**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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# 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: 6

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 |
| 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 |
| 4 | 7 | CONF | 1 | In configuration state |
| 4 | 6:0 | VOL | 7 | Volume Setting in 10 ml units |
| 5 | 7 |  |  |  |
| 5 | 6:0 | MVOL | 7 | Volume measured in 10 ml units |

# assembly

## placement of components

## 3d printed parts