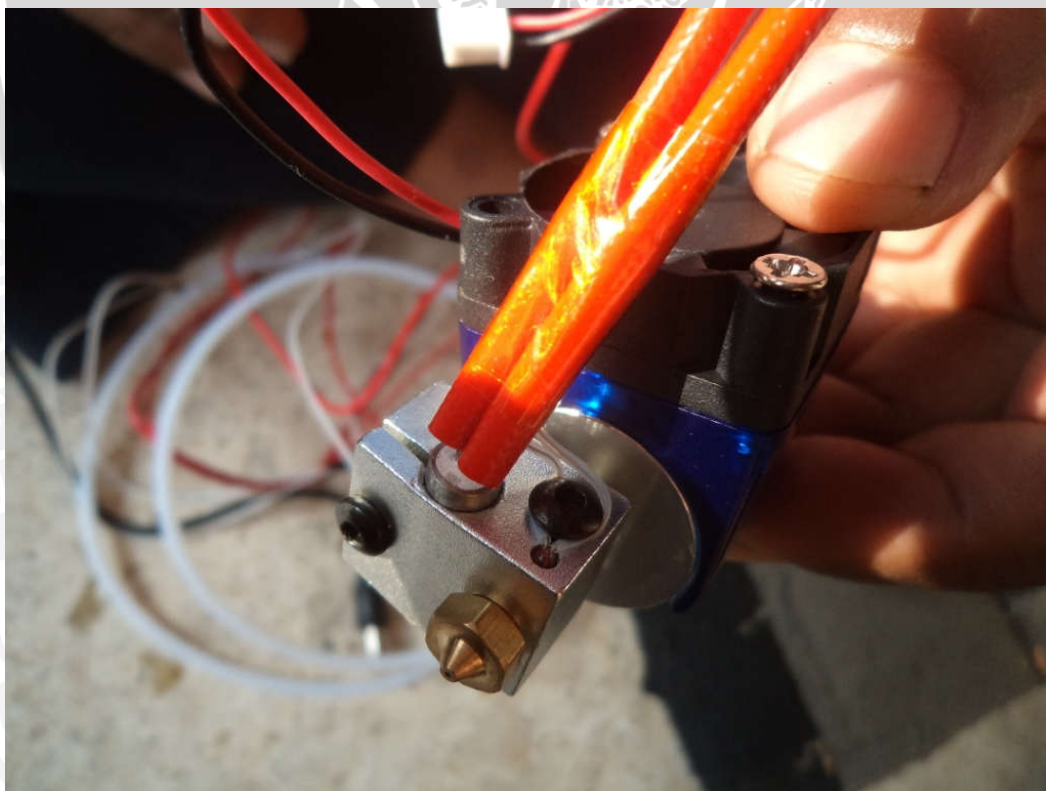
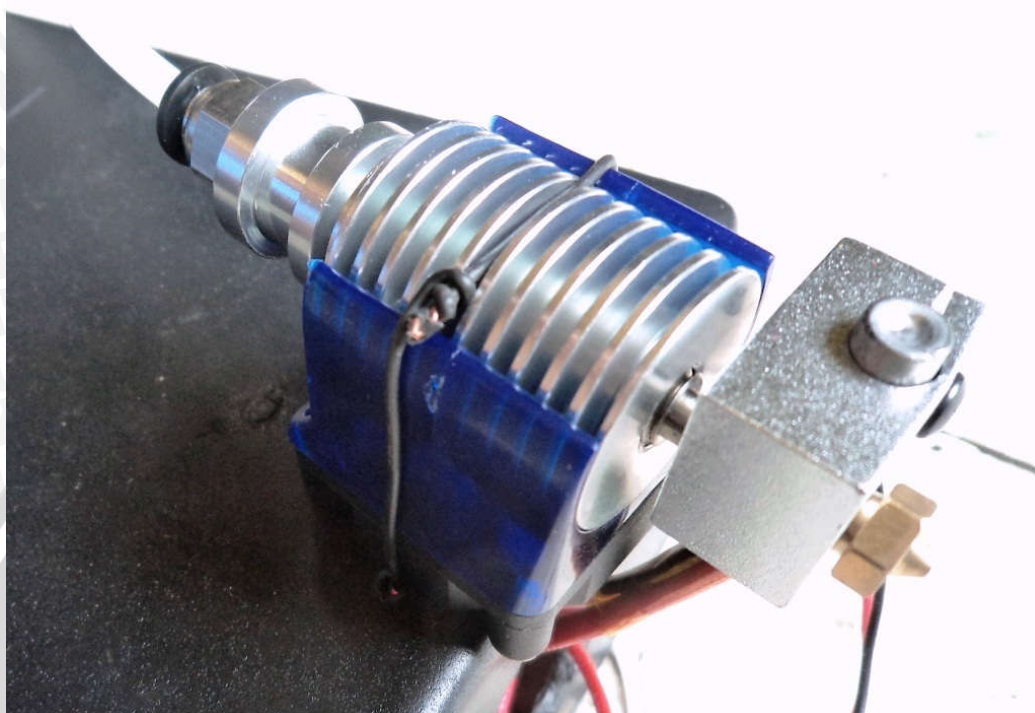


UNIVERSITAS BRAWIJAYA LAMPIRAN



Lampiran 1

Foto Alat





Lampiran 2**Program Pengujian Keseluruhan**

```

/*****/
*
* NAMA : MUHAMMAD TAUFIQ A.R.
* NIM : 115060300111035
*
/*****/

#include <PID_v1.h>

double Setpoint;
double Input, Output;

double Kp = 35.56;
double Ki = 1.975;
double Kd = 160.02;

int dcMotor = 9;
long fb;

int fback = 0;

// Inisialisasi PID
PID myPID(&Input, &Output, &Setpoint, Kp, Ki, Kd, DIRECT);

int feedback()
{
    // baca feedback (rpm) adc kanal 0
    fb = analogRead(fback);
}

void setup() {

```

```
// set pid secara otomatis
myPID.SetMode(AUTOMATIC);

// setpoint dalam °C
Setpoint = 230°C;
}

void loop() {
  // baca feedback
  feedback();
  myPID.Compute();
  analogWrite(dcMotor,Output);
  delay(50);
}
```

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Lampiran 3

Datasheet Pemanas

Features and benefits

- Print 1.75 mm and 3 mm Filament with the same Hotend
- Innovative interchangeable Filament Nozzle Units
- Modular Hotend design
- Optimized thermal barrier
- Short heating zone
- Leakage proof - No PEEK or PTFE used
- Multiple Filament Nozzle Diameters available (e.g. 0.25 / 0.30 / 0.40 / 0.60 / 0.80 mm)
- Brass & Stainless steel Filament Nozzle Units
- Fully assembled
- Print the widest range of filaments
- Max. printing temperature of 300 °C
- Print faster - reduced feeding friction
- Heats up to 200 °C in less than 60 seconds
- Multiple mounting options
- Round Mount turns 1730 Full Metal Hotend into bowden setup
- Change Filament Nozzle Units in cold state
- 500 °C ready (future upgrade)

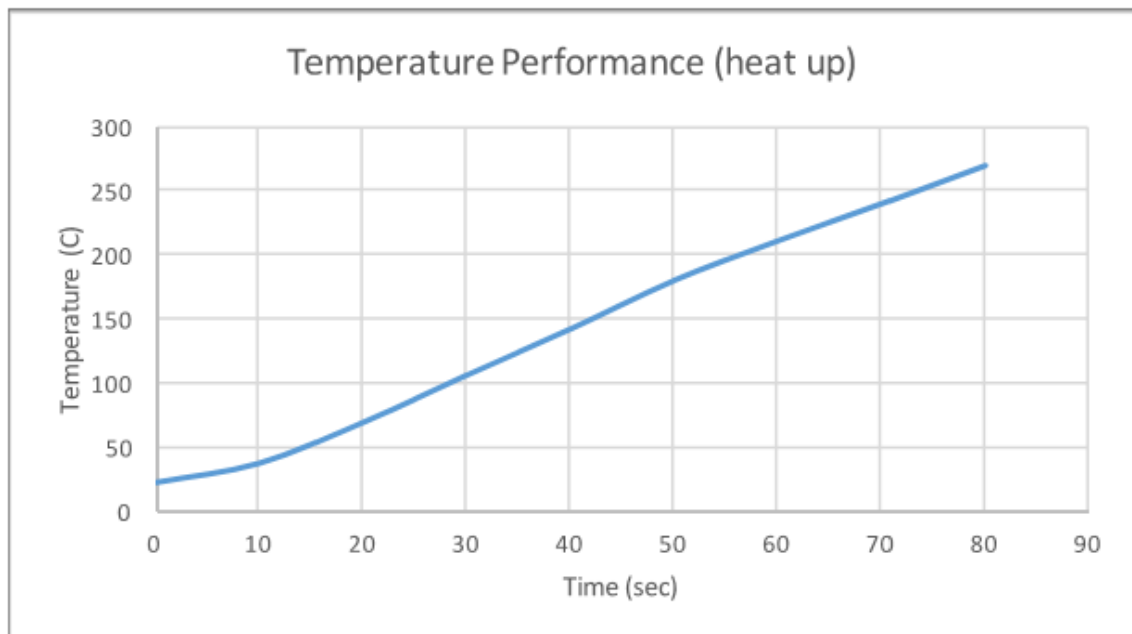


Table 8. Recommended printing temperatures

Symbol	Filament	Min	Max	Unit
T _{PRINT(FDM)}	PLA	190	220	°C
T _{PRINT(FDM)}	ABS	230	260	°C
T _{PRINT(FDM)}	Nylon	250	270	°C
T _{PRINT(FDM)}	PC	260	280	°C

Table 9. Static characteristics

Symbol	Parameter	Condition	Type	Unit
V _{SUP(Fan)}	Fan Supply Voltage	12 V Edition	12	V
V _{SUP(Heater)}	Heater Supply Voltage	12 V Edition	12	V
I _{SUP(Heater)}	Heater Current	12 V Edition	3	A
V _{SUP(Fan)}	Fan Supply Voltage	24 V Edition	24	V
V _{SUP(Heater)}	Heater Supply Voltage	24 V Edition	24	V
I _{SUP(Heater)}	Heater Current	24 V Edition	1.5	A
NTC	Thermistor	NTC3950	100	kΩ

This hot-end is a combination of ideas from other nozzle designs combined with a goal to reduce the number of custom machined parts to a bare minimum. The J-Head Mk IV-B has been proven to print reliably with both ABS and PLA. (PLA will require a small fan to provide air-flow through the cooling vents milled in the sides of the nozzle holder.)

The following is a list of just some of the improvements made to the J-Head Mk V-BV:

- Over 13mm shorter than the Mk IV-B and earlier J-Head hot-ends. This will increase the height of your print area.
- Longer melt zone to reduce the temperature required for extrusion.
- The top portion, of the melt zone, is insulated by the lower part of the PEEK nozzle holder.
- The lower taper, on the PTFE liner, is no longer required. As a result, the liner can be tightened considerably without fear of jamming the hot-end.

This hot-end easily interfaces with the most popular RepRap extruders, including Wade's Extuder, Greg Frost's Hinged Accessible Extruder, etc.

Please note: The maximum operating temperature is 247 degrees Celsius as PEEK will soften at 248 degrees Celsius. Due to many variables, affecting the accuracy of the temperature readings and settings, caution is recommended when extruding at temperatures approaching this limit.