Kühling&Kühling RepRap Industrial 3D Printer (Prototype)

Kühling&Kühling RepRap Industrial

Durable ABS prints without warping.
Heated build chamber.
Dual extruder printhead.
Super easy maintenance workflow.

This is our RepRap-based desktop 3D printer that can reliably print objects from **ABS plastic without warping** – a problem well known from many desktop-grade 3D printers and RepRap designs.

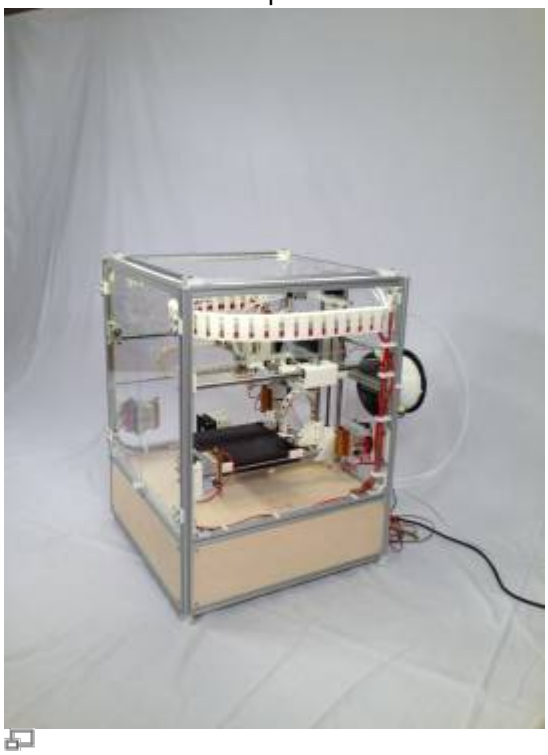
The “Kühling&Kühling RepRap Industrial” has a fully enclosed frame with powerful recirculating **chamber heaters** that raise the ambient air temperature up to 70°C. With minimized thermal stress the printed objects adhere flat to the build platform and allow for dimensionally accurate results.

Featuring **two extruders** this 3D printer can print with different nozzle diameters – printing the visible outer shell of an object in fine details while saving production time on the infill structure by using a bigger extrusion nozzle. Or you can do pretty two-color prints from equal tips.

The whole machine was **developed for productivity**, so you can expect minimal maintenance time for several recurring tasks like swapping filament, changing nozzle tips or levelling the build base. All sub-assemblies are easily accessible so you get the job done quickly.

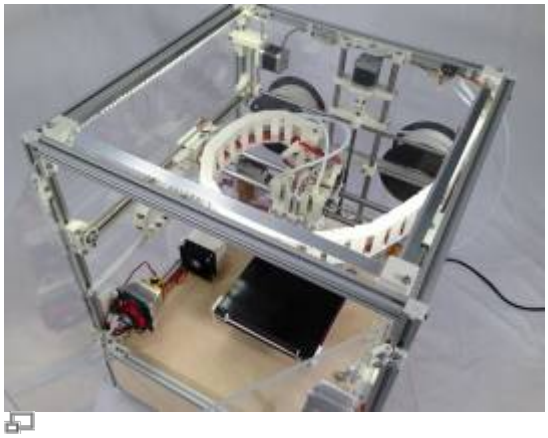
Front view

Front view - doors open

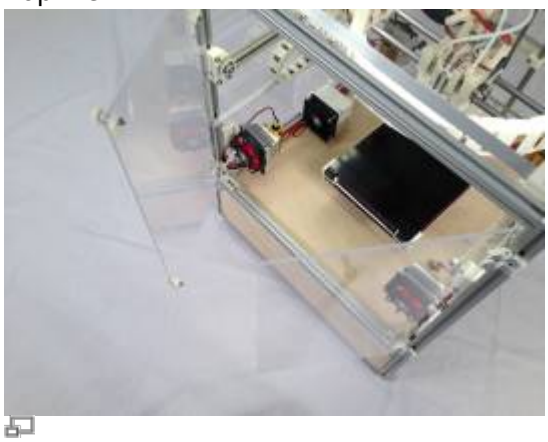


Side view

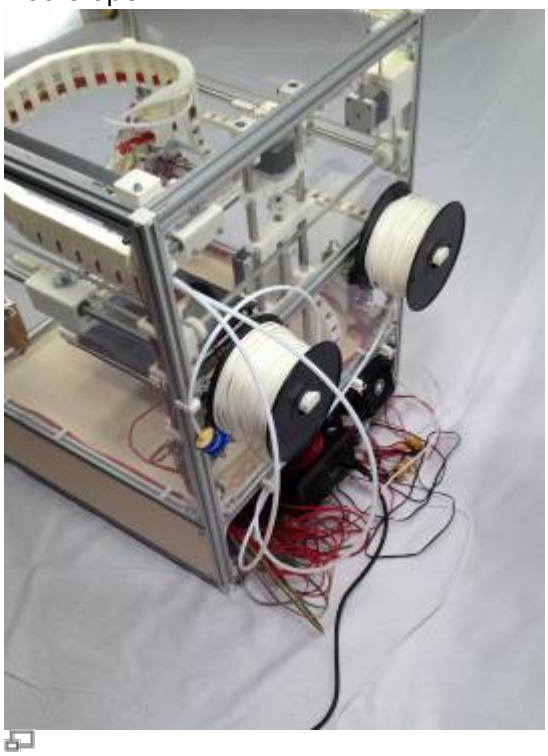
HxWxL: 80x55x55 cm



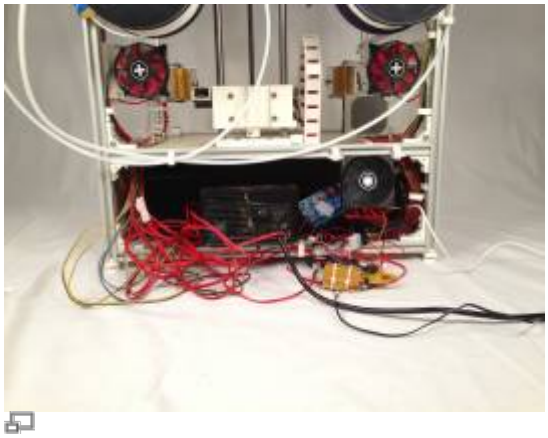
Top view



Doors open



Spool holders on the back – plus cable mania..

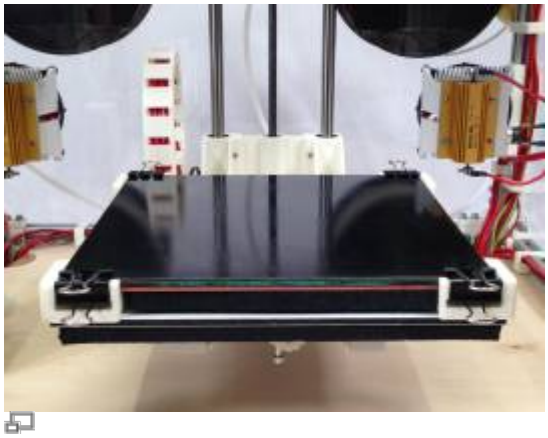


Back view - cable harness waiting for new high power MOSFET driver boards to be finally wired up

Front view

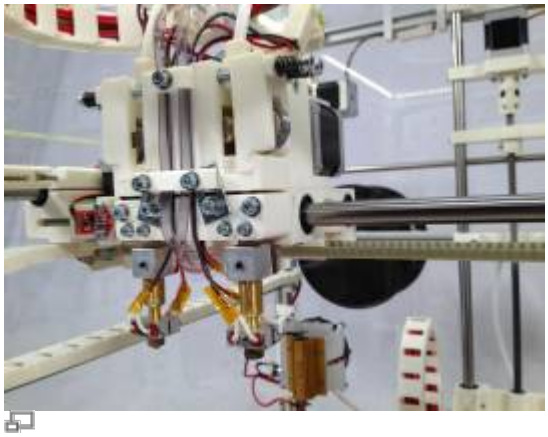
One of four circulating air heatings - each providing 120W for 70°C chamber temperature

Active carbon air filter

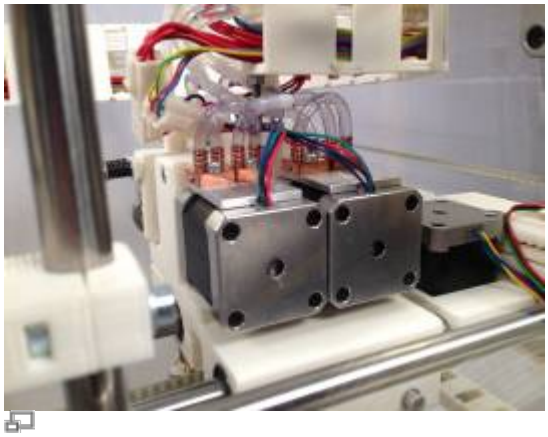


FR4 print surface

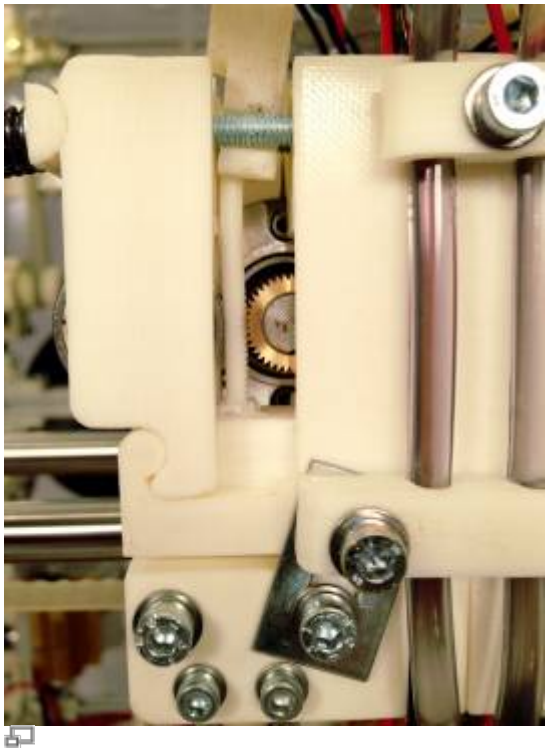
Print bed, bottom view - semi-automatic 3 point bed leveling system



Dual extruders, front view - water cooled hotend insulators



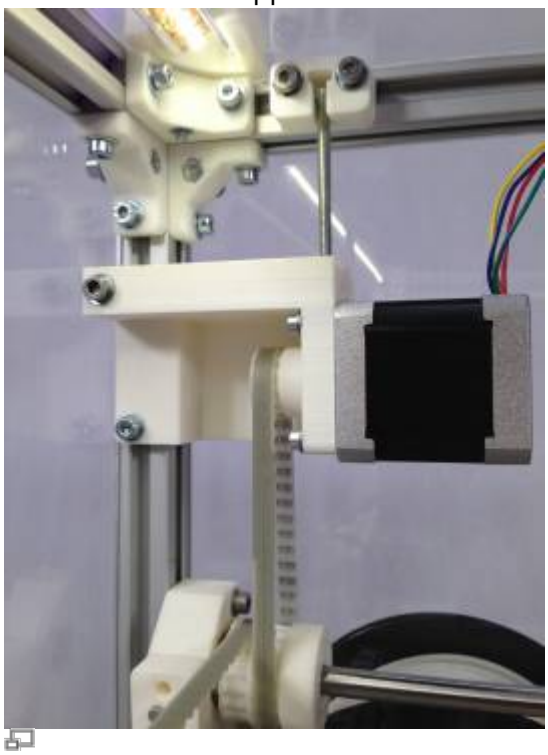
Dual extruders, back view - water cooled planetary geared stepper motors



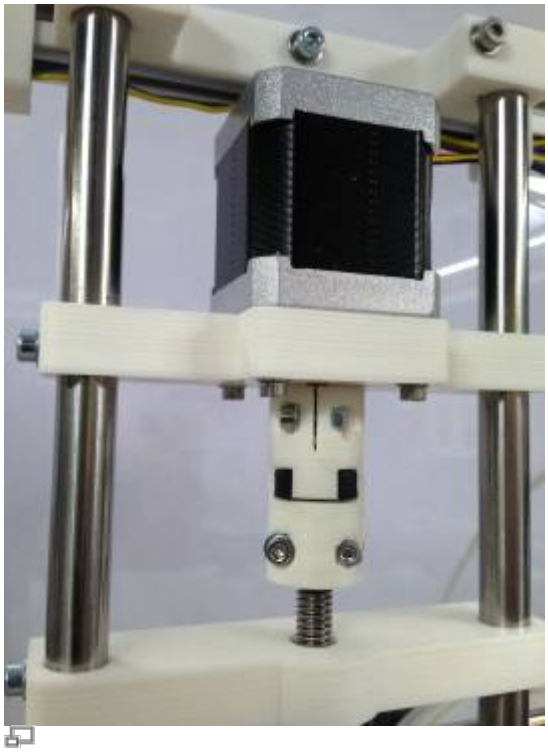
Advanced custom cnc'd direct drive extruder gears

Front left Y end with belt idler

Left X end with stepper motor and hall-o endstop



Y stepper motor



Z stepper motor with Sugru spider coupling

Specifications

- Filament diameter: 3 mm
- Build volume: 200 mm x 200 mm x 200 mm
- Number of extruders: 2
- Overall dimensions: 800 mm x 600 mm x 600 mm

Features

- Specifically aimed at printing ABS with zero warping, low maintenance effort through highly accessible sub assemblies
- Rigid frame made of t-slot aluminium extrusion
- Fully enclosed by acrylic and wood, doors on the front
- A heated chamber capable of 65-70 °C recirculating air temperature
- Heated PCB print bed
- Water cooled hot-ends and extruder steppers to ensure reliable extrusion in high ambient air temperature
- Fully parametric Open Source design
- Dual extruders, primarily for use with different nozzle diameters for perimeters/infill to save printing time on big objects
- Activated-carbon air filter to remove unpleasant smell of molten plastic
- Semi-automatic print bed levelling makes calibrating the machine a matter of seconds
- Z-leadscrew bearing supported on both ends, sugru spider coupling for absolutely wobble-free operation
- 12 mm precision ground shafts with LM12UU linear ball bearings on all axes (will be replaced by

Igus RJMP, see below)
- Tool-free belt tensioning with built-in thumbwheels
- Direct-drive extruders with high torque geared stepper motors
- Permanent printbed material (polyetherimide (PEI) glass fabric composite) – no Kapton or PET tape needed
- Adjustable nozzle height to align both extruders on the same level
- Custom designed, precision extruder drive gears to provide enough grip on the filament in a heated enviroment
- Integrated LED lighting
- All-metal hot ends from reprap-fab.org with 40 W each for short heat up time
- Raspberry Pi with a 10″ capacitive touch display for ethernet enabled standalone operation
- Touch optimized user interface for the raspberry pi is in development
- Magnetic door locks

Upcoming development

- 400 mm x 400 mm x 400 mm super-sized printer based on our extremely parametric design

Open Source

The development version of our OpenSCAD source files are available on GitHub at https://github.com/kuehlingkuehling/RepRap-Industrial-200. A Bill of Material as well as build instructions and details on electronics and wiring will be published as we lock down v1.0 and sales start.