

OpenPlacer first time user manual rev 2.4

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- 1) Check package contents
 - 1 pick and place machine
 - 1 main feeder
 - 1 pick and place head
 - 1 0.6mm ID 0.8mm OD nozzle
 - 1 1.2mm ID 1.6mm OD nozzle
- 2) Check for axis movements.

Without power connected move x and y axis with hand to observe the free movement

Check belt tensions

Check for any loose pulleys (2 on y axis and 1 on x axis)
- 3) Mounting pick and place head

Check pick and place head z axis movement

Mount pick and place head with 2 screws

Connect d-sub15 connector

Connect usb cable

Connect vacuum hose
- 4) Check cameras

Connect one side of the usb cable to PC and other side to the first usb connector



- Open windows camera application
- Confirm the first camera is working
- Disconnect the first usb connector and connect usb cable to the second connector
- Confirm the second camera is working
- 5) Check machine controller and hardware
 - Install Arduino ide
 - Install repetier host
 - Connect power cable to mains voltage
 - Be sure the power switch is turned off
 - Connect usb cable to third usb port

Be sure the power cable is connected to a grounded source

Turn the power switch on

PC will recognize the machine as a COM# port

if not install CH340 driver

open Arduino ide and select the com port

upload test firmware

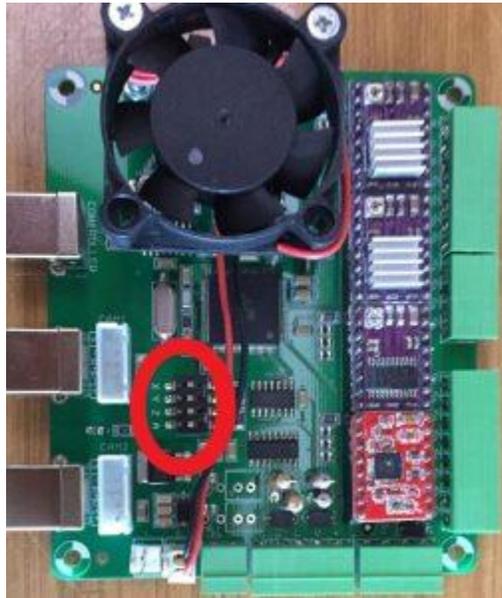
open repetier host

connect the machine

load test g code

the test g code will test all input and output functions of the controller

attention: all 4 axis motor cables are tested individually, but directions needs to be set before using the machine. Directions of axis can be changed with the dip switches on the controller board.



As soon as the test G code starts machine functions will test with order

1. Vacuum pump stage 1 start
2. Vacuum pump stage 2 start
3. Vacuum solenoid open (you will hear a change in the noise)
4. Head camera lights start
5. Bottom camera lights start
6. Vacuum solenoid close
7. Vacuum solenoid open
8. Vacuum solenoid open
9. Machine reference with order Z, X, Y
10. Vacuum pump stage 2 stop
11. Vacuum pump stage 1 stop
12. Vacuum solenoid close
13. Head camera lights stop
14. Bottom camera lights stop
15. Disable all motors

Test G code can be downloaded from openplacer.com

Attention: at step 9 machine will try to reference axis. if the axis direction is incorrect, machine will try to reference to the wrong direction. In this case, power of the machine immediately and change the related axis direction with the dip switch on the controller.

Attention: machine reference direction and order are

1. Z axis + (up)
2. X axis + (right)
3. Y axis + (back)

After test program it is recommended to upload the controller firmware (can be downloaded from openplacer.com)

6) Nozzle adapting

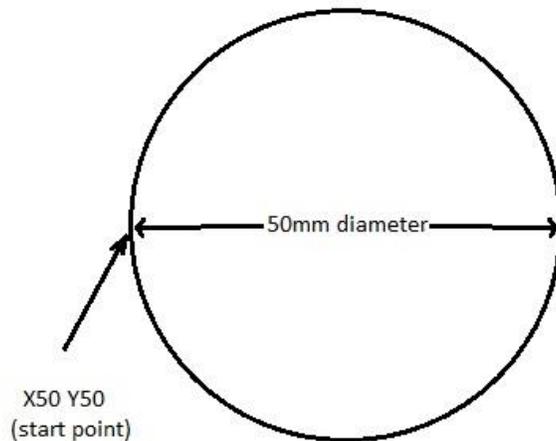
As a new nozzle is going to be used, nozzle adaptation needs to be made to obtain better parallelism and better holding power between the nozzle tip and PCB surface.

For nozzle adapting

- I. Place a blank PCB on the PCB tray (double sided tape is recommended to fix the PCB for this operation)
- II. Download nozzle adapting G code from openplacer.com
- III. Make sure the firmware is uploaded on the machine (not test firmware)
- IV. Start repetier host and connect to the machine

Nozzle adapting G code will go to a specified location, lower the nozzle as the nozzle tip will slightly press the PCB surface, and draw a 50mm diameter circle on the PCB surface with rubbing the tip. This operation grinds nozzle tip and will give a parallel tip finish.

Attention: at the G code "X50 Y50" coordinates are the starting point of the circle and 50mm diameter is at X axis. Please be sure this area is in the PCB limits. A video of nozzle adapting is at [OpenPlacer YouTube channel](https://www.youtube.com/channel/UC...)



Attention: at the adapting G code Z level is determined as "Z-13" this level differs with PCB thickness, Double sided tape thickness, A axis motor type, Nozzle being used. To re determine this Z level operator may use repetier host software. At the repetier host software connect the machine, with manual control tab go over the PCB surface, enter G code "G1 S1" (this will allow the software to go negative Z) and enter G code "G0 Z-10", "G0 Z-11", "G0 Z-12"

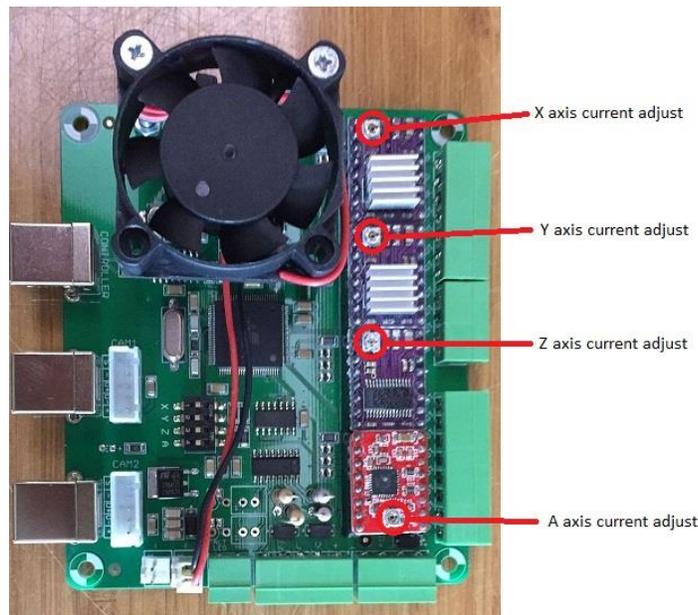
As soon as the tip of the nozzle touches PCB surface go down a millimeter more and this will be your Z level. Modify the G code Z level.

Attention: after adapting nozzle it is necessary to clean the nozzle

V. Start the G code

This will rub the tip of the nozzle on the blank PCB surface several times and grind the tip to a parallel surface.

Attention: this operation takes time and is a good change to observe the motor currents. Motor currents needs to be set as the motors should not get too hot, and enough for the acceleration and speed moves. As this operation will take time you can observe the current with checking the motor heat up.

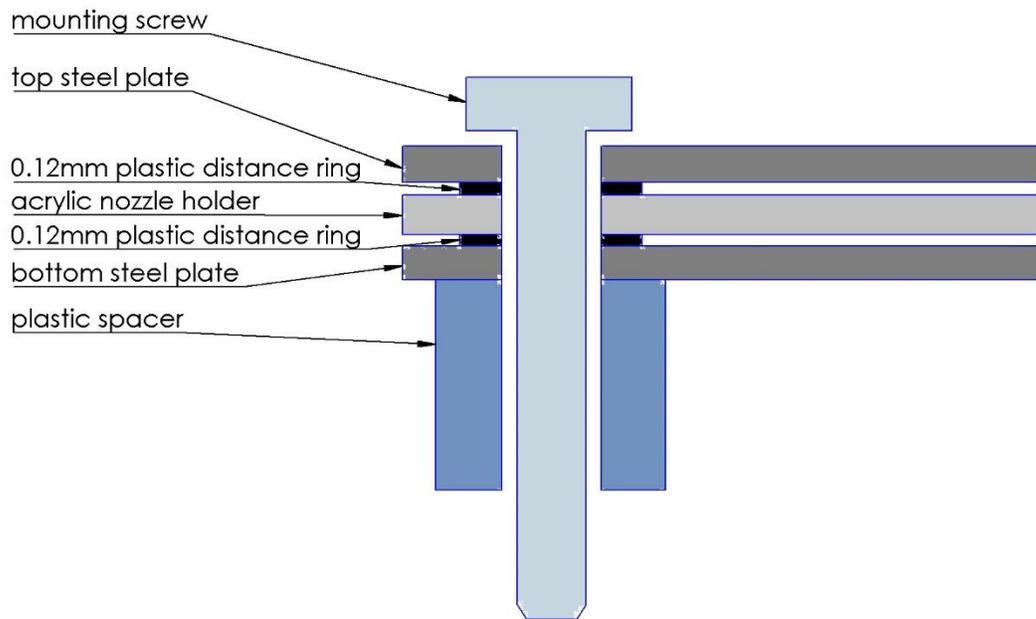


7) Calibration

As the machine references its axis positions by X, Y, and Z Home switches, some parts need to be precisely calibrated. These parts are nozzle, top camera, bottom camera, PCB tray, and after each change feeders. Please refer the calibration manual for detail.

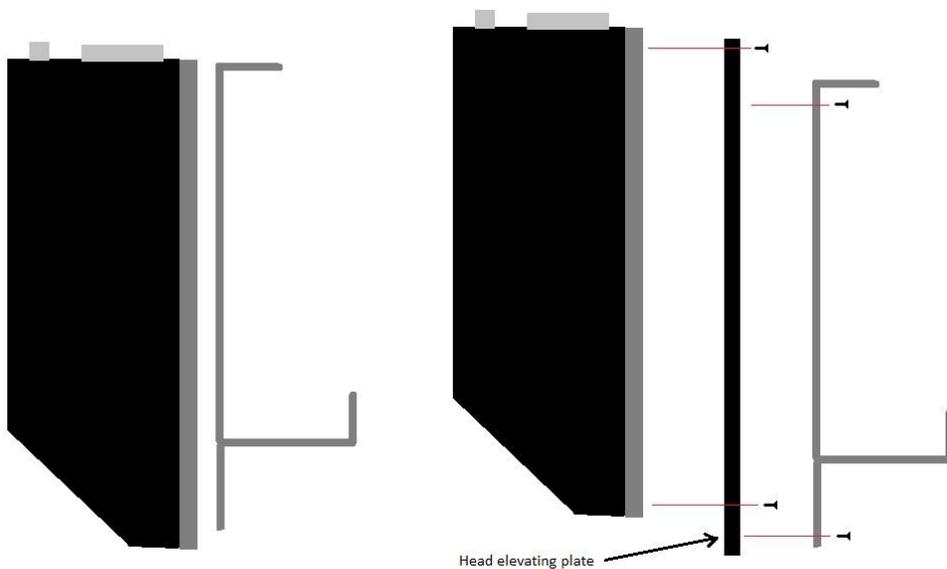
8) Nozzle changer mounting

Nozzle changer consists of top and bottom steel plates (2 pcs) for a rigid structure, acrylic nozzle holder (1 pcs) to suit nozzle, tension springs (8 pcs) to hold the nozzle in place, 0.12mm plastic distance rings (12 pcs) for providing a free movement space between steel plates and plastic distance cylinders (6pcs) to provide a free space for the nozzle tips. All nozzle changer magazines come partially assembled. A assembling order schematic is:



Mounting the lifter part for head:

To make space between the nozzles in the nozzle changer and head a lifter plate is included in the nozzle changer package mounting schematic is explained in the diagram



Necessary screws are also in the nozzle changer package. This plate will lift the head up and will create spacing between back sides of nozzles installed in the changer and head.

Attention: recalibration is required for nozzle and head camera after installing the lifter plate

Software side of the nozzle changer will be published at openplacer.com

To Be Continued