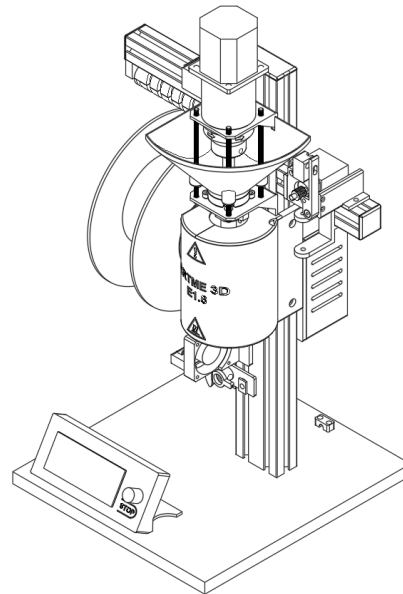


# Upgrade Original Desktop Extruder E1.5 to E1.6

## Assembly instructions

Original Desktop Filament Extruder E1.6 by ARTME 3D

Version 012.01.2022





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### **Required tools for this assembly section:**

Metal saw

Vise

## 1. Decide what kind of upgrade:

1. If you are satisfied with the previous extruder screw and barrel, then only the puller, winder and nozzles can be replaced: For easier starting, the use of different empty spools and clean winding. See chapter 3. The firmware must be updated in any case, see chapter 2..
2. Full upgrade with puller, winder, new extruder screw and tube: Allows easy starting, use of different empty spools, clean winding and easy change between different materials and pellet shapes. See chapter 4. The firmware must be updated in any case, see chapter 2.

## 2. Firmware update:

1. Go to <https://www.arduino.cc/en/software> and download the Arduino IDE software for your operating system.
2. Install Arduino IDE on your PC.
3. Download the documentation of the Desktop Filament Extruder E1.6 at [www.artme-3d.de/support](http://www.artme-3d.de/support).
4. Open the 08-Firmware folder and open the E1.6 folder.
5. Double click on the file "E1.6.ino".
6. Then Arduino IDE should open. If not right click on the file and select "open with". Then select Arduino IDE.
7. Connect the Arduino of the extruder to the PC. A USB cable was provided for this purpose. Make sure that the USB connector is oriented correctly.
8. It may take a moment for the PC to recognize the Arduino. If not, restart the PC or use a different USB port on the PC.
9. The extruder's power supply should be turned off. The extruder's display will start because it is powered by the USB line.
10. Click the "Tools" button in the top menu of the Arduino IDE and set the following parameters:
11. Select "Board" and then "Arduino Mega or Mega 2560".
12. Select "Processor" and then "ATmega 2560 (Mega2560)".
13. Select "Programmer" and then "AVRISP mkII".
14. Select "Port" and then "Arduino" or similar. If there is no plain text designation to choose from, select the port with the highest number.
15. Now the upload can start. To do so, click on the arrow symbol (arrow pointing to the right) under the upper menu bar.
16. At some point "upload complete" appears in the status bar below the program code. If an error message appears it is in most cases a problem with the connection. Make sure that Windows has recognized the Arduino on the USB port. Possible solutions can be
  - a. use another USB port on the PC

- b. restart the PC
  - c. use another USB cable
  - d. use another PC
  - e. If all this does not help, remove the electronics from the extruder and disconnect the Arduino from the Ramps board. (Be careful, you need a lot of power and the pins must not be bent. Only handle the electronics in a de-energized state.
17. If upload is successful, disconnect the Arduino from the PC.
  18. Put the extruder back into operation via the power supply.
  19. Overwrite saved settings by clicking on Main Menu - Control - Restore failsafe.
  20. Save the new settings: Main menu - Control - Store memory.
  21. Done.

### **3. Upgrade procedure WITHOUT replacing the extruder screw and tube:**

1. Buy upgrade kit ([www.artme-3d.de/shop](http://www.artme-3d.de/shop)) or get parts according to list (see chapter 5). Also print the necessary 3D printing parts. Download the documentation for the Desktop Filament Extruder E1.6 at [www.artme-3d.de/support](http://www.artme-3d.de/support). Print the following subfolders in the 05-3D Print Parts folder:
  - a. Spool-Drive-STLs
  - b. Filament-Guide-STLs
  - c. Filament-Puller-STLs
  - d. Sensor-Optical-STLs
2. Unscrew the two wing screws on the back of the extruder and the screws on the side of the insulation and remove the extruder unit and set it aside. If necessary, disconnect the connecting cables of the extruder motor and heating elements beforehand.
3. Remove the parts of the old filament guide rewriter.
4. Disassemble the filament fan and the sensor.
5. The documentation of the Desktop Filament Extruder E1.6 (download at [www.artme-3d.de/support](http://www.artme-3d.de/support)) Open the folder 03-Installation Instructions and edit it in the following order:
  - a. 01-frame mounting
  - b. 05-Spool drive assembly
  - c. 06-Filament guide assembly

- d. Then reassemble the extruder unit. To do this, reattach the extruder unit with the two thumbscrews and align the insulation and screw it tight to the side.
  - e. 08-Sensor assembly
  - f. 09-Puller assembly
6. Done! Please refer to the operating instructions in the documentation of the Desktop Filament Extruder E1.6 (download at [www.artme-3d.de/support](http://www.artme-3d.de/support))

## 4. Procedure upgrade WITH extruder screw and tube exchange:

Attention for this, in addition to the familiar tools, a hacksaw and possibly a vice are necessary.

1. Buy upgrade kit ([www.artme-3d.de/shop](http://www.artme-3d.de/shop)) or get parts according to list (see chapter 5). Also print the necessary 3D printing parts. Download the documentation for the Desktop Filament Extruder E1.6 at [www.artme-3d.de/support](http://www.artme-3d.de/support). Print the following subfolders in the 05-3D Print Parts folder:
  - a. Spool-Drive-STLs
  - b. Filament-Guide-STLs
  - c. Filament-Puller-STLs
  - d. Sensor-Optical-STLs
  - e. Extruder-Barrel-STLs: Only EB10 and if no longer available EB11
2. Unscrew the two wing screws on the back of the extruder and the screws on the side of the insulation and remove the extruder unit and set it aside. If necessary, the connection lines of the extruder motor and heating elements must be disconnected beforehand. Remove the insulation from the heating element and lay it aside.
3. Remove the parts of the old filament guide take-up.
4. Disassemble the filament fan and sensor.
5. The Desktop Filament Extruder E1.6 documentation (download at [www.artme-3d.de/support](http://www.artme-3d.de/support)) Open the 03 assembly instructions folder and edit in the following order:
  - a. 01-frame mounting

- b. 05-Coil drive assembly
- c. 06-Filament guide assembly
- d. Then reassemble the extruder unit. To do this, fasten the extruder unit again with the two wing screws. Reconnect the connecting cables. The insulation is not yet required and the lines must be disconnected again later.
- e. 08-Sensor assembly
- f. 09-Puller assembly
- g. 02-Extruder tube assembly: process the new extruder tube as described. (File)
- h. Now heat up the extruder (temperature depends on the material inside). Then run it with an empty hopper until almost nothing comes out of the nozzle.
- i. Then loosen and remove the nuts from the threaded rods on the extruder motor mounting bracket. Open and remove the thumbscrew on the back of the main frame that holds the extruder motor mounting bracket. Now you can disengage the motor from the coupling and pull it away upward by inserting a flathead screwdriver into the thrust bearing area and levering/turning. Lay the motor on its side. Be careful not to lose the key or pull on the motor cable.
- j. Now the extruder screw can be grasped at the coupling and pulled / turned out upwards. In case of problems, some force may be necessary to do this. If in doubt, heat up the extruder further so that the plastic becomes softer. Caution: There is a great risk of burns during the entire process. Wear protective gloves. After extraction, you can clean the extruder screw. Wait a short time until the screw cools down so that the plastic becomes tough and then you can remove the plastic. Start at the cold shaft. At the tip of the screw it cools down last.
- k. Now you can exchange the extruder screw for the new one.
- l. Unscrew the die (clean and change the filter if necessary).
- m. Switch off the heating and loosen the hose clamps on the heating elements so that they become loose. Loosen the connection lines. Pull the (still hot) heating elements with pliers still below from the tube and lay them on the side. Caution: There is a great risk of burns during the whole process. Wear protective gloves.
- n. Now you can install the new tube. To do this, loosen the clamping screw on the shaft holder. Loosen the grub screw on the shaft holder. Pull the old tube out downwards. Push the new tube into the shaft holder. Again, make sure that the grub screw fits into the groove provided for this purpose in the extruder tube. Then tighten it slightly. Then tighten the clamping screw on the shaft holder. (See also 02-Extruder tube assembly).
- o. The heating elements should now have cooled down. These must now be shortened. For alignment and length, see plan "CM03.1\_heating element" and "CM03.2\_heating element". These can be found in the 06-Mechanical Parts folder of the Desktop Filament Extruder E1.6 documentation (download at [www.artme-3d.de/support](http://www.artme-3d.de/support)). A hacksaw is required for this. It is best

to clamp the heating elements in a vise. Make sure that the wires of the heating cartridges and the sensor are not damaged. After sawing, the edges must be cleaned with a file.

- p. Now the heating elements and the extruder screw can be reinstalled. This is described in 02-Extruder tube assembly and 03-Extruder drive assembly. Please be sure to re-align the threaded rods and extruder screw.
- q. Then reinstall the insulation. See 07-Insulation assembly

6. Done! Please refer to the operating instructions in the documentation of the Desktop Filament Extruder E1.6 (download at [www.artme-3d.de/support](http://www.artme-3d.de/support))

## 5. Partlist Upgrade Kit

Number	Quantity	Name deutsch	Name english	Specs	parcel
Screws					
SC01	11	Holzschraube	wood screw	2,5x12 mm	1
SC02	3	Holzschraube	wood screw	3x25 mm	1
SC03	3	Zylinderschraube	cylinder head screw	M3x6	1
SC04	12	Zylinderschraube	cylinder screw	M4x10 mm	1
SC08	1	Sechskantschraube	hexagon screw	M5x70 mm	1
SC10	2	Hammermutter	hammer nut	M4, Slot 8	1
SC12	1	Sechskantschraube	hexagon screw	M10 x 50 mm	1
SC16	1	Sechskantschraube	hexagon screw	M5x40 mm (20mm thread)	1
SC20	6	Nutenstein	Slot nut	B Typ, 8mm, M4	1
Spare Parts					

SP01	1	Abdeckkappe	cap	30x30 mm	2
SP05	1	Zahnriemen	timing belt	GT2, 6mm x 500mm	2
SP06	1	Verbinder für Profil	connector for profile	90°	2
SP08	1	PTFE Schlauch-Stück	ptfe tubing-part	4x2x10mm	2
SP09	1	Draht für Sensor Arm	wire	0,6 x 210mm, V2A	2
SP14	14	Kugellager	ball bearing	4x13x5 mm	2
SP17	1	Pully	Pully	GT2, 6mm, 20 teeth, 5mm bore	2
SP18	2	Kugellager	ball bearing	10x26x8mm	2
SP19	1	U Kugellager	U ball bearing	FZ0463, 4x13x4 mm	2
SP20	1	Extruder Vorschubrad	Extruder feed wheel	12mm, 38 teeth	2
SP21	1	Druckfeder Puller	Compression spring puller	8x0,8x22 mm	2
SP22	1	Druckfeder Rasten	Compression spring snap	6x0,5x35 mm	2
SP23	1	Zugfeder Schwinge	Tension spring Swing arm	3x0,2x20 mm	2
SP24	1	PTFE Schlauch	ptfe tubing	6x4x630 mm	0
Motors					
MO03	2	Schrittmotor	stepper motor	Nema17, 39mm	0
Custom Metal Parts					
CM01.1	1	Extruder Rohr	extruder barrel	16x2x160 (12,15h7 innen)	3
CM02	1	Extruderschnecke geschliffen	extruder screw grinded	12,0h9 x 215 mm	3
CM04	1	Schlüsselfeile	warding file	square, 100mm long	3
Frame					
FR04	1	Aluminiumprofil	aluminium profile	30x30x120 mm	0
Extruder Barrel					
EB06.0	1	Düse mit M6 Gewinde	nozzle with M6 thread	Verschlussschraube M14x1,5 DIN 910, M6	4



EB06.1	1	3D Druckerdüse PLA/PETG	3D printer nozzle PLA/PETG	M6 thread, E3D-Style, with 1.7mm bore	4
EB07	1	Schmelzefilter	melt filter	16x100mm, Mesh 50 (0,3mm)	4
EB08	1	Teflonband	teflon tape	130mm	4
EB10	1	Zeichenschablone	sign template	stl	-
EB11	2	Klemme Schraubstock	clamp vice	stl	-
Spool drive					
SD01	1	Spulenhalterung	Spool holder bracket	stl	-
SD02	1	Abstandshalter	Spacer	stl	-
SD03	1	Spulenhalterscheibe	Spool holder disc	stl	-
SD04	1	Deckel Spulenhalter 1	Spool holder disc lid 1	stl	-
SD05	1	Motorhalter	Motor mount	stl	-
SD06	1	Motorhalter Deckel	Motor mount lid	stl	-
SD07	1	Riemenspanner	Belt tensioner	stl	-
SD08.1	1	Spulen Adapter 50mm	Spool adapter 50mm (option)	stl	-
SD08.2	1	Spulen Adapter 51mm	Spool adapter 51mm (option)	stl	-
SD08.3	1	Spulen Adapter 52mm	Spool adapter 52mm(option)	stl	-
SD08.4	1	Spulen Adapter 53mm	Spool adapter 53mm (option)	stl	-
SD08.5	1	Spulen Adapter 54mm	Spool adapter 54mm (option)	stl	-
SD08.6	1	Spulen Adapter 55mm	Spool adapter 55mm (option)	stl	-
SD08.7	1	Spulen Adapter 56mm	Spool adapter 56mm (option)	stl	-

SD08.8	1	Spulen Adapter 57mm	Spool adapter 57mm (option)	stl	-
SD08.9	1	Spulen Adapter 58mm	Spool adapter 58mm (option)	stl	-
SD08.10	1	Spulen Adapter 59mm	Spool adapter 59mm (option)	stl	-
SD08.11	1	Spulen Adapter 60mm	Spool adapter 60mm (option)	stl	-
SD09	1	Deckel Spulenhalter 2	Spool holder disc lid 2	stl	-
Filament Guide					
FG01	1	Zacken-Mitnehmer	hook left	stl	-
FG02	1	Zacken-Mitnehmer	hook rechts	stl	-
FG03.1	1	Schwinge für 0,7 bis 1kg Spulen	swing for 0.7 bis 1.0kg spools	stl	-
FG03.2	1	Schwinge für 2,5kg Spulen (Option)	swing for 2.5kg spools (option)	stl	-
FG04	1	Querstrebe 1	crossbrace 1	stl	-
FG05	1	Querstrebe 2	crossbrace 2	stl	-
FG06	1	Heber	lifter	stl	-
FG07	4	Schienen	Rails	stl	-
FG08	1	Schlitten Teil 1	sledge part1	stl	-
FG09	1	Schlitten Teil 2	sledge part2	stl	-
FG10.1	1	Spiralachse für 1,75mm Teil 1	Spiral axis for 1,75mm Part1	stl	-
FG10.2	1	Spiralachse für 1,75mm Teil 2	Spiral axis for 1,75mm Part2	stl	-
FG10.3	1	Spiralachse für 2,85mm Teil 1 (Option)	Spiral axis for 2,85mm Part1	stl	-

FG10.4	1	Spiralachse für 2,85mm Teil 2 (Option)	Spiral axis for 2,85mm Part2	stl	-
FG11	1	Achsenhalter rechts	axis holder right	stl	-
FG12	1	Raste Teil 1	snap part 1	stl	-
FG13	1	Raste Teil 2	snap part 2	stl	-
FG14	1	Pflug	plow	stl	-
FG15	1	Achsenhalter links	axis holder left	stl	-
FG16	2	Stopper	stopper	stl	-
Filament Puller					
FP01	1	Motorhalter Teil 1	motor mount Part 1	stl	-
FP02	1	Motorhalter Teil 2	motor mount Part 2	stl	-
FP03	1	Motorhalter Teil 3	motor mount Part 3	stl	-
FP04	1	Hebel	lever	stl	-
FP05	1	Scheibe	disc	stl	-
FP06	1	Filamentführung	filament guide	stl	-
Electronics					
EL21	1	Y Schrittmotor Kabel	Y stepper cable	4 pin for two Nema 17	5
EL26	1	Lüfterhalterung	fan holder	stl	-
Sensor optical					
SO01	1	Sensor Halterung	sensor holder	stl	-
SO02	1	Sensor Körper	sensor body	stl	-
SO03	1	Sesnorarm	sensor arm	stl	-
SO04	1	Sensor Blende	sensor shutter	stl	-
SO05	1	Biegehilfe	bending aid	stl	-
Tools					
TO01	1	Steckschlüssel	Tubular Socket Wrench	6x7mm	6

TO02	1	Steckschlüssel	Tubular Socket Wrench	8x9mm	6
TO03	1	Steckschlüssel	Tubular Socket Wrench	13x17mm	6
TO04	1	Innensechskantschlüssel	Allen key	1,5mm	6
TO05	1	Innensechskantschlüssel	Allen key	2mm	6
TO06	1	Innensechskantschlüssel	Allen key	3mm	6
TO07	1	Innensechskantschlüssel	Allen key	4mm	6