Introduction

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μDelta introduction

μDelta is developed by eMotion Tech. This new 3D printer is easy to assemble and to operate without loss of performances.

Data sheet:

DATAS

- Printing surface Ø110 x 190mm
- Layer height [0.1 - 0.35]
- Electronic type Teensylu + 4 Stepsticks (integrated firmware)
- Motors NEMA 17
- Belt Type GT2
- Extrusion Head Hexagon 0.4
- Dimensions : Height 440mm Width 250mm Depth 250mm
- Nominal printing speed 70mm/s
- Max speed 200mm/s
- Nominal speed 130mm/s
- Average precision 100 microns
- Average precision (Z) 50 microns
- Operating system Windows™ XP, Windows™ Vista, Windows™ 7+, Ubuntu 12+
- Consumable PLA 1.75mm
- Provided with Repetier preset for μDelta
- Connectivity USB
- Power supply provided yes, 12V 120W

STRUCTURE

- Laser cut Acrylic 5mm
- Extruder core printed in ABS with 0.2mm layer height
- Smooth rod 8mm
- Manufactured Plate plywood 12mm
ERGONOMY

Easy to mount: A 3D printer kit with an intuitive assembly

- Simple electronic, no soldering
- Easy wiring and assembly
- Belt adjustment with ergonomic belt tensioners

Easy to calibrate: A simplified software

- Fully software calibration
- Pre-configured open-source software (no firmware upload required, Repetier Host and Slic3r pre-configured)

Easy to maintain

- Quick height adjustment with the software

OPTIMISATION AND UPGRADE

You can improve the µDelta by adding the following option (soon available on eMotion Tech website):

- Spool holder with fan
- LCD screen controller to print without computer
- Lighting with circular LED
- Heated bed
Safety instructions

General safety instructions

ALWAYS HAVE ADULT SUPERVISION WHEN USING THE PRINTER.

The nozzle can reach 270°C, TO AVOID BURNING, DO NOT TOUCH THE NOZZLE WHILE THE PRINTER IS WORKING.

KEEP THE PRINTER AWAY FROM CHILDREN AND ANIMALS.

OPERATE IN A VENTILATED ROOM. Plastic fumes effects are not known. In case of use in a closed room we recommend the use of an extractor fan.

The addition of protections is your responsibility. Safety can be improved by:

- An emergency stop button
- Housing protection
- Smoke detector

CE marking

µDelta is a 3D printer kit. It includes all the parts you need for assembling but does not include additional protections.

Electrical safety.

The power supply provided is labelled CE. The Power supply is protected against short-circuit and do not need any modifications. The µDelta operate at voltage of 12V and is not concerned by the low voltage directive.

Further information

Information above are not exhaustive.

We used sources of information we consider as reliable. However, we cannot guarantee that all these information are true and complete.

We assume no liability for loses, injuries or damages due to assembly, transporting, storage, use, assembly, transporting or removal of the product.
ASSEMBLY
Bill of materials

A. Printed parts

1x Core
12x rod clamp
1x filament guide

B. Acrylic parts

Acrylic parts can be covered with protection and it may remain pieces of plastic. Remove it before use.

We provide additional parts.

1. Tensioner

6x eM 1
6x eM 2

2. Slider

6x eM 3
6x eM 4
6x eM 5

3. Motor holder

3x eM 7
6x eM 6

4. Extruder

2x eM 8
1x eM 9
1x eM 10

2x eM 11
1x eM 12
1x eM 13
C. Smooth rods and connecting rods

- 6x Ø8x400mm smooth rod
- 6x Connecting rod

D. Mechanical parts

- 9x Linear bearing
- 1x Spring
- 3x 624 ball bearing
- 1x 604 ball bearing
- 1x drive wheel
- 3x GT2 Belt
- 3x GT2 Pulley

A. Screws, nuts and washers

- 6x M3x10mm screw
- 14x M3x20mm screw
- 20x M3x25mm screw
- 15x M3x30mm screw
- 11x M3x50mm screw
- 4x M4x25mm screw
- 6x M2.5x16mm screw
- 3x Wood screw
- 61x M3 nut
- 4x M3 wing nut
- 8x M4 nut
- 6x M2.5 nut
- 76x Ø3mm washer
- 7x Ø4mm small washer
- 5x Ø4mm big washer
- 1x M4 Nylstop nut
- 8x M3 grub screw

We provide more Screws, nuts and washer than necessary.
B. Electronics

1x Teensy

4x Nema 17 motor

3x endstop

2x Fan 3x3

4x stepstick

1x Power supply

C. Additional parts

1x inferior frame

1x superior frame

1x Print bed

1x Ø4xM6mm pneufit

1x Ø4x 1/8” pneufit

1x braided sleeve

1x PTFE tube

30x Zip tie

3x pad

1x adhesive tape
D. Hexagon kit

- **1x Hexagon hot end**
- **1x Thermistor**
- **1x cartridge heater**
- **1x Hex key 3**
- **1x Wrench 4.5**

A. Options

*Parts of the following section are not included in the basic µDelta kit. You can find them on eMotion Tech website.*

- **1x Spool holder frame**
- **3x Chock**
- **1x 6x6 fan**
- **8x Spool holder clamp**
- **4x Ø8mm rod**
- **4x 608 ball bearing**
- **16x M3x20 or M3x25 screw**
- **16x M3 nut**
- **1x LED**
Tools

- Mallet
- Slot screw driver
- Philips screw driver
- ceramic screwdriver
- Wrench 5.5 and 7
- Wrench 4.5 (provided)
- Hex key (provided)
- Long nose pliers
- Cutting pliers
- utility knife
- Meter
Mechanical assembly

A. Bottom assembly

1. Inferior frame

- **1x** Inferior frame
- **6x** Ø8x400mm smooth rod
- **1x** Print bed
- **3x** Wood screw

Use a mallet to insert **completely the rod without exceeding the plate.**

Smooth rods must be normal to the inferior frame.
2. **Tensioner**

- 6x eM1
- 6x eM2
- 3x 624 ball bearing
- 3x M3x50 screw
- 3x M4x25 screw
- 3x Ø3mm washer
- 3x Ø4mm big washer
- 6x Ø4mm small washer
- 3x M3 nut
- 6x M4 nut

Repeat this operation for each corners
Acrylic parts can be covered with protection and it may remain pieces of plastic. Remove it before use.
Nut *at the end of the screw*

eM 1 « inside »

eM 2 « top »
Tighten nuts moderately to avoid breaking Acrylic parts

You can add a drop of glue to maintain the nut on position

M4 nut
Tighten moderately

Tighten against the washer
Repeat the operation for the others tensioners.
3. Sliders

- 6x eM3
- 6x eM4
- 6x eM5
- 12x Zip tie
- 9x Linear bearing
- 3x M3x30 screw
- 3x M3 nut

Assemble all sliders in the same way.
After tightening the screw, eM3 parts may move, it is not a problem.

Insert linear bearings as shown
Insert a zip tie in each hole. Tighten the zip ties to fasten the slider.

The four fixations must be on the same side than the two linear bearings.

This bearing must be centered.

This bearing must not exceed the slider.
B. Top assembly

1. Motor holder assembly
   - 3x eM7
   - 6x eM6
   - 1x Superior Frame
   - 3x Nema 17 motor
   - 3x GT2 pulley
   - 3x Endstop
   - 1x Ø4x 1/8” pneufit
   - 12x Rod clamp
   - 1x Filament guide
   - 6x M2.5x16 screw
   - 6x M3 grub screw
   - 6x M3x10 screw
   - 6x M3x20 screw
   - 12x M3x25 screw
   - 6x M3x30 screw
   - 6x M2.5 nut
   - 18x M3 nut
   - 30x Ø3 washer
Make sure to insert the superior frame correctly.
The frame must easily slide. Do not use the mallet to insert it.

Use these holes to be sure the frame is in the right direction.

Top view

Filament guide
The side with the big hole is the upper side.

Ø4x 1/8" pneufit
Tighten moderately

Pneufit hole

10mm
Be careful, the following step is very important!

You have to compare the wire length of the three endstops:

- If the 3 wires have the same length, this information may not apply to you. Go to the next page.
- If you have 2 wires longer, you have to use this endstop for the motor holder shown below.
To improve the visibility we do not represent endstop wires.

You must assemble the endstop as shown in the left figure.

Push the endstop on the left when you tighten it.

Inside

Outside

Tighten moderately

M2.5 nut

M2.5x16 screw

M2.5x16 screw

M2.5 nut

You must assemble the endstop as shown in the left figure.
Mechanical assembly - Top assembly

- **M3x20 screw (x2)**: Tighten moderately
- **Rod clamp (x4)**
- **M3x30 screw (x2)**: Position without tighten
- **M3 nut (x6)**
- **Ø3 washer (x6)**
- **M3x25 screw (x2)**: Tighten moderately

Make sure of positioning the rod clamp correctly.

Wire hole

Front view
Check that the slider switches the endstop:

You must hear a “CLICK”

If the slider doesn’t switch the endstop there are two solutions:

You have to push the endstop on the left when you tighten it.

You have to disassemble and assemble the endstop properly
Plug the motor cable
The cable can be plugged in only one direction.

Position wires on the edge
Put the endstop wires through the hole

Motor

M3x10 screw
Position without tighten

Ø3 washer

M3x25 screw
Position without tighten
Position the pulley at the end of the shaft, in the right direction.

Tighten the grub screw

Grub screw (if you can, choose a long one)
2. **Superior frame fixation**

- 6x M3x30 screw
- 12x Ø3 washer
- 6x M3 nut

---

*This operation is essential. This will influence your printing quality*

Measure the distance between the bottom of the inferior frame and the top of the superior frame. *This distance must be 388mm for each smooth rod.*
Once the frame is well positioned, tighten moderately the screws in the order below.

Repeat this operation for the other rods. The height of the frame must be the same for all the rods.

At the end of this step check the height of each rods.
3. **Extruder assembly**

- 2x eM8
- 1x eM9
- 1x eM10
- 2x eM11
- 1x eM12
- 1x eM13
- 1x 604 ball bearing
- 1x Drive wheel
- 1x Spring
- 1x Nema 17 motor
- 4x M3x25 screw
- 2x M3x20 screw
- 1x M4x25 screw
- 1x M3x50 screw
- 4x M3 nut
- 2x M4 nut
- 1x Nylstop nut
- 1x M3 Wing nut
- 7x Ø3 washer
- 1x Ø4 small washer
- 2x Ø4 big washer

Tighten **Firmly**
Position the M4 nut of the M3x50 screw between the two eM8. Position the M3 nut into the eM8 “back”.

At the end of the step, the screw can move slowly.

Position wires on the edge.

Assembly realized previously.

Nylstop nut: This side against the motor.

M3x25 screw (x2)
Ø3 washer (x2)
Nylstop nut
M3 nut

Nylstop nut

Nylstop nut
M3 nut

eM 9
M3 nut
eM 10

eM 8 «back»
eM 8 «front»
Mechanical assembly - Top assembly

- **Ø4 small washer**
- **M4 nut**
  - Tighten *moderately*
- **M4x25 screw**
- **Ø3 washer**
- **M3x25 screw**
  - *Tighten*
- **Wing nut M3 on the end of the screw**
- **Spring**
- **Ø4 big washer (x2)**
- Position the hollow of the drive wheel in front of the eM9
  - *Tighten the M3 grub screw*
M3 nut
Place in the nut hole

M3 nut
Nut hole

M3 x 25 screw
Tighten moderately

Ø3 washer (x4)

M3 x 20 screw (x2)
Tighten moderately

Screw holes
C. Belt positioning.

- **3x** Belt
- **18x** Zip tie
- **3x** Ø3 Washer
- **3x** M3 wing nut

Fasten one end of the belt with a zip tie. Position the zip tie as close as possible to the slider.
Once the wing nut is positioned, push the tensioner through the nut.
Fasten the free end of the belt and fix it with a Zip ties.

Make sure the belt is slightly tight.

Tighten the wing nut to tight the belt.

Repeat the operation with the others sliders.
Core

A. Core assembly

- 1x core
- 1x Hexagon 1.75 kit
- 2x 3x3 Fan
- 6x M3x20 screw
- 4x Ø3 washer
- 1x Ø4xM6mm pneufit
- 3x Zip tie

Untighten the central pipe
(key provided)

Use a screwdriver to make it easier
Tighten the central pipe

Use a screwdriver to make it easier

(Not provided)

Tighten the nozzle

It must not have space between the head and the nozzle
If you cannot insert the cartridge heater, file slightly the 6mm hole.

Insert the resistor
Wires must be on the same side than the thermistor hole.

Tighten with a M3 grub screw
Be careful! If the thermistor goes out of the hot end, your printer could be damaged.

You can use a drop of high temperature silicone to maintain the thermistor into the hot end. (Not provided)

Fasten the cables to the hot end with a zip tie. (do not position it too high)

The zip tie must be positioned around the Hexagon
Unscrew the filament guide

Screw the Ø4xM6mm pneufit
Put the cables through the wire hole.

If you have LED put the cables through the hole.
Hexagon Position against the core before screwing

M3x20 screw (x2) Tighten moderately

This side must be oriented toward the hot end
Place the wires of the fan on the same side than the resistor wires

Tighten Moderately
B. LED (optional)

Parts of the following section are not included in the basic μDelta kit. You can find them on eMotion Tech website.

- 1x LED
- 2x Zip ties

Position LED using an alternating tightening to center it.
C. Connecting rods positioning.

- 6x Connecting rod
- 18x M3 nut
- 6x M3x50 screw
- 12x Ø3 washer

Check this nut is tighten.
You can add glue to maintain the assembly.

M3x50 screw
Connecting rod
M3 nut

Tighten firmly
The assembly must not twist the slider.

Repeat the operation with the other sliders and for the core.
Finishing

- 1x PTFE tube
- 8x Zip tie
- 1x braided sleeve
- 3x pad
- 1x adhesive tape
- 1x M3x50 screw
- 1x M3 nut
- 1x Ø3 washer

Push the cables and the PTFE tube through the braided sleeve

Fasten the cables with zip ties

Fold the braided sleeve to improve the appearance

PTFE tube length must be 35cm. cut carefully the end of the PTFE tube if they are flattened

Push the PTFE tube into the pneufit

Push the PTFE tube into the pneufit
Finishing - Connecting rods positioning.

You can bend the screw to reduce strain in PTFE tube.

This screw prevent the sleeve from blocking the end stops.
Fasten the braided sleeve to the core with zip ties.
Stick the three pads under the inferior frame.
Remove the dust

Cover the bed with adhesive tape

Cut the adhesive tape with a utility knife
Electronics assembly

A. Teensylu

- 1x Teensylu
- 4x M3x25 screw
- 8x M3 nut
- 4x Ø3 washer

You must position the teensylu as shown on this image.

M3x20 screw (x4)

Ø3 washer (x4)

M3 nut (x8)
Tighten moderately
B. Connections

Wiring is detailed in the next page.
4. **Stepsticks**

- Make sure that you have 12 jumpers connected to the teensylu.
- Be careful: The orientation is very important! (A wrong connection of the stepstick could cause permanent damage.)
- Plug the stepstick according to the illustration.
- Make sure the flat is positioned as shown in the image.
5. **Endstops**

Plug the endstops according to the illustration below. The endstops can be plugged in only one orientation.

If you cannot plug the endstop, we provide extensions.
6. **Motors**

Plug the motors according to the illustration below. The motors can be plugged in only one orientation.
7. **Cartridge heater.**
Screw the cable of the cartridge heater.

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8. **Thermistor**
Plug the thermistor.

---

9. **Fans**
Plug the fans according to the illustration below. The fans can be plugged in only one orientation.
10. **USB and power supply**

Plug the USB cable and the power supply.
Annex 1: Spool holder

A. Assembly

Parts of the following section are not included in the basic µDelta kit. You can find them on eMotion Tech website.

- 4x Ø8mm rod
- 4x 608 ball bearing
- 1x 6x6 fan
- 3x Chock
- 1x Spool holder frame
- 20x M3x20 or M3x25 screws (both can be used)
- 20x M3 nut
- 8x spool holder clamp
Annex 1: Spool holder - Assembly

- Fan
- The side with the label oriented downward
- Screw
- M3 nut
- Chock
B. Connections

Plug the fan and the LED according to the illustration below. They motors can be plugged in only one orientation.
CONGRATULATION