LINCOLN ELECTRIC | Additive Solutions

SculptPrint 1500

Robotic Wire-Arc Additive Manufacturing System

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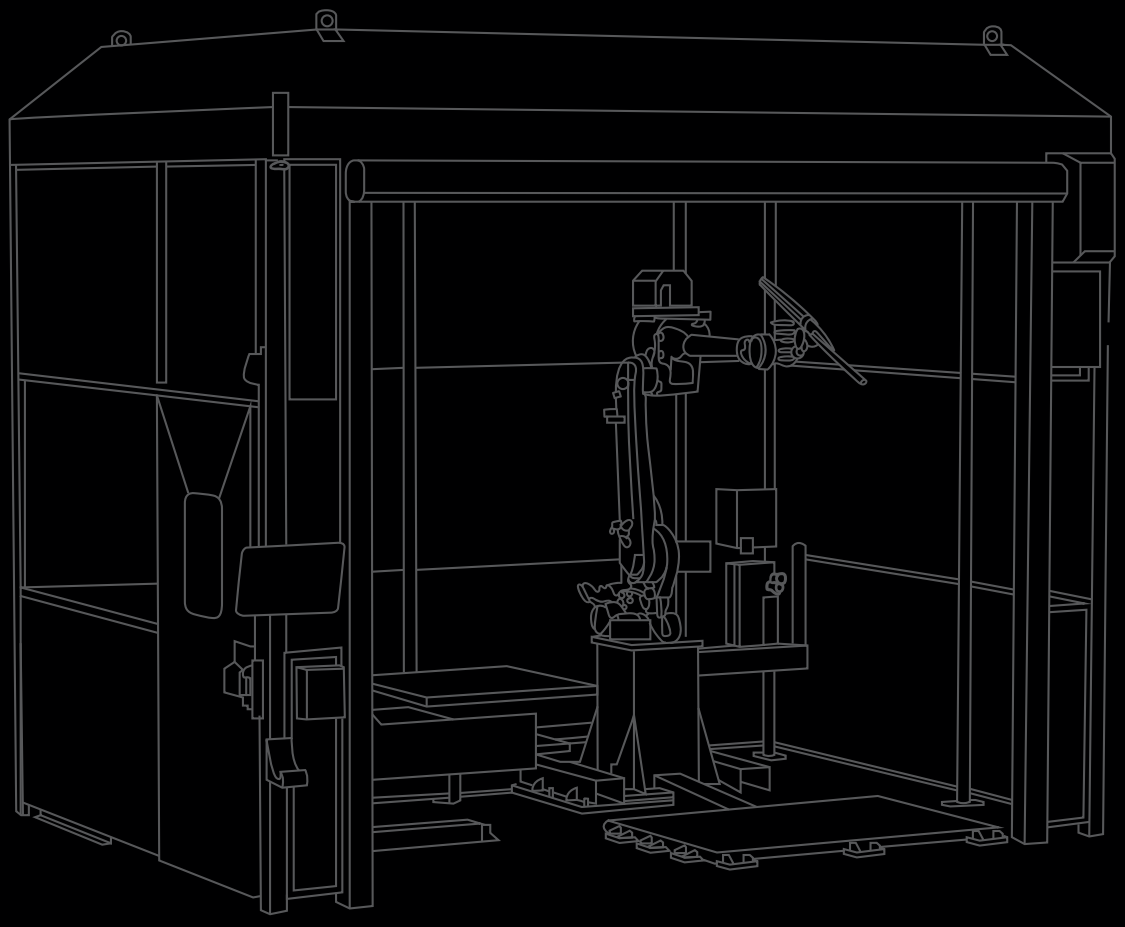
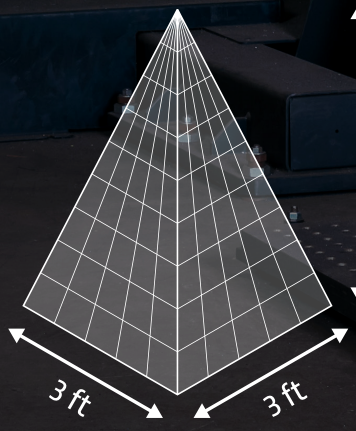
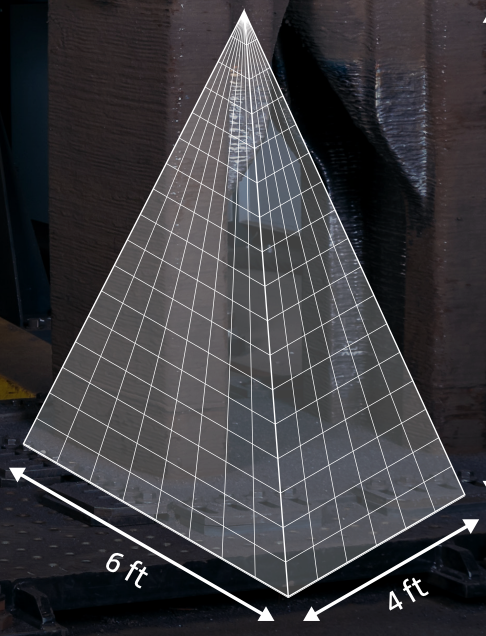


MAKE **BIG** PARTS IN **LESS** TIME



Positioner Build Envelope



Floor Build Envelope

About the SculptPrint 1500 System

Industrial-scale metal additive manufacturing requires precision, reliability, and efficiency. The Lincoln Electric® Additive Solutions SculptPrint™ 1500 system is a turnkey robotic wire-arc additive manufacturing (WAAM) system designed to produce large-scale metal parts, tooling, and sub-assemblies with unparalleled speed and accuracy. Powered by Lincoln Electric's industry-leading welding, automation, and software technologies, this system offers a fully integrated solution for aerospace, defense, energy, heavy industries, shipbuilding, and other industrial applications.

With advanced path-planning software, real-time process monitoring, and an extensive build envelope, the SculptPrint 1500 system enables manufacturers to push the boundaries of large-scale 3D metal printing.

System Footprint (L x W x H): 207 x 188 x 173 in (526 x 478 x 440 cm)
Total System Weight: 17,820 lbs (8,083 kg)

MATERIAL COMPATIBILITY

The SculptPrint 1500 system comes pre-configured for use with the following Lincoln Electric wire feedstocks:

- **Steel:** Low-Carbon & High-Strength, Low-Alloy
- **Stainless Steel:** 316LSi, 410NiMo, 17-4 PH
- **Nickel:** Alloy 617, Alloy 625
- **Copper:** Copper-Nickel 70/30

KEY ADVANTAGES

Designed for industrial-scale 3D metal printing, the SculptPrint 1500 system delivers precision, consistency, and high throughput. Its large build envelope, automated layer height control, and seamless software integration deliver large-scale metal parts with reduced waste, shorter lead times, and expanded design freedom.

INDUSTRIAL-SCALE BUILD ENVELOPE

PROVEN WAAM TECHNOLOGY

HIGH-QUALITY MATERIALS

AUTOMATED PRECISION

SEAMLESS OS INTEGRATION

ROBUST & SCALABLE

System Overview

The SculptPrint 1500 system comes equipped with advanced automation, welding, and sensor technology to ensure precision, reliability, and ease of operation. See the following pages for details on all of the system's components.

STANDARD SYSTEM CONFIGURATION

PROCESS EQUIPMENT

- ABB® IRB 4600-40/2.55 6-axis Robot Package
- Lincoln Electric ANNEX® SkyHook 1500 Positioner
- Lincoln Electric Floor Build Platform
- Lincoln Electric Positioner Build Platform
- Lincoln Electric Power Wave® R450 Robotic Power Source
- Lincoln Electric Power Wave STT® Process Module
- Lincoln Electric Cool Arc® 55 Water Cooler
- Lincoln Electric AutoDrive® 4R220 Wire Drive
- Lincoln Electric Magnum® PRO Water-Cooled Robotic Torch
- Lincoln Electric POWER REAM® II Robotic MIG Welding Torch Maintenance Center

SENSORS & CONTROLS

- Lincoln Electric Premium Cell Control HMI
- ABB BullsEye® Tool Center Point (TCP) Calibration System
- Laser Spot Guiding System
- Digital Infrared (IR) Temperature Sensor
- Lincoln Electric Thru-Arc™ Layer Height Control

SOFTWARE

- Lincoln Electric SculptPrint OS

SERVICES & MISCELLANEOUS

- Equipment documentation package
- System setup and functional testing
- System installation supervision
- On-site training
- Remote support

STANDARD PAINT COLORS

Robot	Lincoln Electric Red
Control Cabinets, Push-Button Stations & J-Boxes	Hoffman Pebble Gray Computer Beige
Fabricated Components	Lincoln Electric Black
Purchased Components	Manufacturer's standard color and finish
Perimeter Fence Posts	Lincoln Electric Black
Perimeter Fence Solid Panels	Lincoln Electric Gray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LINCOLN ELECTRIC
AUTOMATION

Equipment Specifications

The SculptPrint 1500 system comes equipped with advanced automation, welding, and sensor technology to ensure precision, reliability, and ease of operation.

ABB IRB 4600-40/2.55 6-AXIS ROBOT PACKAGE

- ABB IRB™ 4600-40/2.55 Six-Axis Robot
- ABB IRC5 Controller
- ABB Absolute Accuracy

SPECIFICATIONS

Reach	**Repeatability**
100.4 in (2,550 mm)	0.002 in (0.06 mm)
Payload Capacity	**Power**
88 lbs (40 kg)	480V, 3-phase

LINCOLN ELECTRIC ANNEX SKYHOOK 1500 2-AXIS SERVO POSITIONER

- Dual-axis machine with axes situated perpendicular to each other
- Fully coordinated motion between robot and positioner axes

SPECIFICATIONS

Maximum Load	**Maximum Torque**
3,300 lbs (1,500 kg)	5,204 lb-ft (7,056 Nm)
Swing Radius	**Turn Radius**
15.75 in (400 mm)	31.5 in (800 mm)

LINCOLN ELECTRIC POWER WAVE WELDING PACKAGE

- Lincoln Electric Power Wave R450 Robotic Power Source
- Lincoln Electric Power Wave STT Process Module
- Lincoln Electric Cool Arc 55 Water Cooler
- Lincoln Electric AutoDrive 4R220 Wire Drive
- Lincoln Electric Magnum PRO Water-Cooled Robotic Torch

SPECIFICATIONS

Power Output (100% Duty Cycle)	**Power Output** (40% Duty Cycle)
450A	550A
Wire Drive Size Range	**Wire Drive Speed Range**
0.023 - 0.0625 in (0.6 - 1.6 mm)	30 - 1,200 in/min (0.8 - 20.5 m/min)

LINCOLN ELECTRIC POWER REAM II TORCH MAINTENANCE CENTER

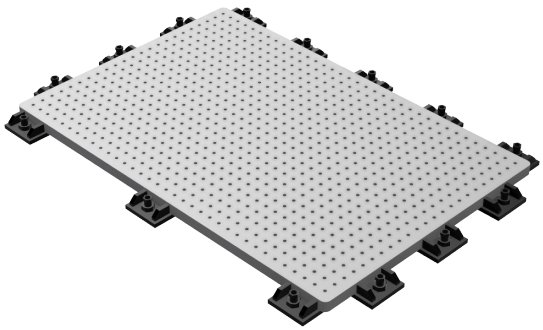
- Air reamer to clean nozzle and contact tip
- Clamp for firm location and alignment of torch during reaming
- Anti-spatter fluid applicator
- Wire cutting unit

ABB BULLSEYE TCP CALIBRATION SYSTEM

- Automated calibration of Tool Center Point (TCP)-based robot tools
- Automated tool position and angle adjustment to ensure path repeatability

LINCOLN ELECTRIC FLOOR BUILD PLATFORM

- Machined surface
- Steel plate to minimize distortion
- Grid pattern with threaded holes
- Ground pickup stud for hot wire process
- Six anchor points with leveling capacity



SPECIFICATIONS

Dimensions (L x W)
48 x 72 in (1,219 x 1,829 mm)

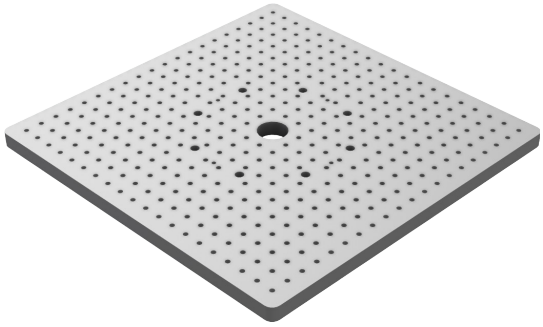
Plate Thickness
2 in (50.8 mm)

Threaded Hole Size
1/2 in - 13 UNC (M14-2.00 UNC)

Grid Pattern Spacing
3 in (76.2 mm)

LINCOLN ELECTRIC POSITIONER BUILD PLATFORM

- Machined surface
- Steel plate to minimize distortion
- Grid pattern with threaded holes



SPECIFICATIONS

Dimensions (L x W)
42 x 42 in (1,067 x 1,067 mm)

Plate Thickness
2 in (50.8 mm)

Threaded Hole Size
1/2 in - 13 UNC (M14-2.00 UNC)

Grid Pattern Spacing
3 in (76.2 mm)

SculptPrint™

Software Specifications

The SculptPrint OS software is the brain behind the SculptPrint 1500 system. Developed by Lincoln Electric, this proprietary software simplifies complex path planning and offers advanced process control, supporting both novice users and experienced additive manufacturing professionals. Simply import your CAD file, select your Lincoln Electric wire feedstock, verify and inspect the toolpath, and send it to the robot.

FEATURES

- **CAD-to-Path Workflow:** Streamlines part preparation with minimal user intervention.
- **Universal File Compatibility:** Import STL and STEP file formats.
- **Path Planning:** Uses voxel-based logic and supports non-planar layer and surface deposition.
- **Pre-Configured Settings:** Includes procedure settings for Lincoln Electric wire feedstock. Select the pre-configured alloy, and the software does the rest.

SYSTEM REQUIREMENTS

GPU

NVIDIA Quadro® or NVIDIA GeForce® and accompanying driver with CUDA® 11.0+ and OpenGL 4.3+ support

CPU

Multi-core processor (the more cores the better)

RAM

≥ 64 GB

Storage

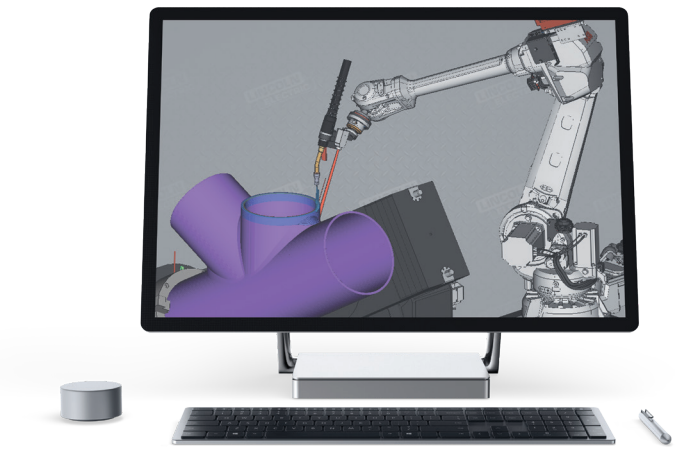
Solid-state drive with ample capacity

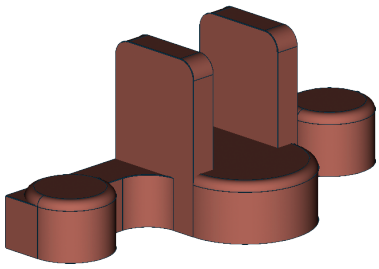
Operating System

Windows® 10 64-bit or newer

LICENSING & SUPPORT

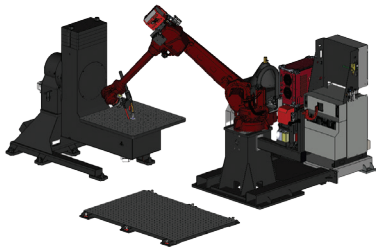
- Three lifetime licenses for the current software version at the time of purchase included
- Additional three-pack licenses available for purchase
- Annual software maintenance agreement available to obtain updates and support beyond the first year





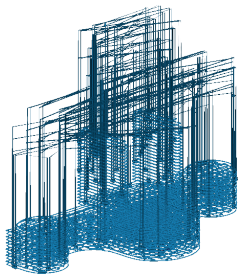
IMPORT CAD MODEL

Start by importing the part geometry as a STP/STEP or STL file. This serves as the foundation for toolpath planning and print setup.



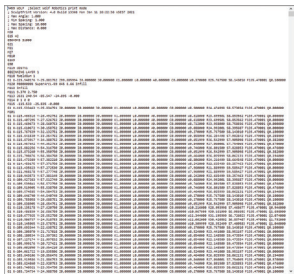
SELECT ROBOT & WIRE FEEDSTOCK

Select the robot you will print with, then choose from pre-configured wire feedstock options.



GENERATE TOOLPATH

The slicing software creates a structured deposition path from the CAD model, taking into account part geometry, layer height, bead width, and build strategy.



GENERATE G-CODE

The toolpath is transformed into G-code, which directs the robot's motion, travel speed, and parameters during the printing process.

PRINT YOUR PART

The robot follows the G-code to deposit molten metal layer-by-layer, producing a strong, near-net-shape part ready for post-processing.

Services & Documentation

Lincoln Electric provides a comprehensive services package with your SculptPrint 1500 system purchase to ensure a swift installation and maximize operational efficiency once the system is up and running.

SYSTEM SETUP & FUNCTIONAL TESTING

- Layout and cell setup
  - Miscellaneous hardware
  - Cell assembly
  - Software loading
- Wiring and labeling per Lincoln Electric specifications

INSTALLATION SUPERVISION

- Equipment will be installed at customer's facility
- Up to 80 hours of installation supervision
- Up to 40 hours for system runoff

CUSTOMER-PROVIDED ITEMS

a. All labor and material to locate, install, anchor, and align the Lincoln Electric-supplied equipment. *Only* installation supervision is to be supplied by Lincoln Electric
b. All required utilities, wireways, ducts, conduits, hangers, etc., as well as labor and material to connect all services

REMOTE EQUIPMENT SUPPORT

- Lincoln Electric will provide one year of remote support after installation and runoff. Additional remote support can be purchased at a later date.

DOCUMENTATION

- **Robot & Controller Manuals:** Provides information on installation, preventative maintenance, troubleshooting, and how to carry out repairs on the mechanical arm and controller.
- **Robot Programming Manual:** Reference manual containing a detailed explanation of the programming language, as well as data types, instructions, and functions.
- **Operating Manual:** Provides the user with step-by-step instructions on how to perform various tasks, such as how to move the robot manually, how to program, and how to start a program when running production.
- **Peripheral Equipment Manuals:** Product manuals provided by the OEMs of other integrated equipment (power supply, torch, torch cleaner, etc.)

Facility Requirements

For optimal performance and seamless integration into your industrial environment, the system requires the following:

Power (configurable for international requirements)

480V, 3-phase
45A main power supply, 20A for robot

Shop Air

80 PSI (5.5 bar)

Shielding Gas

Per material specifications

Flooring

Concrete
Minimum thickness of 5 in (127 mm)

Foundation

Reinforced concrete
Minimum thickness of 6 in (152.4 mm)
Minimum strength of 3,000 PSI (207 bar)

Why Lincoln Electric Additive Solutions?

For over 130 years, Lincoln Electric has been at the forefront of welding, automation, and advanced manufacturing innovation. With deep expertise in large-scale 3D metal printing, software development, and metallurgy, we bring trusted, industry-leading solutions to your business.

LEARN MORE

For pricing, demonstrations, and technical consultations, contact Lincoln Electric Additive Solutions at additive.lincolnelectric.com.

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

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