Density®
INSTANT FOG PROTECTION

Installation and user manual

DENSITY 390 - 900 - 1500 - 2400

New generation of anti intrusion fogging systems designed to fit any customer request.
Four different models from 390 cubic meters to 2400 in same standard external dimensions.
Cenelec EN 50131-8:2019 certification available 4 inputs PIR 5 outputs.
Optional Remote monitoring and control with Active Cloud Lan board.
Solid state relay for heating safe control.

Version 2.5 October 2024

Summary

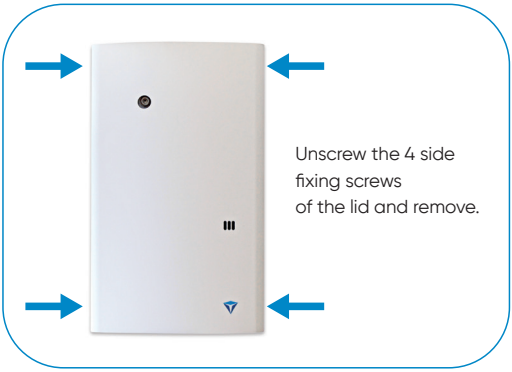
WARNING!

All DENSITY fogging systems should only be used with DENSITY-branded fluids.
It is strictly forbidden to use any fluid not previously authorized in writing by DENSITY.

1. Package content

Inside the box you find:
- The Density Unit
- 2 WARNING labels
- Paper template with marks for wall mounting
- Fluid bag

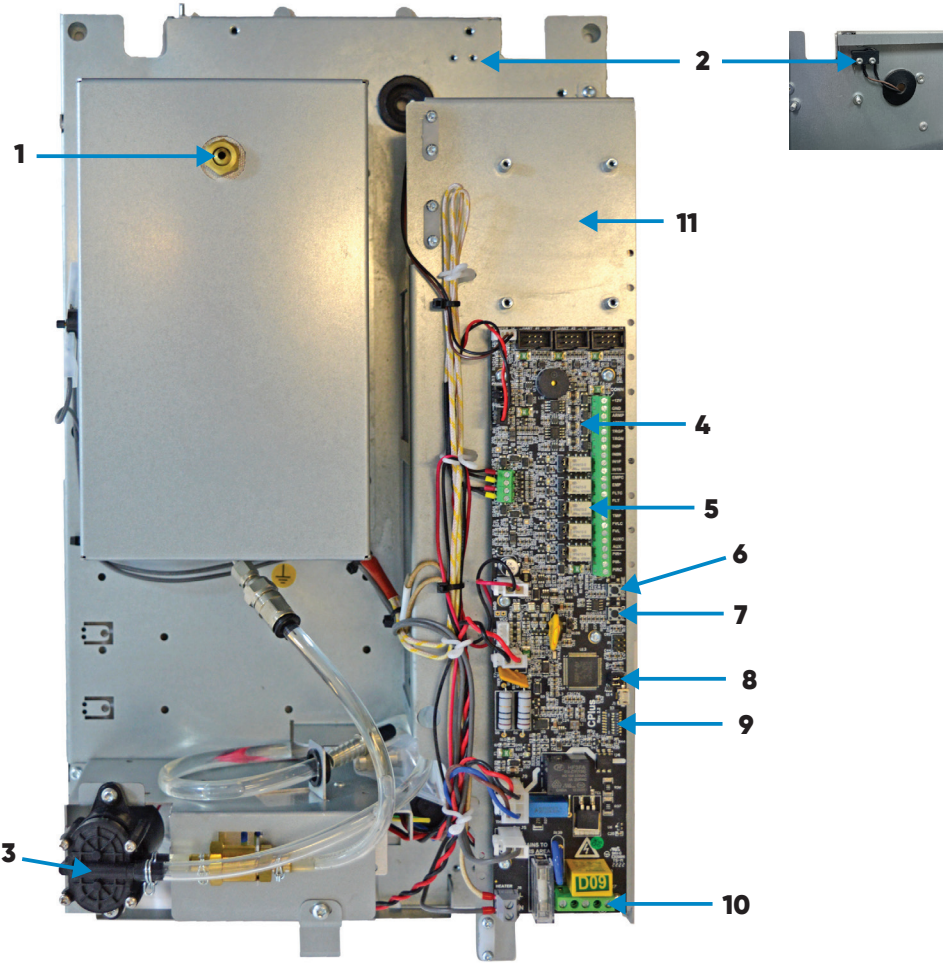
2. Prepare for Installation



Unscrew the 4 side fixing screws of the lid and remove.

Identification of main components:

1. Orientable nozzle
2. Anti-tampering tamper of the lid
3. Fog Storm pump
4. Terminal block for control inputs
5. Terminal block relay outputs
6. Set shooting time button
7. Reset button
8. Jumpers W1-W2
9. Dipswitches for programming
10. Connection to the mains power
11. Active Cloud LAN Wi-Fi spacers (optional)



3. Recommendations

The fog spreads more quickly if it bounces strongly against obstacles.
It is therefore advisable during installation to make sure that the fog flow hits the ground for a better diffusion.
In order to achieve the maximum efficiency described in the shooting table (paragraph 12),
it is recommended to install the fogging system on the ceiling, in the middle of the place to be protected,
within the height limits described below for the chosen fogging systems model.

Placement of a **Density®** Fogging System

VERTICAL WALL INSTALLATION

CEILING

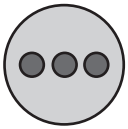
HORIZONTAL WALL INSTALLATION

HORIZONTAL WALL INSTALLATION

Maximum heights of installation of **Density®** Fogging Systems

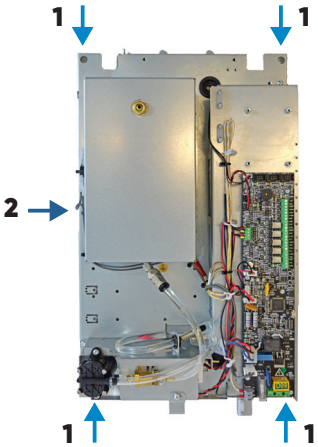
The distances are between the nozzle end and the point of impact on the ground

MODEL	WALL INSTALLATION		CEILING INSTALLATION
	Standard Nozzle 1 hole	3 holes nozzle option *	Standard Nozzle 1 hole
Density® 390	2,20 to 2,50 m	2,00 to 2,20 m	2,20 to 2,80 m
Density® 900	2,20 to 2,50 m	2,00 to 2,20 m	2,20 to 2,80 m
Density® 1500	2,50 to 2,70 m	2,20 to 2,50 m	2,50 to 3,50 m
Density® 2400	2,50 to 3,00 m	2,20 to 2,50 m	3,50 to 4,50 m

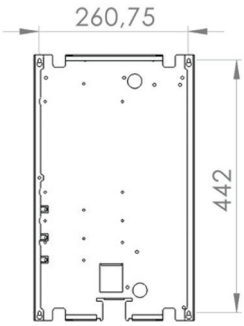


* 3 holes nozzle: in some installations where is required to genereted fog as closed as possible to the unit nozzle with a wide spread, is suggested to install the optional 3 holes nozzle that can cover up to 160° angle.

4. Mounting

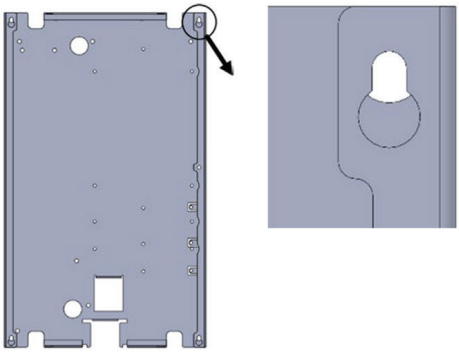


1. Fixing holes
2. Hole f or the saf ety screw

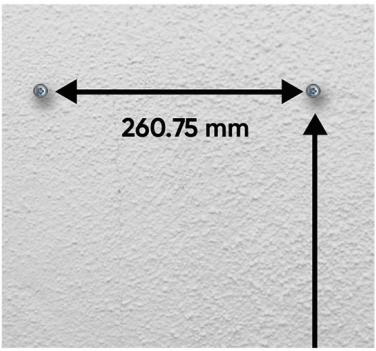


Distance between the holes in the wall.

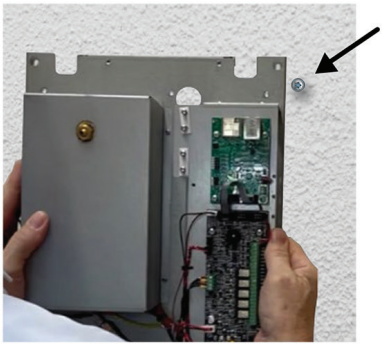
Fixing holes



Hole of ref erence for the installation.



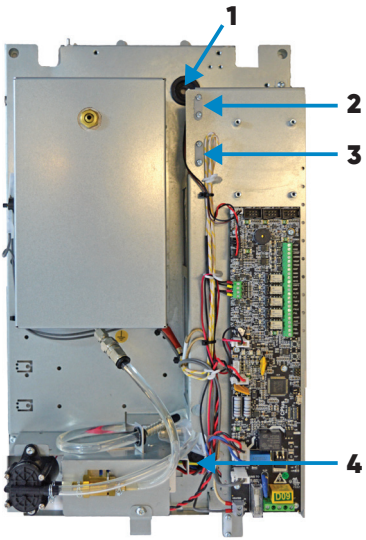
Application of the screws on the wall.



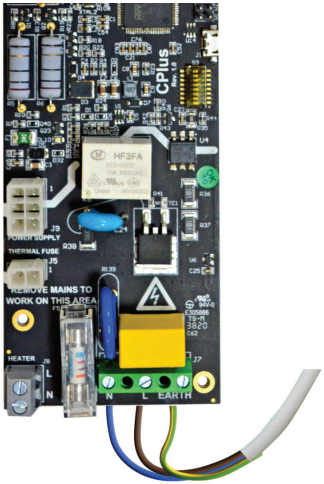
Hang the device on the hole of reference.

NOTE:
During the installation on the wall first fix the 4 screws, and at the end the safety screw. This because the safety screw defends to avoid the possibility to lift the unit.

5. Wiring



1. Hole for signal cables and optional LAN
2. Cable clamp for LAN cable
3. Cable clamp for signal cables
4. Hole for mains power cable insertion

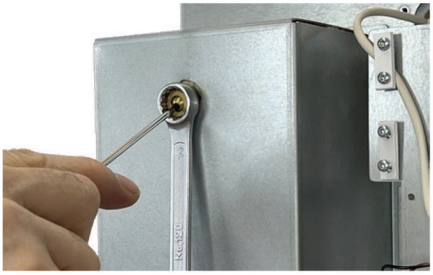


The power cable should be inserted in the lower part of the fogging system. Line, neutral and heart should be connected as shown in the picture.Use the cable clamp to lock it.

NOTE:
All cables from and to the Density fogging systems must be less than 30 meters long, except the RJ45 (IP/LAN network cable).

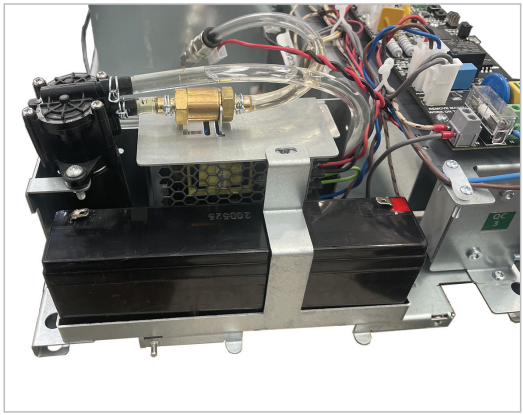
6. Nozzle adjustment

Use a 14 mm wrench to loosen the nozzle nut.
Use a screwdriver inserted into the nozzle hole to adjust the inclination.

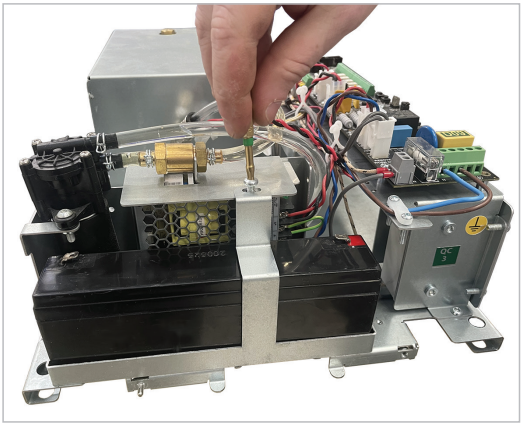


Hold the nozzle in the correct position by using the screwdriver and gently tighten the nut.

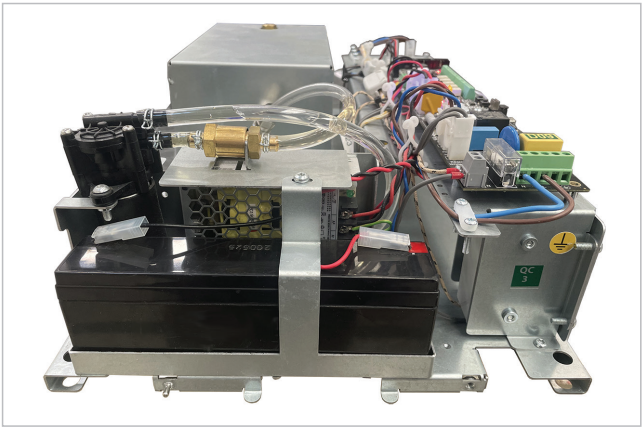
7. Backup battery



To installthe battery*,Insert it into the battery holder.



Turn the screw to fix the battery holder in position.



Connect the backup battery ends respecting the wires colors.

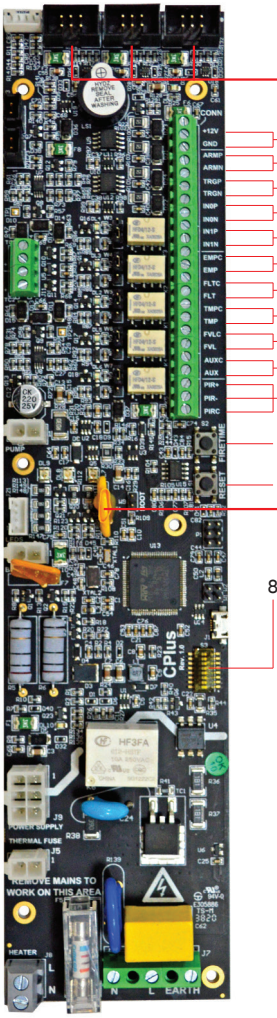
* Battery is not included.
Reference battery: FIAMM 12V 2 Ah model FG 20201 or equivalent.

When the Density® fogging system is accidentally powered on without the backup battery, after 1 minute it will report an Error (E7), the warning red LED will turn on and the FLT output is activated.

This condition will remain for 1 minute, after that the red LED goes out, but the FLT relay output remains active as well as the error 7.

To reset the error 7 and the FLT relay it would be necessary to temporary (1 min) disconnected the fogging systems from the mains power to ensure that the battery is correctly detected.

8. Connections



Density® family devices are equipped with CPLUS board that includes 4+1 inputs and 5 outputs.

INPUTS

Description of the 4 inputs:

Input 1: ARM -to arm and disarm the Density fogging system.

Input 2: TRG -to activate shooting (only if ARM input is already enabled).

Input 3: IN 0 -input confirmed works in AND wIthinput 2 (TRG).

Input 4: IN-1 -Panic/robbery alarm input.Activate the shooting regardless of the state of the ARM input.

The 4 input contacts are equipped with galvanically isolated opto-couplers and, by default their condition is NC (Normally Closed), so with 12V DC present (Dipswitch 6 ON).
It is possible to select if ARM, TRIG and IN 0 inputs are all three in NC or NO (Normally Closed or Normally Open).

Change activation logic (NC Normally Closed or NO Normally Open).

Moving DIPSWITCH 6 to OFF, the 3 inputs ARM, TRG and IN-0 will work in standard security, this means that the three inputs will be activated in the presence instead of the absence of the + 12V signal.
WARNING: in this condition, even ifthe IN 0 input is not used, it must be permanently connected to the 12V signal to authorized the activation.

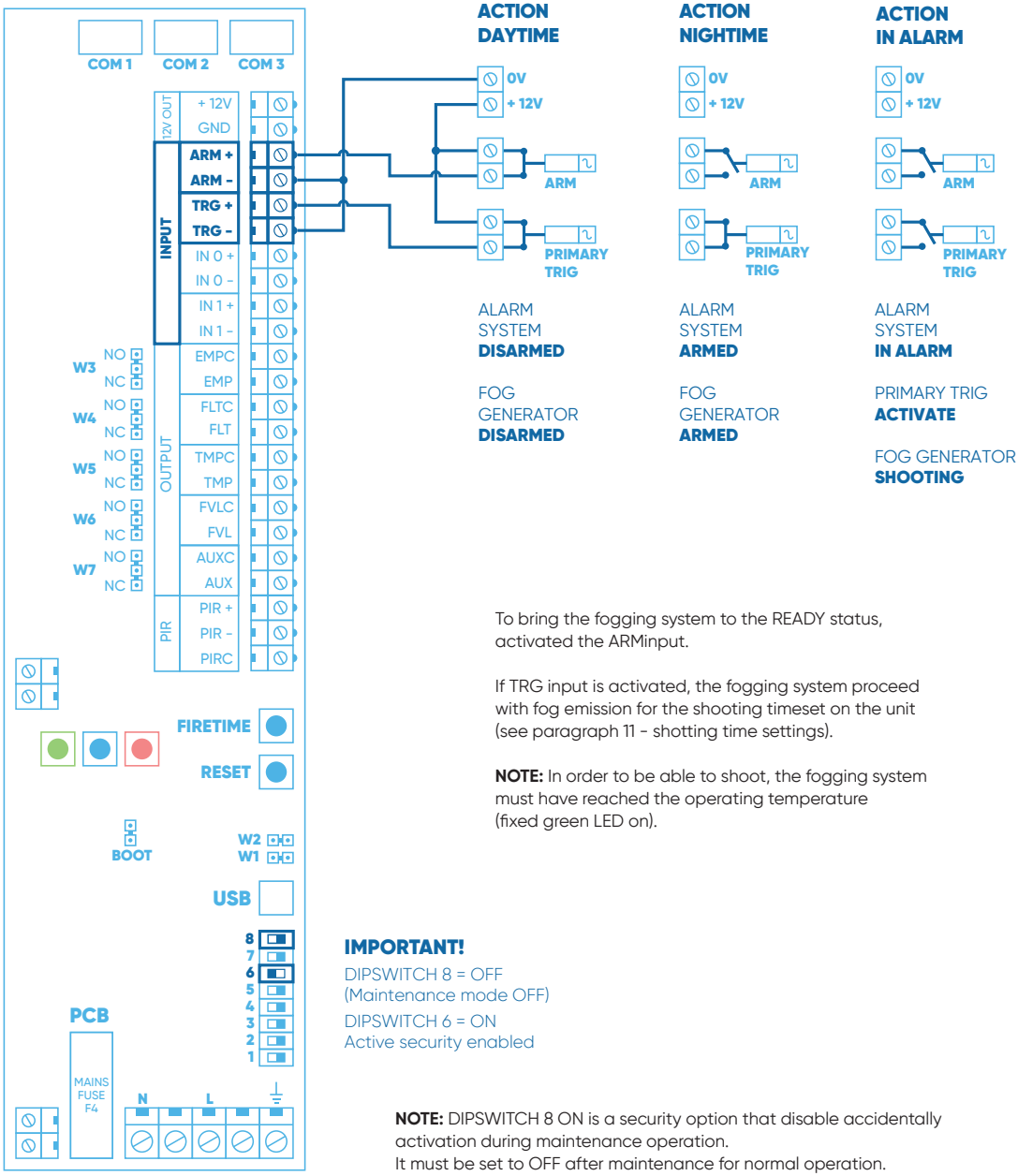
PIR sensor input:
All density family device can prevent false activations controlling an optional local PIR positioned near the device. It means that to generate the shoot,PIR signal must be activated together with TRIG command is sent from the alarm panel.

PIR+ Power supply PIR +12V 300 mA
PIR- Power supply PIR -12V 300 mA
PIRC Contact signal-closed to negative (from PIR C to PIR -)

To activate this input close the W1 jumper. The closed W1 jumper activates this PIR input as AND input with the TRG input. This means that the fogging system device will shoot when both TRG and PIR inputs are active at the same time (always on active ARM input).

9. Examples of connections – Inputs signals

9.1 Arm and Trig in Active security installation



To bring the fogging system to the READY status, activated the ARMinput.

If TRG input is activated, the fogging system proceed with fog emission for the shooting timeset on the unit (see paragraph 11 - shotting time settings).

NOTE: In order to be able to shoot, the fogging system must have reached the operating temperature (fixed green LED on).

IMPORTANT!

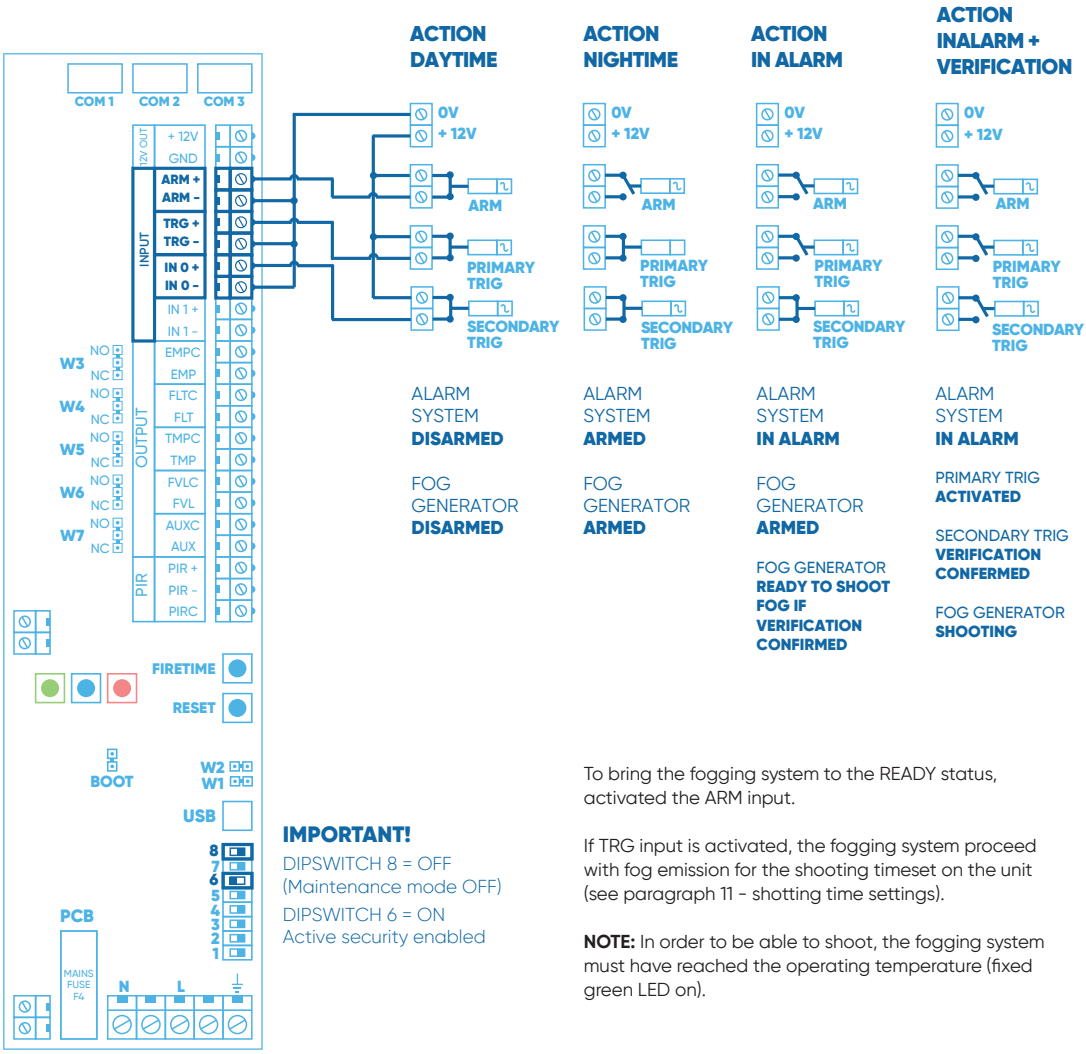
DIPSWITCH 8 = OFF
(Maintenance mode OFF)

DIPSWITCH 6 = ON
Active security enabled

NOTE: DIPSWITCH 8 ON is a security option that disable accidentally activation during maintenance operation.
It must be set to OFF after maintenance for normal operation.

9.2 ARM, TRIG + IN 0 Verification Input in active security installation

If an additional verfication input is required before fog emition it is possible to activate the IN 0 Input .



IMPORTANT!

DIPSWITCH 8 = OFF
(Maintenance mode OFF)

DIPSWITCH 6 = ON
Active security enabled

To bring the fogging system to the READY status, activated the ARM input.

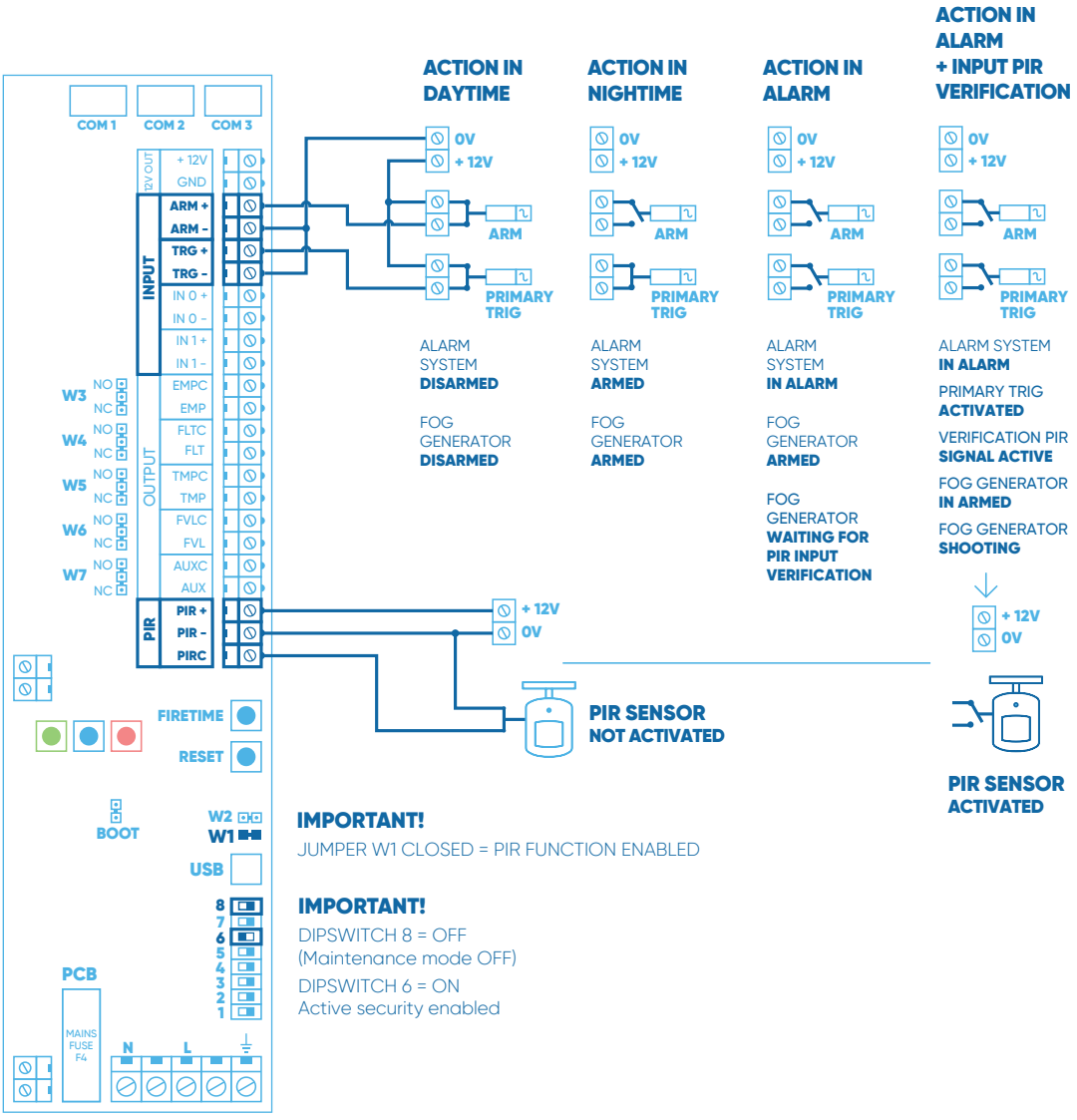
If TRG input is activated, the fogging system proceed with fog emission for the shooting timeset on the unit (see paragraph 11 - shotting time settings).

NOTE: In order to be able to shoot, the fogging system must have reached the operating temperature (fixed green LED on).

NOTE: DIPSWITCH 8 ON is a security option that disable accidentally activation during maintenance operation. It must be set to OFF after maintenance for normal operation.

9.3 ARM, TRIG, PIR verification (PIR input) in Active Security Installation

When the fogging system is armed, the TRG and PIR inputs must be active AT THE SAME TIME for the shooting to take place.



IMPORTANT!

JUMPER W1 CLOSED = PIR FUNCTION ENABLED

IMPORTANT!

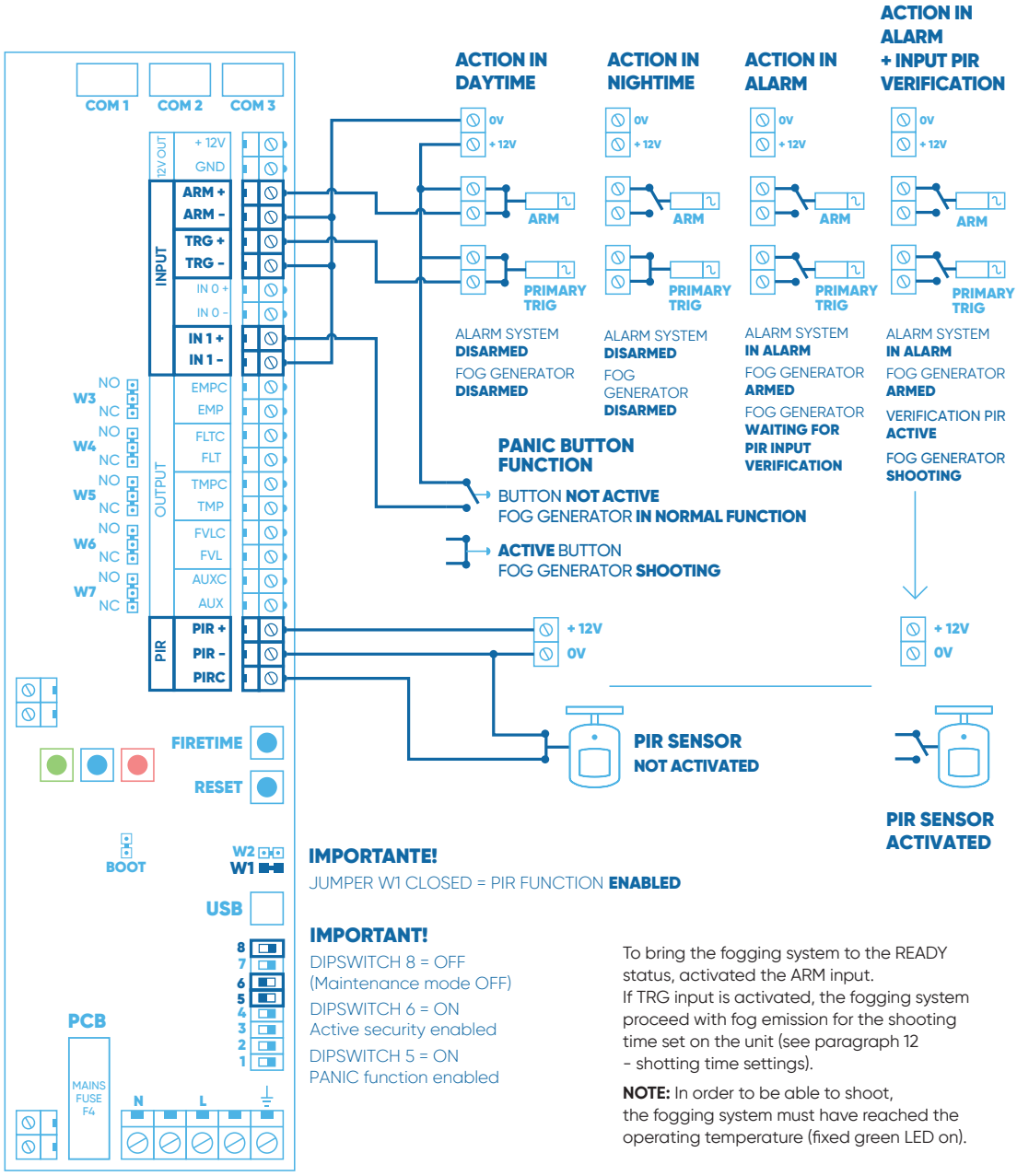
DIPSWITCH 8 = OFF
(Maintenance mode OFF)

DIPSWITCH 6 = ON
Active security enabled

NOTE: DIPSWITCH 8 ON is a security option that disable accidentally activation during maintenance operation. It must be set to OFF after maintenance for normal operation

9.4 ARM, TRIG, PIR and PANIC BUTTON in Active security installation

The PANIC input is used for emergency immediate activation. The PANIC input DOES NOT take into account the status of the inputs ARM, TRG, IN 0 and PIR. The fogging system must in any case be in a HOT and READY state (fixed green LED on).



IMPORTANTE!

JUMPER W1 CLOSED = PIR FUNCTION **ENABLED**

IMPORTANT!

DIPSWITCH 8 = OFF
(Maintenance mode OFF)

DIPSWITCH 6 = ON
Active security enabled

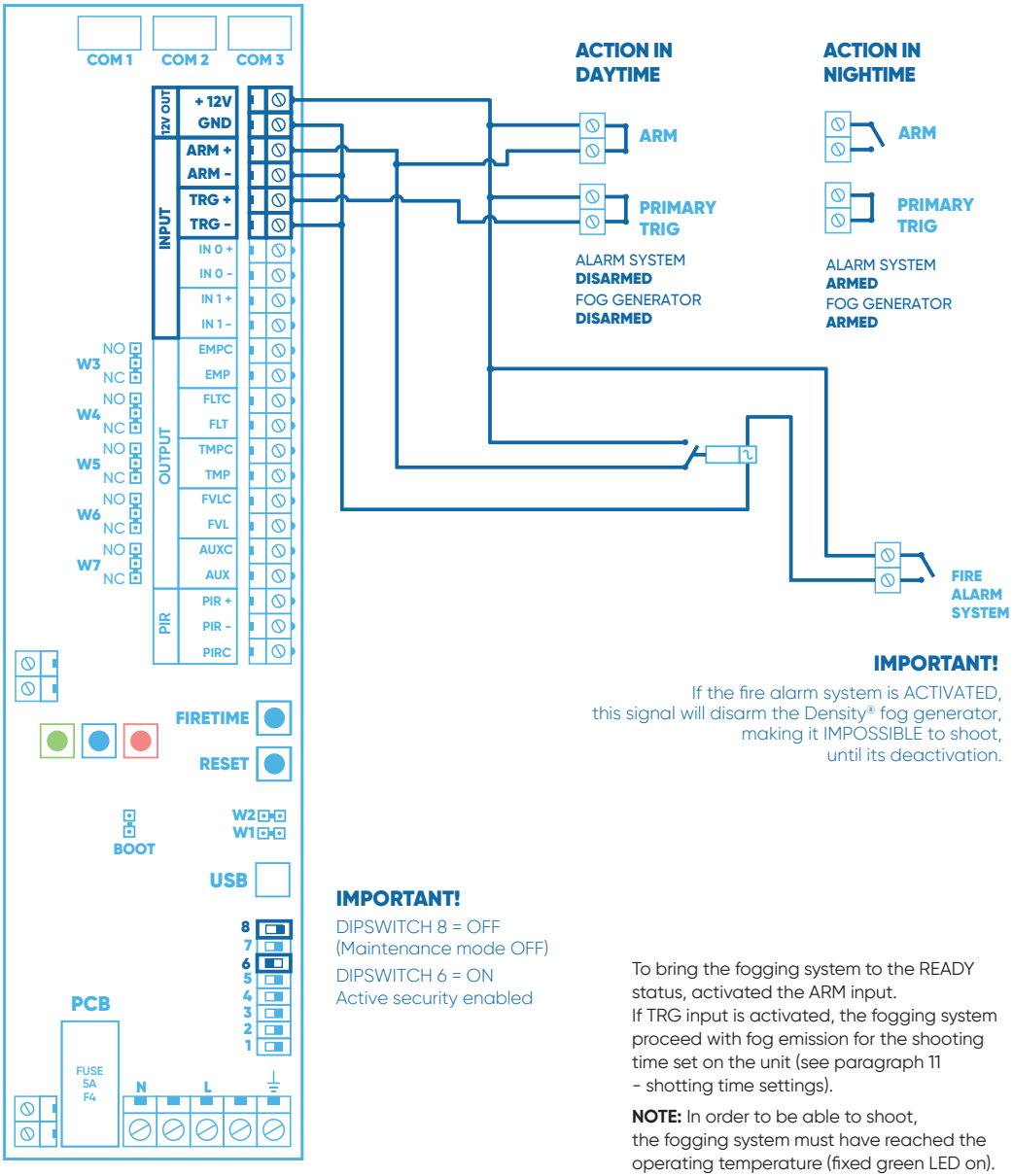
DIPSWITCH 5 = ON
PANIC function enabled

To bring the fogging system to the READY status, activated the ARM input.
If TRG input is activated, the fogging system proceed with fog emission for the shooting time set on the unit (see paragraph 12 - shotting time settings).

NOTE: In order to be able to shoot, the fogging system must have reached the operating temperature (fixed green LED on).

NOTE: DIPSWITCH 8 ON is a security option that disable accidentally activation during maintenance operation. It must be set to OFF after maintenance for normal operation

9.5 Optional connection to the fire protection system



IMPORTANT!

If the fire alarm system is ACTIVATED, this signal will disarm the Density® fog generator, making it IMPOSSIBLE to shoot, until its deactivation.

IMPORTANT!

DIPSWITCH 8 = OFF
(Maintenance mode OFF)

DIPSWITCH 6 = ON
Active security enabled

To bring the fogging system to the READY status, activated the ARM input.
If TRG input is activated, the fogging system proceed with fog emission for the shooting time set on the unit (see paragraph 11 - shotting time settings).

NOTE: In order to be able to shoot, the fogging system must have reached the operating temperature (fixed green LED on).

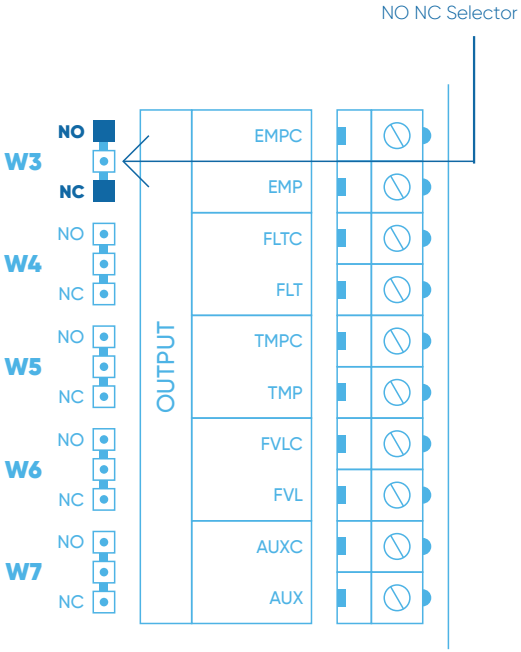
NOTE: DIPSWITCH 8 ON is a security option that disable accidentally activation during maintenance operation. It must be set to OFF after maintenance for normal operation

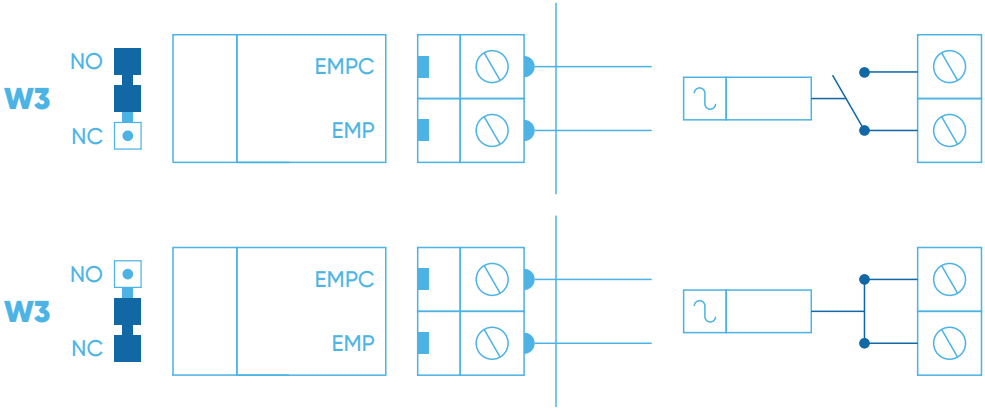
10. Examples of connections – Outputs signals

On CPLUS board
it is possible to connect up to
5 OUTPUTS signals:

EMP = empty bag OR LOW FLUID RESERV
FLT = Fault/ Maintenance required
TMP = unit void-Tamper switch open
FVL = Shoot in progress
AUX = Optional output

Each output is with Relay (CLEAN CONTACT) and have its own jumpers W3 - W4 - W5 - W6 - W7 (Default NO) are used to choose between NO (Normally Open) and NC (Normally Closed) for the output.

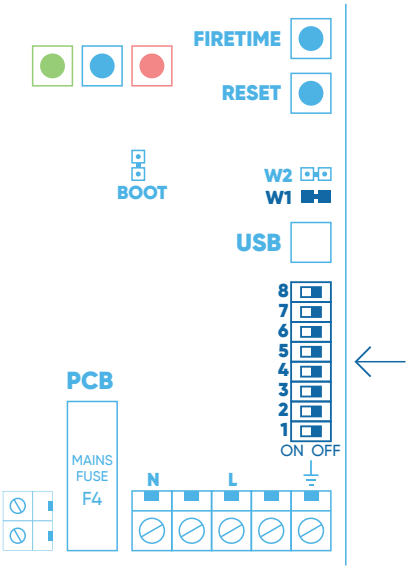




When the output is active, the voltage is applied to the relay generating the status change. Instead, by placing Dipswitch 4 in ON, ALL relays will be programmed in NC active mode. In this condition the alarm system will receive a fault signal if the fogging system loses power completely (active security).

Placing the Dipswitch 1 in ON position will activate the FLV verification relay, which will remain active for all the shooting time.
Placing Dipswitch 1 in OFF position, a check will be performed on the actual correct execution of the shot for the set time by activating the output for 30 seconds, obviously AT THE END OF THE shot. If for any reason the shot is not completed (and of fluid, unit disarmed, etc.) no output signal will be sent at the alarm panel.

11. Dipswitch



On CPLUS electronic board there is a DIPSWITCH with 8 Options.

Default functions:

SW 1 OFF = FVL relay active for 30 seconds after the shooting
ON = Active during all fog emission

SW 2 OFF = Front LED active
ON = Front LED disable

SW 3 OFF = Buzzer Active
ON = Buzzer mute

SW 4 OFF = All relay outputs with logic in NO mode (passive security)
ON = All relay outputs with logic in NC mode (active security)

SW 5 OFF = PANIC button function disabled
ON = Panic button function able

SW 6 ON = ARM, TRG and IN 0 inputs in NC mode (Active security)*
OFF = ARM, TRG and IN 0 inputs in NC mode (Passive security)*

SW 7 OFF = Not Used

SW 8 OFF = Fogging System in normal mode (Not in Service mode)
ON = Fogging System in service mode

* Active security means a configuration where relays are electrically activated NC at rest.

WARNING: the installer must have clear scenarios of this mode of installation because the lack or a particularly low level of power (< 9V DC) related to the alarm system would involve the activation of the fogging system (with unused PIR input or PIR powered by alarm control panel).

IMPORTANT:
To change switch position it is necessary to completely remove power to the device (both mains and backup battery) wait 20 seconds and then powerit again on

EXCEPTION: To set the fogging system in SERVICE mode, after moving Dip 8 to ON it is NOT necessary to restart the system.
In SERVICE mode the functions of the fogging system are disabled.
Returning the Dip 8 to OFF the fogging system will return to normal operation.
During SERVICE mode the three front LEDs Green/Blue/Red will flash sequentially.

12. Shooting time setting

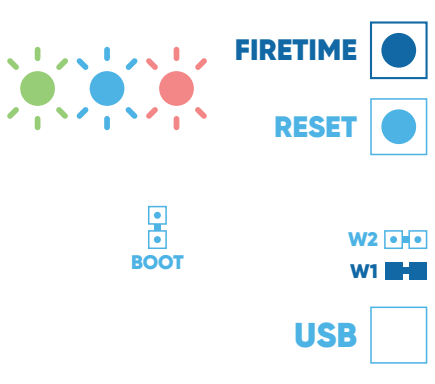
The fogging system can be set to generate fog second by second, adapting it to the different volumes of the premises to be protected. Use the table below to find the correct setting according to the meters and the type of Density® fogging system device.

Reference time setting for Density® 390, Density® 900, Density® 1500 and Density® 2400 (Rif. Industrial standard guideline)							
Density® 390		**Density® 900**		**Density® 1500**		**Density® 2400**	
sec.	**m³**	**sec.**	**m³**	**sec.**	**m³**	**sec.**	**m³**
3	30	4	45	4	60	2	40
5	75	5	75	6	100	4	90
8	135	10	180	15	400	6	140
10	180	15	360	20	570	10	270
13	240	20	550-560	24	700	20	600
15	280	25	670-690	28	840	30	930
18	340	27	810-830	39	1280	40	1260
20	390	29	900	44	1460	49	1540
						59	1810
						70	2100
						80	2380

IMPORTANT

The cubic meters of generated fog mentioned in the table above are based on the industry standard.
This rule states that the visibility in the room to be protected must be less than 1.5 meters after 60 seconds of shooting.
With reference to the table, by way of example, 400 m³ of Density® fog will protect a room of 400 m³ with 1.5 meters of visibility.
The EN 50131-8:2019 standard anyway requires visibility to beless than 1 meter.
To achieve this density increment, it is necessary to dispense DOUBLE of the fog than previous example.
So, in a room of 400 m³ it need 800 m³. We will need to set the seconds as it was 800 m³.
The fog of the Density® devices is the densest on the market and it has the longest stay in the air by far.
Usually the fog last in 45 minutes; 15 minutes if ventilation is present.

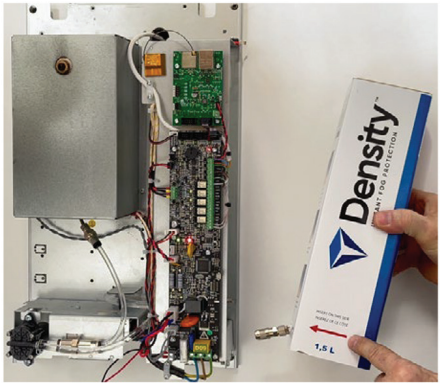
How to set the shooting time



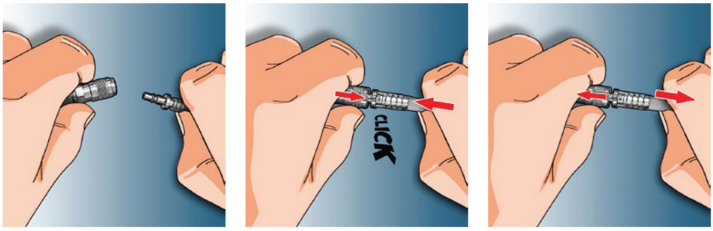
Press and hold the FIRETIME button.
Count the number of LED flashes
(the buzzer will beep synchronous with the LEDs).

EXAMPLE:
To set 20 seconds as shooting time, you need to hold the button «FIRETIME» while counting the flashes.
When you reach the 20 flashes, simply release the button and the time will be automatically set.

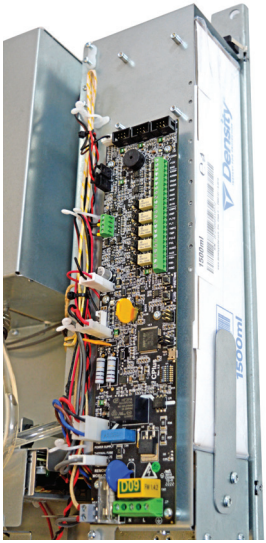
13. Fog fluid refill system



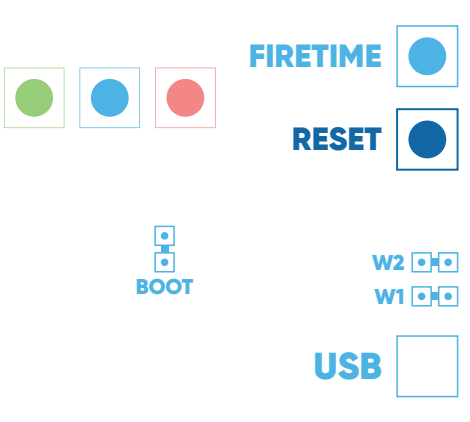
The fluid bag refill fits easily into the compartment located on the side of the Density® Fogging system.



Connect metal connector to the pipe connected to the fluid PUMP.



Fluid measurement system RESET



IMPORTANT!
When inserting a new refill or replacing an empty one, you must RESET the fluid measurement system.
To do this simply hold the RESET button for 3-4 seconds until the confirmation tone is heard.

14. Front LED'S

HEATING

GreenLED

Slow flashing: the heating process is on going. At this stage, the Density® but it is still not ready f or shooting.

Fast flashing: the heating process has exceeded the minimum level for which the Density® fogging system is able to shoot, but is not able to make the maximum shooting time.

Fixed light ON: The device is warm and ready for maximum fog shooting.

ARM

Blue LED

Fixed light ON: The fog device is armed and, if it's warm, it's ready to shoot.

FAULT

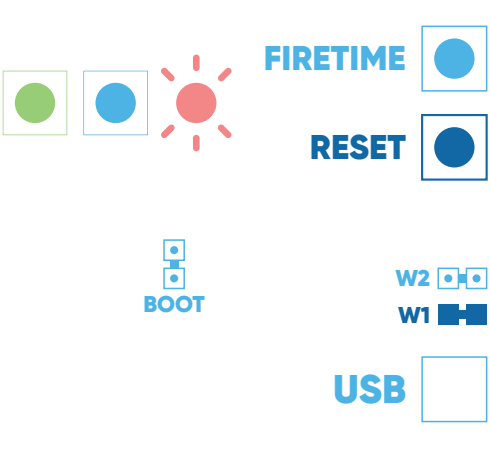
Red LED

Fixed light ON: presence of errors (including E13 fluid in reserve). See paragraph 15. Faults

Fast flashing: Empty or not connected fluid tank (Fault 15)

15. Faults

To READ the faults:
PRESS and RELEASE the RESET button.
Count the number of the red LED flashes. The buzzer will emit an acoustic signal synchronous with the LED.
The number counted is the ERROR present in the device.



Faults 1 to 6 are system faults that need to be carefully examinated.
Please contact support.

7 No presence of Backup Battery
8 Low voltage of the battery
9 No power supply
10 Low power supply
11 Overcurrent on the pump
12 Short circuit in the pump
13 Low fluid level
14 No fluid detected

NOTICE:
Fixed red light = the refill is EMPTY or in reserve. Or there is another error (see list above).
Fast flashing light = Density device did not detect any fluid (empty refill or incorrect connection).

BUZZER: The internal buzzer will sound permanently for 5 minutes when it detects an error.
After 5 minutes, it will emit 1 single «BEEP» per minute.

16. Final test - Yearly maintenance

At the end of intallation it is possible to proceed with a shotting test to verify the installation was correct. Before the shooting test, please follow this checklist:

1. Verify connection and all signals to and from the alarm system.
2. Verify unit has reached the correct temperature (green LED fix on).
3. Verify that arming the alarm panel the blue led on Density turnes ON.
4. Suggested time for shooting test 5 seconds.
5. Provide complete and exhaustive INSTRUCTIONS to the end user with warning notes if panic button is installed.
6. After the test remember to reset the fluid counter pressing RESET button, and remember to set again the correct shotting time.

On yearly maintenance verify the battery voltage level . It is also possible to perform a complete shoot without mains power to deeply test the battery performance.
It is suggested to replace the fluid bag if installed from more than 3 years.

17. Technical specifications

	Density® 390	**Density® 900**	**Density® 1500**	**Density® 2400**
Rated mains voltage	230 VAC	230 VAC	230 VAC	230 VAC
Nominal energy consumption	600 W	600 W	750 W	1000 W
Average energy consumption	56 W	42 W	70 W	78 W
Heating time from cold	31 min.	33 min.	36 min.	34 min.
Heating time after complete shooting	0 min.	7 min.	9 min.	10 min.
Maximum time of shooting	20 s	29 s	44 s	80 s
Volume of fog in a shot *	390	990	1460	2380
Number of complete shoots with 1 fluid bag (1500 ml)		8	5	4
Number of complete shoot swith 1 fluid bag (500 ml)	6			
Operating temperature	-20°C +50°C			
Operating humidity	10 to 95%			
Fuse	10Ah			
Units dimentions	286 mm x 477 mm x 143 mm			
Weight	10,5 kg	11,7 kg	13,5 kg	14,7 kg

(*complete shot, standard fog Density)

18. Warnings

1. This appliance is not intended for use by person (including children) with reduced physical, sensory or mental capabilities, or lack of experience and know ledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

2. Children should be supervised to ensure that they do not play with this appliance.

3. The machine must be installed without blocking escape routes.

4. Verify the fog does not limit the visibility near: stairs, moving objects that may cause falls, injuries or any damage to people.

5. When using the product in multi-storey buildings, if the escape route runs through an area which is protected by a fogging system, it is recommended to install a vocal warning that provides instructions on the behaviour to follow.

6. Do not look directly into the nozzle. Do not add any other substance into the bags.

7. The nozzle may reach high temperatures, touching it may cause burns.

8. When Density® generates fog avoid staying closer than 1 meter from the unit.

9. Before testing Density®, remember to report it in advance to the firefighters in your area to avoid false alarms.

10. Remember to put warning labels reporting the installation of Density® unit on the entrance windows.

11. Report installation to the firefighters in your area and to other institutions, if needed.

12. It is necessary to add an external switch to separate the fog generator from the alarm system, it should be activated before the maintenance to avoid that input tests, for example, it can activate the fog generator.

13. Never direct the fog flow towards an object or a w all less than 2 meters away and, if possible, increase the suggested minimum distance. Thanks to the power of the flow, Density® reaches and exceeds more than 10 meters away in the first 3 seconds from the nozzle.

14. Avoid “overshooting” even if the produced fog is dry and generally doesn’t leave residue, a shot that goes far beyond the recommended seconds can create residue.

15. Install the unit considering paragraph 2 to avoiding possible tampering.

16. Do not move the unit when it is still hot.

17. The main body of Density®, which has the heating system enclosed inside a metal frame, should not be opened unless by specific and authorized service centers. Do not open and touch for any reason the insulation before 24 hours Density® has been shut off. The internal part may reach really high temperature.

18. Do not shoot the Density® unit before the installation is completed.

19. Insert the fluid bag as the last procedure and verify the anti-tampering function.

20. When the installation is finished, always test the system.

21. Install Density® avoiding any obstacles in front of it which can prevent the spreading of the fog.

22. Density® should not be exposed to water spray or dripping.

23. Request to Density® or its distributors to take part in courses for installers to ensure the optimal installation of the equipment.

24. The content of the fluid bags is mechanically predetermined and can be subject to variations +/-10%.

19. Maintenance form

DATE	BATTERY EXCHANGE		BAG EXCHANGE		SIGNATURE
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	
	YES	NO	YES	NO	

It is mandatory to fill out this table in accordance with the security rules

Density®
INSTANT FOG PROTECTION

Version 1.2 - October 2024