Wall Diffuser

Pro Sprayer Series NP

NP 400
NP 800
NP 1400
NP 2000

Technology

SPRAI

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1. The NP series

NP devices are diffusers designed to be integrated into another system or placed on a wall or a ceiling. They take the air outside the volume to spray.

This series does not have an user interface. The control of the diffuser can be made by an external controller or a simple dry contact.

The series comprises four models differentiated by flow rates :

Model	Flowrate (milliliter by hour)
Pro Sprayer NP 400	400
Pro Sprayer NP 800	800
Pro Sprayer NP 1400	1400
Pro Sprayer NP 2000	2000

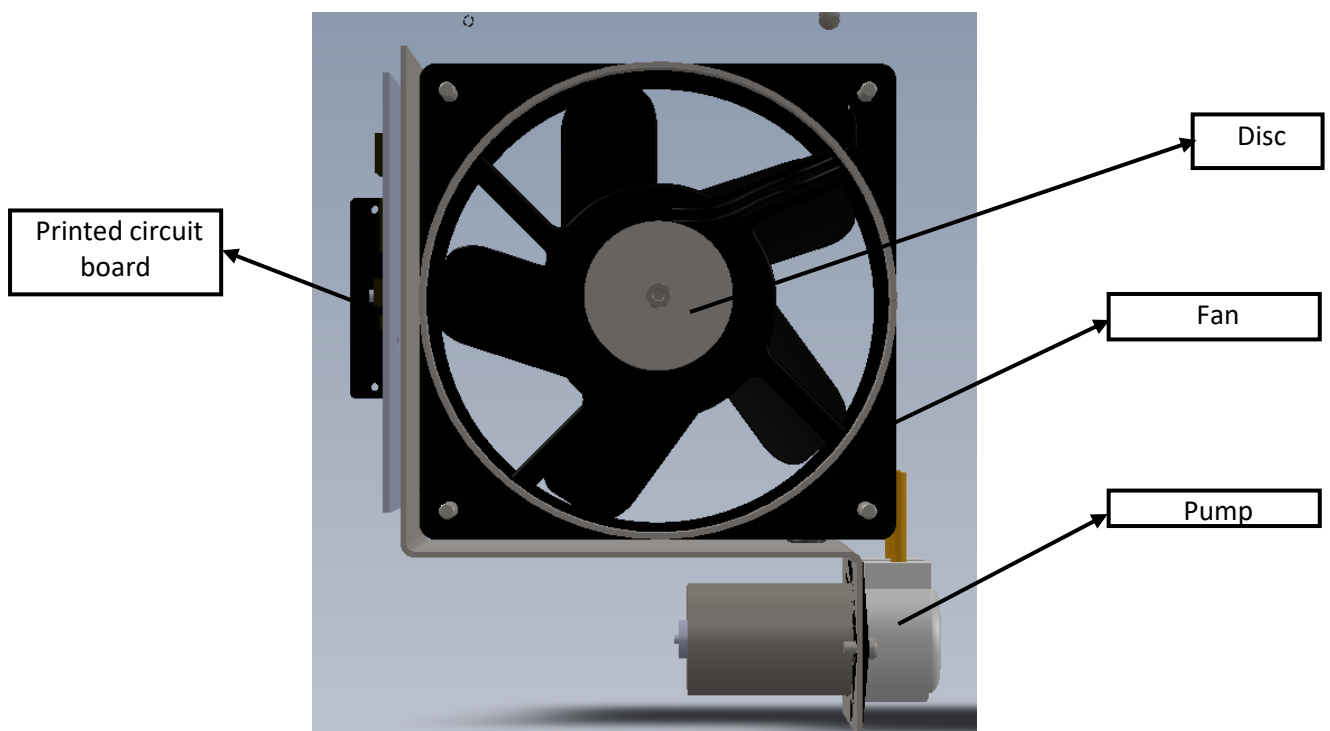# 2. Description

The main components of the enclosure are (figure 1) :

Figure 1: diffuser components

- A thin, 35mm diameter stainless steel disc, spun by a brushless motor and fed liquid near its centre.

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	color	Function
1	Red	Output 5V CC (dray contact)
2	Black	GND
3	White	ON/OFF (dray contact)
4	Green	LPS status
5	Blue	Pump status
6	Brown	Fan status
7	Yellow	Motor status
8	Violet	N.C.

Power cable 3m 24 Vcc / 2.5A

Control cable 3m

Screw to open the panel

tube 1m to the tank

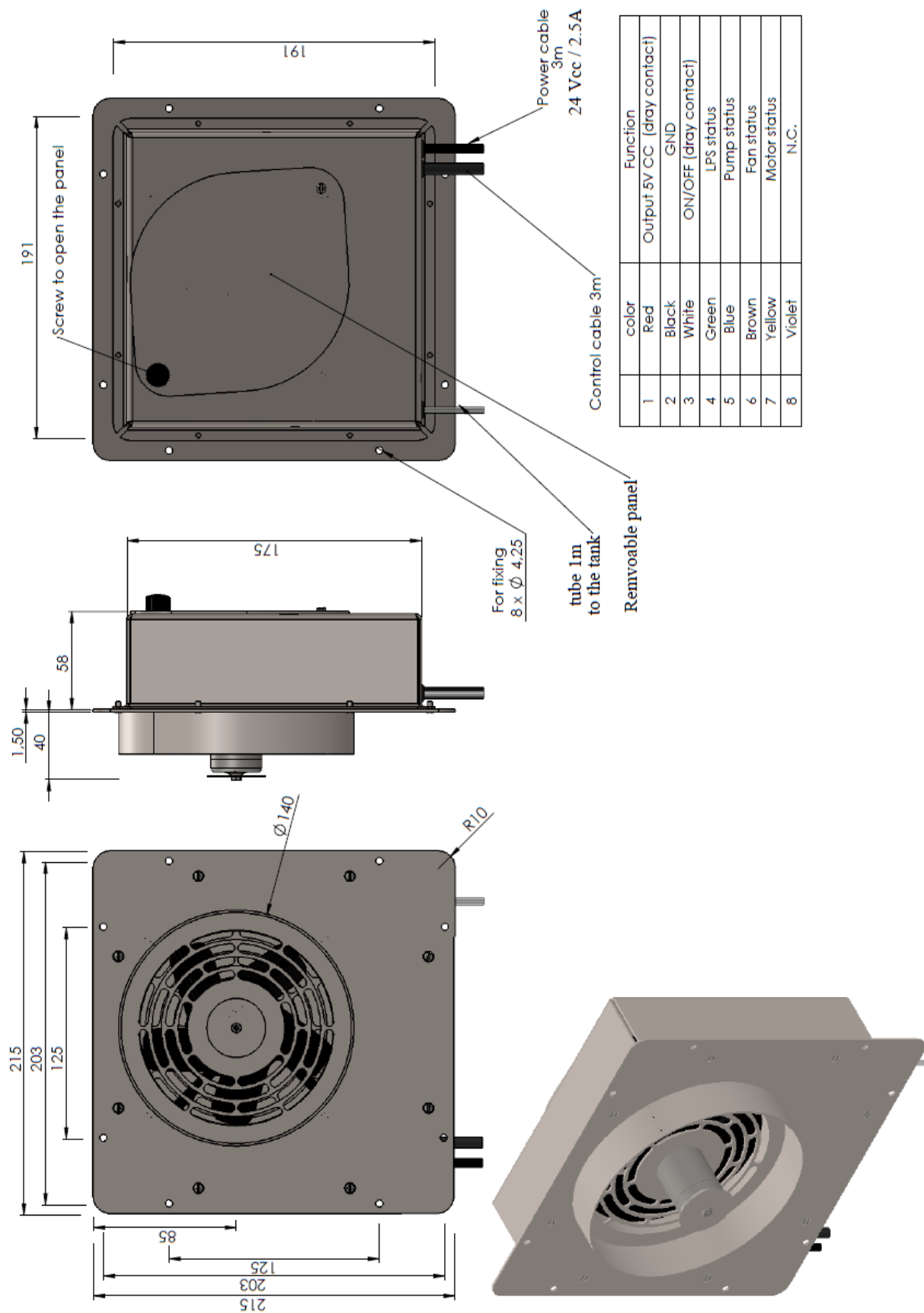Renvoable panel

For fixing 8 x Ø 4,25

Figure 2 : overall dimensions

⚠️ **The disc must be protected by its cover when not in use. Any shock could distort it and damage the motor wheel bearings.**

⚠️ **The disc should not be touched when it is spinning.**

- A 18V brushless motor, rotation speed 45000 RPM.
- A buffer tank allowing the disc to be fed with liquid
- A 24V constant flow rate peristaltic pump with Pharmed tube
    - **ID=1mm, OD=3.2mm** for the NP 400 and the NP 800
    - **ID=2mm, OD=4mm** for the NP 1400 and the NP 2000
- A 24V axial fan
    - **163 m³/h** for the NP 400 and the NP 800
    - **384 m³/h** for the NP 1400 and the NP 2000
- Printed circuit board (power and controls without user interface).
- Semi rigid PTFE connecting tubes.
- A removable panel allowing to cover the rear face

The dimensions of the sprayer :
➢ Overall dimension L=215mm ; W=215mm ; h= 100mm
➢ Wight : 2 Kg

The Sprayer is supplied with :
- A 80W external power supply ; **Input** 100-240 VAC, 50-60Hz, 1.5A ; **Output** 24VDC, 3.33A, 80W Max

3. Operation principle

The pump sucks the liquid from the tank to send it towards the disc through the pipes and the buffer tank. The liquid spreads on the spinning disc's lower surface and diffuses it all in fine droplets near its edge. The air stream created by the fan carries the droplets upwards, and diffuses them over the entire volume treated.

4. Connections

The device is equipped with :

- A 24V DC input
- A 8-contact control cable :
    - ➢ 4 for status feedback from motor, fan, pump and the LPS "liquid presence sensor"
    - ➢ 2 for wiring a dry contact for the control
    - ➢ GND

Wire	Color	Function
1	Black	GND
2	**Red**	**Output 5V CC (dray contact)**
3	**White**	**ON/OFF (dray contact)**
4	*Green*	*LPS status*
5	*Blue*	*Pump status*
6	*Brown*	*Fan status*
7	*Yellow*	*Motor status*
8	Violent	N.C.

Connection of the control cable

The status outputs are linked directly to the microcontroller of the circuit board. Every channel outputs a signal at 5V and 20mA. Before connecting the outputs to a controller, make sure the controller inputs don't consume more than 20 mA per channel.

If the controller inputs take more than 20mA, you damage the circuit board of the diffuser. In this case, we suggest you add a resistor of 240 ohm in series to limit the consumption to 20mA per output.

5. Operating mode

1. Attach the sprayer to its place
2. Connect the status's cables to the controller Inputs
   - Motor status : yellow
   - Fan status : Brown
   - Pump status : Blue
   - LPS status (liquid presence sensor) : green
   - GND (ground) : Black
3. Connect the two wires red (5VDC) and white (on / off) to the dry contact
4. Connect the two power cables to a power source :
   - Red: +24 V / 2.5A
   - Black: GND
5. Put the pipe of the pump's aspiration into the tank
6. Put the diffuser under voltage 24Vcc/2.5A

7. Close the dry contact between the red cable (5VDC) and the white cable

8. The moteur, the fan and the pump start to turn.

9. You can query the status of the motor, the fan, the pump and the LPS via cable; yellow, brown, blue and green respectively.

10. Open the dry contact to shutdown

The table below shows the status of different elements of the diffuser on the different operating phases :

Phase description	24Vcc contact	Dry contact	Motor status	Pump status	Fan Status	liquid presence sensor status
Beginning of the cycle	OFF	OPEN	0V	0V	0V	0V
Apply power without liquid in the circuit	ON	OPEN	0V	0V	0V	0V
Apply power with liquid in the circuit	ON	OPEN	0V	0V	0V	5v
Start the nebulization cycle. The duration is managed by the PLC	ON	CLOSE	5v	5v	5v	5v
At the end of nebulization cycle	ON	OPEN	0V	0V	0V	5v
Lack of liquid	ON	Close	0V	5v	0V	0V
End of cycle	OFF	OPEN	0V	0V	0V	0V

Status of different elements of the diffuser

6. Diffusion time calculation:

The volumetric pump providing the diffusing has a constant flow rate.

The exact flow rate is mentioned on the specifications sheet delivered with the diffuser.

Diffusion time is obtained by dividing the quantity of liquid to be diffused by the flow rate.

Example :

DEVICE	NP 400	NP 800	NP 1400	NP 2000
Quantity of liquid to diffuse	100mL	400mL	1400mL	3000mL
Flowrate	400ml/h	800ml/h	1400m/h	2000ml/h
Diffusion time d = quantity/flow rate	0.25 hour (15 minutes)	0.5 hour (30 minutes)	1 hour (60 minutes)	1.5 hour (90 minutes)

7. Cleaning the diffuser

⚠️ **Do not clean the diffuser with tap water**

- Cleaning the external casing: the casing should be cleaned regularly with a damp cloth.
- Cleaning the hydraulic system: it should be rinsed **after each use :**

  - Replace the product container by a second container containing water (or solvent).
  - Check that the suction tube is still in place.
  - Program the diffuser for a 5 minute diffusing period.

8. Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
No liquid gets to the disc	• The tank is empty • The suction tube does not reach the liquid • The pump does not work • A pipe is clogged up • The buffer tank is clogged up	• Fill up the tank • Replace the tube correctly • Send diffuser back • Send diffuser back • Send diffuser back
The disc does not rotate	• Motor failure • PCB failure	• Send diffuser back
The fan does not work	• Motor failure • PCB failure	• Send diffuser back
The diffuser is abnormally noisy	• Fan noise • Diffusing system noise • Pump noise	• Send diffuser back
The diffusion is not good enough	• Fan problem • Wrong spinning speed • Wrong liquid	• Send diffuser back • Use an appropriate liquid

9. Maintenance

On site maintenance : the disc replacement can easily be carried out on site.

Disc replacement :

The disc replacement can easily be carried out on site.

⚠️ **Please do not use force on the motor, otherwise the bearings will be damaged. Do not remove the power supply cover.**

1. Unscrew the M2.5 nut
2. Remove the disc
3. Replace the new disc in position
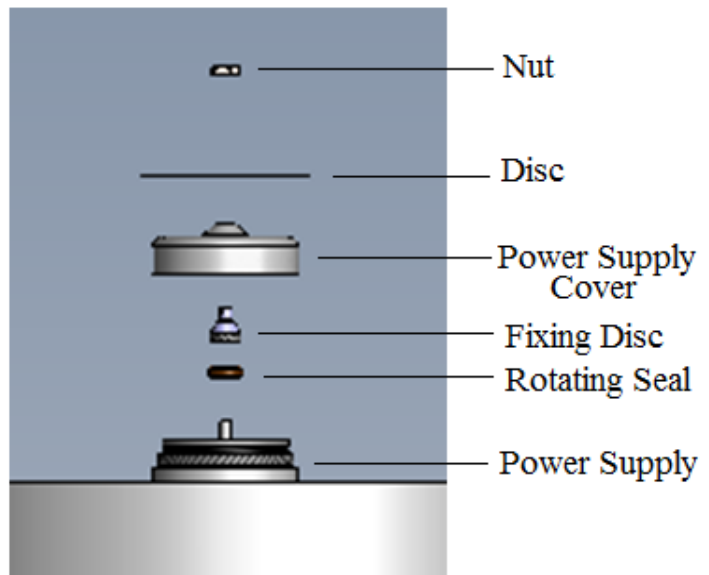4. Tighten the M2.5 nut

Figure 3 : Disc replacement

10.   Preventive care

The diffuser you are using has undergone thorough controls before delivery. It is advisable to schedule a preventive maintenance visit at the manufacturer **every 200 hours** of use.

This visit will include :

*   Disc replacement
*   Seals replacement
*   Pipes check and replacement if necessary