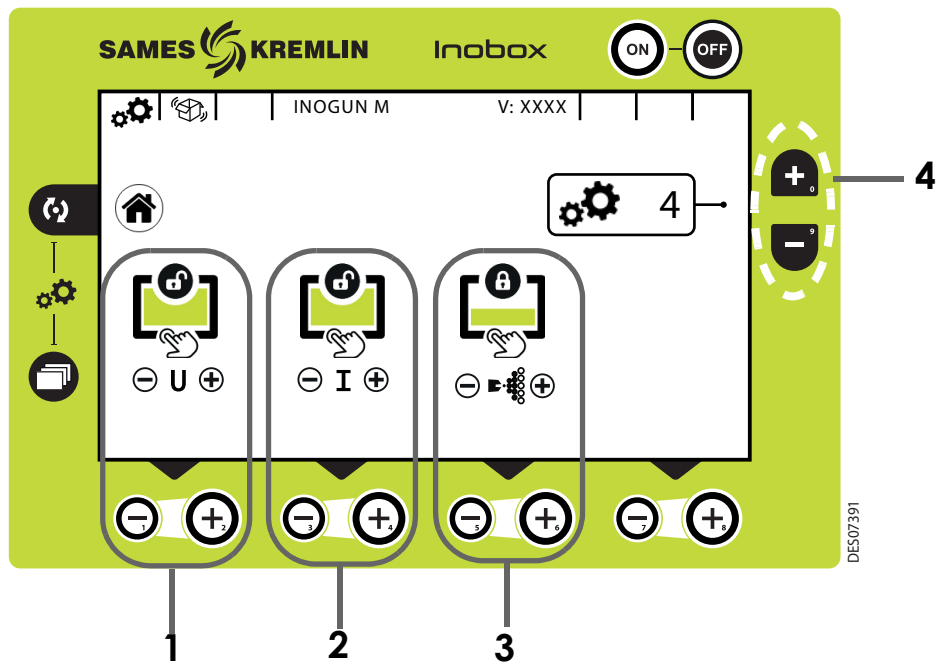
Area	Description
Area 1	Active cleaning cycle time Press the  key to increase the cleaning time in the active phase and  key to decrease it
Area 2	Cleaning cycle time at stop (inactive) Press the  key to increase the cleaning time in the inactive phase and  key to decrease it
Area 3	Number of active cleaning cycles Press the  key to increase the number of active cleaning cycles and  key to decrease it

Press the key to return to the screen 1 for operating mode selection.

To access the following setting screen "Locking Settings", press the key (Area 4).

To access the previous setting screen (screen 2) "Fault History Screen", press the key (Area 4).

5.8.6. Parameter setting screen 4: Parameter setting Locking / Unlocking setpoints

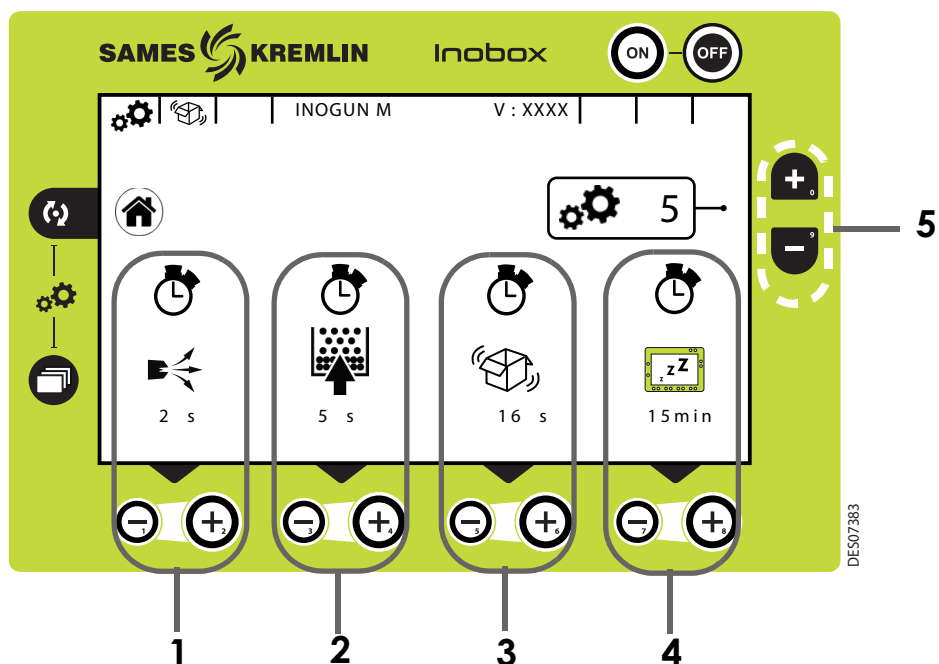


Area	Description
<b>Area 1</b>	Locking / Unlocking the voltage modification Press the  and  keys to lock and unlock the voltage setpoint modification
<b>Area 2</b>	Locking / Unlocking the current modification Press the  and  keys to lock and unlock the current setpoint modification
<b>Area 3</b>	Locking / Unlocking of the modification of all pilot airs Press the  and  keys to lock and unlock the modification of the setpoint of the pilot's airs

Press the key to return to the screen 1 for operating mode selection.

To access the following setting screen "Time delays settings", press the key (Area 4) and the key to access the previous setting screen (screen 3) "Active cleaning phase".

### 5.8.7. Parameter setting screen 5: Time Delays



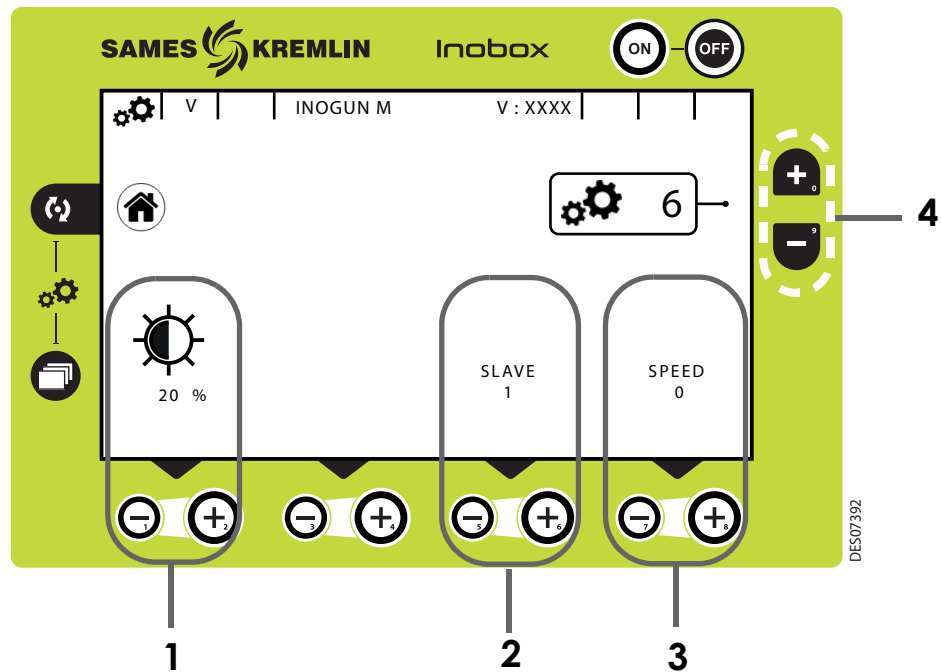
Area	Description
Area 1	Electrode blowing delay before shutdown in seconds Press the  and  keys to set the time delay
Area 2	Fluidisation delay before shutdown in seconds Press the  and  keys to set the time delay
Area 3	Vibrator delay before shutdown in seconds Press the  and  keys to set the time delay
Area 4	Standby time in minutes Press the  and  keys to set the time delay If the value is set to 0, the Inobox does not go into standby.

Press the key to return to the screen 1 for operating mode selection.

To access the following setting screen "Communication Configuration", press the key (Area 5).

To access the previous setting screen (screen 4) "Parameter setting Locking / Unlocking setpoints", press the key (Area 5).

5.8.8. Parameter setting screen: Contrast and Communication Configuration (a CAN link is used)



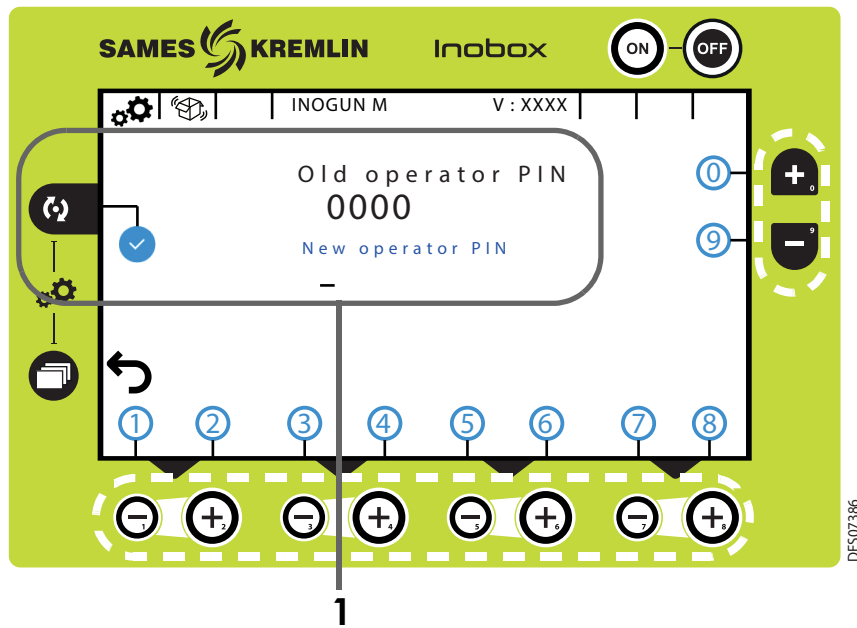
Area	Description
Area 1	Display contrast setting Press the  and  keys to set the contrast
Area 2	Slave number setting Press the  and  keys to change the slave number
Area 3	Communication speed setting Press the  and  keys to change the communication speed if a CAN link is used

Press the key to return to the screen 1 for operating mode selection.

To access the following setting screen "Changing the access code", press the key (Area 4).

To access the previous setting screen (screen 5) "Time Delays settings", press the key (Area 4).

5.8.9. Access code modification screen for parameter setting screens



Area	Description
Area 1	To enter a new 4-digit access code: Press the     keys associated with numbers 0 to 9. After the sign  appears, Press the  to validate the new code.




Press the key to access the previous setting screen then

press the key to return to the screen 1 for operating mode selection.

## 5.9. Standby Screen / Factory Reset screen



**Standby screen:** By default, standby is effective after 15 minutes of inactivity, however the operator can modify this time delay on parameter setting screen 4 ([see § 5.8.7 page 27](#)). Exit from standby mode can be obtained by pressing any key on the keyboard except the ON /OFF keys or the gun trigger.

**Restoring factory settings:** When the Inobox is switched on, the operator can return to the factory settings by pressing the  and  keys at the down right-hand side and the  key at the same time.

## 6. Connections

### 6.1. CAN Inputs / Outputs connector

Pin	Description	Designation	Characteristics
	Shielding	0V	
A	0V Trigger	0V dry contact pilot for ON / OFF high voltage	Solder wire size max. 24 AWG / max. 0.25 mm <sup>2</sup> for Pilot Dry Contact
B	COM Trigger	Cathode input of the pilot opto-coupler On / Off high voltage	
C	0V CLEANING	0V for dry pilot contact On / Off cleaning	Solder wire size max.24 AWG / max. 0.25 mm <sup>2</sup> for Pilot Dry Contact
D	COM CLEANING	Cathode input of the pilot opto-coupler On / Off cleaning	
E	N.O FAULT relay	Output of the NO dry contact (normally open) of the fault relay	Solder wire size max. 24 AWG / max. 0.25 mm <sup>2</sup> Dry contact relay: 30VDC 0.5A
F	N.C FAULT relay	Output of the NC contact (normally closed) of the fault relay	
G	COMMON FAULT relay	0 V	
H	CAN H	Data bus CAN signal H	Solder wire size max. 24 AWG / max. 0.25 mm <sup>2</sup>
J	CAN L	Data bus CAN signal L	
K	CAN shielding	0V	
L	NC	-	
M	NC	-	

### 6.2. Vib / Smoke connector

Pin	Description	Designation	Characteristics
1	NEUTRAL VIBRATOR	N.O. RELAY NEUTRAL VIBRATOR	Vibrator relay 100V /240V / 50W Contacts 4A / 250VAC/DC max.18 AWG
2	VIBRATOR PHASE	N.O. RELAY PHASE VIBRATOR	
3	Ground (G/Y)VIBRATOR	Ground / 0V	
4			





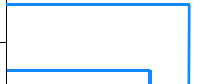


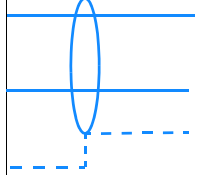
### 6.3. 100 / 240 VAC power supply connector

Pin	Description	Designation	Characteristics
1	NEUTRAL POWER SUPPLY	Neutral	Power supply 100VAC à 240 VAC / 47Hz - 63Hz Contacts 4A / 250 VAC / DC max.18 AWG
2	POWER SUPPLY PHASE	Phase	
3	GROUND (G/Y) POWER SUPPLY NC	Ground / 0V	
4			

### 6.4. Low voltage connector to Inogun A projector or Inogun M spray gun

The high voltage unit of the projector or the spray gun is connected by a low voltage cable to the module Inobox. This cable is connected to the module via a circular connector.

## 7. Cabling - Connector Inputs / Outputs -CAN

Designation	Pin		
Shielding (by shield recovery clamp)			
0 V TRIGGER	A		On / Off Trigger
COM TRIGGER	B		
0V CLEANING	C		On / Off Cleaning
COM CLEANING	D		
N.O FAULT relay	E		Fault (Closed = present fault)
N.C FAULT relay	F		
COMMON FAULT relay	G		
CAN H	H		Communication CAN
CAN L	J		
CAN shielding	K		
NC	L		
NC	M		



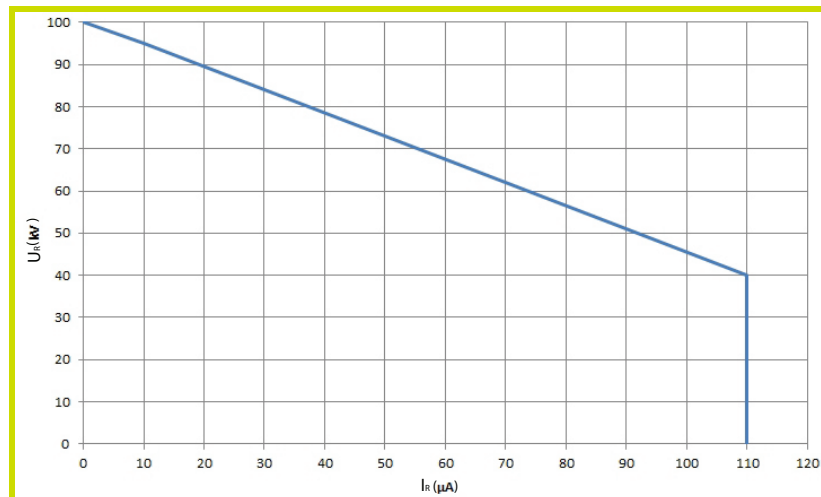
## 8. High voltage

### 8.1. Characteristics of spray gun output voltage and current

The Inobox module has a voltage and current mapping control that limits the operation according to curve 1.

Operator can set all the voltage / current value pairs that are including inside this curve 1.

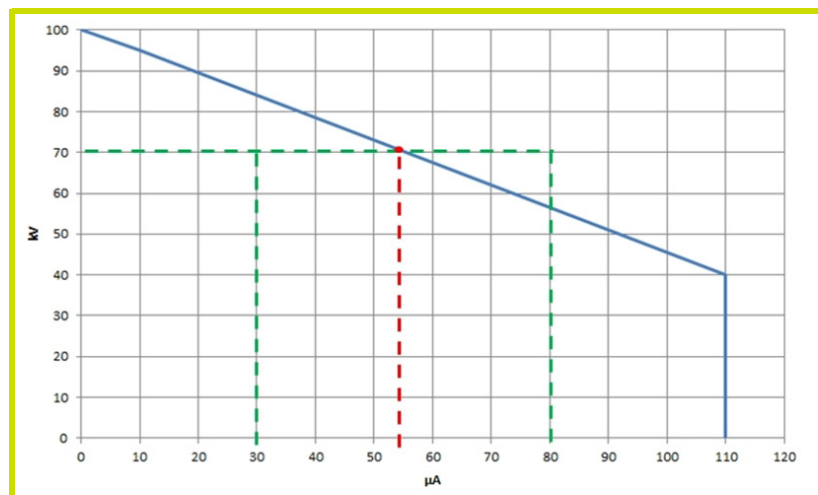
For each UHT  $I_R$  output current point corresponds to a maximum output voltage point,  $U_R$  according to a mapping recorded in the HVU and not modifiable by the user.



Curve 1

**Example 1:** 70kV / 30 $\mu\text{A}$ . The operating point is inside the curve, the voltage (70kV) and current (30 $\mu\text{A}$ ) can be supplied if the system requires it.

**Example 2:** 70kV / 80 $\mu\text{A}$ . The operating point is outside the curve, current will be limited to 55 $\mu\text{A}$ . If electrical charge requires more current, voltage will be limited following the curve.



## 9. Fault management

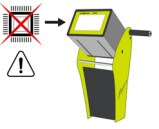
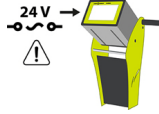



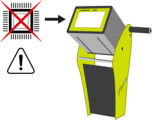

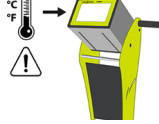
There are two types of faults:


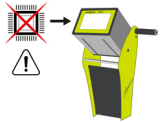
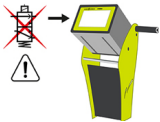
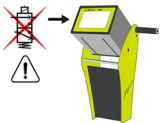



- Resettable faults by fault acknowledgment.
- Blocking faults that require a restart of the +24V DC supply of the Inobox module.

Whatever the type of fault triggered, the regulation cuts off the high voltage and the powdering.

The Fault relay is controlled.

### 9.1. Faults list

Associated pictogram	Nr and Fault label	Description
	1 - Program fault	Microcontroller module fault. This fault requires a power-on to be resetted.
	2 - +24V power supply fault	The internal +24VDC power supply may fail. it has exceeded the authorized operating limits : $21\text{ V} < U < 28\text{ V}$ . This fault requires a power-on to be resetted.
	5 - Voltage coherence fault	Voltage present on the bus without HV request. The fault requires a power-up to be acknowledged. HV request without voltage present on the bus. The fault can be reset by acknowledgment of the fault after a 10-second wait.
	17 - Absence of control mode fault	The CAN Communication is lost while the API is in control mode. The fault can be reset by acknowledgment of the fault
	21 - Bus power fault	The output power of the module or the inverter current has been exceeded. Resettable by Fault Acknowledgment.
	22 - Safe shutdown fault	The maximum high voltage current or the supply current of the barrel has been exceeded . Resettable by acknowledgment of fault.
	24 - Trigger request at startup	The external high voltage/powdering control trigger is controlled when the module is powered on. Resettable by Fault Acknowledgment
	28 - Temperature fault	Exceeding the maximum temperature (75°C) of the internal power supply of the module. Resettable by Acknowledge Default if the temperature has fallen below 60°C.

Pictogramme associé	N° et Libellé du défaut	Description
	29 - HVU link fault	The barrel is not or badly connected to the module. Resettable by Acknowledging Fault
	30 - Internal BUS fault	Internal bus overvoltage (detected by hardware or software) Resettable by fault acknowledgment
	32 - Injection fault	An injection control is activated without pressure feedback. Resettable by Fault Acknowledgement
	33 - Dilution fault	A dilution control is activated without pressure feedback. Resettable by Fault Acknowledgement
	34 - Blowing fault	A blowing control is activated without current feedback from the activated valve. Resettable by Fault Acknowledgement
	35 - Fluidisation fault	A fluidisation control is activated without current feedback from the activated valve. Resettable by Fault Acknowledgement
	37 - Spray gun or projector connector fault	No projector or spray gun connected Resettable by Acknowledgment Fault, unless the connected projector or spray gun is different from that at start-up

## 9.2. Actions following a fault

Fault	Action to be performed
1 - Program fault	The microcontroller is faulty. If the problem persists, contact <b>SAMES KREMLIN</b> .
2 - +24V power supply fault	Check power supply input on the module. It must be 24 V DC (min. 21,6 V DC / max. 26,4 V DC).
5 - Voltage coherence fault	Check the operation by changing the barrel If the problem persists, contact <b>SAMES KREMLIN</b> .
17 - Absence of control mode fault	If the problem persists, check the condition of the CAN connections between the PLC and the module.
21 - Bus power fault	The module delivers too much power or current at the output to the barrel Check connector G and the cable to the barrel (High Voltage Unit Supply). Check the condition of the barrel and its electrical contacts. None of these components must be damaged. Change the barrel.
22 - Safe shutdown fault	The module delivers too much current at the output to the gun. The gun is protected against electric arcs at the HV output by this monitoring. Check connector G and the cable to the barrel (High Voltage Unit Supply). Check the condition of the barrel and its electrical contacts. None of these components must be damaged. Change the barrel.
24 - Trigger request at startup	Check that the trigger is not activated at power up
28 - Temperature fault	Check the ambient temperature as close as possible to the module. This temperature must not exceed 40 ° C.
29 - HVU link fault	Check the cable connection and the cable to the barrel. It must not be damaged. Check the contacts of the circular connector G. Check the connection of the HVU in the gun
30 - Internal BUS fault	The maximum level of the internal supply voltage to the module has been exceeded. If the problem persists, contact <b>SAMES KREMLIN</b> .
32 - Injection fault	Check the air hose connections. Check the air pressures and flow rates in and out of the module. Check the injector of the CS 130.
33 - Dilution fault	Check the air hose connections. Check the air pressures and flow rates in and out of the module. Check the porous ring of the CS 130.
34 - Blowing fault	Internal electrode blowing valve is not correct, if the problem persists contact <b>SAMES KREMLIN</b> .
35 - Fluidisation fault	Internal fluidisation valve is not correct, if the problem persists contact <b>SAMES KREMLIN</b> .
37 - Spray gun or projector connector fault	Check the circular connector G on the back of the module

## 10. Communication with the PLC in CAN

### 10.1. Characteristics

In CAN mode a PLC manages the display and/or control of the data of the INOBOX module.

It is necessary to configure the address of the Inobox and the communication speed (from 0 to 7) using the setting screen. ([see § 5.8.8 page 28](#)).

Speed in Kbits/s	
10	0
20	1
50	2
100	3
125	4
250	5
500	6
1000	7

### 10.2. Data exchange

#### 10.2.1. From CAN to the Inobox module

8 bytes are exchanged from a CAN module to the Inobox

Byte	Label	Description	Unit	Max.
0	CAN Command	Commands requested by the CAN (see the detailed description hereafter)	-	
1	CAN Current Setpoint	Current setpoint requested by the CAN. This setpoint is applied only if the CAN_Control mode is active and the HV trigger is activated	µA	110
2	CAN Voltage Setpoint	High voltage setpoint requested by the CAN. This setpoint is applied only if the CAN_Control mode is active and the HV trigger is activated.	kV	100
3	CAN Injection Setpoint	Injection setpoint requested by the CAN. This setpoint is applied only if the CAN_Control mode is active and the HV trigger is activated.	Point	100
4	CAN Dilution Setpoint	Dilution setpoint requested by the CAN. This setpoint is applied only if the CAN_Control mode is active and the HV trigger is activated.	Point	100
5	CAN Blowing Setpoint	Blowing setpoint requested by the CAN. This setpoint is applied only if the CAN_Control mode is active and the HV trigger is activated.	Point	30
6	CAN Fluidisation Setpoint	Fluidisation setpoint requested by the CAN. This setpoint is applied only if the CAN_Control mode is active and the HV trigger is activated.	Point	50
7	Spare			

Byte 0	CAN Command	
7	ON/OFF trigger	HV trigger start (set to 1)/ stop (set to 0) request. The request is only taken into account if the CAN control is enabled by the Inobox and if the HV pilot is requested. If a manual spray gun is connected, this request must be set to 1 to authorize control of the HV or acknowledgment of a fault by the spray gun trigger
6	Cleaning ON/OFF	Cleaning start (set to 1) / stop (set to 0) request. The request is only taken into account if the CAN control is enabled by the Inobox and if the cleaning pilot is requested
5	Fault acknowledgement	Request for acknowledgement of resettable faults The request is only taken into account on rising edge if the CAN control is validated by the Inobox and if there is no longer a request for trigger operation or cleaning (by the CAN or external)
4	Local setpoint prohibited	If a manual spray gun is connected, it is possible to prohibit the local injection setpoint (set to 1) Otherwise the operator can modify the injection setpoint by simultaneously pressing the trigger and activating the + or - keys.
3	Cleaning control request	The CAN asks to control the cleaning (active if set to 1), to 0 wired control. The request is only taken into account if the CAN control is enabled by the Inobox
2	HV control request	If an automatic projector is connected, request for high voltage control via the CAN (if set to 1). The request is only taken into account if the CAN control is enabled by the Inobox. If a manual spray gun is connected, this request must be set to 1 to authorize control of the HV or acknowledgment of a fault by the spray gun trigger
1		
0	CAN control request	The CAN asks to control the Inobox (active if set to 1)

## 10.2.2. From Inobox to a CAN module

8 bytes of feedback are exchanged from Inobox to a CAN module

Byte	Label	Description	Unit	Max.
0	Status 1	Status information 1 (see description hereafter)	-	-
1	Status 2	Status information 2 (see description hereafter)	-	-
2	Fault 1	Fault information 1 (see description hereafter)	-	-
3	Fault 2	Fault information 2 (see description hereafter)	-	-
4	HV output current		µA	110
5	HV output voltage		kV	100
6	Injection or Blowing flow rates	Bit 8=0 Injection on 7bits in l/min Bit 8=1 blowing on 7 bits in dl/min	L/min or dl/min	110/90
7	Dilution or fluidisation flow rates	Bit 8=1 Fluidisation on 7 bits in L/min if big valve or dL/min if small valve	L/min or dl/min	70

Byte 0	Status 1	Status information 1
7	Initialisation	Software in initialization step
6		
5	High voltage ON	High Voltage is effectively active
4	HV request OK	The HV request is taken into account by the Inobox
3	External cleaning	External cleaning is requested (1 on the input), it will be taken into account if the PLC has not requested cleaning control
2	External HV trigger	External HV trigger is requested (1 on the input), it will be taken into account if the PLC has not requested HV control
1	Cleaning request OK	The cleaning start request is taken into account by the Inobox
0	Cleaning in progress	A cleaning is in progress (the air controls are at maximum, there is no controlled HV)

Byte 1	Status 2	Status information 2
7	Manual spray gun	A manual spray gun is connected (if set to 1)
6	Fault with 24V cutoff	Resettable fault only after a 24V shutdown
5	Configured communication module	The communication module is configured
4	Fault	A fault is present
3	Wireless control - reserved	Control mode by wireless - reserved
2	CAN Control	Control mode by the CAN communication
1	USB Control - reserved	Control mode by the USB software - reserved
0	PLC Control	Control mode by the PLC (via the communication module)

Byte 2	Fault 1	Fault information 1
7	1- Program fault	<a href="#">see § 9.1 page 34</a>
6	2 - +24V power supply	
5	Spare	
4	17 - Absence of control mode fault	
3	35 - Fluidisation fault	
2	34 - Blowing fault	
1	33 - Dilution fault	
0	32 - Injection fault	

Byte 3	Fault 2	Fault information 2
7	5 - Voltage coherence fault	<a href="#">see § 9.1 page 34</a>
6	22 - Safe shutdown fault	
5	21 - Bus power fault	
4	37 - Spray gun or projector connector fault	
3	28 - Temperature fault	
2	24 - Trigger request at start-up	
1	29 - HVU link fault	
0	30 -Internal bus fault	



## 11. Spare parts list



Item	Part Number	Description	Qty	Unit of sale	Level Spare parts (*)
	910029883	Inobox control module for vibrating table	1	1	3
	910029884	Inobox control module for tank	1	1	3
	910030576	Inobox NF control module	1	1	3
	910030041	Power cable "Europe"	1	1	3
	910030398	Power cable "US"	1	1	3
	110002759	Straight M16 female connector 12 contacts	option	1	3
	110001705	4-pair cable 0.12 mm <sup>2</sup> shielded	option	1	3

(\*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance

## 12. Revision index History

Rev.	Date	Description	Modification locating
A	July 2020	First issue	