User Manual for ECODOME, a Shelter for an Outdoor Aquaponic System

User manual

1) Introduction

This is the User Manual to a Shelter for an Outdoor Aquaponic System. The shelter's function is to measure the temperature and humidity, protect the aquaponic system from insects, animals and weather instability.

3D model

2) System Overview

The system is designed to work outside. The polycarbonate panels and the shade cloth protect the aquaponic system from the excessive sunlight, UV, a storms and wind.

The shelter has a passive cooling system, which includes three windows at sides and one at the top that remains always opened. The side windows are opened manually and with the wind power.

It is possible to buy an update to the shelter to give it an automatic cooling system using servo motors. There is a temperature and humidity sensor that controls the environment and gives orders to controlling system to open and close the windows.

3) Technical parameters

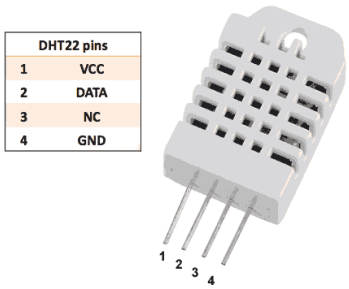
There are presented the most important technical parameters for the electrical system of the shelter:

Product	Description	Value	Accuaracy
Arduino UNO	Microcontroller	12V	-
Power supply	AC/DC	12V / 1.5 A	-
DHT22	temperature sensor	-40 °C to +80°C	± 0.5 °C
DHT22	humidity sensor	0% to 100%	± 2%
MC1602C-SYR	LCD display	2X16 line*column	-

4) How to connect electronic components

It is a short guide to help to connect the devices.

Sensor:

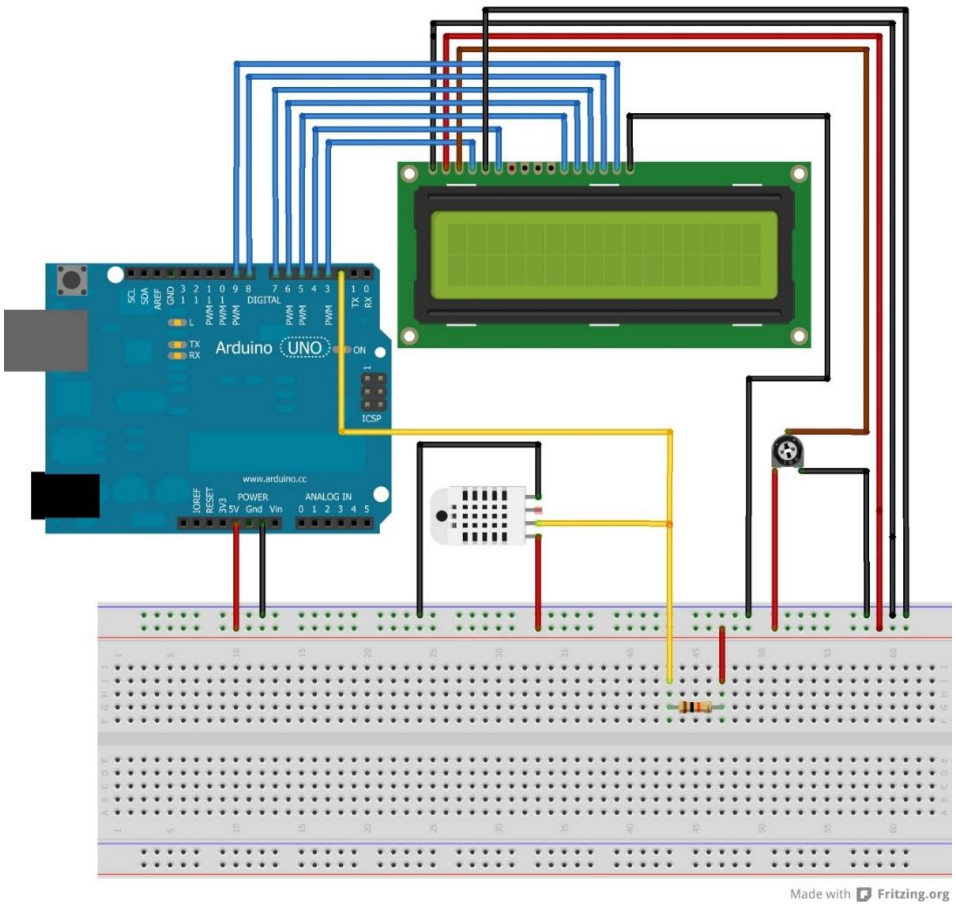


LCD Shield:

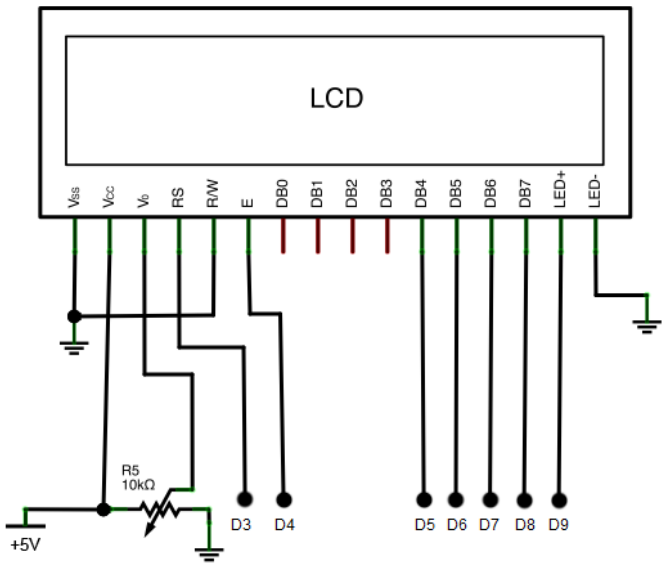
Power Supply:

Arduino UNO:

Electronic schematic:



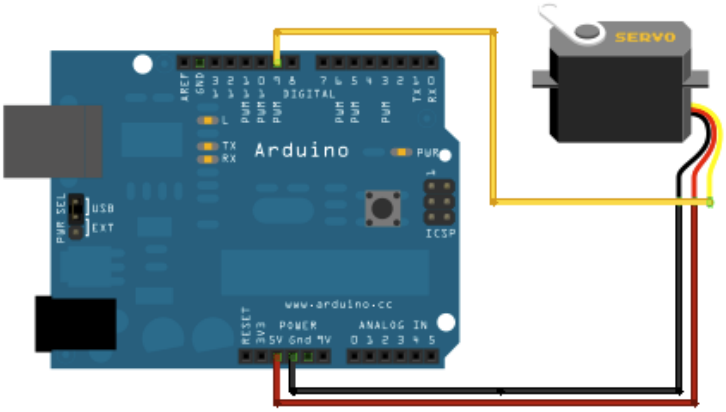
LCD Connection:



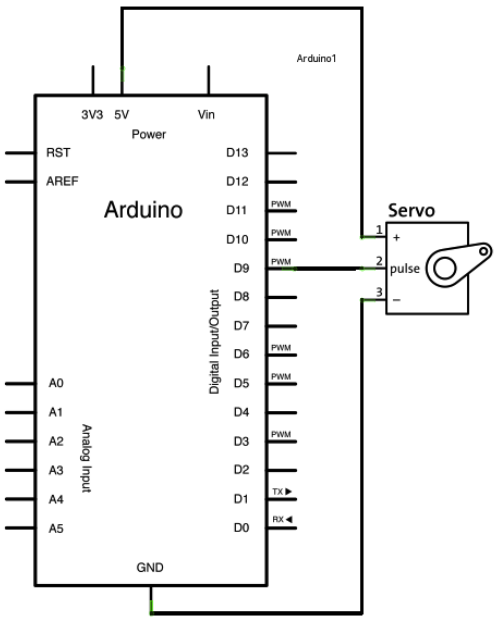
If you buy the servo motor update here is the guide of how to connect it.

Servo motor:

Connection for Arduino:



Schematic:



Attention!

The positive and negative pollution should not be mixed up. It is able to damage the Arduino UNO.

5) Programming

There is an option to change the windows opener and closer value. This value is measured by the DHT22 sensor. To change the operation, only need to change the assigned number. There is a code:

```
#include "DHT.h"
 #include <LiquidCrystalFast.h>
#define DHTPIN A5 // Sensor is connected to pin A5
#define DHTTYPE DHT22 // type of used sensor

DHT dht(DHTPIN, DHTTYPE);

LiquidCrystalFast lcd(8,9,4,5,6,7); //pins used for lcd display

void setup(void) {
Serial.begin(9600);
lcd.begin(16, 2);
lcd.print("Reading sensor");
dht.begin();
}

void loop() {
delay(30000);
lcd.clear();
lcd.setCursor(0,0);
// Read humidity
int H = dht.readHumidity();
// Read temperature as Celsius
```

```
float T = dht.readTemperature();

lcd.print("T:");
lcd.print(T);
lcd.print((char)223);
lcd.print("C”);
lcd.print("H:");
lcd.print(H);
lcd.print("%");
lcd.setCursor(2,1);

if (T<18) {                    // The lower measure
lcd.print("CLOSE WINDOWS");
} if (T>20){                   // The highest temperature
lcd.print("OPEN WINDOWS");
}
}
```

Thank you for reading we hope you will enjoy using the shelter.

If you have any problems do not bother to contact us:

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Your DOMECO team