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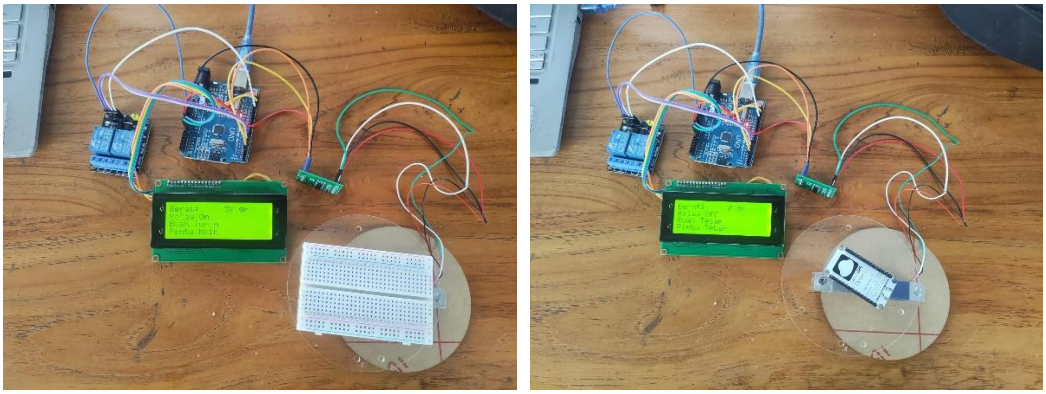
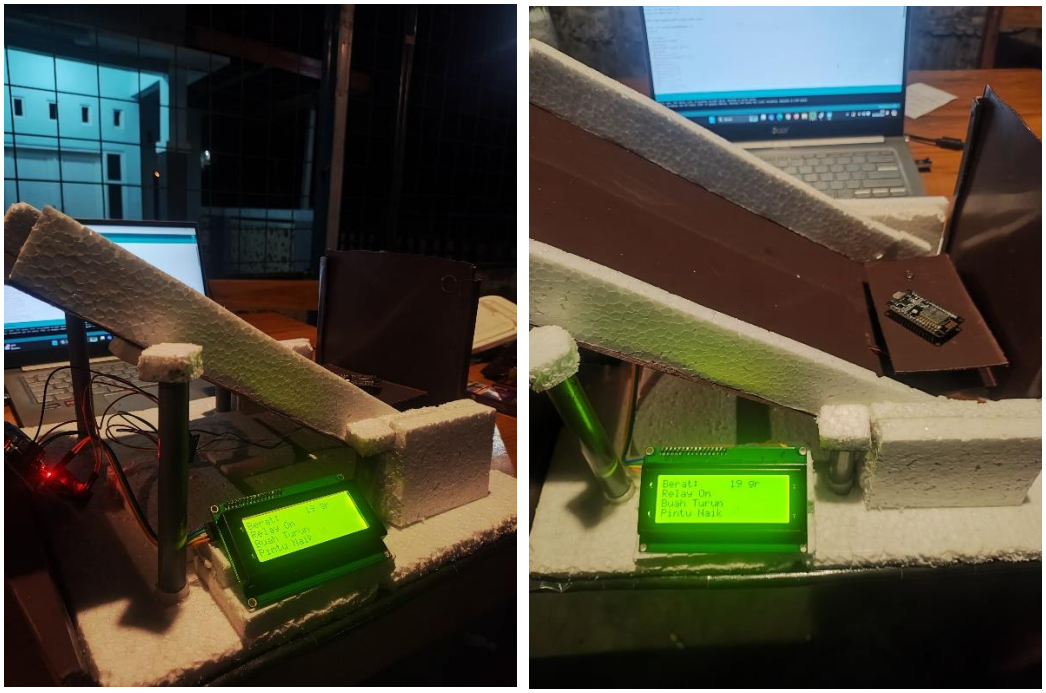
LAMPIRAN

Gamar Rangkaian Elektronika dengan Kotak Komponen Elektronika



Gambar Rangkaian Elektronika



Gambar Model Alat Prototype

Koding Kalibrasi

```
#include <HX711_ADC.h>
#if defined(ESP8266)|| defined(ESP32) || defined(AVR)
#include <EEPROM.h>
#endif
const int HX711_dout = 2;
const int HX711_sck = 3;
HX711_ADC LoadCell(HX711_dout, HX711_sck);
const int calVal_eepromAdress = 0;
 unsigned long t = 0;
void setup() {
```

```
  Serial.begin(57600); delay(10);
  Serial.println();
  Serial.println("Starting...");
  LoadCell.begin();
  unsigned long stabilizingtime = 2000;
  boolean _tare = true;
  LoadCell.start(stabilizingtime, _tare);
  If (LoadCell.getTareTimeoutFlag() ||
        LoadCell.getSignalTimeoutFlag()) {
    Serial.println("Timeout, check MCU>HX711 wiring and pin
        designations");
    while (1);
  }
  else {
    LoadCell.setCalFactor(1.0);
    Serial.println("Startup is complete");
  }
  while (!LoadCell.update());
  calibrate();
}
void loop() {
  static boolean newDataReady = 0;
  const int serialPrintInterval = 0;
```

```
  if (LoadCell.update()) newDataReady = true;
  if (newDataReady) {
    if (millis() > t + serialPrintInterval) {
      float i = LoadCell.getData();
      Serial.print("Load_cell output val: ");
      Serial.println(i);
      newDataReady = 0;
      t = millis();
    }
  }
  if (Serial.available() > 0) {
    char inByte = Serial.read();
    if (inByte == 't') LoadCell.tareNoDelay();
    else if (inByte == 'r') calibrate();
    else if (inByte == 'c') changeSavedCalFactor();
  }
  if (LoadCell.getTareStatus() == true) {
    Serial.println("Tare complete");
  }
}
void calibrate() {
  Serial.println("***");
  Serial.println("Start calibration:");
```

```
Serial.println("Place the load cell an a level stable surface.");
Serial.println("Remove any load applied to the load cell.");
Serial.println("Send 't' from serial monitor to set the tare offset.");
boolean _resume = false;
while (_resume == false) {
  LoadCell.update();
  if (Serial.available() > 0) {
    if (Serial.available() > 0) {
      char inByte = Serial.read();
      if (inByte == 't') LoadCell.tareNoDelay();
    }
  }
  if (LoadCell.getTareStatus() == true) {
    Serial.println("Tare complete");
    _resume = true;
  }
}
Serial.println("Now, place your known mass on the loadcell.");
Serial.println("Then send the weight of this mass (i.e. 100.0) from
        serial monitor.");
float known_mass = 0;
_resume = false;
while (_resume == false) {
```

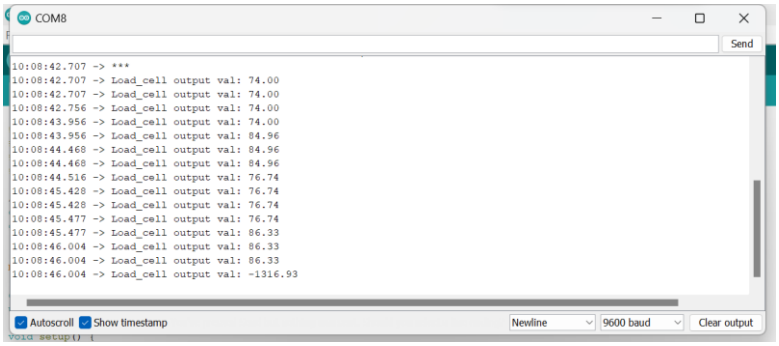
```
  LoadCell.update();
  if (Serial.available() > 0) {
    known_mass = Serial.parseFloat();
    if (known_mass != 0) {
      Serial.print("Known mass is: ");
      Serial.println(known_mass);
      _resume = true;
    }
  }
}
LoadCell.refreshDataSet();
float newCalibrationValue =
        LoadCell.getNewCalibration(known_mass);
Serial.print("New calibration value has been set to: ");
Serial.print(newCalibrationValue);
Serial.println(", use this as calibration value (calFactor) in your
        project sketch.");
Serial.print("Save this value to EEPROM adress ");
Serial.print(calVal_eepromAdress);
Serial.println("? y/n");
_resume = false;
while (_resume == false) {
  if (Serial.available() > 0) {
```

```
      char inByte = Serial.read();
      if (inByte == 'y') {
#if defined(AVR)|| defined(AVR)
#endif
        EEPROM.put(calVal_eepromAdress, newCalibrationValue);
#if defined(AVR)|| defined(AVR)
#endif
        EEPROM.get(calVal_eepromAdress, newCalibrationValue);
        Serial.print("Value ");
        Serial.print(newCalibrationValue);
        Serial.print(" saved to EEPROM address: ");
        Serial.println(calVal_eepromAdress);
        _resume = true;
      }
      else if (inByte == 'n') {
        Serial.println("Value not saved to EEPROM");
        _resume = true;
      }
    }
  }
  Serial.println("End calibration");
  Serial.println("***");
  Serial.println("To re-calibrate, send 'r' from serial monitor.");
```

```
  Serial.println("For manual edit of the calibration value, send 'c'
          from serial monitor.");
  Serial.println("***");
}
void changeSavedCalFactor() {
  float oldCalibrationValue = LoadCell.getCalFactor();
  boolean _resume = false;
  Serial.println("***");
  Serial.print("Current value is: ");
  Serial.println(oldCalibrationValue);
  Serial.println("Now, send the new value from serial monitor, i.e.
          696.0");
  float newCalibrationValue;
  while (_resume == false) {
   if (Serial.available() > 0) {
     newCalibrationValue = Serial.parseFloat();
     if (newCalibrationValue != 0) {
       Serial.print("New calibration value is: ");
       Serial.println(newCalibrationValue);
       LoadCell.setCalFactor(newCalibrationValue);
       _resume = true;
     }
   }
```

```
  }
  _resume = false;
  Serial.print("Save this value to EEPROM adress ");
  Serial.print(calVal_eepromAdress);
  Serial.println("? y/n");
  while (_resume == false) {
    if (Serial.available() > 0) {
      char inByte = Serial.read();
      if (inByte == 'y') {
#if defined(ESP8266)|| defined(ESP32)
        EEPROM.begin(512);
#endif
        EEPROM.put(calVal_eepromAdress, newCalibrationValue);
#if defined(ESP8266)|| defined(ESP32)
        EEPROM.commit();
#endif
        EEPROM.get(calVal_eepromAdress, newCalibrationValue);
        Serial.print("Value ");
        Serial.print(newCalibrationValue);
        Serial.print(" saved to EEPROM address: ");
        Serial.println(calVal_eepromAdress);
        _resume = true;
      }
```

```
      else if (inByte == 'n') {
        Serial.println("Value not saved to EEPROM");
        _resume = true;
      }
    }
  }
  Serial.println("End change calibration value");
  Serial.println("***");
}
```



Hasil Kalibrasi yang tepat

Koding pengukuran beban

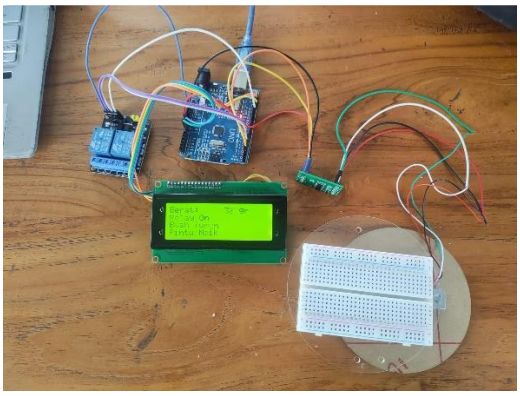
```
#include<HX711_ADC.h>
#include<EEPROM.h>
#include<LiquidCrystal_I2C.h>
#include<Relay_on/off.h>
LiquidCrystal_I2C lcd(0x27,20,4);
const int HX711_dout = 2;
const int HX711_sck = 3;
```

```
const int In1 = 4;
const int In2 = 5;
HX711_ADC LoadCell(HX711_dout, HX711_sck);
Relay_on/off(In1, In2)
const int calVal_eepromAdress = 0;
long t;
void setup() {
  Serial.begin(9600);
  lcd.begin();
  pinMode(HX711_dout, INPUT);
  delay(10);
  Serial.println();
  Serial.println("Memulai...");
  lcd.begin();
  LoadCell.begin();
  lcd.setCursor(0,0);
  lcd.print("Brt: ");
  lcd.setCursor(12,0);
  lcd.print("0");
  lcd.setCursor(14,0);
  lcd.print("gr");
  float calibrationValue;
  calibrationValue = 696.0;
```

```
  EEPROM.get(calVal_eepromAdress, calibrationValue);
  long stabilizingtime = 2000;
  boolean _tare = true;
  LoadCell.start(stabilizingtime, _tare);
  if (LoadCell.getTareTimeoutFlag()) {
    Serial.println("Timeout, cek kabel MCU>HX711 pastikan sudah
          tepat");
    while (1);
  }
  else {
    LoadCell.setCalFactor(calibrationValue);
    Serial.println("Startup selesai");
  }
}
void loop() {
  static boolean newDataReady = 0;
  const int serialPrintInterval = 0;
  if (LoadCell.update()) newDataReady = true;
  if (newDataReady) {
    if (millis() > t + serialPrintInterval) {
      int i = LoadCell.getData();
      if(i<0){
        i=0;
```

```
      }
      tampil(i);
      newDataReady = 0;
      t = millis();
    }
  }
  if(Serial.available() > 0){
    float i;
    char inByte = Serial.read();
    if (inByte == 't') LoadCell.tareNoDelay();
  }
  if (LoadCell.getTareStatus() == true) {
    Serial.println("Tara selesai");
  }
}
void tampil(int j){
  lcd.setCursor(4,0);
  lcd.print("          ");
  if(j<10){
    lcd.setCursor(12,0);
  }else if(j<100 && j>=10){
    lcd.setCursor(11,0);
  }else if(j<1000 && j>=100){
```

```
  lcd.setCursor(10,0);
 }else if(j<10000 && j>=1000){
  lcd.setCursor(9,0);
 }else if(j<100000 && j>=10000){
  lcd.setCursor(8,0);
 }else if(j<1000000 && j>=100000){
  lcd.setCursor(7,0);
 }else if(j<10000000 && j>=1000000){
  lcd.setCursor(6,0);
 }else if(j<100000000 && j>=10000000){
  lcd.setCursor(5,0);
 }else{
  lcd.setCursor(4,0);
 }
 lcd.print(j);
}
```



Hasil Pengukuran Beban