



# INDUSTRY F420



# — KEY FEATURES

## PRINTING

print technology: FFF

**build chamber: 380 × 380 × 420 mm**

**build volume: 60 648 cm<sup>3</sup>**

min. layer height: 50 µm

number of printheads: 2, purging system

nozzle diameter: 0.5/0.5 mm

filament diameter: 1.75mm

printhead temperature: 500°C

buildplate temperature: 180°C

chamber temperature: 180°C (Active heating)

filament chamber temperature: 50°C

## SPEED

travel move: 1000 mm/s

printing speed: up to 400 mm/s

## DIMENSIONS AND MASS

external dimensions: 1900 × 940 × 900 mm

mass: 350 kg

## CONSTRUCTION

chassis: steel

external: steel and vacuformed ABS,

chamber lined with stainless steel

build surface: borosilicate glass / vacuum

sealed plastic sheets

positioning resolution XY: 0.006 mm

positioning resolution Z: 0.0007 mm

## ENVIRONMENT

working temperature: 15-32°C

storage temperature: 0-32°C

## POWER

power requirements: 3-phase, 400V AC

max power draw: 4600 W

average power draw: 1500 W

communication: ethernet, Wi-Fi, USB drive

## SOFTWARE

slicing software: 3DGence SLICER 4.0

cloud based services: 3DGence CLOUD

## SAFETY

filtration: advanced ULT filtration unit

sensors: main chamber door, top access hatch, thermal

sensors, emergency switch UPS device: yes, optional

others: software access overdrive - remote shut down



# KEY FEATURE: SPEED

Key aspect of the new industrial platform from 3DGence is its high focus on speed.

By implementing a number of innovative solutions, the platform's performance has increased greatly, making F420 not only a great rapid prototyping tool, but a full-fledged additive manufacturing system.

travel move

**1 m/s**

printing speed

up to **400 mm/s**



— KEY FEATURE:

# SPEED



caliper: 36 h 18 min  
IM part: 12 h 18 min  
batch print: 41 h 30 min  
single print: 3 h 29 min  
average time:



caliper: 12 h 23 min  
IM part: 5 h 11 min  
batch print: 20 h 57 min  
single print: 1 h 19 min  
average time:

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all prints: sparse infill, 0.25 mm resolution, ABS + support



## — KEY FEATURE:

# SPEED



Stratasys  
**FORTUS**  
450mc

caliper: 12 h 34 min  
IM part: 6 h 50 min  
batch print: 21 h 8 min  
single print: 2 h 40 min  
average time:



3DGence  
**INDUSTRY**  
F420

caliper: 12 h 23 min  
IM part: 5 h 11 min  
batch print: 20 h 57 min  
single print: 1 h 19 min  
average time:

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all prints: sparse infill, 0.25 mm resolution, ABS + support



# — KEY FEATURE: MODULARITY



M280



M360



M500

As established by previous installments, INDUSTRY F420 also features a modular approach to print capabilities, modified through the use of job-specific printing modules.

All shown materials and modules constitute the basic material portfolio, which will be continuously expanded post-premiere.



# M280

temperature up to

**280°C**



## MODEL

MATERIALS (MVP)

**ABS**  
**ASA**  
**PLA**  
**PA6/69**



## MODEL

MATERIALS (POSSIBLE)

**PP**  
**PA6, PA12**  
**PET/PETG**  
**HIPS**  
**PMMA**



## SUPPORT

MATERIALS

**ESM-10**  
**HIPS**



# M360

temperature up to

**360°C**



**MODEL**  
MATERIALS (MVP)

**PC**  
**PEI**



**MODEL**  
MATERIALS (POSSIBLE)

PC/ABS  
PA/ABS  
PPS  
Hi-Temp PA



**SUPPORT**  
MATERIALS

**ABS**  
dedicated break-away





# M500

temperature up to

**500°C**



**MODEL**  
MATERIALS (MVP)

**PEEK**



**MODEL**  
MATERIALS (POSSIBLE)

**PEKK**  
**PPSU**  
**PSU**



**SUPPORT**  
MATERIALS

**ESM-10**



# — KEY FEATURE: KINEMATIC SYSTEM



INDUSTRY F420 uses closed-loop, encoded stepper motors for X, Y and Z actuation. Running in a closed loop means that the system is able to monitor its current position and correct itself should an error be detected.

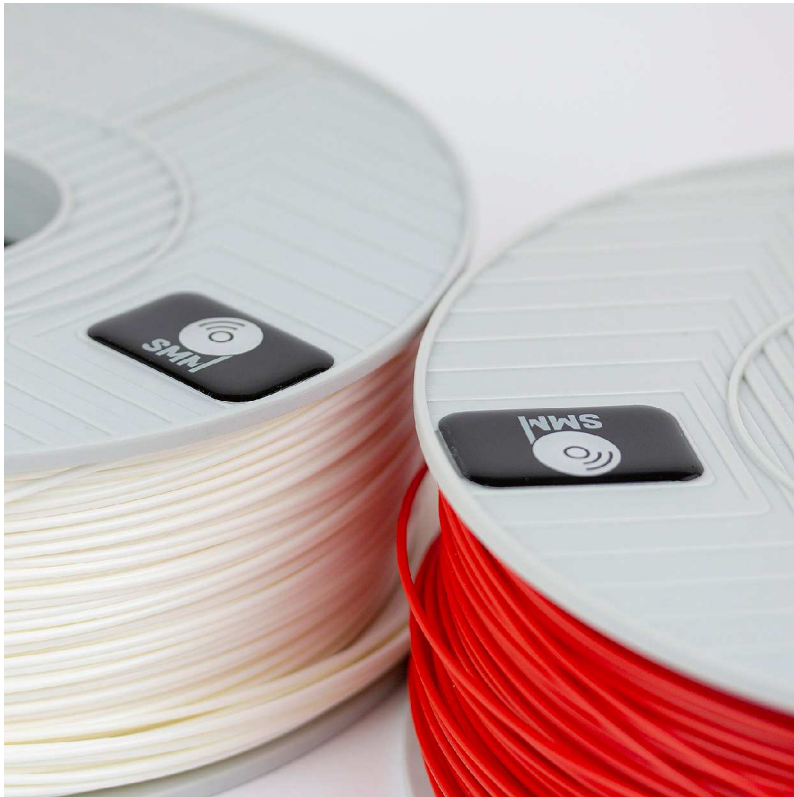
**The result - no more misaligned layers.**

XY kinematic system is based around a steel beam, optimized for light weight and rigidity. X movement along the gantry, Y movement on linear guides running in parallel on opposite sides of the upper chassis.

Z axis is built around a ball screw with additional system for compensating unwanted XY shifting, resulting in a very smooth and consistent Z axis actuation.



# — KEY FEATURE: NFC



**NFC antenna is housed within the material bay.** When a spool is placed in the bay, it is automatically detected and read - no additional action is required.

Apart from containing information about material weight, type and producer, the NFC system is capable of writing new data to the NFC tag. This gives the possibility to update the material weight as the spool is being used. Every time, prior to a print job, available material and required material values are compared. The user is informed about possible need to load the second bay.

Cloud based service also draws information from the tags, building usage statistics for the user.



# — KEY FEATURE: HEATED CHAMBER



F420 is equipped with a powerful, actively heated build chamber, capable of reaching 180°C. With a patent pending solution regarding variable chamber volume, time required for the working temperature to be reached remains minimal. Walls of the chamber are lined with INOX steel, preventing damage and oxidation.

Housed within the chamber is a nozzle priming sector. F420 no longer relies on mechanical nozzle blocking, using printhead purging instead. A purge cycle is only 3 seconds long.

The chamber is equipped with a colour camera.



# — KEY FEATURE: BUILDPLATES

F420 heatbed, reaching 180°C, is dual function.

highly universal  
mechanically resilient  
easy, tool-less removal/replacement  
mounted by metal clamps  
sensor for detecting buildplate presence

**BOROSILICATE GLASS**

specific use  
very effective in certain material combinations  
easy, tool-less removal/replacement  
mounted by vacuum

**PLASTIC SHEETS**

User can choose and switch between used buildplate material with no additional tools or changes to the machine. Pressurized air connection on printer installation site is required for vacuum functionality.



## — KEY FEATURE:

# FILTRATION

F420 uses an advanced ULT filtration unit, capable of filtering:

- macro dust
- nano dust (VOC, UFP)
- solvent vapor
- noxious gasses
- foreign particles

With focus on high performance thermoplastics it becomes increasingly important to provide adequate emissions control. F420 filters offer unprecedented filtering efficiency among FFF AM platforms.



## — KEY FEATURE:

# AUTOMATIC SPOOL CHANGE



**F420 has four material bays**, storing four 1kg spools of material. By default, two are dedicated to model material and remaining two house support material.

**F420 is capable of automatic spool change mid-print.** Once filament end is detected, the machine will load material from the second bay without any user intervention and resume printing seamlessly.

Material bays are continuously heated to 50°C. This temperature can be adjusted via printer interface. With specific spool geometry, mounting four 2kg spools is possible with all functionalities retained.



## — KEY FEATURE:

# NEW EXTRUSION TRAIN

F420's extrusion train has been designed from ground-up to yield maximum performance. As such, it bears no resemblance to older designs of extruders and printheads.

- encoded, direct, dual drive gear extruders
- high power, full metal printheads
- modular, quick-change and simple to service

Measured throughput for the new design reaches **500g/h**, with theoretical values of up to 700g/h, depending on nozzle diameter.

Default nozzle diameter is **0.5mm**. Additional planned diameters are 0.3mm and 0.8mm.





# — KEY FEATURE:

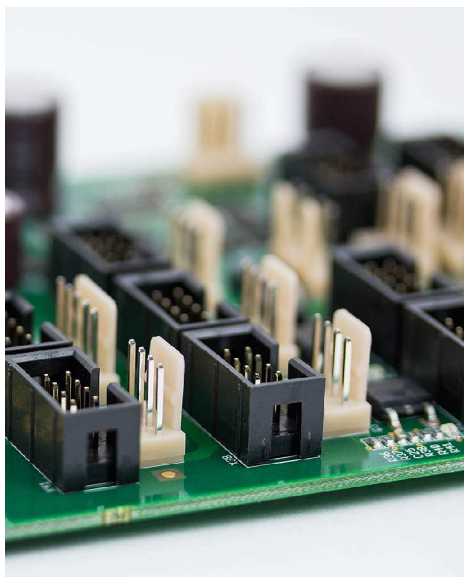
## 3DG NUMERICAL MACHINE CODE

G-code parsing is a text-based operation. This requires significant processing power and is suboptimal for high speed code processing required for increased machine throughput. **3DGence has been working to write a brand-new machine code, called 3DG, to remedy this problem.** 3DG is based on numerical values and does not require the computational unit to parse text - thus increasing the parsing performance tenfold. This means that the machine processes and buffers G-code much faster than it executes it - never having to wait or stutter as new code is being parsed.

Toolpath generation or model requirements have not changed - from the user standpoint, the new code is invisible.



# — KEY FEATURE: NEW MAINBOARD



F340 was based on a proprietary controller - the Titan. Using Texas Instruments drivers, it was, at the time of its release, a superior motherboard.

**With increasing performance demands, a new controller had to be developed.** Build around a 32-bit architecture, the system is highly adaptable and modular. It can support up to 9 stepper drivers, BLDC motors or servos. GUI and whole user interface, along with cloud services, are done by a coprocessor - the main CPU only focuses on machine control. Those two processing units run in parallel, and do not affect each others performance, storing ample computing power for immediate job control.



# — KEY FEATURE: **CLOUD ENABLED**



- remote print start, cancelling and queuing. Full control over job order and execution, even on multiple printers
- real time monitoring of machine and print status
- aggregation and presentation of machine and material usage statistics
- service access module; 3DGence support team may access, diagnose and provide help remotely
- file sharing and storage
- access control and administration
- marketing functionalities
- live camera feed
- asymmetric encryption for data transfer (RSA)



# — KEY FEATURE: SAFETY

- an electronic lock of the main chamber door, also controlled via Cloud service and printers' interface
- sensors for main chamber door and top access hatch
- redundancy for thermal sensors of high-power heating elements
- emergency switch - immediate cut of power to motion and thermal control
- system for emergency shutdown of logic
- software access overdrive - the printer can be remotely shut down



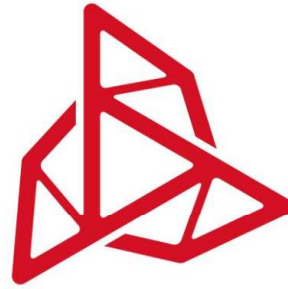
## — KEY FEATURE:

# UPS

F420 may be equipped with a 72Ah UPS unit. Printer supports all functions during short power outages. UPS is integrated with the system at a deeper level, monitoring UPS battery life. In case the power loss is longer, the printer will switch to idle support mode. Printing will be paused, and only key thermal control and logic functionalities will be maintained. Should the power be restored, printing will continue normally. This dual approach can yield two results:

- unaffected printer performance during short power outages
- longer battery life in case of longer power issues





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