



AM-COE, in collaborations with TenDimensions, have designed and manufactured commercial DLP ceramic and metal printers in different sizes and in both top-down and bottom-up technologies to cover a wide variety of ceramic and metal loaded inks for different applications. Our price strategy and open-system technology are set to make our printers available to the mainstream manufacturing, as well as the universities and research centers.

Here at AM-COE we offer our clients a complete solution, from 3D printers to material development, from pre-printing to post-printing optimization, and from development projects to mass manufacturing.

AM Centre of Excellence is strategically located in Derby, close to many manufacturing facilities in mainland UK, within three hours' distance to all major cities, manufacturing centers, and airports in England.

We aim to initiate new links and maintain our existing partnership and collaboration with the main Universities and research centers in the Midland, and actively looking for opportunities, where 3D printing ceramics, metal and composites can unleash a wider use of ceramics and composites or offer structures/geometries never possible before.

Autocera-L is our answer to 3D printing of high-performance ceramics and metal slurries. The machine is open source and offer real-time process monitoring and help you printing with less slurry than top down models. The minimum print slurry requirement is only 20ml. Upside-down build process means less cleaning after printing and any leftover material can be reused. Particularly suitable for material testing, low production costs and medium-sized components. The blade helps to print accurate layer thickness, minimise the risk of segregation and offer long-term stable production. The printing process only includes Z-axis motion, eliminating other moving parts for high reliability. The size of 136x76x200mm with 35um pixel is suitable for processing large parts such as cores for investment casting, among other ceramics and metal components. Finer layer thickness is possible with options are added, and can down to 5 microns.

## Product Specification of Autocera-L:

Size:	650 x 550 x 1700mm (L x W x H)
Build Volume:	136 x 76 x 200 mm (X x Y x Z)
Lateral Res.:	3840 x 2160 (35µm)
Printing Speed:	Z > 200 layers / hr
Weight:	100kg
Layer Thickness:	25/50/75/100µm
Build Mode:	DLP Bottom Up
Wavelength:	405nm
Power Density:	Up to 50mW/cm <sup>2</sup>
Power Supply:	100 - 240V AC 50/60Hz Up to 300W
Interface:	3 x USB 2.0 Host / Ethernet / Wi-Fi
Scraper Speed:	1 - 150 mm/s
Proved Powders:	SiO <sub>2</sub> / Al <sub>2</sub> O <sub>3</sub> / Si <sub>3</sub> N <sub>4</sub> / SiC / ZrO <sub>2</sub> / AlN / TCP / HA / Bioglass / ...
UI Screen:	15.6inch Full-color LCD w/ Capacitive Touch

## Add-on Features

Material Develop:	Fully open and step by step guidance
Adv. Layer Thickness:	Fully adjustable from 10um, 1um step
Slurry Heater:	Automatic slurry temperature control
Adv. Exposure:	Multiple Exposure Mode
More Scrapers:	Multiple types of scrapers
Remote Control:	Monitor printing process remotely
Slurry Feeder:	Automatic slurry feeder



For more information, please contact: [e.sabet@am-coe.com](mailto:e.sabet@am-coe.com)

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The Autocera-R is high-quality Lithography-based Ceramic Manufacturing technology for the research labs and small complex ceramic products. Equipped with a variety of options, add-ons, and accessories, from entry level to high-end application, you can customize the machine based on what you need and what your research projects may take you with vat polymerization. The machine is open source and offer real-time process monitoring and you can go to 5 microns print layer adjustments, when needed and for dark slurries. The build size of 96x54x100mm meets requirements of material development and sample manufacturing. With material develop add-on function, developing can be done in a step by step, using very little slurry.

## Product Specification of Autocera-R:

Size:	450 x 360 x 830 mm (L x W x H)
Build Volume:	96 x 54 x 100 mm (X x Y x Z)
Lateral Res.:	1920 x 1080 (50µm)
Printing Speed:	Z > 200 layers / hr
Weight:	75kg
Layer Thickness:	25/50/75/100µm
Build Mode:	DLP Bottom Up
Wavelength:	405nm
Power Density:	Up to 50mW/cm <sup>2</sup>
Power Supply:	100 - 240V AC 50/60Hz Up to 300W
Interface:	3 x USB 2.0 Host / Ethernet / Wi-Fi
Scraper Speed:	1 - 150 mm/s
Proved Powders:	SiO <sub>2</sub> / Al <sub>2</sub> O <sub>3</sub> / Si <sub>3</sub> N <sub>4</sub> / SiC / ZrO <sub>2</sub> / AlN / TCP / HA / Bioglass / ...
UI Screen:	15.6inch Full-color LCD w/ Capacitive Touch

## Add-on Features

Material Develop:	Fully open and step by step guidance
Adv. Layer Thickness:	Fully adjustable from 10um, 1um step
Slurry Heater:	Automatic slurry temperature control
Adv. Exposure:	Multiple Exposure Mode
More Scrapers:	Multiple types of scrapers
Remote Control:	Monitor printing process remotely
Slurry Feeder:	Automatic slurry feeder



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In our range of 3D printers dedicated for ceramics and metal slurries, the Autocera-U is designed to meet the industrial challenges of large-scale production of heavy and highly-loaded slurries. Our top-down printers enable printing of denser material to avoid falling off the print bed, hence the process is less prone to failures. The technology offers a compact design for top-down DLP ceramic 3D printing, supporting high volume solid loading, meaning it can handle highly viscous materials of up to 20000 cps and can start printing with as little as 1L slurry. Its large area paired with DLP technology offers high print speed. Material development add-on, and advanced exposure option make this printer a strong tool for developing a wide range of new materials.

### Product Specification of Autocera-U:

Size:	1000 x 800 x 1700 mm (L x W x H)
Build Volume:	136 x 76 x 200 mm (X x Y x Z)
Lateral Res.:	3840 x 2160 (35µm)
Printing Speed:	Z > 100 layers / hr
Weight:	150 kg
Layer Thickness:	25/50/75/100µm
Build Mode:	DLP Top Down
Wavelength:	405nm
Power Density:	Up to 50mW/cm <sup>2</sup>
Power Supply:	100 - 240V AC 50/60Hz Up to 300W
Interface:	3 x USB 2.0 Host / Ethernet / Wi-Fi
Scraper Speed:	1 - 150 mm/s
Proved Powders:	SiO <sub>2</sub> / Al <sub>2</sub> O <sub>3</sub> / Si <sub>3</sub> N <sub>4</sub> / SiC / ZrO <sub>2</sub> / AlN / TCP / HA / Bioglass / ...
UI Screen:	15.6inch Full-color LCD w/ Capacitive Touch

### Add-on Features

Material Develop:	Fully open and step by step guidance
Adv. Layer Thickness:	Fully adjustable from 10um, 1um step
Slurry Heater:	Automatic slurry temperature control
Adv. Exposure:	Multiple Exposure Mode
More Scrapers:	Multiple types of scrapers
Remote Control:	Monitor printing process remotely
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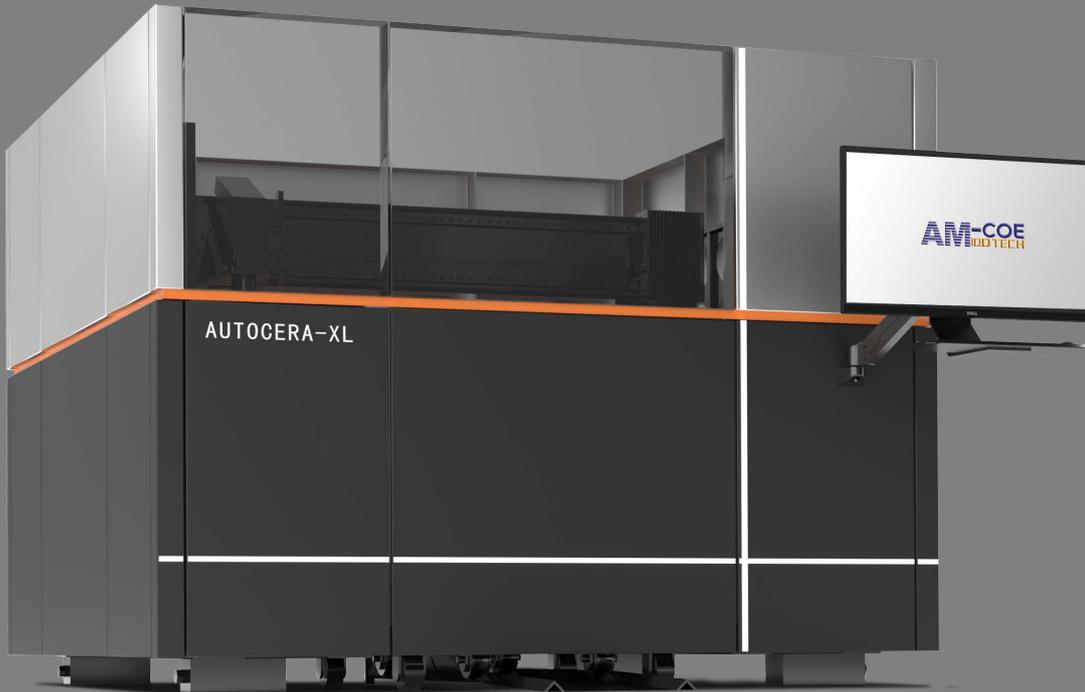
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When it comes to selecting DLP printers for mass-production of ceramics and metal slurries, our XL range is arguably the largest and fastest in the market, with a bottom-up and moving DLP technology and the build-size of 600x600x300 mm.

Autocera 3D printers, the XL is your solution at the highest speed and accuracy, thanks to its magnetic linear motors.

### Product Specification of Autocera-R:

Size:	2200 x 1700 x 2200 mm (L x W x H)
Build Volume:	600 x 600 x 300 mm (X x Y x Z)
Lateral Res.:	27778 x 27778 (21.6µm)
DLP Moving Speed:	Up to 2m/s
Weight:	4t
Layer Thickness:	10 ~ 500µm
Build Mode:	Moving DLP Top Down
Wavelength:	405nm
Power Density:	700mW/cm <sup>2</sup>
Power Supply:	100-240VAC 50/60Hz Up to 6000W
Interface:	3 x USB 2.0 Host / Ethernet / Wi-Fi
Scraper Speed:	1 - 150 mm/s
Proved Powders:	SiO <sub>2</sub> / Al <sub>2</sub> O <sub>3</sub> / Si <sub>3</sub> N <sub>4</sub> / SiC / ZrO <sub>2</sub> / AlN / TCP / HA / Bioglass / ...
UI Screen:	21inch Full-color LCD

Printing can be done very fast with ultra-high power density up to 21 µm pixel and the production speed 20x faster than fixed light source models. An entire build plate accommodates, for example, about 100 dental pieces, and can be print them in just over an hour. Casting cores bigger than 250 mm length can be stack on the build-platform. The top-down technology enables you to print heavy and bulky components with no risk of detaching from the platform. Z length of the machine can be made larger for different needs, and upon customer demands.

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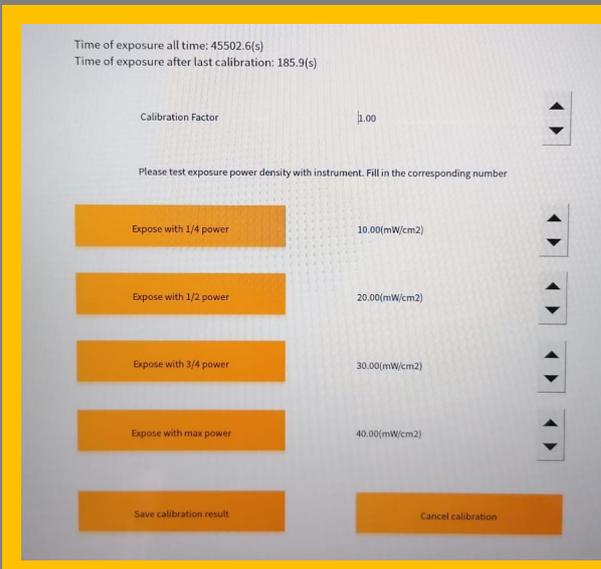
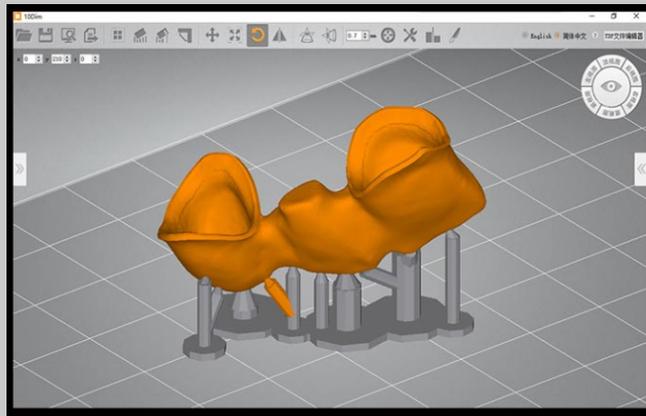


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### Slicing Software

#### Intelligent, Comprehensive and Stable

Our slicing software is designed for ceramics and metal printing, and help you to support your CAD file for a successful print. Intelligent automatic addition of brackets and supports enhance the print stability and prevent deformation and breakage. The software is free of charge and you can install it on as many computers as your wish to support your entire engineering team

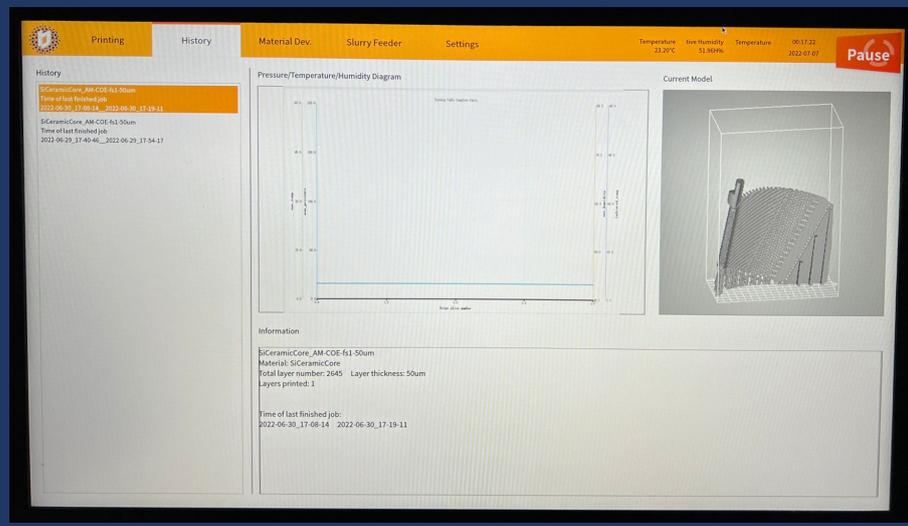


### Intelligent Exposure Power Density Calibration

It is a proven fact, that the light source of all DLP systems (LED arrays) deems down by hundreds of hours of printing, and eventually the exposure power density of any DLP printer reduces by long service time, hence making the printing process less robust and repeatable. This deem-down effect happens to all LED arrays and our printers are no exceptions. However, our calibration system offer a frequent adjustment mechanism to adjust the power sources and the light intensity of the machine, to offer a stable, reliable, and repeatable print process.

### Tracking Life History of Printing

All Autocera printers provide intelligent print monitoring systems that track the temperature, humidity and exerted peeling forces on each layer during the printing process. This technology enables users to improve their printing process and material properties during material development and sample productions.

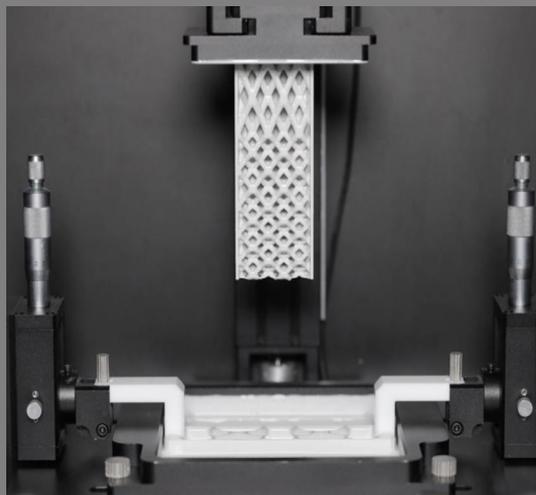


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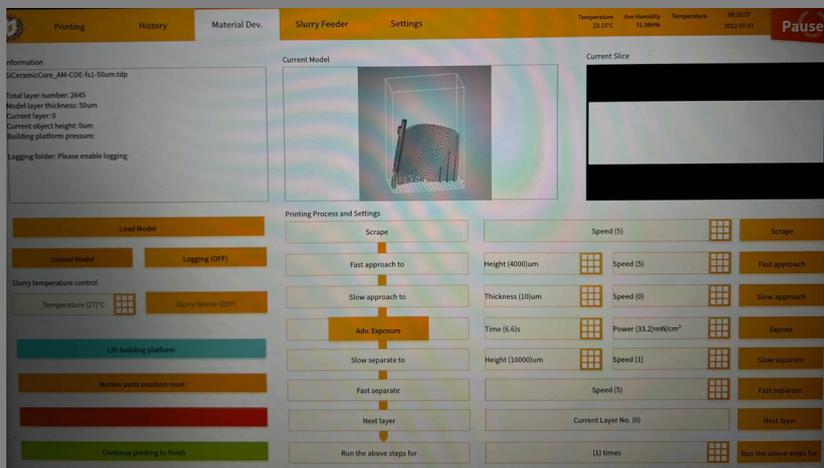
### Touch Screen & User Interface

#### Open Slurry Development Parameter Packages

Operating parameters are adjustable for different slurries, including paving speed and height, peeling speed and height, light source power, exposure time, and many more. It shortens the development cycle and research programmes.

#### Fully Automated Slurry Feeder

Our slurry feeding option changes the auto-feeding of different slurries based on adjusting the speed and volume of feeding equipment. This option can readily adapt the height of slurries and the feeding velocity of every few layers during printing. The primary benefit of this option is to reduce the risk of running out of slurry for long-prints, better dispensing the material in the tank, and decreasing the exerted peeling forces during printing with adjustment of material height in the vat.



#### Material Development – High Precision and Control on Processing Parameters, Exposure Intensity and Time:

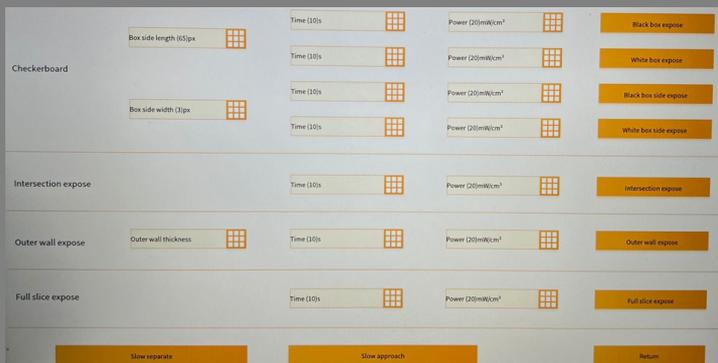
This package is a key technology for your research projects, specially designed for research centres and R&D units to gain full control during the material development stage.

Everything about your print layers are in your control, including exposure energy and time, outer walls' curing, bottom layers, etc.

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### Advance Exposure – Controlling Exposure and Pixels of Each Layers

This package offers even higher control and accuracy on the exposure time, energy and time and the shrinkage of each layer.

This package offers high control and accuracy on the exposure time, energy and time and the image pixels for each layer. The bottom layers of the print require more focus as they form the foundation for the whole print and need better adhesion. Therefore, high exposure energy is necessary for bottom layers to ensure strong adhesion to the build plate and help in building a successful 3D geometry. Our technology in this package, called black and white box exposure, provides a curing option for the bottom layers of parts in a mesh form layer by layer, thus reducing the shrinkage of the first layers and improving the adhesion of components to the build platform. The pixels, exposure energy and time of black (non-cured section) and white (cured section) boxes, as well as normal layers, can be adjusted to achieve better performance. Moreover, the package enables the users to set the external walls' exposure energy of parts, making printed ceramic parts more robust.



### Temperature Controlled Heating Vat

We provide a heating system and hot lithography solution as another option to reduce the viscosity and enhance the reactivity of the binder system of highly-loaded slurries. An infrared sensor behind the tank senses the resin temperature and automatically heats the slurry to a set temperature before starting a print. Once the ideal temperature for the filled slurry is met, the print begins. This system let the users to print their parts at elevated temperatures and helps to control the rheological behavior of the slurries.

### Live Monitoring and Remote Controlling

The Autocera state monitoring system provides a deep insight into your parts in real-time; this allows you to detect flaws in parts during printing and stop the building process remotely when a failure is detected. You can monitor your printer on your phone, from home!



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