

Makertech

Stage 05: Firmware (Klipper)

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Step 1 — Thermistors - 2024

```
10
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15  [thermistor Extruder]
16  temperature1: 25
17  resistance1: 100000
18  temperature2: 160
19  resistance2: 1074
20  temperature3: 300
21  resistance3: 82.78
22
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```

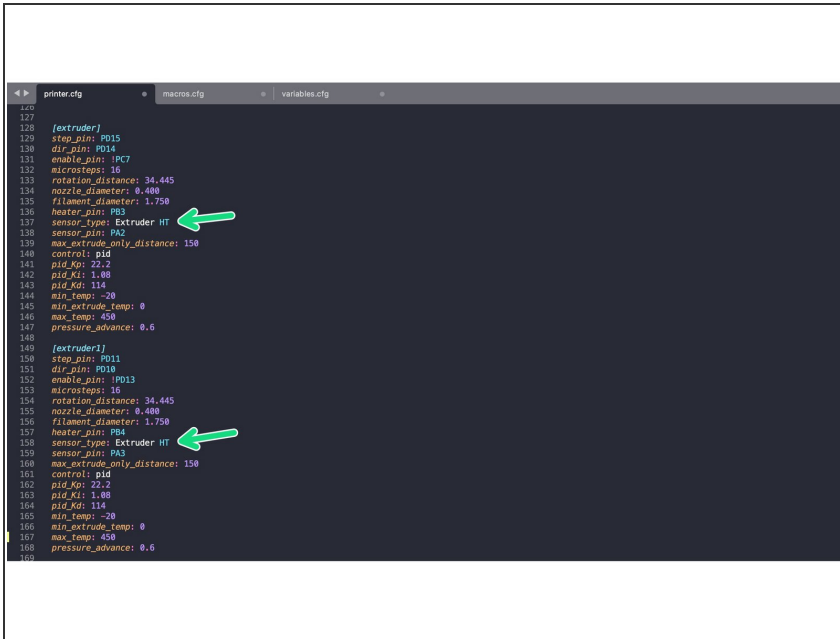
- As of 2024, both sides are high temp sides with the same type of thermistor. If you received your kit in 2024 then use these thermistor values.

Step 2 — Thermistors - Old

```
65
66 [thermistor Extruder HT]
67 temperature1: 20
68 resistance1: 4721000
69 temperature2: 200
70 resistance2: 8000
71 temperature3: 400
72 resistance3: 264
73
74 [thermistor Extruder LT]
75 temperature1: 25
76 resistance1: 100000
77 temperature2: 72.5
78 resistance2: 12868
79 temperature3: 95
80 resistance3: 6854
81
82
```

- ① Set the thermistors up as shown.
Extruder HT is for a high temp side.
Extruder LT is for a low temp side.
- Low temp thermistor (white cable, silver casing):
 - ✧ [thermistor Extruder LT]
temperature1: 25 resistance1: 100000 temperature2: 72.5
resistance2: 12868
temperature3: 95 resistance3: 6854
- High temp thermistor (white cable, brass casing):
 - ✧ [thermistor Extruder HT]
temperature1: 20 resistance1: 4721000 temperature2: 200
resistance2: 8000 temperature3: 400 resistance3: 264
- High temp thermistor (blue cable):
 - ✧ [thermistor Extruder LT]
temperature1: 25 resistance1: 4500000 temperature2: 260
resistance2: 2240 temperature3: 460 resistance3: 125.4

Step 3 — Extruders



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```

 Setup your config so you have two extruders.

 Shown is just an example config, do not copy this exactly. You will need to edit these values based on your printer.

- Set the thermistors based on whether you have installed a high/low temp setup or a high/high temp setup.
- For the 2024 thermistors set this to just *Extruder*.

Step 4 — Servo and Relay

```
268
267
268 [servo extruder]
269 pin: PE5
270 maximum_servo_angle: 180
271 minimum_pulse_width: 0.0004
272 maximum_pulse_width: 0.0024
273
274 [output_pin servo_power]
275 #Set low to power off servo
276 pin: PE6
277 pwm: False
278
279
```

- Create a section named [servo extruder]
 - ✦ [servo extruder] pin: PE5
maximum_servo_angle: 180
minimum_pulse_width: 0.0004
maximum_pulse_width: 0.0024
 - ⚠ Set the pin value to where you have plugged the servo signal line into your control board.
- Create a section named [output_pin servo_power]
 - ✦ [output_pin servo_power] #Set low to power off servo pin: PE6
pwm: False
 - ⚠ Similarly, set the pin value to where you have plugged your relays signal line into.

Step 5 — Probe Settings

```
282
283 [probe]
284 pin: PE4
285 z_offset: 0
286 x_offset: 39.5
287 y_offset: 32
288 samples: 2
289 sample_retract_dist: 3.0
290 samples_result: average
291
292
```

- Set the probe up as shown, again setting the pin value based on where you've plugged the probe to your control board.
- ✦ [probe] pin: PE4 z_offset: 0
x_offset: 39.5 y_offset: 32
samples: 2 sample_retract_dist: 3.0 samples_result: average

Step 6 — Switching Macros

```
111
112 [gcode_macro ARM_INSTALL]
113 gcode:
114   SET_PIN PIN=servo_power VALUE=1 # Power on servo via relay switch
115   SET_SERVO SERVO=extruder ANGLE=90 # Set servo position to 90 degrees
116
117 [gcode_macro SERVO_OFF]
118 gcode:
119   SET_PIN PIN=servo_power VALUE=0 # Power down servo via relay switch
120
121
122 [gcode_macro ARM_POSITION]
123 gcode:
124   SET_PIN PIN=servo_power VALUE=1 # Power on servo via relay switch
125   {% set serv_angle=parms.A|default(0)|float %}
126   SET_SERVO SERVO=extruder ANGLE={serv_angle} # Move servo arm
127   G4 P1500 # Allow time to make move
128   SET_PIN PIN=servo_power VALUE=0 # Power down servo via relay switch
129
130
131 [gcode_macro T0]
132 gcode:
133   {% set svv = printer.save_variables.variables %} # Set svv to point to variable.cfg
134   ARM_POSITION A={svv.left_ang} # Switch to T0
135   {% if "xyz" in printer.toolhead.homed_axes %}
136   SET_GCODE_OFFSET X=0
137   SET_GCODE_OFFSET Y=0
138   {% endif %}
139   ACTIVATE_EXTRUDER EXTRUDER=extruder
140   G4 P2500
141
142 [gcode_macro T1]
143 gcode:
144   {% set svv = printer.save_variables.variables %} # Set svv to point to variable.cfg
145   ARM_POSITION A={svv.right_ang} # Switch to T1
146   {% if "xyz" in printer.toolhead.homed_axes %}
147   SET_GCODE_OFFSET X={svv.x_off} # Account for different X offset
148   SET_GCODE_OFFSET Y={svv.y_off} # Account for different Y offset
149   {% endif %}
150   ACTIVATE_EXTRUDER EXTRUDER=extruder1
151   G4 P2500
152
153
```

- ❗ Copy the following macros into your macros.cfg file.

✦ <https://wtools.io/paste-code/bEw4>

Step 7 — Variables

```
1  [Variables]
2  left_ang = 175
3  right_ang = 10
4
5  #Right Hotend Offsets
6  x_off = -28
7  y_off = 0
8
```

❗ If you don't already have a `variables.cfg` file, create one and add the following code to it.

★ <https://wtools.io/paste-code/bEwc>

Step 8 — Adding Variables to printer.cfg

```
19
20 [include mainsail.cfg]
21 [include macros.cfg]
22 [save_variables]
23 filename: ~/klipper_config/variables.cfg
24 # Required - provide a filename that would be used to save the
25 # variables to disk e.g. ~/variables.cfg
26
```



❗ Finally, add to the top of your `printer.cfg` the following:

- [save_variables] filename:
~/klipper_config/variables.cfg