FOGSCREEN®
walk through magic

FogScreen®
eMotion
Projection Screen

User Manual
Part 1: Installation Guidelines

NOTE: All users of FogScreen® projection screen must read and understand these instructions before installation or operation as they are designed to prevent damage to property and harm to the user. Please keep this manual in an accessible place for future reference.

GENERAL

FogScreen® projection screen is designed to create a laminar walk-through screen onto which it is possible to project images, videos etc., just like onto a regular screen. The screen only needs water and electricity for it to operate. The device must always be suspended so that the laminar screen can be generated under the device. It is prohibited to use the device in any way or for any purpose other than defined in this User Manual without the express permission of the manufacturer.

A risk analysis has been made in accordance with the required standards, and provided that the instructions in this manual are followed, the device is safe to install, use and maintain. The correct and safe operation is described in detail in the User Manual. The manufacturer has completed a Declaration of Conformity and the device is CE approved. The manufacturer can deliver design documents to the owner of the device on request.

It is strictly prohibited to use the FogScreen® screen for any other purpose or in any other way than described in this User Manual. The User Manual is written to ensure the safe operation of the screen and the FogScreen® projection screen has been designed in accordance with the principles of machine safety.

The manufacturer does not accept any liability for damages caused by the incorrect use of FogScreen® projection screen or indirect damages caused by its misuse. The user must be familiar with the User Manual before installation. The owner or renter of the device is considered to be a user.

CONTENT

1 IDENTIFIER INFORMATION

1.1 Model and type

Model of the device: FogScreen® eMotion projection screen.

1.2 Period of validity

The expected operating life for the device is 10 years. All relevant information will be updated when modified. Modifications can only be made by authorities approved by the manufacturer.

1.3 Updates

This User Manual will be updated as part of a continuous improvement and development process. Please contact FogScreen, Inc. for the latest version.

1.4 Contact details

The user can contact the manufacturer, reseller and maintenance provider via e-mail at sales@fogscreen.com or by post at the following address:

FogScreen, Inc.
Porkkalankatu 3
00180 Helsinki
Finland

1.5 Accessories

The user can only connect accessories that have been approved by FogScreen, Inc. and comply with EU law and EU standards to the FogScreen® device. The projector used to project images must be CE approved.

2 CONTENTS OF PACKAGE

The package (1 pc) contains the following items. If any items are missing, please contact FogScreen, Inc. or the reseller.

- FogScreen® screen, 1 pc
- Remote control, 1 pc
- Water hose for filling (male connector on one end, the other end open), 1 pc
- Water hose for emptying (female connector on one end, the other end open), 1 pc
- User Manual, Part 1: Installation Guidelines, 1 pc
- User Manual, Part 2: Operation, 1 pc

Further equipment needed to show an image on the screen are a light source such as a projector and a content source such as a DVD player or a computer.

3 INTRODUCTION

3.1 Before installation

It is recommended that safety shoes and protective gloves are worn during the installation. Personal protective equipment is not needed during the operation of the device.

FogScreen, Inc. does not accept any liability for injuries caused during installation.

This device has been engineered and manufactured to ensure your personal safety; however, improper use may result in damage, injury or even death.

Only a trained person is allowed to install, operate and maintain the FogScreen® projection screen. When suspended the bottom of the device must be at least 2.1 meters (7 ft) above the floor.

The device must be installed so that people cannot hurt their heads when walking under it.

Only officially approved methods are allowed for suspension. Make sure that the truss system and the rigging points can support the total weight of the setup. FogScreen, Inc. does not accept any liability for defects caused by faulty installation.

The suspension must be secured so that the FogScreen® unit cannot fall down under any circumstances.

Always ensure that the water used for the FogScreen® projection screen is fresh and pure. If the tap water available does not fulfil these requirements, use bottled water instead. Using the FogScreen® device with contaminated water may be hazardous.

3.2 Operating conditions

FogScreen® projection screen works in many types of environments - from low to high ambient light - but the best result is reached in controlled conditions. As the screen is transparent, it is more sensitive to ambient lightning than a normal projection screen. Because the screen is especially sensitive to light from the rear, the use of a dark backdrop is highly recommended.

The screen may only be used indoors in temperatures between +5˚C and +40˚C (41°F–104°F).

The ideal installation conditions are as follows:

- **Low ambient lighting:** The screen looks richer and more opaque in low-light conditions. The screen performs well also in brighter conditions, but it will be more transparent, and requires a more powerful projector to compensate for the light. It is also recommended that the set-up is protected by side, top and rear sheltering/dressing to maximize the screen performance.

- **Still air:** FogScreen® projection screen is built to resist standard atmospheric disturbances. For instance, people walking through cause almost no disturbance to the screen. Even large crowds will not disrupt the performance of the screen. The fog of the FogScreen® projection screen is sandwiched between two laminar air curtains that resist wind pressure in most indoor conditions.

  The screen settings can be adjusted to enhance the strength of the fog flow, fog density and air flow if necessary. However, strong constant wind will disrupt the performance of the screen by bowing or arching it, or in the worst case by entirely dissipating the screen. Caution should be taken to ensure the screen is not subjected to air currents created by A/C systems, proximity to outdoor exits, or large pressure differentials in entranceways.

  The device uses normal tap water. If the water quality is low or water has a high limestone content, it is strongly recommended to use a water softener and/or other means to clean the water. The screen has been tested with normal tap water with soft water (4 dH or 0,72 mmol/l) and the same screen quality is guaranteed each time with the same water softness.

3.3 Concealed installation

FogScreen® projection screen can be installed inside structures but it is very important to note that the air-intake channels take all the needed air from the surroundings. FogScreen® projection screen cannot be completely sealed. It is strongly advised to leave the top part of the structure surrounding the screen completely open and enough free space, minimum 15 cm to the ceiling. The honeycomb on the bottom of FogScreen® projection screen must be left uncovered.

3.4 Projector

The projector used to generate the image on the screen should be installed approximately 2.5-5 meters (8.3–16.5 ft) away from the middle of the device and at a height of 2.5-3.5 meters (8.3–11.6 ft). A minimum of 5000 Ansilumen projector is recommended but in bright conditions stronger projector is needed. The screen uses rear projection, i.e., the viewer is on the other side of the screen than the projector. The recommended setup for the FogScreen® projection screen is shown in Figure 1.

3.5 Rigging

FogScreen® projection screen must be hung from two rigging points on each side of the screen (see Figure 2 and APPENDIX A: SCHEMATICS). For example chain lifters can be attached to the rigging points on the screen and used to lift the screen to its place. If the rigging height is an issue, a custom rigging can be done by removing the rigging parts from the unit and assembling it directly from the unit to the rigging structure.

The rigging must always be secured.

3.6 Connections

The FogScreen® projection screen needs to be connected to electricity, a water input line (pressurised or an external tank) and a water output line (for emptying) to operate. The power cord (length 2,5 meters (8')) is equipped with a standard plug. The hoses (length 10 meters (30') each) equipped with fitting adapters to the screen and open ends (see Figure 3) on the other end are supplied for the water input and output.

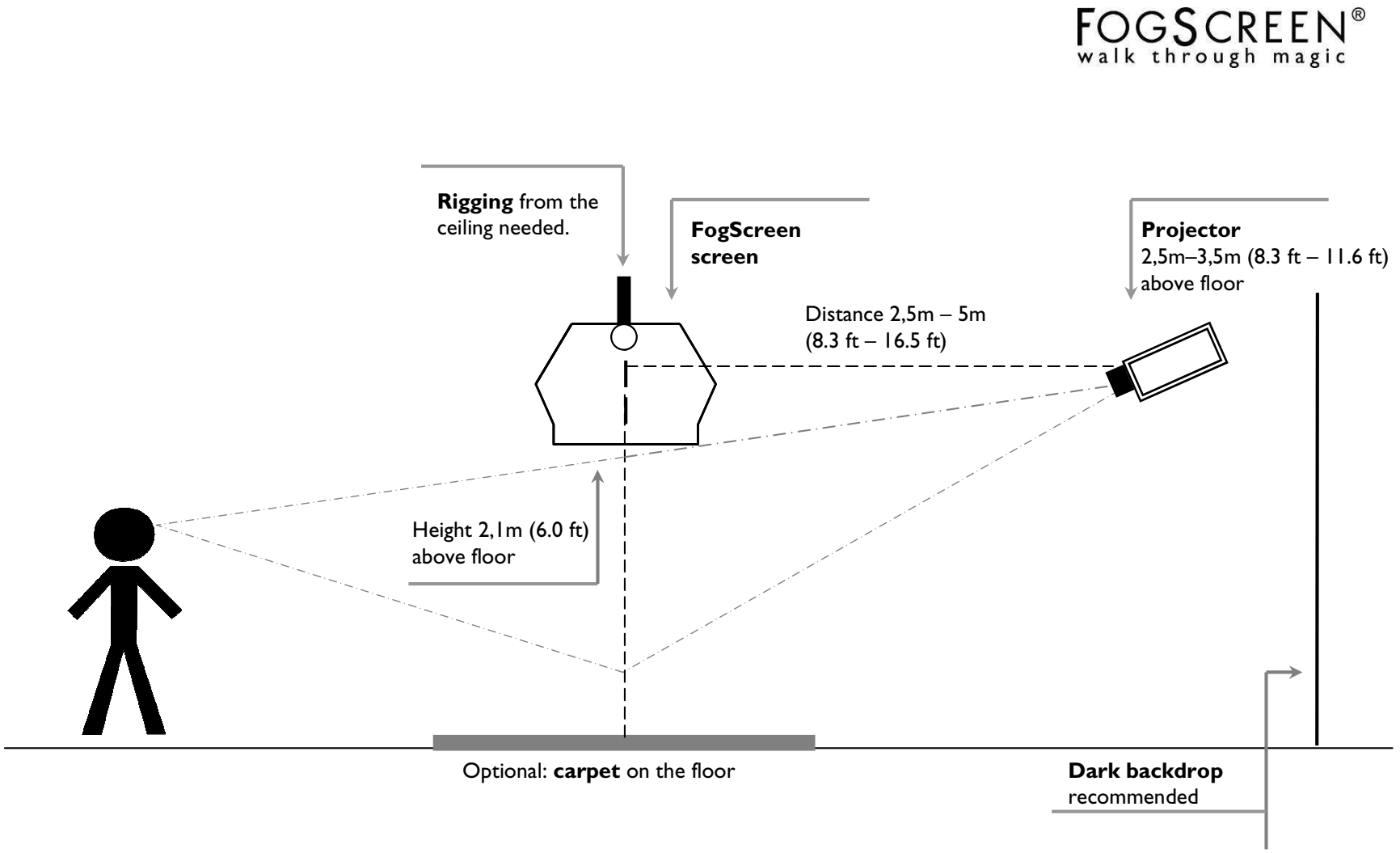


Figure 1. Principle of suspension and projection viewed from the side.

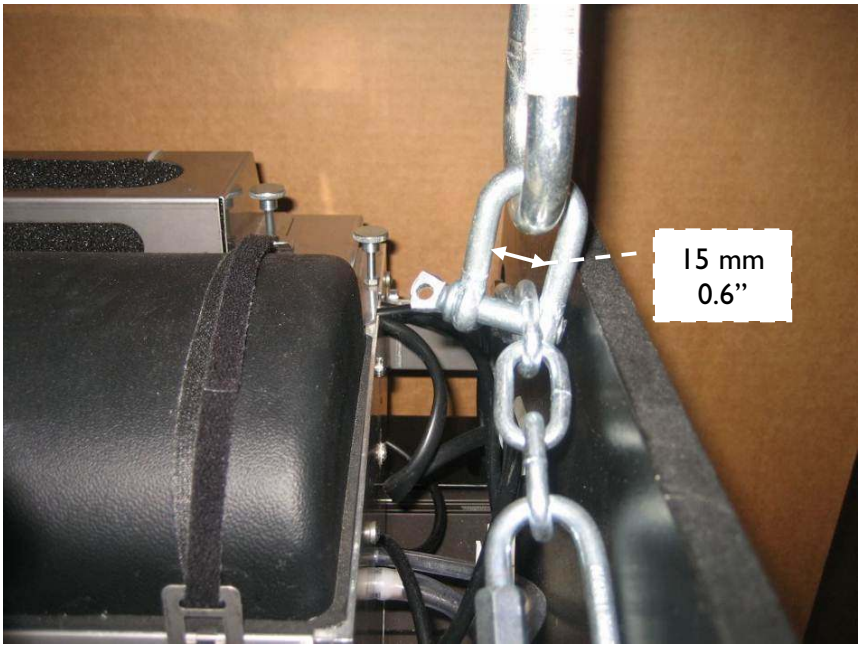


Figure 2. Rigging point equipped with a shackle.

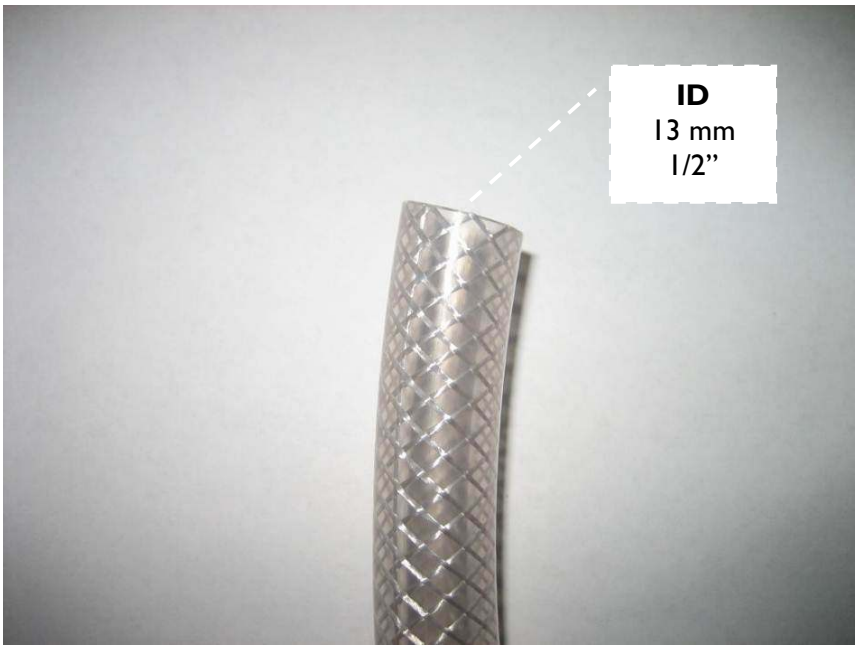
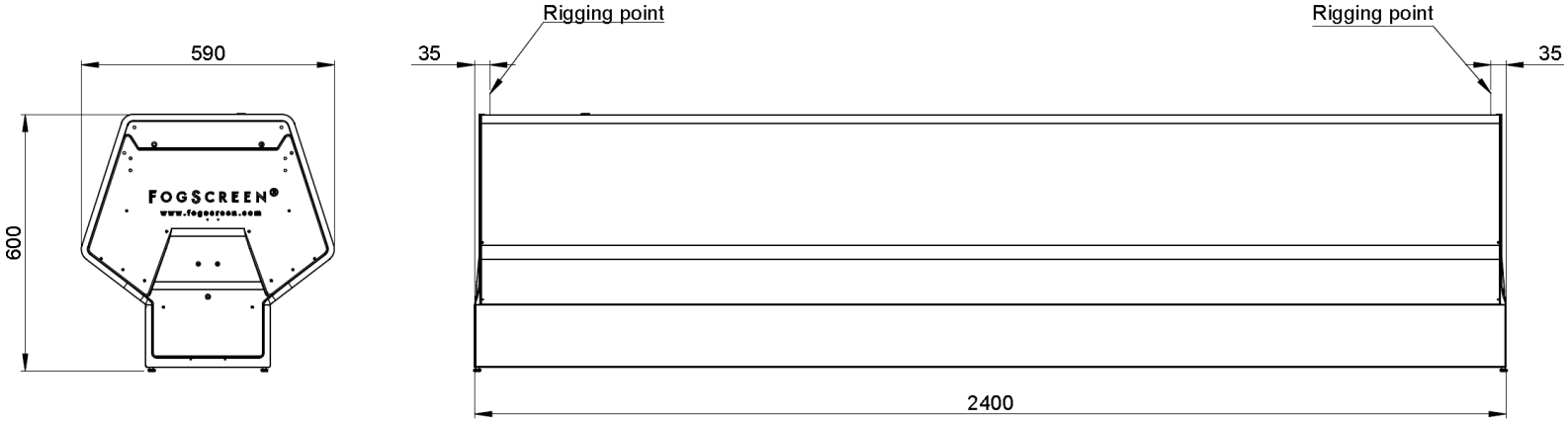


Figure 3. Open end on both the water input and output lines.

4 TECHNICAL INFORMATION

Device	Width	240 cm (7,9 ft)
	Depth	59 cm (1,9 ft)
	Height	60 cm (2,0 ft)
	Weight	180kg (400 lbs)
Projection area	Width	Approx. 220 cm (7,3 ft)
Water consumption		Typical 6 - 10 litre/h (1,6 – 2,6 gal/h)
Voltage		100 – 240V
Current		10 - 20A
Power consumption		2.2 kW
Water input		Pressurised tap water or an external tank, soft water (4 dH or 0,72 mmol/l)
Water input hose		ID ∅13 mm (1/2”), length 10 m (30’)
Water output hose		ID ∅13 mm (1/2”), length 10 m (30’)
Internal water tank	Volume	12 litre (3.2 gal)
Controls		IR-remote control User interface DMX-512 protocol

APPENDIX A: SCHEMATICS



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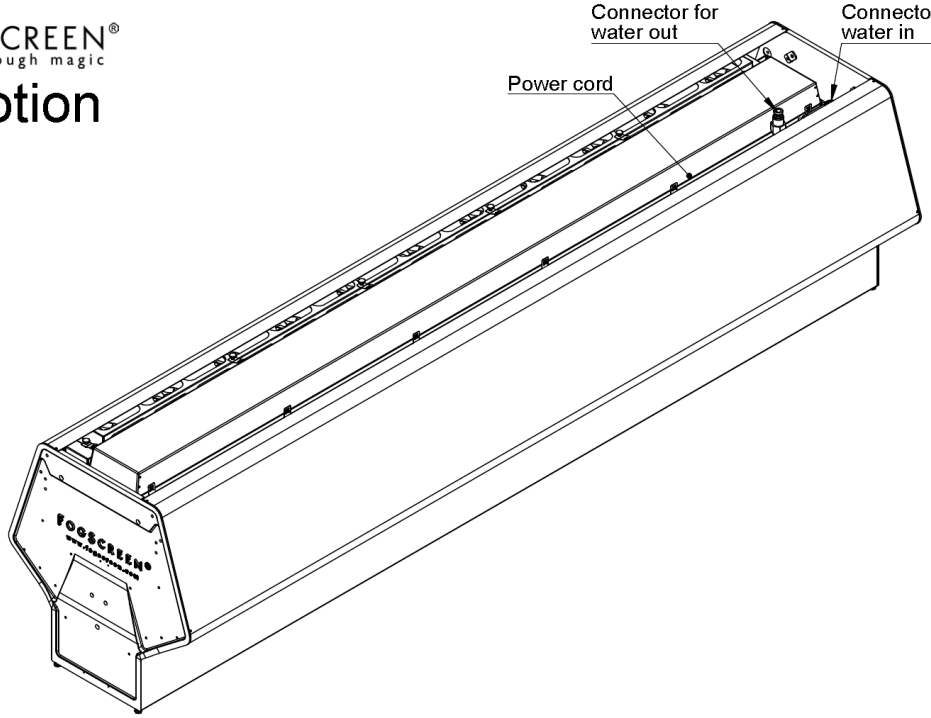

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Projection Screen

User Manual
Part 2: Operation

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CONTENT

1 UNPACKING AND CHECKING

Some edges might be sharp. It is recommended to wear protective gloves while handling the metal sheets.

Placing your hand near the white speaker disks on the fog generators when the screen is turned on is painful and may be harmful.

Do not touch the honeycomb situated underneath the screen. The edges of the honeycomb are sharp and it can be easily damaged.

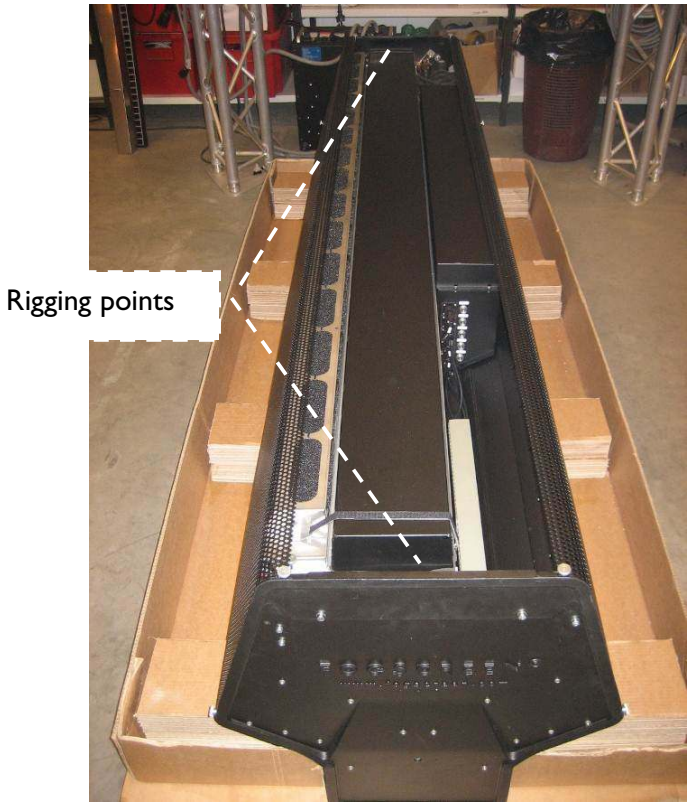


Figure 1. FogScreen® screen as unpacked from the transportation package.

The transportation package is made of recyclable cardboard. Do the following check after unpacking.

1. Remove the side cover from the tank side by unscrewing the finger nuts (6 pcs) (see Figure 2)

2. Unplug the electrical connectors of the fog fan panel (see Figure 3).

3. Remove the fog fan filter by unscrewing the finger screws (2 pcs) (see Figure 4)

4. Remove the fog fan panel by unscrewing the finger screws (2 pcs) (see Figure 5)

5. Check that all the fog generators (8 pcs) are in the right position inside the tank (not turned upside down etc.) and that the splash guard is horizontally above them (see Figure 6 and Figure 7).

Screen may not be used if any of the fog generators is not in the right position inside the tank.

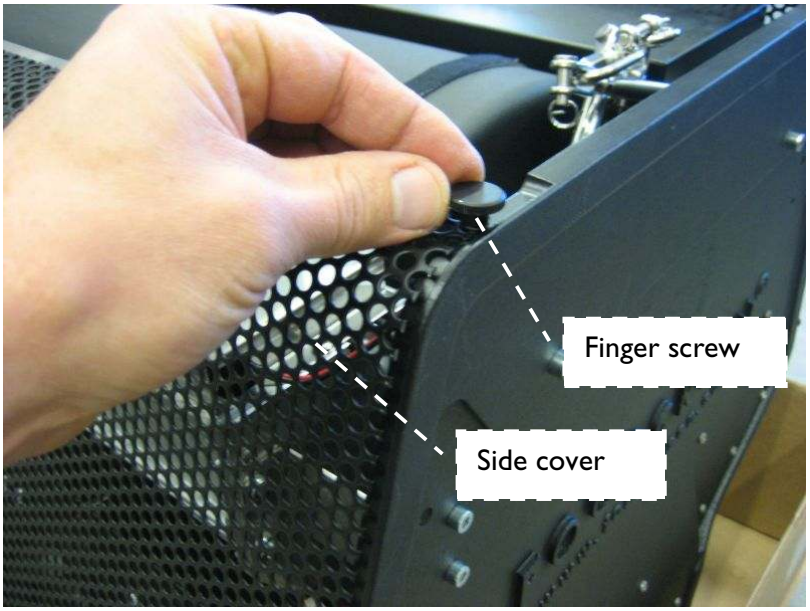


Figure 2. Finger nuts (6 pcs) for the side cover.

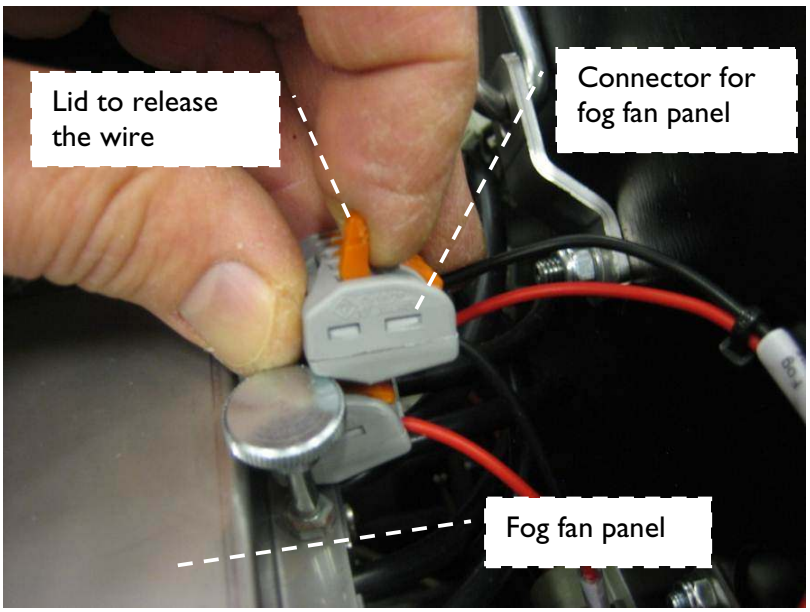


Figure 3. Electrical connectors of the fog fan panel.

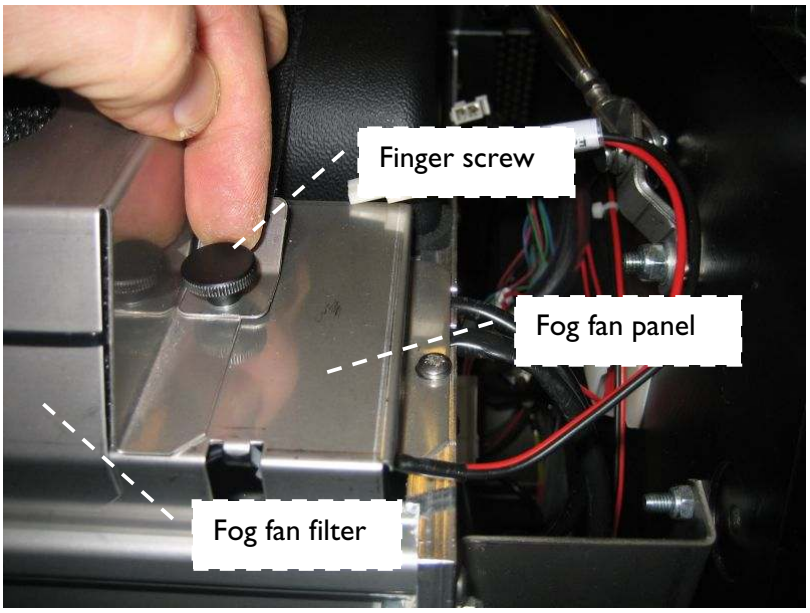


Figure 4. Finger screws (2 pcs) for the fog fan filter.

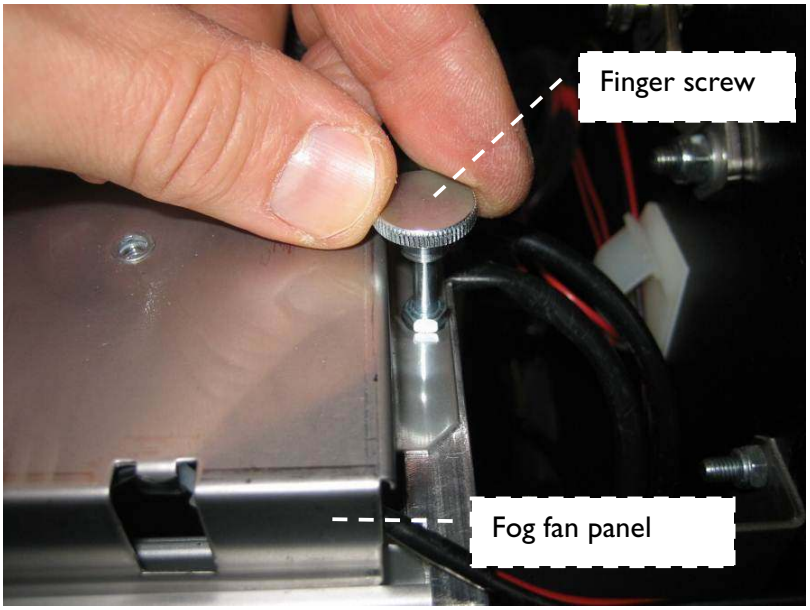


Figure 5. Finger screws (2 pcs) for the fog fan panel.

Figure 6. Splash guard and fog generators (8 pcs) inside the tank.

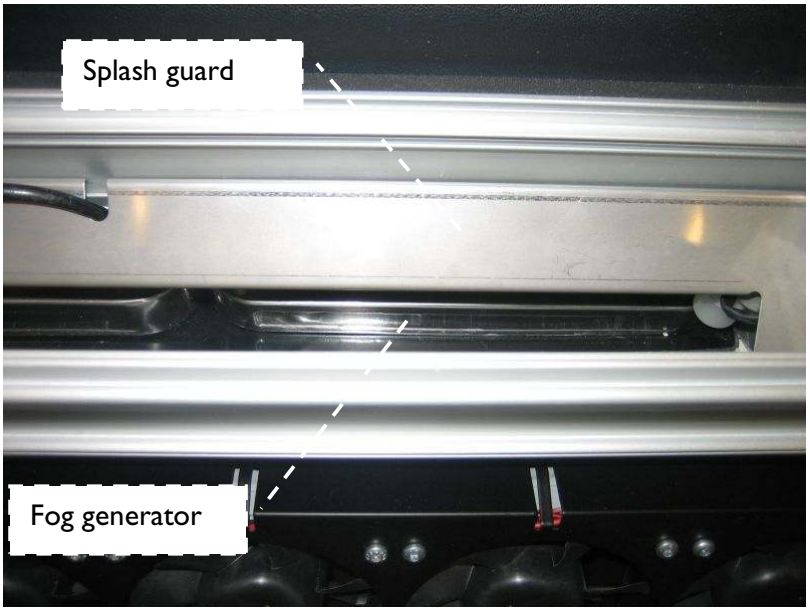


Figure 7. Detailed view of the fog generator in its right position.

2 INSTRUCTIONS FOR OPERATION

2.1 Operation mode with pressurised or tank water

The screen can be operated either with pressurised water or with tank water. The operator chooses the operation mode from the switch on the side of the electrical box (see Figure 8 and Figure 9). The switch has two settings:

Switch upwards: Pressurised water; internal pump only used to drain the internal tank and water feed regulated by the magnetic valve.

Switch downwards: External tank; internal pump used both for filling and emptying.

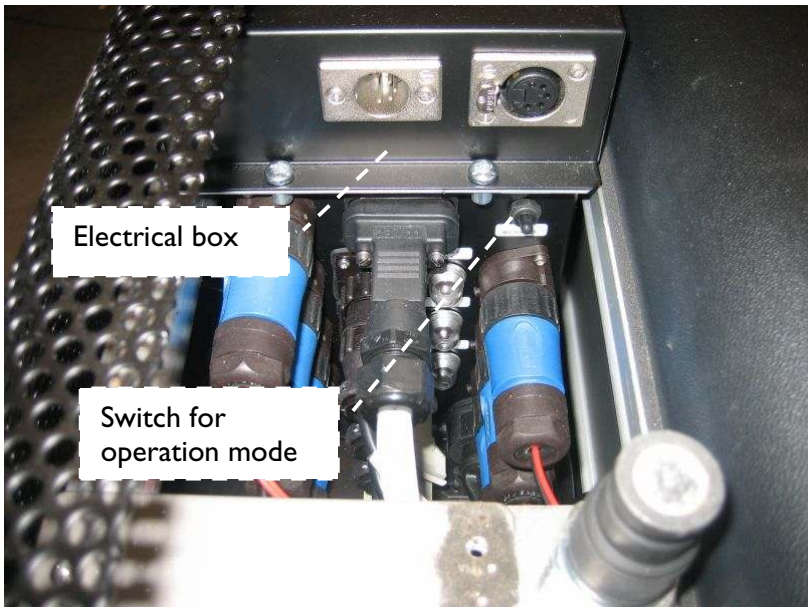


Figure 8. Electrical box with a switch to select the operation mode.

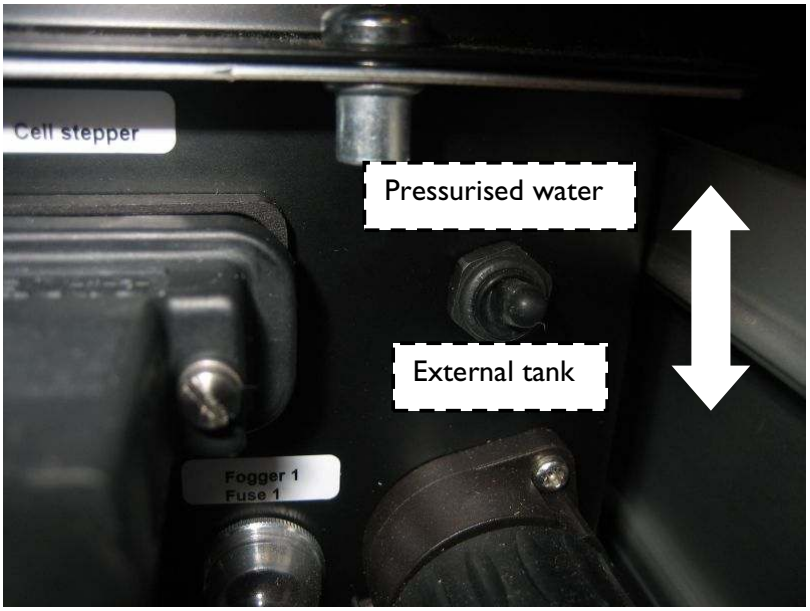


Figure 9. Detailed view of the operation mode switch.

2.2 Remote control

The user operates the screen using the remote control. Fogscreen uses a simple universal IR remote control "One-for-All" Zapper (see Figure 10).

Figure 10. Remote control.

The screen is operated with three buttons:

On: The screen goes on and fills the internal water tank if needed.

Standby: The screen goes off but does not empty the tank. This option is used when the screen needs to be shut down for a short period of time, i.e. under 8 hours.

Off: The screen starts emptying the internal water tank and will be shutdown after the tank is empty, i.e., within a few minutes.

2.3 DMX-control

The screen can be connected to a control via a DMX-512 protocol (see details in Appendix B).

2.4 How to start the operation

1. Connect the filling and emptying hoses (see Figure 11)
2. Choose the right operation mode (see 2.1).
3. Point the remote control towards the user interface (see Figure 12) and press **On** on the remote control.

The screen goes on and starts filling the tank. The fog starts flowing after a couple of minutes when the internal water tank is full.

Figure 11. Connectors for the filling and emptying hoses.

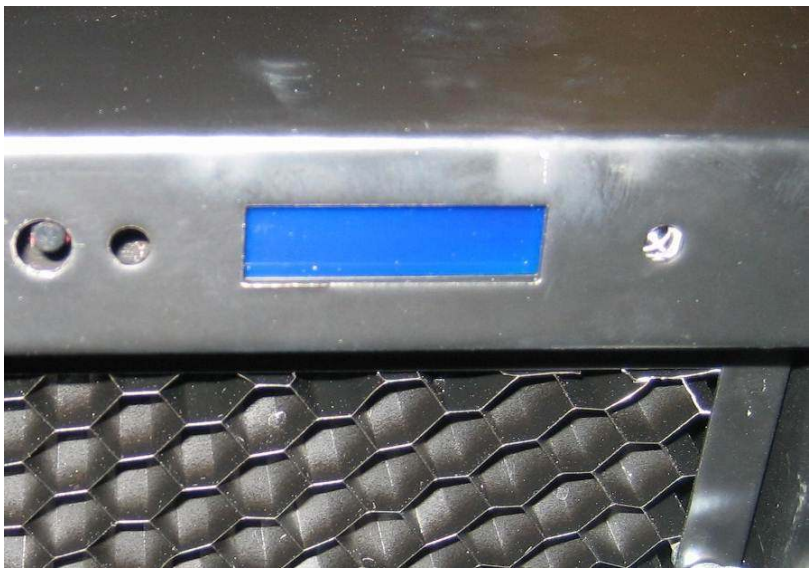


Figure 12. User interface situated underneath the screen.

If the FogScreen® screen does not operate normally, and in particular if there is an unusual sound or odour coming from it, unplug the device immediately and contact an authorized dealer or service provider.

2.5 How to end the operation

Press **Standby** on the remote control for temporary shutdown.

Press **Off** on the remote control for normal shutdown.

Do not unplug the screen immediately after normal shutdown since the pump will operate few minutes to drain the tank. When the pump stops operating, the main power can be unplugged.

It is highly recommended to close the water line with an external valve while the screen is not in operation.

3 MAINTENANCE AND SERVICE

If the estimated down-time is more than 8 hours, the water tank of the FogScreen® screen should be emptied. If the estimated down-time is more than 24 hours, the water tank should be emptied and cleaned.

Do not use strong chemicals to clean the water tank. Wipe the tank dry with a soft cloth.

Only a person trained and authorized by FogScreen, Inc. can perform the service for the FogScreen® device. Proper maintenance consists of the following measures:

- Air filter cleaning
- Complete disinfection and cleaning
- Cleaning of the water in filter
- Change of the honeycomb if necessary
- Change of the wearable parts (such as fog generators and fans) if necessary
- Review of the structures and safety of the screen.

4 TROUBLESHOOTING AND REPAIR

4.1 General errors

PROBLEM	POSSIBLE CAUSE	ACTIONS OF REPAIRING
There is a text "Fog on" on the user interface screen but there is no fog	The screen does not get water.	Check that the water input and output lines are connected in the right order. External water tank: tank may be empty. Pressurised water line: external valve is closed. Check that the correct operation mode is selected (see Section 2.1).
Fog is created only in one end of the screen.	The screen is not horizontally straight.	Level the screen to make the water level even in the water tank. Small angles should not cause problems.
	There is not enough water in the screen; the screen is currently being filled or the water level is too low.	If the water tank is being filled, wait until the end of the cycle. If the water level is too low, restart the filling cycle.
	One or more fog generators are faulty.	Contact Fogscreen Inc. for spare parts and maintenance work.
Machine drips too much water.	Honeycomb does not move sideways.	Check whether the honeycomb moves sideways during operation. If it doesn't, try gently to move it manually to see, whether it has been stuck.
	Fog density is set too high and the screen produces too much condensation.	Check the value of the parameter "FogDensity" on the user interface.
	The drip water filter is not installed or is installed incorrectly.	Check the drip water filter. It must be firmly in its place and seal the channel behind it.
	The condensation recollection pump is faulty.	Check if the recollection pump goes on periodically (note that the pump is not designed to be on constantly). Check if you can see water droplets moving in the outlet tube of the pump. Check whether the pump creates any pressure by pressing the outlet tube with you fingers.
Tank does not empty.	Water output hose is not connected or it is blocked.	Check the condition of the water output hose.

4.2 Error messages

In case of malfunction the following messages may be seen in User interface.

ERROR MESSAGE	POSSIBLE CAUSE	ACTIONS OF REPAIRING
water in timeout	Internal tank does not fill.	Check that the water input and output lines are connected in the right order. External water tank: tank may be empty. Pressurised water line: external valve is closed. Check that the correct operation mode is selected (see Section 2.1).
overtemp	Temperature inside the electrical box is over 85˚C	Too high room temperature Check that the cooling fan inside the electrical box is operating
valve drive *drain drive* *recoll. drive*	Short circuit	Contact Fogscreen
fog time expired	System is locked	Contact Fogscreen

DECLARATION OF CONFORMATION

We

FogScreen, Inc.
Address: FogScreen, Inc. Helsinki
Porkkalankatu 3
tel: +358 20 7118 610
fax +358 20 7118 611

confirm that the screen

FogScreen® projection screen
Serial Number:

manufactured by us, meets the standards set out in the Finnish versions of:

IEC 60950-1 / EN60950-1 Information technology equipment. Safety. General requirements

SFS-EN-60204-1 - Safety of Machinery - Electrical Equipment of Machines - Part 1: General Requirements

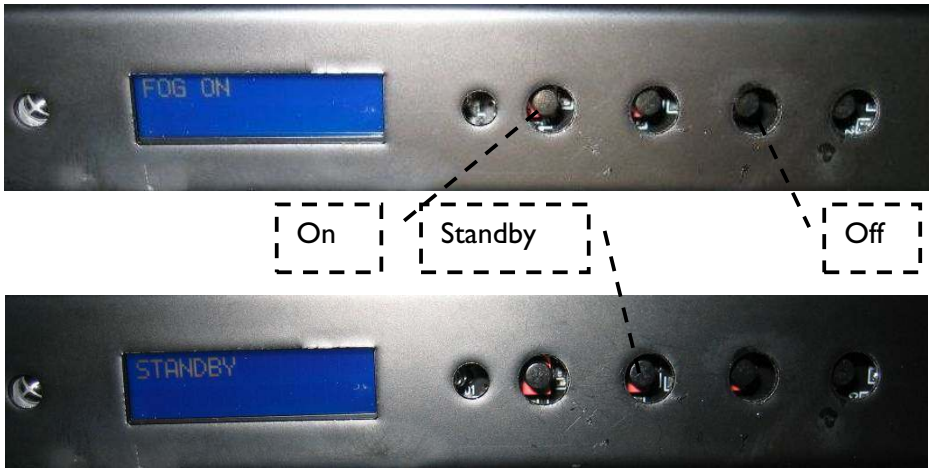
SFS-EN 12100-1 and -2 Safety of machinery -- Basic concepts, general principles for design

APPENDIX A: USER INTERFACE

The following are the instructions how to use the screen using User interface and how to change the operating parameters.

The operating parameters may be changed only by a person trained and authorized by FogScreen, Inc. After the parameters have been adjusted the screen can be simply turned on and off using the remote control or User interface.

1 Screen operation



User interface has the same basic functions as the remote control. The function can be selected by pressing gently the buttons in the interface.

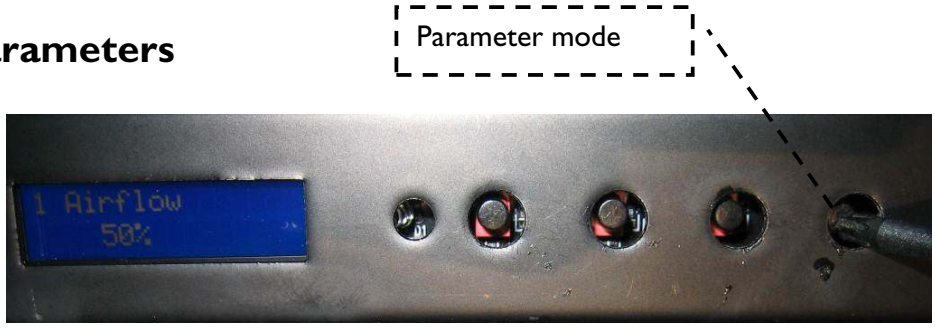
Do not use any sharp object and too much force to press the buttons. You can damage the circuit board underneath the buttons.

On: The screen goes on and fills the water tank if needed.

Standby: The screen goes off but does not empty the tank. This option is used when the screen needs to be shut down for a short period of time, i.e. under 8 hours.

Off: The screen starts emptying the internal water tank and will be shutdown after the tank is empty, i.e., within a few minutes.

2 Parameters

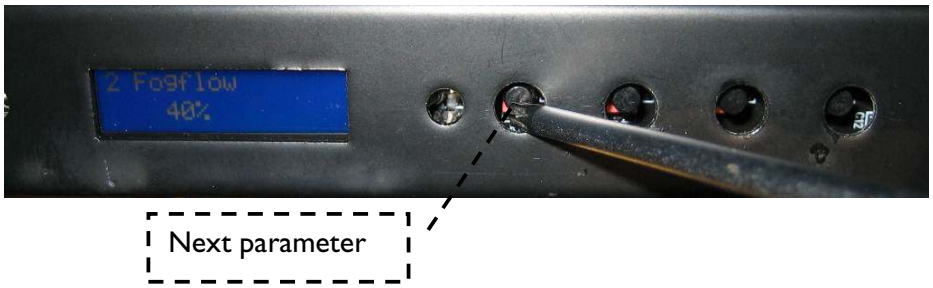


In order to access the parameters, Operation mode must be changed to Parameter mode by pressing the rightmost button (see above). After pressing the button the first parameter shows on the screen. The following parameters can be adjusted using User interface.

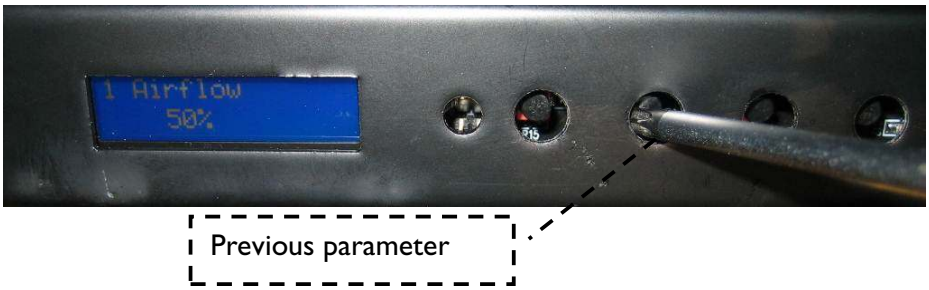
Parameter	Explanation	Factory setting
1 Airfow	Air flow volume of the internal fans (0 – 100% of max)	40
2 Fogflow	Fog flow volume (0 – 100% of max)	50
3 FogDensity	Fog output (0 – 100% of max)	60
4 AirflowEx	Air flow volume of the external fans (0 – 100% of max)	5
5 Draining time	Draining time of the internal tank (time in seconds)	600
6 W in timeout	Filling timeout time (time in seconds)	760
7 Recoll Dcycle	Duty cycle of the recollection pump (% of total operation time)	08
8 DMX State	DMX status (OFF = no commands, SLAVE = ready for DMX)	SLAVE
9 DMX base addr	DMX base address (XXX)	001
10 DMX Adjust	DMX to adjust fans and fog generators (ON/OFF)	ON
11 HC step speed	Honeycomb movement speed (steps in second)	050
12 HC # of steps	Honeycomb movement length (total steps)	1200
13 HC step dir	Direction of the honeycomb movement at start-up (X)	1
14 Diagnose	Diagnose screen	-
15 SW version	Software version (info)	-

Fog Density setting over 70% may only be used after consulting with Fogscreen.

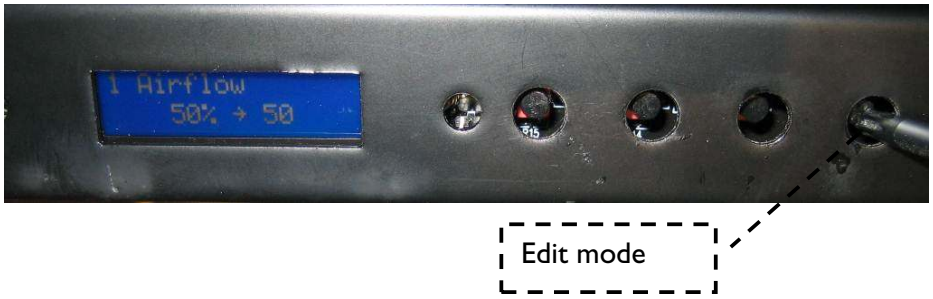
Press leftmost button to move to the next parameter.



Prss second from left button to move to the previous parameter.

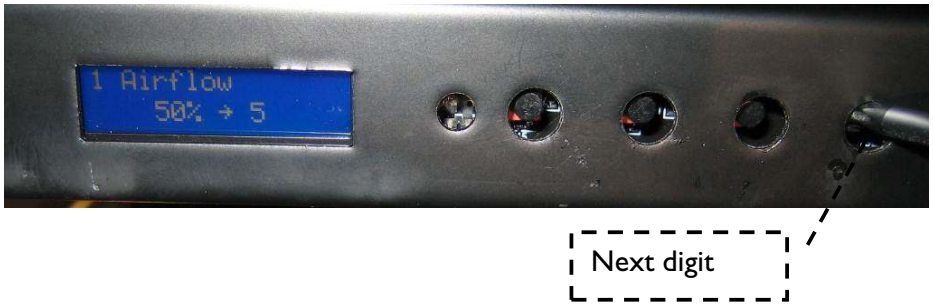


Press rightmost button to go to parameter Edit mode.



Set the first digit of the parameter by increasing the value with the leftmost button and decreasing it with the second from left button.

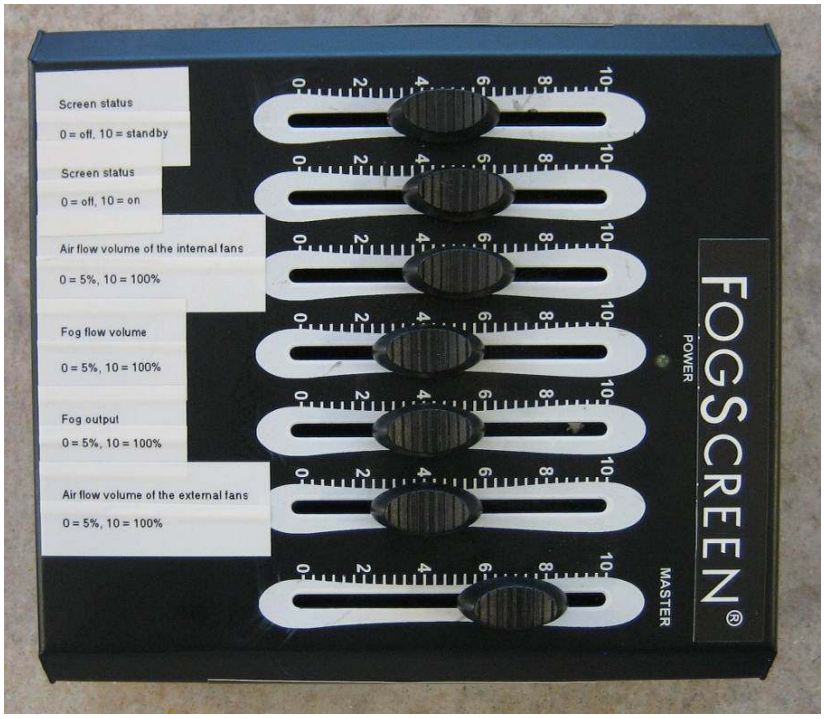
Press rightmost button to jump to the next digit and set the value of it as above.



Press second from right button to return back from Parameter mode to Operating mode.

APPENDIX B: DMX CONTROL

The following are the instructions how to use the screen with the DMX-512 protocol. A simple 6-channel DMX is enough to fully control the screen.



The plug for the DMX control can be found on the side of the electrical box.

In order to enable the screen to accept DMX commands, the following parameters need to be set using User interface (see Appendix A for the detailed information).

Parameter	**Explanation**	**Factory setting**	**DMX control**
8 DMX State	DMX status (OFF = no commands, SLAVE = ready for DMX)	SLAVE	SLAVE
9 DMX base addr	DMX base address (XXX)	001	Can be changed if needed
10 DMX Adjust	DMX to adjust fans and fog generators (ON/OFF)	ON	ON

The table below shows the available DMX channels.

Channel base address +	**Explanation**
0	Screen status: 0 = OFF, 255 (10) = Standby
1	Screen status: 0 = OFF, 255 (10) = ON
2	Air flow volume of the internal fans: 0 = 5%, 255 (10) = 100%
3	Fog flow volume: 0 = 5%, 255 (10) = 100%
4	Fog output: 0 = 5%, 255 (10) = 100%
5	Air flow volume of the external fans: 0 = 5%, 255 (10) = 100%

Fog Density setting over 70% may only be used after consulting with Fogscreen.