

DIRECTED ENERGY DEPOSITION

# MODULO 400



A versatile, integrated DED machine designed for process qualification and industrial production.



**AddUp**  
THINK SMART. MANUFACTURE DIFFERENT.

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## PRODUCTIVITY AND QUALITY IN A SINGLE MACHINE

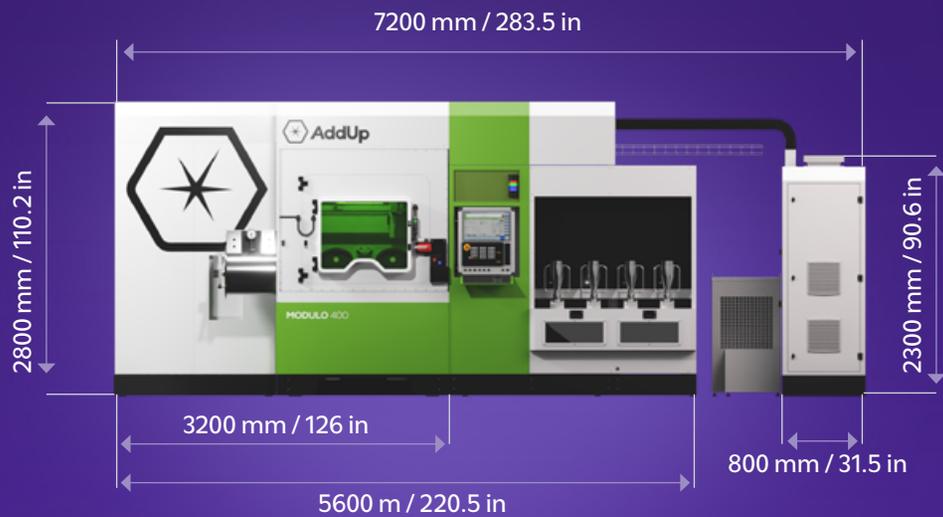
AddUp is an additive manufacturing OEM built upon the pedigree of industry pioneers Michelin and Fives. We bring the latest multi-technology production systems, but we also come from the dirt-under-your-fingernails world of manufacturing.

We understand the world of manufacturing because we were born from it. We understand industrial challenges because we have lived them. This is why we are industrializing additive manufacturing. We know how to use it, qualify it, and scale it; making it a reliable and repeatable solution for your business.

The Modulo 400 is suitable for low to medium rate part production and repair runs without the need for support structures. Add additional features to preexisting structures to optimize cost, quality, and time.



# MACHINE LAYOUT



# TECHNICAL SPECIFICATIONS

## Dimensions

L 7.20 x W 1.95 x H 2.80 m (see layout)

Global weight: ~ 7.2 T

Maximal floor load: 2000 kg/m<sup>2</sup>

## Build volume (3 axis)

X=650 x Y=400 x Z=400 mm (~104 L)

## Number of axis

5 continuous axis (X/Y/Z/B/C)

## Linear axis

Ball screw actuators with asynchronous motors (AC)

Strokes:

X = 800 mm

Y = 400 mm

Z = 450 mm

Maximum speed X/Y/Z: 30 m/min

Precision X/Y/Z: ± 20 µm

Repeatability: 20 µm

Harmonic Drive Transmission

Strokes:

B = ± 110°

C = ± 360°

## Rotary axis

Maximum speeds:

B = 37 rpm

C = 44 rpm

Accuracy B/C: 0.015°

Repeatability B/C: 0.01°

Circular

∅ = 400 mm

## Table

(workpiece holding system)

Clamping element fixations: 8 T-slots

Maximum load: 100 kg (w/part holder)

Temperature monitoring sensor

## Computer Numerical Control (CNC)

Version: SIEMENS 840D sl v4.8

Touch control screen display / 19"

Compatibility G-code

## MATERIALS

All deposition parameters are modifiable, including the powder flow rate, deposition speed, and laser powder.

Our Directed Energy Deposition machines allow the use of many different types of metal powders. Here are some of our machine tested materials:

- Ti64
- Stainless steel 316L
- Stainless steel 17-4PH
- Maraging steel 300
- H13
- Inconel 625
- Inconel 718
- Hastelloy X
- R&D possible for other alloys

Deposition head 10Vx	Deposition width: 0.8 to 1.2 mm
	Deposition accuracy: $\pm 0.1$ mm
	Average deposition rate: 15 to 20 cm <sup>3</sup> /h
	Laser power range: 200 – 500W
	Optical fiber: Ytterbium
	Spot diameter: 200 $\mu$ m
Powder delivery system	Laser wavelength: 1070 nm
	Laser power stability: $\pm 1\%$ (typical) / Max. $\pm 3\%$ over 4 hours
	Cooling: chiller air/air
	Powder feeder technology: vibration
	Number of feeders: 2 (2 more optional)
	Capacity: 2.5 L (~ 13 kg of standard steel)
Filtration and passivation	Flowrate: 1 to 30 g/min
	Flowrate stability: $\pm 5\%$
	Automatic unclogging system
	Calcium carbonate passivation of residue
	For reactive material:
	High level safety
Controlled atmosphere	Better material metallurgical health
	Purification unit: 2 reactors (columns) with automatic scan/ purification cycle management
	Glove box on the front door
	Accurate measurement and traceability of O <sub>2</sub> and H <sub>2</sub> O levels (ppm)
	Antechamber to load/unload small parts while maintaining the controlled atmosphere
	Max. concentration levels:
Antechamber	O <sub>2</sub> : 40 ppm
	H <sub>2</sub> O : 50 ppm
	Regeneration time: 15 hours per columns
	Automatic door
	Internal dimensions: $\varnothing 300$ x 400 mm
	Max. load : 10 kg

## OPTIONAL UPGRADES

Deposition head 24Vx	Deposition width: 1.8 to 2.2 mm
	Deposition accuracy: $\pm 0.2$ mm
	Deposition rate: 90 to 130 cm <sup>3</sup> /h
	Laser power range: 400 – 2000W
	Optical fiber type: Ytterbium
	Fiber diameter: 600 $\mu$ m
Automatic tool changer	Laser wavelength: 1070 nm
	Laser power stability: $\pm 1\%$ (typical) / Max. $\pm 3\%$ over 4 hours
	Cooling: chiller air/water
	With the integration of:
Touch probe	10Vx deposition head
	24Vx deposition head
	Touch probe system
	Renishaw RMP40

## IN-HOUSE DESIGNED NOZZLES. THE CO-AXIAL DIFFERENCE.

Our in-house designed nozzles achieve a smoother finish, with better meltpool control, and less overspray for minimal post processing. Two different nozzles can be mounted on our DED machines: the 24Vx for productivity with up to 2.2mm width, and the 10Vx, perfect for working on fine parts with a deposition 0.8 to 1.2 mm deposition width.



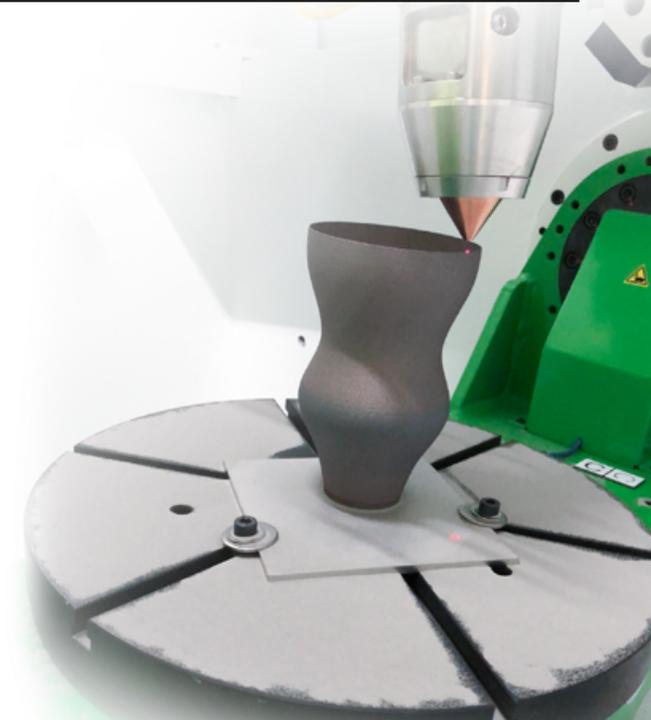
## CONNECTIONS

<b>Electrical</b>	Voltage: 400 V – 50 Hz or 460 V – 60 Hz
	Power: 62 kW
<b>Extraction</b>	Current: 110 A
	3 filtration levels: prefilter, HEPA and chemical filter
	Flowrates:
	Ambient: 300 m <sup>3</sup> /h / 10590 ft <sup>3</sup> /h
<b>Environment</b>	Controlled atmosphere: 300 m <sup>3</sup> /h / 10590 ft <sup>3</sup> /h
	Temperature: 15 to 25°C
	Humidity: 30 to 60%
	Type: Argon
<b>Gas</b>	Min. purity: > 99.95% mini
	Recommended purity: > 99.998%
	Consumption:
	Purge / prod.: < 12 m <sup>3</sup> /h / 423.8 ft <sup>3</sup> /h
	Purification: 2 m <sup>3</sup> /24h / 247.2 ft <sup>3</sup> /24h
	General pressure: 6 bar / 87 psi (pressure reducer integrated)
Regeneration pressure: 1 bar / 14.5 psi	

### INERT CHAMBER

The inert chamber in our Directed Energy Deposition machines enables the use of reactive powders.

This feature makes our DED machines one of the few on the market capable of producing both titanium and aluminum parts.





## A GOLD STANDARD OF SERVICE

When you choose AddUp, you're choosing a partner who will be with you every step of your journey. Experience best in class safety on a repeatable, reliable platform, with support at every stage to realize the full potential digital manufacturing has to offer.

### BEFORE PURCHASE

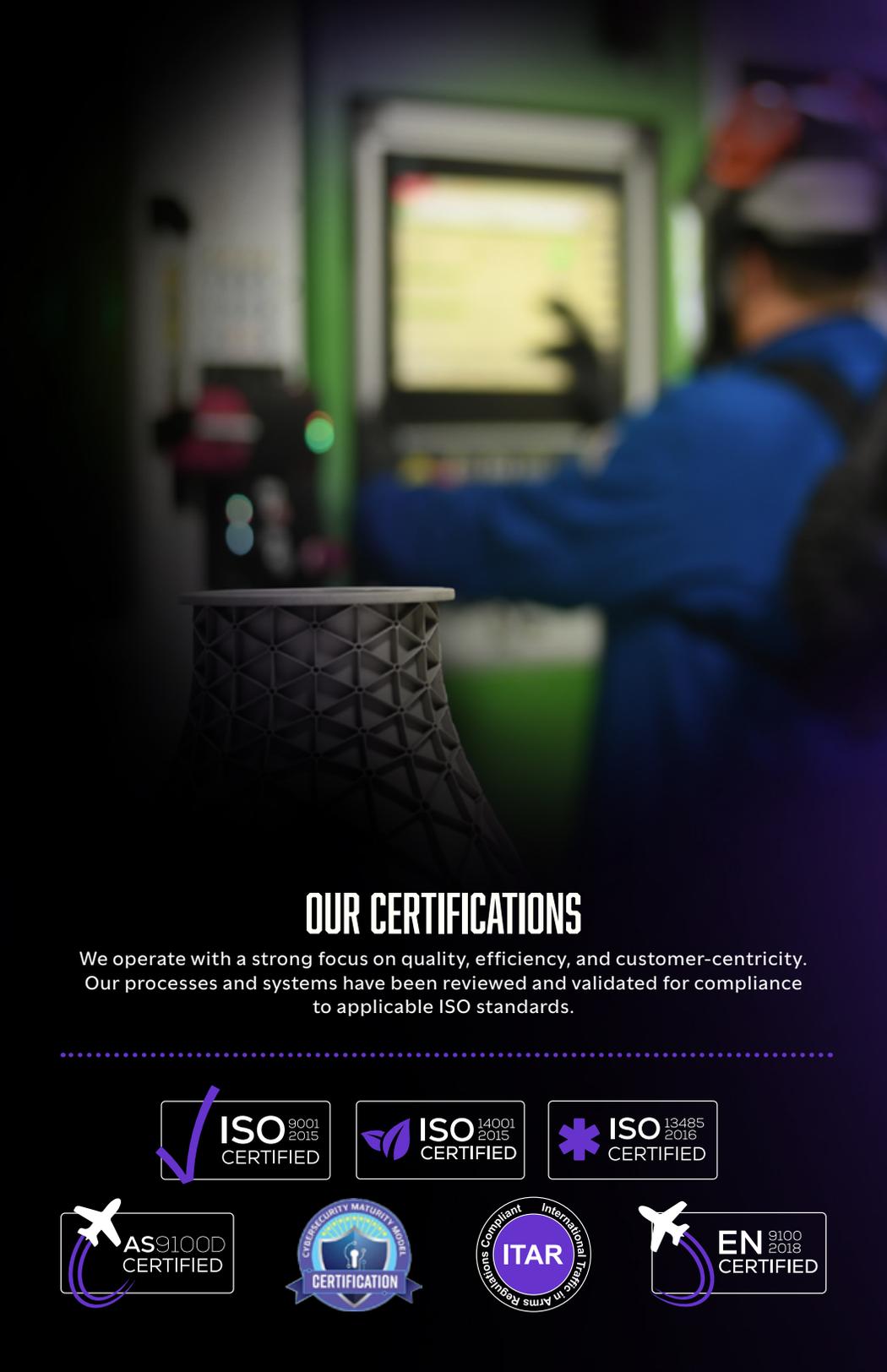
- Acquire basic knowledge in metal additive manufacturing
- Optimize parts for the L-PBF or DED process
- Produce your proof of concept
- Calculate your ROI and consolidate your business model
- Evaluate with on-site inspections
- Define your future additive manufacturing workshop

### AFTER PURCHASE

- White-glove installation service to get you up and running in less than 2 weeks
- Operator training adapted to your employees
- Support services for the qualification of your application

### AFTER INSTALL

- Rapid response times
- Maintenance contracts adapted to the needs of your business
- Spare part kits that allow you to restart quickly
- Process experts and application engineers available
- Material development services
- Support as your business grows by upgrading equipment
- A pathway to fully automate your AM workshop



## OUR CERTIFICATIONS

We operate with a strong focus on quality, efficiency, and customer-centricity. Our processes and systems have been reviewed and validated for compliance to applicable ISO standards.



# CONNECT



AddUp Solutions



AddUp Solutions



addupsolutions.com

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