Inobox

Control module

Instruction manual

DRT7145

C - 2022/11

Sames 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.

Services

Certification and referencing

Sames is certified as a training center by the DIRRECTE of the Auvergne Rhône Alpes region under the number 84 38 06768 38.
Our company provides, throughout the year, training courses allowing you to acquire the essential know-how for the implementation and maintenance of your equipment in order to guarantee its performance in the long term.
A catalog is available on request.

www.sames.com/france/fr/services-training.html

Line audits

As part of a technical assistance program for our customers using **Sames** equipment, the line audits are intended to help you optimize and control your production tool.
Our network of experts is continuously trained and qualified to provide our customers with technical expertise on the liquid or powder installations in which our equipment is integrated. The global environment of the production lines is taken into account during this technical audit.
A brochure is available for download:

www.sames.com/france/fr/services-service-contract.html

Maintenance program

An annual maintenance program (including or not the consumables to be replaced during each intervention) can be considered with the partnership of **Sames**. It is associated with a preventive maintenance plan established during a first audit visit which details the control points necessary to guarantee the performance of the installed equipment.

www.sames.com/france/fr/services-service-contract.html

Hotline

www.sames.com/france/fr/services-service-contract.html

Inobox

1. Health and safety instructions

1.1. Applicable standards

Inobox control module has been designed according to standards indicated below:
Canadian Standards:

- CSA C22.2 No. 61010-1:12
- CSA C22.2 No. 213:19
- CSA C22.2 No. 0:20
- CSA C22.2 No. 60079-31:15 as a guide
- EN 50177:09 / A1:13 as a guide
- EN 50500-2:18 as a guide

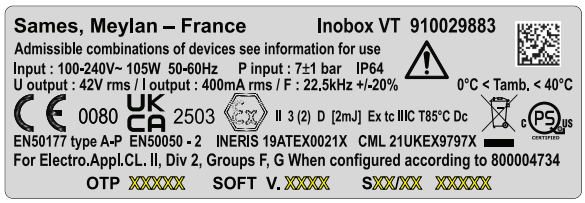
US Standards:

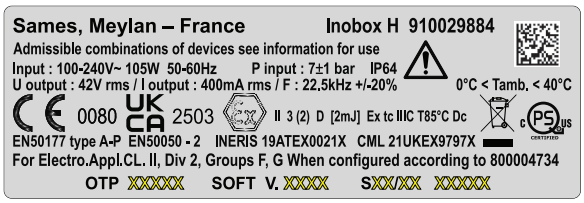
- FANSI/ISA-61010-1: 3rd Ed.
- FM3600: 2018
- FM3611: 2018
- FM 7260: 2018 as a guide
- UL60079-31:2nd Ed. as a guide

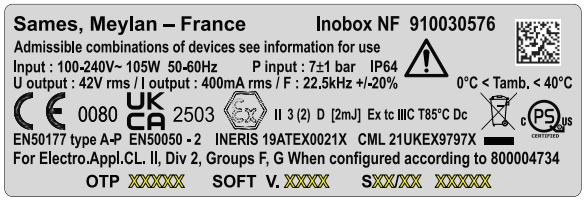
In **Canada**, the installation has to be in compliance with the Canadian Electrical Code C22.1 part I, standard safety for electrical installations.
In the **USA**, the installation has to be in compliance with the National Electrical Code NFPA 70.

1.2. Marking

The **Inobox** control module is designed in accordance with the ATEX 2014/34/EU and SI 2016 No. 1107" Directives, is category 3 and is intended for use in zone 22.







Refer to the user manual for the Inobox control module.

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

- This equipment is intended for an ambient temperature range of 0°C to 40°C.
- During installation, the user should take into account that the keypad of the Inobox control module has only been subjected to a slight mechanical impact.
- The equipment has to be protected from light.

Warning marking:
"For Electrostatic Finishing Applications using Class II, Div 2, Groups F, G spray material when configured according to 800004734", this may be abbreviated as "**For Electro. Appl. CL. II, Div 2, Groups F,G When configured acc. to 800004734**".

1.3. Meaning of pictograms

 Warning electricity	 Warning Automatic start-up	 Warning Hot surfaces	 Warning Explosive material	 General warning sign
 Warning High pressure	 Warning Crushing of hands	 Warning for explosive atmospheres	 Warning Flammable material	 Warning Corrosive substance
 Warning: Toxic material	 Warning Harmful products	 No access for people with active implanted cardiac devices	 Wear ear protection	 Wear a face shield
 Wear respiratory protection	 Wear safety footwear	 Wear protective clothing	 Wear protective gloves	 Wear head protection
 Opaque eye protection must be worn	 General mandatory action sign	 Connect an earth terminal to the ground	 Refer to Instruction manual	

1.4. 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.

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

• have previously be trained by the compagny **Sames**, 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.

1.5. Warnings

It is imperative that anyone wearing a pacemaker does not use the equipment and does not enter the projection area.
High voltage can cause the pacemaker to malfunction.

Equipment performance is only guaranteed if original spare parts distributed by Sames are used.

To guarantee an optimal assembly, spare parts must be stored in a temperature close to their temperature of use. Should the opposite occur, a sufficient waiting time must be observed before the installation, so that all the elements are assembled in the same temperature.

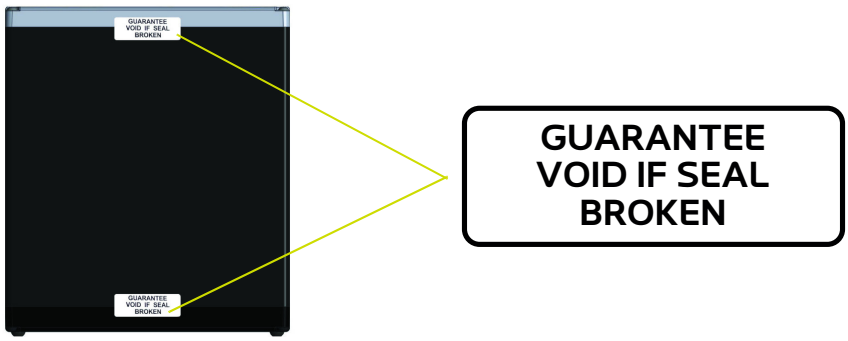
It is the customer's responsibility to verify which local fire and safety standards are applicable for use of the Inobox.

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 keyboard of the Inobox control module must be protected against high mechanical shocks (EN 60079-0 §26.4.2).
- The control module must not be exposed to UV light. If it is exposed to UV light, the front panel must be protected. For mounting on the cart or for wall support, the rear panel is protected by a metal cap and a plastic protection of the connectors. In the case of cabinet mounting, no exposure is possible.
- 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** spare parts, or a repair performed by the **Sames** 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 **Inobox** module with the power supply still on can only be performed by personnel certified and trained for electrical repairs.
- It is imperative to start the installation with the earthing of the module. If the module is de-wired, the earth connection must be disconnected last.

-  For a safety shutdown of the module it is necessary to switch off the module, this requires disconnecting the power supply cable.
- The control modules are an integral part of the spraying system and must therefore be integrated into the safety system of the powder coating installation.
- **Inobox** control modules can be installed:
  1. **On an Inocart cart:** The control modules are delivered mounted and wired on the cart. They are fixed on a support with 4 screws and washers (refer to the user manuals for carts 7159 or 7161).
  2. **On a wall support:** The wall support is installed on the wall of a spray booth or on a wall. The control module is secured using the screws and bolts supplied with the wall bracket kit (refer to the specific user manual).
  3. **In an Inomaster cabinet:** Installed on a rack that can hold up to 8 control modules (refer to the specific user manual).

Two inviolability labels are present on the top of the Inobox. Any damage or absence of these labels will result in the loss of the Sames manufacturer's guarantee.



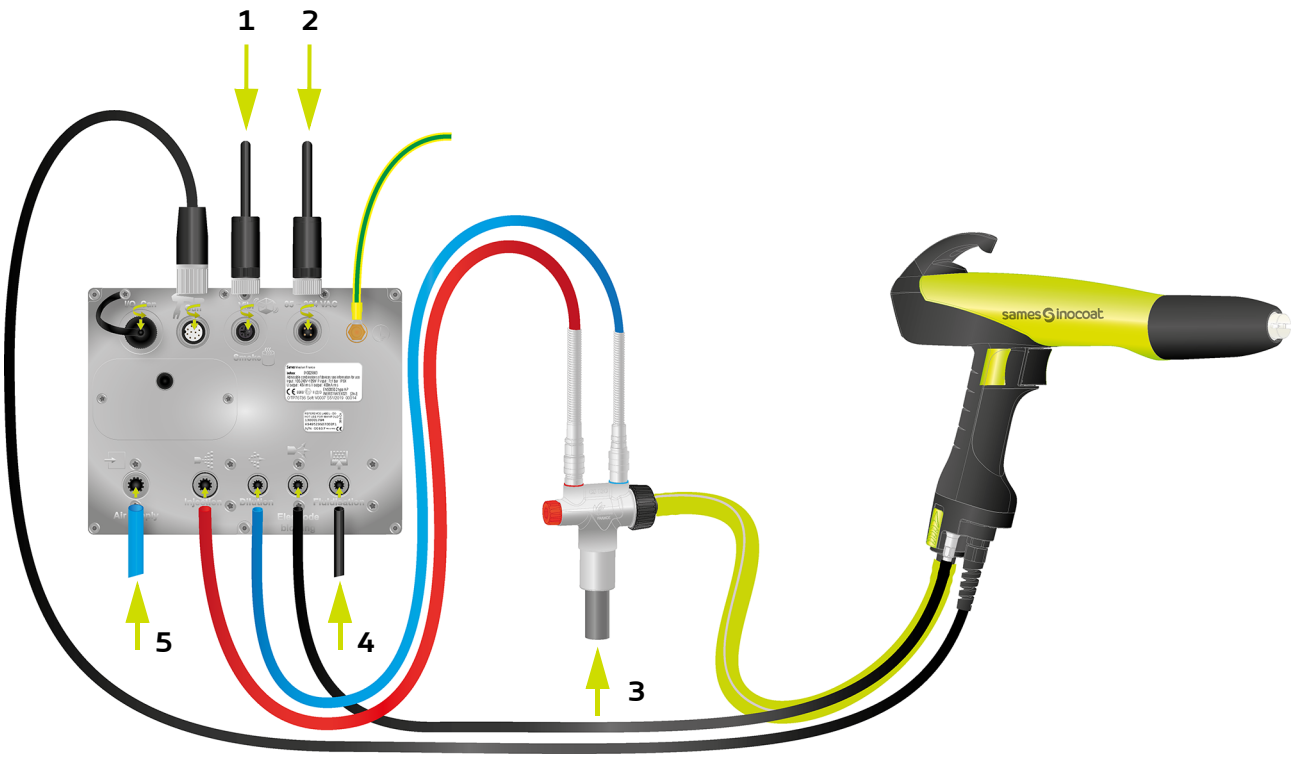
2. Introduction

The **Inobox** is a control module designed to pilot the **Inogun M** spray guns or the **Inogun A** projector.
The function of the **Inogun M** spray guns or the **Inogun A** projector is to project the electrically charged powder by means of a high voltage unit integrated in the barrel which delivers up to 100kV and 110 µA.

The **Inobox** control module manages, by means of a microcontroller, the piloting of the high voltage unit and three or four proportional solenoid valves depending on the version. In return, a reading of the high voltage and current is taken, as well as the flow or current of the three or four proportional solenoid valves.

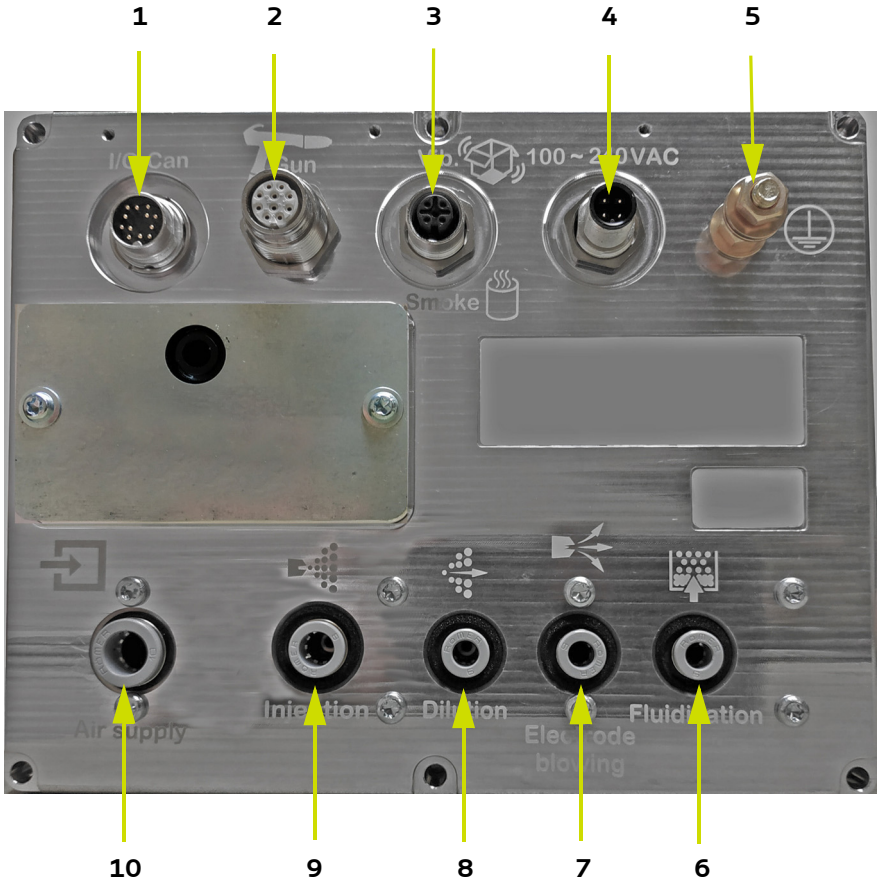
The **Inobox** is controlled manually via its display or by a PLC-type network in the case of a CAN link.

Example:
Synoptic of an installation with an Inogun M



Item	Description
1	Vibrator/smoke extraction connection
2	Power supply
3	Powder suction
4	Fluidization air outlet
5	Air supply

Presentation of the Rear Panel:



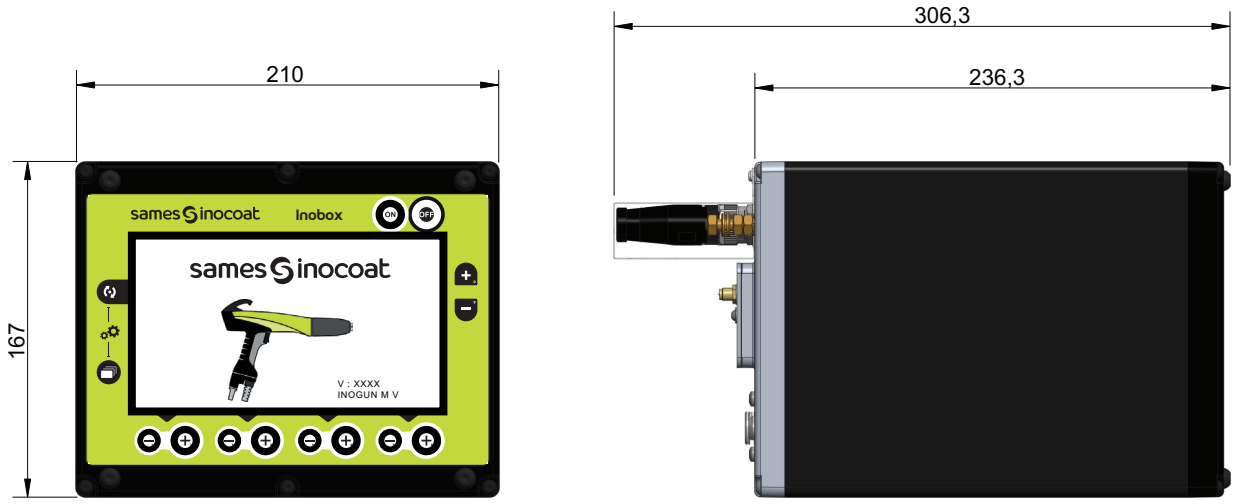
Item	Description
1	PLC connection
2	Spray gun connection
3	Vibrator/smoke extraction connection 100 VAC - 240 VAC +/- 2% /50Hz – 60 Hz
4	Power supply 100 VAC - 240 VAC +/- 2% /50Hz – 60 Hz overvoltage category II (EN 61010-1)
5	Earth connection terminal
6	Fluidization air outlet
7	Blowing air outlet
8	Dilution air outlet
9	Injection air outlet
10	Air supply

3. Technical 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 (1)
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.
Relative humidity	93 % (4 hours)
Maximum altitude	2000 m

The control module must be correctly connected to the earth of the installation by a cable or metal braid with a cross-section of 6mm2 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

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

Supply voltage	100 VAC at 240 VAC / 50 Hz - 60 Hz
Maximum Input Power (*)	105 W at 230 VAC
Maximum current	0.56 A at 230 VAC / 0.95 A at 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)
Pressure supply	7 bars +/-1bar
Output voltage vibrator / smoke suction	100 VAC at 240 VAC +/- 2% /50 Hz – 60 Hz
Output power vibrator / smoke suction	45 W
Max current of the vibrator/smoke suction output	0.48 at 230 VAC / 0.96 A at 115 VAC

(*): The maximum power value is given all active functions simutaneously. (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_0^3 *
Maximum concentration of solid pollutants	Class 3 i.e 5 mg/m_0^3 *

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

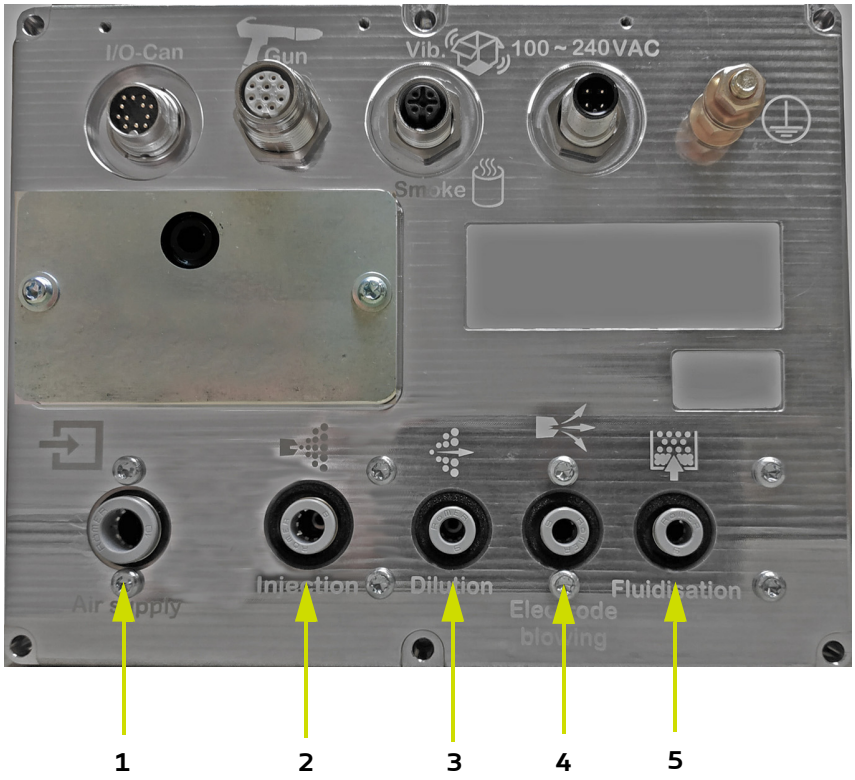
Non-compliance with these characteristics may result in incorrect operation of the"Inobox" control module.

The control module is equipped with an internal air regulator which allows air flows independent of the air supply system, within the operating range 7 bar +/-1bar.

4. Operating principle of the Inobox

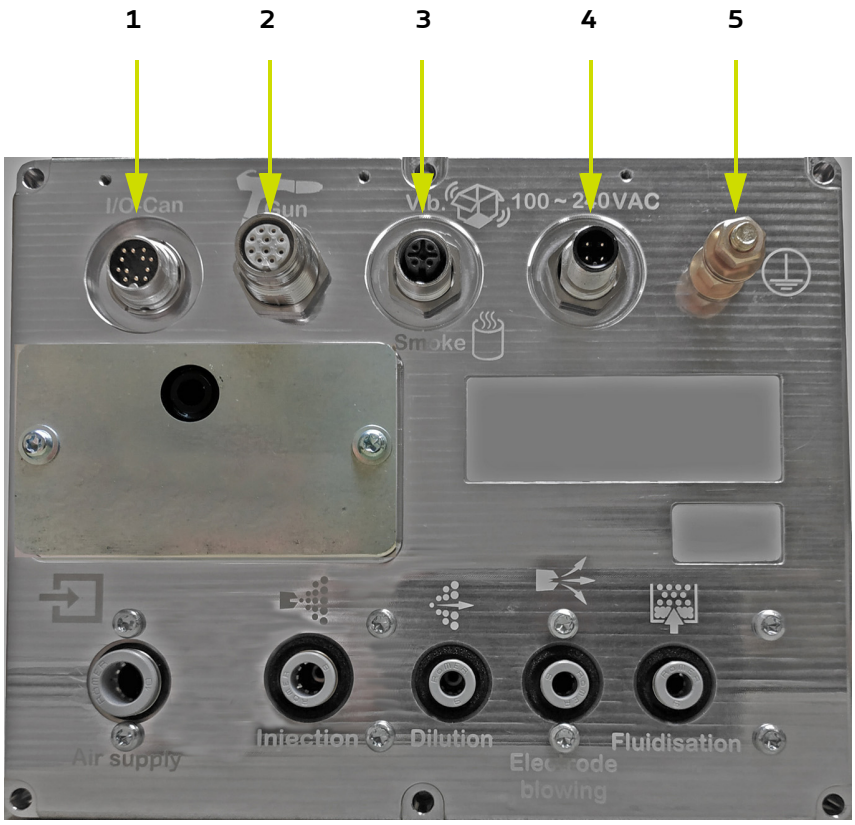
The **Inobox** control module manages the spraying air (injection, dilution, electrode blowing and fluidization) which allows the powder supply to the **Inogun M** spray guns.

4.1. Pneumatic Connections



Item	Icons	Description	Characteristics
1		Air supply	Hose D: 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	100 ~ 240 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^2.

4.3. Starting

- Connect the peripheral equipment (spray gun or projector, powder pump, PLC, vibrator, etc.) (see § 4.2 page 15).
- Connect the air and fluid supplies(see § 4.1 page 14).
- Connect the mains plug to the control module (see § 4.2 page 15).

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 VT (Vibrating Table) control module

5.1. Inoboxconnected to a Inogun M or M + spray gun.

5.1.1. Start screens

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

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

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

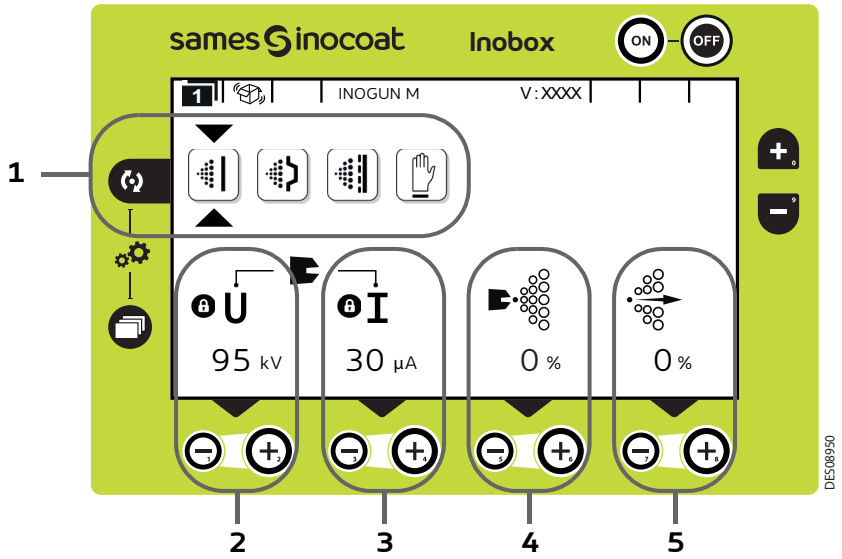
- The **Inobox** has not recognised the equipment to which it is connected or no equipment is connected.

It is therefore necessary:

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

5.1.2. Screen 1: Operating Modes Screen

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



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

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.  .

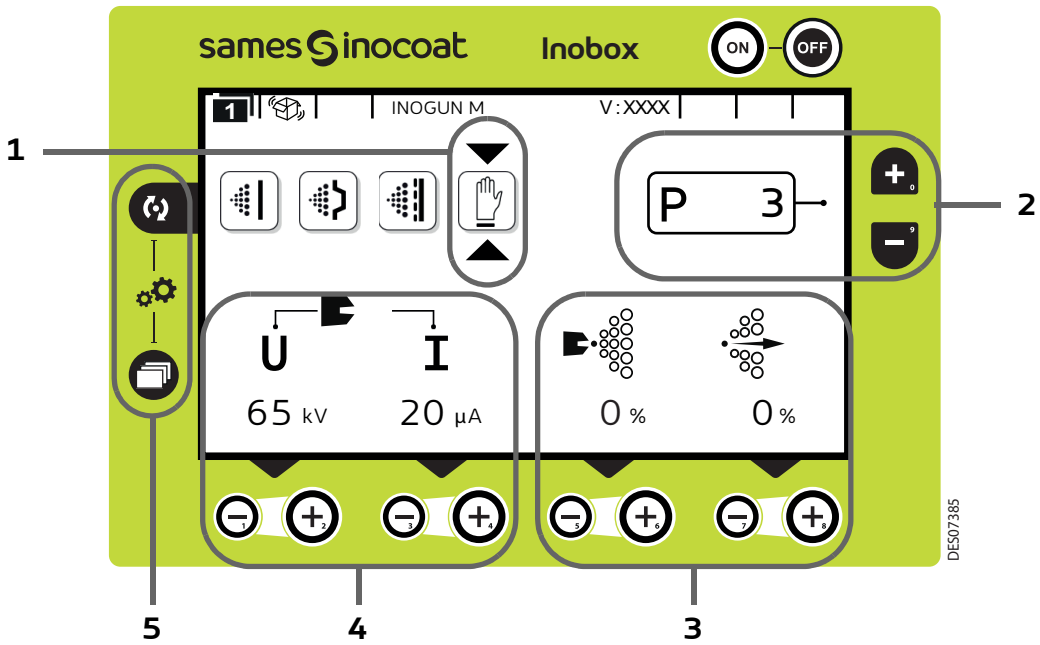
In the custom mode, the voltage and current values can be adjusted using the  and  keys below the value to be changed.
The injection and dilution parameters can be adjusted for each type of part using the corresponding  and  keys.

When spraying is in operation (only with an Inogun M) with voltage at the output, the symbol flashes. The voltage and current settings can no longer be changed.

Press the key  to access the screen 2 (see § 5.1.4 page 20).

5.1.3. Screen 1: Custom mode screen

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

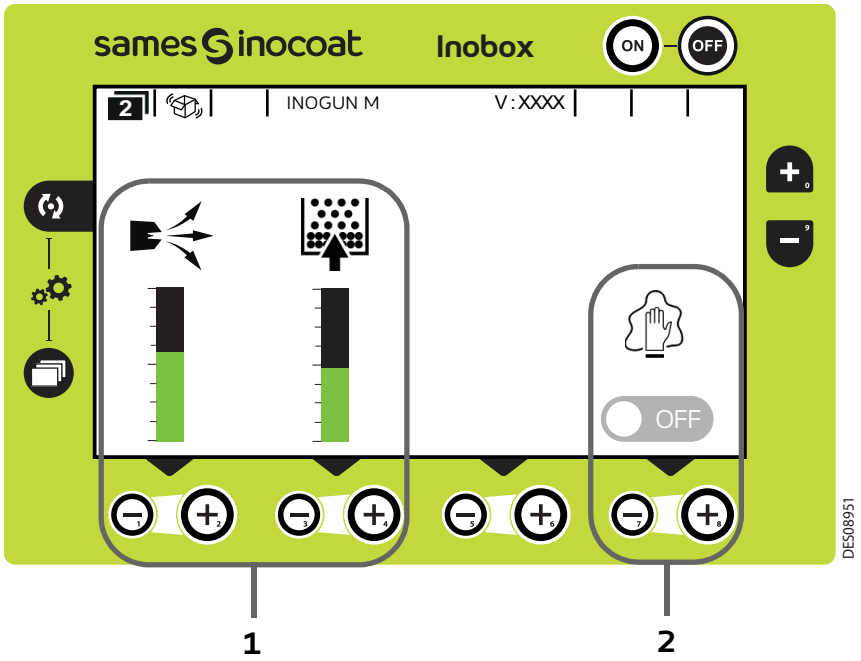


Area	Description
1	Custom mode
2	Program selection: 99 custom programs can be set in voltage, current, injection air and powder flow (see § 5.1.2 page 18). The blowing and fluidization values can also be set for each program. These values can be found on the 2/2 screen. The + and − keys are used to change programs
3	Powder flow rate and conveying air settings for each program.
4	Voltage and current settings for each program. Flashing: Spraying in progress with voltage at the output
5	If both keys are pressed simultaneously, direct access to the parameter setting screen (see § 5.1.5 page 21)

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

5.1.4. Screen 2: Setting of electrode supply air and fluidizing air

In the selected operating modes Simple, Complex and Overpowder and customized, the operator can set the values for electrode blow-out air and fluidization air. He can also activate the cleaning mode.

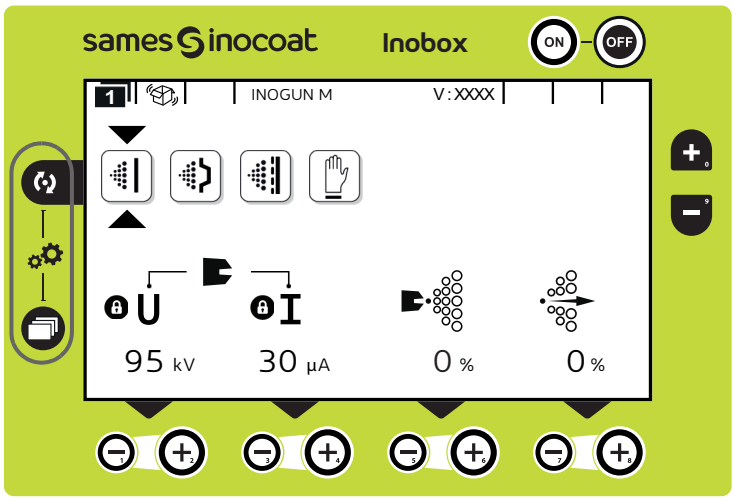


Area	Description
1	Setting the values for electrode blowing air and supply air fluidization using the corresponding ⊕ and ⊖. The values are indicated by the green areas of the associated bargraphs
2	To activate the cleaning mode, press the corresponding ⊕ key, screen 4 appears (see § 5.1.7 page 33)

To return to the previous screen, press the key.

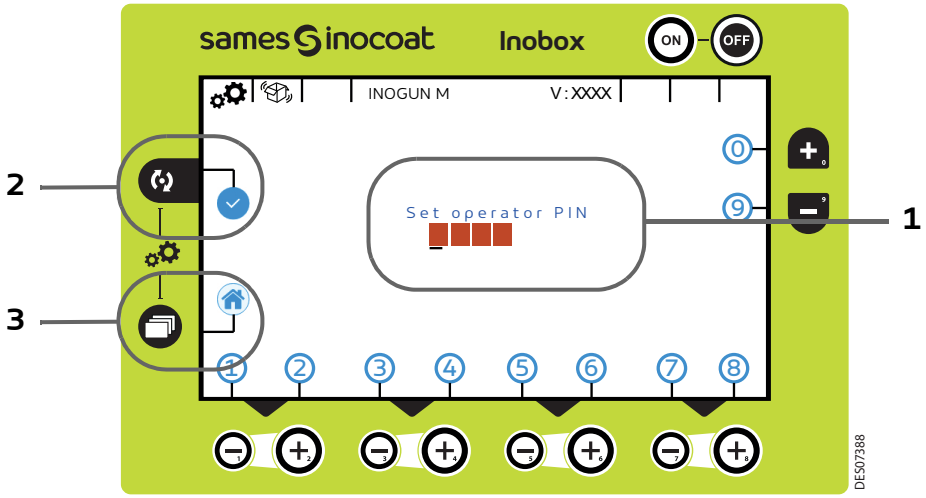
5.1.5. Parameter setting screens

5.1.5.1. Access to the parameter setting screens



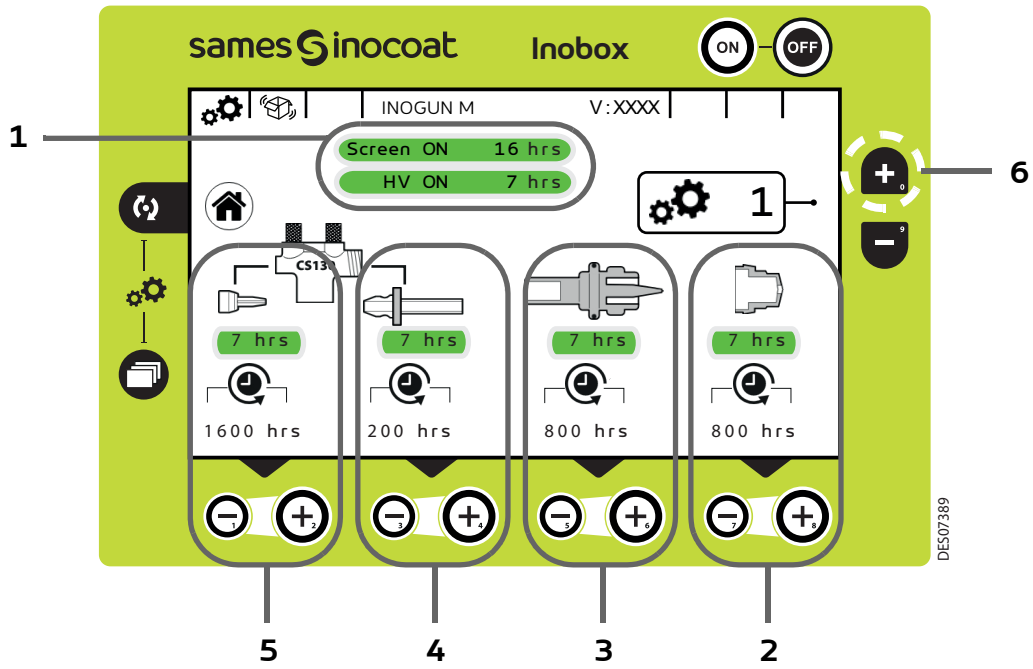
Pressing the 2  and  keys simultaneously for 3 seconds will take the user to the password entry screen.

5.1.5.2. Password Input Screen



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

5.1.5.3. Parameter setting screen 1: Equipment operating time



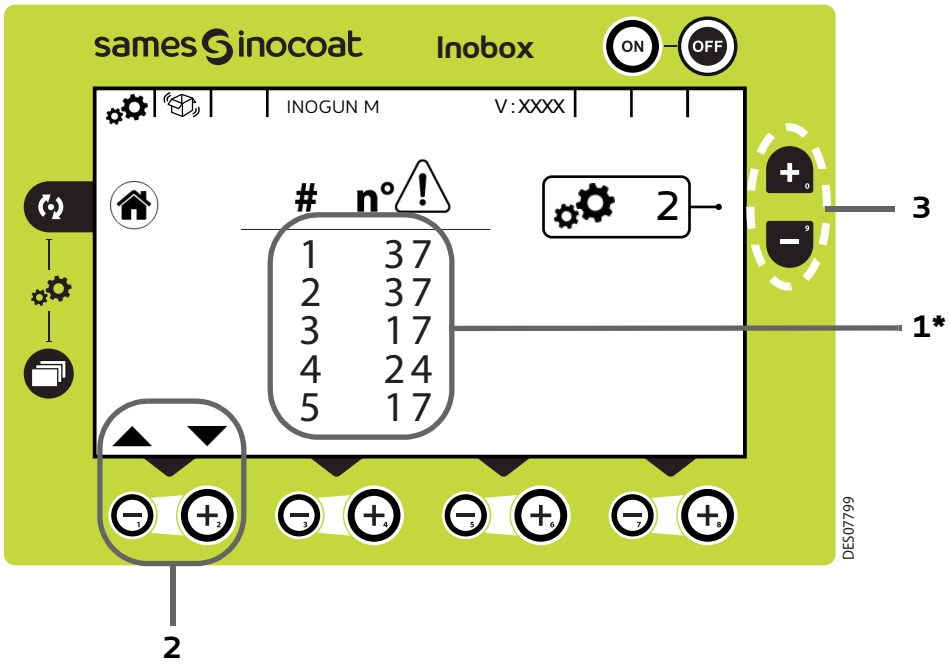
Area	Description
1	Screen and High Voltage Power Run Time
2	Deflector operating time and maintenance threshold settings Press the ⊕ and ⊖ keys to set the alarm corresponding to the desired maintenance threshold.
3	Electrode support operating time and maintenance threshold setting Press the ⊕ and ⊖ keys to set the alarm corresponding to the desired maintenance threshold.
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.
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, press the key + (Area 6).

5.1.5.4. Parameter setting screen 2: Fault History Screen
This screen displays the history of faults that have occurred from the most recent to the oldest.



(*) Fault Nr 1 is the most recent fault that appeared on the module.

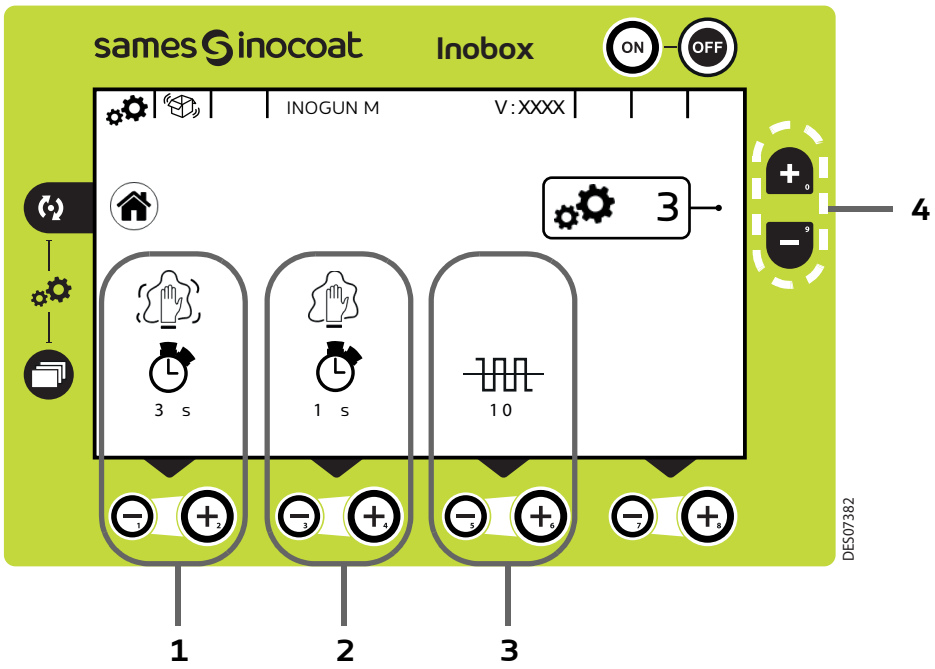
Area	Description
1	Numbering of faults that have occurred and fault number (see § 11.1 page 74)
2	Press the ⊕ key to display the following 5 faults in the list Press the ⊖ key to go back

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

Press the key (Area 3) to access the following setting screen.

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

5.1.5.5. Parameter setting screen 3: Active cleaning phase



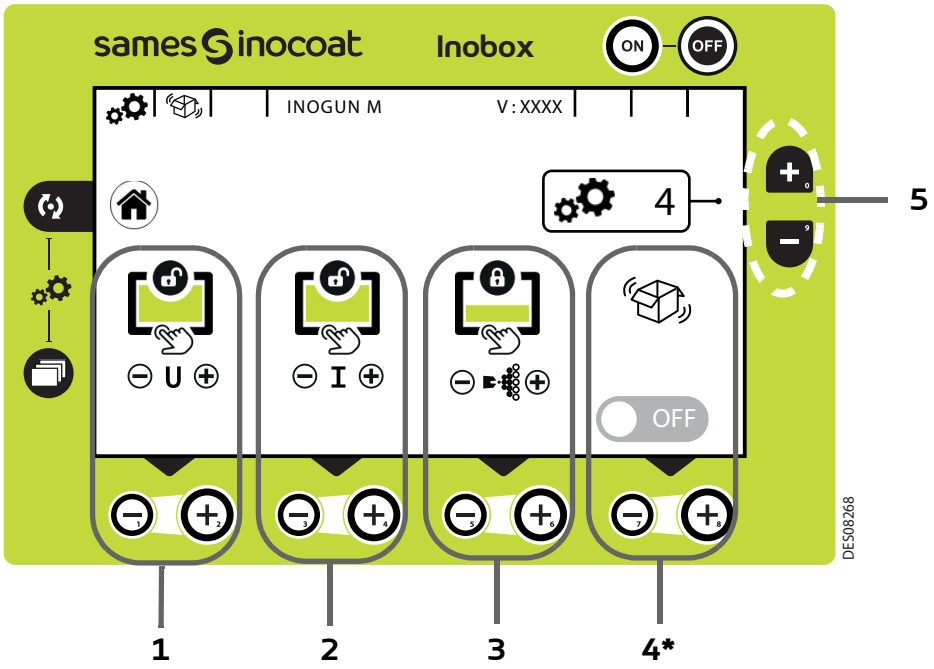
Area	Description
1	Active cleaning cycle time Press the ⊕ key to increase the cleaning time in the active phase and ⊖ key to decrease it
2	Cleaning cycle time at stop (inactive) Press the ⊕ key to increase the cleaning time in the inactive phase and ⊖ key to decrease it
3	Number of active cleaning cycles 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, press the key (Area 4).

To access the previous setting screen (screen 2), press the key (Area 4).

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

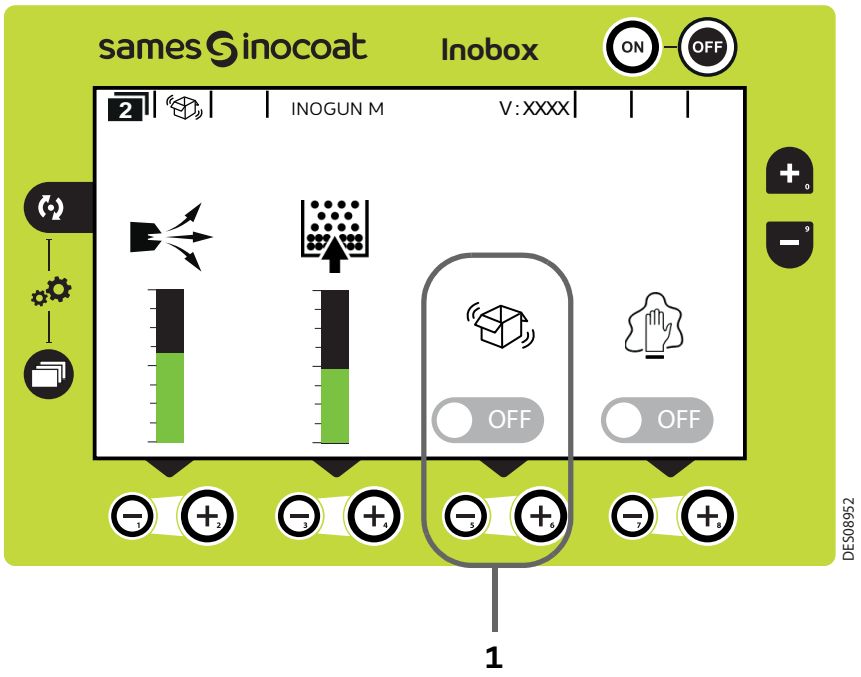


Area	Description
1	Locking / Unlocking the voltage modification Press the ⊕ and ⊖ keys to lock and unlock the voltage setpoint modification
2	Locking / Unlocking the current modification Press the ⊕ and ⊖ keys to lock and unlock the current setpoint modification
3	Locking / Unlocking of the modification of all pilot airs Press the ⊕ and ⊖ keys to lock and unlock the modification of the setpoint of the pilot's airs
4	Locking / Unlocking of the authorisation to use the vibrator at the keyboard Press the ⊕ and ⊖ keys to lock and unlock the authorisation to use the vibrator at the keyboard. The function can be enabled when using a double version cart and thus activate the vibrator by the module on the cart. The other Inobox module is usually mounted opposite the cart.

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

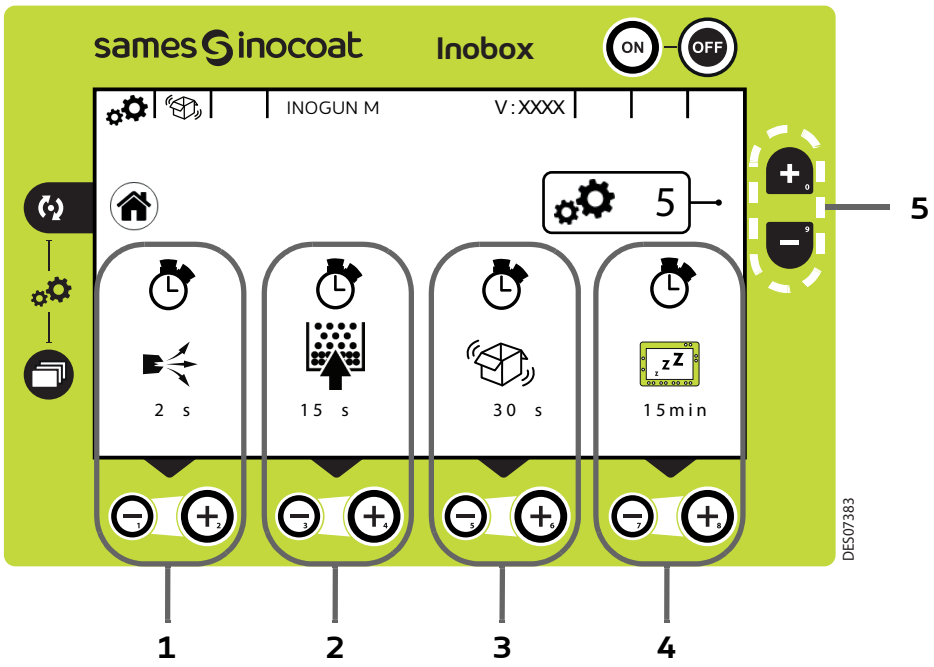
To access the following setting screen, press the ⊕ key (Area 5) and the ⊖ key to access the previous setting screen (screen 3).

Start screen 2 with the activation of the vibrator



Area	Description
1	Activation of the vibrator at the keyboard if the function was previously activated on the parameter screen 4 (see § 5.1.5.6 page 25) Press the ⊕ and ⊖ keys to lock and unlock the vibrator.

5.1.5.7. Parameter setting screen 5: Time Delays



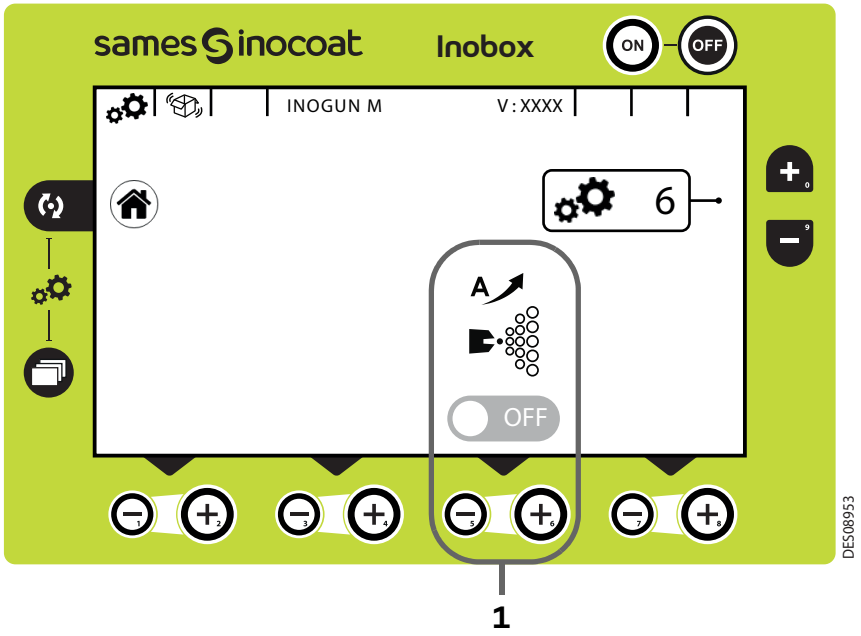
Area	Description
1	Delay of the electrode blowing after the HV control is stopped in seconds Press the ⊕ and ⊖ keys to set the time delay
2	Delay of fluidisation after the HV control is stopped in seconds Press the ⊕ and ⊖ keys to set the time delay
3	Vibrator delay after the HV control is stopped in seconds Press the ⊕ and ⊖ keys to set the time delay
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.

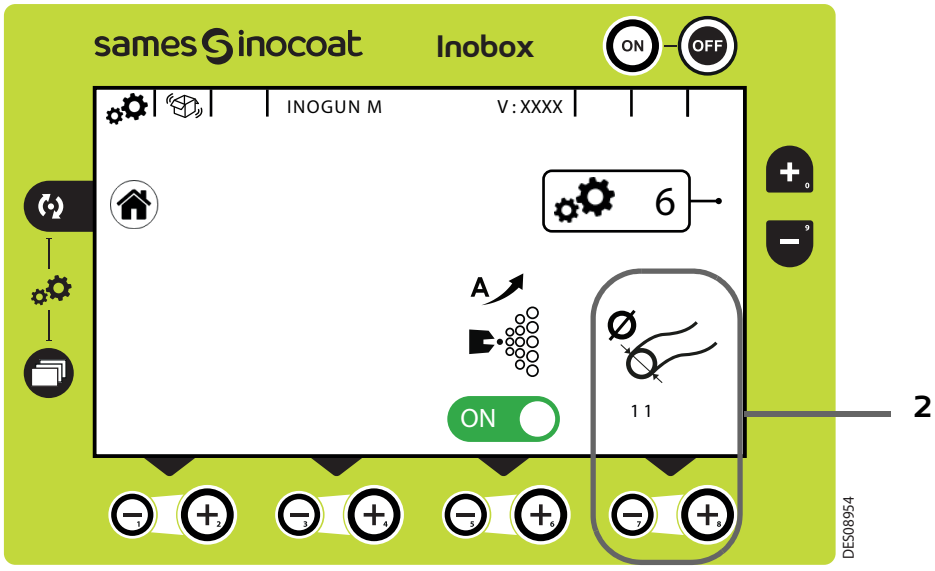
To access the following setting screen, press the ⊕ key (Area 5).

To access the previous setting screen (screen 4), press the ⊖ key (Area 5).

5.1.5.8. Parameter setting screen 6: Inoflow - Automatic control of the dilution air

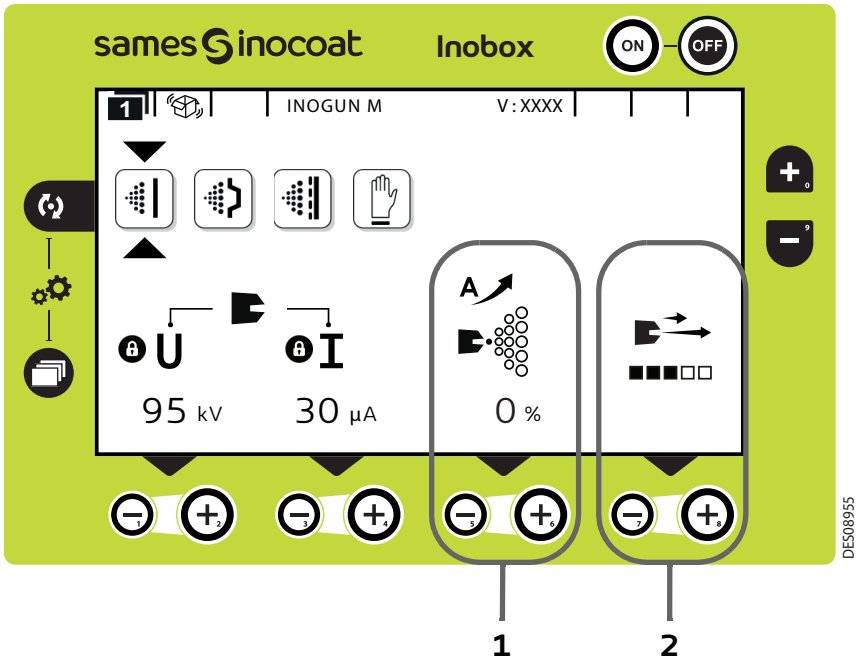


The activation of the Inoflow mode is characterized on the screen by the logo turning green ON and by the selection of the hose diameter (see the screen below).



Area	Description
1	Enable / Disable Inoflow mode
2	Adjusting the diameter of the powder transport hose Press the ⊕ and ⊖ keys to set the hose diameter

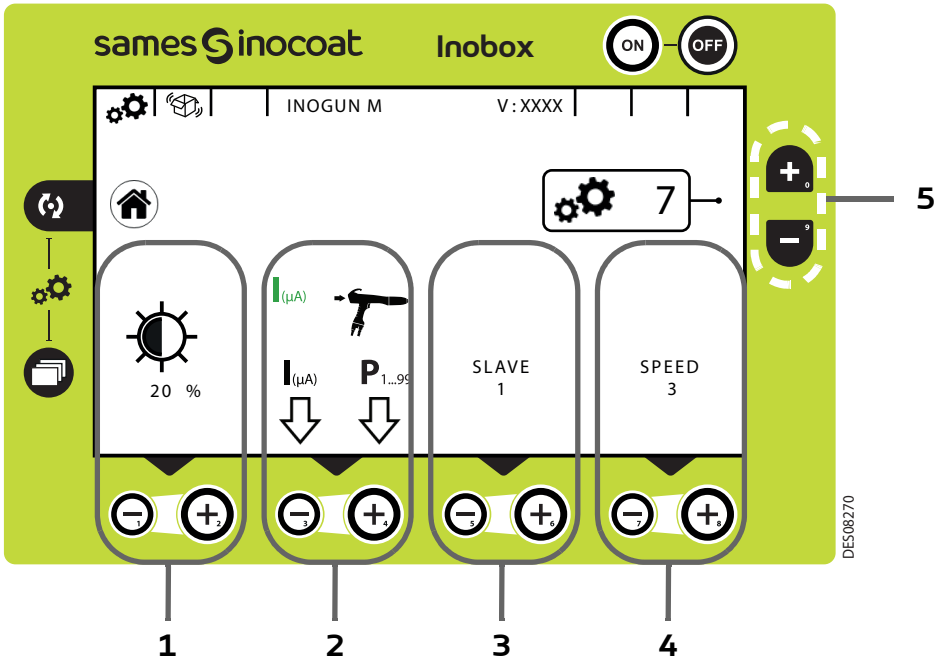
Press the ⟲ key to return to the screen 1 for operating mode selection.



Area	Description
1	Inoflow mode powder flow setting (0 to 100%)
2	5-step adjustment of the speed of powder projection to the gun

Once the Inoflow mode is enabled, the dilution is slaved with the injection.

5.1.5.9. Parameter setting screen 7: **Contrast and Communication Configuration (a CAN link is used)**

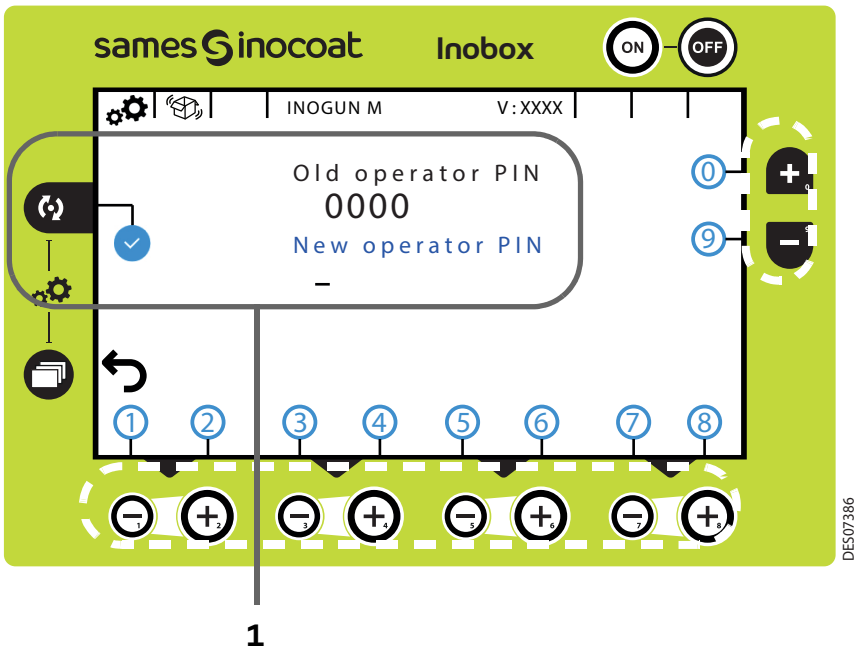


Area	Description
1	Display contrast setting Press the ⊕ and ⊖ keys to set the contrast
2	Selection of the +/- function of the gun keypad Press the key ⊖ to select the current setting Press the key ⊕ to select the program setting
3	Slave number setting Press the ⊕ and ⊖ keys to change the slave number
4	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.

Press the + or − keys (Zone 5) to access the next or previous setting screen.

5.1.5.10. **Access code modification screen for parameter setting screens**



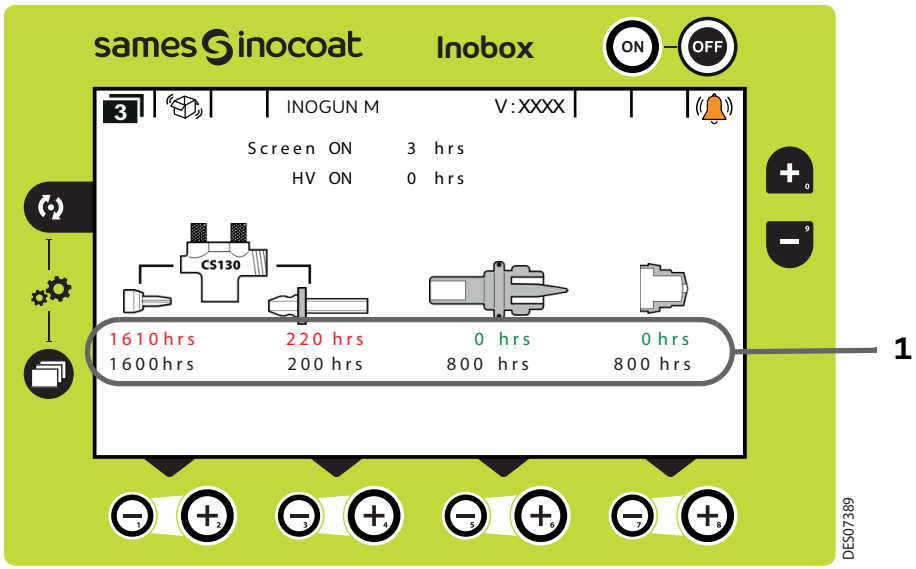
Area	Description
1	To enter a new 4-digit access code: Press the keys associated with numbers 0 to 9. After the sign appears, Press the to validate the new code.

Press the key to access the previous setting screen then

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

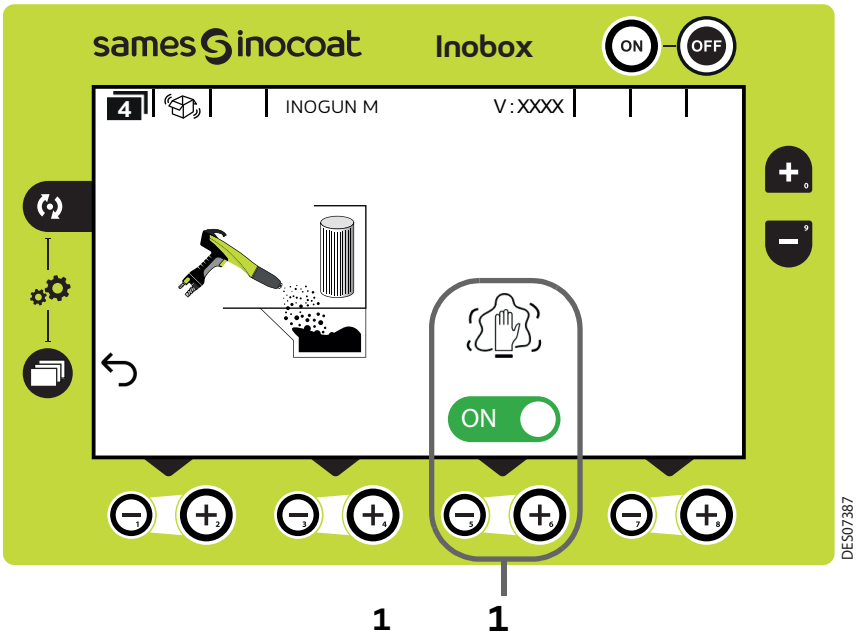
5.1.6. Screen 3: Counter Alarm Screen

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



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

5.1.7. Screen 4: Cleaning screen



Area	Description
1	Activating / Deactivating cleaning mode

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

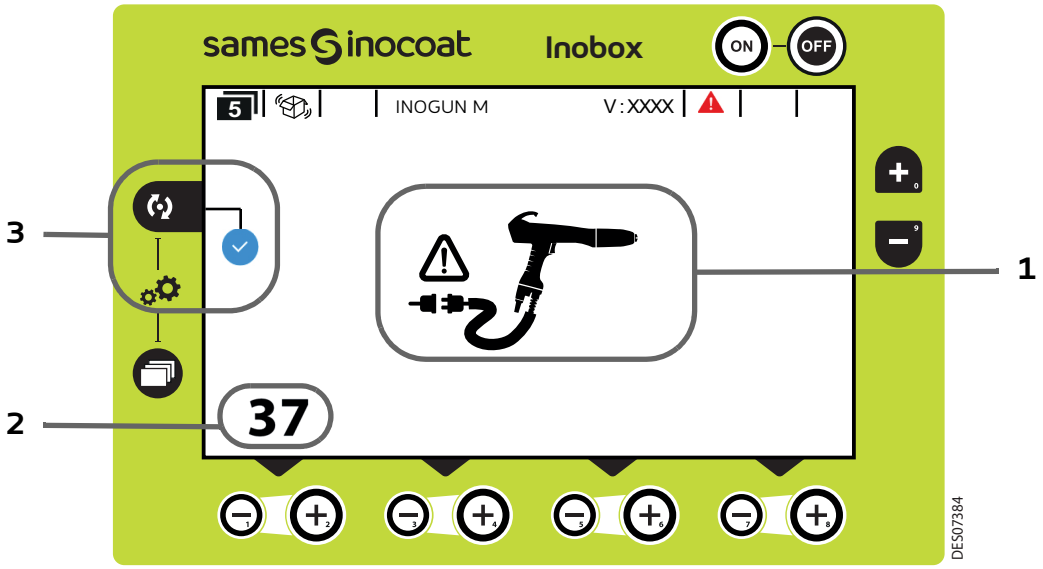
To interrupt the cleaning cycle (before the programmed stop see § 5.1.5.5 page 24) press the key .

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

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

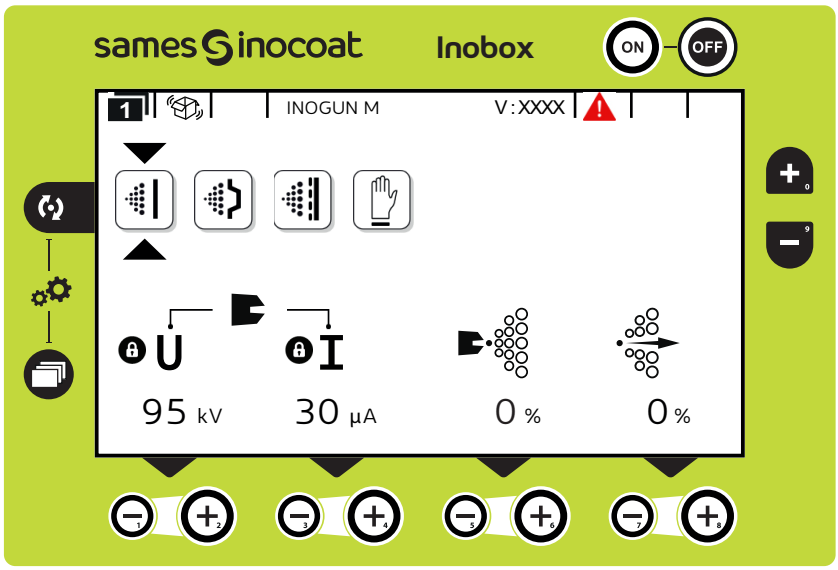
5.1.8. Screen 5: Fault Presence Screen

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:



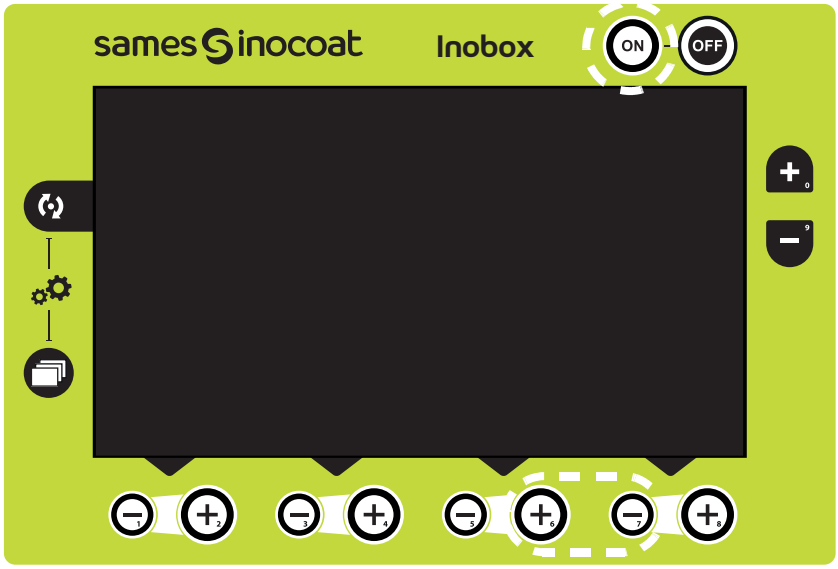
Area	Description
1	Fault icon
2	Fault number
3	Visualization of the fault by the operator Press the key to acknowledge the fault page and return to screen 1.

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.

5.1.9. 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 5 (see § 5.1.5.7 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.

5.2. Inobox VT connected to an Inogun A projector

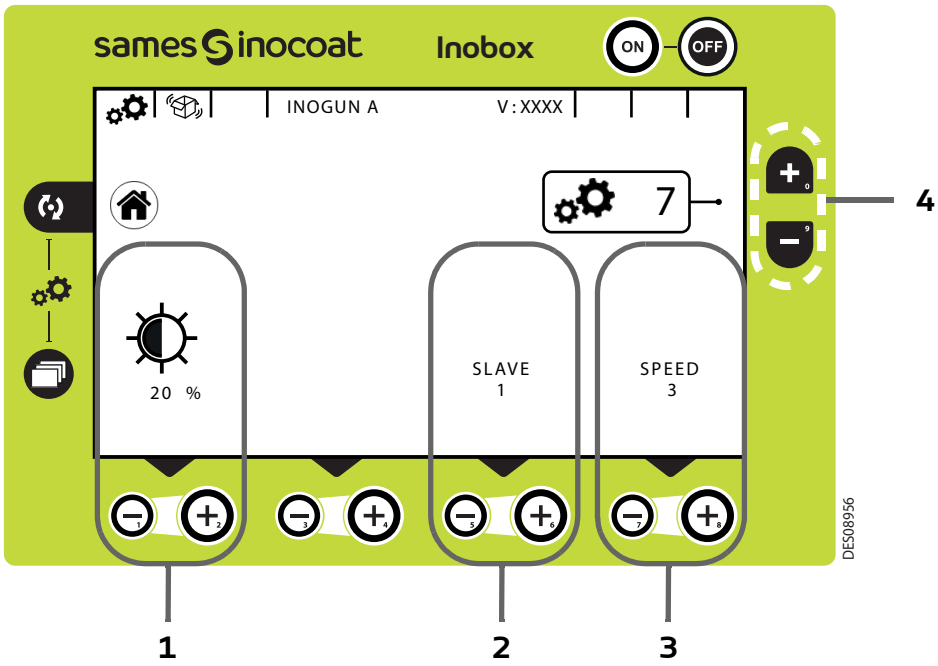
The screens of the Inobox VT connected to an Inogun A are identical to those of a connection to an Inogun M except for the home screen and the settings screen 7 described below:

5.2.1. Start screen of an **Inobox** connected to an **Inogun A** automatic gun.

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

Then after a few seconds the **Inobox** automatically switches to the screen 1.

5.2.2. Parameter setting screen 7: **Contrast and Communication Configuration (a CAN link is used)**



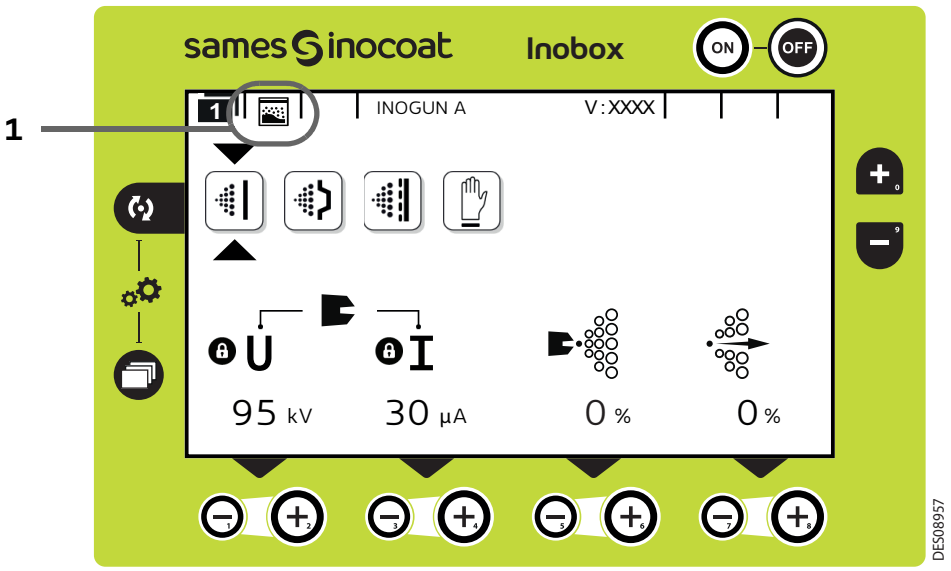
Area	Description
1	Display contrast setting Press the ⊕ and ⊖ keys to set the contrast
2	Slave number setting Press the ⊕ and ⊖ keys to change the slave number
3	Communication speed setting Press the ⊕ and ⊖ keys to change the communication speed if a CAN link is used

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

Press the ⊕ or ⊖ keys (Zone 4) to access the next or previous setting screen.

6. Use of the different menus of the Inobox H control module

The screens of the **Inobox H** are identical to those of the **Inobox VT** whatever the type of gun connected.



The icon in **Zone 1** indicates the type of **Inobox** tank control module.

7. Use of the different menus of the Inobox NF control module

7.1. Inobox NF connected to an Inogun M ou M + manual spray gun

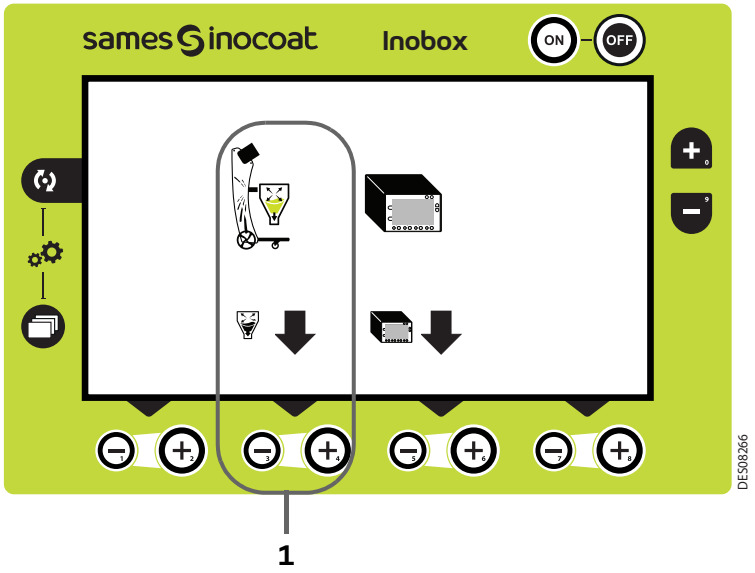
7.1.1. Start screens

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

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

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

- The **Inobox** is connected in NF version. It allows to choose either the pressure tank mode or the mode of an integrated equipment on an installation without fluidization control.



Press ⊕ key in **zone 1**, to select the pressure tank and the **Inobox** automatically switches to the next screen.

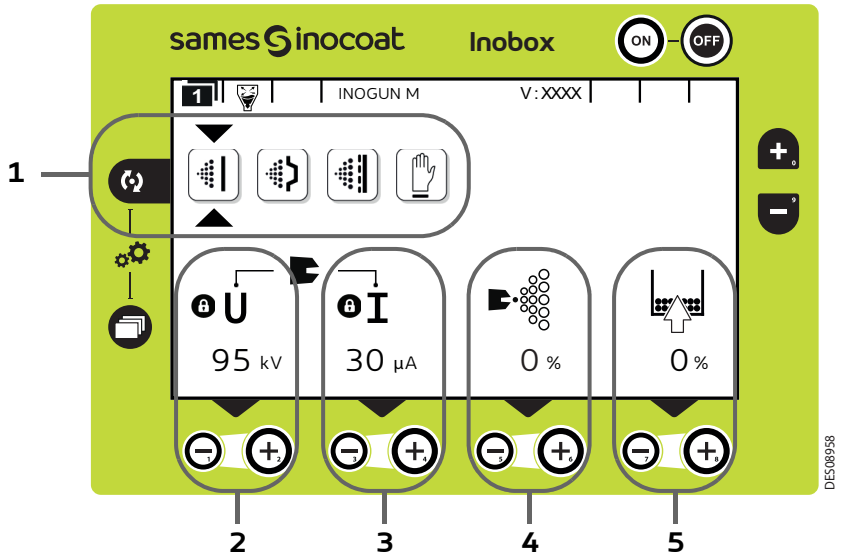
- The **Inobox** has not recognized the equipment to which it is connected or no equipment is connected.

It is therefore necessary:

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

7.1.2. Screen 1: Operating Modes Screen

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



Area	Description
1	Choice of presets, 4 modes are available
2	Voltage setting (available only in custom mode)
3	Current setting (available only in custom mode)
4	Setting the injection air or powder flow rate
5	Setting of the fluidization air which also helps the conveying air because the tank is closed and sealed.

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.  .

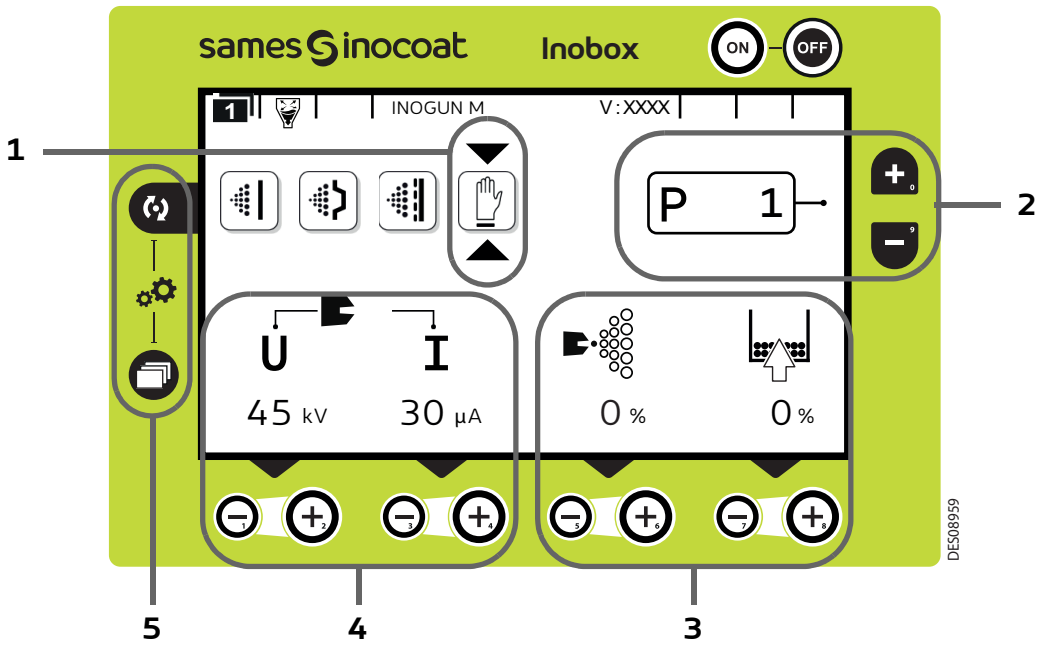
In the custom mode, the voltage and current values can be adjusted using the  and  keys below the value to be changed.
The injection and dilution parameters can be adjusted for each type of part using the corresponding  and  keys.

When spraying is in operation (only with an Inogun M) with voltage at the output, the symbol  flashes. The voltage and current settings can no longer be changed.

Press the key  to access the screen 2 (see § 7.1.4 page 43).

7.1.3. Screen 1: Custom mode screen

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

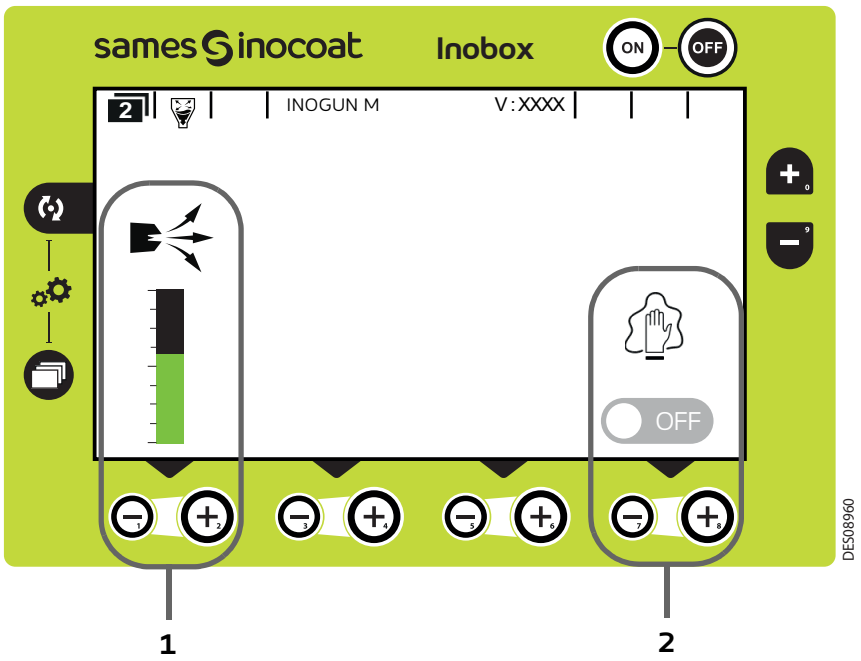


Area	Description
1	Custom mode
2	Program selection: 99 custom programs can be set in voltage, current, injection air and powder flow (see § 7.1.2 page 41). The + and − keys are used to change programs
3	Powder flow rate and fluidization air settings for each program.
4	Voltage and current settings for each program. Flashing: Spraying in progress with voltage at the output
5	If both keys are pressed simultaneously, direct access to the parameter setting screen (see § 7.1.5 page 44)

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

7.1.4. Screen 2: Setting of electrode supply air

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

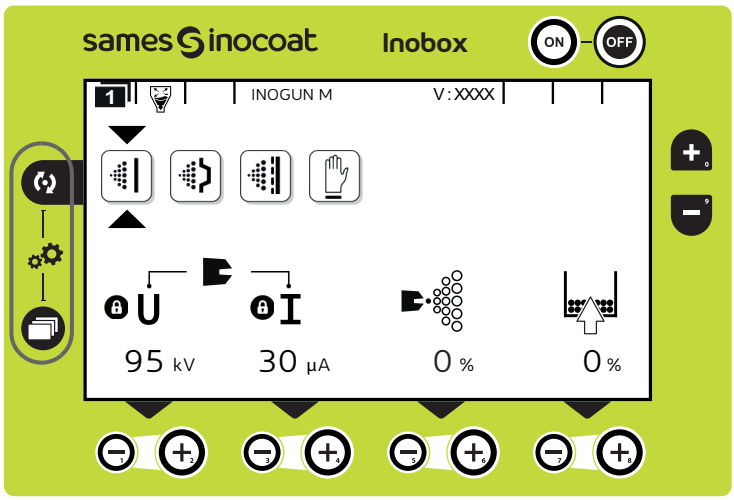


Area	Description
1	Setting the values for electrode blowing air using the corresponding ⊕ and ⊖ . The values are indicated by the green areas of the associated bargraphs
2	To activate the cleaning mode, press the corresponding ⊕ key, screen 4 appears (see § 7.1.7 page 53)

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

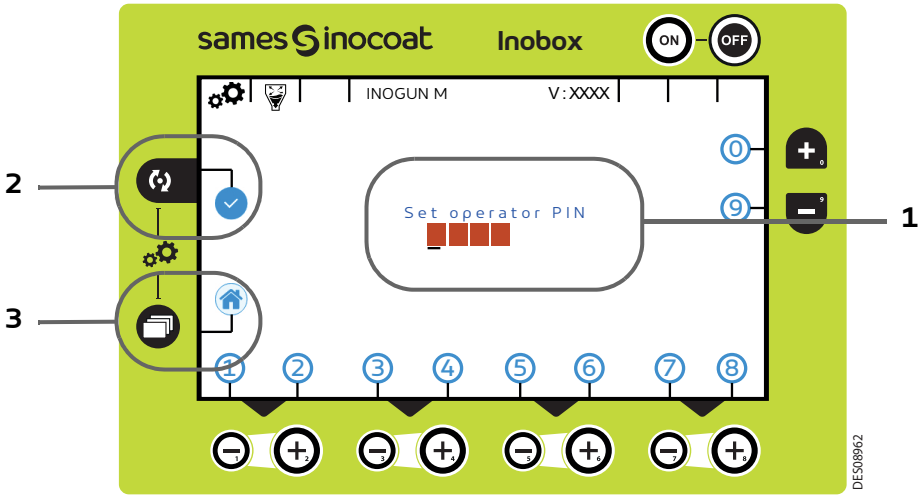
7.1.5. Parameter setting screens

7.1.5.1. Access to the parameter setting screens



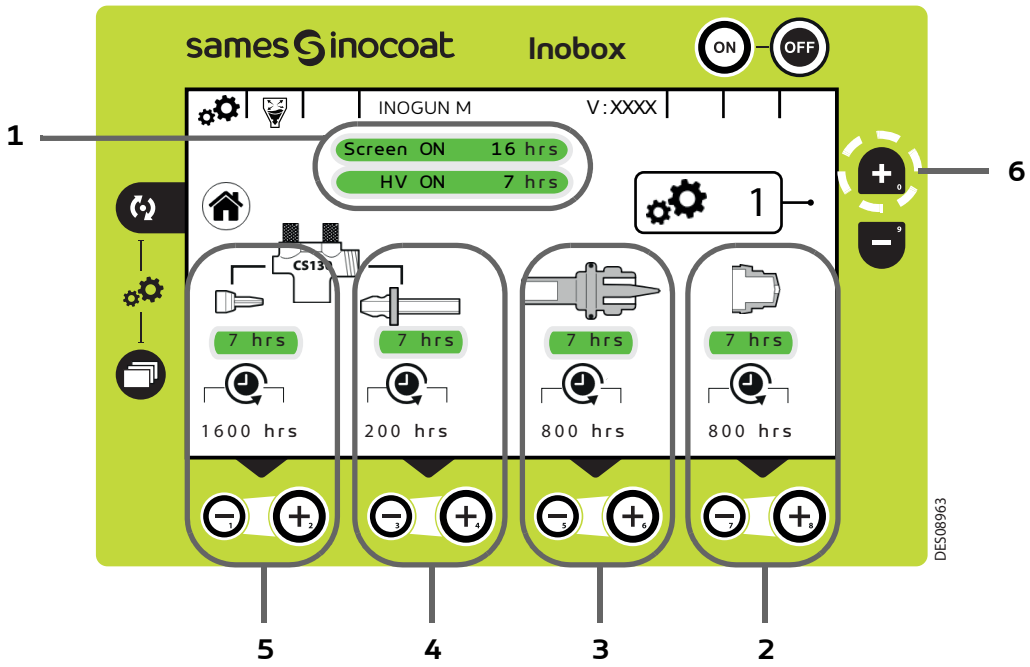
Pressing the 2  and  keys simultaneously for 3 seconds will take the user to the password entry screen.

7.1.5.2. Password Input Screen



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

7.1.5.3. Parameter setting screen 1: Equipment operating time



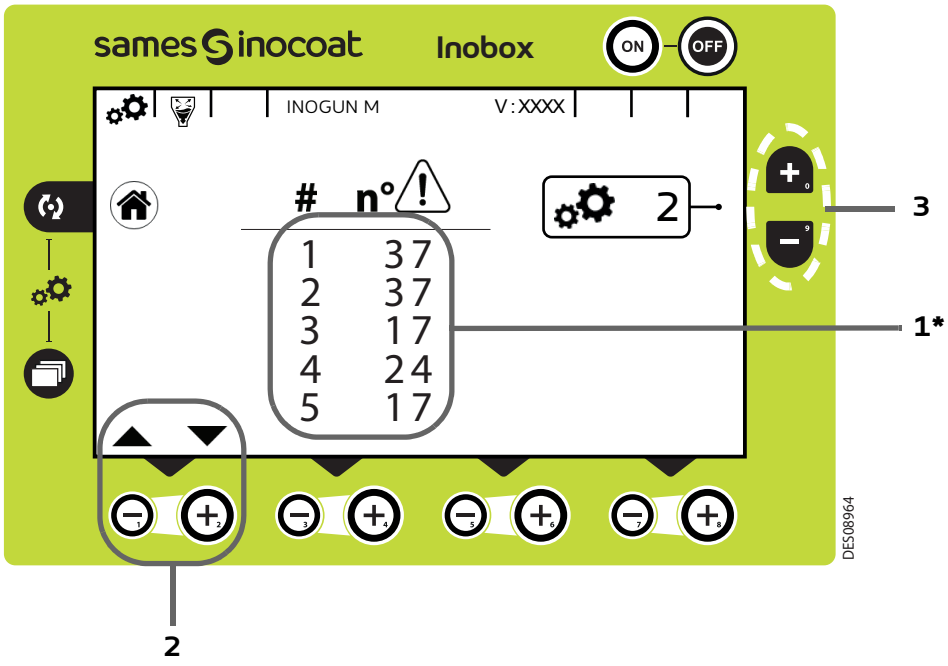
Area	Description
1	Screen and High Voltage Power Run Time
2	Deflector operating time and maintenance threshold settings Press the ⊕ and ⊖ keys to set the alarm corresponding to the desired maintenance threshold.
3	Electrode support operating time and maintenance threshold setting Press the ⊕ and ⊖ keys to set the alarm corresponding to the desired maintenance threshold.
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.
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, press the key (Area 6).

7.1.5.4. Parameter setting screen 2: Fault History Screen
This screen displays the history of faults that have occurred from the most recent to the oldest.



(*) Fault Nr 1 is the most recent fault that appeared on the module.

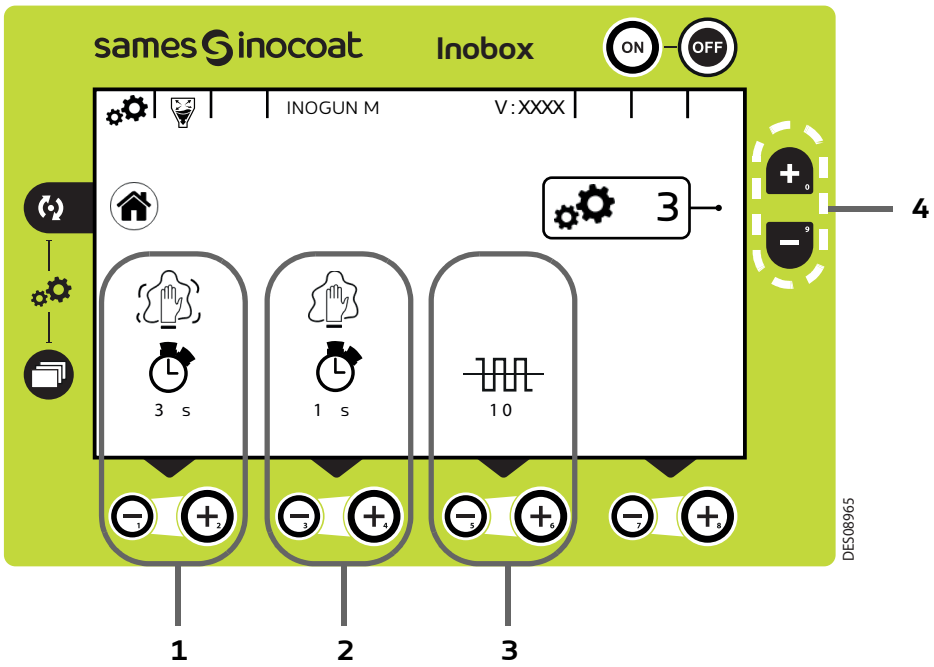
Area	Description
1	Numbering of faults that have occurred and fault number (see § 11.1 page 74)
2	Press the ⊕ key to display the following 5 faults in the list Press the ⊖ key to go back

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

Press the key (Area 3) to access the following setting screen.

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

7.1.5.5. Parameter setting screen 3: Active cleaning phase



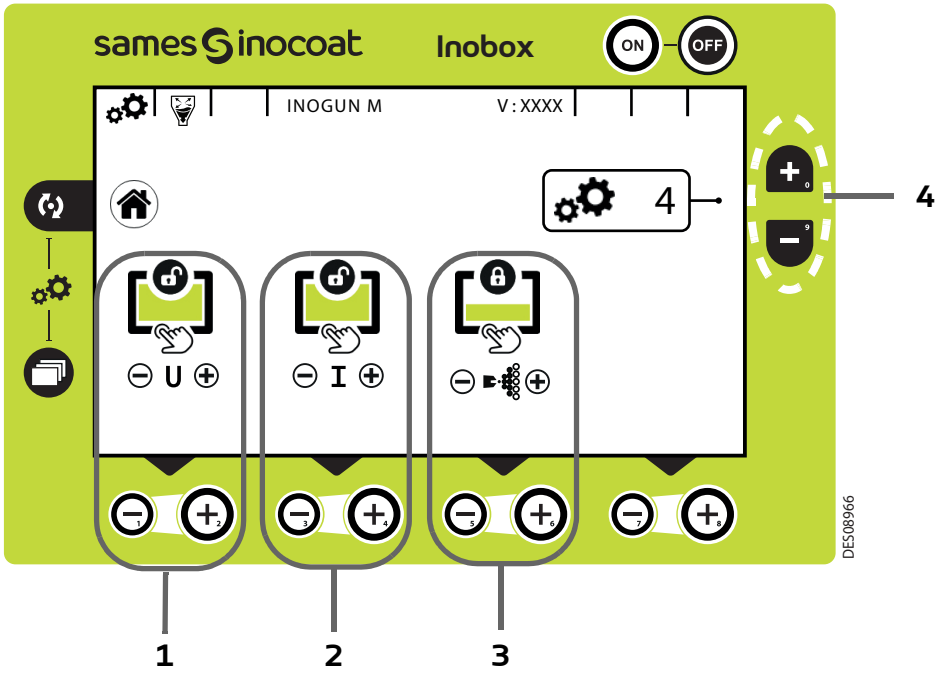
Area	Description
1	Active cleaning cycle time Press the ⊕ key to increase the cleaning time in the active phase and ⊖ key to decrease it
2	Cleaning cycle time at stop (inactive) Press the ⊕ key to increase the cleaning time in the inactive phase and ⊖ key to decrease it
3	Number of active cleaning cycles 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, press the key (Area 4).

To access the previous setting screen (screen 2), press the key (Area 4).

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

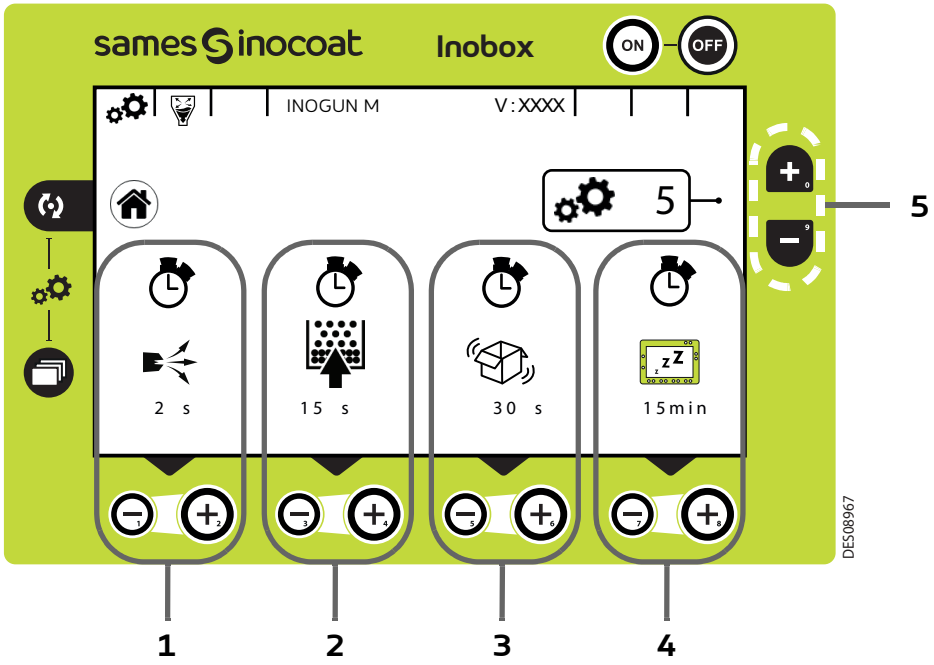


Area	Description
1	Locking / Unlocking the voltage modification Press the ⊕ and ⊖ keys to lock and unlock the voltage setpoint modification
2	Locking / Unlocking the current modification Press the ⊕ and ⊖ keys to lock and unlock the current setpoint modification
3	Locking / Unlocking of the modification 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, press the key (Area 4) and the key to access the previous setting screen (screen 3).

7.1.5.7. Parameter setting screen 5: Time Delays



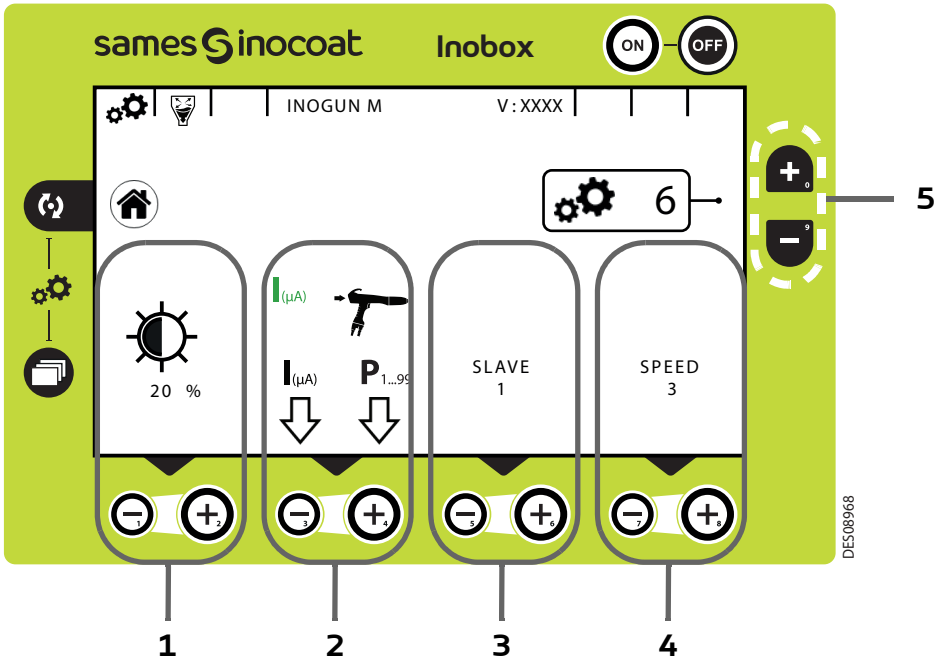
Area	Description
1	Delay of the electrode blowing after the HV control is stopped in seconds Press the ⊕ and ⊖ keys to set the time delay
2	Delay of fluidisation delay after the HV control is stopped in seconds Press the ⊕ and ⊖ keys to set the time delay
3	Vibrator delay after the HV control is stopped in seconds Press the ⊕ and ⊖ keys to set the time delay
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, press the key (Area 5).

To access the previous setting screen (screen 4), press the key (Area 5).

7.1.5.8. Parameter setting screen 6: **Contrast and Communication Configuration (a CAN link is used)**

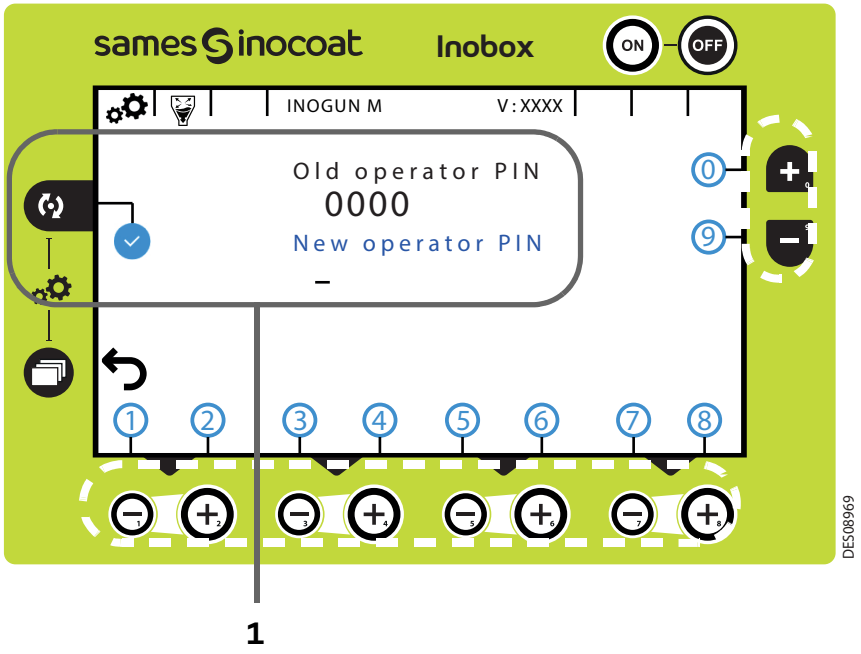


Area	Description
1	Display contrast setting Press the ⊕ and ⊖ keys to set the contrast
2	Selection of the +/- function of the gun keypad Press the key ⊖ to select the current setting Press the key ⊕ to select the program setting
3	Slave number setting Press the ⊕ and ⊖ keys to change the slave number
4	Communication speed setting Press the ⊕ and ⊖ keys to change the communication speed if a CAN link is used (see § 12 page 77)

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

Press the + or − keys (Zone 5) to access the next or previous setting screen.

7.1.5.9. Access code modification screen for parameter setting screens



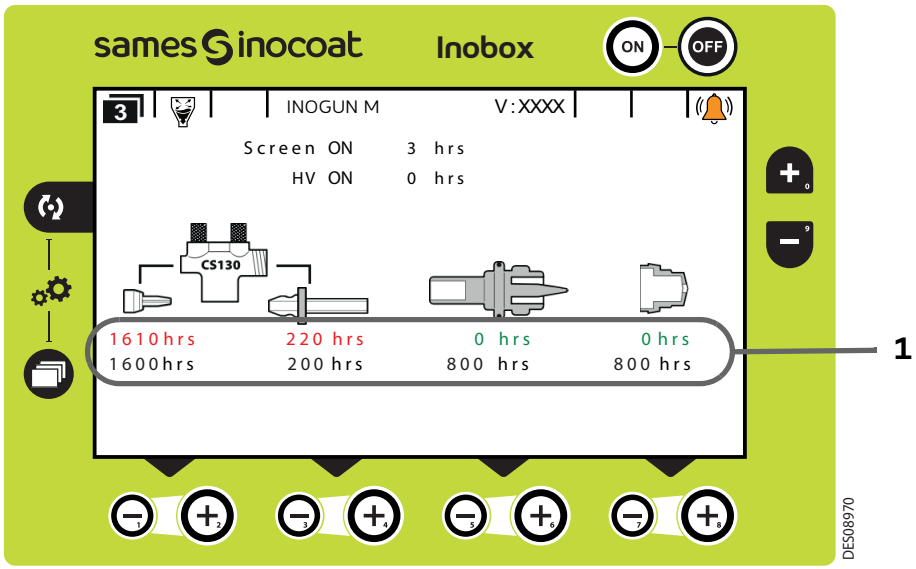
Area	Description
1	To enter a new 4-digit access code: Press the keys associated with numbers 0 to 9. After the sign appears, Press the to validate the new code.

Press the key to access the previous setting screen then

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

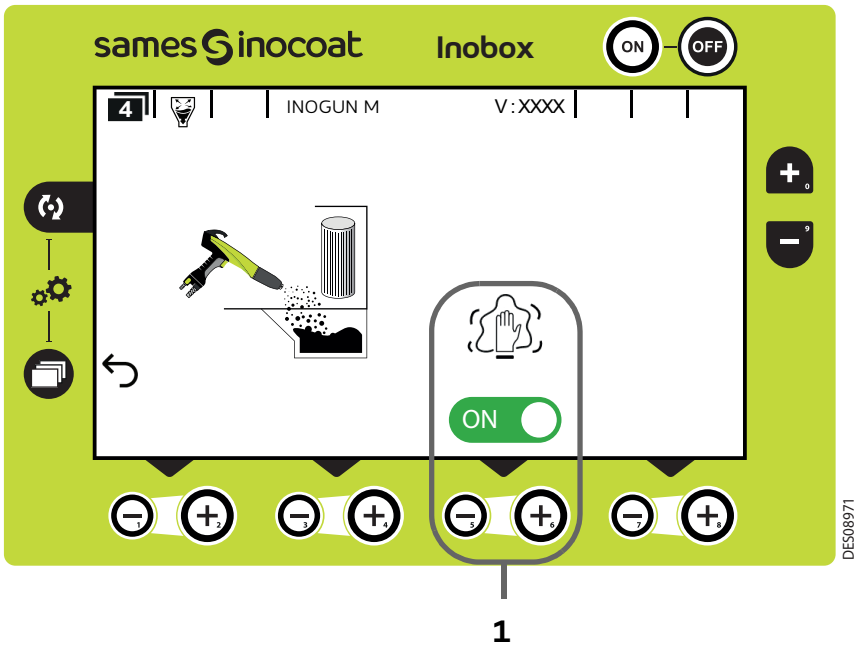
7.1.6. Screen 3: Counter Alarm Screen

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



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

7.1.7. Screen 4: Cleaning screen



Area	Description
1	Activating / Deactivating cleaning mode

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

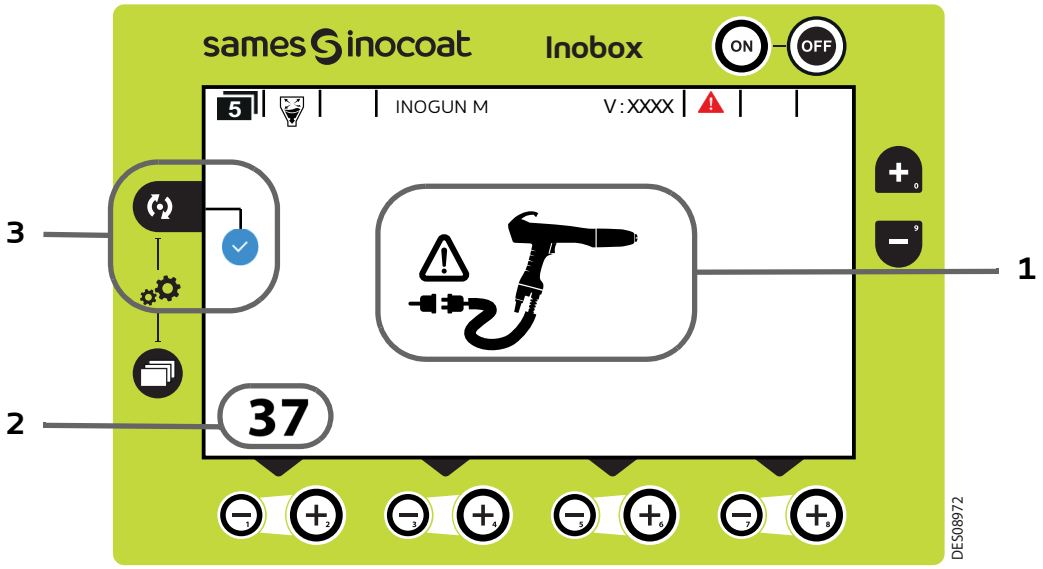
To interrupt the cleaning cycle (before the programmed stop(see § 7.1.5.5 page 47) press the key .

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

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

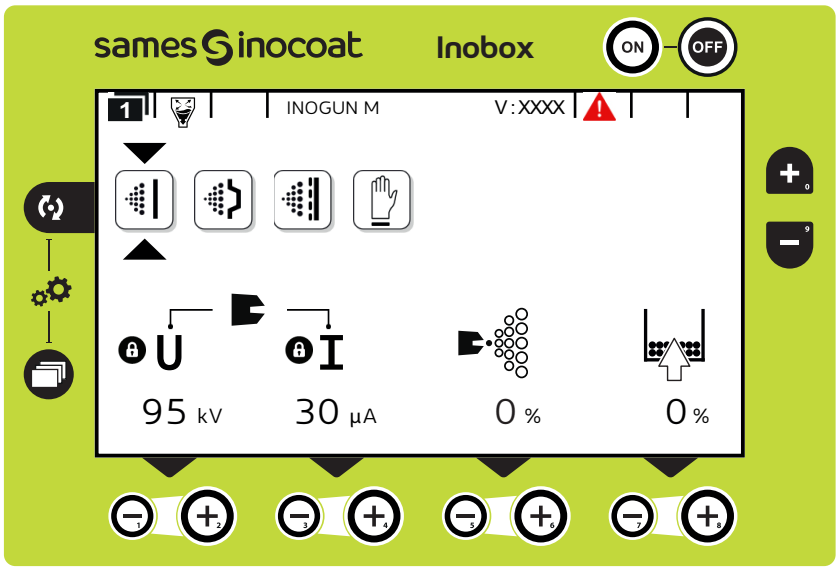
7.1.8. Screen 5: Fault Presence Screen

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:



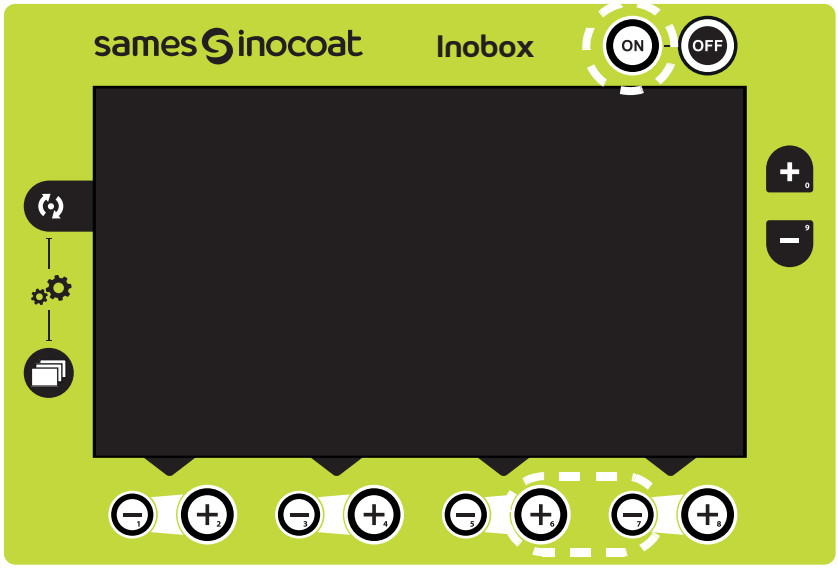
Area	Description
1	Fault icon
2	Fault number
3	Visualization of the fault by the operator Press the key to acknowledge the fault page and return to screen 1.

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.

7.1.9. 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 5 (see § 7.1.5.7 page 49).
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.

7.2. Inobox NF connected to an Inogun A automatic gun

The screens of the Inobox NF connected to an Inogun A are identical to those of a connection to an Inogun M except for the home screen and screen 2 described below:

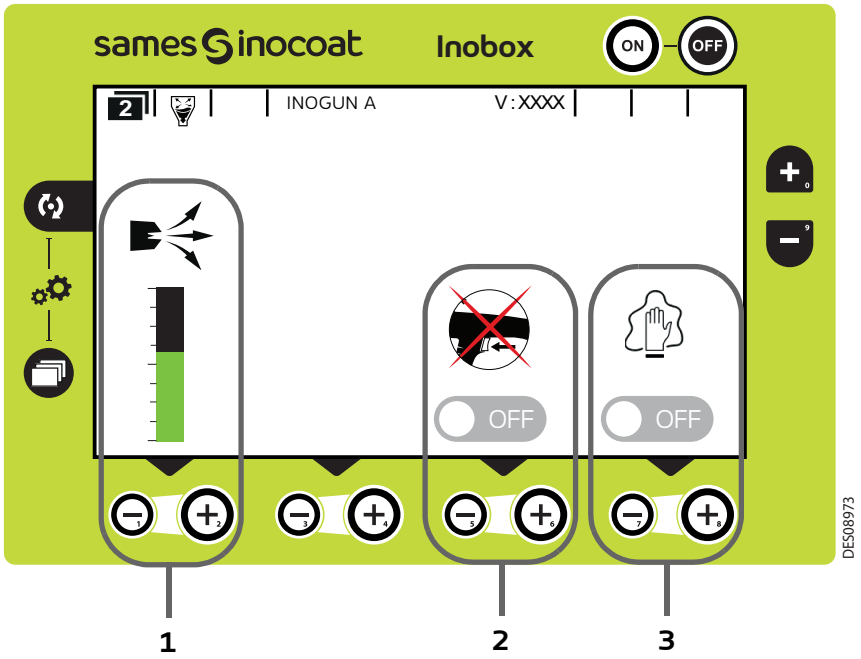
7.2.1. Start screen of an **Inobox** connected to an **Inogun A** automatic gun.

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

After a few seconds, the **Inobox** automatically switches to the screen to select the pressure tank mode or the mode of an integrated equipment on a system without fluidization control.

7.2.2. Screen 2: Setting of electrode supply air

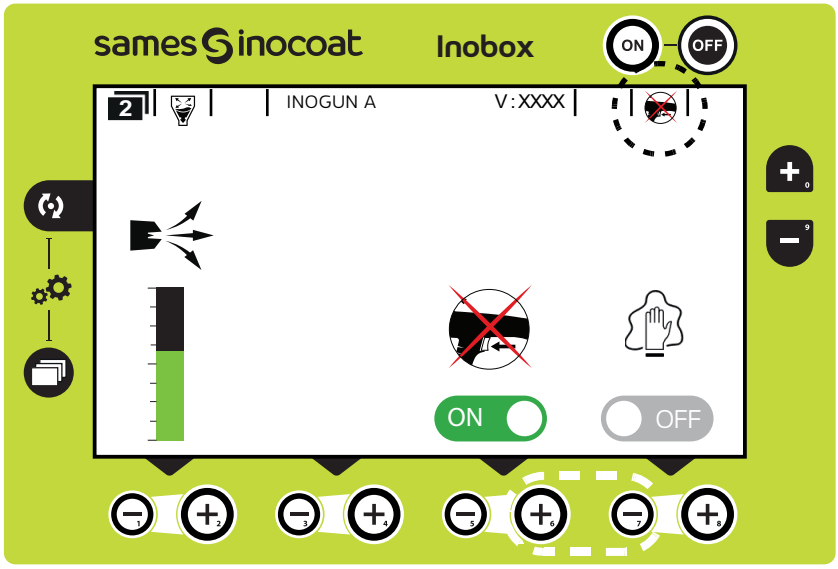
In the selected operating modes Simple, Complex and Overpowder, the operator can set the values for electrode blow-out air. He can also enable the trigger prohibition and the cleaning mode.



Zone	Description
1	Setting the values for electrode blowing air using the corresponding ⊕ and ⊖ . The values are indicated by the green areas of the associated bargraphs
2	Trigger prohibition To enable the trigger prohibition, press the corresponding ⊕ key (see § 7.2.2.1 page 58)
3	To activate the cleaning mode, press the corresponding ⊕ key, screen 4 appears

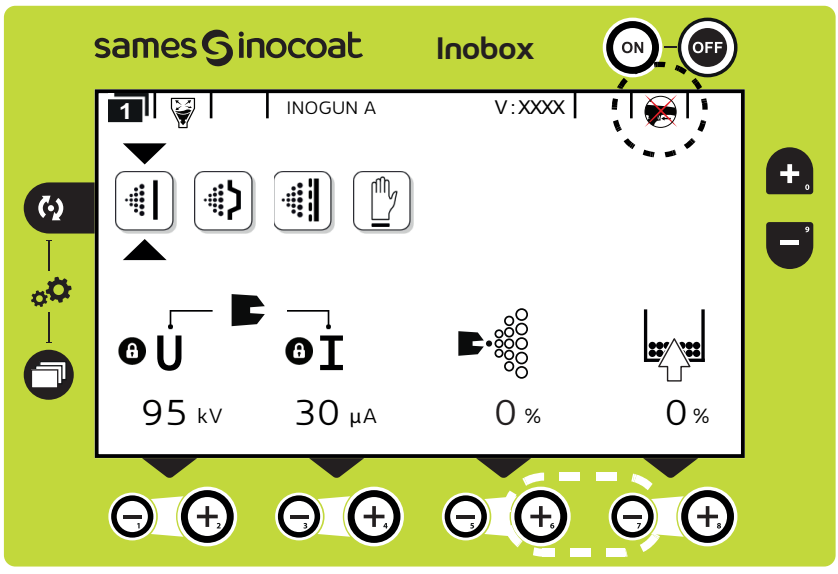
To return to the previous screen, press the key. .

7.2.2.1. Trigger lock activation



The activation of the trigger lock mode is characterized on the screen by the logo turning green ON and by the display of the trigger lock icon at the top right of the screen.

To return to the previous screen, press the key.



When the trigger lock mode is activated, the Trigger lock icon will appear in the upper right corner of the screen.

7.3. Inobox NF connected to an Inogun M/M+ manual gun or an Inogun A automatic gun on a installation without fluidization control

7.3.1. Start screens

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

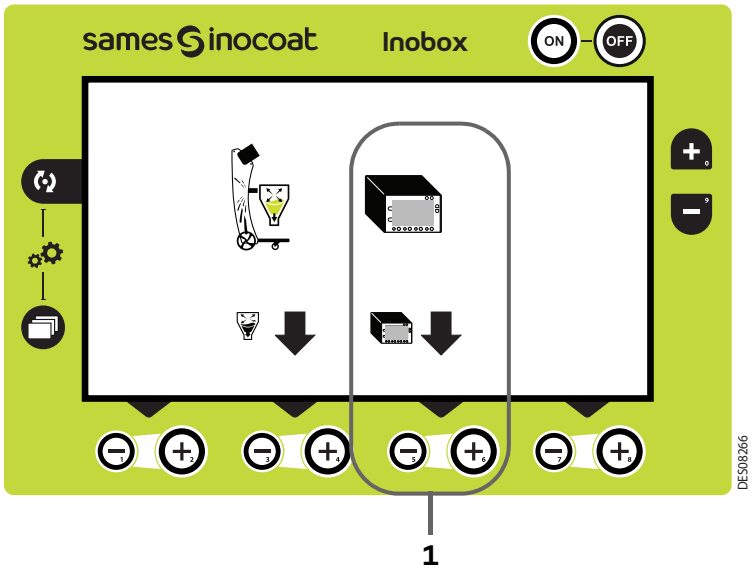
- The **Inobox** is connected to a **Inogun M** or **M +** spray gun.

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

- The **Inobox** is connected to an **Inogun A** automatic gun.

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

- The Inobox is connected in NF version. It allows to choose either the pressure tank mode or the mode of an integrated equipment on an installation without fluidization control.



Press the key in **zone 1** to select the mode of an integrated equipment on a system without fluidization control, and the **Inobox** automatically switches to the next screen.

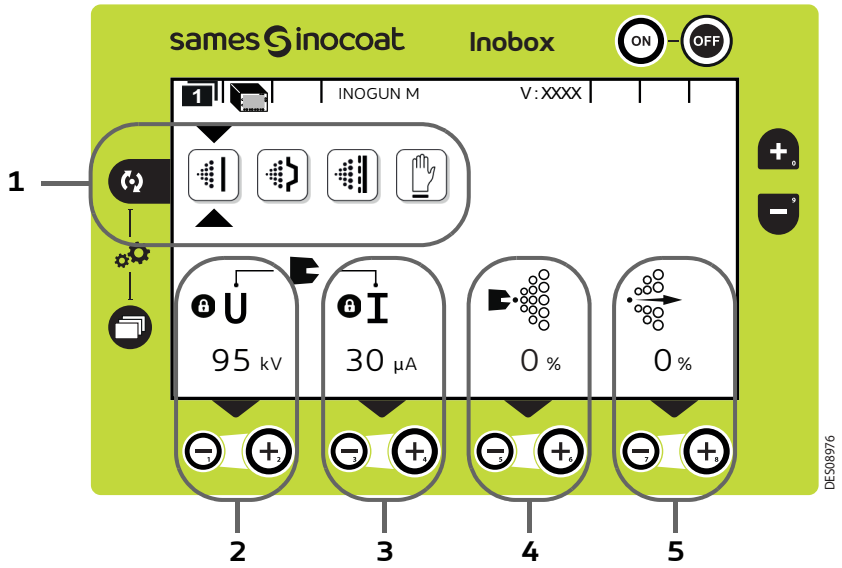
- The **Inobox** has not recognised the equipment to which it is connected or no equipment is connected.

It is therefore necessary:

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

7.3.2. Screen 1: Operating Modes Screen

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



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

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.

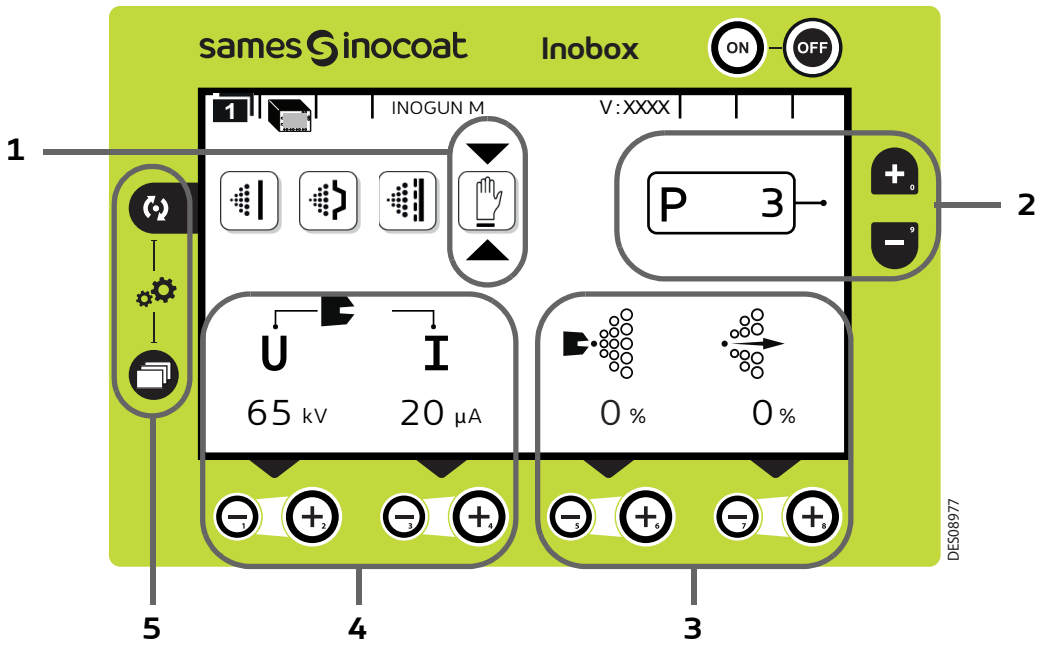
In the custom mode, the voltage and current values can be adjusted using the and keys below the value to be changed.
The injection and dilution parameters can be adjusted for each type of part using the corresponding and keys.

When spraying is in operation (only with an Inogun M) with voltage at the output, the symbol flashes. The voltage and current settings can no longer be changed.

Press the key to access the screen 2 (see § 7.3.4 page 63).

7.3.3. Screen 1: Custom mode screen

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

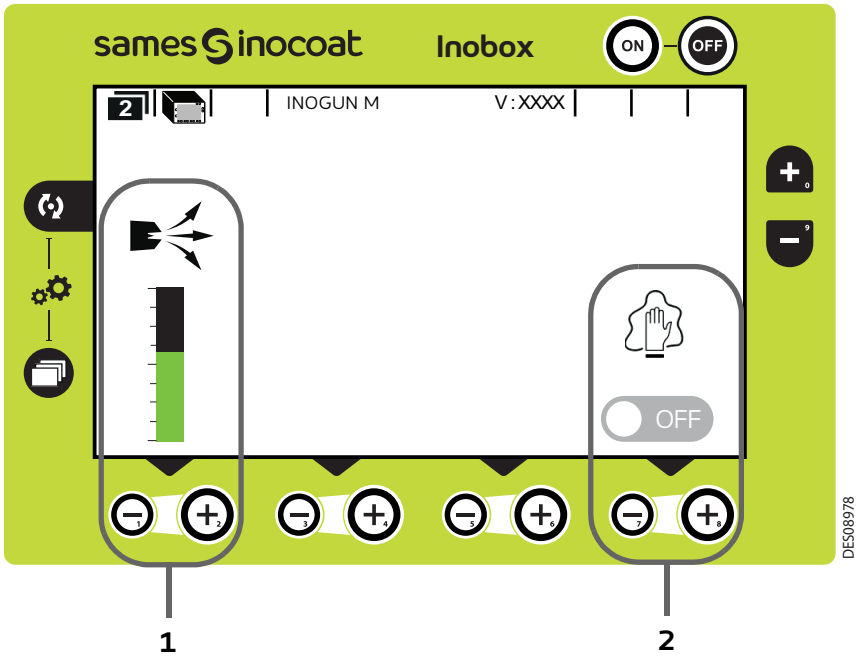


Area	Description
1	Custom mode
2	Program selection: 99 custom programs can be set in voltage, current, injection air and powder flow (see § 7.3.2 page 61). The blowing and fluidization values can also be set for each program. These values can be found on the 2/2 screen. The + and − keys are used to change programs
3	Powder flow rate and conveying air settings for each program.
4	Voltage and current settings for each program. Flashing: Spraying in progress with voltage at the output
5	If both keys are pressed simultaneously, direct access to the parameter setting screen (see § 7.3.6 page 66)

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

7.3.4. Screen 2: Setting of electrode supply air in **Inogun M/ M+** version

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

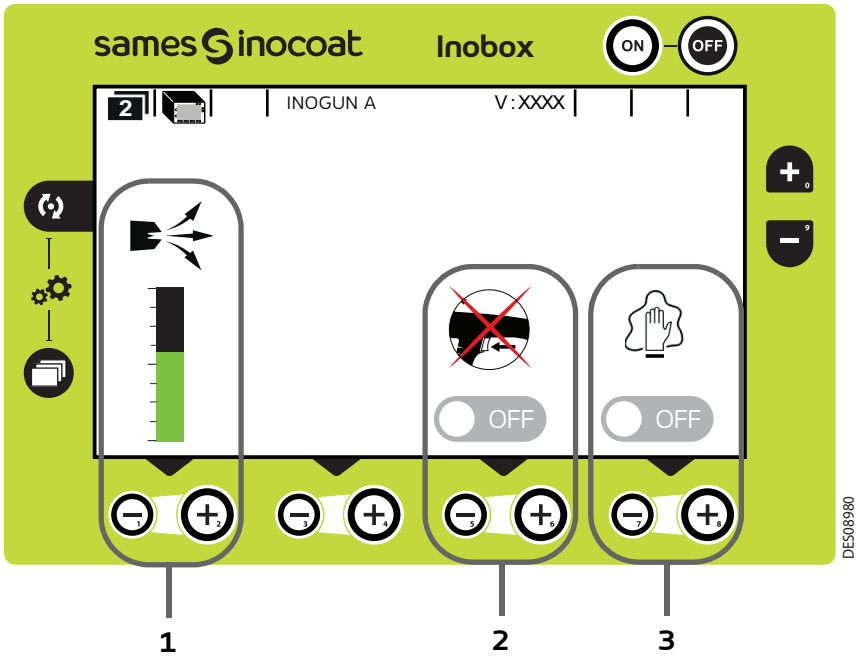


Area	Description
1	Setting the values for electrode blowing airusing the corresponding ⊕ and ⊖ . The values are indicated by the green areas of the associated bargraphs
2	To activate the cleaning mode, press the corresponding ⊕ key, screen 4 appears (see § 7.3.8 page 67)

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

7.3.5. Screen 2: Setting of electrode supply air in **Inogun A** version

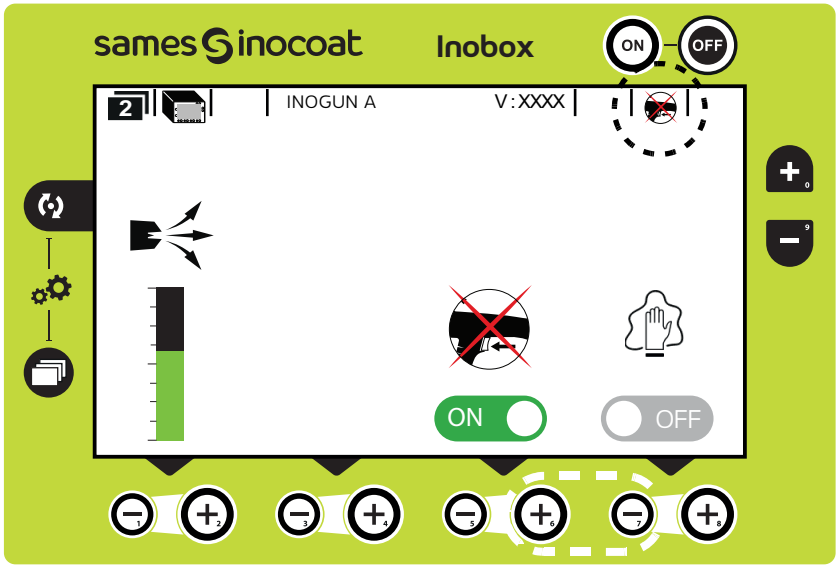
In the selected operating modes Simple, Complex and Overpowder, the operator can set the values for electrode blow-out air. He can also enable the trigger prohibition and the cleaning mode.



Zone	Description
1	Setting the values for electrode blowing air using the corresponding ⊕ and ⊖ . The values are indicated by the green areas of the associated bargraphs
2	Trigger prohibition To enable the trigger prohibition, press the corresponding ⊕ key (see § 7.3.5.1 page 65)
3	To activate the cleaning mode, press the corresponding ⊕ key, screen 4 appears

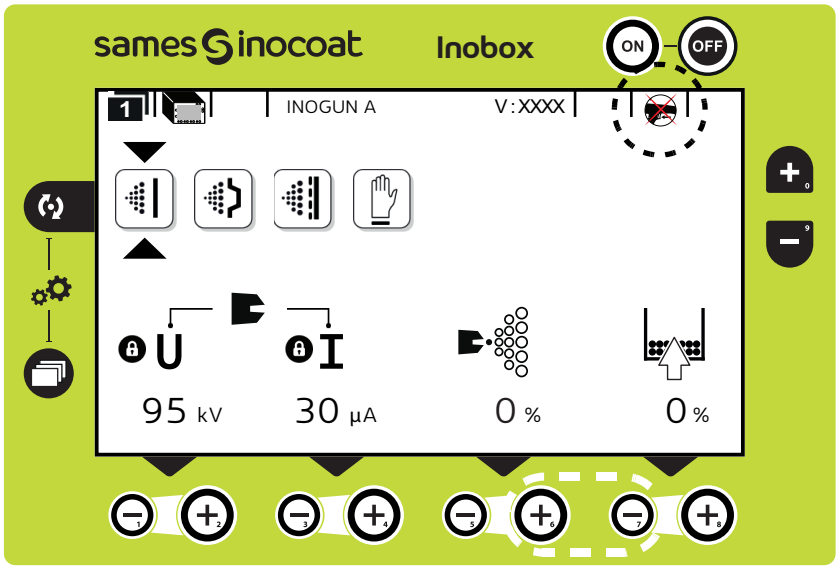
To return to the previous screen, press the key. .

7.3.5.1. Trigger lock activation



The activation of the trigger lock mode is characterized on the screen by the logo turning green ON and by the display of the trigger prohibition icon at the top right of the screen.

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



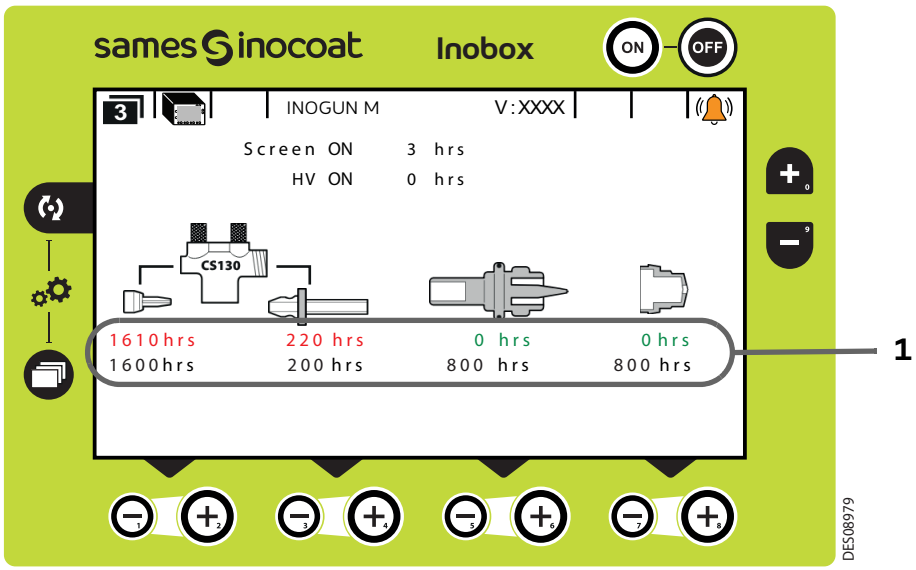
When the trigger lock mode is activated, the Trigger Prohibition icon will appear in the upper right corner of the screen.

7.3.6. Parameter setting screens

The parameter screens of the Inobox NF integrated on an installation without fluidization control are identical to those of the Inobox VT whatever the type of gun connected (see § 5 page 17).

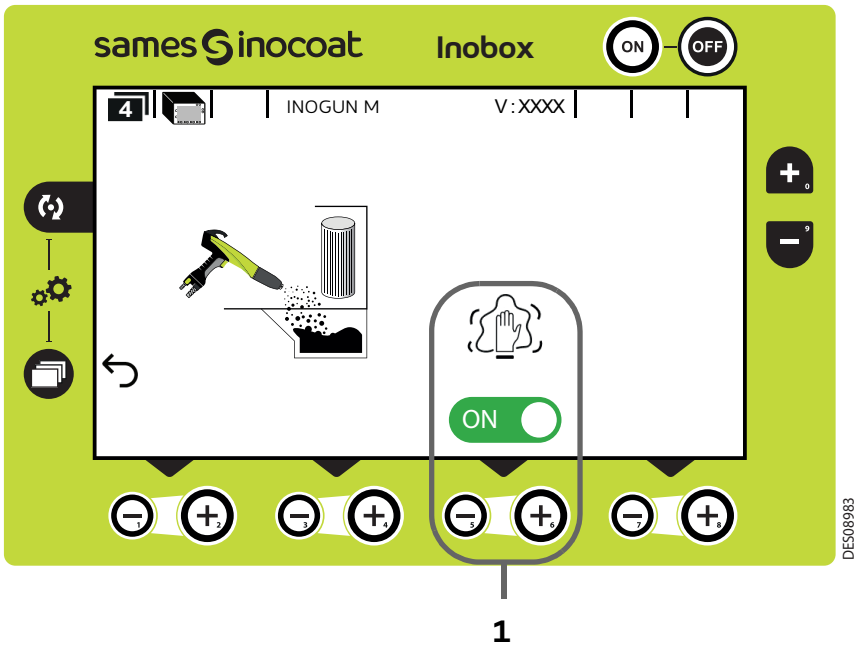
7.3.7. Screen 3: Counter Alarm Screen

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



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

7.3.8. Screen 4: Cleaning screen



Area	Description
1	Activating / Deactivating cleaning mode

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

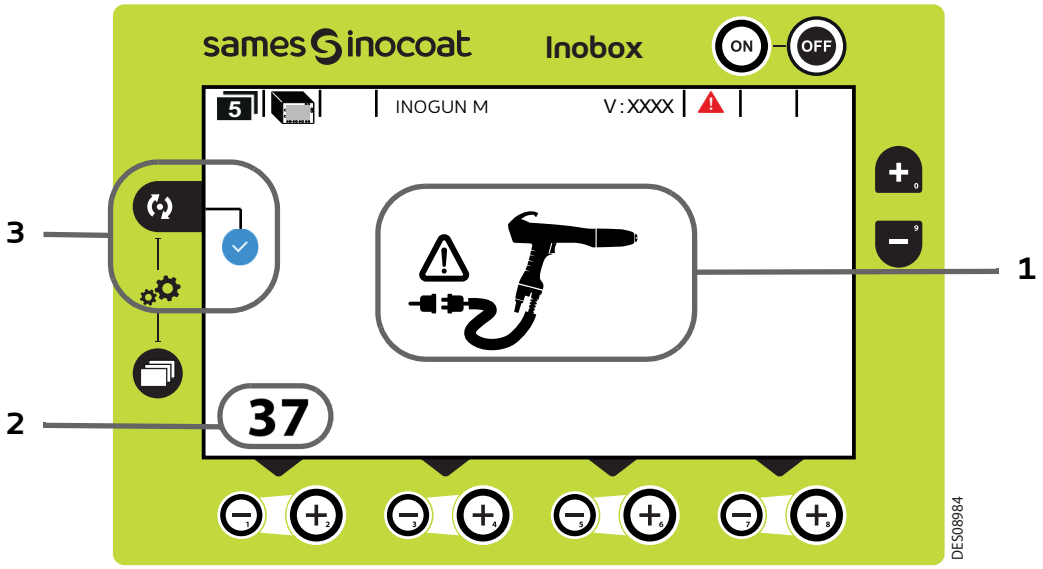
To interrupt the cleaning cycle (before the programmed stop (see § 7.1.5.5 page 47) press the key .

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

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

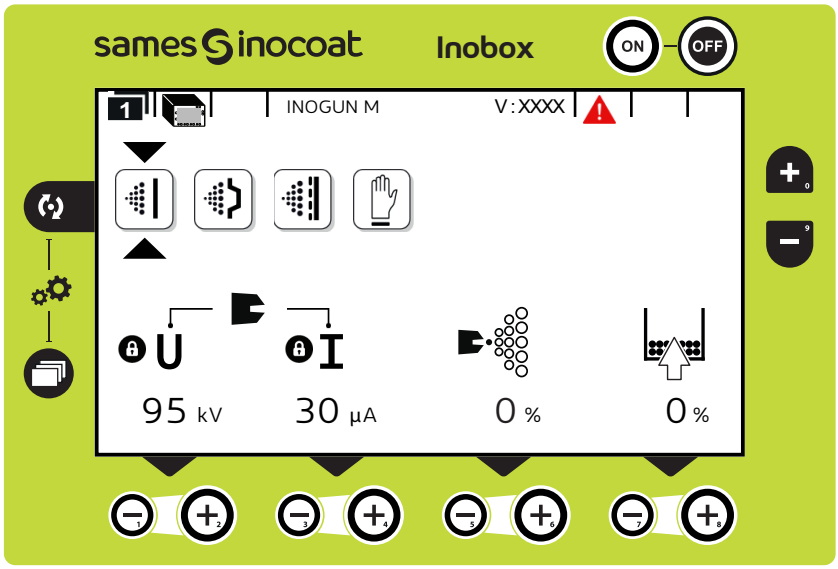
7.3.9. Screen 5: Fault Presence Screen

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:



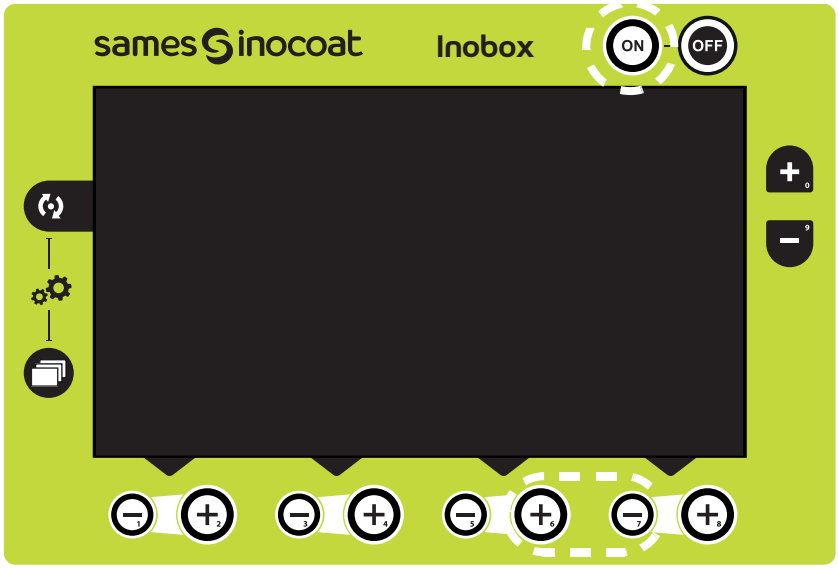
Area	Description
1	Fault icon
2	Fault number
3	Visualization of the fault by the operator Press the key to acknowledge the fault page and return to screen 1.

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.

7.3.10. 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 § 7.1.5.7 page 49).
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.

8. Connections

8.1. 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 mm² for Pilot Dry Contact
B	COM Trigger	Cathode input of the pilot optocoupler On / Off high voltage	
C	0V CLEANING	0V for dry pilot contact On / Off cleaning	Solder wire size max. 24 AWG / max. 0,25 mm² for Pilot Dry Contact
D	COM CLEANING	Cathode input of the pilot optocoupler 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 mm² 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 24 AWG / max. 0,25 mm²
J	CAN L	Data bus CAN signal L	
K	CAN shielding	0V	
L	NC	-	
M	NC	-	

8.2. 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			

8.3. 100 / 240 VAC power supply connector

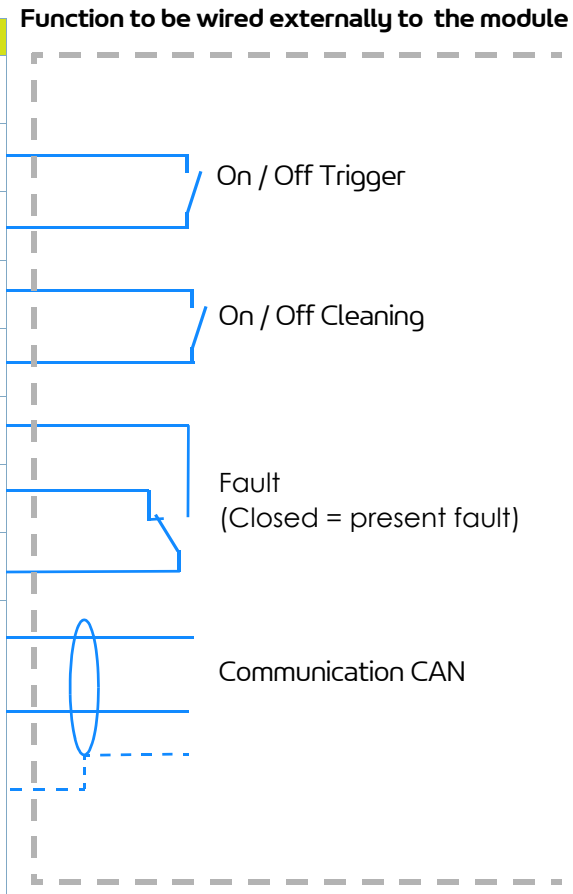
Pin	Description	Designation	Characteristics
1	NEUTRAL POWER SUPPLY	Neutral	Power supply 100VAC to 240 VAC / 47Hz - 63Hz Contacts 4A / 250 VAC / DC max.18 AWG
2	POWER SUPPLY PHASE	Phase	
3	GROUND (G/Y) POWER SUPPLY NC	Ground / 0V	
4			

8.4. Circular 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.

9. Cabling – Connector Inputs / Outputs –CAN

Designation	Pin
Shielding (by shield recovery clamp)	
0 V TRIGGER	A
COM TRIGGER	B
0V CLEANING	C
COM CLEANING	D
N.O FAULT relay	E
N.C FAULT relay	F
COMMON FAULT relay	G
CAN H	H
CAN L	J
CAN shielding	K
NC	L
NC	M



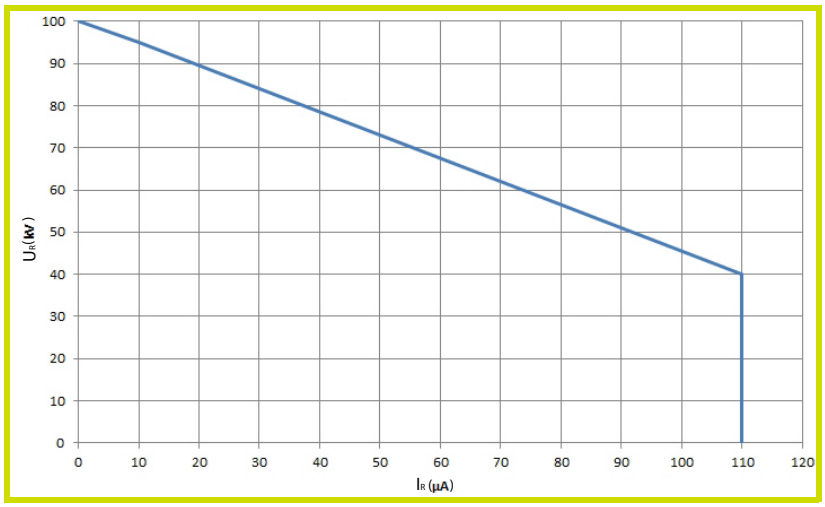
10. High voltage

10.1. 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.

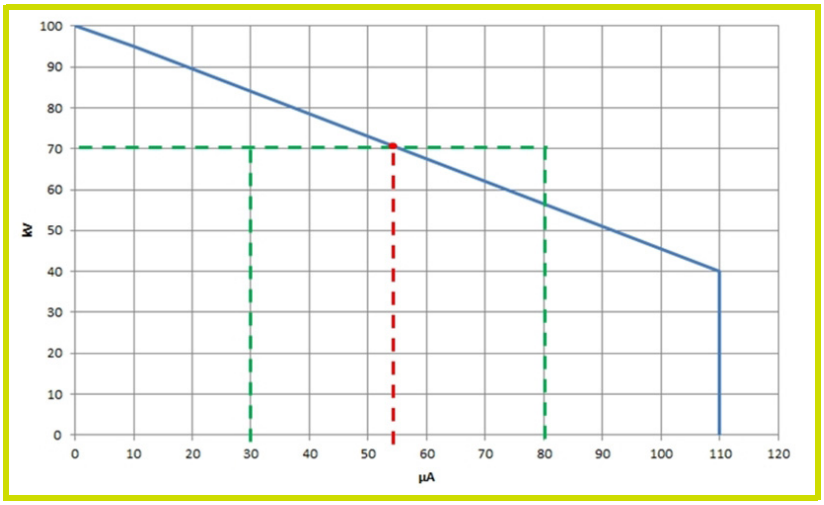
For each UHT IR output current point corresponds to a maximum output voltage point, UR according to a mapping recorded in the HVU and not modifiable by the user.



Curve 1

Example 1: 70kV / 30µA. The operating point is inside the curve, the voltage (70kV) and current (30µA) can be supplied if the system requires it.

Example 2: 70kV / 80µA. The operating point is outside the curve, current will be limited to 55µA. If electrical charge requires more current, voltage will be limited following the curve.



11. Fault management

There are two types of faults:

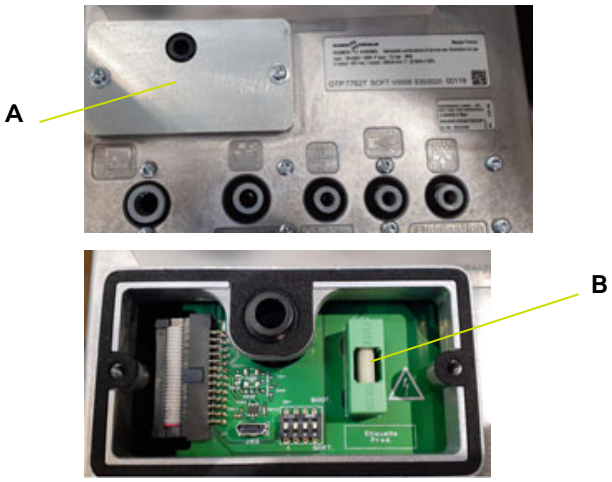
- Resettable faults by fault acknowledgment.
- Blocking faults that require a restart of the +24V DC supply of the Inobox module.

Whatever the type of fault triggered, the regulation cuts off the high voltage and the powdering. The Fault relay is controlled.

Display failure:

The screen remains black despite the ON button being pressed.

1 Stop the module,
2 Check the fuse (B) accessible behind the cover (A),
3 Change the fuse (B) if necessary (see § 11 page 73).



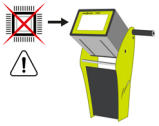
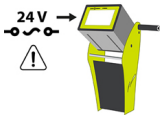
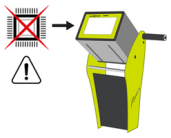
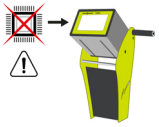
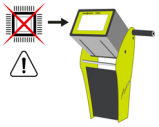
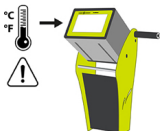
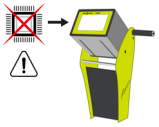
Injection air fault:

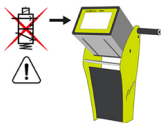
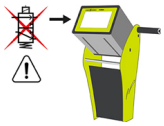
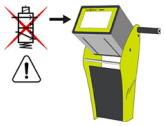
Under certain conditions, it is difficult to have the required air supply pressure (7 bar +/- 1).
This leads to a fault 32 (injection valve) although there is no fault.
The injection rate monitoring function can be inhibited by the user by toggling switch S1.

Inhibition of injection air flow monitoring:

The micro switch S1 at ON allows to inhibit the monitoring of the injection air flow if the setpoint is higher than 20%.
If the micro switch is set to OFF, the monitoring is active over the entire range (factory setting).

11.1. Faults list

Associated pictogram	Nr and Fault label	Description
	1 - Program fault	Micro-controller module fault. This fault requires a power-on to be reset.
	2 - +24V power supply fault	The internal +24VDC power supply may fail. it has exceeded the authorized operating limits: 21 V < U < 28 V. This fault requires a power-on to be reset.
	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 PLC 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 HVU 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.
	29 - HVU link fault	The barrel is not or badly connected to the module. Resettable by Acknowledging Fault
	30 - Internal BUS fault	Internal bus over-voltage (detected by hardware or software) Resettable by fault acknowledgment

Pictogramme associé	N° et Libellé du défaut	Description
	32 - Injection fault	An injection control is activated without pressure feed-back. Resettable by Fault Acknowledgment Inhibition of injection air flow monitoring: The micro switch S1 at ON allows to inhibit the monitoring of the injection air flow if the setpoint is higher than 20%. If the micro switch is set to OFF, the monitoring is active over the entire range (factory setting).
	34 - Blowing fault	A blowing control is activated without current feedback from the activated valve. Resettable by Fault Acknowledgment
	35 - Fluidization fault	A fluidization control is activated without current feedback from the activated valve. Resettable by Fault Acknowledgment
	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

11.2. Actions following a fault

Fault	Action to be performed
1 - Program fault	The micro-controller is faulty. If the problem persists, contact **Sames**.
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 High Voltage Unit. If the problem persists, contact **Sames**.
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 high voltage unit Check the connection between the module and the gun. Check the internal connection of the gun and the condition of the high voltage unit. None of these components should be damaged.
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 high voltage unit. Check the condition of the HVU and its electrical contacts. None of these components must be damaged. The safe shutdown fault monitors that there is no electric arc at the exit of the HVU. Check the connection between the module and the gun. Check the internal connection of the gun and the condition of the high voltage unit.
24 - Trigger request at startup	For the automatic gun, check that the external trigger connection (PLC connector) is not activated. For the manual gun, check that the trigger is not activated on 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 contacts of the circular connector. Check the connection between the module and the gun. Check the internal connection of the gun and the condition of the high voltage unit.
30 - Internal BUS fault	The maximum level of the internal supply voltage to the module has been exceeded. If the problem persists, contact **Sames**.
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. **Inhibition of injection air flow monitoring**: The micro switch S1 at ON allows to inhibit the monitoring of the injection air flow if the setpoint is higher than 20%. If the micro switch is set to OFF, the monitoring is active over the entire range (factory setting).
34 - Blowing fault	Internal electrode blowing valve is not correct. Check the coil of the blowing valve. If the problem persists, contact **Sames**.
35 - Fluidisation fault	Internal fluidization valve is not correct.The connection or the coil of the blowing valve may be at fault. Check the coil of the blowing valve. If the problem persists, contact **Sames**.
37 - Spray gun or projector connector fault	Check the circular connector G on the back of the module

12. Communication with the PLC in CAN

12.1. 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 last setting screen.

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

It is a version CAN2.0A, with the standard format (11-bit identifier)
The CAN uses a linear bus terminated at each end with 120 W resistors (not integrated in the **Inobox** module)
The **Inobox** module must receive regularly, about every 100ms, an exchange otherwise a fault "17 - Absence of control mode fault" appears after 1s.

12.2. Data exchange

12.2.1. 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	Fuidisation 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	CAN Command	
7	ON/OFF trigger (For automatic projector)	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. This boolean is also used to acknowledge a fault, if the trigger is activated, it must first be switched off and then an ON/OFF trigger must be performed to request an acknowledgment (falling edge detected).
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		
4		
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 (For automatic projector)	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**.
1		
0	CAN control request	The CAN asks to control the **Inobox** (active if set to 1)

12.2.2. 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 ouput current		µA	110
5	HV ouput voltage		kV	100
6	Injection or Blowing flow rates	Bit 7 =0 Injection setpoint applied on 7bits Bit 7=1 blowing setpoint applied on 7 bits	Point	100/30
7	Dilution or fluidisation flow rates	Bit 7=0 Dilution setpoint applied on 7 bits Bit 7=1 Fluidisation setpoint on 7 bits	Point	100/50

Byte 0	Statut 1	Statut 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 pogress	A cleaning is in progress (the air controls are at maximum, there is no controlled HV)

Byte 1	Statut 2	Statut 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	see § 11.1 page 74
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	see § 11.1 page 74
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 startup	
1	29 - HVU link fault	
0	30 -Internal bus fault	

13. Spare parts list

The spare parts are classified in 2 different types:

- **1st emergency parts**:
  The 1st emergency parts are strategic components which are not necessarily consumables but which in case of failure prohibit the operation of the equipment.
  Depending on the production line's commitment and the production rates imposed, the first emergency parts are not necessarily kept available in the customer's stock.
  Indeed, if an interruption of the production flow is possible, storage is not necessary.
  On the other hand, if the stop is not possible, the 1st emergency parts will be kept in stock.

- **Wearing parts**:
  Wearing parts are consumable components such as O-rings that undergo regular degradation over time during normal operation of the installation. It is therefore advisable to replace them according to a defined frequency and adapted to the operating time of the installation.
  The wearing parts must therefore be kept in the customer's stock.

To guarantee an optimal assembly, spare parts must be stored in a temperature close to their temperature of use. Should the opposite occur, a sufficient waiting time must be observed before the installation, so that all the elements are assembled in the same temperature.

Part Number	Description	Qty	Unit of sale	Level Spare parts (*)
910029883	**Inobox VT – control module for vibrating table**	**1**	**1**	**-**
910029884	**Inobox H – control module for tank**	**1**	**1**	**-**
910030576	**Inobox NF – control module**	**1**	**1**	**-**
910030041	Power cable «Europe»	1	1	-
910030398	Power cable «US»	1	1	-
110002759	Straight M16 female connector 12 contacts	option	1	-
110001705	4-pair cable 0,12 mm^2 shielded	option	1	-
110002935	Fuse 5X20 SP1,25A250V	1	box	1-2

(*)
Level 1: 1st emergency parts
Level 2: Wearing parts

14. Revision index History

Created by		Checked by: H. Brochier-Cendre	Approuved by S. Court	
Date	**By:**	**Index**	**Purpose of the modification and location**	
2020	S. Court	A	First issue	
2021/05	S. Court	B	Add CAN NC start screen 2 faults Second vibrator settings Intensity and program control	
2022/11	O.Aubin	C	UKCA Marking Transfer of CSA certification to QPS Change of identity and logo Update of the graphic charter Settings for gun functions not connected Update of the fault management New Inoflow function Add trigger prohibition function	§ 6.4.6 § 11 § 5.1.5.8 § 7.2.2.1

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