**Emergency Ventilators**

Implementation details

NOTE

The concept demonstrated in this document is based on professional experiences in the design and development of life-support ventilators. The concept has not been prototype tested and will need validating. Many details are yet incomplete in the current draft. The concept is open source – free to use, evolve or transfer in parts into other designs.

Issue/change record

|  |  |  |  |
| --- | --- | --- | --- |
| Issue | Date | Author | Reason of issue/summary |
| 0.1 | 13/04/2020 | Carlos Pardo | First draft |
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Contents

[Introduction 3](#_Toc37756879)

[1 Controller algorithms 3](#_Toc37756880)

[1.1 Pressure control 3](#_Toc37756881)

[1.2 Air flow / Volume measure 3](#_Toc37756882)

[1.3 display & buttons functionality 3](#_Toc37756883)

[1.4 power on/off management 3](#_Toc37756884)

[2 Monitor algorithms 3](#_Toc37756885)

[2.1 Pressure monitoring 3](#_Toc37756886)

[2.2 alarm control 3](#_Toc37756887)

[2.3 display & buttons functionality 3](#_Toc37756888)

[3 Controller <-> monitor communication 4](#_Toc37756889)

[3.1 i2c information 4](#_Toc37756890)

[4 assembly 4](#_Toc37756891)

[4.1 placement of components 4](#_Toc37756892)

[4.2 3d printed parts 4](#_Toc37756893)

# Introduction

This document contains information about the implementation not described neither in the specification, neither in the user manual

# Controller algorithms

## Pressure control

## Air flow / Volume measure

## display & buttons functionality

## power on/off management

# Monitor algorithms

## Pressure monitoring

## alarm control

## display & buttons functionality

LCD is an I2C controlled Display. The following information is sent via I2C to control the display:

I2C Address: 0x27

I2C WriteByte:

Bits: 7. 6. 5. 4. 3. 2. 1. 0

Data: D7.D6.D5.D4.LED.E.RW.RS

# Controller <-> monitor communication

## i2c information

The controller will send an I2C write command every x00 ms to the monitor. The content of the write command will be as follows:

Master: Controller

Slave: Monitor

Monitor Address: 0xA0 (8 bit address) 0x50 ( 7 bit address)

Num of bytes: 4

Information to be send:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| BYTE | BIT | NAME | SIZE | DESCRIPTION |
| 0 | 7:1 | ADDR | 7 | I2C address of monitor: 0x50 |
| 0 | 0 | R/W | 1 | Write always: 0 |
| 1 | 7 | IDLE | 1 | Switch to IDLE state |
| 1 | 6 | CAL | 1 | In calibration state. At least x seconds at boot up, and after IDLE. |
| 1 | 5:0 | IP | 6 | Pressure in mBar during inspiration period |
| 2 | 7 | LP | 1 | Alarm: Low pressure (No patient or no input air ) |
| 2 | 6 | HP | 1 | Alarm: Pressure too high (Bad functioning or patient cough) |
| 2 | 5:0 | EP | 6 | Pressure in mBar during expiration period |
| 3 | 7 | B12 | 1 | Battery voltage bellow 12.5V |
| 3 | 6 | B10 | 1 | Battery voltage bellow 10V |
| 3 | 5 | B8 | 1 | Battery voltage bellow 8V |
| 3 | 4:0 | BR | 5 | Breath rate in Breath per Minute units |

# assembly

## placement of components

## 3d printed parts