COVID-19 Homemade Ventilator

Introduction

During COVID-19 emergency, everyone tries to give help as possible. I'm not a doctor, I'm just a non-professional maker who wants to partecipate.

Here's the homemade project of a ventilator to help breathing. **It's not a medical supply, so I have to disclaim any responsibility.**

I'm inspired by some Youtube videos.

Architecture

The ventilator is composed by the following parts:

- Power supply
- Micro controller unit
- Motor driver
- Ventilator
- Mask and pipe

Foto/schema

Power supply

It's necessary to provide two electric voltage: +12V and +5V. I used a PC power supply.

Micro controller

The role of the microcontroller is to generate a square wave in order to control the breath of the ventilator in terms of power and timing, trying to synchronize with human breath.

I used an NodeMcu 8266 MOD.

For controlling the information about power and timing, I also implemented a Graphical Interface accessible by a remote device as smartphone or PC/MAC via WiFi.

Motor driver

As the NodeMcu can't directly drive an electric motor, it was necessary to use a motor driver.

I used a "WINGXINE IBT-4" that I already had at home, even if the motor just need less than 5 amp.

Ventilator

I used an Intex Quick-Fill that I had at home. This model is too powerful for this kind of usage, so it need to keep it controlled in terms of power. (pay attention …)

Mask and pipe

For testing I used a corrugated pipe and a mask that I had at home but I strongly suggest to use a sanitized pipe and mask.

If you have a 3d printer you can find mask 3d model on the net.

USE

You can personalize ventilator name and password changing relative strings in CUSTOMIZED PARAMETERS in .ino file. (use the same number of characters)

First of all you must upload "8266_pwm_server_3_p.ino" , "main.htm" and stored.txt files on nodemcu.

Use the Arduino IDE for this step.

The .ino file is a normal file and can be uploaded simply selecting correct board and port and then using upload command.

The .htm and store.txt files must be in data folder and must be uploaded using "ESP8266 SketchData Updater" command in tools menu.

Wire the nodemcu to an electric air pump as in the schematic file.

Loaded software , feed the system an start seeking a new wifi net with a pc or smartphone.

You'll find a net with named as you have setted. (otherwise "VENTILATOR_4")

Connect it with the decided password (otherwise "v4v4v4v4") ad set the browser url to 192.168.4.1 you will see the GUI (Graphical Interface) with three sliders to control motor power and timing.

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