

Last Breath

By Rafael Lozano-Hemmer



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General important information

Last Breath (2012)

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Technique

Motor, bellows, plexiglass, digital display, custom circuitry, arduino processor, respiration tubing, brown paper bags

Description

An installation designed to store and circulate the breath of a person forever, between a bellows and a brown paper bag. The apparatus is automatically activated 10,000 times a day, the typical respiratory frequency for an adult at sleep. This is a biometric portrait: when the person who blew into the bag dies, his or her last breath will remain tangible.

Operation

** Please refer to next pages for components emplacement. **

1. Take the piece out of the crate (see appendix III for details). Fix the mechanized bellows to the wall (see Placement Instructions for details).

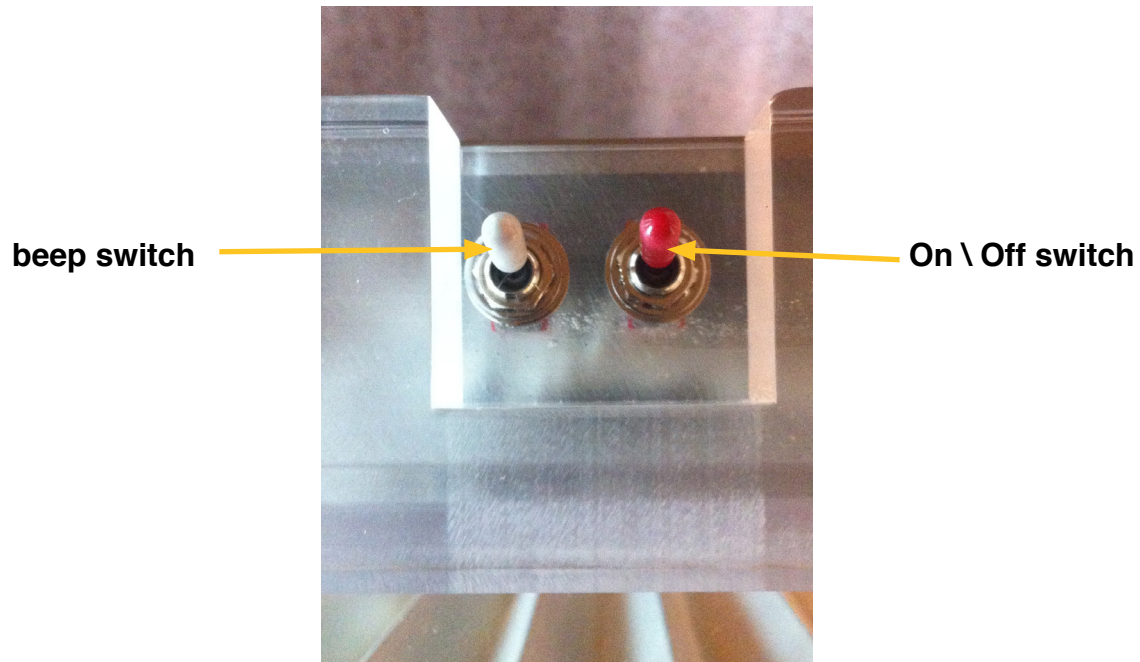
2. Connect and extend the medical air hoses. Fully extended, a maximum of **7 hoses** should be used so as to not overcharge the bellows pressure.

If there is a breath kept already in the bellow a white plastic cap will ensure the bellow is airtight. Then before removing the cap and plugging any air hose in it, ensure all the hose are connected one to the other and that the last one has its paper bag – empty.

3. Install the paper-bag with the rubber bands provided.

4. When everything is in place, connect the piece to electrical power. The piece runs on either 120 Volts or 240 Volts (50-60Hz).

5. To start the piece connect it to the electrical supply and turn the On/Off (red) switch to ON position (towards the machine). At startup the LED counter will show a series of zeros: it will start counting after the homing sequence.



6. The piece beeps every breath. You can turn On (towards the machine) and Off (towards the wall) the beeping with the white switch.

7. To shutdown the piece turn the On/Off switch (red) to Off. The air will be safe inside, but the breathing mechanism will stop and its counter will turn off. The counter remembers the last breath given. Unplug the power to stop any current consumption.

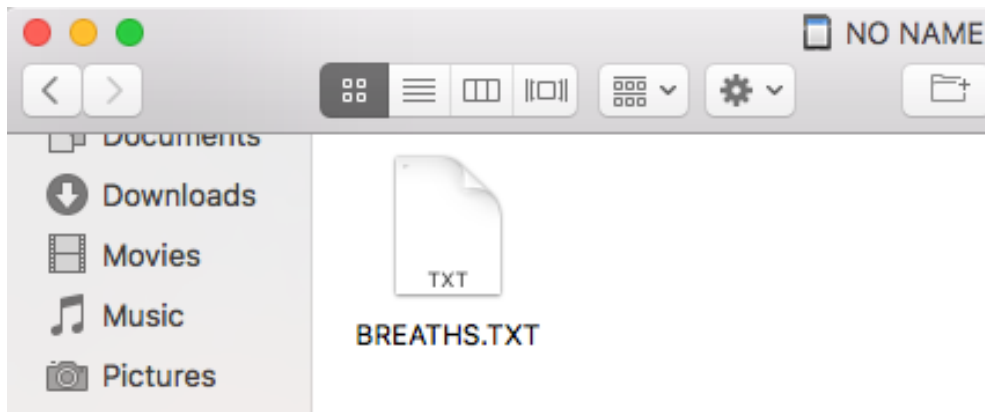
Change the air or the bag

1. To change the air or replace the bag turn off the piece at the right moment to keep the air inside the machine.

Change the count of breaths

If the displayed number of breaths it is not correct, you can change it.

1. Unscrew the M4 socket screws from the back and delicately open the electronics back plate without pulling on the wires.
2. Take the micro SD card out off the socket by pushing into it until you hear the spring action releasing the card.
3. Put the card on proper card reader with or without the SD card adapter included with the piece and plug it to a computer.
4. In a plain text editor (TextEdit on Mac or Notepad on Windows) open the file BREATHS.txt



5. In the file you will see three lines: the header, the number corresponding to the right part of the display and the number corresponding to the second part of the display.



A screenshot of a text editor window with a title bar containing three colored buttons (red, yellow, green) and a file name 'BREATHS.TXT' with a dropdown arrow. The text inside the window is as follows:

```
machine
221336
0
```

6. First, edit the header from **machine** to **human**. Then change the next two lines to the desired number.



A screenshot of a text editor window with a title bar containing three colored buttons (red with an 'x', yellow with a minus sign, green with a plus sign) and a file name 'BREATHS.TXT' with a dropdown arrow. The text inside the window is as follows:

```
human
10|
0
```

7. Save the file and put the SD card back in the socket.

8. Turn on the machine again and the display will show the new number. The number will be recorded on the on-board memory.

If the display shows an error message it means the file was not formatted in the right way.

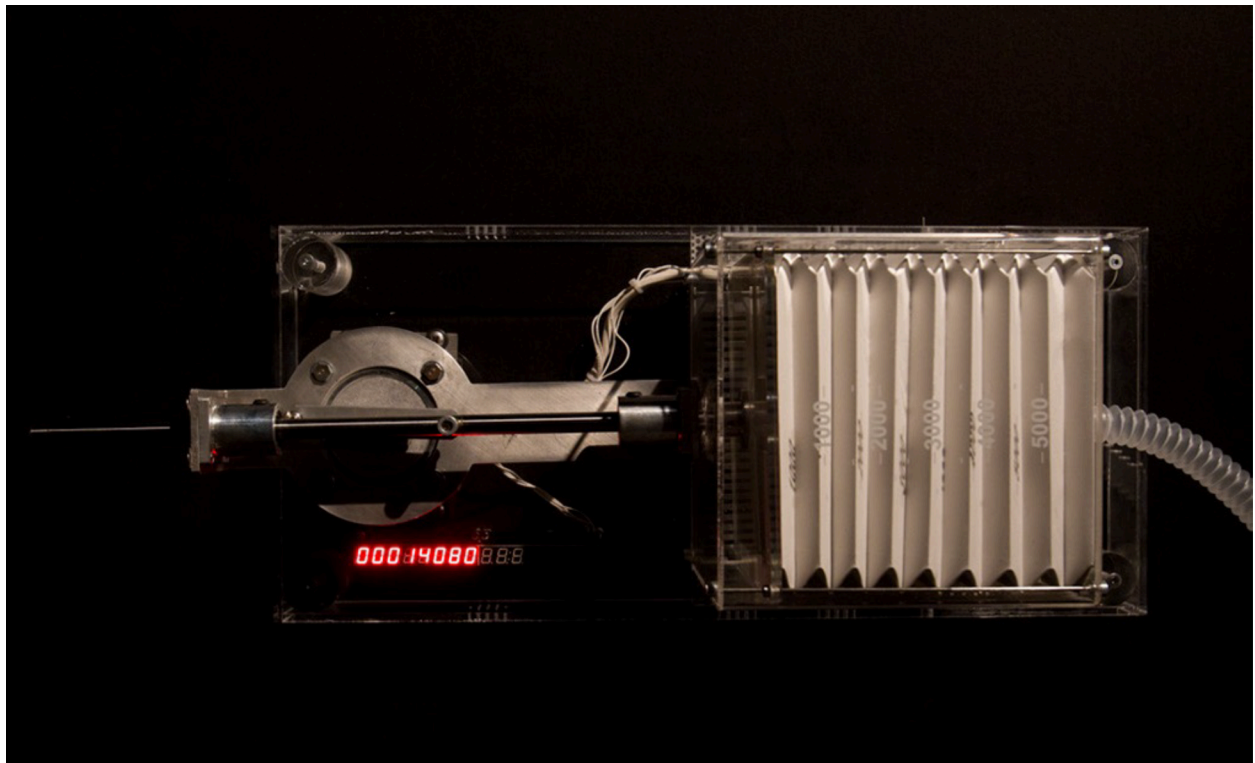
Make sure there are no spaces or capital letters on the file.

Cleaning

The whole acrylic casing has to be cleaned with great care. Standard products for window cleaning are well suited, but only really soft fabrics have to be used.

Placement Instructions

The piece should be hung by the four corner screws vertically centered at 1.6m from the ground (lower edge at 66.5cm from the floor). The machine weights 13 kg and a proper anchoring system should be chosen according to the wall material. The tubing can be coiled and hung from the very same wall so the bag is close to the respirator or it can be hung from thin nylon thread around the room so that the paper bag is in the middle of the room. Please see Appendix IV. Installation Pictures and Dimensions for the exact measurements.



Detailed technical information

Troubleshooting

If after a long period of time you hear a slight clicky sound, it means that the lever mechanism needs some light maintenance. For every socket head screw in the center of each shaft, apply some thread locking liquid and screw the parts back again immediately after the application.



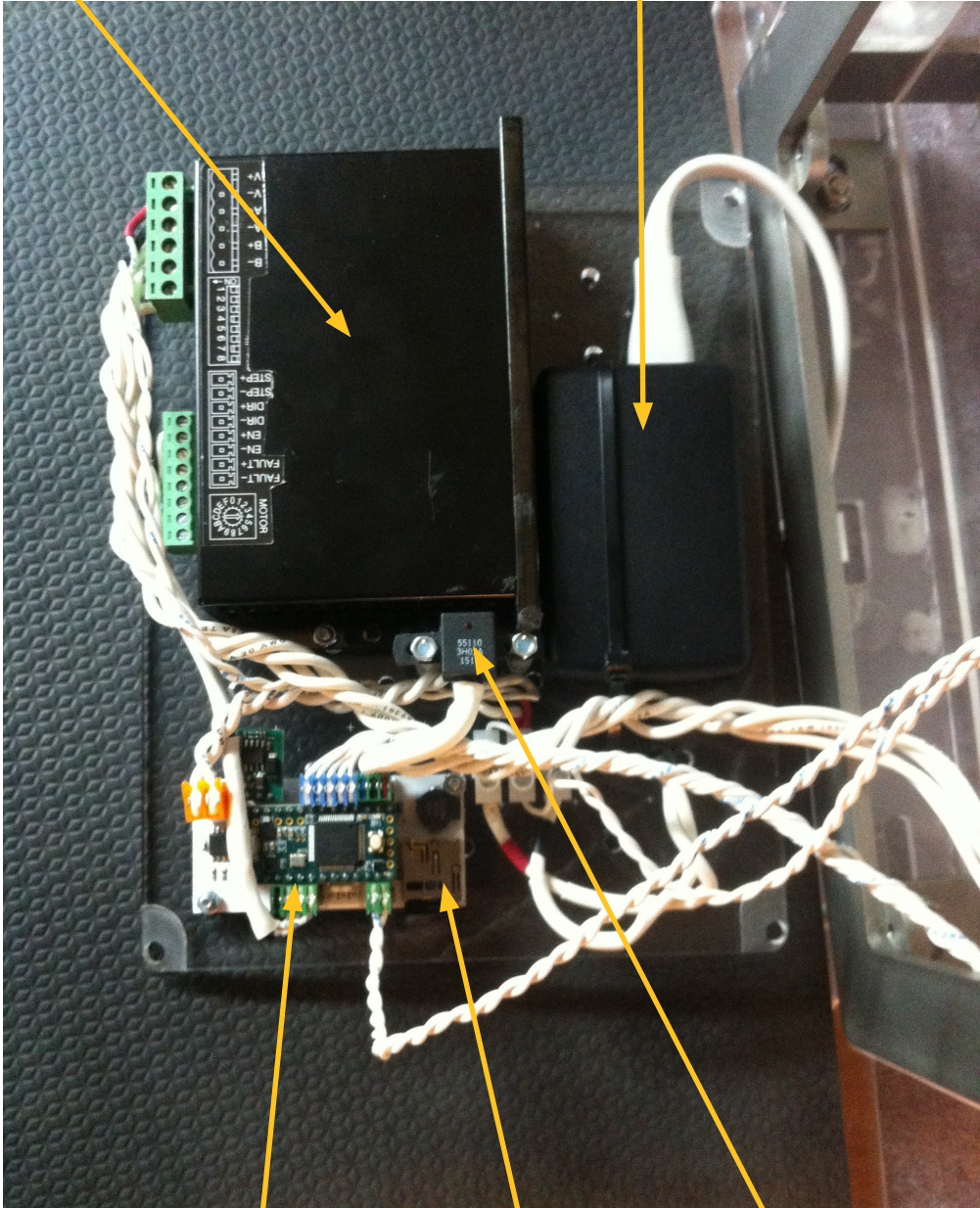
Be careful not to put thread locking liquid on the bearings.



Appendix I - Technical Drawings

Stepper motor driver

**Power supply
24V DC 1.7A**



**Custom control
electronic board**

SD card socket

Hall effect sensor

Appendix II - List of components

LastBreath Parts

Plexiglass and plastic parts

White bellow
22 mm x 108" expandable Tube
PaperBag
Vinyl Sticker
22 mm x 108" COLLAPSIBLE TUBE
Single piece plexi body
folded plexi bellows casing
plexi strip support for display
Case

P/N

ATMR-PF-032812
940-F22108INSS02
APGS5P13-TN
custom design
940-F22108INSS02
custom design
custom design
custom design

Manufacturer

Nabell
Dispomed
TENKA
Dispomed

LastBreath Hardware Parts

Part

Custom

Shaft Flange
Air hose fitting to bellows nylon
Bearings and levers for linear motion
Shaft and bushing holder
Stepper support, electronics holder, structure frame

P/N

custom design
custom design
custom design
custom design
custom design

Manufacturer

Hardware

Shaft
button head M5 stainless steel screw
stainless steel threaded insert M5
Plastic white bushings, Light Duty Dry-Running Flanged Sleeve Bearings
plastic bushings alternative, Ultra-Low-Friction Dry-Running Flanged Sleeve Bearings
Round allen M6 x 1mm, 16 mm for attaching the motor (back)
Round Phillips M6 x 1, 16 mm for attaching the motor (front)
Philips M5 x 0.8, 35 mm for attaching the plastic covers of the bellow
Washers M5
Allen M4 x 07, 12mm for attaching the plastic plate w/ electronics
Washers M4 (electronics plate)
Steel Phillips Rounded Head Screws for Sheet Metal
Stainless steel socket head M5 x 0.8mm, 22mm for levers assembly
Philips M3 screws for attaching electronics
custom mechanical lever assembly

6061K53
92095A210
92398A125
6389K418
2706T24
92095A238
90116A311
92000A335
93475A240
90666A115
90965A150
90190A110
91292A060
92005A128
custom design

McMasterCarr
McMasterCarr
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LastBreath Electronics Parts

Part

Custom electronic control board
Stepper motor
Stepper controller
Power Supply
7-Segment Display
custom display control board

P/N

custom design
OMHT34-505
STR8
24V 1.7 Amp
LTC-4727JR
custom design

Manufacturer

Omega
Omega
Omega
Lite-On

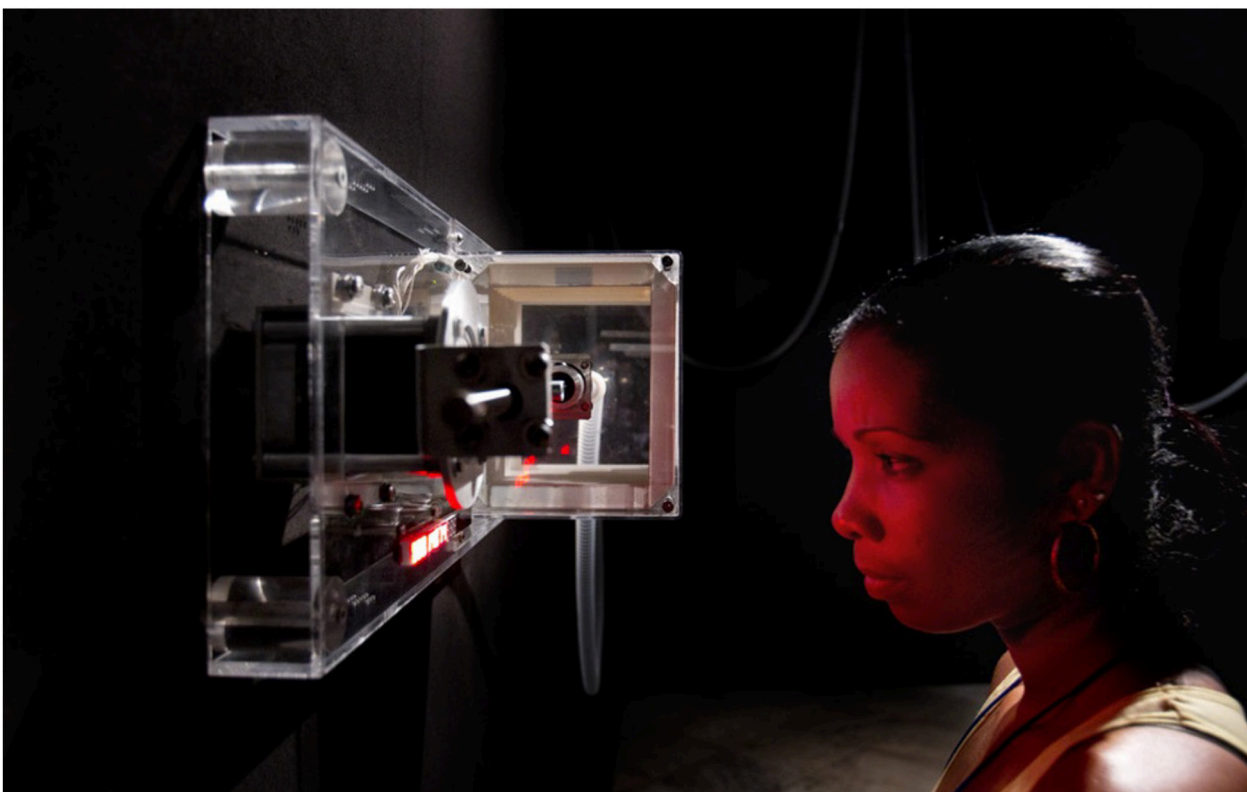
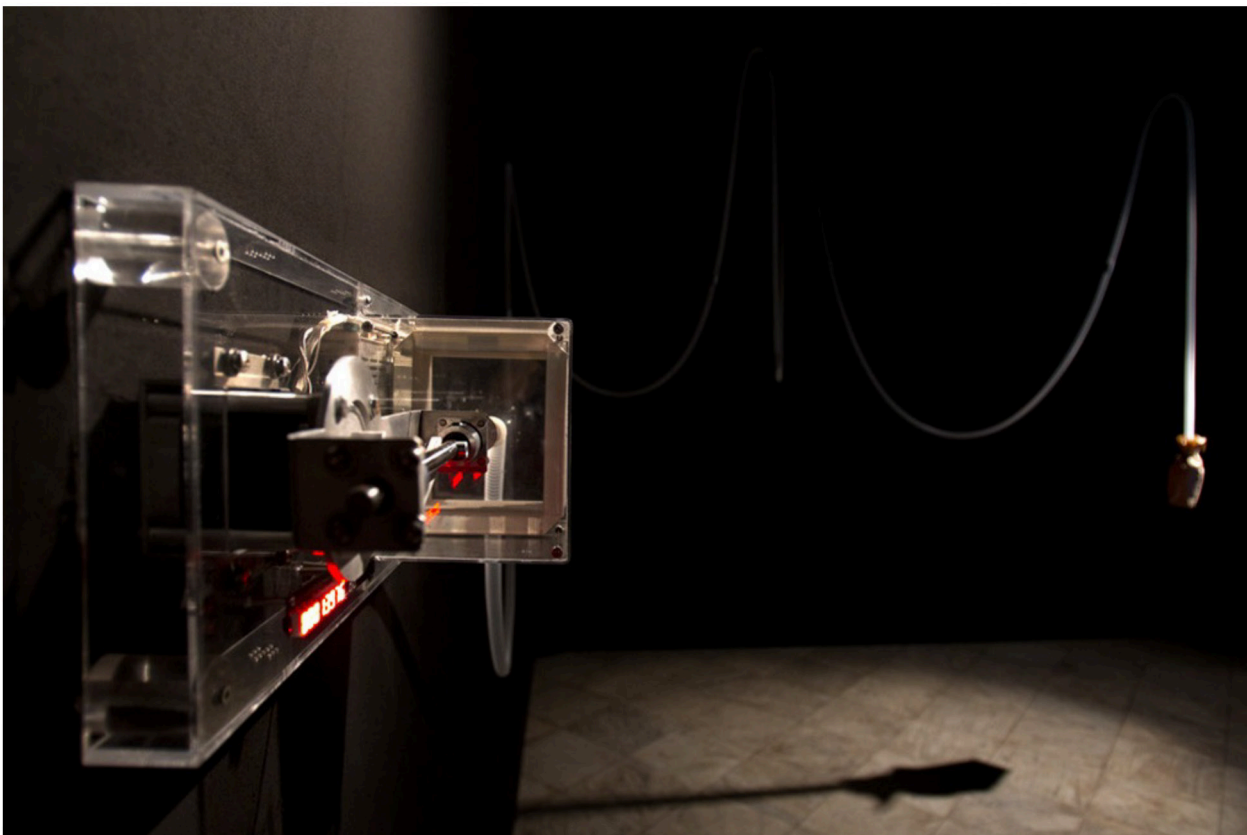
Appendix III - Packing Instructions

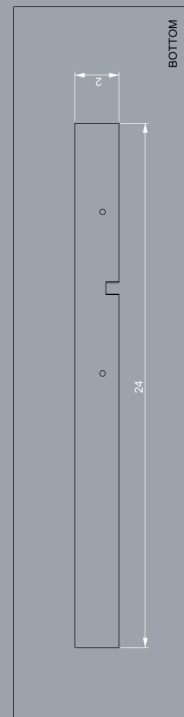
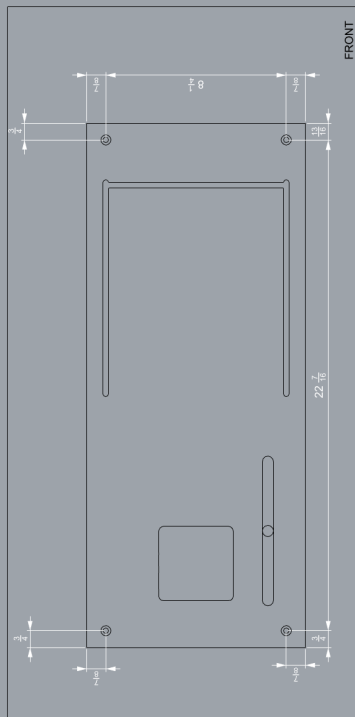
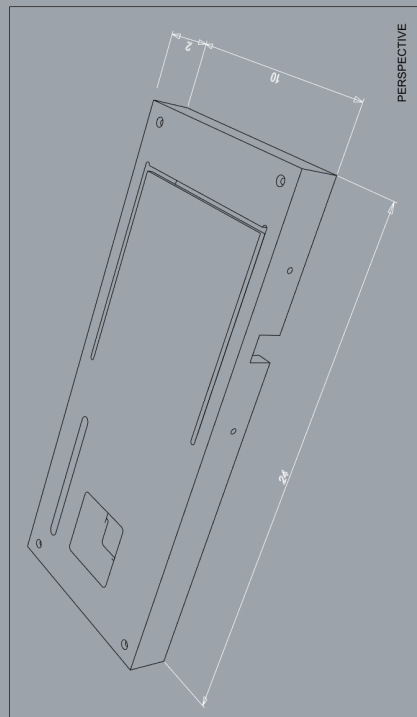
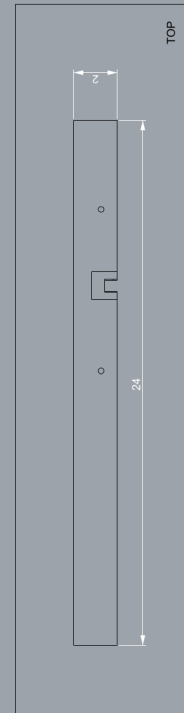
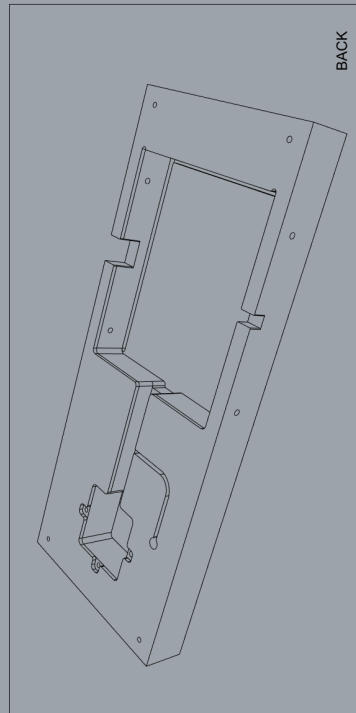
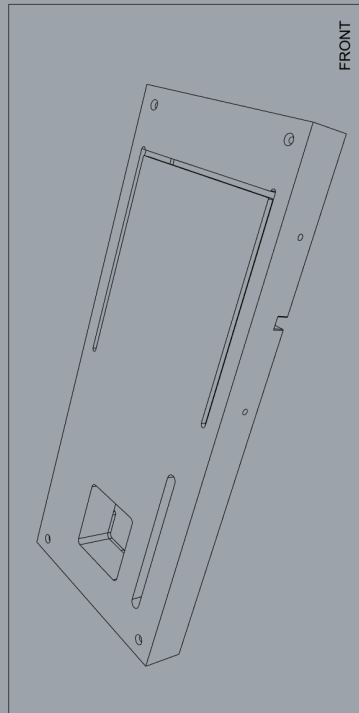
To mount the main unit on the wall only four screw of 3-4" (750mm) are required. One on each corner through the plexiglass pillars. For gypse walls proper wall mount should be used.

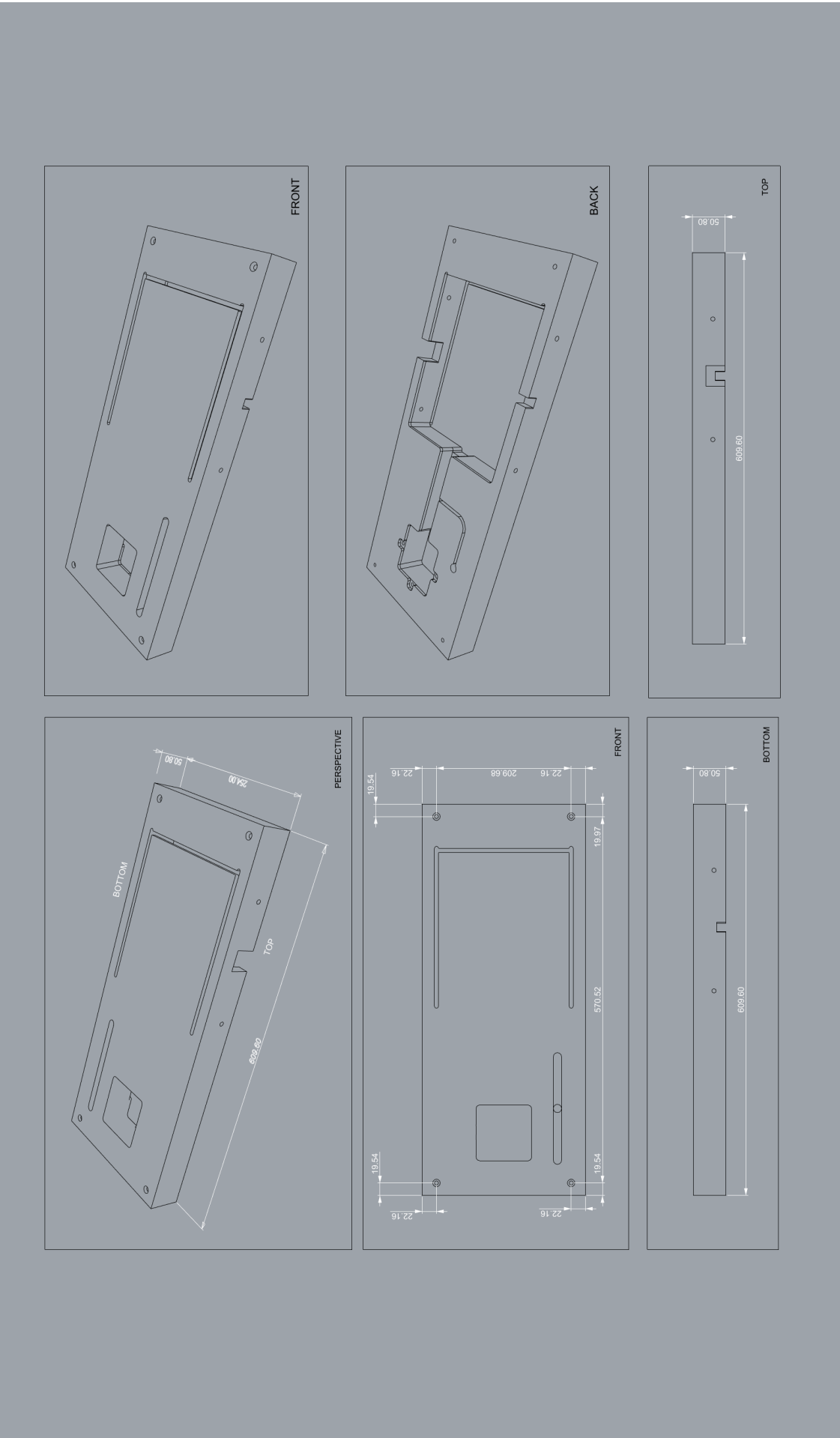
The case is made to fit perfectly the main device. The shaft has to be pull inside and the air hoses disconnected. Enough space stays available at the right of the device (air output of the bellows) to store the retracted air hoses and their fittings. The bags should be folded and stored flat in the case before putting the main device.



Appendix IV – Installation pictures and dimensions







Support

If you would like support for the piece please feel free to call Lozano-Hemmer's studio in Canada:

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