Composer 350, 3devo Filament Maker Standard Operating Procedure

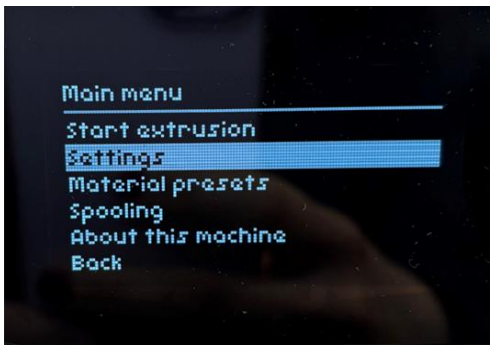
NOTE: Before reading this you MUST read the 'SOP - Energy and environmental impacts under normal, abnormal and emergency conditions' which is Mills group web site, https://www.profandrewmills.com/leaf-documents/. This addresses general energy and environmental impacts under normal, abnormal and emergency conditions considerations which you NEED to be cognisant of before conducting any experiment. If you identify anything in an SOP which can be improved, please contact the LO and PI to discuss the proposed change(s) before putting them into effect.

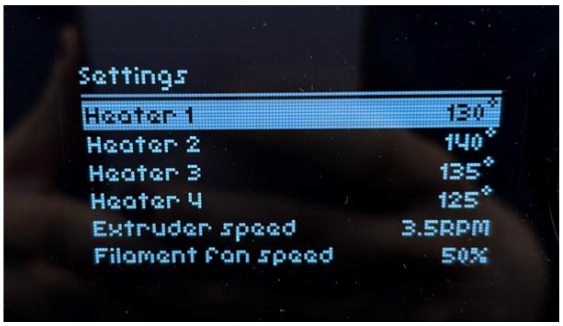
Composer 350, 3devo Filament maker is shown below.

1. Turning the filament maker on

Firstly, switch the mains plug on, and then press the on/off button on the back of the filament maker as shown below.

Once switched on the main screen will appear. Press and turn the black dial button to locate the main menu and navigate through the various settings including heating temperatures, extruder speed and filament diameter etc based on your desired filament requirements. To change a setting, rotate the button until your selection is highlighted. Push the button to select the value. Once done, push the button to confirm the value.





The main status screen below provides information about the extrusion process and the filament.

Temperatures of different heaters. The set temperatures are shown below the heater, the measured temperatures are shown above the heater

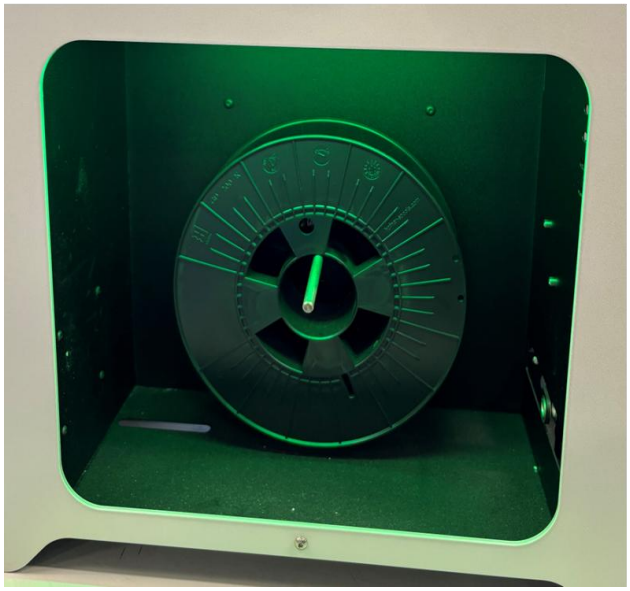
Displays the type of material chosen to extrude

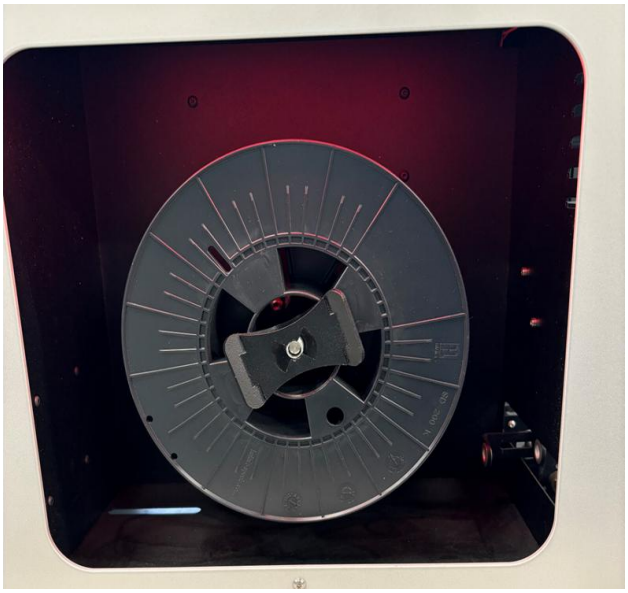
Desired filament diameter in mm

2. Loading the filament maker

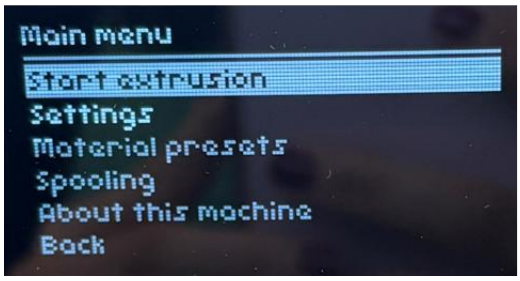
A plastic tube is placed over the feed hopper located on top of the filament maker to prevent the pellets from going everywhere. LDPE pellets (for cleaning) or pigmented pellets from the twin screw extruder are loaded into the feed hopper.

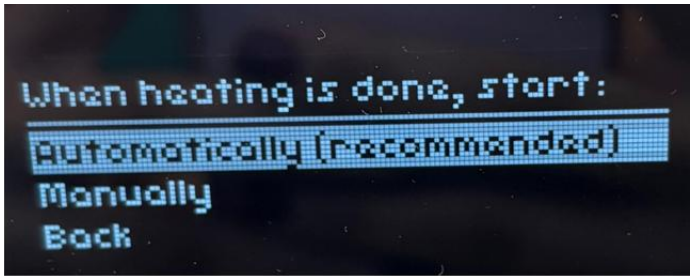
The feed hopper must always be filled with pellets even when not in use. When running, the extruded will light up green when the feed hopper is filled to the correct level. The feed hopper has a sensor so if the levels drop below a certain point the filament maker will beep and flash red. If the pellets remain low for too long the machine will stop extruding.





Once the pellets are loaded, locate the main menu and start extrusion. The following warning will appear, choose the automatic start setting as the extruder will then automatically start extruding once all the set points of the heaters have been reached.

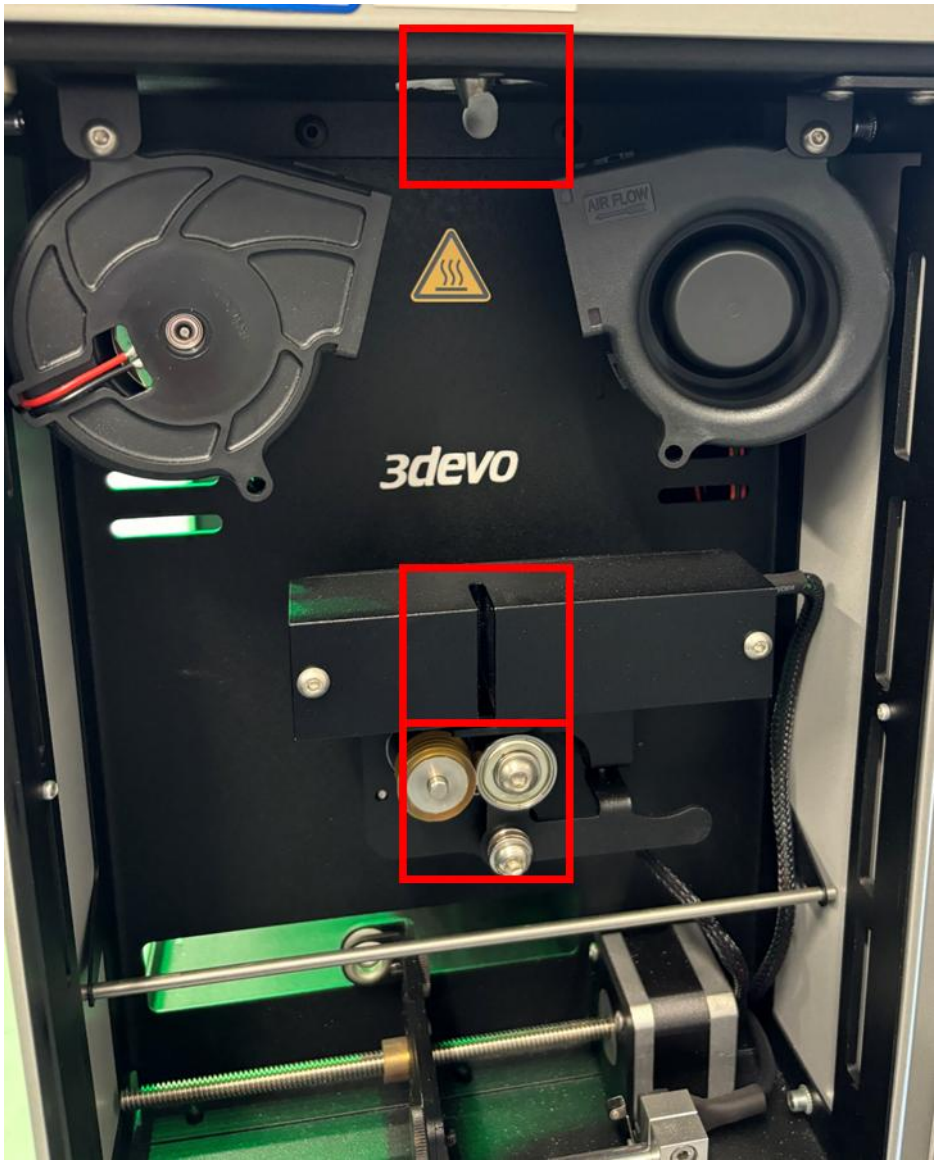




3. Extruding the filament

Red boxes indicate the nozzle, optical diameter sensor and puller wheels, respectively.

Firstly, check that the nozzle is clean. If not pull-out old filament with tweezers.



Gently pull the filament with tweezers from the nozzle, through the optical diameter sensor, which will adjust the filament to the desired diameter set, and then through the puller wheels.

After running for a few minutes, once the desired filament diameter has been reached, the filament can then be fed through the hole to the back and wound on the spool.

4. Typical operating conditions

Polymer	Temperature/ °C	Extruder speed/rpm	Filament diameter/ mm	Weight of pellets added/g	Length of filament produced/m
LDPE	Heater 1 - 90 Heater 2 - 125 Heater 3 - 135 Heater 4 - 145	3.5	1.75	40	20
PLA	Heater 1 - 170 Heater 2 - 190 Heater 3 - 185 Heater 4 - 170	3.5	1.75	40	20