

LAMPIRAN GAMBAR ALAT

Bak Mandi Bayi Tampak Depan



Tampak Atas

Tangki Pemanas Air



Rangkaian Keseluruhan

Kalibrasi suhu



**PROGRAM PERANCANGAN BAK MANDI BAYI MENGGUNAKAN
SISTEM OTOMATIS DAN PENGENDALI SUHU
BERBASIS ARDUINO 2560**

```
1  //===== LIBRARY =====
2  #include <Keypad.h>
3  #include <Wire.h>
4  #include <EEPROM.h>
5  #include <LiquidCrystal_I2C.h>
6  #include <OneWire.h>
7  #include <DallasTemperature.h>
8  #define ONE_WIRE_BUS 2
9
10 OneWire oneWire(ONE_WIRE_BUS);
11 DallasTemperature sensors(&oneWire);
12 LiquidCrystal_I2C lcd(0x27, 16, 2);
13
14 char customKey, mulaiKey; //char stringAngka[2];
15 int indexKeypad = 0;
16 const byte ROWS = 4;
17 const byte COLS = 4;
18 char keys[ROWS][COLS] = {
19   {'1', '2', '3', 'A'},
20   {'4', '5', '6', 'B'},
21   {'7', '8', '9', 'C'},
22   {'*', '0', '#', 'D'}
23 };
24 byte rowPins[ROWS] = {31, 30, 29, 28};
25 byte colPins[COLS] = {27, 26, 25, 24};
26
27 //===== INPUT =====
28 int Sensor_lv0;
29 int respin_0 = A0;
30 int resval_0 = 8;
31 int Sensor_lv1;
32 int respin_1 = A1;
33 int resval_1 = 8;
34 int Sensor_lv2;
35 int respin_2 = A2;
36 int resval_2 = 8;
```

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37 //===== OUTPUT =====
38 int Solenoid_1 = 32;
39 int Heater = 33;
40 int Pompa_Air = 34;
41 int Solenoid_2 = 35;
42 int x = 0;
43 int ssr = 3; // alamat pin SSR
44 float sp;
45 float diff;
46 float dataSuhu_0;
47 float dataSuhu_1;
48 float T_cutoff, T_cuton, nilaicd, nilaisp, nilaidiff;
49 Keypad customKeypad = Keypad(makeKeymap(keys), rowPins, colPins,
50 ROWS, COLS);
51 void(* resetFunc) (void) = 0; //declare reset function @ address 0
52
53 //===== VOID SETUP =====
54 void setup()
55 {
56   sensors.setResolution(0,9);
57   sensors.setResolution(1,9);
58
59   Sensor_lv0 = analogRead(respin_0);
60   Sensor_lv1 = analogRead(respin_1);
61   Sensor_lv2 = analogRead(respin_2);
62
63   pinMode(Solenoid_1, OUTPUT);
64   pinMode(Heater, OUTPUT);
65   pinMode(Pompa_Air, OUTPUT);
66   pinMode(Solenoid_2, OUTPUT);
67
68   digitalWrite(32, HIGH);
69   digitalWrite(33, HIGH);
70   digitalWrite(34, HIGH);
71   digitalWrite(35, HIGH);
72
73   Serial.begin(9600);
74   lcd.init();
75   lcd.backlight();
76   pinMode(ssr,OUTPUT);

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77  sp = 0;
78  diff = 0;
79  nilaisp = sp;
80  nilaidiff = diff;
81  T_cutoff = sp + (diff/2);
82  T_cuton = sp - (diff/2);
83  lcd.setCursor(1,0);
84  lcd.print("BAK MANDI BAYI");
85  lcd.setCursor(4,1);
86  lcd.print("OTOMATIS");
87  delay(3000);
88  lcd.clear();
89  }
90  //=====VOID LOOP=====
91  void loop()
92  {
93    customKey = customKeypad.getKey();
94    if(x == 0){
95      //lcd.clear();
96      lcd.setCursor(0,0);
97      lcd.print("1.SET ON-OFF");
98    }
99    if(x == 1){
100     lcd.clear();
101     lcd.setCursor(0,0);
102     lcd.print("2.MULAI");
103     delay(50);
104    }
105    if(x == 2){
106      //lcd.clear();
107      lcd.setCursor(0,0);
108      lcd.print("3.CEK ON-OFF");
109    } switch(customKey)
110    {
111      case '0' ... '9':
112        break;
113
114      case '#':
115        break;
116      case '*':

```

```
117  break;
118  case 'A':
119    x--;
120    break;
121
122  case 'B':
123    x++;
124    break;
125
126  case 'C':
127    break;
128
129  case 'D':
130    if(x == 0){
131      lcd.clear();
132      //analogWrite(ssr,0);
133      setsp();
134      setdiff();
135    }
136    if(x == 1){
137      lcd.clear();
138      mulai();
139    }
140    if(x == 2){
141      lcd.clear();
142      //analogWrite(ssr,0);
143      cekonoff();
144    }
145    break;
146  }
147  if(x > 2){
148    x = 0;
149  }
150  if(x < 0){
151    x = 2;
152  }
153  }void setdiff(){
154    lcd.setCursor(0,0);
155    lcd.print("SET DIFF ");
156    customKey = customKeypad.getKey();
```

```
157  if(customKey >= '0' && customKey <= '9')
158  {
159      diff = diff * 10 + (customKey - '0');
160      lcd.setCursor(0,1);
161      lcd.print(diff);
162      T_cutoff = sp + (diff/2);
163      T_cuton = sp - (diff/2);
164  }
165
166  if(customKey == '*'){
167      lcd.clear();
168      delay(1000);
169      nilaidiff = diff;
170      return;
171  }
172
173  setdiff();
174  }
175  void setsp(){
176      lcd.setCursor(0,0);
177      lcd.print("SET POINT ");
178      customKey = customKeypad.getKey();
179      if(customKey >= '0' && customKey <= '9')
180      {
181          sp = sp * 10 + (customKey - '0');
182          lcd.setCursor(0,1);
183          lcd.print(sp);
184          //lcd.print(customKey);
185          //sp = customKey;
186      }
187      if(customKey == '*'){
188          lcd.clear();
189          delay(1000);
190          nilaisp = sp;
191          return;
192      }
193
194      setsp();
195  }
196  void cekonoff(){ lcd.setCursor(0,0);
```

```
197  lcd.print("SP = ");
198  lcd.print(nilaisp);
199
200  lcd.setCursor(0,1);
201  lcd.print("Control diff = ");
202  lcd.print(nilaidiff);
203
204  customKey = customKeypad.getKey();
205
206  if(customKey == '*'){
207    lcd.clear();
208    delay(1000);
209    return;
210  }
211  cekonoff();
212 }
213
214 void mulai(){
215   if (sp==0) {
216     lcd.setCursor(0, 0);
217     lcd.print("Mohon Set SP");
218     lcd.setCursor(0, 1);
219     lcd.print("dan Diff Dahulu");
220     delay(2000);
221     return;
222   }
223
224   sensors.requestTemperatures();
225   T_cutoff = sp + (diff/2);
226   T_cuton = sp - (diff/2);
227
228   dataSuhu_0 = sensors.getTempCByIndex(0);
229   dataSuhu_1 = sensors.getTempCByIndex(1);
230   Sensor_lv0 = analogRead(respin_0);
231   Sensor_lv1 = analogRead(respin_1);
232   Sensor_lv2 = analogRead(respin_2);
233   resval_0 = analogRead(Sensor_lv0);
234   resval_1 = analogRead(Sensor_lv1);
235   resval_2 = analogRead(Sensor_lv2);
236
```

```

237 //=====PENGISIAN TANGKI=====
238 if (Sensor_lv0 <= 300 && Sensor_lv2 <= 300 ){// Vol Tanki dibawah
239 batas min
240     digitalWrite(Solenoid_1, LOW);}//solenoid 1 nyala
241 else if(Sensor_lv1 > 300){//Tanki penuh,
242     digitalWrite(Solenoid_1, HIGH);}//solenoid 1 mati
243
244 //=====PEMANASAN AIR=====
245 if (Sensor_lv0 >= 300 && Sensor_lv2 <= 300 && dataSuhu_1 <=
246 T_cutoff){//Suhu dibawah setpoint & Tanki penuh
247     digitalWrite(Heater, LOW);}//pemanas menyala
248 else if (dataSuhu_1 > T_cutoff || Sensor_lv0 < 300 || Sensor_lv2 >
249 300){//Suhu diatas setpoint & Vol Tanki dibawah batas min
250     digitalWrite(Heater, HIGH);}//pemanas mati
251
252 //=====PENGISIAN BAK MANDI BAYI I=====
253 if (Sensor_lv0 > 300 && Sensor_lv2 <= 300 && dataSuhu_1 >
254 T_cutoff){//Vol Tangki diatas batas min, Suhu sesuai SP & Suhu bak
255 mandi kurang Bak mandi kosong
256     digitalWrite(Pompa_Air, LOW);}//Pompa menyala
257 else if(Sensor_lv2 > 300 || Sensor_lv0 < 300){//Bak mandi penuh dan
258 suhu sesuai set point atau Vol Tanki dibawah min
259     digitalWrite(Pompa_Air, HIGH);}//Pompa mati
260
261 lcd.setCursor(0, 0);
262 lcd.print("Set Point= ");
263 lcd.print(sp);
264 lcd.print("C");
265 lcd.setCursor(0, 1);
266 lcd.print("T=");
267 lcd.print(dataSuhu_1);
268 lcd.print(" ");
269 lcd.setCursor(9, 1);
270 lcd.print("B=");
271 lcd.print(dataSuhu_0);
272 lcd.print(" ");
273 delay(50);
274 customKey = customKeypad.getKey();
275 if(customKey == '*'){
276     lcd.clear();

```

```
277 analogWrite(ssr,0);
278 resetFunc(); //call reset
279 delay(800);
280 return;
281 }
282 //=====DRAIN BAK MANDI=====
283 if(customKey == 'C'){
284 digitalWrite(Solenoid_1, HIGH);
285 digitalWrite(Heater, HIGH);
286 digitalWrite(Pompa_Air, HIGH);
287 lcd.clear();
288 lcd.setCursor(2, 0);
289 lcd.print("PROSES TELAH");
290 lcd.setCursor(5, 1);
291 lcd.print("SELESAI");
292 digitalWrite(Solenoid_2, LOW); //solenoid 2 nyala
293 delay(300000);
294 digitalWrite(Solenoid_2, HIGH);
295 digitalWrite(Solenoid_1, HIGH);
296 digitalWrite(Heater, HIGH);
297 digitalWrite(Pompa_Air, HIGH);
298 lcd.clear();
299 }
300
301 mulai();
}
```

