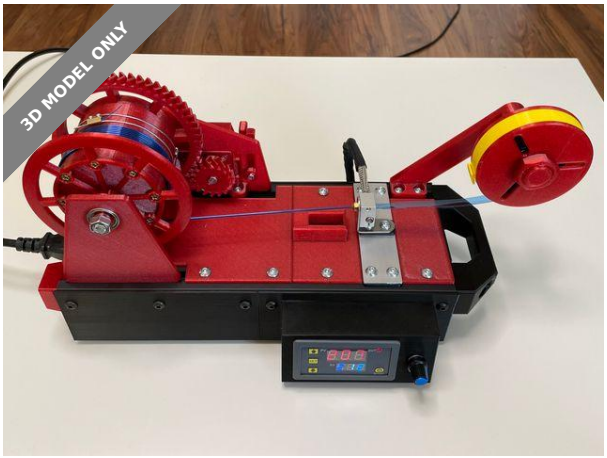

Compact PET Filament Machine

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VIEW IN BROWSER

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Summary

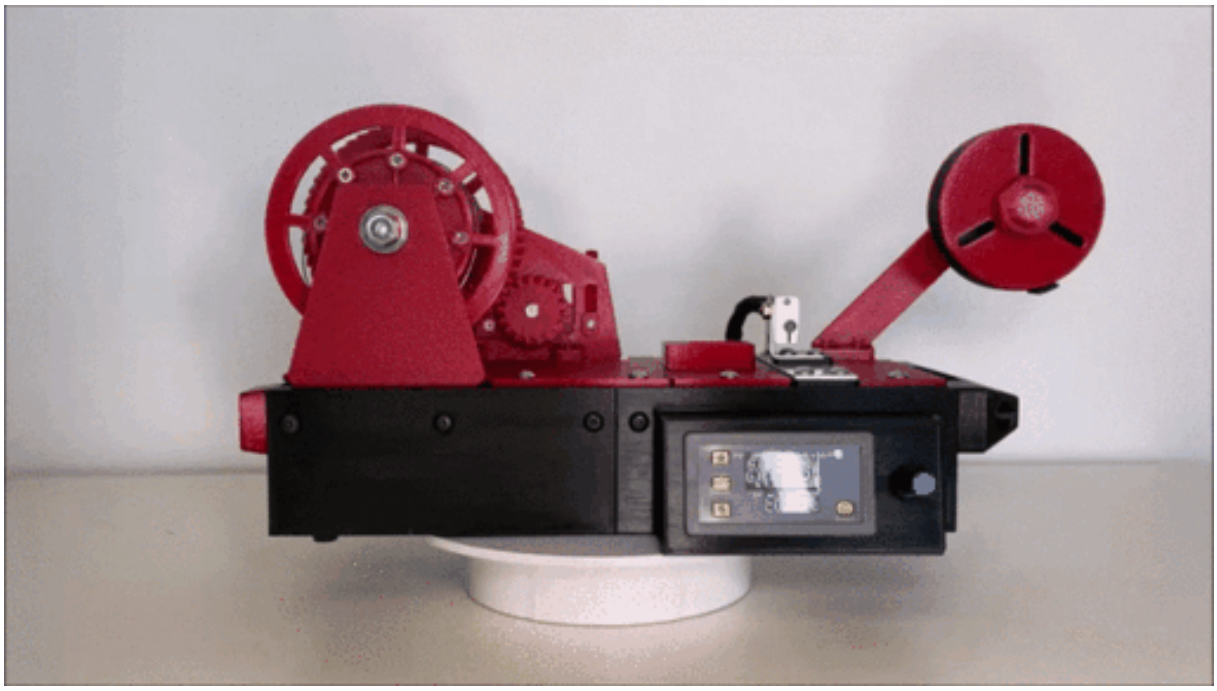
Compact machine to transform strip from PET bottle to filament for 3D printer.

3D Printers > Accessories

Tags: petfilament pet petbottle recycling

Overview:

After success of my firts PET Filament Machine I decided to build new one which will be more compact and neat.



Here you can see the new machine in operation:

Assembly Instructions:

Bottom:

1. Print and cleanup all printable parts
2. Install rubber feet to the bottom case
    - 4x Rubber Foot
    - 4x M3 Nut
    - 4x M3x8mm Screw
3. Joint the left and right bottom case together
    - 2x M3 Nut
    - 2x M3x8mm Screw
    - 2x M3 Washer
4. Install power supply
    - 2x M3x6mm Screw
    - 2x Washer
5. Prepare main socket and power switch module
    - Length of the wires should be about 18cm
    - Two additional ground wires will be connected to the Al profiles
6. Install main socket and power switch module
    - 2x M3x10 Countersink Screw
    - 2x M3 Nut
    - 2x M3 Washer
7. Prepare wired for motor speed controller and thermostat
    - (+)/(-) wires ... power supply → motor speed controller ... 45cm, AWG18
    - (+)/(-) wires ... power supply → terminal block ... 35cm, AWG18

    - (+)/(-) wires ... motor speed controller → motor ... 55cm, AWG18
    - (+)/(-) wires ... thermostat → terminal block ... 14cm, AWG18
    - 2x (+) wires ... thermostat → terminal block ... 18cm, AWG18
8. Connect cables to power supply
9. Cover terminal block on power supply with terminal cover
10. Connect cables to motor speed controller
11. Mount the motor speed controller to the base body
12. Glue the terminal holder with terminal blocks (5-port, 5-port, 2-port) to the base body with double side tape
13. Connect +/- cables from power supply to terminal block
14. Exchange K type thermocouple by smaller version (3x15mm)
    - Modify the back of thermostat case to connect thermocouple wires without tension
15. Connect cables to thermostat
16. Push the thermostat to the base body
17. Connect cables from thermostat to the terminal block
18. Install 40mm side panel fan and connect it to the terminal block
    - 4x M3x30mm Countersink Screw
    - 4x M3 Nut
    - 4x M3 Washer
19. Connect cartridge heater to the terminal block
20. Organize all cables
21. Cut threads into the Al profiles from side (if you want to mound side feet and handle)
22. Clear the paint/anodized surface to have good contact for ground wires
23. Mount the Al profiles into the body
    - 10x M5x12mm Screw
    - 10x M5 Nut + TNut_3030_M5
24. Connect ground wires to the Al profiles
    - 2x M5x10mm Screw
    - 2x M5 Nut + TNut_3030_M5
    - 2x M5 Big Washer
25. Mound side holders
    - 2x M5x12mm Screw
    - 2x M5 Nut + TNut_3030_M5
    - 2x M3x10mm Countersink Screw
    - 2x M3 Nut

Top:

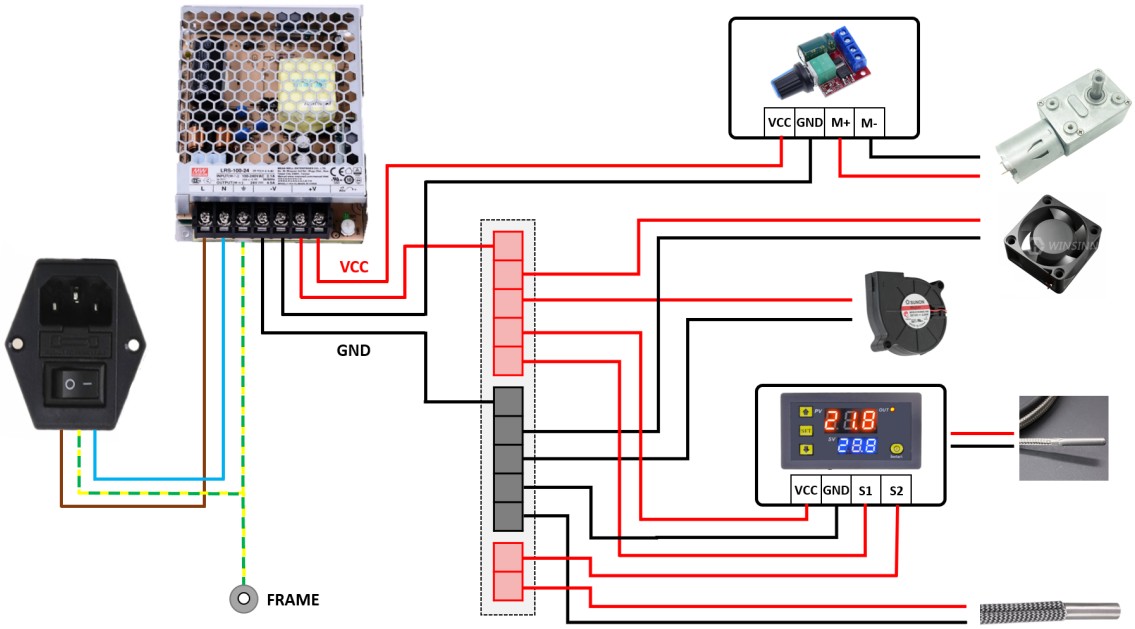
1. Screw big gear and spool side to the spool cylinder
    - 16x 3.5x20mm Screw
2. Install Cover Plate 1
    - 2x M5x12mm Screw
    - 2x M5 Nut + TNut_3030_M5

3. Push the bearings into Motor and Bearing Plates
    - 2x Bearing 608ZZ
4. Mount Motor and Bearing Plate (don't tight the screws)
    - 5x M5x12mm Screw
    - 5x M5 Nut + TNut_3030_M5
5. Mount motor
    - 4x M3x10mm Countersink Screw
6. Mount motor lock mechanism
    - 1x M3x15mm Screw
    - 1x M3 Nylon Lock Nut
    - 1x M3 Washer
7. Mount small gear to the motor
    - 1x M3x10mm set screw
    - 1x M3 Nylon Lock Nut
8. Install the spool
    - 1x 125mm M8 threaded rod
    - 2xM8 Nut
9. Glue together two parts of the fan mount
10. Screw the 4020 fan to the fan mount
    - 3x Nut M3
    - 3x Screw M3x25mm
    - 3x Washer M3
11. Install the fan mount to the body and connect the fan to the terminal block
    - 2x M5x12mm Screw
    - 2x M5 Nut + TNut_3030_M5
12. Assemble heater block holder and install heater block
    - 1x V6 Nozzle drilled 1.7mm
    - 1x V6 Heater block
    - 1x L-shape holder 30x30mm
    - 1x Al plate 110x30 mm
    - 6x M5x12mm Screw
    - 4x M5 Nut + TNut_3030_M5
    - 2x M5 Nylon Lock Nut
    - 2x M5 Washer
13. Install cartridge heater and thermocouple into the heater block
14. Assemble and install strip holder
    - 2x M5x12mm Screw
    - 2x M5 Nut + TNut_3030_M5
15. Install Cover Plate 2
    - 2x M5x12mm Screw
    - 2x M5 Nut + TNut_3030_M5
16. Connect motor to the speed controller
    In my case the polarity is opposite than indicated on the motor to have correct rotation direction. In case the direction is not as you want switch the polarity.

17. Mount motor cover
    - 4x M3x6mm Screw
18. Mount handle and feet
    - 4x M8x20mm Screw
19. Add steal cord
    - 1x Approximately 40 cm steel cord 1mm in diameter
    - 1x Screw terminal
    - 1x Clip for steel cord (can be substituted with screw terminal)
20. Wrap wires to motor and heater block (optional)
    - 2x Approximately 20cm of woven wire wrap 5mm diameter

Electronics:

Here is the schematic of the electronics:



Bill of Material:

- **Base**
    - 1x Bottom_Case_Right_EdgeCircles.stl (115g)
    - 1x Bottom_Case_Left_EdgeCircles.stl (93g)
    - 1x Side_Holder.stl (6g)
    - 2x Foot.stl (2x6g)
    - 1x Handle.stl (25g)
    - 4x rubber foot
    - 14x M3 Nut
    - 10x M3 Washer
    - 6x M3x8mm Screw
    - 4x M3x10 Countersink Screw
    - 4x M3x30mm Screw
    - 2m AWG18 red wire red

    - 2m AWG18 black wire black
    - 20cm of brown, blue, yelow/green wire
    - 2x ground connection
    - 2x Al profile 3030, length 300mm (Black 3030 Al profile or Silver 3030 Al profile)
    - 12x M5x12 Screw
    - 2x M5x10 Screw
    - 14x M5 Nut
    - 4x M8x20mm Screw
    - 2x M5 Big Washer
    - 14x TNut_3030_M5.stl
- **Spooler**
    - **Body**
        - 1x Motor_Plate.stl (25g)
        - 1x Bearing_Plate.stl (40g)
        - 1x Distance_Ring_1.stl (<1g)
        - 1x Distance_Ring_2.stl (<1g)
        - 2x Washer.stl (<1g)
        - 2x Bearing 608ZZ (i.e. Bearing 608ZZ)
        - 5x M5x12mm Screw
        - 5x M5 Nut
        - 5x TNut_3030_M5.stl
    - **Motor**
        - 1x Gear Reduction Motor with 8mm diameter and 25mm length D-shape shaft, 6 or 10 rpm, (i.e Gear Reduction Motor - Package A)
        - 1x Gear_17_Teeth.stl (8g)
        - 1x Set screw M3x10mm
        - 2x Nylon Lock Nut M3
        - 1x Motor_Mount_Front.stl (6g)
        - 1x Motor_Mount_Back.stl (6g)
        - 4x Screw M3x10mm (flat head)
        - 1x Motor_Mount_Lock_1.stl (<1g)
        - 1x Motor_Mount_Lock_2.stl (<1g)
        - 1x Motor_Cover.stl (28g)
        - 1x M3x15mm Screw
        - 4x M3x6mm Screw
        - 1x M3 Washer
    - **Spool**
        - 1x Gear_55_Teeth.stl (44g)
        - 1x Spool_Cylinder.stl (105g)
        - 1x Spool_Side.stl (20g)
        - 16x Screw 3.5x20mm
- **Cooler**
    - 1x Fan_Mount.stl (28g)
    - 3x Nut M3

    - 3x Screw M3x25mm
    - 3x Washer M3
    - 2x M5x12mm Screw
    - 2x M5 Nut
    - 2x TNut_3030_M5.stl
- **Heater Block**
    - 1x V6 Heater Block (i.e. V6 Heater Block)
    - 1x V6 Nozzle drilled to 1.7mm diameter (i.e. Brass Nozzle)
    - 1x L-shape Holder 30x30mm (i.e. L-shape Holder)
    - 1x Al plate 110x30 mm based on Heater_Block_Holder_Template.stl
    - 1x Heater_Block_Holder_Distance_1.stl
    - 2x Heater_Block_Holder_Distance_2.stl
    - 6x M5x12mm Screw
    - 4x M5 Nut
    - 2x M5 Nylon Lock Nut
    - 2x M5 Washer
    - 4x TNut_3030_M5.stl
- **Strip Holder**
    - 1x Strip_Holder.stl (28g)
    - 1x Strip_Holder_Washer_1.stl (12g)
    - 1x Strip_Holder_Washer_2.stl (10g)
    - 1x Strip_Holder_Nut.stl (3g)
    - 2x M5x12mm Screw
    - 2x M5 Nut
    - 2x TNut_3030_M5.stl
- **Covers**
    - 1x Cover_Plate_1.stl (40g)
    - 1x Cover_Plate_2.stl (12g)
    - 3x M5x12mm Screw
    - 3x M5 Nut
    - 3x TNut_3030_M5.stl
- **Electronics**
    - 1x Power Supply Mean Well LRS-100-24 (24V, 100W)
    - 1x Power Socket with Switch (i.e Power Socket with Switch AC-01A)
    - 1x DC Motor Speed Controller (i.e. Speed Controler 5A)
    - 1x Thermostat for K type thermocouple (i.e. Thermostat).
    - 1x K type Thermocouple 3x15mm (i.e. Thermocouple)
    - 1x Fan 4020 24V (i.e. 4020 Cooling Fan)
    - 1x Blower Fan 4020 24V(i.e 4020 Blower Fan)
    - 1x 50W Cartridge Heater (i.e Cartridge Heater)
    - 2x 5-Port Terminal (i.e Terminal Set)
    - 1x 2-Port Terminal (i.e Terminal Set)
- **Other**
    - 1x Power_Connector_Cover.stl (6g)

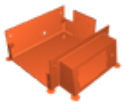
- 1x Terminal_Cover.stl (6g)
- 1x Terminal_Holder.stl (3g)
- 50cm Woven Wire Wrap 5mm diameter (i.e Woven Wire Wrap)

About 680g of filament is needed in total.

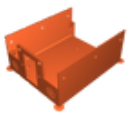
Accessories:
For cutting the PET strips from bottles you can use my Simple PET Bottle Cutter.
For storing PET strips you can use my PET Strip Spooler And Spool Holder.

Model files

Base 8 files



bottom_case_right_edgecircles.stl



bottom_case_left_edgecircles.stl

side_holder.stl

foot.stl

handle.stl

cover_plate_1.stl

cover_plate_2.stl

tnut_3030_m5.stl

Spooler

14 files

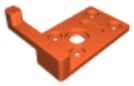
motor_plate.stl

bearing_plate.stl

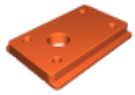
washer.stl

distance_ring_1.stl

distance_ring_2.stl



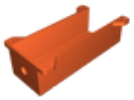
motor_mount_front.stl



motor_mount_back.stl

motor_mount_lock_1.stl

motor_mount_lock_2.stl

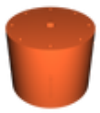


motor_cover.stl

gear_17_teeth.stl

gear_55_teeth.stl

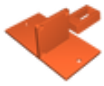
spool_side.stl



spool_cylinder.stl

Filament Cooler

1 file

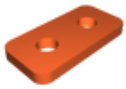


fan_mount.stl

Heater Block

3 files

heater_block_holder_template.stl



heater_block_holder_distance_1.stl

heater_block_holder_distance_2.stl

Strip Holder

4 files

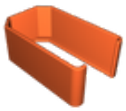
strip_holder.stl

strip_holder_washer_1.stl

strip_holder_washer_2.stl

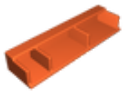
strip_holder_nut.stl

Electronics 3 files



power_connector_cover.stl

terminal_cover.stl



terminal_holder.stl

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