

## BOM

HXM delta printer, build with mechanical parts of the Fisher delta.

Complementary Bill Of Material, parts needed in extra of the Fisher parts

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Screw length are given for wood panel thickness of 18mm

Note that screw length is cylindrical length only for hex, flat, domed, .. head screws, but is total screw length for countersunk head screws

In some cases, you shall either make a recess in the panel, or use cutted screws

Part	Qty	Usage
Fan Sunon Maglev 25x25x10, 5V, 5m3/h	2	hotend fan + part fan
Low forward voltage diode, SB340	2	secure the fan power supply, other solution remove board LED
Cable dupont 4 pins M/F	1	Prolonge 1 motor wire
Molex female connector , 2 pins	1	5V connection on board
Molex female connector , 2 pins	1	Connect controlled fan on board – use only 1 wire
Molex male connector, 3 pins	1	Connect fixed fan on existing loom – could be replaced by soldering
Male/female junction with 100mm wires, JST	2	connect effector sensor and adjustable fan on hotend side
Eyed insulated terminal	2	connect effector sensor standoff. Existing not usable because insufficient clearance
'Bootlace' Ferrules , small size	8	connect the fans on screw terminals
Wire pair , 600mm	2	Adjustable fan and effector sensor connection
JST plug pair or M/F dupont cables, 2 wires	2	Connection of the calibration sensor and of the controlled fan on Effector
Prepared cables for fan, with dupont terminals	2	Fan plugs on effector
Screw terminal block x 2	2	Fan connection to 5V
Textile sleeve 500 mm	1	Effector cables maintain
Fiber gasket 20/27 (3/4") thickness 1.5mm	1	Hotend insulator
Threaded rods M5, length 1m	2	triangle, cuts 3x225, 3x214
Threaded rods M3, length 1m	2	arms 6x40, 6x147
Nuts M5	24	
Washer M5, small	24	triangle rods
Screw M4x80, countersunk head	3	Tensioner screw
Screw M4x50 domed head	6	bottom attach rod locks
Screw M4x30	6	bottom support attach to wall
Screw M4x30	2	Top attach motor support
Screw M4x30	2	Top attach extruder
Washer M4, small	3	Tensioner screw
Washer M4, large		
Screw M3x40, flat head	12	Motor attach
Screw M3x30, flat/hex head	3	carriage lock
Screw M3x25, countersunk head	3	tensioner bearing shaft
Screw M3x15,flat head	4	extruder plate attach

# BOM

Part	Qty	Usage
Screw M3x12 domed head	6	kinematic cylinders
spacer 10~15mm (cut aluminium tube)	4	Board support
Nuts M3	salvaged	
Washers M3, Medium	25	
<b>Extruder bolts and nuts</b>		
Screw M3x35, countersunk head	3	Motor attach
Bolt M3x40	2	Tensioner
Screw M3x25, hex head	1	Main gear axis
Bolt M3x20, countersunk head	1	Bearing axis
Bolt M3x20, countersunk head	1	Lever axis
Screw M3x20, countersunk head	1	Motor attach
Washers small M3	8	
Washer medium M3	1	1st washer on main gear
<b>Stainless steel bolting for the hotend</b>		
Bolt M3x35, countersunk head, <b>Stainless steel</b>	4	Hotend attach
Washers M3, Medium, <b>Stainless steel</b>	10	
Wood screw 4x20		
Wood screw 4x25		
Nylon wire resistance 10 kg (needed ~3m)	1	arms tension
Rubber band (tube)	salvage	effector maintain
bowden tube	0.25m	filament inlet
Aluminium sheet 150x200 thk 8/10	1	board cover
Buildtak diameter 203mm	1	printing surface
<b>Options</b>		
fan 40x40x7, 5V	1	board cooling
DC/DC 24 to 12V supply, for independent supply	1	to use 12V fans instead of 5V – safer
DC/DC 24 to 5V supply, for independent supply	1	
Flanged bearing F623	6	belt pulleys
High end SD card	1	To speed up transfer – could go up to 350 kB/sec
Note: it may be safer to use 12V instead of 5V fans, but you need a DC/DC converter 19V → 12V		
Take a lot of caution while wiring fans, 19V connection on 5V input will burn the board		
<b>Consumables :</b>		
400g of Filament	1	The base material
'Dremel' cutting disks	3	To cut M3 rods. M5 rods are sawed
<b>Melaminated chip boards, thickness 18mm</b>		
Panels dimensions are linked to the size of the printer, which is defined by the radius of the rod axis		

## BOM

Part	Qty	Usage
<b>For HXM 131</b> (usable space Diam 170x242)		
Side panel 150 x 500	2	
Back panel 340 x 500	1	
Top and bottom panels 320x370	2	
Extruder support plate 172x40, thickness 5mm	1	
<b>M5 and M3 rod lengths to be cutted</b>		
Rod M3x105	3	switch actuation (option)
<b>For HXM131/500</b> (usable space Diam 170x242)		
Measurement stick 172mm	1	
Rod M5x214	3	Bottom triangle
Rod M5x225	3	Top triangle
Rod M3x40	6	Arm, short side
Rod M3x147	6	Arms, long side (for arms L190mm)
<b>For HXM139/500</b>		
Measurement stick 188mm	1	
Rod M5x230	3	Bottom triangle
Rod M5x241	3	Top triangle
Rod M3x40	6	Arm, short side
Rod M3x161	6	Arms, long side (for arms L204mm)

## Weights

### Printed parts for HXM delta Printer (c) Pierre ROUZEAU - cc BY-SA

Weights in grams, time in minutes

Part	Weight		Time (total)		Comments
Tensioner	7		60	Layer 0.3	
base support	30		240	Layer 0.3	
motor support	20		150	Layer 0.3	
carriage	15		175	Layer 0.3	
rod joint	2		20	Layer 0.3	
	<b>74</b>	<b>222</b>			
hotend support	20		85	Layer 0.25	
effector	19		48	Layer 0.3	
		<b>39</b>			
arm links (6)	-	<b>8</b>		Layer 0.3	
extruder base	16		50	Layer 0.25	
extruder lever	7	-		Layer 0.2	
pinion	4	-		Layer 0.2	
gear	8		90	Layer 0.2	gears+lever common print
		<b>35</b>			
Extruder plate brackets	7	<b>7</b>	20	Layer 0.3	
Spool support	-	-		Layer 0.3	
Axis	-			Layer 0.3	
Spool ring	-	<b>30</b>	-	Layer 0.3	
			90		all spool
		<b>341</b>			
			15.30		

If printed on the Fisher in PETG, there is no point to print in layer 0.3, as the extruder cannot have sufficient flowrate at 80 mm/s, so you could print with layer 0.3 and reduced speed (~50mm/s) or with layers 0.25 at full speed (80 mm/s). Temperature shall be high, but you may face problems for parts with bridging or small area.

The hotend support shall absolutely be in plastic somewhat resistant to heat. PLA WILL melt.

The given times are for a hotend with long heat zone adapted for PETG printing.

Also, there is controlled cooling, which allow shorter cooling time and faster prints for some parts

For the fisher, printing time may be increased approximately by 20%