# Created By: Delhi Institute of Tool Engineering Mechatronics Department

# Basic Design:

CONVEYOR

RESERVOIR

SOLENOID VALVE

IR SENSOR

BOTTLE

LCD DISPLAY

BELT

M

DC MOTOR

ULTRASONIC SENSOR

# Components Required (Fully Automated and AI based without Button to start stop water filling)

|  |
| --- |
| Conveyor Belt |
| DC Motor |
| Solenoid Valve |
| Sonar Sensor |
| IR Transmitter + Receiver |
| LCD Display |
| Atmel ATmega 328 |
| Relay |
| Acrelic Box |
| Other Misc components (Wire, Glue, Soldering etc.) |

# Project Source Code (P.S. – Intendation may be change while copying the source code )

#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins

// LCD Display usage and the example to write the characters in this GitHub Link : https://github.com/adafruit/STEMMA\_LiquidCrystal/tree/master/examples to understand in detailed Arduino Link http://www.arduino.cc/en/Reference/LiquidCrystal

LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

#define echoPin 7 // Echo Pin Ultrasonic // to understand Ultrasonic https://create.arduino.cc/projecthub/abdularbi17/ultrasonic-sensor-hc-sr04-with-arduino-tutorial-327ff6

#define trigPin 8 // Trigger Pin Ultrasonics

#define relay 10 // Onboard LED

#define Glass 9 // Bottle detection

#define solenoid 13 // Solenoid detection

// Conveyor DC Motor use and understanding the circuit diagram https://www.tutorialspoint.com/arduino/arduino\_dc\_motor.htm#:~:text=Following%20is%20the%20schematic%20diagram%20of%20the,interface%20to%20Arduino%20Uno%20board.&text=Pin%20IN1%20of%20the%20IC,PWM%20pin%202%20of%20Arduino.

byte armsUp[8] = {

0b00100,

0b01010,

0b00100,

0b10101,

0b01110,

0b00100,

0b00100,

0b01010

}; // make some custom characters: on LCD Display these are ASCII and Binary value for characterisation link to understand this : https://github.com/adafruit/STEMMA\_LiquidCrystal/blob/master/examples/CustomCharacter/CustomCharacter.ino

int maximumRange = 200; // Maximum range needed depends on the motor used it can be 200+ and more

int minimumRange = 0; // Minimum range needed and change as suitable for conveyor for industry usage

long duration, distance; // Duration used to calculate distance to understand this

void setup() {

lcd.createChar(4, armsUp);

lcd.begin(16, 2);

lcd.write(4);

lcd.print(" Production Line Automation ");

for (int positionCounter = 15; positionCounter < 84; positionCounter++) {

// scroll one position left:

lcd.scrollDisplayLeft();

// wait a bit: and change time if bottle is not hold at right position

delay(400);

}

delay(1000);

lcd.clear();

delay(2000);

pinMode(trigPin, OUTPUT);

pinMode(solenoid, OUTPUT);

pinMode(Glass, INPUT);

pinMode(echoPin, INPUT);

pinMode(relay, OUTPUT); // Use indicator like led or buzzer whatever suitable for you

}

void loop()

{

digitalWrite(trigPin, LOW); // Change delay while debugging

delayMicroseconds(2);

digitalWrite(trigPin, HIGH);

delayMicroseconds(10);

digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH);

//Calculate the distance (in cm) based on the speed of sound. Ultrasonic sound to distance conversion formula HC-SR04 Ultrasonic to stop the conveyor

distance = duration/58.2;

int Detect\_glass =digitalRead(Glass);

if(Detect\_glass == HIGH) //no glass

{

digitalWrite(relay, HIGH); //conveyor

lcd.setCursor(0, 0);

lcd.print("Conveyor Start");

digitalWrite(solenoid, LOW);

if(relay==HIGH)

delay(40); //int a = a++;

}

if(Detect\_glass == LOW)

{

lcd.setCursor(0, 0); // Understand solenoid valve usage here: https://bc-robotics.com/tutorials/controlling-a-solenoid-valve-with-arduino/ and https://create.arduino.cc/projecthub/robotgeek-projects-team/control-a-solenoid-with-arduino-710bdc

lcd.print("Conveyor Stop");

digitalWrite(relay, LOW); //conveyor off

delay(1000);

digitalWrite(solenoid, HIGH); //solenoid on water pouring continuously else it will stop right away if solenoid off the valve will be too

//sonar value for level detector change according to your suitability

if(distance<=9)

{

digitalWrite(solenoid, LOW); //water off because solenoid put the valve down/close

delay(1000);

digitalWrite(relay, HIGH); //conveyor on

delay(3000); // change delay as convinient to you also debug every single step while pouring the fluid

}

}

delay(50);

}