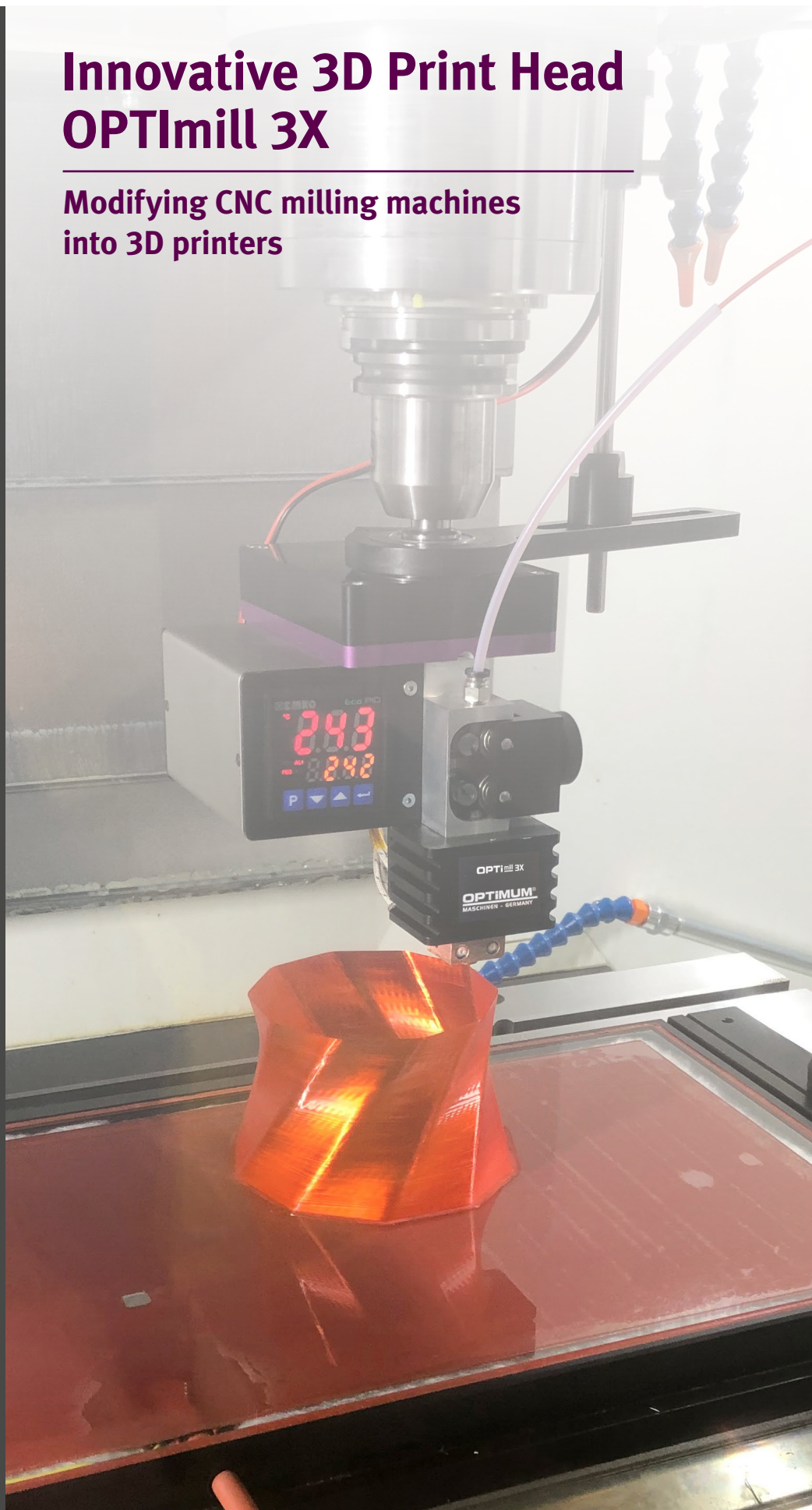


## Innovative 3D Print Head OPTImill 3X

Modifying CNC milling machines  
into 3D printers



**OPTi**mill 3X

# PRINT HEAD OPTIMILL 3X MODIFIES YOUR CNC MILLING MACHINE INTO A 3D PRINTER

## The OPTImill 3X Allows You to Create Tangible Objects via 3D CAD Files

### Printing Instead of Milling

Convert your CNC milling machine into a fully operational 3D printer within minutes. The **OPTIMUM print head OPTImill 3X** upgrades your machine to a top-class 3D printer!

The included software Cura is capable of reading and converting 3D models, and translating them into a machine-compatible G code. That means the components are being programmed with Cura and outputted to your machine via an add-on software.

Our concept has the great advantage that the wire feeder is controlled by the spindle speed. Accordingly, we are able to slow down and accelerate in corners leading to excellent results.

By using the tool path preview and controlling the feed rate we are able to print substantially faster than our competitors while maintaining consistent quality.

Three times the printing speed while maintaining or improving quality.

**A setup time of 20 minutes\* – an easy installation thanks to the 3D interface.**

### Think Big – Print Big!

The build space of your CNC machine allows you to print larger components than would be possible on a commercial printer. The advantage of our concept is that you can use your CNC machine conventionally by day, and by night you can profit from an effective machine utilisation avoiding downtimes.

The two heating elements attached to the print head generate temperatures of up to 300 °C allowing the printing of a variety of filaments. Our printer can handle materials like PA, PLA, ABS, nylon, and carbon with ease.

### The OPTIMUM Print Head OPTImill 3X Offers Virtually Infinite Possibilities.

Whether you need large or small 3D prototypes – due to flexibility and speed as well as the precision of your CNC milling machine, production can be as cost-effective and flexible as possible. For programme creation we are using the 3D printing software Cura.

The standard scope of supply includes filament of a thickness of 1,75 mm. For 2,85 mm filament you will be needing a retrofit kit for the print head. Moreover, you will benefit economically from our exchangeable printing jets. Unlike with other manufacturers, the assembly does not need to be replaced completely.

\*for Optimum CNC milling machines

# PIONEERING TECHNOLOGY

## Production Process of Tomorrow – 3D Printing

3D manufacturing, also named generative or additive manufacturing, is becoming more and more important in industry. This production method is used in particular for building prototypes, highly individualised components, or parts with a complex geometry.

### What are the advantages of 3D printing?

The list is long: freedom in design, protection of resources, sustainability and eco friendliness.

A design-driven production process, where construction determines fabrication – and not the other way round – is granting many businesses a great deal of freedom of scope. In the future, primarily production series benefiting from customer-specific individualisation or implementation of additional functions respectively, are going to be altered.

### Is 3D printing suitable for your product or production?

If you want 3D components of medium production accuracy for high-end applications and harsh conditions, 3D printing is right for you.

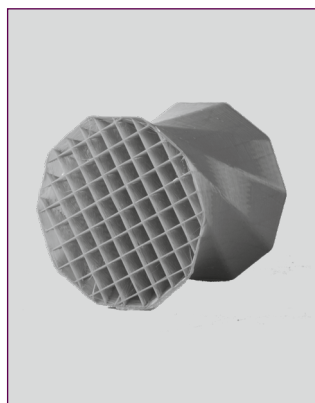
Many companies are already enjoying the benefits of Rapid Prototyping technology, Rapid Tooling, and Rapid Manufacturing producing functional prototypes, tools, and components with simple and complex geometries.

## APPLICATIONS



### Models

Models are particularly suited for turning your concept into a tangible object.



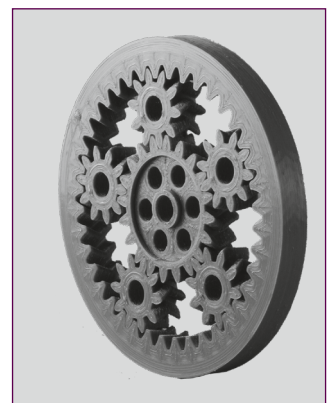
### Prototypes

Prototyping allows companies to significantly shorten the development time for new products. Errors can be detected early on and improvements can be made.



### Single-item-production

Using conventional abrasive production processes, components and models with complex geometries are impossible to produce or only with great cost. Especially when producing small quantities, it is worthwhile to switch to additive manufacturing.



### Spare Parts

Printing spare parts is a common and cost-effective solution with fast availability. Improvements possibly extending durability or offer an additional benefit can be implemented.

## OPTImill 3X Print Head

Every Optimum CNC milling machine with SIEMENS Sinumerik control system 828D/840 sl can be fitted.



### Technical data:

- ▶ 2 heating nozzles with a power output of 100 W at 24 V
- ▶ Temperature range: 150°–300 °C
- ▶ Print speed (depending on machine concept): ± 75 mm/s

### Scope of delivery:

- ▶ 2 spools of filament, 1,75 mm
- ▶ Filament holder
- ▶ Nozzle size: 0,4 mm
- ▶ Print head with PID temperature controller
- ▶ Power supply: 230V/24V DC 15A
- ▶ Instructions

OPTImill 3X Print Head

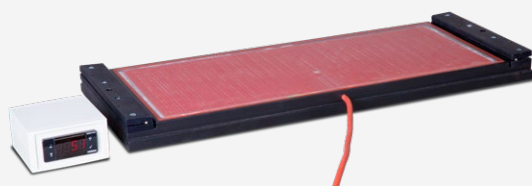
3560010

## Heating Plates

Heating plates prevent rapid cooling of objects and therefore improve and facilitate bonding. They provide increased adhesion particularly for large components.

### Scope of delivery:

- ▶ Complete and ready to operate
- ▶ Separate temperature controller with magnetic holder
- ▶ Power supply: 230V



### Size 1

Perfectly suited for Optimum CNC milling machine  
F 150 / F 150HSC / F 210HSC

#### Technical data:

- ▶ Work surface: 600 x 245 mm
- ▶ Power output: 500 W / 230 V ~ 50 Hz
- ▶ Adjustable heating temperatures from 0 °C to 120 °C



### Size 2

Perfectly suited for Optimum CNC milling machine  
F 310HSC / F 410HSC

#### Technical data:

- ▶ Work surface: 980 x 500 mm
- ▶ Power output: 2.200 W / 230 V ~ 50 Hz
- ▶ Adjustable heating temperatures from 0 °C to 120 °C

Heating plate size 1

3560050

Heating plate size 2

3560051



## Accessories and Spare Parts

### Transmission Shaft Transport Rollers

- 2 items
- For print head OPTImill 3X
- Premium quality
- Milled transport grooves

**Transport roller** for 1,75 mm filament 3562202

**Transport roller** for 2,85 mm filament 3562204

- without coating

**Transport roller** for 1,75 mm filament 3562212

**Transport roller** for 2,85 mm filament 3562214

- with diamond coating



### Retrofit Kit for 2,85 mm Filament

3562220

- For print head OPTImill 3X
- 2 transport rollers
- Teflon material feed, Ø 3 mm
- Cooler: 3 mm
- Holder with pressure rollers
- Premium quality
- Milled transport grooves



### Nozzle Cleaning Set

- Nozzle drill
- Cleaning drill

**Nozzle cleaning set small** 3562342

- For nozzle size 0,4 mm / 0,6 mm / 0,8 mm

**Nozzle cleaning set large** 3562344

- For nozzle size 0,8 mm / 1,0 mm / 1,2 mm



Nozzle cleaning set small

Nozzle cleaning set large

### Extruder Nozzle Sets, 3 Items

- For print head OPTImill 3X
- Robust and durable

**Stainless steel nozzle set** for 1,75 mm filament 3562302

- For nozzle size 0,4 mm / 0,6 mm / 0,8 mm
- Suitable for PLA plastics etc.

**Stainless steel nozzle set** for 2,85 mm filament 3562308

- For nozzle size 0,8 mm / 1,0 mm / 1,2 mm
- Suitable for PLA plastics etc.

**Titanium nozzle set** for 1,75 mm filament 3562312

- For nozzle size 0,4 mm / 0,6 mm / 0,8 mm
- Suitable for carbon

**Titanium nozzle set** for 2,85 mm filament 3562318

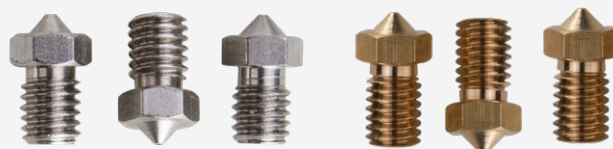
- For nozzle size 0,8 mm / 1,0 mm / 1,2 mm
- Suitable for carbon

**Brass nozzle set** for 1,75 mm filament 3562322

- For nozzle size 0,4 mm / 0,6 mm / 0,8 mm
- Suitable for PLA

**Brass nozzle set** for 2,85 mm filament 3562328

- For nozzle size 0,8 mm / 1,0 mm / 1,2 mm
- Suitable for PLA



Stainless steel nozzle set

Brass nozzle set

### Hotend Nozzle Throat, 3 Items

**1,75 mm filament** 3562401

**2,85 mm filament** 3562402



### Cleaning Scraper

3562430

- Material: stainless steel
- Colour: silver
- Handle slides over blade for safety when not in use.
- 40 mm blades
- 5 blades included



### Spare Blades

3562431

- 10 blades

### Torque Support

- For mounting on the main spindle
- Custom sizes available on request

120 mm	3562511
125 mm	3562512
130 mm	3562513
140 mm	3562514
155 mm	3562515
160 mm	3562516
200 mm	3562520



### GRP Build Plate Set

- 2 pieces build plates
- Mounting material
- Glass fibre, black
- The printed part is removed from the printer along with the plate.
- Flexible, and therefore allowing easier separation of components in cold condition.
- Shows strong adhesion during printing.
- Printed parts will have a very smooth bottom surface.
- The plate is easy to clean and very durable.
- Unbreakable

Size: 600 x 245 mm	3562260
Size: 980 x 500 mm	3562262



### Tool Holder Set 3D Print Head

3562190

- Collet chuck ER32 / SK40 DIN69871
- Collet chuck key ER32
- Collet chuck ER32/16mm



### Infrared Heater

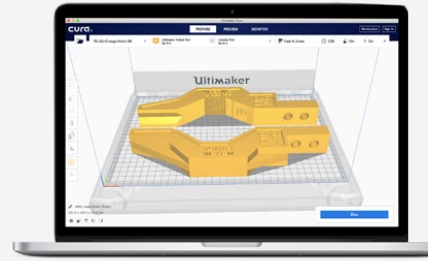
- Use of the entire assembly space
- Optimization of temperature in assembly space
- Heat output: 300 W
- Safety class IP 44
- Without fixation

Size: 600 x 600 x 17 mm	3562420
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### Software Cura 3.6.0

- <https://ultimaker.com/en/products/ultimaker-cura-software>
- Including plugin via USB



### Top surface for SIEMENS Control System

3584012

- Enables the NC data from the CAM system to be optimized online while the program is being run, producing high surface quality on complex freeform surfaces during milling.
- This is particularly advantageous in the production of geometrically complex molded parts in the automotive, aircraft or power generation sectors.
- All the new functions are integrated into the system and are available with Sinumerik Operate.

### 3D Printing Interface

3562411

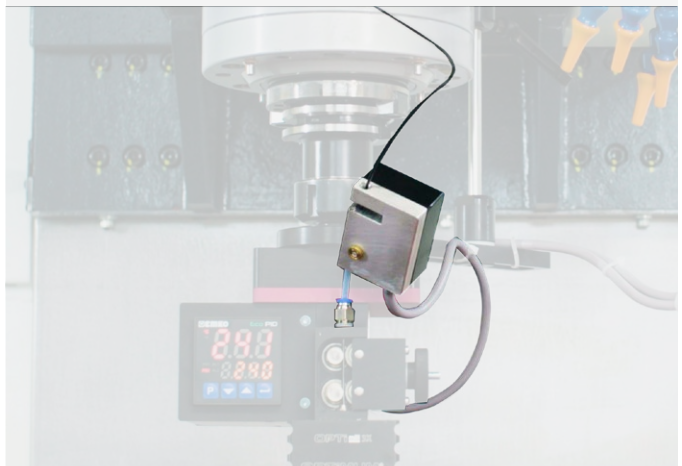
- Connection plug on milling head for the OPTImill 3X print head
- Power supply is installed inside the control cabinet.
- Prepared for the connection for wire break monitoring
- Filament holder
- Assembly from stock D included



### Wire Break Monitoring

3562410

- Machine stops at wire breaking or end of wire.
- Fault message is displayed in the control system.

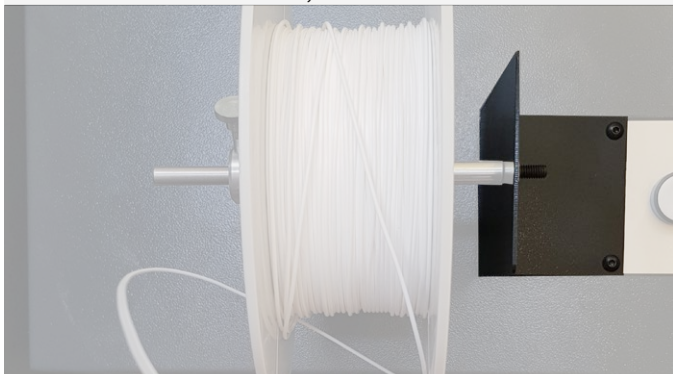


## Wide Range of Filaments

### Filament Spool Holder

3562590

- Dimensions: L 250 x W 85 mm
- For machines with wide heads
- Holder must be screwed on by the customer.



### Glass Fibre Filament

- Base material: PA 6
- 15% extra long fibres
- Extreme high rigidity and hardness

1.75 mm (1 kg)	3568071
2,85 mm (2 kg)	3568072



### Carbon Filament

- Base material: PA 6
- Carbon fibre/carbon filament
- Carbon look
- 15% extra long carbon fibres
- Extreme high rigidity and hardness
- 1 kg spool

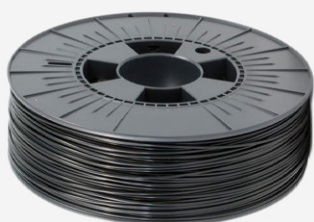
1.75 mm	3568061
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### PA 6 (Polyamide) Filament

- High strength and toughness
- Great durability and extremely resistant to chemicals
- Perfectly suited for components that are exposed to mechanical stress, e.g. gears or screws.

1.75 mm (1 kg)	3568081
2,85 mm (2 kg)	3568082



### PLA (Polylactide) Filament

- Material processing 1A
- Saturated and clear colours
- PLA filament with good performance
- Excellent filament for every-day use
- Excels through its high rigidity
- 1 kg spool

Black 1.75 mm	3568014
Black 2,85 mm	3568015
White 1.75 mm	3568011
White 2,85 mm	3568012
Red 1.75 mm	3568017
Red 2,85 mm	3568018



### XT-CF20 Filament

- Base material PLA
- Carbon fibre composite material based on co-polyester with at least 20% carbon fibre
- Very good adhesion of printed layers
- Odourless and styrene free
- High Glass temperature ( $T_g = 80\text{ °C}$ )
- Very high melt strength
- Very high melt viscosity
- matt black surface
- 0,75 kg

1.75 mm	3568051
2,85 mm	3568052



### ABS filament

- Synthetic (petrochemical based)
- High degrees of strength, stiffness and toughness
- Very high impact and scratch resistance
- Excellent weather-resistance
- Particularly suited for components subjected to high stresses
- Black

1.75 mm (1 kg)	3568040
2,85 mm (2 kg)	3568041





**OPTIMUM<sup>®</sup>**  
MASCHINEN - GERMANY

In our spacious demonstration centre at our company headquarters, a selection of our machines are on display.

Our show room provides a fitting environment for explaining machine technology in greater detail. Our expert advisors are happy to guide you through the OPTIMUM machine world, and find an ideal solution for your individual demands on a perfect CNC milling machine.

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