



Installation and user manual

DENSITY Basic

Version 1.2 - October 2024

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.

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The conditions of use will be automatically accepted by breaking the security labels on the product.

1. Package content

Inside the package you will find:

1. A fogging unit model DENSITY Basic
2. A warning label to indicate the device installation
3. Installation and user manual

NOTE: Fluid bag and Backup Battery are both NOT included.

2. Product presentation

Thank you for purchasing a DENSITY product.

The great technological innovations such as the fluid injection system, the disposable bag, the ecological and economic system for the complete emptying of the bag, together with the heating system, make the DENSITY Basic fogging systems the best performing devices in the security market.

- Simple: unit easy to install and ready to be integrated to any existing alarm system.
- Green: just 32 WATT, the lowest power consumption among fogging systems.

3. Conditions of use and warnings

The fog generated by DENSITY Basic does not create problems or injuries to people during a short stay in a room filled with fog, if the system is used according to the manufacturer's recommendations.

The generated fog is certified as safe for people and animals from an authorized international certification company and it is proven that it does not leave any residual.

DENSITY products are certified respecting European laws and regulations.

Any certifications required in specific countries are a responsibility of the distributor of that specific country.

The documents related to certifications can be requested by mail to: support@densityglobal.eu

It is not guaranteed by the manufacturer the use of DENSITY system in the presence of objects that may be damaged in any way by the contact with substances based on glycol, water and alcohol.

Any employee or worker that may be exposed to the fog must be warned in advance and must be checked for any allergy to the substances listed on the toxicological evaluation (available on request), anyway at the date of printing of this manual it has never been pointed out any problem related to any allergy.

DENSITY is in no way responsible for any damage or condition of use that has not been required and specifically approved by any specific written request prior to the installation of its products.

For fog fluid please refer to DENSITY fluid safety data sheet published on the website and carefully read it at www.densityglobal.eu

Contact a doctor if for any reason you swallow fog fluid or if after contact with eyes or skin you have any kind of reaction, and in any case wash it immediately with water and soap.

Do never stay for a long time in a room filled with fog.

Do not use charged bags that are not the ones suggested by DENSITY and never try to recharge them, they are made for a single use.

Follow your national rules for the dispose of empty bags.

Keep DENSITY bags out of reach of babies and animals.

The nozzle may be hot and touching it may cause burns.

Do not look directly into the nozzle.

Never use DENSITY products for any purpose that is not related to protection from thief or robbery (the choice of the conditions of use in case of robbery will be suggested by your security consultant).

Never use different fog fluids or add any other substance into the bags.

Do not leave DENSITY Basic unit connected to fluid bag in vehicles and do never transport DENSITY Basic before 24 hours since it has been shut off.

During transport it must be not armed.

4. Installation tips

Please observe the following instructions for installing DENSITY:

1. This appliance is not intended for use by person (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, 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 unit 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 produces 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 about the presence of DENSITY on the windows.
11. Report its 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 jet towards an object or a wall less than 2 meters away and if possible increase the suggested minimum distance. Thanks to the power of the jet, DENSITY reaches and exceeds more than 10 meters away in the first 3 seconds from the point where the unit is installed.
14. When setting the shooting time interval between the minimum and maximum shown in the shooting table, 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 problems in the room.
15. Install it at an height of about 2,5 meters to not let it be reached, 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 activate the DENSITY unit before the installation is completed.
19. Insert the fluid bag as the last procedure and verify the anti-tampering function if present.
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. The DENSITY unit 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 bags is mechanically predetermined and can be subject to variations +/- 10%.

5. Technical specifications

	Density® Basic
Weight without bag	3,8 Kg
Max fog emission in a single shot	130 m ³ (visibility < 1 m)
*Total fog emission capacity with full bag	Around 780 m ³
Fluid bag capacity (NOT included)	1 x 500 ml
Working time without mains power	Around 1 hour
Max power on heating system	300 W
Average power consumption during heating	300 W
Heating time	Around 20 minutes
Average power consumption	32 W
Maximum current consumption at 12 V	1,2 A
Battery type (not included)	Pb 1.2 Ah 12V
Tamper lid switch (NOT INCLUDED)	Optional
Anti-tear off and anti-shift	n/a

* Industrial standard as from other manufacturers

WARNING:

- Do not disconnect the unit immediately after the shot
- Change the battery every two years
- Change the bag as soon as the "empty" signal appears
- The generator cannot be activated on a surface that does not allow air circulation from top and bottom slots

The red led ON related with the "empty" signal shows that the unit needs to be refilled, even if fluid for a full shot is still available.

It is recommended to always have available a new refill and to proceed to replace it as soon as possible.

6. Installation

It is always recommended to secure the fog generator to a wall even when it is placed on a flat surface.

The optional mounting kit for Density® Basic, mainly recommended for ceiling installation, include both battery and fluid bag holders. An optional orientable 15° (pan & tilt) VESA module is available for wall mounting, it can also simplify standard installation by allowing to use back holes for the routing of cables.

Always verify that the bracket or the support surface are suitable for the weight of the unit.

It is suggested not to install the unit behind walls in a limited closed area without a specific ventilation, in order to prevent a possible overheating. Always verify that for Density® Basic ceiling/horizontal installation the temperature of the rooms doesn't exceed 40°C. To avoid injuries please securely fix the fogging unit to the wall according to the installation instructions.

After removing the unit from the package, unscrew the side four screws of the plastic front panel.

Remove the front panel and uncover the electrical circuit (hereinafter referred to as PCB), the DC12V power supply, the thermal unit and the fluid bag. (Fluid bag is sold separately).

7. Electrical power supply

The 230V input provides primary power to the heat exchanger and, by the use of a switching power supply, to the electronic board and the fluid pump. The heat exchanger's working time without mains power ensures proper functioning for a certain period of time, usually around one hour, even in complete absence of mains power. The functioning of the electronic board and the pneumatic system is guaranteed by the T2V 1.2A backup battery (not included). Although the heating element is of 300W, the average power consumption is between 30W and 50W on normal operation.

Do not use inverter or UPS if you are not sure that are designed to generate a pure sine wave. Square wave or rebuilt sine wave are not suitable for the device. Please ask to the UPS manufacturer the correspondence of such feature before proceeding with mains power connection.

- The max current to be considered for the device is 2A
- The connection to the 230V or 120V mains power must be performed by a qualified technician.
- Connect the equipment to the mains power only when installation is completed.
- It is necessary to connect the ground terminal.
- The system must be connected to the mains through an automatic switch (automatic switch, curie C, with $I_h = 10\text{ A}$ and $I_{dif} = 30\text{ mA}$,...) with breaching capacity based on the assumed fault current of the fogging system in the sampling point.

PLEASE NOTE THAT, AS ALL POWERED EQUIPMENT FROM THE ELECTRICITY GRID REQUIRING INSTALLATION, IT IS SUBJECT TO COMPLIANCE WITH RULES OF THE COUNTRY IN WHICH IT IS INSTALLED

IF FOR ANY EVENIENCE IT IS NEEDED TO REPLACE THE FUSE, USE ONLY FUSE WITH THE SAME SPECIFICATIONS AS THE ONE INSTALLED.

EXAMPLE FOR 120v/230v Model: Timed Fuse 250v H Type (1500A) CERAMIC BODY FILLED WITH QUARTZ, REF. STD. EN60127-2-3/DIN41660 6,3AH (EXAMPLE OMEGA GT520263)



N

L



While connecting the unit to the mains power, it is recommended to carefully care the connections and the screwing of the terminal block screws.

Disconnecting or modifying the ground cable voids the warranty and can generate faults related to the temperature control.

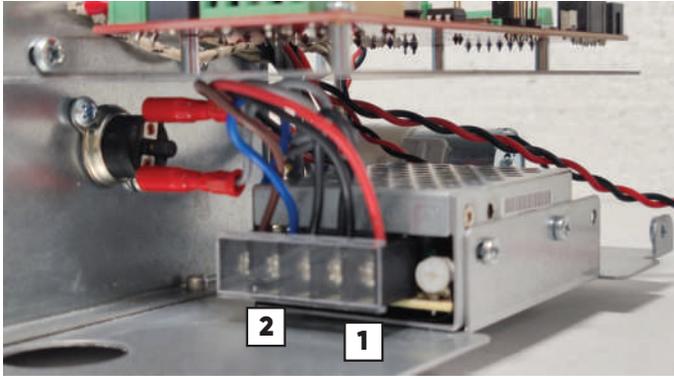
Note: always check the unit AC voltage is corresponding to the mains power available in your country.

Different models are available for 120v AC and 230v AC mains power.

NEVER connect the unit to mains power if voltage doesn't match.

8. Power supply connection

As for the fluid bag (500ml) in Density Basic model backup battery is NOT included and should be provided by the installer.
Reference model: FIAMM FG 20121 A



- 1** 12V Power supply connection
- 2** 230V Power supply connection
- 3** 230V Mains power
- 4** Ground connection
- 5** Battery slot (battery not included)



- N** **L** **⏏**
- 3** **4**

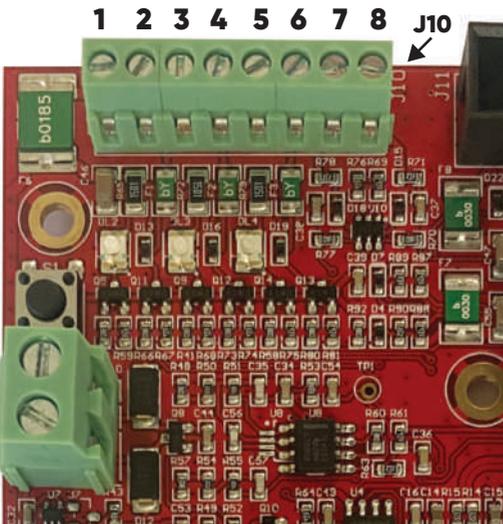
- The battery installation is essential for the safe use of the device, it is monitored and recharged by the board's circuit.

- The housing for the 1.2A 12V lead-acid battery is lodged on right side of the exchanger.

- To gain access to the battery it is necessary to remove the plastic front panel and metal side battery holder screws (horizontal and ceiling installation).



9. Description of input and output connections



Connection PIN description

DC12V Power supply OUTPUT
1 + DC 12V Output (max 200 mA)
2 - 0V DC ground connected

OUTPUTS

3 ARD / SHP (ARmeD status/ SHoot in Progress status)
4 EMPTY
5 ERROR

INPUTS

6 - GND
7 ARM Arming input
8 TRIG Shooting input

Note: both inputs accept clean contacts toward GND.

OUTPUT Power DC12 V

1-2 Output DC12v (max 200mA) for electrical connection of local devices connected to the board.
It can be used to power a local PIR or a remote receiver. It is recommended not to overload the output.

OUTPUTS

3 ARD/SHP - Reports the ARMING status (W2 open), or is active when TRIG is in progress (W2 close).

4 EMPTY - reports the fluid EMPTY condition.

5 ERROR - reports a transient error or fault condition that voids functionality.

It also activated when maintenance is needed, eg. faulty battery , mains power fault or detected temperature out of range.

If a mains power fault occurs it will be self resetted when correct mains power is back. We remind that it is necessary to connect this output to an alarm control panel or other equipment able to forward the signal to whom is concerned.

INPUTS

6 GND Reference GND for the inputs.

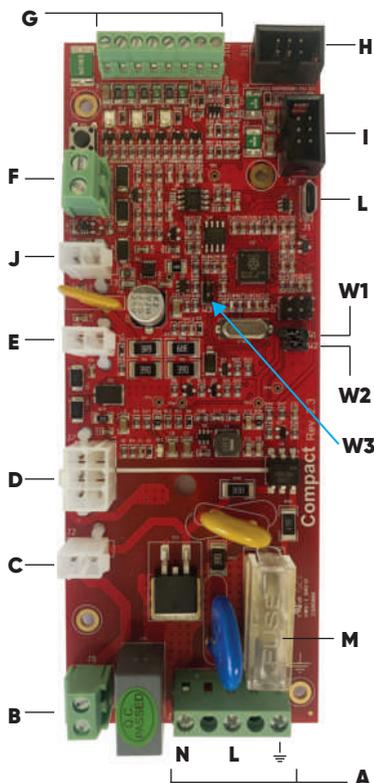
7 ARM Closing the contact ARM: the blue led turns ON and then, if the unit has reached the correct temperature, is ready to generate fog. During the shot, if the contact ARM is opened, it immediatly stops fog generation.

8 TRIG Closing the contact TRIG, if the unit is armed and has reached the correct temperature, it generates fog for the time set.

After the shot, all further shot commands within 120 seconds will not be processed.

In order to avoid accidental activations with consequent fog emission, the inputs are in "negative safety", so the disconnection of a wire does not cause the activation.

It is essential to carefully check the reliability of the connections and protect the cables to the alarm control unit where there is a risk of accidental or malicious void.



- A)** J4 Mains power connection
- B)** J5 Heater Resistor
- C)** J2 Thermal CutOff
- D)** J7 Power supply unit 230v AC/12v DC
- E)** J9 Battery 12v 1.2A connector
- F)** J8 Thermal Sensor connector
- G)** J10 Inputs/Outputs connector
- H)** J11 RS232 port 1 connector
- I)** J6 RS232 port 2 connector
- J)** J3 Fluid Pump Connector
- L)** J1 USB port
- M)** F4 Mains fuse

- W1)** Shooting time setting enable
- W2)** Default open (see paragraph 10)
- W3)** Reserved (Open)

10. Connection examples

The diagrams and examples below are intended only for a "better understanding" of the operation of the inputs/outputs. None of the diagrams below represents the "single scheme to perform" as, in respect of the reference standard EN50131-8:2019, there are precise indications and only using all inputs and outputs on the PCB it is possible to abide by the standard.

Is recommended to use the "HOLD-UP" function after a careful evaluation of the risks from a security consultant.

When Density® Basic is ARMED, it becomes immediately ready to create fog.

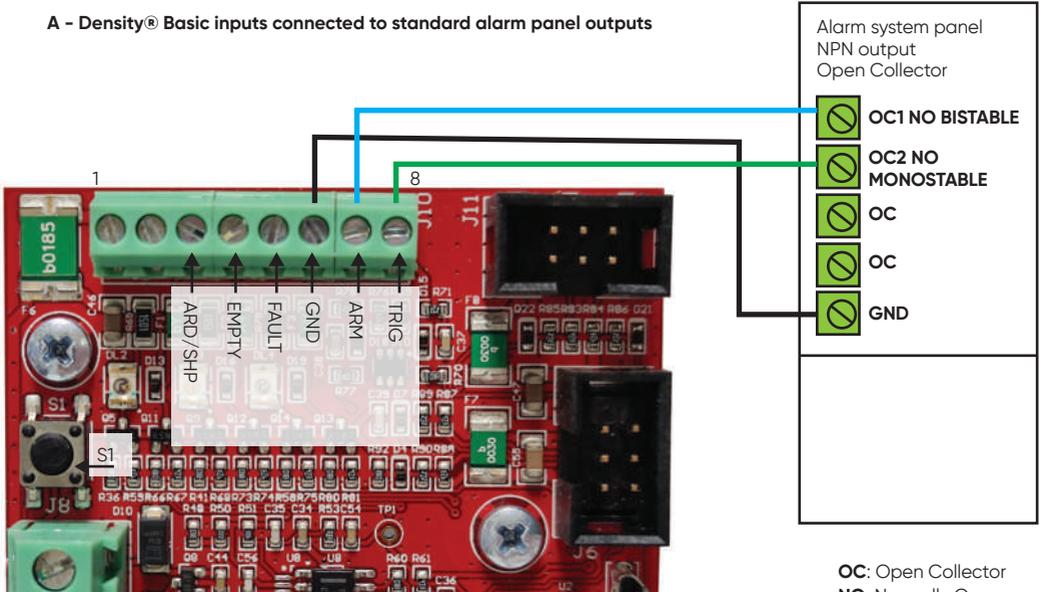
For safety reasons and to avoid false fog emissions is suggested to program the alarm panel to allow enough time to leave the place.

- A** Density® Basic inputs connected to standard alarm panel outputs
- B** Density® Basic inputs connected with a clean contact (relays) alarm panel outputs
- C** Wiring example of Density® Basic outputs to drive leds and/or relays

Note: in the following examples the output signal ARD/SHP has the following meaning depending on jumper W2:

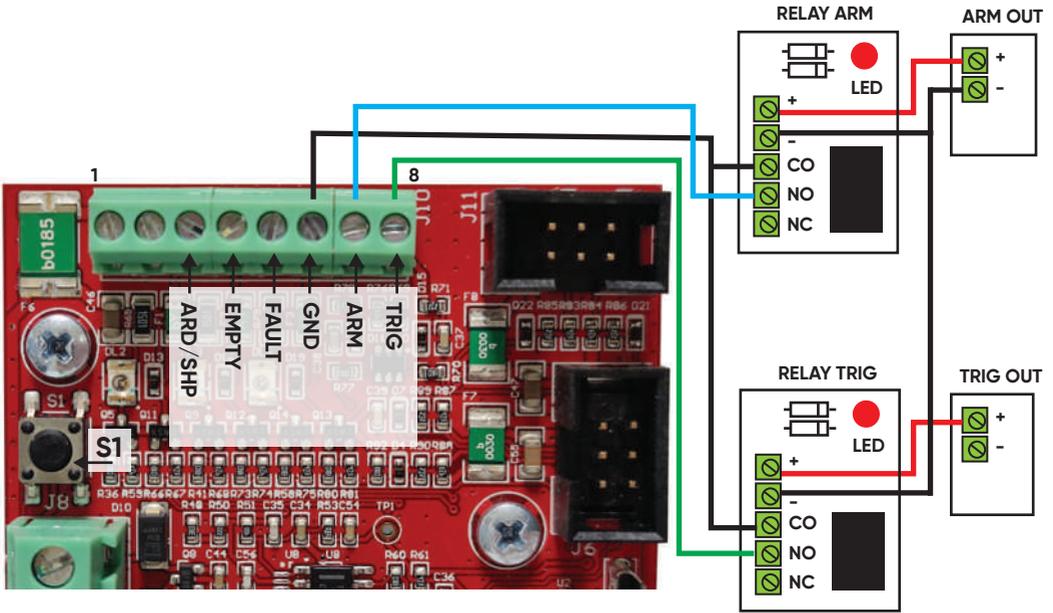
- W2 OPENED=ARM STATUS reported**
- W2 CLOSED=SHOT in PROGRESS STATUS reported**

A - Density® Basic inputs connected to standard alarm panel outputs



The ON/OFF output of this alarm panel is an Open Collector NPN that is OPEN with the alarm OFF and close to negative for all the time the alarm panel is active and monitoring. The alarm panel output is normally open and close the contact during alarm time.

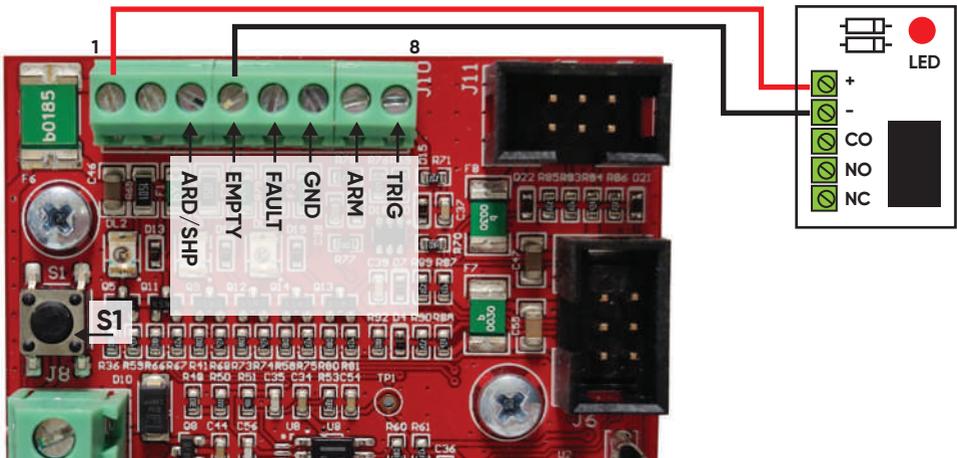
B - Density® Basic inputs connected with a clean contact (relays) alarm panel outputs



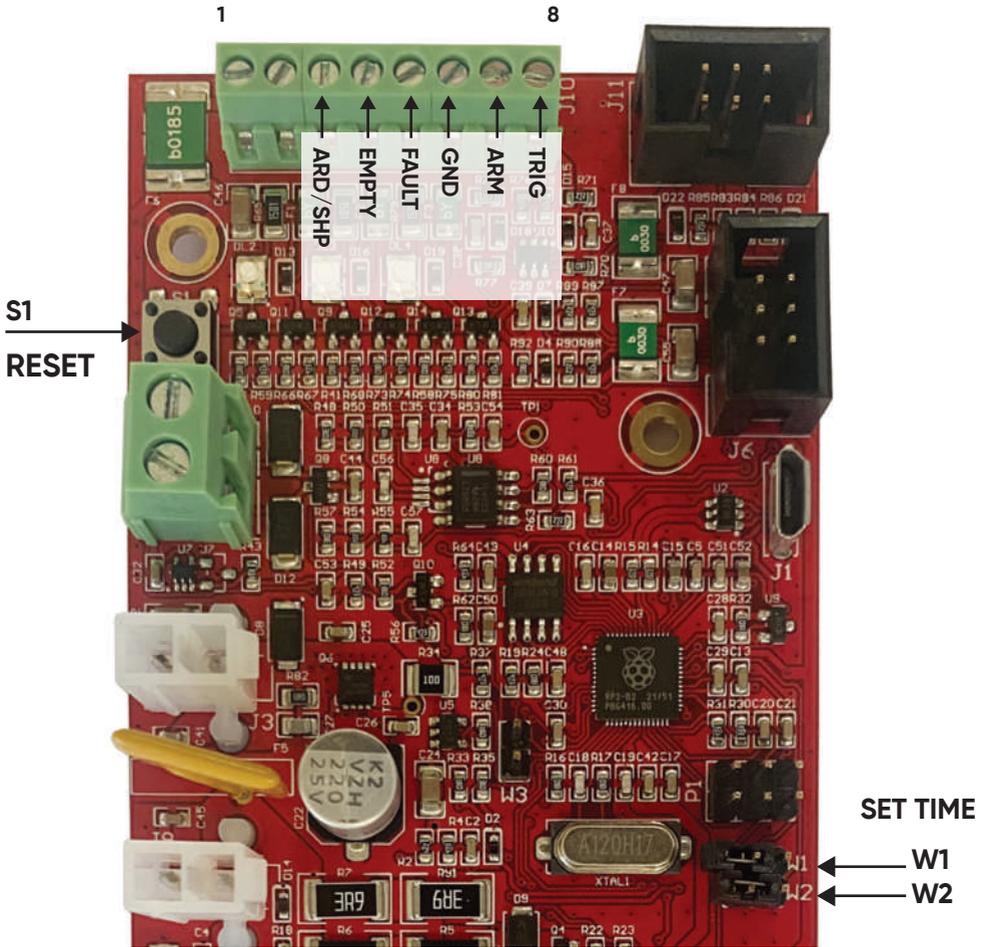
The ON/OFF output of this alarm panel is an open relay when panel is OFF that continuously keep close for all the time the alarm panel is monitoring.

The alarm output of the panel is an open relay that close when alarm condition is detected.

C - Wiring example of Density® Basic outputs to drive leds and/or relays



11. Shooting time setting and fog flow orientation



To set the shooting time, after opening the front panel, you must **CLOSE** the jumper **W1** in SET position then, holding down the button S1, the 3 leds on the front will flash and each flash is equivalent to one second fog emission. If you press the button again, the shooting time is not added to the one previously set, but will restart from zero. If **S1** button is pressed for a time longer than the shooting time allowed for the unit, shooting time will be set to the maximum possible. Shooting time can be set according to desired seconds, but to correctly activate pipes refill in full security, it must be set to minimum 2 seconds. After setting the shooting time, to avoid wrong time settings, is suggested to keep the **W1** jumper **OPEN**ed.

On the Density® Basic mainboard are present two serial ports connectors (J11 and J6) that are reserved for connection to expansion modules and communication devices specially designed by the manufacturer. To allow advanced diagnostics, it is possible to connect a personal computer with Microsoft Windows or Linux operating system using a microUSB cable to the J1 port. Using a generic terminal emulator it will be possible to display the operating parameters of the device on the screen. The same port can be used for any firmware updates of the device. We recommend that you refer to your product distributor for more information about advanced diagnostic.

RECOMMENDED SHOOTING TIME ACCORDING TO THE VOLUME SPACE TO PROTECT (m³)

Fogging systems Density® Basic is able to produce fog based on second by second setting. The maximum quantity of 1,5 ml/s allows to fill an area of around 135 cubic meters.

There might be cases in which, due to specific characteristic of the location, nozzle type, levels of temperature and air pressure, degree of the fog density and light in the target area, the shooting time can be increased or decreased.

For example, above 3 mt of height the shooting time must be integrated and above 5 mt, every additional meter should be considered as double.

(HxLxP) x D x V x R x I

HxLxP----- Height x Width x Depth of the area to protect

D----- Density of the produced fog

V----- Temperature and air pressure

R----- Acceptable residue in case of saturation of V parameter

I----- Intensity of the surface light

The following tables indicate the suggested fog emission in relation to the number of seconds of shooting set in average condition of temperature, air pressure and humidity.

To correctly dimension the units it is needed to verify that the saturation of the area occurs in faster time than the one supposed for the theft.

SHOOTING TABLE Density® Basic (max 50 sec.)					
m³ to protect	Seconds of emission	m³ to protect	Seconds of emission	m³ to protect	Seconds of emission
13 (39*)	5	65 (195*)	25	117 (351*)	45
26 (78*)	10	78 (234*)	30	130 (390*)	50
39 (117*)	15	91 (273*)	35		
52 (156*)	20	104 (312*)	40		

* Industrial standard as from other manufacturers

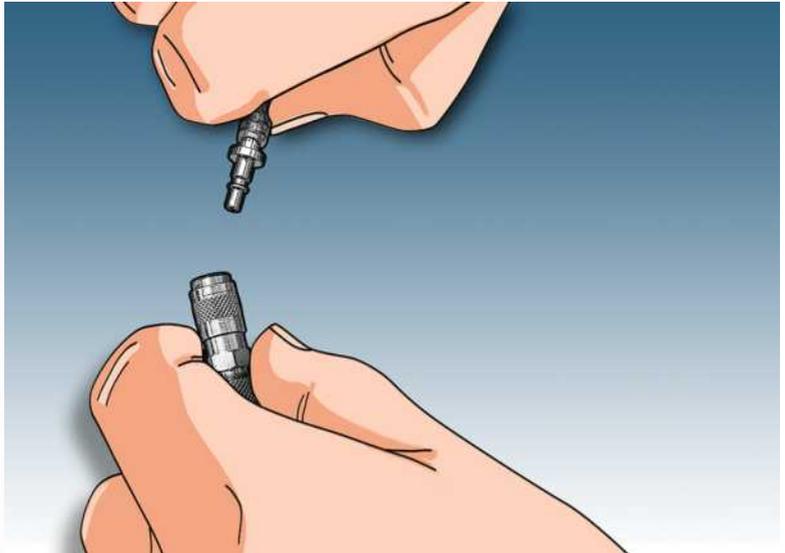
The value in the first column indicates the volume of the room to be protected, with respective seconds of emission reported in the second column. The value in m³ varies depending on the density to be obtained. With the suggested value it is possible to get the maximum density recommended to ensure the absence of any residual. In places where a little residual causes no problems, it is possible to increase the shooting time. Please note that the more fog released, the more the time required to recover visibility. High levels of fog, over recommended limits, can leave residual. Any residue usually goes away by itself within 24/48 hours, otherwise, being soluble in water, it is enough to use a wet cloth for cleaning. If you desire to obtain an average of 1 meter visibility after 60 seconds from shooting, as specified by the standard EN 50131-8:2019, used as reference by all manufacturers of fog generators, the number of shooting seconds it is to be reduced in half.

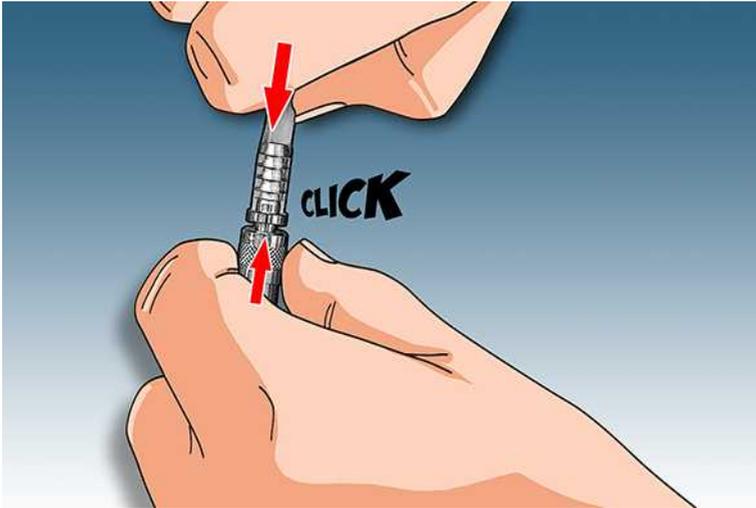
12. Installation, exchange and bag reset

Insert the bag in place as show in picture.



Insert a new bag and push metal connector till a "click" is heard.





Press S1 button after bag replacement - bag 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 (S1 Button) for 3-4 seconds until the confirmation green led blinks.

13. Front leds meaning

EMPTY RESERVE

RED LED (right)

ON: Error (Mains power off / Battery low) or Fault.

Blinking: Empty bag or low fluid.

OFF: No error condition.

ARM

BLU LED (center)

ON: Unit is armed and ready to shoot (if green led is already ON).

OFF: Unit is disarmed, shot not possible.

HEATING

GREEN LED (left)

ON: Unit has reached the correct temperature.

Blinking: Unit is warming, no shot possible.

OFF: Device fault.

The EMPTY signal also means that fluid is going LOW.

It means that the unit has shot at least 240 seconds since last reset (**Density® Basic**).

14. Reset from fault condition

Disconnect the units from any power source, both mains power and battery must be disconnected.

Wait 5 minutes and reconnect the battery and mains power.

This procedure helps to understand if the fault condition was due to mains power overload, serious power supply problems or problems in thermal loop. The fault condition is shown by the RED led ON (LED DL4 on the top), the output FAULT immediately switches and can indicate a transient or fixable condition (Eg. low battery power or no mains power), or a problem that cannot be fixed on site.

On mains power fault or battery low conditions the unit will recover itself without any further operation on it.

In the event that the mains power fault has generated further problems to the unit (Eg. on board fuse) or that the backup battery is not working anymore, the maintenance is needed.

Note: The RED led (LED DL1, middle of the board), means that unit is ON. It is NOT a fault condition.

15. Maintenance possible solutions

Density® fogging systems don't need special maintenance, nevertheless is suggested a periodical check to the following components by skilled operators:

- 1) Verify battery and power supply status.
- 2) Verify screws are firmly tight.
- 3) Verify the output nozzle is not damaged and without anything inside.
- 4) Verify pneumatic circuit performing a test shot.
- 5) Verify once a year fluid pump.

BATTERY AND POWER SUPPLY CHECK

Verify that the output of the power supply without any load (battery unplugged) is 14,1 V on the PSU.

If a different value is noticed, set the trimmer on power supply.

Verify battery status (integrity check, no overheating); is suggested to replace the battery on 2 years base due to the heavy load during shots without mains power.

SCREWS

Verify that all fixing screws are correctly setted and eventually rescrew them.

OUTPUT NOZZLE

Verify that output nozzle is not damaged and that there is nothing inside blocking the fog ejection flow.

YEARLY PUMP FUNCTIONALITY TEST

The test is done executing a trial shot on the unit. To avoid creating too much fog during the test is suggested to stop the flow after a few seconds dearming the unit under test. The fog flow will immediately stop.

ACTION/SIGNAL FOUND	POSSIBLE CAUSE	POSSIBLE SOLUTION
Small fog flow coming out from nozzle	All units are 100% tested so a small amount of fluid could be still in the warming unit.	This condition is normal and can happen on first installation, it will completely disappear in a while when the unit will become completely hot.
RED Led ON (Error)	Too low battery level or exhaust	Replace Battery
	Bag in Reserve or Empty	Replace fluid Bag
	No Mains power	Check mains power or F4 fuse
RED Led ON (Fault)	Disturbance / interference or potential differences between devices	In the event of high noise on mains power (lightings) an error while reading thermocouple values can occur. Execute recovery (Paragraph 16). If even recovery fails the unit may be faulty
		In very large installations or with more than one fog units connected to the same alarm panel, a mains power difference can occur, in that event the units have to be decoupled.
	Error in the thermal loop	Error on thermocouple, fuse cable, resistor. Please refer to technical service
	Heater Temperature too high or thermocouple error	Switch off the unit and verify the correct insertion on J8 connector
Poor ventilation	Switch off the unit and clean air holes	

ACTION/SIGNAL FOUND	POSSIBLE CAUSE	POSSIBLE SOLUTION
Unit ARMED (BLUE LED ON) but don't execute trig command	Red front led BLINKING	Bag changed, reset needed Follow instructions Paragraph 13
		Empty bag - replace it following instructions on Paragraph 13
	Green front led is BLINKING	Unit still warming, wait max 20 min. with the unit connected to the mains power
	Wires error	Verify on J10 that when alarm is ON there is a contact between - GND (Pin 6) + TRIG (Pin 8)
	Mains power overload	Try the Recover procedure (Paragraph 14) With no results replace the board
	Electronic Board overheath	Power off the unit and verify air flow near the unit (Paragraph 14)
Unit cannot be ARMED BLU LED OFF	Wires error	Verify on J10 that when alarm activates there is a contact between - GND (6) + ARM (7)
While setting shooting time the green LED blinks only once	The W1 jumper is OPEN, unit in "RESET" mode	Refer to bag Reset (Paragraph 12) and shooting time setting (Paragraph 11) Warning: please verify/set again the shooting time.
		See time setting (Paragraph 11)

16. Warranty

The warranty of DENSITY is two years and is handled directly from the dealer or authorized installer, so please contact your supplier to take advantage of warranty with the copy of the purchase document that contains the serial number of the unit. Not included in the warranty: moving parts and/or damages depending on the incorrect use unless it is found a manufacturing defect in origin.

Fluid and bags are not covered by warranty.

BY BREAKING THE SECURITY LABELS AND THE OPENING OF THE UNIT
YOU WILL ACCEPT WHAT IS WRITTEN ON THIS MANUAL AND
ON THE WEB SITE: www.densityglobal.eu



We recommend to throw away the batteries in the appropriate waste containers for recycling. Heavy metals contained in them are recyclable.

RESELLER/INSTALLER STAMP
(company to contact for the warranty)

Serial number _____

Date of installation _____

Signature of installer _____

At the end of the installation, write down the identification number of the units, the date of the installation and sign in the dedicated spaces.



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