

# MicroProbe

## User Manual

### Product Parameters

Product Name: MicroProbe

Total Weight: 6g

Voltage: 5V

Standby Current: 3mA

Maximum Current: 600mA

Cable Length: 1.5 m

Wiring: 5 pins, 1.25 mm Pitch

Working Chamber Temperature:  $\leq 60^{\circ}\text{C}$

Accuracy: 0.001mm Standard Deviation @24°C Ambient, 60°C Bed

0.003mm Standard Deviation @60°C Ambient, 100°C Bed

Lifespan: 10,000,000+

Compatibility: All FDM 3D Printers

### Main Features

Ultra small, fits into more places;

Lightweight design;

Easy installation;

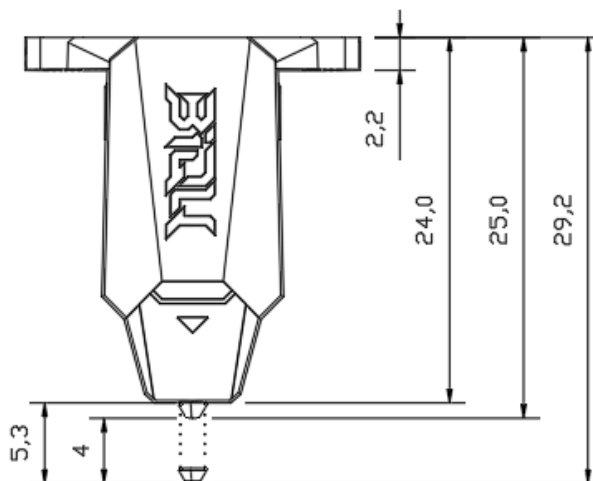
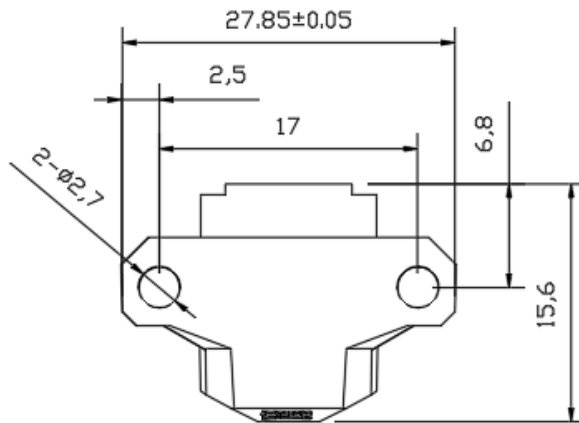
Compatible with a wide range of FDM printers;

High precision and reliability;

Removable and replaceable probing pin.

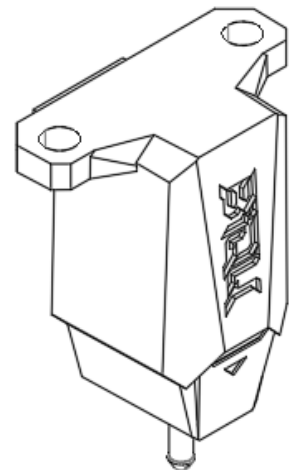
## Product Dimensions

27.9 x 15.6 x 29.2 mm (Probe Extended)



Size Diagram

Trigger Point

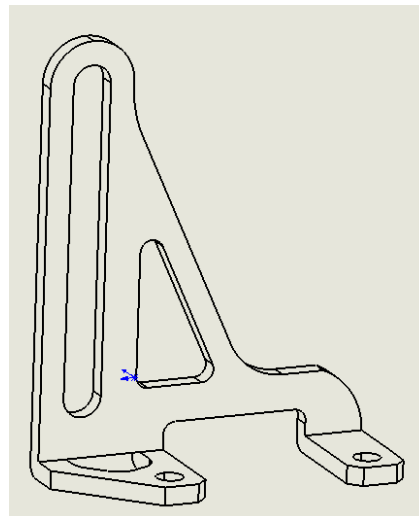
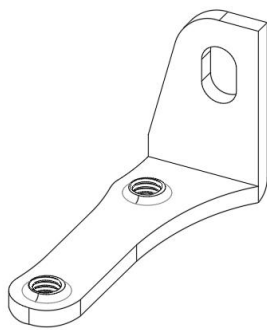


**Note:** The Microprobe works differently from BLTouch. There is no trigger distance, and the probe will trigger instantaneously at the fully extended position. When designing brackets, please place the bottom surface of the probe approx. 1.5-2 mm below the nozzle in the fully extended position.

# Mounting Bracket Instruction and Installation Guide

## 1. Mounting Bracket Instruction

Optional mounting brackets are available for purchase for drop-in installation, for B1/H2 series extruder, Ender series printheads, and Voron Afterburner/StealthBurner. Alternatively, 3D models of brackets for other printheads are available for download and print yourself. The source CAD model of the MicroProbe mockup is also available to provide references for users to design mounting brackets for other machines. You are welcome to send your bracket design to us and we will upload it to our bracket reservoir and share it with the community.



## 2. Installation Guide

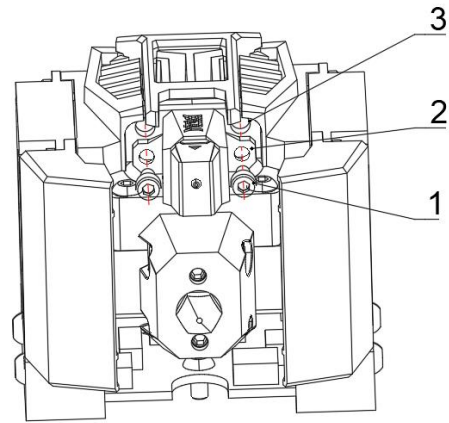
### 2.1 Hurakan Printhead-No mounting bracket needed:

1: M2.5x5 Screws (2pcs)

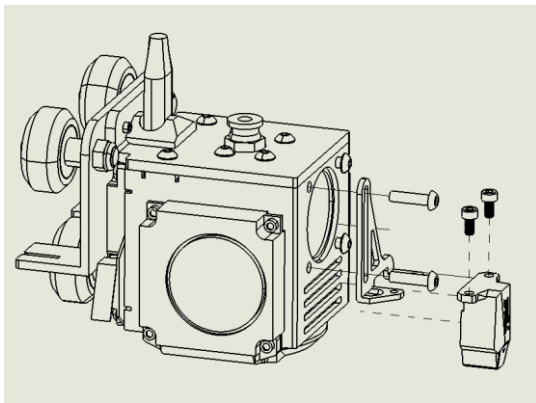
2: MicroProbe

3: Hurakan Printhead

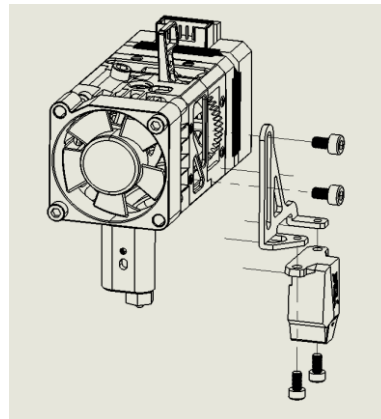
As shown in the picture: Use the two M2.5x5 screws to directly fix the MicroProbe to the Hurakan printhead.



### 2.2 B1 Printhead / H2 V2S Extruder-B1/H2 V2S Bracket needed:



B1 Printhead



H2 Series Extruder

Fix the B1/H2 V2S Bracket to the B1 Printhead/H2 Series Extruder, then fix the MicroProbe to the B1/H2 V2S Bracket with the two M2.5x5 screws.

### 2.3 Ender Series Printhead-Ender Bracket needed:

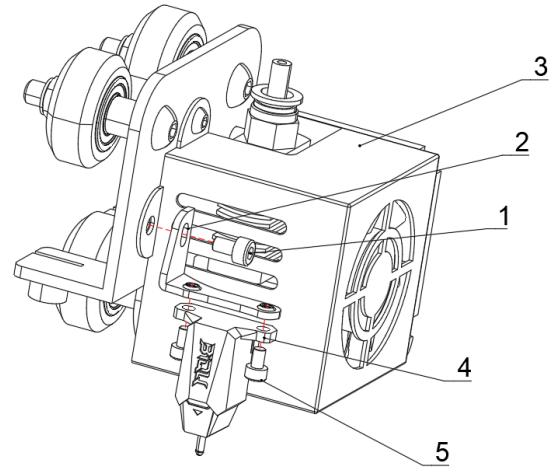
1: M3x5 Screw

2: Ender Bracket

3: Ender Series Printhead

4: MicroProbe

5: M2.5x5 Screw

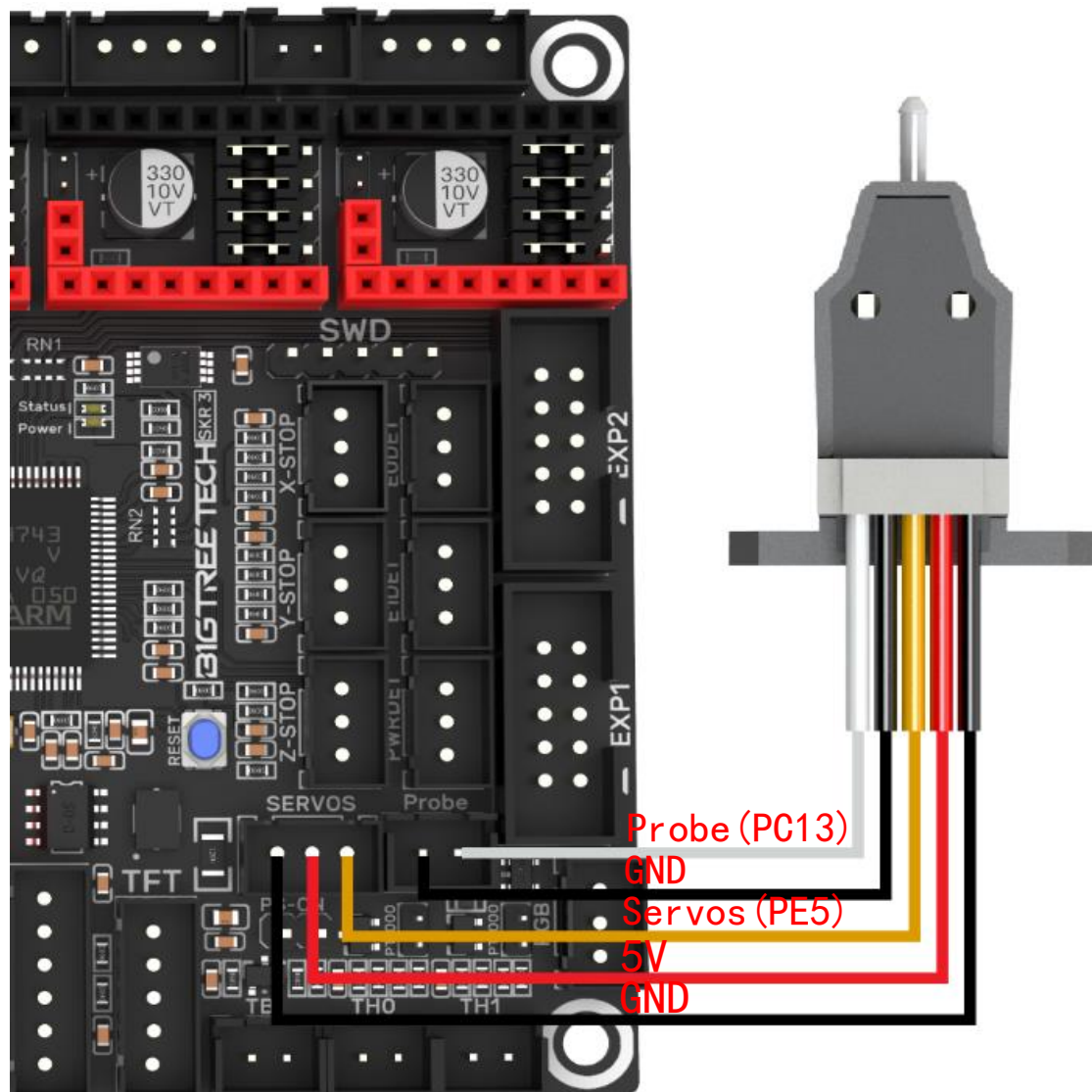


Fix the Ender bracket to the Ender-3 printhead with the M3x5 screw; then fix the MicroProbe to the Ender Bracket with the two M2.5x5 screws.

## Wiring

The wiring of MicroProbe is the same as BLTouch. The power supply voltage is 5V, the control signal is compatible with 3.3V/5V, and the detection signal is an open-drain output externally (10K pull-up resistance is required on the signal of the motherboard, or the IO needs to be set as input pull-up in the firmware).

Take SKR 3 motherboard as an example, and the wiring is as follows:



## Firmware

### Important:

- Microprobe works differently from BLTouch, the firmware **MUST** be re-configured for Microprobe, Failed to do so will result in un-recoverable hardware damage.
- Take the configuration of the SKR 3 motherboard as an example. Other motherboards only need to replace the IO of the "control (PE5) and detection (PC13)" with the actual IO on the motherboard.
- The detection signal triggered level of the Microprobe V1 and V2 versions is different. V1 is low-level triggered and V2 is a high-level triggered, and corresponding firmware needs to be set according to the actual hardware version.



## 1. Marlin

```
C Configuration.h M X
Marlin > C Configuration.h > ...
1125  */
1126  //#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN
1127
```

`//#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN`

Comment out `#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN`, or the IO of the detection signal will be automatically set to `Z_MIN_ENDSTOP`

```
C Configuration.h M X
Marlin > C Configuration.h > ...
1145  */
1146  #define Z_MIN_PROBE_PIN PC13 // Pin 32 is the RAMPs default
1147
```

`#define Z_MIN_PROBE_PIN PC13` // The detection IO on the SKR 3 is PC13

```
C Configuration.h M X
Marlin > C Configuration.h > ...
1331  */
1332  #define PROBE_ENABLE_DISABLE
1333  #if ENABLED(PROBE_ENABLE_DISABLE)
1334  #define PROBE_ENABLE_PIN PE5 // Override the default pin here
1335  #endif
```

`#define PROBE_ENABLE_DISABLE` // Probe Enable / Disable

`#define PROBE_ENABLE_PIN PE5` // The control IO on the SKR 3 is PE5

```
C Configuration.h M X
Marlin > C Configuration.h > ...
1165  */
1166  #define FIX_MOUNTED_PROBE
1167
```

`#define FIX_MOUNTED_PROBE` // Set the type of leveling sensor

```
C Configuration.h M X
Marlin > C Configuration.h > NOZZLE_TO_PROBE_OFFSET
1285  */
1286  #define NOZZLE_TO_PROBE_OFFSET { 0, 0, 0 }
1287
```

`#define NOZZLE_TO_PROBE_OFFSET { 0, 0, 0 }` // Actual installed offset of MicroProbe



```
C Configuration.h M X
Marlin > C Configuration.h > ...
971 #define W_MAX_ENDSTOP_INVERTING false // Set to true to invert the logic of the endstop.
972 #define Z_MIN_PROBE_ENDSTOP_INVERTING false // Set to true to invert the logic of the probe.
973
```

`#define Z_MIN_PROBE_ENDSTOP_INVERTING false` // Detection signal triggered level, V1 should be `false` means low-level triggered, V2 should be `true` means high-level triggered

```
C Configuration.h M X
Marlin > C Configuration.h > ...
924 // #define ENDSTOPPULLUP_WMAX
925 #define ENDSTOPPULLUP_ZMIN_PROBE
926 #endif
```

`#define ENDSTOPPULLUP_ZMIN_PROBE` // The detection signal is open-drain output, and the pull-up resistance needs to be set

## 2. Klipper

[output\_pin probe\_enable]

pin: PE5 # The control IO on the SKR 3 is PE5

value: 0 # Probe default stow

# Probe deploy

[gcode\_macro Probe\_Deploy]

gcode:

SET\_PIN PIN=probe\_enable VALUE=1

# Probe stow

[gcode\_macro Probe\_Stow]

gcode:

SET\_PIN PIN=probe\_enable VALUE=0

[probe]

pin: ^PC13 # The detection IO on the SKR 3 is PC13, V1 should be ^PC13 means low-level triggered, V2 should be ^!PC13 means high-level triggered

deactivate\_on\_each\_sample: False

x\_offset: 0.0 # Actual installed offset of MicroProbe

y\_offset: 0.0 # Actual installed offset of MicroProbe

z\_offset: 0.0 # Actual installed offset of MicroProbe

speed: 5.0

activate\_gcode:

Probe\_Deploy

G4 P500 # Allow 500 milliseconds for probe deploy

deactivate\_gcode:

Probe\_Stow

Refer to [https://www.klipper3d.org/Probe\\_Calibrate.html](https://www.klipper3d.org/Probe_Calibrate.html)

And [https://www.klipper3d.org/Bed\\_Level.html#the-paper-test](https://www.klipper3d.org/Bed_Level.html#the-paper-test)

In this section, we're going to discuss the Z offset in a bit more detail. First, we'll run the following command in the console.

**G28**

**PROBE\_CALIBRATE**

home the machine and begin the calibration process. Place an A4 paper between the nozzle and heated bed, and operate in the console:

**TESTZ Z=-0.1**

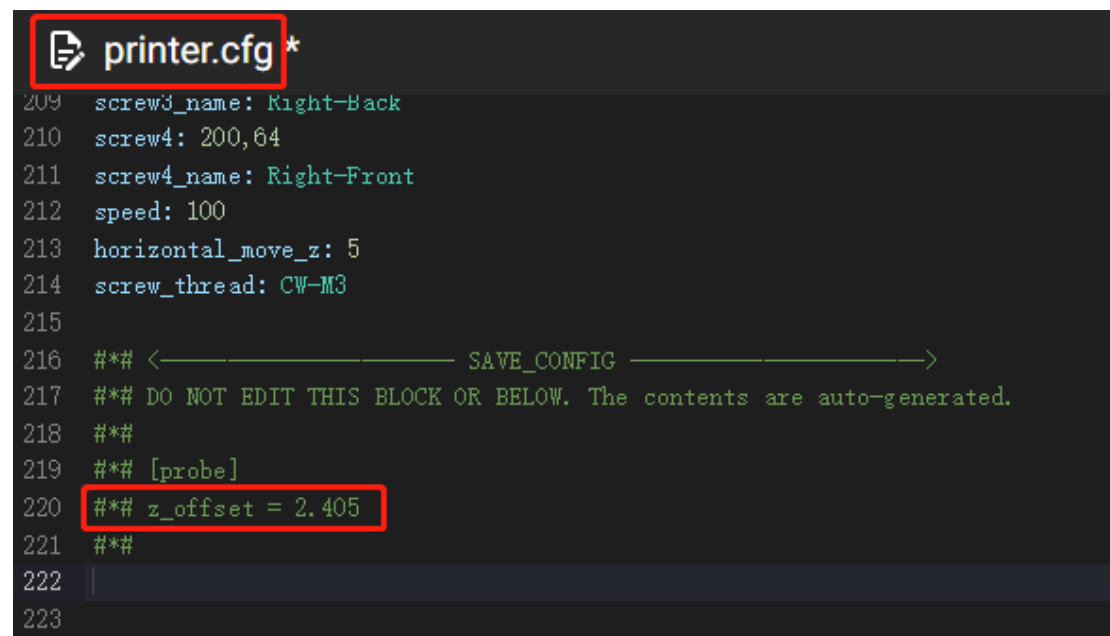
Adjust the height of the printhead. Positive values mean moving up and negative values mean moving down. -0.1 indicates moving down by 0.1mm, and the moving distance depends on the actual height of the printhead.

The height of the nozzle should be adjusted so that it just presses the A4 paper but not crushes it. The height is right if you can feel slight resistance when moving the A4 paper back and forth. Then operate in the console:

**ACCEPT**

**SAVE\_CONFIG**

Accept and save the z offset in printer.cfg, you can find the actual height of the z offset just calibrated at the end of the printer.cfg after Klipper restarts.



```
printer.cfg *
209 screw3_name: Right-Back
210 screw4: 200,64
211 screw4_name: Right-Front
212 speed: 100
213 horizontal_move_z: 5
214 screw_thread: CW-M3
215
216 ### <----- SAVE_CONFIG ----->
217 ### DO NOT EDIT THIS BLOCK OR BELOW. The contents are auto-generated.
218 ###
219 ### [probe]
220 ### z_offset = 2.405
221 ###
222
223
```

[bed\_mesh]

speed: 50

# The speed (in mm/s) of non-probing moves during the calibration

horizontal\_move\_z: 5

# The height (in mm) that the head should be commanded to move to  
# just prior to starting a probe operation.

mesh\_min: 10, 10

# Defines the minimum X, Y coordinate of the mesh for rectangular  
# beds. This coordinate is relative to the probe's location. This  
# will be the first point probed, nearest to the origin. This  
# parameter must be provided for rectangular beds.

mesh\_max: 220, 220

# Defines the maximum X, Y coordinate of the mesh for rectangular  
# beds. Adheres to the same principle as mesh\_min, however this will  
# be the furthest point probed from the bed's origin. This parameter  
# must be provided for rectangular beds.

probe\_count: 5, 5

# For rectangular beds, this is a comma separate pair of integer  
# values X, Y defining the number of points to probe along each  
# axis. A single value is also valid, in which case that value will  
# be applied to both axes.

Refer to [https://www.klipper3d.org/Config\\_Reference.html#bed\\_mesh](https://www.klipper3d.org/Config_Reference.html#bed_mesh)

### 3. RRF

```
× 0:/sys/config.g
; Z-Probe
M950 P0 C"servo0"
M558 P5 C"^probe" H5 F120 T6000
G31 P500 X0 Y0 Z0
```

The name of SKR 3 control IO in RRF firmware is "servo0"

M950 P0 C"servo0"

The name of SKR 3 detection IO in RRF firmware is "probe", set as pull-up input

M558 P5 C"^probe" H5 F120 T6000

V1 should be "^probe" means low-level triggered, V2 should be "^!probe" means high-level triggered

G31 P500 X0 Y0 Z0; Actual installed offset of MicroProbe

```
× 0:/sys/bed.g
M42 P0 S1
G4 P500
G29 ; probe the bed and enable compensation
M42 P0 S0
```

M42 P0 S1; Probe deploy

G4 P500; Allow 500 milliseconds for probe deploy

G29; probe the bed and enable compensation

M42 P0 S0; Probe stow